

## **‘Green’ Capitalism: Toward A New Ideological/Policy Framework for Environmental Negotiations and Energy Innovation**

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### **Introduction**

The issue of sustainable development and its connections with climate change has been fairly well examined from a scientific and public policy perspective. Most works on these issues have relied upon approaches that are either purely scientific (based on scientific methods), technocratic (focused on the bureaucratic and politico-diplomatic inconsistencies of international environmental negotiations), or journalistic (either politically engaged or based simply on the restatement of facts). Although some accounts have proposed ingenious solutions to the problem from a theoretical or practical perspective, scant attention has been devoted to developing a framework that blends systematic and constitutive factors together to explain *how* come and not just why we are unable to move forward with the international environmental negotiations and attaining sustainable development based on advanced and knowledge-intensive energy technologies.

This paper is an attempt to fill this gap by looking at the problem from a different angle and by introducing new analytical variables in environmental and innovation studies: ideology and discourse. It focuses on two main questions: 1) Is sustainable development compatible with globalization? and 2) How can we foster innovation in the energy sector so that sustainable energy production can be made economically feasible?

The main contributions of this paper are theoretical and normative. It argues that the difficulty of promoting sustainable development—despite all the evidence on the adverse effects that climate change and globalization have on the planet—is due to: 1) a *structural* problem attributable to the contradictions of global capitalism as well as to the competitiveness that underpins the international system; and (2) an *ideological* problem attributable to the fact that the discourse on sustainable development (and by extension, on climate change and “clean” technologies) *ideologically counters* the current paradigm that legitimizes and consolidates the structure (and logic) of the global capitalist-innovation system.

The paper begins by exposing the contradictions of capitalism within the context of the nefast consequences that globalization has had on the environment. It then assesses the compatibility of globalization and its neoliberal ideology with the concept of sustainable development. It supplements (without downplaying) current scientific and technocratic/policy approaches to environmental studies by proposing a new ideological/policy framework that sits at the nexus of innovation economics, political sociology, and linguistics. The proposed framework draws upon the works of Swiss sociologist Michael Freitag on globalization and postmodernity

(Freitag, 2008); the concepts of innovation (Fagerberg, 2006; Scherer, 1999a, 1999b) and ideology (Hunt, 2004, 1998; Mészáros, 1990); and builds upon Prospect Theory (Kahneman and Tversky, 1979; Boettcher, 2004; McDermott, 2004). The framework attempts to demonstrate how the climate problem and existing non-fossil fuel technologies provide incentives that are compatible with the capitalist precepts of growth, profit, and innovation. The framework also identifies crosscutting vehicles by which sustainable energy production could become profitable once introduced to the market. Finally, it highlights the importance of discourse performativity and dissemination in structuring the way we conceptualize climate change and green technologies, and in supporting the very policies we craft to address these issues. The paper then assesses the implications of this new framework for climate change negotiations and technological change. The conclusion suggests that the market value of clean technologies is underestimated due to a valuation bias toward fossil fuels. It also suggests that rendering the economic value of the environment and the prominence of new energy technologies ideologically compatible with the dominant paradigm would augment this value and help advance climate change negotiations.

## The Contradictions of Capitalism

According to Marxists, the contradiction at the heart of capitalism is that, due to its exponential dimension, capital constantly needs to propagate itself. Yet the more propagation there is, the more value added is needed, which in turn requires more exploitation. Indeed, with the formation of societies of “mass consumption,” industries had to drastically increase their output while simultaneously maximizing profits.<sup>1</sup> Firms also had to produce faster and in greater quantities. The solution was to replace (or significantly reduce) the workforce by using machines and specialized (skilled) workers. This facilitated the adoption of knowledge- and technology-intensive economies. Yet, for Marxists, the ultimate *plus value* (capital gain) is always derived by “exploiting” some form of workforce; hence the current mutation of the global labor division marked by the increasing delocalization of manufacturing production centers in developing countries.

Today, with the globalization of international trade and the transnationalization of world affairs (migration and financial flows), capitalism has profoundly changed. The new dynamics of globalization have brought new opportunities (progress), but also new contradictions. For the purpose of this paper, five main contradictions have been identified:

- 1) The economic power of capital has never been so great and yet globalization paradoxically requires greater government assistance. This contradiction stimulates the competitive or adversarial nature of international relations, creating

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<sup>1</sup> The notion of profit maximization as the main objective of the firm has been criticized in the economic literature. In today's developed financial markets, where competition is not always perfect, profit maximization cannot be seen as the sole objective of the firm. In those circumstances, other important objectives need to be accounted for, such as the maximization of the firm's market capitalization.

a gap between the ability of capital to be deployed and the states' capacity to support this deployment—hence the introduction of new “extra-economic doctrines” to fill this gap (Wood, 2003: 164). The opportunities emanating from globalization thus produce the contradictory result of hardening economic competition, which is why states need to ensure that domestic actors with direct responsibility for controlling strategic sectors such as energy and high-technology industries line up behind state policies and vice versa.

- 2) The success of capitalist development (e.g. economic modernization and technological innovation) worldwide has brought about tremendous failures—including an increase in socioeconomic inequality and exploitation as well as destruction of social solidarity (save for the presence of strong labor movements and social legislation in European countries such as France and Germany).
- 3) Capitalism has, on the one hand, allowed us to utilize the environment (urbanization and resource exploitation) to modernize our societies. On the other hand this modernization has caused an upheaval of the biosphere (deforestation as well as biological, biogenetic, and chemical pollution), the magnitude, depth, and consequences of which we are just beginning to appreciate.
- 4) Liberal capitalism emerged from the individual liberty movement, which was at the root of practically all the modern revolutions. But, this human liberation, which operates not only in the minds of individuals but also extends to social practices and the very texture of social relations, altered our relationship with nature, which became categorically objectified and *instrumentalized* (Freitag, 2008: 373).
- 5) Capitalism, at least in its current state, needs inequality to work effectively. Freitag (2008: 372) suggests that, despite the benefits that capitalism can bring on the development level, it always needs *underdevelopment* to compensate for *overdevelopment*. It is the selective growth of massive poverty and underconsumption in the less developed countries that paradoxically saves the world from total devastation on the environmental level. This is in part what Larry Summers implied when he said that “dumping” pollution in underdeveloped countries made economic sense since the former are “under-polluted” and the cost of pollution effects are less in those countries than in the industrialized ones (cited in *The Economist*, 1992).

### **The Compatibility of Sustainable Development with Globalization: Ideological and Structural Levels**

The question of whether sustainable development is compatible with globalization is not a simple one. The answer depends largely on our ontological inclinations, on the explicative variables we prioritize, and the ones we downplay. This paper assumes that sustainable development is *compatible* with globalization and focuses on two major variables: one that is structural (global capitalist system) and one that is constitutive (ideology).

Before articulating an argument on *how* sustainable development is compatible with globalization, it is necessary to focus on *why* it is not. If sustainable development is *not* compatible with globalization, change must come from *within* the system through some form of social-political revolution—one that could generate critical mass movements (process) to change the system (structure). Therefore, abruptly changing the system is possible, provided that we adopt a new set of convictions or assumptions about reality (i.e., ideology) that could justify and legitimize such change. However, based upon the current nature of the system<sup>2</sup>, a “war of movement” à la Gramsci<sup>3</sup> in the name of fighting global warming and climate change is *not* attainable. To pretend otherwise would mean, according to Freitag, changing the exponential mathematical logic behind capitalism. Indeed, Freitag intimates that the only way that sustainable development can be achieved is by adopting a new logic of development that would not comprise any intrinsic quantitative dimension. This, of course, is not conceivable as it directly conflicts with the logic of capital accumulation and profit maximization, which form the very basis of the dominant paradigm—neoliberal capitalism—to which we subscribe (Freitag, 2008: 373).

### *The Structural Level*

We cannot, practically speaking, aspire to progress toward healing the planet by eliminating all the mechanisms of quantitative expansion and the regulatory authorities of systemic and cumulative character such as money and markets, and by stopping consumption and work. Recall that even in communist regimes, people were and still are seeking utility by working and trading together and with the outside world (e.g., China’s capitalist path). We must recognize that capitalism and the entrepreneurial spirit have become inculcated in our *logos* (principle or ensemble of principles governing our world) and *bios* (life). With the introduction of new technologies (cybernetics, semiconductors, optoelectronics, robotics, biotechnology, nanotechnology, new informational and communicational platforms, etc.), we went from economies involving the internationalization of concrete markets where actual goods were traded to economies involving the internationalization of financial markets where mere numbers are virtually traded in a speculative orbit. Moreover, in an increasingly interdependent and interactive world, capitalism is becoming *glocalized*: nations have deterritorialized by multiplying the scale of their actions from the most global to the more local (Sullivan, 2008; Beck, 2003). The globalization of capitalism has therefore reached its climax, its crisis, by becoming purely and unabashedly systemic (Freitag, 2008: 376, 380–381).

Another important structural reason why a systemic reversal is inconceivable is related to the logic of competitiveness (relative gains) that encompasses all dimensions of interstate rapports. This logic is also reflected in economics—game

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<sup>2</sup> A discussion of the current trends in modern capitalism is beyond the scope of this paper. For more details, see Doogan, 2009.

<sup>3</sup> For a thorough account on Gramsci’s work on ideology, see Cox, 1993.

and utility theories, imperfect competition, strategic trade theory, etc.—which inform the way we conceptualize and conduct economic and trade policy (Gilpin, 2002; 2001). In other words, competition (whether high, low, malignant, or benign) is a permanent characteristic of the international system. With regard to environmental politics, this logic is at the heart of the comparability concept between the actions needed to mitigate the effects of climate change on industrialized and developing countries. Navroz Dubash rightly remarks that this “stance poses the rest of the world with an unfair choice between sacrificing differentiation, and hence equity, or providing the world’s largest emitter an excuse to stay out of the [climate change regimes]” (Dubash, 2009: 9). The result is that the logic of competition is inextricably reflected in the negotiations. What Dubash calls “*ingrained* oppositional stances” during negotiations are directly linked to this logic (Dubash, 2009: 10. Emphasis added).

### ***The Ideological Level***

Following the victory of the “free-world”—an ideological metaphor that conciliated technology and freedom, success and anti-authoritarianism, democracy and capitalism—over communism, society has ceased to think in ideological terms. Neoliberal democracy has become (within the dominant paradigm) a *self-evident* necessity taking place in a historical-dialectical form, the synthesis of which being the universalization of liberal democracy. In 1992, Francis Fukuyama published *The End of History and the Last Man*. In this book, Fukuyama contends that liberal democracy and its capitalist foundation constitute the climax of mankind’s ideological development. Although Fukuyama specifies in *America at the Crossroads* (2006) that this “climax” has yet to be attained and that the task would not be as easy as supposed, it is clear that in the West (especially in the English sphere<sup>4</sup> and in Western Europe), achieving universal democracy is still something most desirable. In effect, since the end of the Cold War, we have witnessed an omnipresence of the unsurpassable character of Western ideological precepts in influential media and political platforms. The most recurring precepts being good governance, freedom capitalism, human rights and entrepreneurism. The result is that we do not (or rarely) engage in any ideological debates anymore, for it seems we have found our ultimate *façon d’être*.

### **‘Green’ Capitalism: Bringing Ideology Back In and Fostering Energy Innovation**

Considering the systemic naturalization of global capitalism, its adverse and contradictory effects on the environment as well as the lack of ideological alternatives, sound energy policies that respond to climate change, energy security, and the eventuality of rising energy costs will require *rethinking capitalism* through a process that can marshal new technological advancements (i.e., alternative energy sources and efficiency technologies) and merge them with our current ideology and energy use patterns. In this sense, the idea *is not* to reverse capitalism, but rather to

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<sup>4</sup> United States, United Kingdom, Canada, Australia, New Zealand, Ireland, and to a certain extent, South Africa and India (Bennett. 2007).

advocate for a *new and more modern* capitalism that takes into account the climate reality.

### *Toward a New Ideological/Policy Framework?*

Michael Hunt define ideology as an “interrelated set of convictions or assumptions that reduces the complexities of a particular slice of reality to easily comprehensible terms and suggests appropriate ways of dealing with that reality” (Hunt, 1988: xi). According to the economist Lester Thurow, the primary factors of change in the structure of the economic order are the interactions between technologies and new ideologies. These two factors are the key drivers of change in the economic system. We have undergone a series of technological revolutions (perhaps the most important being the Internet) that have launched the transnationalization of world affairs and the globalization of the economy. For the international system to adapt to these new technological advancements, it had to find an ideology that gave them meaning (justification)—neoliberalism. This was the case during the industrialization period where new technologies (steam engine, electricity, and internal combustion) allowed capitalism to emerge. Yet, capitalism (as a socioeconomic system) needed to be ideologically aligned with these new technologies. According to Thurow, without the belief in the maximization of individual welfare (accumulation and ownership of capital, production, maximization of profit, etc.), “the incentive structure of capitalism had no meaning and economic growth had no purpose” (Thurow, 1996: 11). In this regard, transitioning toward a sustainable energy infrastructure system would necessitate a socio-technological systemic change; or as Marina Van Geenhuizen et al. suggest (2010: 3), a “coevolution of technology and society.”

Today, we seem to be living in a period of “punctuated equilibrium” in which our ideological thinking does not match our technological innovation (Thurow, 1996: 7). We know that we already have the technologies, the scientific knowledge, and the financial means to carry out an incremental transition toward a sustainable future (Stern, 2007). We also know that neoliberalism is the dominant paradigm and that we have yet to create an alternative to it. Therefore, before a new systemic equilibrium can be reached that would reflect the actual problem (balancing the environment with global economic growth), neoliberalism and the economic value of advanced non-fossil fuel technologies must be compatible. That is to say, ideology, nature, and technologies must be *synthetically reconciled*. More concretely, sustainable, innovative and climate-conscious economic development policies will require the following four tasks:

- 1) *Present a new way of making money and building our economies to the business and policy circles.*

Sustainable development could very well be the new reference point from which we begin to devise an alternative accumulation model for capitalism, which, in turn, could give international environmental treaties the legitimacy they need to take

action and could spur energy innovation. The World Commission on Environment and Development defines this concept as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1987). More precisely, the Organization for Economic Cooperation and Development (OECD) Round Table of Sustainable Development defines the concept as encompassing issues such as: “removing barriers to greener growth (such as environmentally harmful subsidies); decoupling economic growth and environmental pressures; achieving deep technological transformation; and selecting new measures of progress” (OECD, 2010:3).

First, sustainable development makes economic sense. Numerous energy alternative and efficient technologies offer opportunities to leverage sophisticated and value-added innovations. These include solar photovoltaics (e.g., the Grätzel cell, a solar cell based on dye-sensitized nanostructures); coal-carbon capture and storage (e.g., using geochemical processes and microbacterial activity to trap carbon dioxide in rocks and sediments); fuel cells (e.g., solid oxide and proton-exchange membrane fuel cells); and bio-energy (e.g., using genetically modified algae to produce bio-oils) (Van Geenhuizen and Shoonman, 2010: 22-30). One of the mantras of economics is efficiency. If efficiency is defined as getting the most out of given resources, then it stands to reason that investing in these innovations makes economic sense as their purpose is to render energy production and usage more efficient in the medium-long term. Moreover, to make these technologies cost-effective, we need a combination of “technology-push” and “demand-pull” effects. A “technology-push”—manifested in the form of a scientific breakthrough—would reduce the research and development costs associated with creating commercially viable alternative energy technologies. In turn, a demand-pull effect (e.g., energy shock) would render energy innovations more attractive to consumers. The more the public demands alternatives, the more innovation becomes profitable. As F.M. Scherer noted: “Just as both blades of a scissors cut paper, both technology-side and demand-side changes contribute to making technological innovations profitable and thus induce their appearance on the market” (Scherer, 1999b: 25). Obviously, these micro-level changes are difficult to implement in practice. Indeed, Marina Van Geenhuizen et al. (2010: 3) argue that managing the transition to an environmentally sustainable economy will require a “complex and difficult multi-actor and multi-level steering process.” Yet, such a process is necessary to remove (or reform) regulatory measures that support the persistence of fossil fuel dependence and environmentally damaging government subsidies, which have the adverse effect of distorting the prices of fossil fuels and creating a “competitive disadvantage [for] alternative energy technologies” (Diaz Arias and Cees Van Beers, 2010: 39).

Second, the greatest strength of capitalism is its ability to adapt to particular situations (the most intriguing example being capitalism in China), especially when confronted with a crisis (in the current case, climate change and the scarcity of resources). Not only is making a “green transition” in line with some of capitalism’s fundamental precepts, including entrepreneurship and innovation, but capitalism is

equipped to adapt to such a transition. The key is that advanced energy technologies need to be perceived through the prism of innovation management so that firms feel compelled to respond to the environmental urgency by developing new technologies to remain competitive. Today's new global and specialized economy can stimulate firms to develop new capabilities by amassing human capital and gaining technical expertise from external sources (absorptive capacity) as well as transforming this knowledge into innovative assets (dynamic capacity) (Swann, 2010: 23). And due to the process of "creative destruction" (Schumpeter), energy businesses can spur future innovation, allowing various companies "with different technical capacities and market insights to take the next steps" (White House, 2011: 9; Scherer, 1990b).

- 2) *Unlock our technological system to reduce costs and encourage the commercialization of new energy technologies.*

The dominance of neoliberalism has limited our ability to take a new and more sustainable path to development. We choose to optimize the existing energy and accumulation system rather than make progress toward structural change. Existing energy technologies offer tremendous potential for innovation, but without a political motive, these technologies go undeveloped and cannot be used to create a sustainable energy system (Van Geenhuizen et al., 2010). The current paradigm has the effect of blocking the introduction of non-fossil fuel energy technologies in the market even as a supplement to fossil fuels and impedes the reforms needed to gradually increase the share of renewables in the energy mix and to progress toward sustainable development (Diaz Arias, Cees Van Beer, 2010: 39).

Furthermore, our market structure does not allow innovators to recoup the full economic benefits of their technological breakthroughs (i.e., appropriability problem). This in turn undercuts the benefits these breakthroughs can procure for society. According to expert Jan Fagerberg, our current system is "locked" into a specific development path that supports fossil fuels and constrains new non-fossil energy technologies from entering the market. This systemic configuration leads firms to ignore potentially rewarding avenues of exploration (Fagerberg, 2006: 9). Fagerberg explains that since a system is affected by its environment, "the more open a system is to impulses from outside, the less chance there is for being 'locked out' from promising new paths of development that emerge outside the system" (Fagerberg, 2006: 9). To "unlock" energy innovation, four steps are recommended:

1. Foster economies of scale by increasing the production of non-fossil fuels while simultaneously lifting costs through "moving from low output per unit of input to high output per unit of input" (Scherer, 1999a: 20). Existing large-production capacity and distribution networks provide fossil fuel with lower costs per unit as opposed to non-fossil fuels.
2. Gain market experience. The reduction in unit costs can be achieved with "knowledge from production and market experience." Alternative energy,

technologies thus “need to be given the opportunity to learn in the current marketplace” (Diaz Arias, Cees van Beers, 2010: 47).

3. Reduce uncertainty associated with alternative energies by supporting more investment not just in research and development, but in production capacity as well. The more we produce innovative energy technologies, the more effective and economically profitable they will be (Diaz Arias, Cees van Beers, 2010: 47).
  4. Maximize the incentives for startups to innovate. The emergence of new risk-taking firms, which offer “technologically differentiated substitutes and leapfrogging to still better products” can be key drivers of energy innovation (Scherer, 1999a: 41-42).
- 3) *Ideologically frame sustainable development to reconcile its a priori revisionist nature with growth potential, profit, and utility.*

To effectively promote energy innovation in climate change negotiations, there is a pressing need to seize the market of ideas by finding new interpretative frameworks. In this sense, the sustainable discourse could benefit from the insights of *Prospect Theory* (Kahneman and Tversky, 1979; Boettcher, 2004; McDermott, 2004), which demonstrates that individuals are more inclined to take risks when exposed to situations where they face potential losses—in this case, a loss of *security* regarding the continued use of fossil fuels and the maximization of heavy industrial production that is detrimental to the environment. In other words, the idea would be to present or frame sustainable development as a solution that, if not espoused, would result in a series of losses. Such losses might include environmental catastrophes but also the loss of innovation incentives, maximized utility, and economic value, etc. This “loss situation,” once discursively constructed, could help foster new beliefs regarding economic growth and development

With new beliefs come new ideas, and with new ideas come new opportunities to *structure* the way we conceptualize sustainable development and climate change issues—and *support* the policies to address them (i.e., energy innovation) (Mutimer, 1997: 194; 2008: 115-116). As Hunt points out the eminently discursive aspect of ideology and its practical side (the simplification of reality), philosopher István Mészáros highlights the fact that ideology is articulated and communicated by and through discourse according to *practical pointers* and effective incentives that entice social action (Mészáros, 1990: 12). Alternative energies and new efficient technologies can be profitable as long as they contribute to the market and to economic dynamism. As difficult as it may seem, we need to “frame” to the decision-makers and to the owners of the means of production that implementing cost-effective carbon reduction strategies to contain climate change make economic sense and provides technological and economic incentives for firms to innovate. Thus, the narrative efficacy of the different meanings and benefits of sustainable development as well as the urgency of addressing climate change depend on the very fabrication and dissemination in practical terms of such “frames,” which

acquire political alliances and credibility through various degrees of discourse: government reports, economic studies, national press, tabloid, television, radio, specialized journals, publicity (Jamieson and Waldman, 2003: 151-2).

4) *Reach out to the critical masses in the industrialized world.*

There is a need to rally a critical mass of people within industrialized societies who would assume the leadership in *legitimizing* this new discourse by agreeing to alter their social behaviors and economic preferences. Because of the high level of gross domestic product per capita and the technological advancements in such countries, proponents of sustainable development and clean technologies (and of remedial actions to address climate change) will have less difficulty raising awareness within this social stratum by directly promoting the value it offers for their utility maximization (assuming that, *ceteris paribus*, that is what they ultimately seek). Pioneering cities or “green clusters” could take the initiative by encouraging others to join the transition movement toward “green capitalism”—urbanization, economic growth, utility maximizing, and innovation based on advanced energy technologies (Van Greenhuizen and Schoonman, 2010). A general axiom of game theory is that your best action depends on what other players do. In critical mass games, individual behavior depends on *how many* behave in a particular way. If we can get a critical mass to perceive new energy technologies and sustainable development as optimal, then their choices are likely to influence others. The more people we can get into the movement, the more will join. Small changes generate important outcomes as expectations increase (Axelrod, 1984). Should this strategy work, perhaps in the medium-long run, we could see the rise of a new social consciousness materially anchored to new means of accumulation and energy use patterns as well as sustained by a new “practice-oriented ideological form” such as sustainable development (Mészáros, 1990).

### **Implications for Environmental Negotiations and Technological Change**

As mentioned above, we already have the scientific findings (IPCC, 2007; 2001), a vision of how sustainable growth could work (Bertie, 2010; Grin, Rotmans, and Schot, 2010; Committee for Development Policy, 2009; Hettne, 2008) and how the private sector could help sustain growth (WBCSD, 2010) as well as some solutions to the problem from a theoretical-practical perspective (Najam et al. 2004; Susskind et al. 2003; Susskind, 1996). Furthermore, there seems to be a quasi-convention within epistemic communities and energy industries that the transformation of our 20<sup>th</sup> century energy system to meet the needs and constraints of the 21<sup>st</sup> century is arguably the major engineering challenge of the next 50 years.

What we first need are mechanisms by which we can transform these ideas into concrete remedial actions to effectively address the climate change issue. There has been a substantial amount of effort in that regard, notably with major multilateral treaties (UN Framework Convention on Climate Change, Montreal Protocol, Kyoto, Copenhagen, etc.). Yet, judging by the outcome of all these efforts, it seems as though

we have failed to comprehend why, precisely, we are incapable of “cooling the planet without chilling trade” (Bergsten and Wallach, 2009). The recent UN Climate Change Conference in Tianjin consolidated the vicious cycle in which we keep pushing off real and effective solutions to the next conferences. At Tianjin, we have “agreed,” again, that we are “committed”—but we have not agreed on how to strive. Perhaps the only promising aspect of the conference is that the governments have agreed that action on climate change can be done through “small doors,” which could eventually open “big” ones. This is an important, yet perhaps discouraging, recognition that the problem cannot be successfully addressed by rushing into steps that are too drastic—hence the need for a flexible adaptation process (Hulme, 2010). But in the end, the Tianjin Conference reproduced the same discourse as Accra and Copenhagen. Such articulations as “it’s all about the *real people* being given the opportunity to take control,” and “we are still *on track* ... governments are becoming *very serious* about negotiating a *result* in Copenhagen” and “we will show the world that we are committed to take the next *essential* steps on climate change” are legion (UNFCCC, 2010, 2008. Emphasis added). There is thus a serious and immediate need to surpass this circular discourse surrounding environmental negotiations. Before even committing to new international treaties, we need to *think first* about what we want on the ideological level, and then about what we can do to improve the current regimes and solutions accordingly (Hulme, 2010). No policy can be implemented without being understood, analyzed, and thought; it must first be the object of a political-ideological consciousness.

Second, in reengineering our energy infrastructure to exploit alternative energy sources and efficiency technologies, we need to replace our current, rather conservative, approach to energy production with a new “hybrid-source approach” based on incremental technological innovation (Van Geenhuizen and Shoonman, 2010: 31; Droege, 2008). To that end, engineers, captains of industries, and policymakers have a special responsibility to: 1) understand the urgency of promoting sustainable development while simultaneously satisfying global energy demand; and 2) advocate for appropriate responses to the energy transformation challenge. Although a variety of technically feasible approaches are available to address the need for a sustainable future, no single technology can produce the answer; what we need is an amalgam of many technologies and a policy-push toward energy innovation. Indeed, politics and economic policy are at least as important as technology in developing systems solutions. Transitioning toward a sustainable energy infrastructure system is not just a technological challenge but also a political, economic, and public education one. Innovation is constantly evolving. There are always unused potentials to be discovered and utilized. If current solutions are not adequate, then we ought to improve them by rendering them more cost-effective and more efficient. Throughout the 20<sup>th</sup> century, we achieved tremendous technological achievements. We were able to think “outside the box” and move toward progress. Let the 21<sup>th</sup> century see even greater achievements by reengineering our energy infrastructure system and exploiting alternative energy sources and efficiency technologies.

## Conclusion

The question of whether renewable energy is cost-effective or not is one of economic convention (i.e., everything must always generate greater value or benefit) and social norms (i.e., value is subjectively assigned to certain types of resources). Proponents of fossil fuels base their arguments on the rather weak effectiveness of clean energy sources in growing the economy compared to coal, oil, and natural gas, and their current weak commercial profitability. Using the pure economic logic of a cost/benefit analysis will quickly produce the conclusion that immediately and drastically moving away from fossil fuels will generate a lower expected present value than maintaining the status quo. Yet the payoffs depend on the very "value" that we assign to non-fossil fuels. The climate problem goes beyond numbers. So, while the existing value of renewable energies is indeed uncertain, their production on a broader scale could very well appreciate their long-term market profitability, thereby allowing us to derive greater value from them. The challenge is to set up the climate problem in such a way as to take into consideration both *long-term* costs and *future* benefits (which, for the moment, are difficult to quantify). Saving on fossil fuel today will permit us to avoid the abysmal costs of dealing with global warming tomorrow.

By aligning economic growth and profit maximization with climate-conscious "power sources" and production (as it takes power to produce) through effective discourse *performativity*, we should be able to put more of value on the table and address (to an extent) the issue of relative gains. Pragmatically, this would allow the negotiators to better know their interests and those of their counterparts so that the "negotiation game" would be considerably less based on oppositional stances and on the logic of who gets more, but would reinforce the current mutual gains approach to negotiations (Susskind, 2010; Susskind, Moomaw, and Gallagher, 2002). In fact, we are starting to see some interesting work in that regard. This is a sign that ideology and discourse, as fundamental explicative variables and factors of change in international environmental politics, are being acknowledged by experts in negotiation and climate change. For instance, in their latest paper, William Moomaw and Michaela Papa (2010: 1) highlight the need for a "substantive shift" in the discursive framing of the objectives of international environmental treaties in order to achieve absolute gains and a "win-win situation." The authors also advance the need for a *normative focus* to change the ways in which resource use patterns and services are conceptualized.

Ultimately, however, these shifts need to gain political and ideological salience in the collective representation of all the parties involved in the negotiations. Moreover, adapting capitalism to the climate problem can be achieved only through a sustained effort on the part of business leaders, policymakers, and their constituents to "rethink and redefine traditional measures of wealth, prosperity, and well-being." Only then will we be able to move effectively toward sustainable development, foster a technological innovation revolution, and implement concrete policies to contain climate change (UNEP, 2011:38).

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