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The Green Energy Transition

Sustainable Development or Ecological Modernization?

by Natalia Magnani

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1. Introduction

This paper aims to contribute to the critical review of the sociological debate on sustainability by focusing on the contested relationship between Ecological Modernization [EM] and Sustainable Development [SD].[1] While a large part of the literature has generally conflated these two theoretical paradigms and policy discourses, others have argued for the need to keep them separated. Reviewing this literature, in the first part of the paper I shall highlight key differences in the origins, contents and concerns of the two terms, justifying arguments in favor of the distinction.

On these premises, in the second part of the paper I shall focus on the green economy transition, and in particular on renewable energy innovations and their impact on local societies, as a relevant research field to investigate the differential relationship between EM and SD.

I shall stress that, while renewable energy technologies are by many scholars and policy makers considered as a good example of EM, there is an emergent debate in both the policy arena and the academia about whether and under what conditions they can contribute to sustainable communities and societies.

[1] I would like to thank Lauro Struffi, Andrea Vaona and two anonymous referees for their helpful comments on an earlier version of this paper. The usual disclaimer applies.

In the academic literature on the green energy transition the contradictions between an EM discourse and a SD approach have recently started to be addressed by two emerging research streams, namely the literature on the Clean Development Mechanism [CDM] concerning developing countries on one side, and the literature on the local social acceptance of renewable energy facilities mainly focusing on Northern European industrialized countries on the other.

This article will review major studies in each of these two emerging research areas in order to highlight key foci of tensions between EM and SD. In particular, the increasingly salient issue of equity and justice will be explored.

The general aim of the paper is to critically analyze the relationships between EM, SD and the green energy transition in order to investigate under what conditions and in which ways innovative green technologies can contribute to actual SD in relation to specific local contexts.

2. Exploring the Difference Between Ecological Modernization and Sustainable Development

In the sociological literature SD has been traditionally related to EM. Indeed both of them are generally recognized crucial paradigms for the analysis of the environment and development problem [Lafferty 1996], at the empirical/societal and political/discursive levels. If the existence of a relationship between EM and SD is generally recognized, however, the nature of this relationship is contested. The ambiguity of their relationship is closely linked to the controversial meaning of each paradigm and policy discourse, which in both cases has resulted in a range of theoretical perspectives emphasizing different aspects, contents and outcomes and in complex typologies of weak-strong EM and weak-strong SD.[2]

A large amount of the theoretical and empirical literature seems to consider them as identical or overlapping approaches to environmental issues. In particular this is the view of both the founding fathers of EM, namely Joseph Huber and Martin Jänicke. From both Huber [2000] and Jänicke [2008] it emerges the idea that EM can play a key role in bringing about SD for industrialized countries looking for solutions to the conflictual relationship between the environment and the economy.

[2] A detailed analysis of the different interpretations within EM and SD is, however, outside the scope of this article, given its focus on differences between the two discourses. A discussion of the different varieties of SD can be found in Connelly 2007 and Hopwood *et al.* 2005. A discussion of different approaches within EM can be found in Milanez and Buhrs 2007.

Also Hajer equates EM with SD. Hajer [1995] views the Brundtland Report [WCED, 1987] – traditionally considered as the key statement of SD[3] – as marking the emergence of a new belief system and policy discourse, notably called "EM." Indeed, according to the author SD can be considered as the central storyline of the EM policy discourse.[4]

Also Dryzek [1997] and Blowers [1998] seem to conceive SD and EM as somehow overlapping concepts. However, they have different views as to which of the two approaches is more challenging with respect to current environmental and socio-economic conditions. According to Blowers [*ibidem*, 245] EM can be considered a weak form of SD. Dryzek [1997, 143], instead, argues that "ecological modernisation has much more analytical rigour and a much sharper focus than does SD on exactly what needs to be done with the capitalist political economy."

Against this literature stressing the similarities between EM and SD, a number of authors have highlighted the crucial differences existing between the two paradigms and have argued for the need to keep them separated.

In particular, a detailed comparative analysis of the differences between EM and SD as paradigms for environmental policy and policy programs has been conducted by Langhelle [2000]. His analysis is based for SD on the definition contained in the Brundtland report [WCED 1987], and for EM, lacking a similar key statement, on the common features emerging from the sociological literature.

According to Langhelle [2000, 308] "the most striking difference between SD and EM is that SD attempts to address a number of issues about which EM has nothing to say." First of all, he mentions how SD is characterized, in its original formulation contained in the Brundtland report, by a focus on the global level. The concept of SD derives "partly from global north-south concerns, partly from intergenerational global concerns and partly from a growing awareness of global environmental problems" [*ibidem*, 308]. On the contrary, EM focuses primarily on western industrialized societies, from which it emerged during the 1980s as a political program to address the relationship between the economy and the environment by economizing the environment [Hajer, 1995].

Another key difference between the two paradigms concerns the distributive aspects of environmental policy [Langhelle 2000, 309]. Social and environmental

[3] However, the origins of the concept of SD are also debated [see Langhelle 2000].

[4] However, Hajer also distinguishes between a techno-corporatist EM and a reflexive EM. While the first is characterized by a top-down technocratic approach to expert knowledge and environmental decision-making, the latter exhibits "a strengthening of public, inter-discursive forms of debate in order to contextualize expert opinion and make environmental politics a matter of deliberate and negotiated social change" [Hajer 1995, 282].

justice within the present generation and between generations is considered at the core of SD [Agyeman and Evans 2004; Redclift 2005]. Indeed meeting the basic needs of all – namely both the present world's poor and the future generations – and extending to all the opportunity to fulfill aspirations for a better life is the primary goal of SD as emerging from the Brundtland report [WCED 1987, 8]. In order to fulfill it a set of critical objectives is identified in the report: changing the quality of growth; meeting essential needs for jobs, food, energy, water and sanitation; conserving and enhancing the resource base; reorienting technology and managing risk [*ibidem*, 49].

Unlike SD, EM is neither concerned with intra-generational justice, nor with inter-generational justice. This is closely linked to the fact that "EM belongs to the simple modernization phase, making unproblematic use of science and technology in controlling environmental problems" [Mol and Spaargaren 1993, 455, cited by Langhelle 2000, 309].

The differential position of EM and SD in relation to justice and equity issues is also clearly visualized by Connelly's [2007] triangle, mapping the different theoretical and policy positions concerning the environment and development relationship. While SD is represented by the central region of the triangle, implying a balance between economic, environmental and social justice concerns, EM is located on the A-B axis, joining the priorities of economic growth (A) and environmental protection (B) and it is the furthest away from the social justice corner (C) [*ibidem*, 269].

A further but closely connected difference between the two paradigms concerns the issue of limits to growth. According to Langhelle [2000, 310] this issue is "crucial to sustainable development in a way it is not, and cannot be, in ecological modernization." The "productivist" approach implicit in EM has been highlighted by various scholars [Carolan 2004; York and Rosa 2003]. In particular, as stressed by Carolan [2004, 248], according to EM environmental problems can be corrected by "super-industrialization" or "more as different" production. Indeed, the focus of EM is on production eco-efficiency, thus on the "how question" of production, while the "how much" is not addressed [*ibidem*].

The ecological effectiveness of such a focus on eco-efficiency have recently been questioned by critics of EM. In particular, it has been argued that as long as consumption continues to increase, production efficiency only can delay the inevitable resource exhaustion [*ibidem*, 250]. Moreover, the issue of "rebound effect" – namely the problem of increased consumption that results from innovations that increase efficiency and reduce consumer costs – has been highlighted on the basis of extensive cross-country research [*ibidem*, 251; York and Rosa 2003, 280]. These considerations seriously challenge the ability of EM to deliver effective solutions to ecological problems.

On the contrary, SD seems to acknowledge the importance of social and natural constraints to growth. As highlighted by Langhelle [2000, 311], while for EM economic growth, thanks to technological innovation, can be unlimited, SD considers technology a tool to meet the needs of the present without violating ecological limits and the ability of future generations to meet their own basic needs [*ibidem*, 311]. Accordingly, the Brundtland report calls for a shift in the content of the growth of industrialized nations towards less resource and energy intensive activities and for a change in consumption patterns away from maximization.

Finally, EM and SD differ in the magnitude and nature of the policy change advocated. Neither EM nor SD challenge the idea that environmental problems can be solved within the existing capitalist system, however SD differs because it implies a certain degree of structural change, in the sense that some sectors' societal role must be reduced or re-defined [*ibidem*, 316]. This does not seem to be the case for EM, which, as stressed by York and Rosa [2003, 274], "argues for [...] a greening of business as usual – thereby avoiding such alternatives as radical structural changes in society."

According to Langhelle [2000, 316] this implies that the core story-line of EM, namely the idea that environmental protection results in a positive-sum game, is not necessarily shared by SD. On the contrary in the promotion of SD some sectors can be losers and others can be winners.

On the basis of the above differences Langhelle [*ibidem*] argues that EM should be seen as a necessary, but not sufficient, condition for SD.

The differences highlighted by Langhelle have been further examined and elaborated by Wright and Kurian [2010] in a comprehensive comparison of the key traits of the two approaches as emerging from the literature concerning each discourse.

In addition to the differences already examined regarding key normative priorities like justice, equity and economic growth, Wright and Kurian [*ibidem*] especially emphasize differences concerning the way in which the two approaches have generally been implemented. These include first of all the different role assigned to public participation. While EM reflects the logic of traditional representative democracy and is thus generally characterized by a weak participatory process, public participation through civil society networks is a recognized central feature of the SD agenda [*ibidem*, 400]. In particular, the Bellagio principles "that call for openness, communication, broad participation, iterative processes, sufficient institutional capacity and the need for a coherent framework" [*ibidem*] are considered crucial by SD to promote environmentally sounder and more socially acceptable solutions.

Differences between the two approaches concern also the type of solution proposed to the environmental problem and its degree of centralization. Wright and

Kurian [*ibidem*, 402] stress that EM is implemented through traditional state-led regulatory regimes and through voluntary agreements between government and industry to find industry solutions. SD instead promotes an innovative cooperative and multi-stakeholder approach to solutions which involve not only the industry and the state but also the public and in particular the local society. The different role assigned to the local is highlighted also by Gibbs [2000]. He argues that SD is characterized by a commitment to "exploratory and decentralized approaches with a range of local experimentation" [*ibidem*, 13], while EM assigns a limited role to the sub-national scale.

Finally, Wright and Kurian [2010] identify a further key difference between EM and SD concerning their approach to risk and the use of expertise. As also highlighted by Backstrand [2004], EM sees environmental risks as apolitical technical problems and thus it tends to adopt a technocratic approach to problem solving and decision making. On the contrary, SD considers environmental risk as a political and ideological issue which requires the consideration of different social, cultural and ethical values [Wright and Kurian 2010, 402]. Accordingly in a SD perspective expert risk assessment needs to be balanced with community risk perception and expert knowledge with lay/ local knowledge.

The key differences between the two approaches emerging from the literature here considered have been summarized and made clearer for the reader in Table 1.

Eventually, the consideration of these differences in empirical case studies have led to highlight the problematic relationship between SD and EM discourses. In particular, Wright and Kurian [*ibidem*], on the basis of their analysis of the discourses and procedures concerning the regulatory framework of biotechnology policy in New Zealand, have argued that the institutionalization of an EM approach can preempt real commitment to SD.

Other empirical research reached similar conclusions. In particular, Memon et. al. [2011] have highlighted how the adoption of EM principles by political institutions in relation to the governance of natural resources hardly delivers both environmentally and socially SD. Indeed in the case analyzed by the author, concerning fresh water governance in New Zealand, key precepts of EM, like the promotion of new technologies for greener production and consumption and the marketisation of natural resources, resulted in further reinforcement of the power of "modernisation losers," namely production interests responsible for pollution [*ibidem*, 540].

In the next section I will explore whether and to what extent these considerations about the differences and contradictions between SD and EM are relevant also for understanding the social implications at the local level of the recent shift towards green energy technologies in the broader context of the green economy.

TAB. 1. *Key Differences Between Sustainable Development (SD) and Ecological Modernization (EM)*

Key Dimensions	SD	EM
Focus/origins	Global level	Western industrialized societies
Priorities and normative concerns with regard to economic growth, justice and environmental protection	Integrative approach balancing economic growth, environmental protection and intra/inter-generational justice. Limits to growth in order to meet present and future needs.	Economizing the environment through greener innovation. No concern with distributive effects of environmental policy. Productivist orientation: more resource efficient production.
Magnitude and nature of the change advocated	Some degree of structural change: some sectors' role redefined or reduced. Change in the content of growth towards a more equitable distribution of income. Change in production and consumption both important.	No structural change: a greening of business as usual. Focus on 'more as different' production.
Key features of the implementation process	Decentralized, cooperative and negotiated implementation. Centrality of public participation. Centrality of procedural and distributive justice.	Centralized and top-down implementation: state-led regulatory regimes and agreements between government and industry. Weak participatory process.
Approach to risk	Risk as a political and ideological issue. Expert knowledge complemented with lay/ local knowledge and community risk perception.	Environmental risks as apolitical technical problems. Top-down risk communication. Technocratic approach to problem solving and decision making.

Note: Adapted from Wright and Kurian [2010]

3. The Case of Renewable Energy Technologies in the Green Economy Transition

According to Le Blanc [2011] the academic origins of the concept of green economy can be traced back to the book *Blueprint for a green economy*, by Pearce *et al.* [1989]. The core argument of this work was that "environmental assets and services, as supports for economic and social systems and as inputs in production, are undervalued or not valued, resulting in inefficient consumption of natural resources as well as environmental degradation" [Le Blanc 2011, 151]. The solution to the en-

vironmental problem was thus identified with the need to correct the price system faced by agents in the economy. This, was argued, would have led to improved environmental outcomes.

During the last twenty years or so the elaboration of this idea in the academia has been accompanied in the political arena by various policy initiatives undertaken by international organizations such as the OECD [2011] and the UNEP [2011], as well as by national governments under the different names of "green growth," "green new deal," and "green jobs" [Le Blanc 2011, 151].

In these documents and policy initiatives, support to the production and consumption of renewable energy has been given a central place in light of the emerging awareness of the environmental impact of fossil fuels on climate change and of the future depletion of fossil energy sources.

The green economy idea and, in particular, renewable energy technologies are generally considered to be consistent with the paradigm of EM [Breukers and Wolsink 2007; Huttunen 2009; Toke 2011]. As stressed by Mol [1995, 43] "the general emphasis on the importance of the influence of technology in socio-ecological transformations has remained a feature of the EM theory." Jänicke and Lindemann [2010] mention explicitly the technologies for the production of renewable energy. These are considered "radical innovations" [*ibidem*, 129], namely innovations concerning new product types or technologies, which – unlike "incremental innovations," such as increases in the efficiency of coal-fired power plants – can eventually produce substantial environmental improvements.

However, the social effects of the increasing pressure towards a green energy transition have recently started to be scrutinized. A growing debate in international policy circles has recently started to emerge concerning the general relationship between green economy and SD linked to the run-up of the United Nations Conference on SD in 2012[5] (UNCSD 2012 or Rio+20). Indeed, "a green economy in the context of SD and poverty eradication" has been identified as one of the core themes for the international meeting [Le Blanc 2011, 151], also in response to the growing concern raised by civil society and governments of developing country that certain approaches to green economy could sideline or even undermine SD.

In preparation of this event, international conferences, such as the UNRISD conference on "Green Economy and Sustainable Development," have started to draw attention to the issue of the social dimensions of development – especially justice, power relations and participation – which are seen as downplayed in main-

[5] See the special issue of *Natural Resources Forum*, 35, 2011 on green economy and SD.

stream approaches to green economy centered on green growth, green jobs and green consumerism.[6]

In the academic literature, only recently attention has started to be given to the social implications of the transition to green technologies. In general, the study of Boehmer-Christiansen [2003] highlights the social limits of the advocated de-carbonization of global energy supplies as emerged from the Kyoto protocol. By critically analyzing the controversies about the causation of global warming and the advocated technical and fiscal solutions, she argues that in most cases green technologies cannot be defended on grounds of equity. Rather they rely on commercial expectations and promises of secondary benefits that often serve the interests of technical, commercial and political elites. As a result, poorer countries and social groups are unlikely to benefit either socially or environmentally from proposals to redirect energy policies to combat global warming.

Moreover, concerning in particular the implementation of renewable energy technologies, two research streams developed in quite different academic subfields have recently started to analyze the social dimensions of the green energy transition at the local level and to raise issues of sustainability. These are the study of the Clean Development Mechanism [CDM] in developing countries, on the one hand, and research on the social acceptance of renewable energy facilities in local communities of mainly Northern European societies, on the other. In the following each of these two research streams will be analyzed. Key critical issues which unveil the underlying conflict between an EM approach and SD will be highlighted.

3.1. *Promoting Renewable Energy Technologies in Developing Countries: the Un-sustainability of the Clean Development Mechanism (CDM)*

The CDM came out of Kyoto Protocol in 1997 and is centered on the creation, expansion and governance of markets designed to sequester carbon out of the atmosphere or reduce its quantitative production [Boyd and Goodman 2011, 837]. It does so by allowing industrialized countries to compensate for greenhouse gas emissions by investing in climate change mitigation activities and technologies in developing countries in exchange for tradable certified emission reductions.[7]

These offsetting projects are intended to reduce emissions while simultaneously contributing to local development [Erlewein and Nüsser 2011]. The CDM projects

[6] See the website of the conference: http://www.unrisd.org/events/greeneconomy.

[7] While the US did not ratify the treaty, US companies are eligible to participate in CDM projects and are actually among the main donors.

often are based on partnerships between fossil fuel-based power plants in industrialized countries, private sector companies with branches in developing countries and local authorities in developing countries.

In the period between 2005 – year of the entry into force of the Kyoto Protocol – and 2007 more than 1600 projects have been proposed under the CDM and 696 have been approved [Wittman and Caron 2009, 712].

While the CDM is not exclusively concerned with green energy, renewable energies schemes – such as river hydropower stations, dams, biomass powered generation plants, wind turbines – represent the majority of the projects financed under this program.[8] Indeed, as stressed by Erlewein and Nüsser [2011], the CDM actually works as one of the most important instrument for the funding of renewable energy projects in the developing world.

The EM approach implicit in the CDM has been variously highlighted. As stressed by Boyd [2009, 2380] the CDM reflects "a major shift in thinking about low carbon futures, wherein the environment and economy are coupled by virtue of valuing ecosystem services and where carbon is commodified through models and measurement and certified emissions reductions traded in the carbon market." Furthermore, Boyd and Goodman [2011, 837] argue that the logic behind the CDM mechanism is that "allocating resources through market relationships means that it will be done in the most efficient, cost-effective and equitable way and at the same time that value is generated out of nature […] The CDM is constructed […] as a way to 'right' (in the multiple senses) a series of current and past environmental and economic wrongs in the harsh light of climate change."

The limits of such an EM view and its ability to deliver effective SD have recently started to be explicitly questioned by a number of both quantitative and qualitative studies analyzing the socio-economic impact of specific CDM projects at the local community level.

In particular, Sutter and Parreño [2007] analyze 16 CDM projects, mostly involving the exploitation of renewable energy sources in different developing countries from India to China to Central and Southern America. Through a quantitative analysis, they assess the ability of these projects to deliver SD along three criteria, namely economic development (defined as employment generation), environmental development (defined as change of air pollutants emissions), and social development (defined as equal distribution of project returns and ownership structure of project activity). Sutter and Parreño conclude that while a large part of the CDM projects

[8] Others major projects concern for example tree plantations and methane landfill gas [see Boyd, 2009].

were likely to contribute to measureable greenhouse gas emissions reductions, less than 1% was likely to contribute significantly to SD in the host countries. According to the authors there seems to be a trade-off between cost-efficient emission reduction and SD and the first seems to be strongly favored with respect to the latter [*ibidem*, 89]. This result appears to be closely related to the predominance of large-size projects owned by external actors.

Qualitative studies of CDM projects have reached even more drastic conclusions. The case-study by Wittman and Caron [2009] is particularly relevant to our discussion. They analyze the social impacts of the world's first rural solar electrification-carbon offset agreement, aimed at installing 120.000 photovoltaic systems in remote households without electricity in Sri Lanka. This target population was mostly made by Tamil estate workers, who lived in a semi-slavery condition on tea and rubber plantations [*ibidem*, 718]. The project was based on a partnership between an American power corporation, an American solar company with branch offices in Sri Lanka and a local authority.

Wittman and Caron [*ibidem*, 712] highlight how the project had unanticipated social consequences that negatively affected poverty alleviation and rural development processes in the area. In particular, the project resulted in the exacerbation of community divisions and inequalities among ethnic and social groups because solar-home systems were only made available to Tamil estate workers, rather than to all village residents [Wittman and Caron 2009, 722].

Moreover, unexpected opposition was raised by part of the population because the project was perceived as threatening chances for extension of the national electricity grid, thus hampering prospects for improved quality of life. In addition, the program's financing scheme further aggravated the economic condition of estate workers, already burdened with debts, and further hindered their ability to eventually leave the plantation [*ibidem*, 720].

In general, the project was mainly shaped by the dominant aspiration of the American solar company to capture the local off-grid market, while no provisions to ensure social equity within the community or to provide for community-wide benefits (e.g. electrification of the local school) was included [*ibidem*, 719].

Also as a result of these factors the project eventually failed to deliver its environmental and economic targets. Only a very small number of families (35) adopted the solar-home system. The low level of system installation coupled with the high cost of imported capital resulted in the solar company declaring bankruptcy and closing its operation.

In conclusion, this study highlights that unless care is taken to ensure broad participation, transparency and accountability and unless attention is given to issues

of environmental and social equity environmental benefits are also going to be limited. This conclusion raises also the question as to whether an EM approach based on green technology can effectively address environmental problems.

Other qualitative studies similarly highlight the contradictions of the CDM with regard to other energy sources. In particular Finley-Brook and Thomas [2011] and Erlewein and Nüsser [2011] analyze the renewed interest in large-scale hydropower developments in developing countries as a result of climate-change mitigating policies. They highlight how after decades of decline there has been a rise in the construction of new dams promoted as carbon-offsetting schemes. Indeed the hydro sector represents the largest CDM sector in terms of total number of projects, with private corporations playing a major role in their operation.

Erlewein and Nüsser [*ibidem*] focus their study on 11 large "clean development" dams in the Indian Himalaya region – where about the 60% of existing large CDM hydropower projects are located. Their aim is to assess the contribution of these projects to local SD against strategic socioeconomic and environmental priorities set by the World Commission on Dams [WCD]. Eventually they show that the CDM hydro-projects considered fall short of most of them.

First of all, "clean development dams" fail to meet the WCD strategic priority "gaining public acceptance" through "open and meaningful participation of project-affected communities at all stages of planning and implementation" [Erlewein and Nüsser 2011, 298]. Indeed in the cases analyzed, while information campaigns towards local community were undertaken, stakeholders meaningful participation was restricted to compensation negotiation. Especially the projects were not compliant with regulations concerning the participation of indigenous communities. These were also the main opponents to the project on the basis of environmental concerns and violation of tribal law.

The "clean dams" were also in breach of the WCD priority "sustaining rivers." Indeed the most severe environmental impact documented by the authors [*ibidem*, 299] was lengthy disruption of river flow with negative consequences for river ecology and biodiversity. In addition, water contamination during construction and deforestation were highlighted.

Moreover, the projects also failed to fully comply with the priority of sustaining livelihoods. While few displacements were undertaken, and the projects created temporary employment opportunities, river diversion conflicted with water demand for irrigation schemes. Moreover, construction work resulted in the drying-up of natural springs fundamental for local water supply [*ibidem*, 299].

According to the authors these results call attention to the limits of the CDM as a market mechanism: "On the one hand the CDM as a market mechanism is supposed

to identify the most economic options for GHG reduction. On the other hand, realization of the objective of sustainability usually requires additional investment [...]. This may result in a situation in which the contribution of a project to sustainability turns out to be a competitive disadvantage" [*ibidem*, 302].

The study of Finley-Brook and Thomas [2011] reaches similar conclusions. By focusing on the local social impacts of two Panamanian dam projects they highlight how "clean hydro-developments" can cause significant social harm in indigenous territories. In particular, they stress that with the rise of carbon offset markets, project developers use low-carbon objectives to justify their demands for socio-cultural change to the detriment of indigenous communities: "As global environmental change influences expectations for energy projects, we identify a resurgence of historical prejudices that categorize subsistence practices as inefficient and indigenous customs as inferior" [*ibidem*, 864].

Indeed, their empirical study highlights that CDM projects not only failed to provide adequate opportunities for local participation by indigenous people, but also adversely affected indigenous land tenure and the protection of cultural heritage [*ibidem*, 869], by obstructing progress towards legal recognition of indigenous homeland and by destroying or displacing ancient ancestral sites.

Furthermore, the CDM may extend and further exacerbate "hydrologic colonialism," namely the process through which source territories are burdened which economic, environmental and social costs, while benefits are exported elsewhere [*ibidem*, 864]. Large-scale CDM projects might extend this inequities for two reasons. First of all, justice and social consensus usually play a marginal role in CDM decision making because a major goal is to save money: "Industrialized countries finance CDM projects in developing countries because it is less expensive than cutting domestic emissions" [*ibidem*].

In the second place, for developing countries facing rapid growth in electricity demand CDM projects are a crucial opportunity to obtain foreign investments for the expansion of energy infrastructure. The result is "green authoritarianism," a process where the state and the private sector join forces to defend renewable energy sources and market-valorized ecological processes, while, at the same time, limiting local resource access and disempowering indigenous people [*ibidem*, 866].

3.2. *(In)justice and the Local Social Acceptance of Renewable Energies Facilities in Industrialized Countries*

Another research area where the contradictions between EM and SD have surfaced is the literature on the local social acceptance of renewable energy facilities mostly in Northern Europe industrialized countries. As highlighted by Wustenhagen *et al.* [2007], the theme of local social acceptance of renewable energies has remained largely understudied until the beginning of the 2000s due to the high level of general public support for renewable energy technologies and the relatively low diffusion of renewable energy facilities.

However, the national and European incentives for green energy production have recently resulted in the rise of energy-related conflicts and a renewed attention to the issue.

The majority of the studies analyzing the impact of renewable energies on local communities in industrialized countries [e.g. Aitken 2010; Bell *et al.* 2005; Van der Horst 2007; Wolsink 2007; Wustenhagen *et al.* 2007] share the critique to the Nimby syndrome explanation, dismissed as an over-simplification of people's actual motives and views. Against simplistic explanations characterizing local energy conflicts as controversies between selfish locals attached to their backyard and enlightened developers, these studies use both quantitative and qualitative research methods to identify key social factors explaining opposition to existing or projected renewable energy facilities (in most cases wind energy parks). This research stream indirectly highlights how the implementation of the green energy transition at the local level is often characterized by limited attention to many of the central concerns of SD examined above.

In particular, research in this area points out the relevance of justice and fairness issues in relation to local conflicts over renewable energies. Wolsink [2007] explicitly argues that feelings about justice and fairness, rather than selfishness, are the determinants of "backyard" motives against wind power implementation. Gross [2007] also highlights how the lack of attention to justice in wind energy developments can result in loss of social well-being and damaged community relationships.

Two different, but closely interconnected, kinds of justice concerns are considered relevant, namely distributive justice and procedural justice. Distributive justice refers to the way in which the costs and benefits (financial as well as environmental) associated with a certain infrastructure are spatially and socially distributed [*ibidem*, 2729]. It thus deals with the outcomes of renewable energy developments for local communities. In this regard, empirical research [Gross 2007; Jobert *et al.* 2007; Upreti 2004; Walker and Devine-Wright 2008] highlights that a major source of conflict

over renewable energies infrastructure are the (perceived) low benefits for the general local community compared to the high social and environmental costs and the predominance of corporate or elites profit.

Distributive justice then concerns not only the just distribution of outcomes among social groups, but also among territories. Renewable energies facilities are often located in rural areas due to their richness of natural resources (land, water, wood). As highlighted by Osti [2011], their vulnerability in terms of small and old population can result in a sort of colonization by external powers and actors from farther areas, not creating opportunities for local development.

As shown by Jobert et al. [2007] wind park developers often come from the outside and they stipulate high-value rent contracts with a small number of private owners. In the majority of cases access to shares of wind park is not granted to the local population. This further exacerbates the gap between a "few winners" and "the many losers" of green energy developments [Gross 2007]. Others [e.g. Magnani 2012] have shown that the promoters of renewable energy technologies are powerful local productivist elites, already discredited with regard to their contribution to local environmental sustainability and whose commitment to the common interest is thus not trusted by the majority of the local population.

In addition to concerns with distributive justice, the literature on renewable energy conflicts has stressed the relevance of procedural justice. This concerns the provision in the planning process of a fair decision making process giving all relevant local stakeholders an opportunity to participate and to express different views about the problem and the solution [Gross 2007, 2729]. It thus deals with issues of information and participation, crucial to the SD paradigm.

Empirical research on community acceptance of wind-energy parks in different European countries highlights that local acceptance of renewable energy is crucially dependent on transparency of information from the outset and wide public participation. However, developers' effort to involve local people in the planning and development process is often insufficient and of poor quality [e.g. Devine-Wright 2005; Jobert *et al.* 2007]. In some cases energy facilities are built without prior information of concerned communities [Jobert *et al.* 2007, 2759]. Often public involvement is limited to information meetings. Very limited opportunities are given to the people affected by the proposed facilities to discuss their concerns.

Similar conclusions are reached also by research on conflicts over biomass energy developments. In particular, Upreti [2004, 787] highlights that public involvement in biomass energy development is mainly limited to providing information about decisions already made on economic and technical grounds. According to the author, the democratic deficit in the siting of renewable energy facilities reflects a dominant

view of public participation as something that "causes delay, underscores technical supremacy, undermines the authority of developers and sets precedence for future siting processes."

Finally, recent research [Aitken 2010; Magnani 2012] has highlighted how the planning process of renewable energy facilities also underpins a technocratic approach to risk. Upreti documents a top-down risk communication strategy, which dismisses as ill-founded public risk perceptions that drastically differ from the rationales of scientists and technicians recruited by developers. Especially in conflicts over biomass plants, a controversy often emerges between the latter, arguing for uncontestable environmental advantages of the technological solution proposed, and local communities, concerned with health hazards linked to emissions and increased traffic movement, with risks for the local ecosystems and with negative impacts on the local cultural heritage and on the tourism sector [Upreti 2004, 787].

A more proactive approach to developing common understanding, collective planning and concerted action is advocated by the literature in order to address the different forms of injustice at the origin of local conflicts over renewable energies [*ibidem*, 798]. Moreover, the need to give local population access to direct benefits from renewable energies – possibly also ensuring some forms of local ownership – is regarded as increasingly crucial [Jobert *et al.* 2007; Walker and Devine-Wright 2008; Wolsink 2006].

4. Conclusions and Ways Ahead

This paper contributed to the debate on sustainability by investigating the contested relationship between two key theoretical and policy paradigms addressing the environment and development nexus, namely SD and EM. This has been done by reviewing the major theoretical contributions on the relationship between the two paradigms and by investigating an emerging empirical research field where they have been applied, namely research on renewable energies.

The review of the general literature has highlighted that key differences between the two approaches can be identified concerning their core normative values, the way the democratic process is conceived, the nature of the change they advocate, their implementation mechanisms, and their approach to risk management. In particular, it has been stressed that, when looking for solutions to the environment and development problem, SD, unlike EM, is primarily concerned with inter-generational and intra-generational justice, public participation and a decentralized and multi-stakeholder approach to decision making and risk evaluation. On the basis

of these supposed differences some authors have stressed the possibility of a conflict between the two approaches, whereby EM could sideline or even undermine SD.

This article has shown that this debate is especially relevant for the analysis of the social dimensions of the green energy transition. By bringing together two emerging research streams – namely the literature on the local impacts of the CDM in developing countries and research on social acceptance of renewable energy facilities in industrialized countries- new ways to examine the relationship between SD and EM have opened up.

While focusing on two very different geographical and socio-political contexts, both these research streams share the attention to the local level, namely to the way the green economy is perceived locally and the way local level dynamics are affected by – and in turn affect – external interventions to promote green energy solutions. In both cases the literature has highlighted the limits of the process of "commodification of the environment" implicit in the exploitation of renewable energy sources and has questioned the ability of such commodification process to deliver SD for local communities.

As shown by Table 2, the analysis of the two case studies in relation to the key dimensions of SD and EM examined above indicates that both in developing countries and in industrialized countries the push towards green energy production has proved – in a more or less evident way – to fall short of many key concerns and principles of SD, while it appears in line with an EM discourse.

In particular, as regards priorities and normative concerns, equity, justice and redistribution issues – central to SD – were largely absent from both the CDM and the majority of the projects concerning renewable energy facilities in industrialized countries examined. In both cases renewable energy projects were shaped primarily by environmental and economic aims, namely reducing emissions of developing countries and creating a market of tradable certified emissions reductions (in the case of CDM), and reducing country emissions and country dependence from fossil fuels (in the case of investments in renewable energy production in western countries).

Moreover, the nature of the change promoted by the CDM was definitely non-structural, being aimed at offering a mere compensation for the continuous polluting emissions of developing countries. Also in the case of renewable energy projects in industrialized countries most often the change promoted simply aimed at integrating innovations for the production of a highly profitable green energy into the existing mode of production.

However, it was especially with regard to the implementation process that both case studies appeared to be the farthest from the principles guiding SD. In both

cases renewable energy production was promoted through top-down, centralized approaches: namely, through partnerships among fossil-fuel-based power plants in industrialized countries, aiming to expand their market in developing countries, and local authorities, looking for foreign investment in local infrastructures, in the one case; through large incentives for the production of green energy, often exploited by profit-interested elites, in the other.

TAB. 2. *Local Renewable Energy Projects and Key Dimensions of Ecological Modernization (EM) and Sustainable Development (SD)*

Key dimensions of EM and SD	CDM (developing countries)	Renewable energy facilities in Western industrialized countries
Priorities and normative concerns with regard to economic growth, justice and environmental protection	Environmental: reducing emissions of developing countries. Economic: creating a market of tradable certified emissions reductions.	Environmental: reducing country emissions. Economic: reducing country dependence from fossil fuels.
Magnitude and nature of the change advocated	Non-structural. Compensation for continuous emissions by industrialized countries.	Non-structural. In most cases integration of green energy generation innovation (wind, solar, biogas) into existing production system and production relations.
Key features of the implementation process	Partnerships between fossil-fuel-based power plants in industrialized countries with branches in developing countries and local authorities. Predominance of large-size projects owned by external private actors willing to expand their market. Violation of indigenous rights and subsistence practices. Hydrologic colonialism. Green authoritarianism.	Large state incentives for green energy production often exploited for elite or corporate profit. Limited local ownership. Insufficient and poor quality public participation. Issues of distributive and procedural injustice.
Approach to risk	Authoritarian and technocratic approach.	Technocratic approach. Usually top-down risk communication and management. Public environmental and health risk perceptions often dismissed as unfounded.

This way of implementation had significant implications in terms of public participation, justice and opportunities for local development. In the case of renewable energy developments in industrialized countries, insufficient and poor quality public participation as well as limited local ownership and the relevance of injustice issues concerning social groups within affected communities have been highlighted. In developing countries, violation of indigenous rights and subsistence practices, hydrologic colonialism and green authoritarianism have been documented.

Finally, the projects analyzed in both contexts proved far from adopting a sustainable approach to risk management. Indeed in both cases an authoritarian and technocratic approach to risk, disregarding or dismissing as unfounded community risk perception and local knowledge, was generally prevailing.

In conclusion, this analysis points out the need to maintain a distinction between EM and SD for at least two reasons. First of all, the conflation between the two policy paradigms would deprive policy makers and local movements of a powerful frame for addressing environmental injustice in relation to green economy developments and for promoting more socially inclusive projects in the green energy sector.

In addition, as argued also by Langhelle [2000], the conflation of the two theoretical paradigms should be avoided because it would result in an impoverishment of the analytical and heuristic capacity of sociological research. Especially in the "energy and society" field, highlighting and tracing the differences between EM and SD proves important in order for sociological analysis to be able to unpack tensions concerning the relationship between environment and development. Moreover, preserving the distinction between the two approaches may help to identify those situations where renewable energy production (and consumption) is more consistent with SD. In particular, further research may investigate whether and to what extent new initiatives in the emerging research and policy field of Community Renewable Energy (CRE) are more compatible with SD [Mulugetta *et al.* 2010; Walker and Devine-Wright 2008].

CRE includes a variety of heterogeneous innovative experiences of public participation in renewable energy development like co-provision, green energy cooperatives, co-ownership of green energy projects. Indeed some studies [e.g. Osti 2012; Middlemiss and Parrish 2010] stress that experiences of CRE can combine a locally-based knowledge of how ecosystems work, a culture of environmental protection and a logic of self-sufficiency in producing and consuming in a way that can actually be considered strongly consistent with SD. It has also been argued that CRE can contribute to more sustainable energy systems in two ways: on the one hand it results in locally more appropriate and effective facilities than commercial projects [Rogers *et*

al. 2012; Rogers *et al.* 2008]; on the other hand it may foster awareness of sustainable energy issues and more sustainable energy consumption patterns[9] [Middlemiss 2011; Walker et al. 2007; Walker and Cass 2007].

However, other studies [e.g. Walker *et al.* 2010] warn against considering CRE *tout-court* as a form of sustainable development, since the vagueness of its meaning and its increasing popularity in policy discourse allow it to be strategically deployed by powerful social groups with negative effects on social cohesion and trust.

The literature on the social effects of CRE is still limited and mostly focused on the UK.[10] Further research is thus needed to investigate the conditions under which CRE can contribute to the sustainable development agenda.

References

Agyeman, J. and Evans, B.

2004 "Just sustainability: the emerging discourse of environmental justice in Britain?" *Geographical Journal* 170: 155-164.

Aitken, M.

2010 "Why we still don't understand the social aspects of wind power: a critique of key assumptions within the literature." *Energy Policy* 38: 1834-1841.

Backstrand, K.

2004 "Scientisation vs. civic expertise in environmental governance: eco-feminist, eco-modern and post-modern responses." *Environmental Politics* 13: 695-714.

Bell, D. *et al.*

2005 "The 'social gap' in wind farm siting decisions: explanations and policy responses." *Environmental Politics* 14: 460-477.

Blowers, A.

1998 "Power, participation and partnership." Pp. 229-249 in *Co-operative Environmental Governance: Public-Private Agreements as a Policy Strategy*, edited by P. Glasbergen. Dordrecht: Kluwer Academic Publishers.

Boehmer-Christiansen, S.

2003 "Science, equity, and the war against carbon." *Science Technology & Human Values* 28: 69-92.

Boyd, E.

2009 "Governing the clean development mechanism: global rhetoric versus local realities in carbon sequestration projects." *Environment and Planning A* 40: 2380-2395.

[9] However, as stressed by Mulugetta *et al.* [2010] and Trier and Maiboroda [2009], given the dominant consumerist and individualist discourses, fostering sustainable consumption at the level of individual community project is difficult and sometimes counter-productive.

[10] However, a study on co-provision in Italy has been conducted by Osti [2010].

Boyd, E., and Goodman, M.K.

2011 "The clean development mechanism as ethical development? Reconciling emissions trading and local development." *Journal of International Development* 23: 836-854.

Breukers, S., and Wolsink, M.

2007 "Wind energy policies in the Netherlands: institutional capacity-building for ecological modernization." *Environmental Politics* 16: 92-112.

Carolan, M.

2004 "Ecological modernization theory: what about consumption?" *Society and Natural Resources* 17: 247-260.

Connelly, S.

2007 "Mapping sustainable development as a contested concept." *Local Environment* 12: 259-278.

Devine-Wright, P.

2005 "Beyond NIMBYism: towards an integrated framework for understanding public perceptions of wind energy." *Wind Energy*, 8: 125-139.

Dryzek, J.S.

1997 *The Politics of the Earth. Environmental Discourses*. New York: Oxford University Press.

Erlewein, A., and Nüsser, M.

2011 "Offsetting greenhouse gas emissions in the Himalaya? Clean development dams in Himachal Pradesh, India." *Mountain Research and Development* 31: 293-304.

Finley-Brook, M., and Thomas, C.

2011 "Renewable energy and human rights violations: illustrative cases from indigenous territories in Panama." *Annals of the Association of American Geographers* 101: 863-872.

Gibbs, D.

2000 "Ecological modernisation, regional economic development and regional development agencies." *Geoforum* 31: 9-19.

Gross, C.

2007 "Community perspectives of wind energy in Australia: the application of a justice and community fairness framework to increase social acceptance." *Energy Policy* 35: 2727-2736.

Hajer, M.

1995 *The Politics of Environmental Discourse: Ecological Modernisation and the Policy Process*. Oxford, UK: Oxford University Press.

Hopwood, B., Mellor, M., and O'Brien, G.

2005 "Sustainable development: mapping different approaches." *Sustainable Development* 13: 38-52.

Huber, J.

2000 "Towards industrial ecology: sustainable development as a concept of ecological modernization." *Journal of Environmental Policy & Planning*, 2: 269-285

Huttunen, S.

2009 "Ecological modernisation and discourses on rural non-wood bioenergy production in Finland from 1980 to 2005." *Journal of Rural Studies* 25: 239-247.

Jänicke, M., and Lindemann, S.
2010 "Governing environmental innovations." *Environmental Politics* 19: 127-141.

Jänicke, M.
2008 "Ecological modernisation: new perspectives." *Journal of Cleaner Production* 16: 557-565.

Jobert, A. *et al.*
2007 "Local acceptance of wind energy: factors of success identified in French and German case studies." *Energy Policy* 35: 2751-2760.

Lafferty, W.M.
1996 "The politics of sustainable development: global norms for national implementation." *Environmental Politics* 5: 185-208.

Langhelle, O.
2000 "Why ecological modernisation and sustainable development should not be conflated." *Journal of Environmental Policy and Planning* 2: 303-322.

Le Blanc, D.
2011 "Introduction. Special issue on green economy and sustainable development." *Natural Resources Forum* 35: 151-154.

Magnani, N.
2012 "Exploring the local sustainability of the green economy in Alpine communities. A case study of conflict over a biogas plant." *Mountain Research and Development* 32: 109-116.

Memon, P.A. *et al.*
2011 "Limits to ecological modernisation as a framework for sustainable fresh water governance." *Land Use Policy* 28: 534-541.

Middlemiss, L., and Parrish, B.D.
2010 "Building capacity for low-carbon communities: the role of grassroots initiatives." *Energy Policy* 38: 7559–7566.

Middlemiss, L.
2011 "The effects of community-based action for sustainability on participants' lifestyles." *Local Environment* 16: 265-280.

Milanez, B., and Buhrs, T.
2007 "Marrying strands of ecological modernisation: A proposed framework." *Environmental Politics* 16: 565-583.

Mol, A.
1995 *Ecological Modernisation Theory and the Chemical Industry*. Utrecht: Van Arkel.

Mol, A. and Spaargaren, G.
1993 "Environment, modernity and the risk-society: the apocalyptic horizon of environmental reform." *International Sociology* 8: 431-459.

Mulugetta, Y. *et al.*
2010 "Carbon reduction at community scale." *Energy Policy* 38: 7541-7545.

OECD
2011 "Towards Green Growth." Paris: OECD Publishing.

Osti G.

2010 *La co-fornitura di energia in Italia. Casi di studio e indicazioni di policy*. Trieste: Edizioni Università di Trieste.

2011 "Rural Italy land use tensions for the development of renewable sources of energy." Unpublished paper presented at the XXIV ESRS Congress Inequality and Diversity in European Rural Areas, Chania, Greece, 22-25 August 2011.

2012 "Green social cooperatives in Italy: a practical way to cover the three pillars of sustainability?" *Sustainability: Science, Practice, & Policy* 8: 82-93.

Pearce, D. *et al.*

1989 *Blueprint For a Green Economy*. London: Earthscan.

Redclift, M.

2005 "Sustainable development (1987-2005): an oxymoron comes of age." Sustainable *Development* 13: 212-227.

Rogers, J.C. *et al.*

2008 "Public perceptions of opportunities for community-based renewable energy projects." *Energy Policy* 36: 4217-4226

Rogers, J.C. *et al.*

2012 "Social impacts of community renewable energy projects: findings from a woodfuel case study." *Energy Policy* 42: 239-247.

Sutter, C., and Parreño, J.C.

2007 "Does the current Clean Development Mechanism (CDM) deliver its sustainable development claim? An analysis of officially registered CDM projects." *Climatic Change* 84: 75-90.

Toke, D.

2011 "Ecological modernisation, social movements and renewable energy." *Environmental Politics* 20: 60-77.

Trier, C., and Maiboroda, O.

2009 "The green village project: a rural community's journey towards sustainability." Local *Environment* 14: 819-831.

UNEP

2011 *Green Economy Report*. Nairobi: UNEP Editing.

Upreti, B.R.

2004 "Conflict over biomass energy development in the United Kingdom: some observations and lessons from England and Wales." *Energy Policy* 32 : 785-800.

Van der Horst, D

2007 "NIMBY or not? Exploring the relevance of location and the politics of voiced opinions in renewable energy siting controversies." *Energy Policy* 35: 2705-2714.

Walker, G. *et al.*

2007 "Harnessing community energies: explaining and evaluating community-based localism in renewable energy policy in the UK." *Global Environmental Politics* 7: 64-82.

Walker, G., and Cass, N.

2007 "Carbon reduction, "the public" and renewable energy: engaging with socio-technical configurations." *Area* 39: 458-469.

Walker, G., and Devine-Wright, P.

2008 "Community renewable energy: what should it mean?" *Energy Policy* 36: 497-500.

Walker, G. *et al.*

2010 "Trust and community: Exploring the meanings, contexts and dynamics of community renewable energy." *Energy Policy* 38: 2655-2663.

WCED

1987 *Our Common Future*. Oxford: Oxford University Press.

Wittman, H., and Caron, C.

2009 "Carbon offsets and inequality: social costs and co-benefits in Guatemala and Sri Lanka." *Society and Natural Resources* 22: 710-726.

Wolsink, M.

2007 "Planning of renewables schemes: Deliberative and fair decision-making on landscape issues instead of reproachful accusations of non-cooperation." *Energy Policy* 35: 2692-2704.

Wright, J., and Kurian, P.

2010 "Ecological modernisation versus sustainable development: the case of genetic modification regulation in New Zealand." *Sustainable Development* 18: 398-412.

Wustenhagen R. *et al.*

2007 "Social acceptance of renewable energy innovation: An introduction to the concept." *Energy Policy* 35: 2683-2691.

York, R., and Rosa, E.A.

2003 "Key challenges to ecological modernisation theory." *Organization & Environment* 16: 273-288.

The Green Energy Transition

Sustainable Development or Ecological Modernization?

Abstract: This article contributes to the critical review of the sociological debate on sustainability by focusing on the contested relationship between Ecological Modernization (EM) and Sustainable Development (SD). In order to do so the article is organized in two main sections. In the first section the key literature arguing against the conflation of EM and SD is analyzed and crucial differences between the two theoretical paradigms and policy discourses are highlighted. In the second part, the argument for the distinction between EM and SD is tested against the literature investigating the social implications of the green energy transition at the local level. In particular, two emerging research streams are considered, namely research on the local effects of the Clean Development Mechanism (CDM) in developing countries and research on social acceptance of renewable energy facilities by local communities in industrialized countries. With regard to this literature major sources of tension between EM and SD are highlighted, especially concerning justice, public participation and risk management. Accordingly, the article argues that in the emerging "energy and society" research field the conflation between EM and SD is counterproductive for both analytical and policy reasons.

Keywords: Sustainable development, ecological modernization, green economy, renewable energy; social acceptance, justice, clean development mechanism, community renewable energy.

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