EUGOV

Working paper No. 30/2011

Ideas, Possibilities and Limitations of Sustainable Economic Policy – the Example of Ecological Economics

Kajetan Stransky*

* Master's Student in Economics, Vienna University of Economics and Business Administration.
E-mail contact: kajetan.stransky@wu.ac.at

Stransky, Kajetan (2011), Ideas, Possibilities and Limitations of Sustainable Economic Policy – the Example of Ecological Economics, EUGOV Working Paper, No. 30, 2011, Bellaterra (Barcelona): Institut Universitari d'Estudis Europeus.

Ideas, Possibilities and Limitations of Sustainable Economic Policy – the Example of Ecological Economics

Abstract

As the support of economic growth constitutes a main target of economic policy making, it must be noted that this kind of growth is naturally limited by a finite planet. This paper argues that from the viewpoint of intergenerational justice, the realization of a concept of de-materialisation and, as an effect, of a non-growing economy (in a sense of absolute de-coupling of economic growth and energy and material consumption) can be justified. Therefore, growth can also be understood as primarily enhancing quality of life instead of expanding sheer quantities of output. Hence, a drastic reduction of material throughput is required, especially within the countries of high income. After presenting some critique of the proposed approaches, the focus of this article will be drawn onto arguments why future economic policy should be labelled as "ecological" and, then, options of putting into action the ideas from the presented theoretical framework into manageable policy tasks will be discussed. Here, it will be argued that the classic approach of internalizing external effects often followed by orthodox economic policy making is not fully capable of reflecting ecological changes in the price structures of markets. Therefore, formal (industrial and consumer policy setting) and informal institutions (households) are representing pivotal points of sustainable economic policy, pointing at individual as well as collective responsibility to fill in this substantial gap.

Introduction

In order to achieve the main aims of economic and social policy, the economic growth seems to be the crucial and essential condition. Considering the fact that our planet is finite and the realistic judgement that not all the economies of the world can be put on a similar resource-intensive growth path following today's countries with high income, it is essential not to reduce the economic growth to a sheer expanding of output. We have to bear in mind the finiteness and restricted receptive capacity of our planet when elaborating on economic policy agendas. This perspective was once harshly criticized by industrial and employer associations as over-emphasizing regulation regimes, "green growth" has also found its proponents in these circles – along the targets of improving energy efficiency and support for renewable energy sources, this kind of growth also constitutes a considerable source of employment.[1]

However, coherent economic policy is not only made out of suggestions for practical solutions of economic matters but also requires an understandable background in well-founded (socio-)economic theories. The development of ecological growth theories dealing with environment-agreeable economic growth has made dramatic improvement during the 1970s. Some of the pillars laid out during this decade were being discussed, improved and re-considered since then up to now and are even arising in today's debates, especially after the events of Copenhagen Summit in 2009 (Arbeitsgruppe Alternative Wirtschaftspolitik 2010, 186). Therefore, this paper presents different approaches to the problem of combining "need for growth" and ecological restrictions and their applicability in economic policy.

Part 1 elaborates the approaches from ecological economics and their various lines of thought aiming towards the reduction of material and energy consumption. The reason for the selection of these theories is to emphasize their special role in the field of ecological economics. At the same time, some differences to (neoclassical) environmental economics will be worked out. The second part of the paper demonstrates some critiques of the presented concepts. Consequently, an evaluation of the contributions of these approaches regarding the progress of applied economic policy will follow whereas section 3 renders the main results and presents the drawn conclusions.

[1] http://derstandard.at/1289608305642/Die-Arbeit-der-Zukunft-ist-gruen (accessed on 12. 6. 2011)

1. The idea of a sustainable economy and some of its developments

1.1 Welfare-theoretical basis

An answer to the question, whether a stationary status of an economy is somehow possible under the given conditions of growth dynamics from doing business and the system of institutions depending on it (Luks 2000, 12), cannot be found in a theory of justice, but the legitimacy of its arising can be justified.

A turning point of the approaches to ecological economics presented in the following section is represented by the doubt about the potential of being able to guarantee for future satisfaction of needs. From differing definitions on welfare and utility and in a sense of sustainable development, it can be derived that future generations should be in the same position as the current one to follow welfare-enhancing activities. Here, the central issue is to preserve the potential for development (Ibid., 13). Out of an economic policy point of view, sustainable development can be described as a triple target: The familiar aims of programs in economic policy are a stable economic development and an internalisation of distributional conflicts – moreover, the needs of future generations are to be taken into account. Since the preservation of the ecological sphere is one prerequisite among others for following those aims, the conservation of natural basics for living, is a secondary target (Ibid., 14 et seq.). Hence, it is not about promoting intensive regulations founded on ideas with a strict focus on ecology, but to present new perspectives for the necessary advancement of the productive sphere in connection with the claim for intra- and intergenerational justice. Even in an economy with high income, where services make up the largest part of the gross domestic product (GDP), the processes creating value added cannot be seen as isolated from their biophysical basis (Luks 2001, 25).

In the middle of the 1990s, a quarter of transfers of material could have been rooted in the services sector. This fact underlines the dependency of services production from physical output (Hinterberger et al. 1996, 96). Therefore, the expectations about realization of human capacities to transform intergenerational, sectoral and international distributional conflicts into “simple” technical solutions, proved unreasonable. First of all, the decisions made in politics and in the economy have to be reflected along with lifestyles and consumption patterns individuals got used to (Arbeitsgruppe Alternative Wirtschaftspolitik 2010, 185).

The cornerstone of founding a definition of intergenerational justice is represented by John Rawls' "Theory of Justice". He describes his view on an asymmetric relationship between current and future generations as follows: The individuals of the current generation are, with respect to the following generations, only occupied by their current interchange, which of course can only be observed in one direction.[2] Hence, it is important to consider how institutional arrangements are coping with natural barriers and the usage of historically given possibilities. Persons with a certain age are to the same extent responsible for younger and older generations as well as for people with the same age, regarding their rights and obligations. The range of manoeuvre for the current generation is constrained by principles founded in the situation of origin ("primeval situation" under the "veil of ignorance", KS) (Rawls in Luks 2000, 17). From that, it follows that there is an obligation for sustainable development. A non-sustainable development would challenge the basic assumption of Rawls, which says that for the definition of principles in the primeval situation, the security of existence of an individual has to be guaranteed, for the following simple reason: Economic development could seriously challenge the living conditions of all beings on our planet. Therefore, only a dignitary basis of existence for future generations can free their capacities for reflecting about socio-economic development paths (Luks 2000, 17 et seq.).[3]

1.2 The connection between economic growth and material and energy throughput

One of the first and best-known propositions about how an economy in a steady-state could look like is to be found in the "Club of Rome"-Report about the limits to growth (Meadows 1972). In this report, controversially debated computer simulations show that within half of a century, a growth frontier can be reached. To overcome this frontier, a new ecological and economic equilibrium is to be reached, which can only be possible, among other things, with a restriction of material throughput within the economy. This study has had a major impact on further publications in the field of ecological economics (Luks 2001, 31 et seq.). Moreover, it helped the discourse on sustainability to be flourishing not only within marginalized media. And, the question about a possible synthesis of economic growth and limited resources has been a strongly debated issue within the UN for a long time before the period around the conference of Stockholm held in 1972. This lead to the

[2] From this conclusion, an obvious asymmetry of power derives: The current generation can influence the living conditions of the future generations, but they cannot influence ours. See the interview with philosopher Lukas H. Meyer at http://derstandard.at/1289608901177/Un-Gerechtigkeit-Auch-kuenftig-lebende-Menschen-haben-Rechte (accessed on 12. 6. 2011.).

[3] Maximizing utility based on a utilitarian theory, however, provides – along with the ignorance of preferences of future generations - no answer to the question of who might be compensated according to the Kaldor-Hicks-Criterion (which postulates a compensation of those individuals who are loosing surplus in favour of others, to assure a Pareto-improvement, KS) (Spash 2008, 271).

foundation of the " World Commission on Environment and Development" (WCED) in the middle of the 1980s which has published the "Brundtland-Report" (1987) that still constitutes as a point of reference for debates on sustainable development today. If we want to interpret the term of development as an improvement in living conditions, ordinary growth, which is commonly understood as an important determinant of this improvement, might be recognized not only as a solution to, but also as an intensifier of problems (Luks 2000, 19). Considering the strong relationship between societal progress and economic growth, we have to ask whether the latter could somehow deal with the ecological restriction.

In its definition of sustainable growth, the "Brundtland-Report" focuses on technological solutions. While considering this frame, the connection with the ecological disasters of the 1980s (Chernobyl, Bophal) has to be taken into account. Furthermore, the report assumes a medium-term growth rate of 3-4% for the countries with high income. From that, the WCED concludes that this accelerated growth has to be decoupled from consumption of environmental capital if not to be followed by negative ecological consequences. Hereby, the reduction of the intensity of material and energy processing as well as an improvement in energy and material efficiency in production are focused on (Ibid., 20-2). The economists cited in the following lines are intensively dealing with both of these issues.

For example, Hinterberger et al. (1996, 76) are criticizing the recent approach to deal with the consequences of environmental degradation without considering its causes. Instead of trying to find solutions at "the end of the pipe", they are essentially proposing a re-construction of production to avoid irreversible consequences of material and energy transfers / transformation. It cannot be expected that the environment (likewise as the economy) returns to its equilibrium state after having crossed a certain frontier. No one can imagine when this frontier will be crossed, but it is clear that the more environment is changed by human intervention, the more the absorption capabilities of this environment will be reduced. Since danger is mostly not avoided and just its consequences are fought against, more and more regulations have to be implemented – resulting in an "ecological dictatorship", as Hinterberger et al. (1996, 77 et seq.) call it. The expenditures on ecological protection programmes are (currently, KS) rising over-proportionally compared to economic growth (Luks 2001, 207). So how can we imagine a re-structuring of production to look like?

Because of the illusion of rational management of ecological consequences, uncertainty about the implications of human action and the limited cognitive range of subjects, a principle of caution can be justified. This principle says that consumption of environment overall has to be reduced to avoid potential damage. With

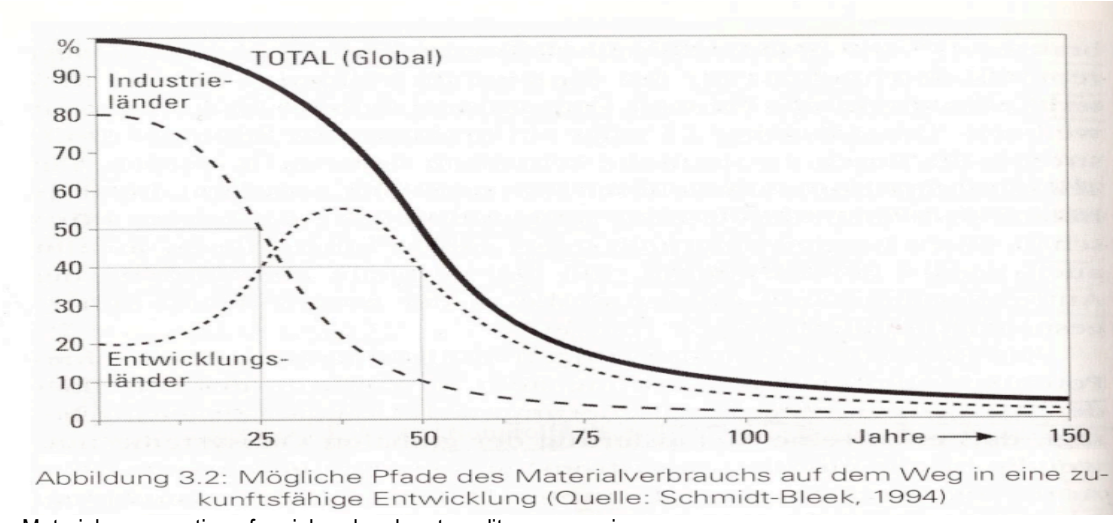
innovations bearing little risk and being insensitive to mistakes, the possibility of reducing potentially devastating effects of production is at stake (Hinterberger et al. 1996, 82 et seq.). Here, a link to the proposal of Luks (2000, 13) to sustain development potentials of an economy becomes obvious. Moreover, he puts the often irreversible and complexly interdependent consequences of environmental consumption at centre-stage (Luks 2000, 26).

1.3 The concepts of de-materialisation and the "weak" / "strong" sustainability

Hinterberger et al. (1996, 85) are engineers of the idea of de-materialization. To stabilize the global ecosystem, they assume that a reduction of global material and energy transfers / transformations by 50% is necessary. Taking into consideration the already accumulated burden on the ecosystems from the passed industrialisation processes in countries with high income, the reduction of material and energy transfers / transformations by a factor 10 has to be achieved in countries of the centre while taking into account the need for sustaining potentials for development in the countries of the periphery.

Such a transformation cannot be realized over night, but when writing down those ideas, a window of opportunity ranging for 50 years has been assumed, corresponding to a reduction of 4.5% every year (ibid.).[4] "A 'loaded world' in a new situation of scarcity, characterized by the threat of crossing borders of ecological limits" (Luks 2000, 48 [own translation]) is not confronted with the same options to development as a world which is not facing ecological scarcity. This implies differential consequences for the peripheral and metropolitan countries. Only a change in structures in the latter is leading to possibilities for the former to form their own progress, which can only prove successful when it turns out to be independent of development models transferred from the countries with high income (Hinterberger et al. 1996, 62). A path of material consumption, securing a sustainable development in the future, can look alike as follows (the sharply dashed line represents the countries with high income, the slightly dashed line the countries of the periphery, the x-axis the time [years]):

[4] Making a "steady-state-economy" a condition for the holding of this equation. "In other words: An economy *without* growth has to reach an improvement in resource productivity of 4.5% every year to make possible a reduction in scale of 90%." (Luks 2001, 207 [own translation]) If we assume a growth rate of 1.6% for the EU-15 in the period 2005-2050 (as many projections show), resource productivity has to improve by 4.42% every year all over the same period to reduce scale by the same amount.



Picture 1 – Material consumption of peripheral and metropolitan economies

Source: Hinterberger et al. 1996, 86

According to this, Hinterberger et al. (1996, 87) pointed out that within a system of market economy, it cannot be appreciated to fix targets for per-capita reduction of environment-damaging consumption patterns from above. Even consumption-intensive sectors will survive as long as less consumption in other fields of the economy could compensate for this surplus and as long as the general targets of reduction were met. Those who are producing and consuming very resource-intensively should reduce their material and energy transfers / transformations – the polluter pays principle[5] is, therefore, put in a broader context to avoid the mostly complex accounting of costs from resulting devastation. This presents a clear advantage to the neoclassical solutions of trying to internalise external effects (Hinterberger et al. 1996, 88 et seq.). Here, Hinterberger et al. did not want to tell us that the implementation of existing environmental policies[6] should be interrupted: "Policies concerning hazardous waste and technology evaluation would not turn out to be superfluous within a de-materialized society. But, the quantity of toxic emissions and dangerous technologies would be remarkably reduced." (Hinterberger et al. 1996, 90 et seq. [own translation])

5 The reply to the question of who should compensate future generations for the costs of the no more avoidable climate change, philosopher Meyer replies: "This is a question of compensating equality. There are some possible answers, among them the compensation incorporating the polluter pays principle. So, it is about the dimension of historical justice." (http://derstandard.at/1289608901177/Un-Gerechtigkeit-Auch-kuenftig-lebende-Menschen-haben-Rechte [own translation; accessed on 12. 6. 2011])

6 Luks (2000, 31, footnote 12) remarks critically that for recycling processes, energy has always to be used which, in turn, is itself not recyclable.

A point of critique by ecological economists about the neoclassical textbook presentation is that it is analysing economic processes as isolated and without intercourse with its environment. Neoclassics is primarily occupied with its analysis of productivity characteristics of static factors without considering factors of flow. In contrast, ecological economics sees the production sphere as embedded into its natural environment (Luks 2000, 27). To put its sceptic view on growth[7] onto a stable basis, ecological economics is importing the theory of thermodynamics from physics. In accordance to the second law of thermodynamics,[8] the whole production process can be viewed as a transformation of valuable natural resources into waste and waste heat (Luks 2000, 30). Similarly, Leff (2009, 106) argues that an alternative to the path of "entropic death", under which he subsumes the production of consumption goods with a rest of lost energy within an irreversible process, could be a supply of basic goods made out of renewable resources. A problem which he oversees is of course the growth dynamic from usage of technologies needing renewable resources – which is mirrored in the scarcity of rare kinds of metal (Arbeitsgruppe Alternative Wirtschaftspolitik 2010, 188).

One possibility to elaborate on the significance of absorption abilities of planet earth is to introduce the concept of "carrying capacity" (CC). It refers to the environmental function in both supplying dips and resources (Luks 2000, 32). The definition of CC resemble another familiar definition of sustainability: "'[CC is] the maximum size of a given species that can be supported within a certain area without reducing its ability to support the same species in the future'" (Ehrlich 1994 in Luks 2000, 32 [own translation]). Here, the aspect of intergenerational justice comes through. Based on the CC, the "environmental space" has been established which in itself has represented the starting point for many studies on sustainability published during the 1990's[9] and is able to consider the manifold interventions into and patterns of use of the environment (Luks 2000, 32). This environmental space is defining the limits of the usage of the environment – a crossing of those limits would, however, destabilize the global cycle of nature (Hinterberger et al. 1996, 97).

Another possibility is the conceptual distinction between "weak" and "strong" sustainability. Whereas weak sustainability assumes that an aggregate of natural and human-made capital is to be sustained,[10] the principle of strong sustainability is to conserve natural capital out of reflections upon intergenerational justice. This is

7 Especially in its contribution to the understanding of long-term processes, the ignorance of ecological aspects by the standard theory of economic growth is to be questioned. This questioning, in turn, would put a stop to the optimistic view on growth propagated by this theory (Luks 2001, 209 et seq.).

8 This law is defining a fundamental difference between inputs (material taken from nature for the purposes of production) and outputs (the finished product within its packaging material, emissions from production, […]).

9 E.g., "Sustainable Europe" (1995) and "Germany able to face the future" (1996).

10 Intensive critique on this point of view, which is focussing on the same methods of valuation of resources and ecosystems as of other products and services, is made by Spash (2008).

connected to the critical view on the neoclassical assumption that anthropospheric and natural capital are, assuming permanent technological progress, perfectly substitutable (Luks 2000, 35). Furthermore, there is the under neoclassical assumptions problematic fact that the complete anthropospheric capital stock has to be renewed from time to time. The sum of this capital stock is critically depending on the answer to the question whether those two kinds of capital are substitutes or complementaries. From the perspective of ecological economics, the answer would be clearly the latter. The adequateness of "weak" sustainability would require a substitution on the global macro level in a long run. The micro level is restricted by the fact that the evolution of the neoclassical factors of production (capital and labour) is itself based on metabolic input (ibid., 36 et seq.). One may also consider the increasing marginal costs of gaining non-renewable resources (Luks 2001, 207).

1.4 The "Steady-State" by Herman Daly

The demand for a lower throughput of material and energy within the economy is focusing on the "scale" of this economy (Ibid., 21). For the possibility of a sustainable development, the relationship between the scale and the social product is on centre-stage, although the relationship between the status of environment and growth is not clearly determined. Here, it is depending on the definition of growth: Is the throughput of an economic system growing; is it the social product or the welfare and the living quality of people? One necessary condition for sustainable development is the de-coupling of those three kinds of growth. It is important to make use of potentials arising from the intra- and inter-sectoral change to de-couple growth of the social product from the throughput of material and energy from improvements in welfare.

Technological innovations can contribute to a higher value added via a restructuring of final demand with the same throughput. Nevertheless, growth as an increase in social product is not necessarily leading to development in a qualitative dimension. De-coupling of physical growth and the social product is, however, not enough if it is followed by an increase of environmental consumption – a "rebound effect" can occur: The advantages from a resource-saving technology can be overcompensated by the increase in production of goods using this specific technology (Hinterberger et al. 1996, 54).[11] In contrast to earlier basic innovations, which seemed to be independent from nature and any reproducible, today's innovations have to contribute to a de-coupling of physical growth from improvements in welfare (Arbeitsgruppe Alternative Wirtschaftspolitik

[11] This effect can, according to Luks (2001, 208), also be labelled as the "Jevons-effect", which gains its macroeconomic momentum from "de-coupled" growth.

2010, 182).

An ecological economist focusing on the long-term evolution of physical growth is Herman Daly, presenting his concept of a steady-state economy. Daly is constructing his concept in classical tradition to differentiate it from the neoclassical steady-state (Luks 2001, 27). In contrast to the main debates in the early 1970s, which made the reduction of economic growth a subject of discussion, Daly just describes a reduction of throughput within the economy. For him, an eventual reduction of economic growth is just a by-effect. From a macroeconomic viewpoint, it is important to reach *and* sustain the point where marginal costs equal marginal benefits of the activities performed in the economy as a whole. For that, material and energy throughput has to be fixed on a sustainable level and they may not grow (Ibid., 37 et seq.). In his earlier publications, Daly works with a stock-oriented definition of doing business – nothing except for the capital and population stock has to be held constant.

The throughput as a factor of cost is to be stabilized at a low level (Luks 2000, 44 et seq.). However, in newer contributions, Daly defines throughput as a flow beginning with the reduction of natural capital, ending with pollution and with its size not to surpass the regenerative absorptive capacities of the environment (Ibid., 46). Technological innovations are welcomed by Daly, but he is warning about to see them as a device for sustaining resource consumption on a level constantly destroying basic living conditions. This warning is based on the assumption of fundamental insecurity regarding the consequences of human influence on nature as well as regarding the development of technology in future (Luks 2001, 41).[12] More production with the same throughput thanks to innovation in technology is certainly appreciated (Daly 1991 in Luks 2000, 46). However, it has to be taken into account that up to now, technological progress has always led to more intensive use of the environment. This was and is due to the channel progress – growth – consumption of environment.

The high trust into technological progress led many actors to forget this chain of consequences (Hinterberger et al. 1996, 52 et seq.). Now, as Daly says, the demand side is stimulated by greed whereas the supply side is proclaiming expansion without limits in its technocratic belief in science (Luks 2000, 49). Moreover, Hinterberger et al. (1996, 56) emphasized on the social factors which stimulate the demand for material goods – consumption could function as a substitute for self-realization or as a compensation for missing social relationships. This consumption is constituted of throwaway products and investment goods of short survival

[12] „There is *a nonexistence theorem about the prediction of the future of knowledge and discovery*: that if we could predict it, we would know it now, we would have discovered it now, and we would not have to wait. All genuinely new information or knowledge has to be in some degree surprising; otherwise, it is not new knowledge[…]" (Boulding 1977 in Luks 2001, 206; own emphasis)

which are ever quicker replaced by new ones (Hinterberger et al. 1996, 57). This physical concept of a steady-state would lead to a stationary status in the sense of missing growth of social product, as Daly is convinced (Luks 2001, 41). For him, both human-made and natural capital are behaving as complementaries – the continuing accumulation of the former puts growing pressure onto the latter (Luks 2000, 47). But, economic growth as such is neither refused nor appreciated. Its consequences for the environment and its contributions to human welfare are at centre-stage.

Daly is seeing growth as a physical measure, he is defining development as a realization of potential and a qualitative improvement of non-physical parameters. Therefore, economic growth as well as development can be gained with constant throughput and simultaneously. Growths in physical terms and development have in contrast, to be separated from each other (Luks 2001, 41-3). Anyway, this possibility of de-coupling the services from the goods-producing sector is not realizable for Daly: The application of knowledge requires some human-made capital in forms of libraries or information technology (Ibid., 44). For that, de-coupling cannot be achieved simply through a high growth rate of the new economy.

The starting point for Daly's steady-state-economy is, hence, the political influencing of the throughput of the whole economy. The consequences from this influence can in turn mean a decrease or the end of economic growth. This position feeds an ecological-economic discourse which questions the paradigm of growth itself, i. e., growth not delivering any further benefits (Ibid., 46).[13] So, if the marginal costs of physical capital are increasing whereas its marginal benefits are decreasing, there would be an intersection of the two functions which should not be crossed from an economists' point of view. This basic economic law is projected onto the scale of the economy by Daly. Hence, growth has to be given up and development guaranteed via a qualitatively better usage of natural resources through re-distribution (Luks 2000, 50 et seq.). Nevertheless, it must be mentioned that with reduced economic growth, a limitation to the financial range of manoeuvre of the welfare state is drawn and, therefore, the significance of the question of re-distribution will increase (Luks 2001, 208). An overview of potential instruments of economic policy to follow a steady-state paradigm in a sense of Daly will be presented in section 3.

[13] By the biggest part of ecological economists, the consequences of growth for the environment is seen as problematic – which is in contrast to Daly who is categorizing growth *in itself* as problematic (Ibid.).

2. A critique of ecological economics

2.1 The ambivalence of innovations

The "innovation"-term is a dominant figure within the debate around ecological economics. Considering this, it is possible that within ecological economics, certain contradictions could occur when describing innovations or that there is no clear distinction made between the differentiated interpretations of that term.

On the one hand, innovation is welcomed by ecological economists when efficiency of energy and material usage is improved[14]; however, they do not principally label it as "good". For example, permanent innovation would lead, on average, to a lower living cycle of products which become outdated for reasons of fashion, implying negative effects for resource consumption. The term of innovation can further be related to institutional reforms, structures of social organization, patterns of mobility or organizational forms of every-day living. These aspects render a particular innovation support difficult (Hinterberger et al. 1996, 102 et seq.). However, Hinterberger et al. (1996, 260 et seq.) saw a tight connection between the propositions of action to create environment-friendly products and to the "development of corresponding *technologies*". The partial analytic weakness of the distinction of different understandings of innovation can lead to a confusion of less informed supporters of ecological economic policy. Moreover, from its inflationary usage, the significance of a term could be lowered or even erased.

2.2. Critique on the study by Meadows et al. (1972) and on the idea of de-materialisation

The controversial socio-political discussions around the study of Meadows et al. (1972) about the limits to growth revealed, from the viewpoint of criticizers, are the main weaknesses of the study. Here, pessimistic and static assumptions about resource availability, missing price mechanisms, a pessimistic view on the possibilities of technological progress and the options for substitution as well as missing conclusions about regional and distributional aspects can be mentioned (Luks 2001, 35). Furthermore, it has to be pointed out that Meadows et al. did not think over the socio-political consequences of their claims. And, they are not

[14] See, among other, section 1.4

making any propositions of how to handle a growing world population whose growth they want to restrict (Stransky, forthcoming). Nevertheless, the pioneer work of this study is to be highly welcomed from the viewpoint of ecological economics.

The underlining of the importance of resource efficiency by supporters of the de-materialization approaches also leads to the critique that they are uncritically welcoming sensitive technologies (e. g. nuclear power, genetic engineering). Moreover, it seems that all kinds of material consumption have to be lowered without having a differentiated look onto this consumption. A certain contradiction to the (neoclassical approach of, KS) internalisation of external effects is occasionally diagnosed, too, because of the avoided counting of concrete damages within the target of de-materialization (Hinterberger et al. 1996, 88 et seq.). These arguments can be countered by the fact that de-materialization, critical evaluation of technologies, and the adequate treatment of hazardous materials by the regulatory instance may not cannibalize each other. Moreover, it will be shown here that the consideration of external effects can certainly be a part of a policy mix for incentives to sustainable ways of doing business. But, socio-economic problems are often, as noted by Hinterberger et al. (1996, 243), treated by an unsatisfactory level of precision. This, too, might have contributed to the development of the past years when material consumption did not decrease at all, at least within the countries with high income.[15]

As another weakness of theories of de-materialization, the difficulty of measuring incremental degrees of costs and benefits has to be considered. It is on these variables, the conception of a stable steady-state of an economy not consuming resources exceeding a sustainable level, that it is finally based on. This optimization problem is certainly seen by Daly, but here, he means that the reached sustainable "scale" has to be temporarily enough whereas at the same time, the development of optimality will go on in theory (Luks 2000, 55 et seq.).

3. Economic policy options for a sustainable and ecological development

> „It is the clear duty of Government, which is the trustee for unborn generations as well as for its present citizens […] to defend the exhaustible natural resources of the country from rash and reckless spoliation[...]" (Pigou 1920 in Frederick 2006, 676).

[15] On this issue, see Global (2000, 2009).

3.1 "Ecological economic policy" for what?

An accelerated structural change started today fed through active environment protection measures offers more possibilities than risks – this claim is often accepted, especially, when the potentially exorbitant costs of destruction of environment and climate change in the future are taken into account (Arbeitsgruppe Alternative Wirtschaftspolitik 2010, 181). The design of this change is not to be dedicated to market forces alone – externalities can be internalized where pragmatically and politically realizable. However, trying to solve problems of ecology solely via the path of internalization seems to be unrealistic. So, it is illusionary to believe that human suffering and destroyed ecosystems can somehow be completely reflected in prices (ibid., 184).

A possibility to restrict the dominance of existing actors operating intensively with non-renewable resources is to be seen in local-based initiatives of civil society. Here, movements calling for a re-establishment of communal structures in energy provision through a regional autonomy in energy or cooperative energy production are worth mentioning (Arbeitsgruppe Alternative Wirtschaftspolitik 2010, 186). Without a doubt, approaches like them can mean more freedom and fewer pressures from market powers for the involved individuals. Hinterberger et al. (1996, 258) see the positive aspect of the role of social movements in their function kicking off discussions on environmental issues. Nevertheless, for him, there is no alternative to changing the established structures of mass production and over-thinking usual instruments of economic policy. Currently, the societal system is designed to reproduce non-responsibility. Control mechanisms and institutions to limit the growing consequences of ecological (over-)pressure are missing (Hinterberger et al. 1996, 59). Beck, who coined the term of the "world risk society" "emphasizes that the existing societal system is producing structures of power and responsibility which lead to ecological dangers and risks without anyone made responsible for them." (Hinterberger et al. 1996, 244 et seq. [own translation])

As already mentioned, the "material throughput" is forming a central turning point to the conceptions of ecological economic policy. The throughput of quantity of energy and materials, coupled with economic growth, can be described with the internationally used measure of aggregated quantity of the "global material consumption". This consumption, in turn, is found in the analysis of material flows and, then, can quickly be put into relation with the created GDP to get an indicator of resource efficiency for an economy (Arbeitsgruppe Alternative Wirtschaftspolitik 2010, 192). Whereas a remarkable trend of relative de-coupling is already identifiable (the former is growing under-proportionally with respect to the latter), the efforts to achieve an absolute de-coupling (as brought further by ecological economists, KS) have not yet been intensified. These

can be started by intra- and inter-sectoral structural change (Ibid., 193). As considering missing regulation, the danger of socialized losses and privatized gains by companies arises – especially the reduction in natural capital is a figure neither relevant for firm-internal accounting nor for the domestic accounts. Therefore, it is not included into the formulation of corporate strategies (Ibid., 194). At this point, it should be reconsidered that it is about defining ecological ranges of manoeuvre – the changes in society should not be planned, but their direction influenced. Here, institutions in a wider sense are playing a central role: markets; values; jurisdictional frameworks (Hinterberger et al. 1996, 246) and a corresponding adjustment of the battle field for entrepreneurial action (Ibid., 251.).

Daly, too, is aware about the necessity of suitable policy instruments to reach an ecological optimum. In his view, distribution, allocation and scale are independent areas which can collide with each other when the economy is growing – primarily because problems around employment and distribution were, at least up to now, solved with higher rates of economic growth (Luks 2000, 54). From an ecological-economic point of view, a policy of planned slowing down in growth has no priority. Instead, the throughput of material and energy has to be reduced and then stabilized, which is not very likely reachable with market processes only. The structural change already taking place can be influenced ecologically. Certain general conditions can contribute to that - for example, with reference to the principle of caution, the condition of reduction of the potential environmental stress caused by economic activities can be mentioned here (Luks 2001, 238 et seq.).

A long-term institutional focus not intervening solely through short-term demand- and supply-oriented policies would improve the guidance of the economy (Ibid., 243). In this way, ecological economic policy is limited by the results of societal evaluation of technologies. Formal as well as informal institutions are limiting the individual range of manoeuvre and influence and, therefore, the direction of societal development (Hinterberger et al. 1996, 90; 242 et seq.). In contrast to the Austrian and the Chicago-School, it is appreciated to transport information not only through prices but, also, additional information on intensity of material inputs into goods and about the improvements in resource productivity should be provided (Hinterberger et al. 1996, 244). To draw the focus onto the input-side of economic metabolism means to take a step away from emissions-oriented environmental policy[16] and to realize some “resonance within society” with the idea of de-materialization (Hinterberger et al. 1996, 259).

[16] See section 3.3

3.2 Possibilities of realization of de-materialization

The presented theories in their abstractness cannot provide immediate remedies for the everyday-work of economic policy making. Therefore, in a first step, a measure of mass throughput has to be defined and, then, it will be shown how the throughput can be lowered with the help of instruments of economic policy. Regarding the space for this paper, the latter issue can only be described in its funding.

A measure evolving from the core of material procession processes is the MIPS (material input per service unit). This indicator is evaluating the intensity of potential stress for the environment coming from the goods and the production processes through all their sections of existence. All used materials for the creation of those processes and goods delivered by nature are contained within the material input (MI). As the service character connected with each good is mostly important for the consumer, the MI is put into relation with the created service units (S). To divide the MI into measurement elements suitable for operation, it is split into five categories: water; air; movements of earth mass; biotic resources from agriculture and forestry; non-biotic resources. They are registered in kilograms, whereas the qualitative differentiation described above is falling away again in the step of adding up the MI (Hinterberger et al. 1996, 91-3). The MIPS can be used as an approximation "for the potential change in nature caused by human intervention" - here, it is about a "possibly precise quantitative estimation", for which the handbook of material intensity analysis (MAIA) is proposing accounting principles (Hinterberger et al. 1996, 95). The fact that an estimation of those changes in nature is preferable is based on the assumption of non-knowledge of the entire consequences of human action.

Even for the case when concrete numbers for the calculation of MIPS are not easily to obtain, the principle of definition of MIPS can offer propositions of action to an individual wanting to live more environment-friendly, through realizing a potential for comparing products. The (today well-known, KS) ecological footprint is related to the concept of MIPS. It is measuring how much space a region is consuming with its activities both within and outside its frontiers. In the mid-1990s, land consumption between three and five hectares (ha) was standing against 2.5 ha of renewable landscape.[17] For the countries with high income, a factor 10 from a perspective of inter- and intra-generative aspects of justice can also be justified by the fact that the footprint of those nations is ten-fold their area. Anyway, a strong reduction of this kind means a necessary implantation of a *role model* for decision makers in politics and business as well as for the other individuals within the population (Ibid., 244) – we will return to this point later.

[17] In the end of the last decade, this relation is to be quantified as 2.2 to 1.8 ha.

Practical examples of utilization of the MI- and the MIPS-values, respectively, are represented by compulsory evaluation for the companies (similar to the duty of accounting) and a signing duty of all products. For that, the MAIA-handbook contains first suggestions. When importing goods, approximation approaches can be used when the calculation of MIs renders impossible (Hinterberger et al. 1996, 101).[18] This can contribute quite quickly to making many people more sensitive about the ecological problem and to institutionalize the factor 10. Hence, the role model of de-materialization wants to take into account the potential consequences for the environment when doing business and draw the attention onto an issue which has not yet been discussed in that form (Ibid., 247-9). When considering the material input, it is important to calculate values for certain countries and regions to guarantee a better awareness of the people about environmental problems. Often, though, the necessary information about the stress intensity of diverse goods and services are lacking which renders even individually planned changes of behaviour quiet difficult. With a system of MIPS-signing, this problem would be solved. An improvement in productivity of resources is to be appreciated when regarding cost issues solely - with the nice side-effect that new market chances for de-materialized products and services will be created. Moreover, a possible enlargement of an instrument of consumer policy, namely the guarantee, could contribute to the longer survival time of products and, therefore, to the lowering of material intensity. A similar effect of strengthened product responsibility would have a stricter law of liability.

Concrete channels for a communication of relevant information about an ecological role model are formed by party organizations and public broadcasting. They serve to publish results of research as well as diverse opinions and, hence, can possibly initiate public discussion processes. They can also be underpinned by organisations co-financed by the state. Furthermore, the state can contribute to take a step upon less motorized individual traffic through investment guiding or own investment into infrastructure. In the current situation, it cannot wonder that technologies and preferences are primarily oriented towards the car. A stabilization of environmental policies can contribute to the consistency of economic policy: Long-term reduction targets mean stability to the expectations of economic actors. While avoiding an environmental policy setting reacting from case to case, investment possibilities can be broadened and investment security improved.

Beside the already described functions of an ecological role model and the information for consumers and producers, environment-informational and -management systems as well as eco-audits constitute a policy

[18] A minimum estimation of the MI for all products can be made by using standardized guiding numbers (ibid., 277).

area with the purpose of changing behaviour voluntarily. Moreover, education and vocational training are to be highlighted in connection with behavioural change (Hinterberger et al. 1996, 273). Those two policy areas are to be dealt with in the following two paragraphs.

As early as 1993, a EU-directive proposed that companies could participate in an eco-check on a corporate level. Here, it should be critically remarked that even at fulfilment of EU-standards, still environment-damaging products can be produced even when the company is certified. An easy road to controlling the material intensity of production can be laid out by the MIPS-method, primarily when companies are themselves confining to the new role model to lower the material intensity of their goods produced at a certain place by 4-5% every year (Hinterberger et al. 1996, 278 et seq.).

For supporting the teaching of problem-solving competencies on a broad basis, issue-connecting, and interdisciplinary didactics as well as live-long learning is proposed. To get familiar with the handling of complexity, the acceptance of insecurity, and non-knowledge is required. The realisation of the fact that not every solution of human doing is suitable for prognosis is to be seen as a pre-requirement of the chance to stabilize the de-materialization – role model in broad layers within the population (Ibid., 280). Further possibilities to guide economic action are represented by subsidies, taxes and certificates. Lots of subsidy resources are still used for correcting environmental politics. Instead of supporting sustainable investments, a substantial part of the resources are flowing into the “end of the pipe” (i. e., into support for installing catalysts and filter systems installation). Furthermore, intensive agriculture and areas with structural weaknesses, which stagnate because of their specialization on exploitation of fossil energy sources (e. g. coal), are supported by tax reductions and financial help (even by the EU or the KS).

In connection with an ecological reform of the taxation system, von Weizsäcker (a former President of the FRG) is proposing a relieve on wages and an additional burdening of sources of energy. Then, technological progress and consumer behaviour will be influenced through prices. As a fiscal point of a new kind of tax, the MI could function as a basis for assessment (Hinterberger et al. 1996, 286). But this, as a first step, presupposes the acceptance of MI in the whole economy as well as a concept of registration of material intensity – otherwise, the basis for assessment would be missing.

An alternative to the tax solutions is represented by the MI-certificates. The possession of such a certificate would permit for the movement of a certain quantity of material. Derived from the aim of the factor 10, an

international or a national office would be responsible for handing out the required amount of certificates. The market could, then, determine the trade between companies and, hence, state the prices. This, in turn, creates incentives to avoid critical inputs of material, save on material and develop a resource-saving product design. An advantage from the certificates compared to the MI-tax is the non-necessity of defining a tax rate because the prices of the certificates are found through market mechanisms. Nevertheless, a combination of both of these instruments is not ruled out.

Summary and conclusions

Ecological economics is differentiating itself significantly from neoclassical economics concerning its solutions for the practical field of economic policy. The state should not, in its line of thought, just ensure the presence of an ordering framework, but also directly and indirectly interfere into economic development and into the expectations of economic actors. Instead of just combating evident consequences of resource-intensive doing business, it has been outlined how a reform of production fundamentals from their core, namely starting from the material input, could look like. To evaluate the possibility of realization of those approaches in economic policy, the necessity of integrating an ecological *role model* with its supporting measures has been presented. The ecological restriction will become even graver if politics will do nothing – whether an unsure avenue of trading emission certificates, inspired by the neoclassical arguments, could provide as a good guide for the future, is questionable.

A radical change in favour of ecologically inspired economic policy in the sense of Daly is currently not registrable. Yet, the impression should be avoided here that looking into the future is only possible with pessimism. Primarily on a technological level, in certain areas, market forces are creating innovations for improved resource efficiency and the strengthened usage of renewable resources. Political guidance led partly to situations being in favour for usage of those resources but, here, the boomerang is hitting the distribution target via an increase in prices of basic food items and energy. As long as a certain level of basic needs in the countries of lowest incomes is absent and those countries, where this level is (already) reached, are oriented towards countries with high incomes, it will be difficult to make a role model of de-materialization on a broad social founding a realistic option. Therefore, the post-materialistic patterns are not far enough established even in countries with high income – the developments in the last years are characterized by ever increasing numbers of people owning a car, frequent meat consumption, and the increase in the amount of electronic

devices in the households as well as consumption of flights.

Acknowledgements

The author would like to thank Israel Solorio for his useful comments on an earlier version of this paper and with Adhurim Haxhimusa for having made possible a proof-reading of a first draft. Finally, the author is also grateful with Nikole Ottolia, research assistant of the IUEE, for the proof-reading of the final draft of this paper.

References

Arbeitsgruppe Alternative Wirtschaftspolitik (2010). Memorandum 2010. Sozial-ökologische Regulierung statt Sparpolitik und Steuergeschenken, PapyRossa: Cologne.

Frederick, Shane (2006). Valuing future life and future lives: A framework for understanding discounting, in: Journal of Economic Psychology, Vol. 27, 667-80

Global 2000 (2009). Ohne Maß und Ziel? Über unseren Umgang mit natürlichen Ressourcen der Erde, Vienna.

Hinterberger, Friedrich/Luks, Fred/Stewen, Marcus (1996). Ökologische Wirtschaftspolitik. Zwischen Ökodiktatur und Umweltkatastrophe, Birkhäuser: Berlin/Basel/Boston.

Leff, Enrique (2009). Degrowth, or deconstruction of the economy: Towards a sustainable world, in: Contours of Climate Justice. Ideas for shaping new climate and energy politics. Critical Currents – Dag Hammarskjöld Foundation, Occassional Paper Series, No. 6 (October 2009), 101-7

Luks, Fred (2000). Postmoderne Umweltpolitik? Sustainable Development, Steady-State und die „Entmachtung der Ökonomik“, Metropolis: Marburg.

Luks, Fred (2001). Die Zukunft des Wachstums. Theoriegeschichte, Nachhaltigkeit und die Perspektiven einer neuen Wirtschaft, Metropolis: Marburg.

Meadows, Dennis L. (1972). Die Grenzen des Wachstums. Bericht des Club of Rome zur Lage der Menschheit, Stuttgart.

Solow, Robert M. (1986). On the Intergenerational Allocation of Natural Ressources, in: Scandinavian Journal of Economics, Vol. 88 No. 1, 141-9

Spash, Clive L. (2008). How Much is that Ecosystem in the Window? The One with the Bio-diverse Trail, in: Environmental Values, Vol. 17, 259-84

Stransky, Kajetan (forthcoming). A Contribution to the „Growth Paradigm“, in: Šauer, Petr/Šauerová, Jana (eds.). Environmental Economics and Management. Young scholars perspective, Litomysl Seminar Publishing: Prague.

WIFO (2010). Gesamtwirtschaftliche Effekte der klimarelevanten Maßnahmen im Rahmen der Umweltförderung im Inland 2009. Vienna.

Wissen, Markus (2010). Klimawandel, Geopolitik und “imperiale Lebensweise”. Das Scheitern von “Kopenhagen” und die strukturelle Überforderung internationaler Umweltpolitik, in: Kurswechsel – Zeitschrift für gesellschafts-, wirtschafts- und umweltpolitische Alternativen, 2/2010. Sonderzahl: Vienna. 30-8