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Green Economy and the Transition to Sustainable Development



- Efficiency gains in the use of natural resources and less waste generation
- Investment in green sectors
- Creation of green jobs

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Synonyms

[Green growth](#); [Low-carbon economy](#); [Sustainable development](#)

Definitions

The United Nations (UNEP 2011) defines a green economy as “one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities” (p. 9). Furthermore, a green economy has three main characteristics: (i) it is low carbon; (ii) it is resource efficient; and (iii) it is socially inclusive. In a more extensive definition, we could add that a green economy encompasses:

- Internalization of negative externalities associated with pollution
- Internalization of positive externalities associated with environmental conservation
- Substitution away from unsustainable consumption, production, and energy sources

Introduction

The term green economy and the term sustainable development are often used interchangeably as an all-encompassing representation of development which takes environmental limits into account. Nonetheless, a green economy can be understood as a means to sustainable development. Sustainable development was defined in the report of the Brundtland Commission (1987) and carries a strong fairness distinction between generations and within each generation. The concept of sustainable development emphasizes the connection between environmental degradation and poverty and therefore the need to combat both from a justice-oriented motivation and from an environmental perspective. Accordingly, economic growth and development are possible to be fairly distributed and should be aligned to environmental protection. While doing so, the prospective needs of future generations should be met.

The Brundtland Commission report (1987) is widely used as a reference to define sustainable development, even though it has reportedly been criticized for having a “broad vagueness” (Lélé 1991). In contrast, the term green economy is often used without a clear definition of it, which

fosters the confusion between the two terms. In this sense, the guidebook prepared by the United Nations (Allen and Clouth 2012) came as an important work to clearly place the term in historical context and relate it to other close terms such as low-carbon economy and green growth.

The term green economy has first appeared in Pearce et al. (1989) who do not actually define it but only use it as an embracing title to an analysis of sustainable development and the design of solutions to stimulate environmental conservation and pollution reduction. The term became more prevalent at the end of the years 2000s, as illustrated in Fig. 1. Since then the term green economy has been increasingly used in academic research. According to Allen and Clouth (2012), the term reappeared in 2008 as a response to the global financial crisis, with the United Nations promoting the adoption of a green package to stimulate the global economy.

A green economy is one which is low carbon, is resource efficient, and is socially inclusive. To achieve these three aspects of a green economy requires the adoption of a purposely designed legal and regulatory framework and a set of policy instruments. In this sense, a green economy also comprehends the design and implementation of specific policy instruments targeted at the environment. Furthermore, a broader definition of a green economy requires rethinking trade relations and the international chain of goods to avoid having countries being green at the cost of others. A green economy in this broader sense is globally inclusive and acts to reduce the global ecological footprint.

While transitioning toward a green economy, countries should therefore observe a reduction in pollution, reduction in the generation of waste, an increase in environmental preservation, and an increase in natural resources conservation and social cohesion. Essentially the green economy promotes a balance between economy and environment.

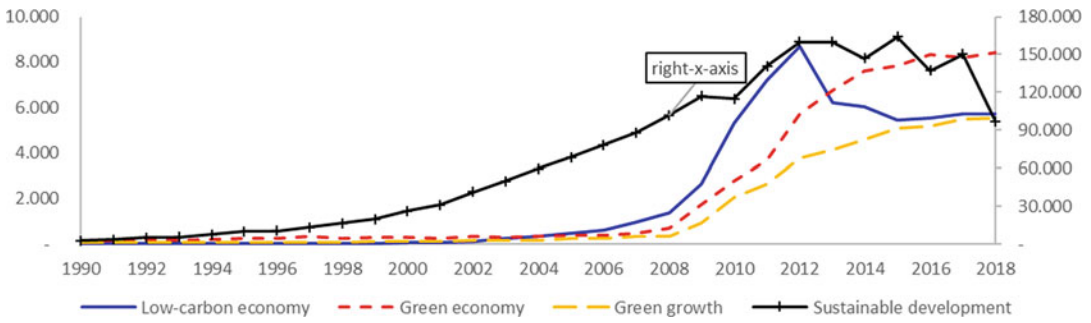
Green Economy and Economic Growth

A central issue in the green economy debate is whether a green economy can go hand in hand

with economic growth. From the definition green economy is a means to sustainable development. In principle, sustainable development can come without economic growth as development and growth do not mean the same thing. Redistributing resources in a fair and environmentally friendly way stimulates the development of a green economy and leads to sustainable development, which can take place without experiencing economic growth. On the other hand, setting the incentives, rules, and regulations for a green economy can serve as a stimulus package to advance economic growth. So, promoting a green economy is compatible with economic growth: to green growth. Green growth, according to the OECD (2011), “is about fostering economic growth and development while ensuring that the natural assets continue to provide the resources and environmental services on which our well-being relies. To do this it must catalyse investment and innovation which will underpin sustained growth and give rise to new economic opportunities.” The concept of a green economy is thus close to the concept of green growth with the main difference that the intention of a green economy is not growth per se, so the focus goes away from measuring GDP toward measuring a variety of indicators encompassing social and environmental features.

This change in economic paradigm is an unsettling one. At all levels (personal, local, regional, national, or global), mankind has prioritized economic prosperity. Standards of living and income are seen as synonymous, and developed countries are those whose GDP per capita is above a certain threshold level. The World Bank, for example, classifies countries according to the GNI per capita. It is accepted as a good proxy for standards of living as it has a strong positive correlation with indicators such as life expectancy at birth and enrollment rates in school. Nonetheless, the relationship between GNI/GDP per capita and different environmental indicators does not follow a straightforward positive relationship, neither is there a consensus over an environmental Kuznets curve (see, e.g., Dinda 2004; Stern 2004).

In the beginning of the 1960s, high-income countries emitted approximately 36 times more CO₂ emissions per capita than low-income



Green Economy and the Transition to Sustainable Development, Fig. 1 Number of publications with search results in Google Scholar for four key phrases. Notes: data collected on June 6, 2019. The search excluded

citations and patents and used the exact phrases alternatively: “low-carbon economy”; “green economy”; “green growth”; and “sustainable development”

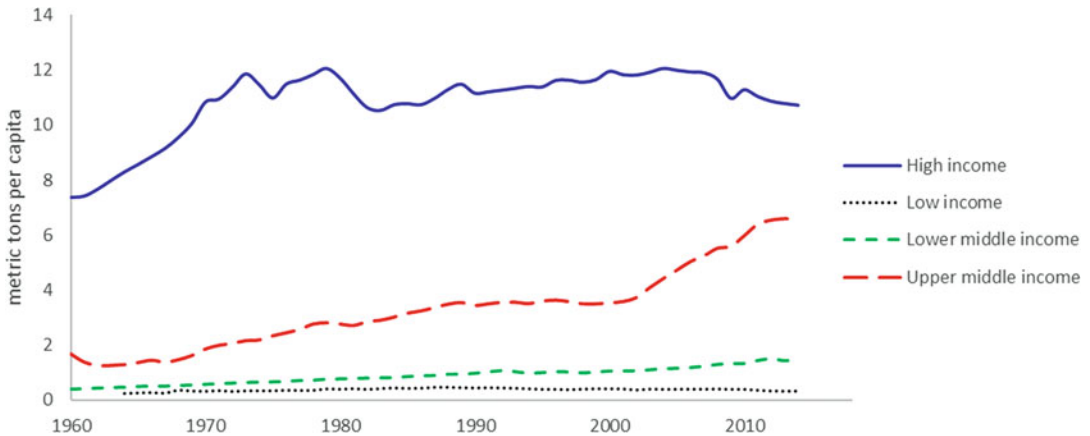
countries; 18 times more than lower-middle-income countries; and 6 times more than upper-middle-income countries. With the significant increase in emissions per capita from upper-middle-income countries and a declining trend from high-income countries, these figures changed in 2014, respectively, to 33, 7, and 2 (see also Fig. 2). Thus, whereas on the one hand Fig. 2 indicates evidence of, albeit very modest, greening of high-income countries’ economies through time, on the other hand, high-income economies are substantially “dirtier” than all other income level economies. Figure 2 also suggests that upper-middle-income economies are becoming less green.

Extending this analysis by looking at the sectoral composition of CO₂ emissions, Fig. 3 shows similar developments across countries with higher income and with lower income. In general, as income increases, CO₂ emissions from electricity and heat production increase in the total share of fuel combustion. Thus, to green the economy, countries should prioritize creating economic incentives to renewable energy. In most developed countries, this implies replacing old electricity and heat production infrastructure based on nonrenewables, such as coal, to new facilities based on renewable sources of energy (solar, wind, hydro). For less wealthy countries, where the demand for electricity and heating is on the rise, this creates an immense opportunity for green growth. Such opportunity must not be missed, as the adoption of electricity and heating production

facilities creates lock-in infrastructure with long-term consequences.

Besides an unclear relationship between GDP per capita and different environmental indicators, a high GDP per capita does not imply a tendency toward a more green economy because low pollution and resource efficiency often disguise a transfer of pollution and resource depletion elsewhere. Figure 4 shows the top 15 exporters (left panel) and top 15 importers (right panel) of bovine meat. Meat from beef cattle is associated with many environmental externalities, including deforestation, methane emission, and groundwater depletion. Mekonnen and Hoekstra (2010) estimate that on average, every ton of beef cattle meat corresponds to the usage of 15,400 m³ of water, which is equivalent to filling up approximately 5.5 Olympic swimming pools. Meat has therefore a high content of virtual water, which is the water embedded used throughout the meat production process. The concept of virtual water is closely related to the concept of water footprint which at the country level represents the total amount of water consumed by a given country.

Figure 5 shows that global consumption of meat is increasing steadily, in particular because of consumption from upper-middle-income countries, such as China, Brazil, and Russia. Consumption from high-income countries remains high but relatively stable. Overall global consumption of meat is expected to keep increasing in the coming years, because of population growth and growth in the global GDP per capita.



Green Economy and the Transition to Sustainable Development, Fig. 2 CO₂ emissions (metric tons per capita). Notes: Based on World Bank, World Development Indicators (WDI) dataset. Data downloaded on 11 June 2019

Decreasing consumption of environmentally unfriendly goods can be difficult because of social lock-ins. For the case of energy consumption, Maréchal (2010) argue that individual habits refrain their response to incentives to reduce energy consumption. His finding indicates that it is easier therefore to change consumption patterns of new residents. Similarly, at the country level, Fouquet (2016) analyzes the case of path dependency on energy systems. Both technological lock-ins and behavioral lock-ins make more advanced countries stuck with the current energy system which is heavily dependent on fossil fuel. Furthermore, this provides strong support for countries which are now industrializing and investing in new infrastructures to critically consider and possibly avoid these high-energy-intensity economy lock-ins.

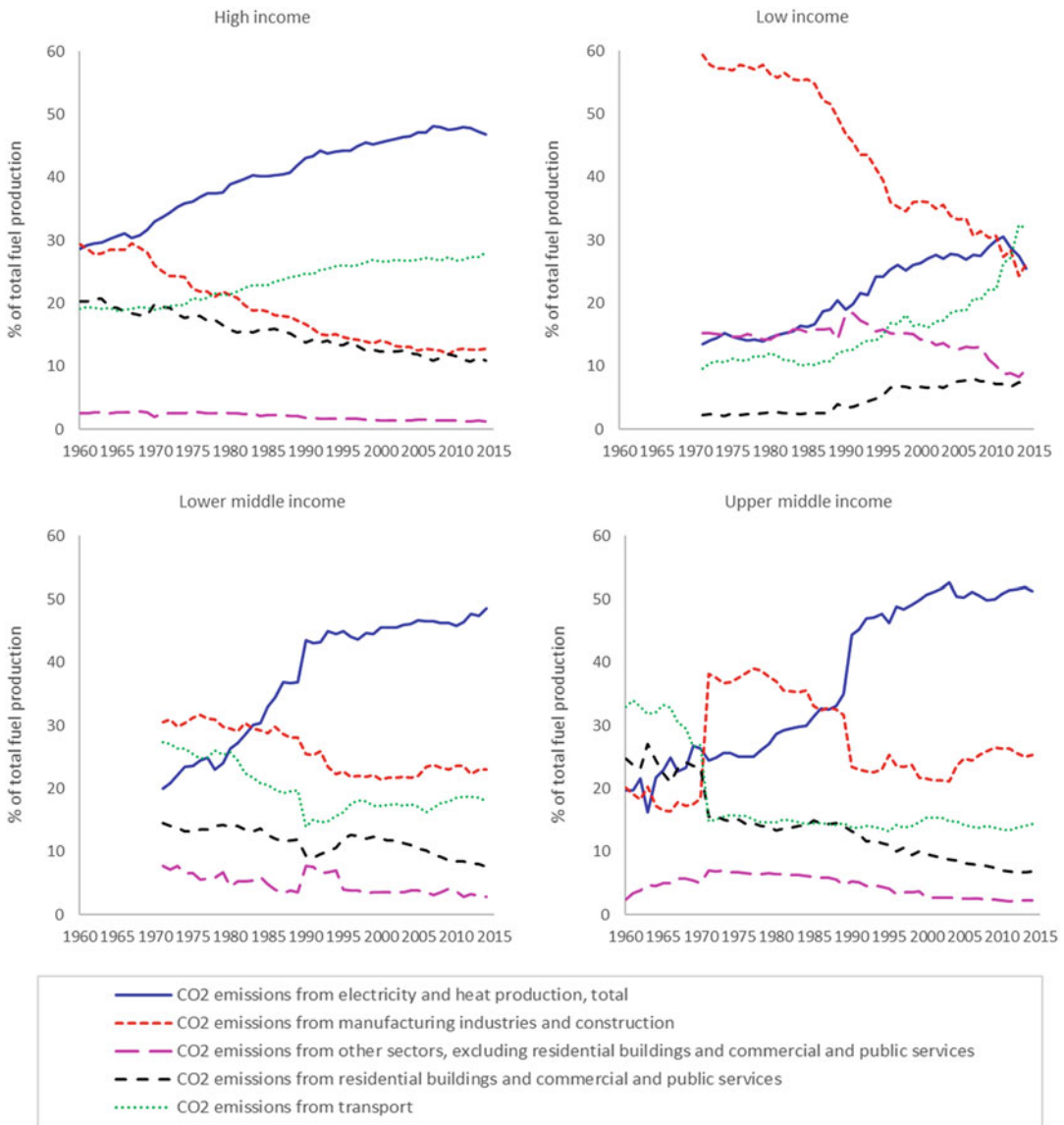
To understand the developments made toward greening the global economy, the following sections will present the main indicators to assess economies' greenness; an example of a current initiative; and the link with the United Nations' Sustainable Development Goals.

Green Economy Indicators

Countries transitioning to green economies should experience a decrease in carbon intensity, an increase in resource efficiency, and an increase

in social inclusion. This would then be reflected in an increase in green investments and green jobs. Bowen and Kuralbayeva (2015) define green jobs as those “associated with environmental objectives and policies” (p. 5) and point out that most green jobs definitions “focus on employment in industries (or specific projects) that produce environmentally beneficial products.” Furthermore, the authors stress that knowledge about the number of green jobs allows to assess how employment is affected by environmental objectives and policies. Green investment, on the other hand, encompasses investment in many different sectors, such as water management, building, and transport. These investments are considered to be green when they allow low-carbon and resource-efficient development.

Corfee-Morlot et al. (2012) identify five elements of a green investment policy framework. Figure 6 indicates these elements and illustrates the relationship between harnessing resources and building capacity (element 4) and the promotion of green business and consumer behavior (element 5). The other elements are element 1, strategic goal setting for infrastructure and climate change and the alignment of the policies across and within the different levels of government; element 2, modifying policies to enable investment and strengthen market incentives for low-carbon climate-resilient infrastructure; and

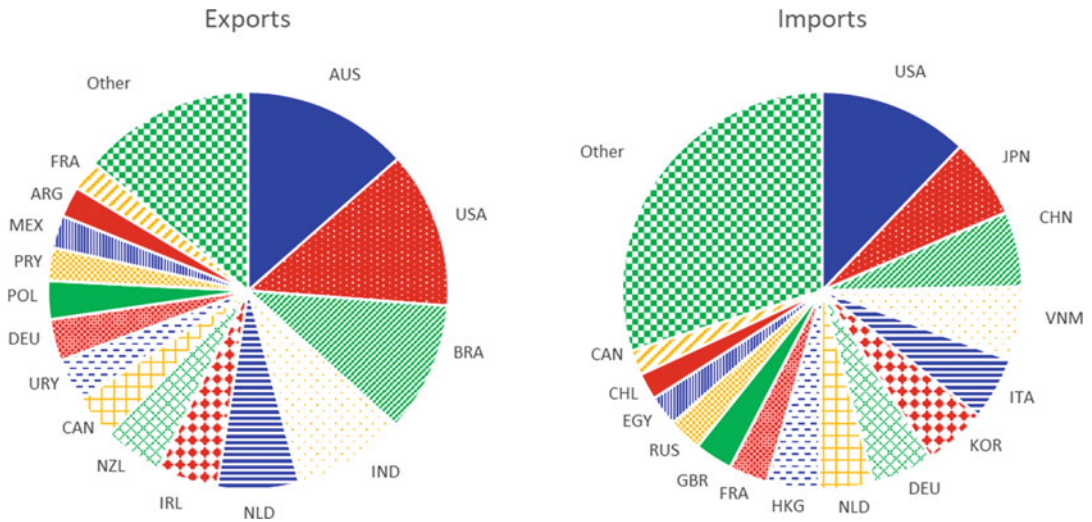


Green Economy and the Transition to Sustainable Development, Fig. 3 Source of CO₂ emissions, as percentage of total fuel combustion. Notes: Based on World Bank, World Development Indicators (WDI) dataset. Data downloaded on 12 June 2019

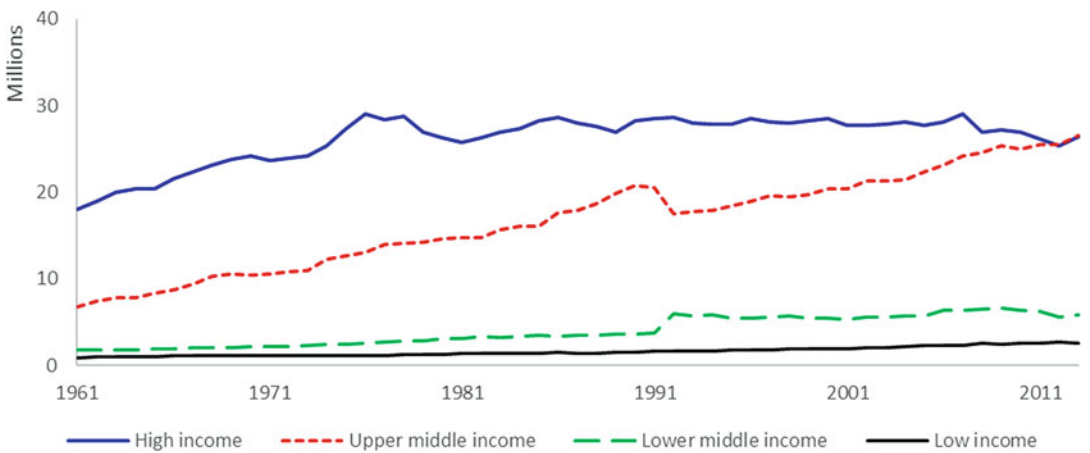
element 3, establishing the financial apparatus to give the support for new green technologies.

One way to investigate whether countries are becoming greener is by analyzing the evolution of green jobs and green investments. Yi (2013) conducts a regression analysis for the metropolitan areas in the United States to evaluate the impact of clean energy and climate policies on jobs and

finds a positive impact. Böhringer et al. (2012) find that a feed-in tariff policy increased employment in green sectors in Ontario, but overall unemployment increased as a result of the policy. Annandale et al. (2004) analyze green jobs in Australia and find that green jobs growth is higher than other employment growth in the period 1996–2004. However, Bird and Lawton (2009)



Green Economy and the Transition to Sustainable Development, Fig. 4 Exports and imports of meat bovine (fresh), percentage of world total, 2016. Notes: Based on FAO, Food and Agriculture data. Data downloaded on June 14, 2019. Based on export value and import value of meat bovine fresh, item code 1924



Green Economy and the Transition to Sustainable Development, Fig. 5 Consumption of meat, cattle, in US\$, 1961–2013. Notes: Based on FAO, Food and Agriculture data. Data downloaded on June 14, 2019. Based on

production value (meat indigenous, cattle; item code 944), export value, and import value of meat bovine fresh, item code 1924. Aggregation based on World Banks’ list of economies classification of June 2018

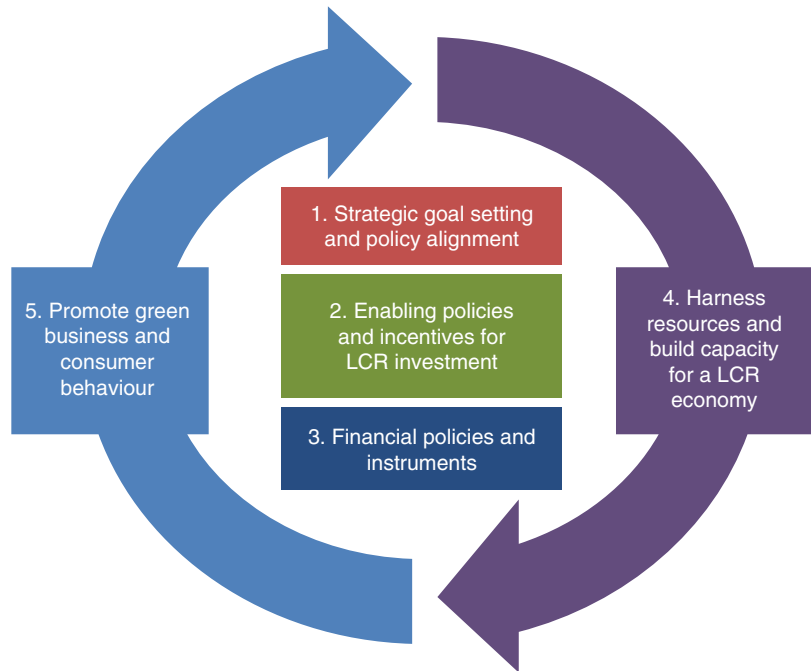
point to the fact that more jobs might be lost while transitioning to a green economy than created. Overall, there is no consensus in the literature about how the transitioning to a green economy will affect overall employment, even though the transitioning is associated with the creation of green jobs.

OECD (2017) raises four sub-questions/areas to answer the main question of whether an

economy is experiencing green growth. These areas are related to (i) efficiency of natural resources and environmental services; (ii) the level of the natural asset base; (iii) the benefits created by green initiatives to individuals; and (iv) the generation of economic opportunities. Based on these four areas, OECD (2017) defined a set of 26 indicators to monitor green growth. In addition, a set of socioeconomic indicators are

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Fig. 6 Toward a policy framework for green investment. (Source: Corfee-Morlot (2012), p. 10. LCR stands for low-carbon, climate-resilient development)



used to monitor the characteristics of growth, in terms of economic development, in particular poverty alleviation and social inclusion. Although extensive, this set of indicators is not exhaustive, and different indicators should be used to take into account local characteristics. Nonetheless, this wide range of indicators, covering diverse things such as biological diversity and training development, makes it unfeasible to classify countries as experiencing green growth or not. It is therefore a qualitative analysis instead of a classificatory exercise. Similarly, in general the emphasis lies on whether countries are transitioning toward a green economy instead of classifying countries as green or not.

Table 1 presents the OECD's suggested headline indicators to monitor green growth (OECD 2017). These indicators are multidimensional, and their individual analysis through time allows policy makers and other interested parties to have an overview of countries' development with respect to green growth. Countries experiencing green growth are by definition developing toward a greener economy. In the period from 1990 to 2015, indicators identified by OECD (2017) show that different countries are advancing

toward a greener economy through different means. Some countries have invested more in environmental technologies and innovation (e.g., Denmark), whereas others have experienced lower air pollution exposure (e.g., Iceland). Accordingly, the report enforces the need to look into a broad range of indicators. More research is still needed to evaluate development on a more global scale.

Transitioning to Green Economies

According to Ocampo (2013), green growth and the development of a green economy requires a substantial governmental role. Trade and investment can also help in the transition phase (Cosbey 2011). Khor (2011) lists nine policies and measures to promote a green economy (and thus sustainable development):

1. Recognition of the value of environmental resources, both from a social and from an economic perspective, so that governments can thus internalize the positive externalities associated with environmental resources.

Green Economy and the Transition to Sustainable Development, Table 1 – Six headline indicators to monitor green growth plus a placeholder for a future additional indicator

Headline indicators	
Environmental and resource productivity	
Carbon and energy productivity	1. CO ₂ productivity
Resource productivity	2. Non-energy material productivity
Multifactor productivity	3. Environmentally adjusted multifactor productivity
Natural asset base	
Renewable and nonrenewable stocks	4. Natural resource index
Biodiversity and ecosystems	5. Changes in land cover
Environmental quality of life	
Environmental health and risks	6. Population exposure to air pollution (PM _{2.5})
Economic opportunities and policy responses	
Technology and innovation	Placeholder: No indicator specified
Environmental goods and services	
Prices and transfers	
Regulations and management approaches	

Source: OECD (2017), p. 17

2. The conservation of resources and the restoration of damaged environments and ecosystems. There should be a reconciliation between the short-term benefits of exploring the environment and ecosystems, with the long-term benefits of conserving them.
 3. Getting the prices right and guaranteeing that access to basic goods and services will be met. Prices should reflect the real value of the goods and services, such as water, while at the same time guaranteeing access to the poor population.
 4. The public sector should have an active role. This active role should encompass regulation and strategic policy-making in industries such that their economic choices become aligned to social and environmental objectives.
 5. Market regulation. Governments should create the conditions to incentivize improvement in the environment by setting regulations and incentives for firms to become greener.
 6. Acknowledge the link between the livelihoods of rural communities and the environment by fostering the amelioration of their natural environment.
 7. Reform existing patterns of consumption. Current patterns of consumption are unsustainable and are placing significant pressure on the environment.
 8. Improvement of food security and sustainable agriculture. With the dual objective to eliminate hunger by providing the right to food and increase sustainability in the agricultural sector, trade relations need to be reviewed and rural livelihoods improved.
 9. Enforcing support to developing countries to establish and develop policies and efforts to become greener. This involves providing financial and technological assistance.
- Around the world initiatives to promote a green economy are taking place. Stimulated by the research and innovation program Horizon 2020, the EU is investing in nature-based solutions. Nature-based solutions are “. . . inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions.” Furthermore, “these nature-based solutions provide sustainable, cost-effective, multi-purpose and flexible alternatives for various objectives. Working with nature, rather than against it, can further pave the way towards a more resource efficient, competitive and greener

economy. It can also help to create new jobs and economic growth, through the manufacture and delivery of new products and services, which enhance the natural capital rather than deplete it” (EC 2019).

There is still little research on nature-based solutions. Those available, however, provide strong support for nature-based solutions to societal and environmental problems. Keestra et al. (2018) find that nature-based solutions can improve soil quality and landscape function, by, for example, decreasing hydrological risks and land degradation. The authors analyze diverse examples of nature-based solutions, including organic farming, land restoration, and wetland construction, and conclude that nature-based solutions can restore ecosystem services and therefore help to realize the sustainable development goals (see next section). Cohen-Shacham et al. (2016) describe ten case studies of nature-based solutions. The success attributed to these case studies is given by their inclusive, integrated approaches; the participation of stakeholders; the presence of a leader to mobilize the peers; the engagement of public and private sectors in setting up a partnership; the setup of solutions which are “locally grown”; the simultaneous search to address biodiversity and social benefits; and conducting a valuation analysis of the ecosystem in order to obtain the appropriate funding for the initiative. Maes and Jacobs (2017) argue that there is ample opportunity for nature-based solutions, but it requires dealing with political, economic, and scientific challenges.

Green Economies and the Sustainable Development Goals

In September 2015, 193 world leaders met in New York under the umbrella of the United Nations. These leaders agreed to follow 17 sustainable development goals which were set up during the UN Conference on Sustainable Development in Rio de Janeiro in 2012. These goals are interconnected and have three general objectives:

1. End extreme poverty
2. Fight inequality and injustice
3. Fix climate change

The Sustainable Development Goals (henceforth: SDG) expand on the Millennium Development Goals (a global effort starting in the year 2000 to combat poverty) by incorporating new areas such as climate change and sustainable consumption. In the 2015 meeting the world leaders set goals and targets to be implemented by 2030. Seven out of the 17 Sustainable Development Goals are directly related to the environment (see IAEG-SDGS 2016):

- Goal 6 – Clean water and sanitation
- Goal 7 – Affordable and clean energy
- Goal 11 – Sustainable cities and communities
- Goal 12 – Responsible consumption and production
- Goal 13 – Climate action
- Goal 14 – Life below water
- Goal 15 – Life on land

According to UNEP (2019), the green economy is closely related to five of the 17 Sustainable Development Goals:

- Goal 1 – No poverty
- Goal 8 – Decent work and economic growth
- Goal 9 – Industry, innovation, and infrastructure
- Goal 11 – Sustainable cities and communities
- Goal 12 – Sustainable consumption and production

All 17 Sustainable Development Goals are related, and therefore they are all somehow connected to the green economy. Moreover, sustainability is a prerequisite to achieve development and alleviate poverty, in particular in poorer countries, whose dependence on the environment is high. Dercon (2014) points out that the poor suffer the most from environmental damage and climate change, because they are often more dependent on agriculture. But also those in the

urban areas face difficulties, for example, because of higher exposure to pollution and inadequate access to water and sanitation. Additionally, the poor lack a financial safety net in case of a shock such as a bad harvest and extreme events.

Goal 1 – no poverty – foresees that tackling poverty requires a green agenda. A clean and balanced environment provides sources of jobs and income to the poor. This creates a brighter perspective for the future, allowing the poor to stay in their hometowns, which also has the positive effect of diminishing migration with the associated urban planning problems. In particular, Goal 1 encompasses expanding resilience of the poor to environmental shocks.

Goal 8 – decent work and economic growth – is closely related to the concept of a green economy, inasmuch as a green economy is one which is socially inclusive. Moreover, two of the targets associated with Goal 8 are linked to the environment. Target 8.4 is to decouple economic growth from environmental degradation, a main component of a green economy; and Target 8.9 stipulates the promotion of sustainable tourism, which has the double objective to stimulate the economy and conserve the environment.

All three aspects from Goal 9 – industry, innovation, and infrastructure – need attention to transition to a green economy. A green economy should have greener industries, stimulate green innovation, and replace or build infrastructure which is low carbon and resource efficient. Targets 9.1, 9.2, 9.4, and 9.a are all related to the environment. They involve developing sustainable and resilient infrastructure, promoting inclusive and sustainable industrialization, and the adoption of clean technologies and financial support to developing countries to establish green infrastructure.

Goal 11 – sustainable cities and communities – is part of a green economy and also related to the concept of a Green City. Sustainable cities and communities involve sustainable transport systems, housing facilities which create inclusion and are sustainable, protection against natural disasters, safe levels of air quality, availability of clean freshwater to all population while considering water conservation, waste management

collection, recycling and reuse of materials, and accessibility to green spaces. Sustainable cities and communities contribute to sustained standards of living in the long run by focusing on environmental quality and social equity.

Finally, a green economy fosters the realization of Goal 12 – sustainable consumption and production – given that a green economy foresees resource efficiency. To attain Goal 12, it is necessary to reduce waste, increase resource efficiency (e.g., water and energy), and decrease pollution which by contaminating either water, soil, or air can hinder future consumption and production.

Concluding Remarks

Green economy is a relatively new concept, with the underlying suggestion that the economy and the environment are not in competing positions. The concept also pertains social inclusion, thus aligning the economy and the environment with social demands. Throughout the world, progress has been made toward greening the economy, particularly in developed countries, but not uniformly and not always in the same direction. More research needs to be done to scrutinize-specific countries achievements and challenges. Additionally, it is fundamental to emphasize and correctly assign how the achievements have been made. In the end the objective is to have a green world. Praising progress of individual countries toward greening the economy can give a too optimistic view of worldwide trends.

In the case of developing countries, Ocampo (2013) proposes an investment-based strategy to bring about the transition toward a green economy, with a role for public and private investment. Technological progress is mostly experienced in developed countries. New environmental technologies need to be adapted and diffused in developing countries, which requires a deliberate technology policy. In this sense, trade policy can also foster the transition toward a green economy by decreasing trade barriers in environmentally friendly goods. Overall, the academic literature seems to agree that greening the economies of developing countries is fundamental for

sustainable development. Less agreement exists with *how* to foster a green growth strategy in developing countries, in particular.

For future research it is necessary to expand the work done for developed countries toward developing countries, for example, by applying the green growth indicators proposed by OECD in developing countries. Secondly, research should focus on the types of policies, instruments, and rules and regulations that have been successful and under which context and country. Finally, research needs to address the international linkages between countries, in terms of trade, foreign direct investment, and financing which can collaborate to a greener world.

Cross-References

► Green Cities

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