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1. Introduction: the emergence of the green economy

The emergence of the green economy at the international level, which has occurred in the last few years, has been driven by two main factors. On the one hand, the need to devise innovative solutions to address the great financial and economic crisis started in 2008, and on the other hand the need to tackle the climate change challenge, by promoting a progressive transition towards a low carbon economy.

The great financial and economic crisis is widely considered the most profound crisis since the Great Depression of the 1930s. The crisis started with the bursting of the US "housing bubble" and quickly affected the whole financial system, triggering the collapse of many financial institutions both in the US and in the rest of the world. The financial crisis rapidly extended to the whole economic system and led to a widespread global recession, which also sparked the European sovereign-debt crisis. Following the outburst of the crisis, most economies worldwide slowed down due to the credit crunch and the decline in international trade. Nowadays, the negative effects of the crisis are still felt in many countries.

The crisis has brought about many considerations about the necessity to question and reassess the very foundations of the mainstream economic model. In such a context, the green economy has been proposed and promoted as a possible solution to, at least partially, address such criticalities. The close relationship between the financial and economic crisis of 2008 and the emergence of the green economy concept is well explained by the following statement of UNEP: *"This recent traction for a green economy concept has no doubt been aided by widespread disillusionment with the prevailing economic paradigm, a sense of fatigue emanating from the many concurrent crises and market failures experienced*

during the very first decade of the new millennium, including especially the financial and economic crisis of 2008."1

The complexity of the present global scenario is enhanced by the climate change challenge, one of the most striking emergencies of our times, as it was confirmed by the outcomes of the September 2014 Climate Summit convened by the UN Secretary General Ban-Ki-Moon.2
From an institutional point of view, climate change reached the top of the international agenda towards the end of the 1980s, when the General Assembly of the United Nations, by means of Resolution 43/53 of 1998, defined climate change as a "common concern of mankind", which ought to be addressed by the international community by means of a coordinated action at a global level. 3 In the same year, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC), with the task of analysing and verifying in an objective, open and interdisciplinary way the state of scientific evidence related to climate change, in order to provide reliable scientific evidence upon which the international community could base its institutional and legal efforts to efficiently tackle climate change.4
Building on the findings of the first IPCC report, published in 1990, the Framework Convention on Climate Change (UNFCCC) was adopted in 1992. A few years later, the UNFCCC was supplemented by the 1997 Kyoto Protocol, which introduced the first binding greenhouse gases (GHG) mitigation and reduction commitments for the Annex I Parties to the UNFCCC. The first commitment period envisaged by the Kyoto Protocol spanned from 2008 to 2012 and was quite successful in relative terms, although in absolute terms it contributed very little to a true global GHG emission reduction. Later on, the first commitment period has been followed by a second commitment period, covering from 2013 to 2020, which involves a more limited number of countries and rather shows that the Kyoto Protocol has meanwhile lost its propulsive role.
At the time of writing, after several years of long lasting and quite disappointing international negotiations, the global community is currently waiting for the adoption of a

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1 UNEP, *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*, 2011, p. 14.
2 UN Climate Summit: Ban Ki-moon Final Summary, STATEMENT/25. SEP. 2014, http://newsroom.unfccc.int/unfccc-newsroom/un-climate-summit-ban-ki-moon-final-summary/.
3 Un General Assembly, Resolution 43/53 (1998).
4 On the climate change regulatory framework see *inter alia* L. Massai, *The Kyoto Protocol in the EU. European Community and the Member States under International and European Law*, TMC Asser Press, Springer, The Hague, 2011; M. Montini, *La risposta istituzionale al problema dei cambiamenti climatici*, in M. Montini (ed.), Il Protocollo di Kyoto e il *Clean Development Mechanism*: aspetti giuridici e istituzionali. L'esperienza nei Balcani, Giuffrè Editore, Milano, 2008, pp. 3-29; W. Th. Douma, L. Massai & M. Montini (eds.), *The Kyoto Protocol and Beyond: Legal and Policy Challenges of Climate Change*, T.M.C. Asser Press, Springer, The Hague, 2007; M. Montini, *Il cambiamento climatico e il Protocollo di Kyoto*, in Quaderni della Rivista Giuridica dell'Ambiente, Speciale 20 anni, Giuffrè, Milano, 2006, pp. 21 ss.; M. Peeters & K. Deketelaere (eds.), *EU Climate Change Policy: The Challenge of New Regulatory Initiatives*, Edward Elgar, Cheltenham, 2006; R. Verheyen, *Climate Change Damage and International Law*, Martinus Nijhoff Publishers, Leiden, 2005; D. Freestone & C. Streck, *Legal Aspects of Implementing the Kyoto Protocol Mechanisms,* Oxford University Press, Oxford, 2005; M. Bothe & E. Rehbinder, *Climate Change Policy*, Eleven International Publishing, Utrecht, 2005; B. Metz & M. Hulme (eds.), *Climate Policy Options post 2012: European Strategy, technology and adaptation after Kyoto*, Earthscan, London, 2005; F. Yamin & J. Depledge, *The International Climate Change Regime*, Cambridge University Press, Cambridge, 2004; D. Victor, *The Collapse of the Kyoto Protocol and Struggle to Slow Global Warming*, Princeton University Press, Princeton, 2004.

new global agreement, protocol or other international legal instrument on climate change, which may be hopefully agreed in the near future. In this sense, the harshest delusion was experienced at the 2009 Copenhagen Conference of the Parties (COP), which probably marked the lowest point for the international cooperation efforts at international level, showing the "lost momentum" for the possibility to reach a real consensus at a global level on rules and actions needed to promote an effective fight against climate change.5 However, new positive expectations have been raised up after the 2011 Durban and 2012 Doha COPs,6 which identified the 2015 Paris COP as the possible right time for adopting a new global agreement on climate change for regulating the post-2020 period. The new agreement, protocol or other international legal instrument should build on the findings of the most recent IPCC Reports, according to which the most serious planetary consequences of climate change might be avoided if the international community will manage to maintain the increase of the global average temperatures within the limit of 2 °C above pre-industrial levels.7 However, despite the good intentions of several countries, the possibility to reach a new "protocol, another legal instrument or an agreed outcome with legal force" by the 2015 Paris COP seems to be still very uncertain.

As to the relationship between the climate change challenge and the green economy, this is once again well explained by UNEP, in the following terms: "*A major challenge is reconciling the competing economic development aspirations of rich and poor countries in a world economy that is facing increasing climate change, energy insecurity and ecological scarcity. A green economy can meet this challenge by offering a development path that reduces carbon dependency promotes resource and energy efficiency and lessens environmental degradation.*"8

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5 M. Montini, *Reshaping Climate Governance for Post-2012*, in European Journal of Legal Studies, vol. 4 (1), 2011, pp. 7-24.

6 To this respect, the first remarkable step has been taken by COP 2011 in Durban which, by virtue of Decision 1/CP.17, launched a new negotiation process through the establishment of the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP), a subsidiary body hereby created under the UNFCCC, with the mandate to develop "*a protocol, another legal instrument or an agreed outcome with legal force under the Convention applicable to all Parties"* and to explore options to enhance the level of mitigation ambition (Decision 1/CP.17 paragraphs 7-8).

7 It generally understood that the 2 °C limited increase goal might be achieved if greenhouse gas concentrations in the atmosphere are kept below 550 ppm carbon dioxide equivalent by volume.

8 UNEP, *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*, 2011, p. 14.

2. The green economy

2.1 Green economy: origin, characteristics and definition

The origin of the green economy, as highlighted above, is deeply rooted in the concurrent contribution of the two already mentioned factors, namely the great financial and economic crisis started in 2008 and the climate change challenge. The green economy calls for the partial revision of the current dominant economic model, not so far as to plead for the departure from the "growth mantra" as the main reference concept for the world economy, but rather to promote the partial revision of such economic model towards a more sustainable, or simply a more green, approach. According to the green economy promoters and supporters, the proposed revision of the currently dominant economic model should lead towards the establishment of a low carbon economy, characterised by a greater recourse to technological innovation and the progressive substitution of fossil fuels with renewable energy sources.

The term green economy reached the international stage by means of the Global Green New Deal proposed by UNEP as a way to react to the great financial and economic crisis started in 2008. In this respect, it should be recalled that UNEP proposed and advocated the Global Green New Deal as a response to the crisis and as an instrument to steer the economic recovery towards a medium and long term greener perspective, as it emerges from the following excerpt:*"today's multiple crises demand the same kind of government leadership, but at the global scale and embracing a wider vision. A Global Green New Deal is proposed as a manifestation of that leadership. It refers to a set of globally coordinated large-scale stimulus packages and policy measures that have the potential to bring about global economic recovery in the short term, while laying the foundation for sustained economic growth in the medium- and long-term".*[9]

In the following years, the green economy was endorsed and supported by many international organisations dealing with economic and financial matters, by several governments at a global level and by the avant-garde of the business sector, including many multinational companies. Nowadays, the green economy perspective finds many supporters around the world. This is probably due to the fact that it promotes the need to revise and reassess the current economic model, while not contesting its foundational concepts, goals and instruments. Therefore, such a concept is apt to please a large number of organisations and people, which normally have quite different positions with regard to the development (and growth) agenda in a global perspective. Moreover, the green economy is considered by many as a useful instrument to try to balance the imperative of economic growth (albeit in a greener scenario)10 with the need to steer human development towards patterns which are

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[9] UNEP, Policy Brief "*Global Green New Deal*", 2009, p. 3. According to UNEP, the *Global Green New Deal* should be framed along three main objectives. In particular: "*It should make a major contribution to reviving the world economy, saving and creating jobs, and protecting vulnerable groups. It should promote sustainable and inclusive growth and the achievement of the MDGs, especially ending extreme poverty by 2015. Also, it must reduce carbon dependency and ecosystem degradation – these are key risks along a path to a sustainable world economy.*"
(http://www.uncclearn.org/global_green_new_deal_policy_brief).

[10] Green Growth Leaders, *Shaping the Green Growth Economy. A review of the public debate and the prospects for green growth*, The Berkeley Roundtable on the International Economy, 2011.

more responsive to the respect of the planetary boundaries.11 However, notwithstanding the widespread support to the green economy emerged in the last few years, one should be aware of its possible shortcomings, which are essentially related to the failure to question the underpinning reasoning and the main instruments and tools related to the application of the currently dominant neoclassical economic model. This issue, in particular, will be addressed later in the present paper. First of all, however, it seems useful to analyse in greater detail the most relevant issues related to the origin, the characteristics and the definition of the green economy.

The term green economy appeared for the first time in 1989 in a well known Report named Blueprint for green economy, which had been commissioned by the British government and was prepared by three leading environmental economists, namely Pearce, Markandya e Barbier.12 The main objective of such a Report was not to present an analysis of green economy itself, but rather to focus on the emerging concept of sustainable development. In such a context, the term green economy appears to have been used just in the title of the Report, while the analysis was limited to the concept of sustainable development.
As already mentioned above, the term green economy was re-launched as a response to the great financial and economic crisis started in 2008. In such context, as mentioned above, it was UNEP that advocated the use of the term green economy as a slogan to put under a single framework all of the possible initiatives related to the stimulus packages proposed at various levels to react to the global economic crisis which was underway. In order to support its call for the transition towards a green economy scenario at a global level, UNEP launched the so-called *"Green Economy Initiative"*, with the aim to create a reference scenario and a platform for exchanging experiences and initiatives adopted in this context by various countries around the world. [13] Within the scope of such an initiative, UNEP commissioned to Barbier, one of the economists who had authored the original 1989 *Blueprint for a Green Economy* report, a new Report, specifically dedicated to the exploration of the green economy scenario. The new Report, which was published in 2009 under the title a *Global Green New Deal* (GGND)[14], proposes the adoption of a series of policies and initiatives aimed at promoting the recovery of the world economy at a global level, while at the same time aiming at the improvement of its green dimension, in the framework of a sustainable development context. Within the framework of action proposed by the *Global Green New Deal* Report, the stimulus packages to be adopted at international level by different countries should be framed within a single global scenario, based on three main objectives: 1) make a major contribution to reviving the world economy, saving and creating jobs, and protecting vulnerable groups; 2) reduce carbon dependency and ecosystem degradation, putting economies on a path to clean and stable development; 3) further sustainable and inclusive growth, the achievement of the MDGs, and end extreme poverty by 2015.

It should be underlined that the Green Economy Initiative launched by UNEP as a concrete response the great financial and economic crisis started in 2008, which was backed by Barbier's Global Green New Deal report, had a relevant influence on the development of national economic policies and initiatives in many countries around the world in the

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[11] On the planetary boundaries see J. Rockström & J. D. Sachs with M. C. Öhman & G. Schmidt-Traub, *Sustainable Development and Planetary Boundaries*, Background Research Paper for the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda, 2013; J. Rockstrom, *et al.*, *A Safe Operating Space for Humanity*, in Nature, vol. 461, 2009, pp. 472-475.
[12] D. Pearce, A. Markandya & E. B. Barbier, *Blueprint for green economy*, Earthscan, London, 1989.
[13] UNEP, *Green Economy Initiative*, 2008,
http://www.unep.org/greeneconomy/AboutGEI/WhatisGEI/tabid/29784/Default.aspx
[14] UNEP*, Global Green New Deal (GGND),* 2009,
http://www.unep.org/pdf/A_Global_Green_New_Deal_Policy_Brief.pdf

following years and greatly contributed to the success of the green economy concept. Moreover, several other international organisations and agencies supported a global move towards the green economy. An example in this sense is represented by the publication in 2009 of a technical note issued by UNDESA (United Nations Department of Economic and Social Affairs), titled "A Global Green New Deal for Climate, Energy and Development",15 which suggested the adoption of a "big push" strategy, aiming at the achievement of some priority objectives, with a view to concretely promote the shift towards the green economy. The "big push" strategy, in particular, should aim at the following main results: "Drive down the cost of renewable energy, ramp up deployment in developing countries, end energy poverty, contribute to economic recovery and growth, generate employment in all countries and help avoid dangerous climate change".16 By so doing, according to UNDESA, the national investments aimed at the promotion of renewable energy sources, within a green economy perspective, would have the following positive results: "*Investment and cost reduction will generate a "virtuous cycle" of additional investment, economic growth, employment generation, energy security, geopolitical stability, international cooperation and emission reductions*".[17]

A clear evidence of the great success of the green economy concept in the last few years was represented by the fact that the "green economy in the context of sustainable development and poverty eradication" was identified as one of the two main themes of the Rio +20 Conference, which took place in 2012 in order to mark the 20th anniversary of the 1992 Rio Conference. In such context, however, despite the great expectations of the international community and the green economy supporters, the final outcome of the conference did not manage to ensure the full recognition of a widespread role for the green economy as the reference concept for all development policies at a global level. In fact, while in one of the preparatory reports of the 2012 Rio+20 Conference, the green economy was indicated as "*a lens for focusing on and seizing opportunities to advance economic and environmental goals simultaneously*", [18] the final outcome report of the conference titled "*The Future We Want*" simply referred to the green economy in the following terms: "*we consider green economy in the context of sustainable development and poverty eradication as one of the important tools available for achieving sustainable development and that it could provide options for policy making but should not be a rigid set of rules. We emphasize that it should contribute to eradicating poverty as well as sustained economic growth, enhancing social inclusion, improving human welfare and creating opportunities for employment and decent work for all, while maintaining the healthy functioning of the Earth's ecosystems*."[19]

Despite the great success experienced by the green economy in the last few years, there is yet no commonly agreed definition of such concept at international level. There are, instead, various relevant definitions of the term, which have been put forward by several international organisations, countries and NGOs. For the purpose of the present paper, I will consider as a reference the definition of green economy proposed by UNEP in its 2011 publication *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*.[20] Such a definition is a quite broad and encompassing one, insofar it

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15 UNDESA, *A Global Green New Deal for Climate, Energy and Development*, 2009, http://www.un.org/esa/dsd/resources/res_pdfs/publications/sdt_cc/cc_global_green_new_deal.pdf.

16 UNDESA, *A Global Green New Deal for Climate, Energy and Development*, cit., p. ii.

17 UNDESA, *A Global Green New Deal for Climate, Energy and Development*, cit.

18 Objective and Themes of the United Nations Conference on Sustainable Development, *Report of the Secretary-General* (UN Doc. A/CONF.216/PC/7, 22 December 2010) ("Objective and Themes"), § 24.

19 UN, *The Future We Want*, p. 9.

20 Given the role played by UNEP in the last few years for the promotion of green economy, its understanding of such concept is certainly of a paramount relevance for the present

aims to enhance the environmental and social dimensions of the concept, alongside its economic relevance:

> *"[Green economy is] one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. It is low carbon, resource efficient, and socially inclusive. In a green economy, growth in income and employment should be driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services. These investments need to be catalysed and supported by targeted public expenditure, policy reforms and regulation changes. The development path should maintain, enhance and, where necessary, rebuild natural capital as a critical economic asset and as a source of public benefits, especially for poor people whose livelihoods and security depend on nature."* [21]

2.2 Green economy: the relationship with sustainable development

As briefly mentioned above, the green economy concept historically originated in the late 1980s, in parallel with the emergence of the sustainable development concept at international level. However, its widespread recognition came much later. In fact, as already highlighted above, the green economy concept was fully developed only in the aftermath of the beginning of the great financial and economic crisis of 2008 as a catalyst of the multiple responses and initiatives aimed at tackling such a crisis both at international and national level. In such a context, the green economy seems to be logically linked to the sustainable development concept, insofar it may be understood as a possible operational modality to promote more sustainable development patterns, by fostering actions and enhancing international investments in greener sectors and initiatives, characterised by lower greenhouse gases emissions as well as by a more efficient and rational use of natural resources. In this sense, as it emerges also from the Report *Life Beyond Growth* by AtKisson, the green economy may be considered as a subset of sustainable development.[22]

The relationship between the green economy and sustainable development concepts became very close when the green economy, in the context of sustainable development and poverty eradication, was identified as one of the two priority themes of the 2012 Rio+20 Conference, as already mentioned above. In particular, the debate that took place before and during the 2012 Rio+20 Conference was largely focused on the characteristics and contents that the green economy should have in order to be able to play a relevant operational role with regard to the sustainable development objective. In this sense, it should be recalled that in one of the preparatory Reports to the Rio+20 Conference, the green economy was defined as one of

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analysis. However, there are several other definitions that might be taken into account in order to have a full appraisal of all the possible implications of the green economy concept. In this sense, a good reference source is represented by an UNDESA 2012 publication titled "*A guidebook to the Green Economy*", which contains a survey on the several definitions of the green economy concept proposed by some international organisations, countries and NGOs. See UNDESA, *A guidebook to the Green Economy. Issue 1: Green Economy, Green Growth, and Low-Carbon Development*, 2012.
http://www.uncsd2012.org/index.php?page=view&type=400&nr=528&menu=45#sthash.gx3QN4Jl.dpuf

[21] UNEP, *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*, 2011.

[22] A. AtKisson, *Life Beyond Growth. The history and possible future of alternatives to GDP-measured Growth-as-Usual Life Beyond Growth. Alternatives and Complements to GDP-Measured Growth as a Framing Concept for Social Progress*, 2012 Annual Survey Report of the Institute for Studies in Happiness, Economy, and Society — ISHES, Tokyo, Japan, 2012, p. 37.

the "*several mutually complementary constructions that have emerged to enhance convergence between the different dimensions of sustainable development, together with national sustainable development strategies, the Millennium Development Goals, integrated policy and planning, sustainable livelihoods and pro-poor approaches*".[23] On the basis of such definition, the green economy was understood and presented as an "*omnibus term, like sustainable development itself, which comprises a suite of economic instruments that could harness economic activity in support of one or more sustainable development goals*".[24]

However, despite the great expectations about the possible recognition of the green economy as the leading modality to achieve sustainable development and the broad discussions about the possible role of the green economy before and during the Rio+20 Conference, as already mentioned above, the final Declaration of the Conference titled "*The Future We Want*" limits itself to recognise that the green economy should be considered as "*one of the important tools available for achieving sustainable development*".[25] To this respect, it may be said that, on the one side, such an understanding of the green economy concept is quite relevant insofar it fully recognises the relevant operational rule that such a concept may play as a tool to be used in order to concretely promote sustainable development. On the other side, however, it seems to be a limitation on the potential scope of the concept, insofar it fails to recognise to the green economy a predominant role as compared to other possible instruments and tools for promoting sustainable development.
In sum, it may be concluded that, as correctly highlighted by Morgera and Savaresi, the legal implications of the green economy and its capacity to contribute to the achievement of sustainable development remain difficult to ascertain.[26] This notwithstanding, it can be argued that the analysis conducted so far shows that the green economy may be already considered as an operational modality to promote sustainable development, despite the lack of a common understanding at international level on its precise content and definition.
Building on the analysis of the green economy concept, in relation to sustainable development, in the next paragraph I will introduce and present some economic instruments which have emerged in the last few years for the promotion of climate change related international investments. Such instruments, named flexibility mechanisms, in my opinion represent paradigmatic examples of green economy tools, insofar they have a twofold objective. In fact, they aim at enhancing sustainable development by promoting the deployment of international investments, in particular in developing countries, while at the same time contributing to the fight against climate change, by enabling the realisation of projects which have the potential to contribute to the global efforts for the reduction of GHG emissions.
To this effect, it should be mentioned that, according to their promoters and supporters, climate change related international investments may have the positive indirect effect of promoting environmental protection through the achievement of GHG emission reductions. However, as it will emerge from the analysis that will be conducted below, there might be also some environmental risks associated with the development of such investment projects. In fact, the identification of such risks will be the object of the analysis in the following paragraphs.

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[23] UN Secretary General, *Progress to Date and Remaining Gaps in the Implementation of the Outcomes of the Major Summits in the Area of Sustainable Development, as well as an Analysis of the Themes of the Conference, Summary* (UN Doc. A/CONF.216/PC/2, 1 April 2010), § 43.
[24] UN Secretary General, *Progress to Date and Remaining Gaps in the Implementation of the Outcomes of the Major Summits in the Area of Sustainable Development, as well as an analysis of the themes of the Conference,* 2010, p. 19. cit., § 57.
[25] *Rio+20 Declaration, The Future We Want*, § 56.
[26] E. Morgera and A. Savaresi, *A Conceptual and Legal Perspective on the Green Economy*, cit., p. 28.

3. Climate change related investments

3.1 Climate change related investments: the relevant context

In the last few years, the emergence of the green economy has been coupled with the progressive introduction of several economic instruments aimed at facilitating the fulfilment of the environmental commitments by the contracting Parties to several environmental law conventions.
A relevant example in this sense is represented by the flexibility mechanisms introduced by the Kyoto Protocol on climate change, which will be analysed in greater details below. The economic rationale of the flexibility mechanisms is to enable the Parties with binding reduction commitments under the Kyoto Protocol to partially meet their obligations through the promotion of projects for the reduction of GHG emissions in other Annex I Parties to the UNFCCC - with the Joint Implementation (JI) - or in Non-Annex I Parties - with the Clean Development Mechanism (CDM) - or by trading in emission reduction units with other Annex I Parties - with the Emission Trading (ET).
It should be underlined that a major feature of the flexibility mechanisms is their facilitative role for the promotion of climate change related investment projects, which aims at the same time at contributing to the fight against climate change as well as at fostering sustainable development patterns in the host countries. In this sense, the realisation of investment projects in the framework of the flexibility mechanisms is presented, by its promoters and supporters as a "*win-win opportunity*". This is due to the fact that it might lead to the achievement of a "double dividend", by satisfying at the same time GHG reduction goals, related to the fight against climate change, as well as (sustainable) development objectives, related to the realisation of foreign direct investment, mostly in developing or less developed countries.
It is within such a relevant context that the flexibility mechanisms foreseen by the Kyoto Protocol need to be analysed and assessed as possible drivers of climate change related investments within the green economy scenario.

3.2 Climate change related investments: the Kyoto Protocol flexibility mechanisms

Despite the unsatisfactory contribution given by the Kyoto Protocol in terms of its contribution to the absolute reduction of GHG emissions globally, it must be acknowledged that, in the last few years, it has inspired and promoted, both directly and indirectly, the realisation of a huge number of international emission reductions projects, which have often involved the establishment of bilateral partnerships among various Annex I as well as Non-Annex I Parties to the UNFCCC. As already mentioned above, this trend has been largely driven by the implementation of the flexibility mechanisms foreseen by the Kyoto Protocol, which have promoted a large flow of climate change related investments.

The three flexibility mechanisms foreseen by the Kyoto Protocol are two project-based instruments, namely the Clean Development Mechanism and the Joint Implementation, and one market-based tool, namely the Emission Trading.[27]

The first mechanism envisaged by the Kyoto Protocol is the Joint Implementation (JI), a market-based instrument, which is defined as follows in article 6 of the Kyoto Protocol: *"For the purpose of meeting its commitments under Article 3, any Party included in Annex I may transfer to, or acquire from, any other such Party emission reduction units resulting from projects aimed at reducing anthropogenic emissions by sources or enhancing anthropogenic removals by sinks of greenhouse gases in any sector of the economy"*. In brief, the JI foresees the performance of project activities carried out by Annex I Parties into the territory of other Annex I countries, with the aim of reducing GHG emissions and generating Emission Reduction Units (ERUs), which are equivalent to one tonne of CO_2 and may be traded on the carbon market. The issuance of ERUs is made by the host Party (under the JI Track 1 procedure), or, alternatively, by the JI Supervisory Committee (under the JI Track 2 procedure). The Kyoto Protocol does not spell out the detailed rules and procedures for the functioning of the JI mechanism. Instead, such rules and procedures, covering project eligibility requirements, stages of approval, entities involved and ERUs issuance have been adopted at a later stage by the Conference of the Parties to the Kyoto Protocol.[28] In sum, it may be said that, despite a slow start, the JI mechanism has been quite a successful instrument, as shown by the available data on the quantity of projects realised and the total amount of ERUs issued.[29]

The second mechanism foreseen by Kyoto Protocol is the Clean Development Mechanism (CDM), which is defined in article 12 of the Kyoto Protocol as an instrument aiming *"to assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention, and to assist Parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments under Article 3 of the Kyoto Protocol"*. In brief, the CDM foresees project activities carried out by Annex I Parties into the territory of non-Annex I Parties, in order to earn Certified Emission Reductions (CERs), each one being equivalent to one tonne of CO_2. The so obtained CERs are tradable and may be sold in the related carbon market, and ultimately may be used by Annex I Parties to meet a part of their emission reduction targets under the Kyoto Protocol. Therefore, it may be said that, likewise the JI, also the CDM is a project-based instrument, which aims at generating carbon credits. However, contrary to the JI, it foresees the participation of both Annex I Parties, as project proponents, and non-Annex I Parties, as project recipients.
As already seen above with regard to the JI, the Kyoto Protocol did not determine the operational rules and procedures for the functioning of the CDM. Also in the case of the CDM mechanism, the detailed rules regulating projects requirements, supervision, project cycle, entities and authorities involved, as well as CERs issuance, have been defined at a later stage by the Conference of the Parties to the Kyoto Protocol.[30] In sum, it may be said that the CDM mechanism has been the most successful instrument, among those foreseen by the

[27] See in general D. Freestone & C. Streck, *Legal Aspects of Implementing the Kyoto Protocol Mechanisms*, Oxford University Press, Oxford, 2005.
[28] See Decision 2/CMP.2, www.unfccc.org.
[29] The latest available data report a total of 761 JI projects, for a total of 863.516.000 issued. Ukraine is by far the leading host country with 321 JI projects, followed by the Russian Federation accounting for 182 projects (source: UNEP/DTU partnership, JI projects, http://www.cdmpipeline.org/ji-projects.htm (last updated, 16 April 2015).
[30] See Decision 5/CMP.1, www.unfccc.org.

Kyoto Protocol, as it is very well demonstrated by the available data on the CDM projects by quantity, by type and the host region, as well as by the total amount of CERs issued.[31]
In addition to the two project-based mechanisms just analysed above, the Kyoto Protocol also foresees a market-based mechanism, namely the Emission Trading, also known as International Emission Trading (IET). This is defined as such by article 17 of the Kyoto Protocol: *"Parties included in Annex B may participate in emissions trading for the purposes of fulfilling their commitments under Article 3. Any such trading shall be supplemental to domestic actions for the purpose of meeting quantified emission limitation and reduction commitments under that article"*. In brief, the IET mechanism works as follows. Annex B Parties to the Kyoto Protocol (corresponding to the Annex I Parties to the UNFCCC) have been given reduction targets corresponding to specific levels of allowed emissions, or "assigned amounts," over the 2008-2012 commitment period, which are divided into "assigned amount units" (AAUs). The IET allows any Annex B Party which has AAUs in excess (i.e.: not used for compliance purposes) to sell them in the related carbon market to other Annex B Parties that are exceeding their targets, in order to enable them to meet their emission reductions commitments. Also with regard to the IET, the relevant procedures for its functioning have not been determined directly by the Kyoto Protocol. Once again, it has been the Conference of the Parties to define the relevant modalities, rules and guidelines for IET at a later stage[32]. With specific regard to this mechanism, it should be highlighted that it is not quite clear whether the functioning of the IET has been as successful as the CDM and JI, since there are no available data published by either the UNFCCC or by other international organisation on the number of AAUs traded.[33]

Despite the difficulty experienced at international level with the functioning of the IET mechanism, it must be recognised that such an instrument, in recent years, has been the main inspiration source for the development of a broad series of emission trading schemes (ETSs), operating at national and regional level.[34] To this respect, it should be noted that most ETSs have been promoted and instituted by Annex I Parties, that is by Parties with binding emission reduction commitments under the Kyoto Protocol. An example in the sense is represented by the European Union and its Member states, which have developed a very ample ETS, operating at pan-European level, which is characterised by a broad geographical scope and sectorial coverage.
There are however other ETSs that have been established in other countries which do not have binding reduction commitments under the Kyoto Protocol. The first example in this sense is represented by the United States, which despite not having an ETS established at federal level, have witnessed the establishment of two relevant ETSs, operating at state level. The first one, namely the Regional Greenhouse Gas Initiative (RGGI) is operating in nine states of the US East Coast, whereas the other ETS is operating in the State of California.
Moreover, even the People's Republic of China, which, as a non-Annex I country, does not have any binding reduction commitment under the Kyoto Protocol, has launched in 2013 the

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[31] The latest available data on the CDM mechanism report a total of more than 8.694 CDM projects, for a total of 1.540.768.000 CERs issued (source: UNEP/DTU partnership, CDM projects by type, http://www.cdmpipeline.org/cdm-projects-type.htm (last updated, 1 October 2014)). The vast majority of CDM projects have been hosted by the Asia and Pacific Area (81.7%, out of which 55.7% hosted by China and 29.2% by India), followed, at long distance, by Latin America (13,2%) and Africa (2.8%) (source: UNEP/DTU partnership, CDM projects by host region, http://www.cdmpipeline.org/cdm-projects-region.htm (last updated, 1 October 2014)).
[32] See Decision 11/CMP.1, www.unfccc.org.
[33] See http://unfccc.int/kyoto_protocol/mechanisms/emissions_trading/items/2731.php.
[34] On this issue see the World Bank *Pricing Carbon* programme, which contains detailed analyses of all the existing ETSs, as well as the related yearly publication *State and Trends of Carbon Pricing*. See also S. Bogojevic, *Emissions Trading Schemes. Markets, States and Law*, Hart Publishing, Oxford, 2013.

institution of seven pilot ETSs, operating at the level of the Chinese Provinces, corresponding to the state level if compared to other jurisdictions. According to the Chinese plans, the experience gained in the functioning of the seven pilot ETSs will be used in order to determine whether it will be feasible and convenient to develop a countrywide national ETS in the future.
Another relevant ETS operating at national level has been developed in the last few years by Australia. The Australian ETS represents a very peculiar example in this context. In fact, it started operating in 2012, but shortly after its start, it was firstly suspended and then repealed, following a change in the political majority after the Australian 2013 general elections. The experience of the Australian ETS is particularly relevant, insofar it shows the difficulty that some countries may encounter in establishing emission trading schemes. This is essentially due to the critical fact that those regimes, differently from what was originally conceived by the IET mechanism foreseen by the Kyoto Protocol, which was addressed to the countries themselves, are based on the imposition of emission reduction obligations directly on the industrial installations located in the territory of the relevant countries.
At this point, it should be underlined that the relevance for the present analysis of the ETSs operating at national or regional level is given by the fact that such regimes, despite being market-based instruments, normally foresee the possibility of a "linking" with some project-based instruments, either at the international or at the national or regional level. This is the case for instance with regard to the EU ETS, which enables the possibility for the participating entities to trade within the European carbon market ERUs or CERs gained through the realisation of JI or CDM projects. In fact, the existence of such a linking possibility may give an important incentive to the interested parties for the promotion of climate change related investments connected with the implementation of the JI and CDM mechanisms. In fact, if one considers that there might be a non-negligible difference in the generation cost of emission reduction credits through the JI and CDM projects with respect to the cost of the emission units traded under the national or regional ETSs, it may become economically convenient for some operators to increase the number of units that they might be able to trade on the carbon market. If this is the case, the consequence might be that operators have an incentive to promote and realise a higher number of climate change related investment projects in order to increase the number of their tradable units in the national or regional carbon markets.

On the basis of the analysis of the three existing flexibility mechanism and the most relevant ETSs developed at national or regional level around the world, no doubt can be raised on the existence of a comprehensive regulatory framework at international level, aiming at the promotion of foreign direct investments, related to the fight against climate change. In fact, the operation of the project-based and the market-based mechanisms envisaged under the Kyoto Protocol, combined with the functioning of the several existing ETSs, decisively point to the direction of trying to promote and facilitate climate change related investments.
However, as I will discuss in the next paragraph, the implementation of such a facilitative regulatory framework for the development of climate change related investment projects does not necessarily lead only to positive outcomes. In fact, it may also entail some relevant risks, relating in particular to the emergence of a structural imbalance between the potentially conflicting interests relating, on the one side, to the investment promotion plus the contribution to the fight against climate change, as opposed, on the other side, to the protection of the environment, in a more traditional and general sense. Such a structural imbalance seems to give rise to a new type of investment versus environment conflict, as it will be better explained in the next paragraph.

4. The rise of "internal environmental conflicts"

41. The internal environmental conflicts: the concept

The new type of investment versus environment conflict mentioned above resembles for many respects the traditional investment versus environment conflict, which is characterised by the opposition between the interests related to the investment promotion on the one side and those linked to the environmental protection on the other side. Such a traditional type of conflict has emerged in recent times in many controversies, dealing with the interpretation and application of bilateral investment agreements (BITs) or of multilateral investment treaties, such as for instance the NAFTA or the Energy Charter Treaty (ECT), which have been adjudicated by international arbitral tribunals set up under the ICSID Convention or other similar legal instruments. The decisions of arbitral courts and tribunals that have analysed and settled such traditional types of investment versus environment conflicts have given rise to a broad, but often not very consistent, case-law. In fact, such a case-law has been subject to a certain criticism by several international law scholars, in particular insofar it has generally not been able to give a proper consideration to the environmental interests opposed to the (normally prevailing) investment interests.[35]

There is, however, a very relevant difference between the traditional type of investment versus environment conflicts and the new type of conflicts highlighted above. Such a difference lies in the fact that the new type of conflict substantially derives from the realisation of climate change related investments induced by the implementation of the project-based and market-based mechanisms foreseen or somehow related to the Kyoto Protocol. As already mentioned, these mechanisms are intended to induce climate change related investments in the green economy scenario, by promoting a twofold objective. On the one side they aim at contributing to the reduction of GHG emissions, while on the other side they aim at supporting host countries in their sustainable development patterns. In other words, as already noted above, they claim to pursue a "win-win objective", insofar they may produce a "double dividend", related on the one side to positive results in terms of increased international investments and on the other side to an improved fight against climate change.

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[35] On this issue see among others J. Vinuales, *Foreign Investment and the Environment in International Law*, Cambridge, CUP, 2012; V. Vadi, *Cultural Heritage in International Investment Law and Arbitration*, Cambridge: CUP, 2014; V. Vadi, *Public Health in International Investment Law and Arbitration*, Abingdon: Routledge, 2013; S. Di Benedetto, *International Investment Law and the Environment*, Cheltenham: Elgar, 2013; K. Tienhaara, *The Expropriation of Environmental Governance*, Cambridge: CUP, 2009.

These features of the said mechanisms enable their promoters and supporters to claim that they should be considered proper tools to promote sustainable development, in a green economy perspective, insofar they can contribute to the achievement of sustainable development patterns in the host countries, by promoting the realisation of international investments characterised by technological innovation, low carbon emissions and a reduced use of natural resources. In fact, the combined presence of all of these relevant positive features in the climate change related investments may lead to the conclusion there they are truly able to substantially contribute to the achievement of both investment and environmental interests at the same time.

However, I am not convinced that this is necessarily always the case. Instead, it seems to me that several doubts may be casted on the capability of such mechanisms to improve or solve all the problems related to the complex relationship between the conflicting investment and environmental interests. In fact, despite their capacity to present themselves as the ideal mechanisms for promoting sustainable development, due to their double dividend potential, it is not possible to exclude *a priori* the possible emergence of negative consequences for the environment which may be linked to the implementation of such mechanisms. This is evident if one considers the environmental interests in a broader sense, not limiting the analysis to the climate changes related interests, but rather including also the more traditional interests linked to the protection of the environment from any kind of pollution or depletion of natural resources. In fact, the realisation of climate change related investments might sometimes lead to negative consequences for the ecological balance, or more generally for the sustainable development, of the affected lands. This might be the case, for instance, with regard to projects related to the construction of new power stations, even in case that they would be powered with renewable sources, thus ultimately leading to the reduction of GHG emissions, if compared with conventional power stations. In such a circumstance, no one can obviously deny the beneficial effects that such projects may have in terms of GHG emission reductions; however, this does not necessarily mean that such a kind of projects may not entail any negative consequences for the land where they will be localised, if one considers all the possible risks for the environment, intended in a more traditional and general sense.

Quite to the contrary, the realisation of climate change related investments induced by the above-mentioned mechanisms, within a green economy scenario, may have the consequence of creating a new type of investment versus environment conflict, which is characterised by an internal environmental dimension. Such a new type of conflict, which may be defined as an "internal environmental conflict", seems to represent an evolution of the traditional investment versus environment conflict, which presents partially different and peculiar characteristics. In fact, in the framework of such a new type of conflict, the traditional interests related to the promotion of international investments are sided and reinforced by climate change related interests, linked to the GHG emission reduction, while on the other side remain the (weakened) traditional and general environmental interests, related to the protection of the environment of a given land which may be damaged by the localisation of an international investment project. As a consequence, it seems that within the new type of "internal environmental conflict" the relative strength of the traditionally opposed (investment and environmental) interests is altered by the presence of climate change related interests, which seem to reinforce the investment side of the controversy, while at the same time paradoxically reducing the strength of the environmental side. In other words, when an internal environmental conflict emerges, in connection with the realisation of climate change related investments, this creates a sort of "increased risk" for the environment of the land affected by the relevant investment.

In sum, it may be concluded that the "internal environmental conflict" described above basically derives from the current international trend of conflating all the environmental issues into climate change ones. In the last decades, in fact, climate change has become at a global level the leading environmental problem, downgrading all the other environmental issues to a secondary role. However, despite the relevance and seriousness of the climate change question, its prominence should not be used as a justification for giving a green light to every kind of investment (even when it may entail negative consequences for the

environment), simply on the basis of real (or alleged) GHG emissions reductions, thus downgrading any other environmental requirement or consideration. Instead, I am convinced that, quite on the contrary, when a climate change related investment is proposed, the inherent ecological features of the land where the relevant projects are going to be localised should be thoroughly analysed and assessed, and the ecological interests at stake should be carefully balanced with the climate change related expected gains, through a comprehensive and holistic evaluation process.

4.2 The internal environmental conflicts: types of projects

The internal environmental conflicts described above may emerge from several types of projects related to the fight against climate change. To this respect, the relevant activities may range from the extraction of unconventional fossil fuels (e.g. shale gas), to the energy production from renewable energy sources, to the recourse to the carbon capture and storage technique, which may in various ways negatively affect the land where they are going to be placed.

For instance, as far as energy production plants are concerned, some criticalities may arise involving both non-renewable and renewable sources of energy. As for non-renewable ones, an interesting example is represented by the extraction of the so-called "unconventional fossil fuels" which, due to their peculiar geological location, cannot be extracted with conventional drilling. Unconventional gas in particular, in the form of "shale-gas", is gaining a growing attention at international level as a means to fight climate change. In fact, gas is the lowest CO_2 emitter if compared to the other fossil fuels.[36] However, this feature should be coupled with the following one: methane, the main component of natural gas, "when released into the atmosphere is 86 to 105 times as powerful as CO_2 at disrupting the climate over a 20 year period".[37] Although compared with CO_2, methane emissions associated with the burning of fossil fuels are very small,[38] it should be taken into consideration that, as reported by Greenpeace, the IPCC calculated that methane is 34 times stronger as a heat-trapping gas than CO_2 over a 100-year time scale (according to EPA, the comparative impact of methane on climate change is over 20 times greater than CO_2 over a 100-year period),[39] meaning that its heat-trapping strength is nearly 40% greater than the previously estimated 25%. Furthermore, the alleged advantage of unconventional gas in terms of climate change mitigation should be carefully scrutinised and balanced with the possible (or likely) disadvantages in terms of its overall environmental impacts. In fact, the technique used to extract the shale-gas (the so-called fracking) has the potential to seriously interfere with an essential environmental resource, namely water, in two ways. Firstly, such a technique consumes huge quantities of water (it has been estimated between 9.000 and 29.000 cubic

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[36] The amount of CO_2 produced when a fuel is burned is a function of the carbon content of the fuel. The pounds of CO_2 emitted per million Btu of energy for various fuels are as follows: Coal (anthracite) 228.6, Coal (bituminous) 205.7, Coal (lignite) 215.4, Coal (subbituminous) 214.3, Diesel fuel & heating oil 161.3, Gasoline 157.2, Propane 139.0, Natural gas 117.0 (see EIA, How much carbon dioxide is produced when different fuels are burned?, http://www.eia.gov/tools/faqs/faq.cfm?id=73&t=11).

[37] Greenpeace, Natural Gas and Global Warming - Methane's Contribution to Global Warming, http://www.greenpeace.org/usa/en/campaigns/global-warming-and-energy/science/Natural-Gas-and-Global-Warming/.

[38] Ecofys, Effects of New Fossil Fuel Developments on the Possibilities of Meeting 2°C Scenarios - Final Report, 2012, p. 9.

[39] EPA, United States Environment Protection Agency, http://epa.gov/climatechange/ghgemissions/gases/ch4.html#ref1.

meters of water per year for each gas well);[40] secondly, it affects the aquifers, by polluting them with the chemical additives used in the extraction process.[41] Moreover, some concerns have been raised regarding the presumed implications of fracking for the overall geological stability of the concerned land. Lastly, and more surprisingly, the extraction of shale gas also entails fugitive methane emissions, which, to a certain extent, could counterbalance the low levels of GHG emissions usually associated with gas.[42] While the United States are supporting this technique, in Europe only Great Britain and Poland have so far decided to engage in shale gas exploitation. The European Union, on its side, has a fluctuating attitude towards such energy source: after issuing in 2014 both a Recommendation on minimum principles for the exploration and production of hydrocarbons (such as shale gas) using high volume hydraulic fracturing [43] and a Communication on the exploration and production of hydrocarbons (such as shale gas) using high volume hydraulic fracturing in the EU,[44] it is now showing a more cautious approach towards promoting an EU-wide regulation of this matter, thus substantially leaving any decision to the discretionary powers of its Member States.

Moreover, with regard to the energy production by means of renewable energy sources, it should be noted that also the construction of new power plants may present some criticalities, in terms of environmental risks, which ought to be weighed against the alleged gains related to climate change and energy considerations. The most relevant critical features may be represented by the possible aesthetic impacts on the affected landscape and by the occurrence of the so-called "land consumption phenomenon".[45] In this sense, wind farms and ground-mounted photovoltaic plants, in particular, represent relevant examples of projects where interests related to the use of renewable energy sources may sometimes conflict with environmental protection ones. In fact, such types of power plants may unarguably have a non-negligible impact on the land where they are placed, by altering the traditional landscape and by diverting land from its traditional use.

In fact, in some circumstances, the construction of renewable energy power plants in rural areas may give rise to a certain degree of competition between energy production uses and agriculture/food production uses on the same land. This might give rise to conflicts where it

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[40] Tyndall Centre for Climate Change Research, Shale gas: an updated assessment of environmental and climate change impacts, 2011, http://tyndall.ac.uk/sites/default/files/coop_shale_gas_report_update_v3.10.pdf.

[41] On the pollution of water see for instance T. H. Darrah *et al.*, *Noble Gases Identify the Mechanisms of Fugitive Gas Contamination in Drinking Water Wells Overlying the Marcellus and Barnett Shales*, in PNAS, 2014, vol. 111, n. 39, pp. 14076–14080; A. Vengosh *et al.*, *A Critical Review of the Risks to Water Resources from Unconventional Shale Gas Development and Hydraulic Fracturing in the United States*, in Environmental Science and Technology, 2014, vol. 48, n. 15, pp. 8334–8348.

[42] A. R. Brandt *et al.*, *Methane Leaks from North American Natural Gas Systems*, in Science, vol. 343, 2014, pp. 733–35; D. T. Allen *et al.*, *Measurements of Methane Emissions at Natural Gas Production Sites in the United States*, in PNAS, vol. 110, 2013, pp. 17768–17773; D. R. Caulton *et al.*, *Toward a Better Understanding and Quantification of Methane Emissions from Shale Gas Development*, in PNAS, vol. 110, 2014, pp. 6237–6242; S. M. Miller *et al.*, *Anthropogenic emissions of methane in the United States*, in PNAS, vol. 110, 2013, pp. 20018–20022

[43] European Commission, *Recommendation of 22 January 2014 on minimum principles* for *the exploration and production of hydrocarbons (such as shale gas) using high volume hydraulic fracturing,* OJ L39/72.

[44] European Commission, *Communication on the exploration and production of hydrocarbons (such as shale gas) using high volume hydraulic fracturing in the EU*, COM(2014)23.

[45] The so–called "land consumption phenomenon" consists in the progressive loss of pristine and agriculture land for the development of industrial, commercial and residential buildings and facilities.

is not easy to establish which of the competing interests at stake should prevail over the others, especially when the affected land belongs to rural areas with a high landscape or naturalistic value.

Finally, similar remarks could be made with regard to the recourse to the carbon capture and storage (CCS) technique as well. Such a technique consists of capturing carbon dioxide emissions from coal or gas burning power plants and transferring the captured CO_2 as high-pressure liquid carbon dioxide into underground geologic formations. Due to its potentially relevant role in reducing CO_2 associated with the use of conventional fossil fuels, CCS is widely supported as an effective means to fight climate change, despite its limited concrete application on a large scale up to date. However, CCS has a certain potential to negatively affect the land where the relevant plant is located. In fact, as discussed more extensively elsewhere,[46] the complex CCS technology entails various risks, still partially unexplored, for both the environment and human health.[47] Furthermore, as noted above with respect to fracking, also the CCS technique, which involves the injection of large volumes of CO_2 into the brittle rocks, may represent a potential risk for geological stability of the affected land.[48]

[46] M. Montini and E. Orlando, Balancing climate change mitigation and environmental protection interests in the EU Directive on carbon capture and storage, in Climate Law 3 (2012), pp. 165–180.

[47] For a quick, yet exhaustive, overview on the health and environmental risks, see, for instance, J. Fogarty and M. McCally, Health and Safety Risks of Carbon Capture and Storage, Commentary, in JAMA, January 6, 2010—Vol 303, No. 1, pp. 67-68.

[48] See, for instance, M. D. Zobacka and S. M. Gorelick, Earthquake triggering and large-scale geologic storage of carbon dioxide, in PNAS, 2012, vol. 109, No. 26, pp. 10164-10168.

5. How to manage and solve internal environmental conflicts?

5.1 Beyond the green economy

The rise of the "internal environmental conflicts" shows that the green economy, while not being a panacea for all the evils of the neoclassical economic model, may paradoxically contribute to the creation of further problems, in particular from an environmental perspective. The emergence of such problems demonstrates that there is an inherent inefficacy in the green economy approach, insofar it does not clearly departs from the mainstream economic approach and tries to promote its mere partial revision while not questioning its basic foundations, assumptions and objectives.

The great financial and economic crisis started in 2008 has shown a reality which had remained, more or less intentionally, veiled so far: the impossibility of a limitless economic growth in a limited Planet.[49] The present crisis is just providing an evidence of the failure of the neoclassical economic model (neo-liberalism), which has characterized the last decades. A major shortcoming of such a model is that it is based on the GDP growth as the major (if not unique) indicator of development. [50] Moreover, it adopts a sectoral thinking, which tends to separate the economic dimension from the environmental, social and cultural ones. For

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[49] This finding was already evident in the well-known 1972 Limits to Growth report (D. H. Meadows, D. L. Meadows, J. Randers & W. W. Behrens III, *The Limits to Growth*, Potomac Associates, Washington, 1972). Moreover, the concept was restated and better refined in the following reports by the same authors: D. H. Meadows, D. L. Meadows & J. Randers, *Limits to Growth: The 30-Year Update*, Club of Rome, 2004; D. H. Meadows, D. L. Meadows & J. Randers, *Beyond the Limits: Confronting Global Collapse, Envisioning a Sustainable Future*, Club of Rome, 1992; J. Randers, *2052: A Global Forecast for the Next Forty Years*, Club of Rome, 2012.

[50] Nowadays, GDP, although called into question by many scholars and institutions which have investigated on alternative indicators, still plays a leading role as the most commonly used indicator of development. On this issue see A. AtKisson, *Life Beyond Growth. Alternatives and Complements to GDP-Measured Growth as a Framing Concept for Social Progress*, cit.; European Commission, *Communication GDP and beyond: measuring progress in a changing world*, COM(2009)433, 2009; R. Costanza, M. Hart, S. Posner & J. Talberth, *Beyond GDP: The Need for New Measures of Progress*, The Pardee Papers n. 4, Boston University, 2009; E. Schokkaert & K. Decancq, *Beyond GDP. Measuring Social Progress in Europe*, KU Leuven Euroforum, 2013.

this reasons, it does not pay the due attention to the environmental, social and cultural spheres, neither to their interactions and interconnections. Indeed, the deep relationship between the economy and the environment, neglected by the neoclassical economy, is deeply grounded in the biophysical reality, as explained by two fundamental laws of the branch of physics known as thermodynamics, which may be considered as economic formulations of the physical relations.[51] According to the first law of thermodynamics, known as the law of conservation of energy, energy can only be transformed from one form into another, but cannot be created or destroyed. The second law of thermodynamics, known as the entropy law, can be expressed according to various formulations. One of them states that the entropy, that is the amount of bound unavailable energy of a closed system, [52] continuously increases.[53] Therefore, any process which implies energy transformations cannot develop spontaneously without an energy degradation from a concentrated form to a dissipated one. The two aforementioned thermodynamics laws imply that an economic activity cannot create or destroy matter or energy, it can only rearrange it[54] and that economic activities normally use raw materials and convert it into waste outputs with a substantial transformation in qualitative terms, thus increasing the overall entropy of the system.
Such findings, coupled with the physically limited natural resources and capacity of sinks to absorb wastes, lead to the logical conclusion that, as already recalled above, economy cannot grow limitless in a limited Planet. As a consequence, it may be concluded that the neoclassical economic model calling for a potentially limitless growth, which has so far dominated the world economy, needs to be completely revised. Unfortunately, however, as shown in the present contribution, it seems that the green economy, despite its possible positive features, it is not suitable to address the emergencies of our times, given the fact that it does not substantially depart from the neoclassical economic model, but simply proposes its partially revised application, while not questioning its underpinning values and goals. Quite on the contrary, there is a need for the adoption of a completely different approach in order to properly address the internal environmental conflicts highlighted above.

5.2 The need for a new interpretative paradigm: ecological sustainability

The analysis performed so far has shown that internal environmental conflicts cannot be properly managed by means of the traditional criteria and instruments which have been used so far by international as well as national courts and tribunals to deal with the traditional investment vs. environment conflicts. Therefore, in order to efficiently manage and solve such new types of conflicts, a new and different criterion, set at an overarching level, should be identified and relied upon, so as to correctly steer the balancing between the competing interests at stake in the internal environmental conflicts. This criterion should be able to fully consider and take into account the need to ensure the ecological sustainability of

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[51] C. J. Cleveland, 'Biophysical Economics: Historical Perspective and Current Research Trends', in R. Costanza, C. Perrings and C. J. Cleveland, *The development of ecological economics*, 1997 (originally in *Ecological Modelling*, 38, 1987), p. 62.
[52] The Earth is a closed system in regard to matter, that is, a system in which there is neither increase nor decrease in material entropy. On the contrary, as it continuously receives energy from the sun, the Earth is an open system in regard to energy, although the reservoirs of fossil fuels are progressively being depleted.
[53] N. Georgescu-Roegen, 'The Entropy Law and the Economic Problem', in R. Costanza et al., *Ibid.*, pp. 236 - 247 (originally in H. E. Daly (ed.), *Economics, Ecology; Ethics: Essays Towards a Steady-State Economy*, Chapter 3, 1973), p. 239.
[54] Peter A. Victor, 'Indicators of Sustainable Development: Some Lessons from Capital Theory', in R. Costanza et al., *Ibid*, (originally in *Ecological Economics*, 4, 1991), p. 433.

climate change related investments, that is their capacity to promote global climate related goals while, at the same time, not endangering the local environment of the land where they are located.

In my opinion, this new criterion should be represented by a new interpretative paradigm, which should consist in the concept of "ecological sustainability", that I have described and analysed in greater detail elsewhere.[55] In brief, it may be recalled here that such a concept has been well defined by Bosselmann as "*the duty to protect and restore the integrity of the Earth's ecological systems*"[56] and may be said to refer to the need of the human civilisation to live in harmony with nature and the eco-systems that enable life on the planet and support human development. The concept of ecological sustainability should represent from now on the reference criterion to be relied upon in order to promote a correct balancing of the various competing interests at stake within the internal environmental conflicts presented above. This seems to be also in line with a correct interpretation and implementation of the principle of sustainable development, which also represents one of the overarching and foundational principles of climate change law. To this effect, the clear link existing between the concept of sustainable development, the application of the interpretative criterion of ecological sustainability and the correct implementation of environmental law has been well explained by Westerlund, who has stated that "*sustainable development cannot take place without ecological sustainability, which in turn is related to environmental quality and natural resources"* and has strongly advocated the need to make law "sustainable", both in its definition and its application, insofar "*unless law is made sustainable, it protects unsustainable conduct*".[57]

In sum, drawing inspiration once again from Bosselmann's work, it may be stated that the ecological sustainability interpretative paradigm should constitute in the present context a sort of *Grundnorm*, which ought to "*underpin and guide the interpretation of existing and the creation of new laws*".[58] In this sense, the ecological sustainability interpretative paradigm should become the reference concept to be relied upon in order to promote a proper assessment of the various competing interests at stake in the internal environmental conflicts which emerge from the implementation of climate change related investments, in the framework of a green economy scenario.

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[55] M. Montini, *Revising International Environmental Law Through the Paradigm of Ecological Sustainability*, in F. Lenzerini & A. Vrdoljak (eds.), International Law for Common Goods: Normative Perspectives in Human Rights, Culture and Nature, Oxford: Hart Publishing (2014), pp.271-287.

[56] K. Bosselmann, The Principle of Sustainability, Aldershot, UK, 2008, p. 53. It should be highlighted here that I have taken the inspiration for the choice of the concept of ecological sustainability as the new interpretative paradigm for addressing the internal environmental conflicts mainly from Bosselmann, which refers to the principle of sustainability as the fundamental concept to be relied upon for transforming law and governance at the global level.

[57] S. Westerlund, Theory for Sustainable Development, in H.C. Bugge and C. Voigt (eds.), Sustainable Development in International and National Law (Europa: Groningen, 2008), pp. 52-54.

[58] K. Bosselmann, Grounding the Rule of Law in C. Voigt (ed.), The Rule of Law for Nature, Cambridge: CUP, 2013, pp. 75-93.

6. Conclusion

The analysis conducted above has started by introducing the two-fold roots that have greatly influenced the emergence of the green economy, namely, on the one hand, the great financial and economic crisis started in 2008, and, on the other hand the climate change challenge, which calls for a transition towards a low carbon economy. Then, the origin and main features of the green economy have been presented. In such a context, it has been noted that the green economy calls for the partial revision of the current dominant economic model, not so far as to plead for the departure from the "growth mantra" as the main reference concept for the world economy, but rather to promote just the partial revision of such economic model towards a more sustainable, or rather a more green, approach. Finally, it has been analysed the close relationship between the green economy and sustainable development concepts, and it has been concluded that, despite the lack of a common understanding at international level on the precise content and definition of green economy, as well as the difficulty to assess its effective capacity to contribute to the achievement of sustainable development, the green economy may be considered as an operational modality to promote sustainable development.

Building on such an analysis of the green economy, in relation to sustainable development, the focus has shifted to the analysis of the flexibility mechanisms introduced by the Kyoto Protocol on climate change. To this respect, it has been noted that such economic instruments represent paradigmatic examples of green economy tools, insofar they pursue a twofold objective. In fact, on the one side, they aim at enhancing sustainable development by promoting the deployment of international investments, in particular in developing countries, while, on the other side, they intend to give a contribution to the fight against climate change, by enabling the realisation of projects which have the potential to reduce GHG emissions.

In such a context, it has been highlighted that, according to their promoters and supporters, climate change related international investments induced by the application of the flexibility mechanisms may have the positive indirect effect of promoting environmental protection through the achievement of GHG emission reductions. However, it has been also noted that the implementation of the flexibility mechanisms for the promotion of climate change related investment projects does not necessarily lead to positive outcomes only, if considered from an environmental protection point of view. In fact, it may also entail some relevant risks, with regard, in particular to the emergence of a structural imbalance between the potentially conflicting interests relating, on the one side, to the investment promotion plus the contribution to the fight against climate change as opposed, on the other side, to the protection of the environment in a more traditional and general sense. Such a structural imbalance seems to give rise to a new type of investment versus environment conflict, which is characterised by an internal environmental dimension. This new type of conflict, that has been defined as an "internal environmental conflict", seems to represent an evolution of the traditional investment versus environment conflict, which presents partially different and peculiar characteristics. In fact, it has been clarified that, in the framework of such a new type of conflict, the traditional interests related to the promotion of international investments are sided and reinforced by climate change related interests, linked to the GHG emission reduction, while on the other side remain the (weakened) traditional and general environmental interests, related to the protection of the environment of a given land which may be damaged by the localisation of an international investment project. As a consequence, it seems that within the new type of "internal environmental conflict" the relative strength of the traditionally opposed (investment and environmental) interests is altered by the presence of the climate change related interests, which seem to reinforce the investment side of the controversy, while at the same time paradoxically reducing the strength of the environmental side. In other words, when an internal environmental conflict emerges, in connection with the realisation of climate change related investments, this creates a sort of "increased risk" for the environment of the affected land. In such a context,

the “internal environmental conflict” described above basically derives from the current international trend of conflating all the environmental issues into climate change ones. However, despite the relevance and seriousness of the climate change question, its prominence should not be used as a justification for giving a green light to every kind of investment (even when it may entail negative consequences for the environment), simply on the basis of real (or alleged) GHG emissions reductions, thus downgrading any other environmental requirement or consideration.

As a consequence, the new type of internal environmental conflicts cannot be properly managed by means of the traditional criteria and instruments which have been used so far to deal with the traditional investment vs. environment conflicts. Therefore, it has been proposed that, in order to efficiently manage and solve such new types of conflicts, a new interpretative paradigm is adopted, which consists in the concept of ecological sustainability. The use of such a new interpretative paradigm, in my opinion, might ensure the ecological sustainability of climate change related investments, by making sure that they can promote global climate change related goals while, at the same time, not endangering the local environment of the land where they are localised.