

# The European Economy: From a Linear to a Circular Economy

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**Abstract:** For quite some time a profound preoccupation for many economists, politicians, environmentalists, sociologists or philosophers looking towards the coming decades consisted in searching for a new paradigm of development and growth that is feasible within the given limits of planet Earth. There are already widely accepted concepts like “sustainable development” or “low-carbon economy” that seem right but not enough. Such concepts seem to address the effects and not the causes. In this paper we analyze a broader approach that places human activity into a long term historical perspective, namely **the circular economy**. This new development paradigm, supported by the European Union, is, in fact, an “old” one moved upwards on a dialectical spiral so that it connects and resonates with the spirit and realities of our times. The conclusions reflect optimism concerning the success in large scale implementation of the circular economy concept in the European Union and worldwide and thus in taking advantage of opportunities rather than wasting resources by opposing the ineluctable changes.

**Keywords:** development paradigm, linear economy, circular economy, European economy, spirit of our times.

**JEL classification:** A13, B15, B25, F63, O33, O44.

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## Historical models and concepts regarding economy and society: Some past and present concerns on the not so clear and bright future of humankind

Doubts on the future of modern (Western style) economy and society have been expressed in various forms since Malthus<sup>2</sup> but more recently, in the 20<sup>th</sup> century, they got more substance since the oil shocks of the early 1970s and, on a conceptual level, since the publication in 1972 of the first report on the Club of Rome – The Limits to Growth<sup>3</sup> which was regarded as “one of the most influential books of the 20<sup>th</sup> century”<sup>4</sup>. This report that

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<sup>2</sup> In 1798 Thomas Robert Malthus published his work “An Essay on the Principle of Population” in which in essence he stated that the growth of population would lead to poverty.

<sup>3</sup> Donella H. Meadows, Dennis L. Meadows, Jorgen Randers and William W. Behrens III, (1972) *Limits to Growth*, New York: New American Library.

<sup>4</sup> Ian Johnson, Secretary to the Club of Rome, in Foreword to *Limits to Growth Revisited* by Ugo Bardi, Springer Briefs in Energy, page 9

attracted equal amounts of attention and criticism presented the fact, that a linear, infinite increase in production and prosperity is simply not possible in a world with finite resources. To be scientifically accurate we have to mention that the previous statement assumed that humankind uses the current technological resources and that we do not access in the near future things like nuclear fusion, anti-gravity or total genetic engineering capabilities.

Later, in 1980, Jeremy Rifkin published “Entropy – A New World View”, a book in which he pointed out (among other things) the historical character of the linear, ever increasing, model of development<sup>5</sup>. In a convincing manner Rifkin reminded his readers that even if it may seem amazing today, before mid-18<sup>th</sup> century (at least in the Western world) the representation of history had been that of a decline from a “Golden Era” to a dire present. This representation had been accepted in the Greek and Roman antiquity, as reflected in the works of Hesiod and Ovid, as a gradual decline from a Golden Age to lesser and lesser ages of Silver, Bronze and Iron. Even in the Christian view, as presented in the Bible, the passage of time reflected a decline from the Garden of Eden to a mortal existence of hardships and penitence.

What is therefore interesting is the fact that for more than a millennium the Western world had a vision in which the distant past had been better than the present and the human existence as well as the nature itself had been characterized by the cyclicity of seasons (which describes in fact a “circular” movement). Therefore, for a long time, measured in centuries, in the Western world the future seemed either worse than the past or, at best, the same as the past, marked only by the phases and cycles of nature.

This millennium long understanding of humankind had been replaced in 1750 by the “modern” concept of linear progress in which the future is by definition better than the past (due mainly to an accumulation of wealth, knowledge and experience) and the human condition is ever increasing and improving its status for a majority if not for all the people.

Very few concepts have a birth date as clear as this concept of linear improvement of human life and we owe this concept to Jacques Turgot who published in 1750 his work named “A Philosophical Review of the Successive Advances of the Human Mind”. The linear progress model found its solid base and growth in the Newtonian physics, in the first industrial revolution and in the global expansion and success of capitalism. Even the emergence of Marxism and then of the Socialist block contributed to the support of this linear progress model because Socialism was based on the materialist-dialectical approach that, in its turn, was linear and Newtonian (that is mechanistic) in its logic. According to this approach everything had a rational explanation and in order to obtain economic results it was only necessary to properly allocate certain resources.

The post World War II confrontation between capitalism and socialism has been described (leaving aside ideologies) as a matter of economic efficiency and very seldom, if ever, the relation of these economic and social systems with the environment was put into question. In this context the main topics of international debate were “market economy” versus “centrally planned economy”, “private property” versus “collective property”, “democracy” versus “authoritarian leadership”.

The reason why Nature or environment was left aside can be easily understood by looking at the following graph produced by the Global Footprint Foundation. For a long

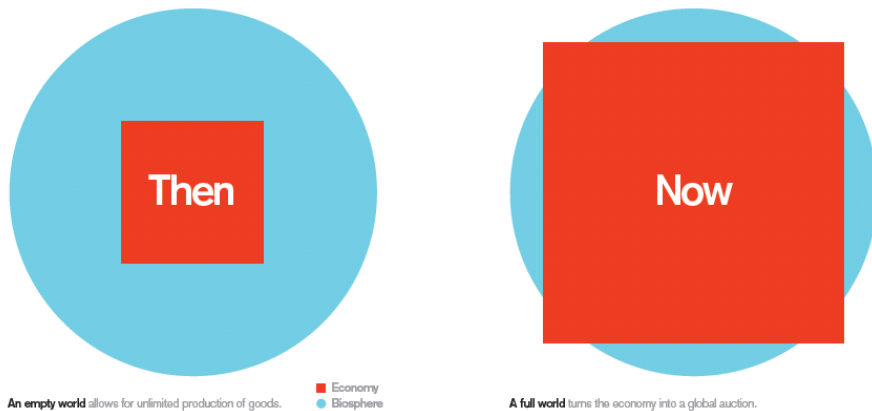
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<sup>5</sup>Jeremy Rifkin, Ted Howard, *Entropy a new world view*, The Viking Press, New York, 1980, pp. 11 – 14.

period of time economy (at a global level) represented a tiny fraction in relation with the global ecosystem. Therefore, in a world where humankind occupied just a small part, the idea of unlimited production seemed possible mainly because it was just theoretical.

In the decades after World War II this proportion occupied by humankind in the global ecosystem dramatically increased and we reached a point in 2010 when the overall needs exceeded by more than 50% the regenerative capacity of the Earth. In this case the continuation of the quantitative increase of resources extracted from environment, of the increase of production (output) sold to the markets and of waste eliminated in the environment became more and more a physical impossibility.

**Figure 1. Relation between economy and biosphere**



Source: Global Footprint, Annual Report 2012, p.21

### **Initial reactions: energy conservation, increase of efficiency, recycling and sustainable development**

As a result of a multitude of signals coming from the economy (mainly because the increasing costs related either to extraction of resources or to environment protection and waste management), from scientists (that could determine long term effects of current industrial activities), from environment aware citizens and non-governmental organizations (that took into account the public interest and the impact of economic activities on health and well-being) after mid 1970s several attempts were made in order to improve the relation between human activities and environment or at least to alleviate the negative implications.

Immediately after the oil shocks of the early 70s, energy conservation became a priority and this translated in some cases into a substantial increase in efficiency. For example, in the developed countries in the 1960s the relation between economic growth and energy consumption growth had been 1:1, while in 1984, after the implementation of energy conservation measures, the relation became 1:0.4 meaning a reduction of over 2 times of the quantity of energy consumed for the production of an unit of economic growth<sup>6</sup>.

<sup>6</sup> Gheorghe Preda, Henry McCarl, Florin Bonciu, *Introducere în economia conservării energiei*, Oficiul de Informare Documentară pentru Industria Construcțiilor de Mașini, SID-91, București, 1988, p.38

The more pragmatic, engineering style approaches related to energy conservation and increase of efficiency in energy use were accompanied in the conceptual field by the emergence of the “sustainable development”, a concept presented first in 1988 by the Bruntland Commission in its Report (“Our Common Future”) for the UN World Commission on Environment and Development.

According to this Report, sustainable development is the “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.<sup>7</sup>

On a more profound level a scientist of Romanian origin, Nicholas Georgescu-Roegen, studied the implications of the entropy law on the economic process and the relation between entropy, value and development<sup>8</sup> and formulated the concept of “bioeconomy” which proposed the transition from the representation of “the world as a mechanical machine” to the representation of “the world as a living organism”<sup>9</sup>. At the same time, Nicholas Georgescu-Roegen stated very clearly that current generations are closely linked with future generations by the long term implications that the present activities have on the living conditions in the future.

These theoretical approaches had relatively little impact on the industry and serious attempts to improve energy efficiency, energy conservation or to limit the negative impact on environment took place only when and where either legislation imposed such measures or when cost arguments transmitted clear signals to decision makers.

In the coming decades after the 1970s there were debates on climate change and global demographic evolution and concerns were expressed on the limited character of natural resources or on the irreversible changes determined by human activity.

More and more people, including significant industrialists, remarked that it is not possible to conceive a continuous increase in the supply and demand of automobiles, TV sets, refrigerators and such as a sign of healthy economy and individual success. In the modern economic framework the rule of the game is based on profit and therefore, success is measured in profit terms. More profit means more sales and more sales means more units produced and sold. But is it possible to continue like this forever?

Beyond any political or philosophical debates there are some hard facts that point to a negative answer. According to Global Footprint Network by 2010 the global economy used the equivalent of 1.5 Earths to provide the resources needed and to absorb or re-integrate the waste that is generated as result of human activity. In other words, Planet Earth needs one year and a half to produce and absorb what is consumed as raw materials and eliminated as waste in one year<sup>10</sup>.

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<sup>7</sup> Report of the World Commission on Environment and Development: Our Common Future, p.16, at <http://www.un-documents.net/our-common-future.pdf>

<sup>8</sup> Nicholas Georgescu-Roegen, *Legea entropiei și procesul economic*, Editura Politică, București, 1979, pp.450-507

<sup>9</sup> Koyo Mazumi, Nicholas Georgescu-Roegen: His Bioeconomics Approach to Development and Change, *Development and Change* 40(6), Institute of Social Studies, The Hague, 2009, pp.1235–1254

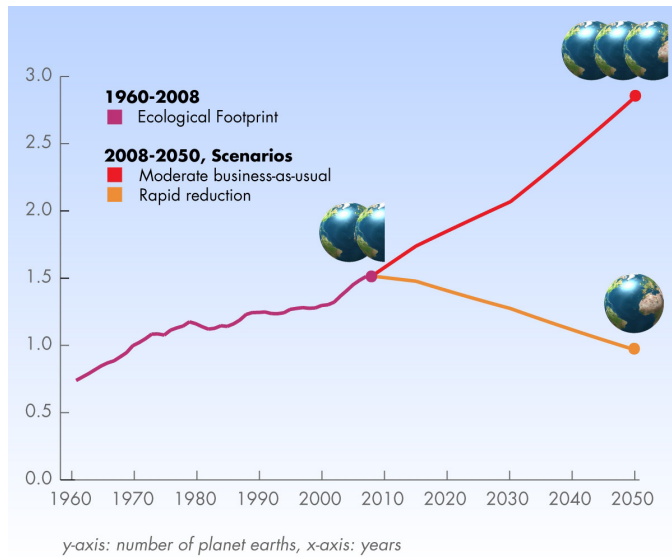
<sup>10</sup> World Footprint - Do we fit on the planet?, at <http://www.footprintnetwork.org/en/index.php/GFN/page/world-footprint/>, read at 03.08.2014

According to the estimates of the United Nations, if the current trends continue by 2030, humankind would need two Earths to function and by 2050 three Earths. A convincing graphic representation of this situation is shown in Figure 1.

The situation gets more complicated due to the fact that globalization determined more and more people worldwide, most notably from Asia, to join the ranks of Western style middle class and therefore to increase their consumption of resources. The research based on 2011 data, shows that if all the people on Earth would live as an US citizen then 4.1 Earths would be necessary<sup>11</sup>.

Starting from this we can say that **the dilemma of our times** is the following: to deny the people outside the Western world the right to enjoy a similar standard of living would be unacceptable according to any ethical standards; to pursue the achievement of this Western living standard for the majority of world population, with the existing technologies, would be impossible given the limited resources of Planet Earth.

**Figure 2. Ecological footprint of global economy**



Source: Global Footprint Network, Footprint basics, [www.footprintnetwork.org](http://www.footprintnetwork.org)

Due to the process of globalization, that dramatically increased the inter-connection and inter-dependence among all actors from the global economy, even if they are transnational corporations, small companies or countries, long term solutions could not be found individually, at whatever level.

<sup>11</sup> Emily Elert, *Daily Infographic: If Everyone Lived Like An American, How Many Earths Would We Need?*, 19.10.2012, at page <http://www.popsoci.com/environment/article/2012-10/daily-infographic-if-everyone-lived-american-how-many-earths-would-we-need>, read on 03.08.2014

A simple example is that in which European Union enacted stronger environment protection regulations that determined large companies to simply relocate to other parts of the world where environment protection is not that strict. Global governance and global regulations may represent a solution for this type of situations but such a solution is not for the near or even foreseeable future.

### **A European Union solution: the circular economy**

The gradual increase of awareness on the soon to be reached limits of the linear economy determined interest for the design of a new model of economic organization that would provide the necessary goods and services for maintaining and improving living standards for more and more people without ever increasing the consumption of raw materials and the quantity of waste ejected into the environment. To call into question the idea of a perpetual economic growth is still a delicate matter. As Tim Jackson observed in his book "Prosperity Without Growth? The Transition to a Sustainable Economy": "Questioning growth is deemed to be the act of lunatics, idealists and revolutionaries. But question it we must."<sup>12</sup>.

The difficulty to question the idea of economic growth as a measure of development has also been proofed by the reaction to the economic crisis that started in several parts of the world in 2008. People expected that sooner or later we would return to growth or, in other words, to business as usual. To think about "prosperity without growth" is difficult because this requires a new frame of mind, a new perspective. And above all it requires us to invest in change, a profound change just like the one that had marked the first industrial revolution.

Fortunately, such a new perspective exists, namely **the circular economy**. It is not the only new perspective and it is not by far perfect and ready to be used out of the box. But it is feasible because it has already been tried by several companies and because it is endorsed by the European Union.

The official position on the European Commission on the circular economy was presented on December 17, 2012 under the name of a **Manifesto for a Resource-Efficient Europe**<sup>13</sup>. This document emphasized from the first paragraph that: "In a world with growing pressures on resources and the environment, the EU has no choice but to go for the transition to a resource-efficient and ultimately regenerative circular economy".

This statement called for a circular economy and society able to provide a way out of the crisis and, at the same time, a way towards the reindustrialization of Europe and towards an efficient growth that will be sustainable.

The circular economy is already applied by a number of representative entities from the business sector<sup>14</sup> and in July 2014 it was also more clearly presented in a Communication

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<sup>12</sup> Tim Jackson, *Prosperity without growth? The Transition to a Sustainable Economy*, Sustainable Development Commission, United Kingdom, 2009, p. 7

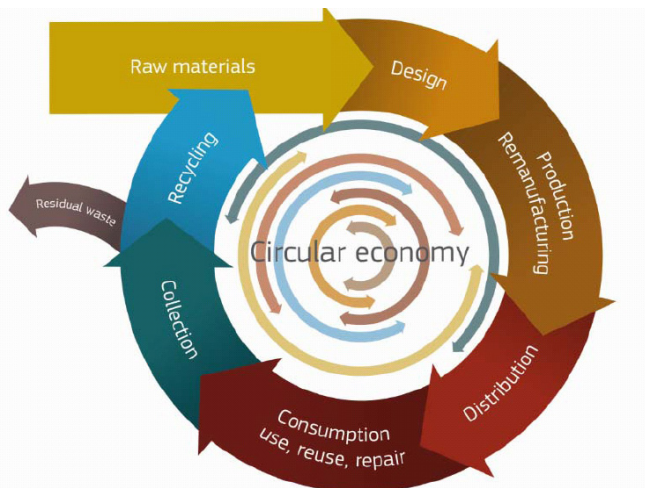
<sup>13</sup> Manifesto for a Resource-Efficient Europe, European Commission Memo 12/989, 17 December 2012, Brussels, p.1

<sup>14</sup> A prominent role in promoting the circular economy is played by Ellen Macarthur Foundation which has as leading partners companies like Unilever, Renault, Kingfisher, Philips, CISCO and McKinsey & Co., <http://www.ellenmacarthurfoundation.org/about/partners>

from the European Commission<sup>15</sup> which refers to a radical change in the perception and use of resources.

In this new perception, resources are no longer something obtained at a cost from the environment **in a linear way** (a linear way means that more production requires more resources obtained from the environment and more waste returned into the environment with disregard of the sustainability of the process) but rather a component of the production process that is designed **in a circular way** (meaning that resources are initially obtained from the environment but afterwards waste becomes itself a resource and it is indefinitely re-cycled in the economic process). The graphic representation of this concept is reflected in Figure 2.

**Figure 2. The Circular Economy**



Source: Towards a circular economy: A zero waste programme for Europe, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Document COM(2014) 398 final, Brussels, 2.7.2014, p.5

The circular economy concept mentioned above **does not refer to a perpetuum mobile**. Energy is indeed consumed in order to put and maintain the economic process in function and waste still exists but both energy consumption and waste exiting the system are orders of magnitude lower than in the current economic and technological processes.

The large scale implementation of the circular economy involves a paradigm shift because it includes all aspects of the social and economic activities<sup>16</sup>. By its comprehensive, all encompassing content, the circular economy differs from earlier, partial attempts concerning only selective collection of waste or individual attempts to recycle or to increase energy efficiency.

<sup>15</sup> Towards a circular economy: A zero waste programme for Europe, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Document COM(2014) 398 final, Brussels, 2.7.2014

<sup>16</sup> Felix Preston, *A Global Redesign? Shaping the Circular Economy*, Chatham House Briefing Paper, March 2012

Firstly, the circular economy would imply the ending to a large extent of the throw away society. Secondly, the circular economy would mean the renunciation of the “make, use, dispose” cycle as a way of organizing production and the transition to a “re-use and recycling” approach. A very brief and simple definition of circular economy is that when “your outputs become your inputs”<sup>17</sup>. According to the European Commission “A circular economy preserves the value added to the products for as long as possible and virtually eliminates waste. The resources are retained within the economy when a product has reached the end of its life, so that they remain in productive use and create further value”<sup>18</sup>.

### **Differences between the circular economy and previous attempts to improve the efficient use of energy and materials**

Some aspects distinguish the circular economy concept from previous attempts to reduce energy and material consumption as well as to reduce pollution under all its forms of manifestation.

**The first aspect** refers to **the holistic approach** that characterizes the circular economy. The circular economy refers to all activities carried out in a society. It starts with the design of products, services and processes. These have to be designed in such a way as to be more durable, repairable and upgradeable, in order to allow remanufacturing and recycling for the same industry or for others. Therefore, the fundamental difference between the circular economy and the linear (existing) economy refers only to some materials and parts that are recycled and consists in the fact that in the circular economy products, services and industrial processes are designed, conceived in a way that allows a longer life cycle and the possibility to be repaired, to be upgraded or to be remanufactured (restored to brand new condition). Besides, from the design phase of products and services it should be taken into account that when their life cycle ends they will represent inputs for other industries.

Such an approach would mean less throw away products (single use products) and more very durable, repairable, upgradeable products. How will this approach fit with the current trends and life styles that put a premium on novelty and encourage consumers to buy new products just because they are new remains to be seen. But even this simple question gives an indication on the difficulty of the implementation of this new approach.

**The second aspect** refers to **the scale** on which, the companies will rely on re-using, recycling and remanufacturing products during their industrial activity. The large scale implementation of such an approach will reduce the energy needed to produce whatever product and will require less raw materials. At the same time, in order to be successful, such an approach will require an intense networking and collaboration among companies from different sectors of activity and among companies and consumers. This aspect also points out the fact that the circular economy will require changes in education, values and behaviors of producers and consumers. From this point of view the difference between the linear and the circular economy is the difference between individual decisions and actions

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<sup>17</sup> Teresa Domenech, *Explainer: What is a Circular Economy?*, 25 July 2014, at <http://theconversation.com/explainer-what-is-a-circular-economy-29666>, read at 01.08.2014

<sup>18</sup> Questions and answers on the Commission Communication “Towards a Circular Economy” and the Waste Targets Review, Memo 14/450, 2 July 2014, Brussels



related to re-using, recycling and remanufacturing and a structured and systemic approach in this direction carried out in a regulated manner at the European Union scale.

If we analyze Figure 2 we can understand that the essence of the circular economy is to maintain and recycle energy and material resources as much as possible within the economic system. In order to have a functioning economic system in an optimal way it is necessary to secure an efficient inter-linkage among industrial processes, various industries and activities. At this point it may be useful to remind the old saying that a chain is as strong as the weakest link. Therefore, we can not have a partial circular economy and, like in case of traffic rules, everybody has to drive by the same rules at the same time in order to secure a fluid traffic without any accidents. Even if such a task may seem gigantic, it is still feasible within the European Union because the mechanism of the single market allows the implementation of rules that are observed by all participants.

From this perspective, the circular economy is feasible as a theoretical model and it is supported by small scale industrial applications that already proved their efficiency. Therefore, the concept is valid from both theoretical and practical points of view. Anyway, this is a necessary but not sufficient condition. It remains to be widely accepted and implemented at the European level and a huge coordination task is required so that various framework programmes and plans (Horizon 2020, Ecodesign Directive, Green Public Procurement, Eco-Innovation Action Plan, EU Environment Action Programme to 2020, to name but a few) act in a consistent and synchronized manner.

**The third aspect** has in view the fact that in order to be functional, the circular economy needs **a specific legislative and institutional framework** that will cover all aspects of economic and social activity. The European Commission is fully aware of this requirement and it already started this long and very intricate process. In order to underline the complexity and implications of this process we can note that only in case of food waste there is evidence that about 30% of all food produced is lost or wasted. The Commission is considering specific measures for tackling this issue but we can not expect a simple solution.

**The fourth aspect** refers to the need of selecting and developing specific indicators that would allow the implementation and further monitoring of the circular economy. While the process is underway, since mid 2014 some possible indicators have been discussed by the European Commission such as: resource productivity measured by GDP relative to Raw Material Consumption (RMC), water use, used finite land resources<sup>19</sup>. Current discussions at the European Commission level have in view an increase of resource productivity by more than 30% by 2030<sup>20</sup>.

### **Circular economy in the European Union: National initiatives and expected results**

While the European Commission is creating the community framework and guidelines for the transition to a circular economy some of the more developed member states have

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<sup>19</sup> Towards a circular economy: A zero waste programme for Europe, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Document COM(2014) 398 final, Brussels, 2.7.2014, pp.13-14

<sup>20</sup> The Circular Economy: Connecting, creating and conserving value, European Commission, 2014, p.2

already implemented national legislation and programmes that may represent best practices to be adopted and adapted to the specific conditions of other EU members<sup>21</sup>.

Some of the most substantial and directly related to the circular economy initiatives are the following:

- Germany set as an objective for the decoupling of economic growth and material consumption since 2002. In 2012 Germany adopted a law that explicitly promoted circular economy and the use of materials in a closed loop.
- United Kingdom has been developing an initiative for promoting circular economy named WARP (Waste and Resource Action Program) since 2000, its received a substantial increase in its scope towards a more global approach in recent years.
- In 2013 France developed a roadmap for the transition to a circular economy and established the French Institute for the Circular Economy. France expects to adapt its national legislation on circular economy by 2017.

European Union as a whole considers that a strong instrument for the dissemination and large scale implementation of circular economy is represented by the expected results obtained by the early adopters, results that can further motivate and attract more and more companies, governments and individuals.

Among these results, three are more notable:

- Stop losing valuable materials. Currently EU economy loses annually about 600 million tonnes of materials despite existing waste management programmes. Taking action in this area will reduce costs, dependence on non-EU suppliers and exposure to high competition for resources at a global level.
- Develop new businesses and create new jobs. This is maybe the most appealing result to be obtained by implementing circular economy. It was estimated that the increase of the resource productivity by 30 % by 2030 will generate over 2 million new jobs while eco-design, re-use and waste prevention may bring net savings of 8% of the annual turnover of EU businesses.
- To improve the quality of life by means of creating a bio-friendly economy and a safer and healthier environment.

We appreciate that European Union has favourable circumstances for setting European economy on a solid path towards the circular economy. The favourable circumstances have in view the keen interest of all member states and EU institutions for the relaunch of the European economy after the crisis, the decision for reindustrialization of Europe, the existence of previous attempts and experiences related to the circular economy that can now be integrated in a systemic approach.

A larger favourable circumstance is represented by the fact that other countries and global organizations are already very active in promoting the circular economy. A representative initiative in this respect is **Circular Economy 100** which is defined as a global platform reuniting global companies, innovators, networks of academics and universities, and regions with a view to accelerate the transition to a circular economy.

Using the advantages of the information society and internet Circular Economy 100 attempts to facilitate this transition by means of three levels of support:

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<sup>21</sup> Questions and answers on the Commission Communication "Towards a Circular Economy" and the Waste Targets Review, Memo 14/450, 2 July 2014, Brussels

- Creating a mechanism for collective problem solving;
- Building a library of best practice guidance to help businesses fast track success;
- Provide a scalable mechanism for building circular economy capabilities within businesses<sup>22</sup>.

The economic motivation for this transition to the circular economy is very significant because according to recent research done by Ellen Macarthur Foundation, the net material cost savings at a global level determined by the adoption of circular economy measures may exceed by 2025 1 trillion US dollars annually<sup>23</sup>.

### **Conclusions: Circular economy as a possible and viable solution for European and global economy in the medium and long term perspective**

The use, implementation and tentative regulation of the circular economy have intensified in the past years, especially in the European Union, marking the end of a more than 100 years old trend characterized by a decline of prices for numerous raw materials, goods and services.

The **circular economy** represents the opposite of the linear economy (model of production and consumption) that has been used on a larger scale during the 20<sup>th</sup> century. The linear model has been defined by the fact that goods and services are produced, sold, used and eliminated as waste once they fulfilled their function<sup>24</sup>.

For many years science and technology allowed for the increase of the efficiency of the linear model and therefore the production of one unit of product or service was possible with a lower consumption of raw materials and energy. Anyway, this increase of efficiency could only postpone the moment when this type of economic system became unsustainable.

By contrast, the circular economy represents an industrial system based on re-use and regeneration at three levels: a) conceptual; b) organizational; c) operational. Within this system the re-use and regeneration are fundamental and intrinsic characteristics and not just additions or improvements of the linear economy. A significant aspect is that the circular economy is based on the study of the non-linear systems, particularly of the living systems. From this point of view, the circular economy concept has an approach similar with that of Nicholas Georgescu-Roegen who, at the beginning of the 1970s, proposed and studied the concept of "bio-economy"<sup>25</sup>.

At present, the good news is that the gradual transition to the circular economy approach has already started in the real world of business where more and more companies realized that the linear model makes them vulnerable at least from two points of view: a) the prospect of the prices increase and the associated vulnerabilities in the supply of raw materials and

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<sup>22</sup> What is the Circular Economy 100? at <http://www.ellenmacarthurfoundation.org/business/ce100>

<sup>23</sup> Towards the Circular Economy – Accelerating the Scale-up Across Global Supply Chains, Vol.3/2014, Ellen Macarthur Foundation, p.11

<sup>24</sup> The circular model – an overview, Ellen Macarthur Foundation, 8 July 2013, at <http://www.ellenmacarthurfoundation.org/circular-economy/circular-economy/the-circular-model-an-overview>

<sup>25</sup> John Gowdy, Susan Mesner, *The Evolution of Georgescu-Roegen's Bioeconomics* Review of Social Economy Vol. LVI No. 2 Summer 1998, p.149

energy; and b) the threat of exhaustion of many conventional resources in a foreseeable future, correlated with the climate change and its consequences.

These two aspects must be put into the global context of the emergence by 2030 of an additional 3 billion people belonging to the middle class, the majority of them located in the emerging economies of Asia, a fact that will open huge sale opportunities but, at the same time, will place equally huge pressure and even unsustainable demands on the existing systems of production and supply with raw materials and energy<sup>26</sup>.

As mentioned above, from the year 2014 perspective, one of the most important aspects related to the circular economy is that this concept is already applied with notable results by a large number of global companies. One of this companies is Renault<sup>27</sup> which uses, among other things, the re-conditioning of auto parts (a process which saves 80 % of energy, 88 % of water and 77 % of material waste in comparison with normal technological processes for obtaining such parts for the first time, from raw materials) and the re-positioning of some of its suppliers of industrial fluids, as suppliers of industrial solutions (a change of approach and of technological process flow, that reduces by 20 % the total cost of operation).

Philips is another significant supporter of the circular economy. Applying this new concept, Philips proposed to the local authorities to deliver to them lighting services instead of lighting products. In this case all technical aspects (maintenance, replacement, modernizing, optimizing) remain in Philips' responsibility and two important consequences result: a) for the beneficiary (local authorities) the organization of municipal services is simplified as they outsource the lighting services; b) for the supplier (Philips) the whole process became more efficient and effective as they integrate vertically the design, production, choice of lighting solution, implementation, maintenance and re-cycling related to this activity.

These two examples show that the circular economy focuses **on optimization of systems and not of components** and therefore makes a very clear distinction between the consumption of materials and the use of materials<sup>28</sup>.

As a result the circular economy proposes a business model in which the economic actors maintain the property on their goods and act as suppliers of services, thus selling the use of products and not the products themselves. This approach makes the producers think and design from the very beginning their products in such a way as to fulfil the requirements of durability, re-usability and bio-compatibility with the environment.

In our opinion, due to these characteristics, the circular economy may be a comprehensive solution for the complex problems existing today in Europe and in the world economy as a whole. The concept is feasible; it can be implemented with existing technologies and capitalizes on the huge potential of the information economy. At the same time, the circular economy concept integrates and acts in a synergic manner with other concepts that are widely accepted such as: sustainable development, low carbon economy and communion with nature instead of conquest of nature.

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<sup>26</sup> Asia 2050 – Realizing the Asian Century, Asian Development Bank, 2011, p.12

<sup>27</sup> Renault as well as Philips are members of Ellen MacArthur Foundation which promotes the circular economy.

<sup>28</sup> Michael Braungart, William McDonough, *Cradle to Cradle: remaking the way we make things*, North Point Press, 2002

The European Union initiatives regarding the circular economy have all chances to be successful because they aim at assisting a process already initiated and partially implemented by significant representatives of the business sector, being at the same time in resonance with other strategies such as Europe 2020 and with a large public support for environment friendly and sustainable development.

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