# Untying the Climate-Development Gordian Knot - Economic options in a politically constrained world

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Climate policies face the typical contradiction generic to global environment policies, recognized as early as in 1972 at the UN conference on Human Environment at Stockholm: the participation of developing countries is essential since their current emissions are significant and trend showing increasing share in future global emissions, but they will not cooperate so long as they perceive environmental issues as a new form of Malthusianism. But, despite repeated references to sustainable development at Rio (1992), the negotiations for framing a climate regime have remained disengaged from the debates on how to embark on sound development paths, thus tying up a new Gordian Knot through a succession of misunderstandings.

This mistake was all the more grave as the timing of the climate change issue was inopportune. The recognition of the climate change phenomenon coincides with a period in which many developing countries are set for rapid economic growth and in which global power equations are changing (military power, globalization of world markets and control over natural resources). No sword of a new Alexander can cut this knot tied by history. The aim of this paper is to delineate the threads which when pulled would untie the knot.

In the first section we draw on history to outline the intellectual underpinning of North/South divide around climate affairs. In the second section we show the economic basis for a leverage effect between development and climate policies. The third section proposes some guidance to develop a climate regime robust enough to support an ambitious effort to decarbonize economies and show that the Kyoto Protocol (KP), once re-interpreted and amended, provides a reasonable foundation for such a regime.

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## 1. 1988 – 2005: Intellectual sources of North-South misunderstandings

It is apt to recollect how the G7 was paradoxically hasty, three years after the first predictions of global warming by the tri-dimensional climate models, to bring on to the diplomatic agenda an affair for which its members born a large historical responsibility. This cannot be explained regardless of a broader geopolitical context which included how the petroleum game may be reshaped by the emergence of large developing countries as major consumers in the 21th century (Schlessinger, 1989).

The diplomatic momentum that led from this context to a cap and trade architecture did not result from the deployment of an ex-ante fully-fledged vision of any actor; it was rather the outcome of a succession of diplomatic *fait accompli* (Bodanski 2001), the most important being the adoption at Berlin (1994) of a quantity based approach to create an incentive system embracing all countries and sectors. This conception rested on the intellectual influence of the economic notion that a single price of carbon worldwide is essential to minimize costs of meeting a global target and to prevent distortion in international competition. After 1992, the unpopularity of carbon taxes left the cap and trade system the sole candidate for this purpose. Against the reluctance of some quarters in the EU (who wanted caps with limits to trade) this system was advocated as reconciling cost-effectiveness, environmental integrity, universal participation and flexibility vis-à-vis national sovereignty.

On the North/South question, this system, as argued by Grubb in *negotiating targets* (1989) had the advantage of organizing North-South transfers large enough to spur the South to take significant commitments in a foreseeable future. This advantage could not adequately materialize though; as the principle of *common but differentiated responsibilities* (article 3.1 of the UNFCCC) led to the decision that only developed countries would adopt binding commitments in the first period. But the cautious silence about the targets for developing countries beyond 2012 had the perverse effect of placing them as pure spectators of intra Annex B debates (target setting, supplementarity squabble) as if they should be content with their absence of commitments, with the damages avoided thanks to the Kyoto Protocol (KP) and with some financial and technological gains through jointly implemented abatement projects. The silence about their future commitments and the disengagement of climate negotiations from other global governance issues (energy, trade, technology) caused skepticism if not distrust.

Due warnings from either side however duly signaled why the cap & trade option could not be a magic bullet:

- the United States Senate (Byrd-Hagel resolution 1997) demanded developing countries to agree to "new specific scheduled commitments to limit or reduce greenhouse gas emissions." This meant refusing too large asymmetry of carbon constraints for developing economies and asserting of the "no votation without participation principle" (Bodansky, 2001).

- on the penultimate day of COP 3, the G77 plus China stated that: "Until the question of emission rights and entitlements is addressed equitably, it [will] not be possible to have emission

trading." (G77&China 1997). This underscored the concern about possible unfair quota allocations in future as well as the political will of emerging economies to be engaged in the debate.

Why these warnings could not alter the diplomatic momentum is a complex story. We venture to say that the prevalence of misinterpreted economic communications did not help supporters of the KP to overcome, between COP3 and COP6, the political divergences about the technical modalities of its enforcement and to make credible offers to developing countries.

### 1.1. The "cap and trade architecture" in the trap of the *tabula rasa* myth

The economic science evolves through uneasy journeys along the routes full of neglect, distrust, misuses and abuses. One main source of confusion is simply that optimal tools in a first best world may be far from optimal if applied without caution in a second best world. The real world is not the *tabula rasa* of the metaphors of the junior year courses in economics; it is a world full of imperfections, the hallmarks of which in conditions of underdevelopment are the existence of incomplete and fragmented markets (multiple discount rates, unequal marginal costs across sectors & regions), weak policy regime, poor governance, under protected property rights (land, technology, IPRs) and dual economy in perpetual reformation. This has two main consequences.

First, the carbon price signal in countries experiencing multiple rapid transitions and churning heterogeneous technology vintages are swamped by high noises from other signals. One obvious example of the resulting perverse effect is that a carbon price will increase carbon emissions due to the switch to carbon intensive non-traded energy resources (Sagar 2005) and initially reduce the electricity access of the rural sector. This is not only a matter of their relative price to service ratio. Rural markets have informal lending mechanisms which provide credit to small enterprises and households with high interest rates in a context of low labor rates in absence of firm wage contracts. The benefits associated with energy resources from formal market therefore vanish; these could be appropriated by altering the baseline parameters like interest rates and wages, but these are out of the scope of climate centric mechanisms.

Second, the development benefits of carbon trading are uncertain; this is not only because Annex B countries will not accept allocation rules generating large external transfers[2]; but also since the revenues from carbon exports may not materialize as higher income for the exporter. Indeed, to exploit the full potential of carbon export for a given world carbon price, the domestic energy price has to increase more, in relative value, in most developing countries than in the EU and in the US (four and two times more respectively in India); the negative income effect would be such that it may not be fully compensated by the inflow of carbon revenues especially in countries with market distortions, large inequalities and political constraints to redistribution (Ghersi et al, 2003). To avoid the dampening of growth, governments should then export only that

[2] This reluctance was explicit in the US position; the supplementarity condition insisting on domestic abatements, advocated by the EU, is an indirect form, although motivated by the political virtue of a demonstration effect.

fraction of the export potential for which these adverse effects can be compensated by an efficient recycling of carbon revenues. One consequence is that the availability of cheap carbon in developing countries may be significantly lower than suggested by partial equilibrium analysis.

This credibility deficit could be filled by short term benefits from the CDM. Compared with Joint Implementation, this last minute 'Kyoto surprise' operates an inversion of priorities, placing the sustainable development at the first rank and the facilitation of Annex B commitments at the third. But despite the recent rise of the number of projects, its expansion remains inhibited by contradictory demands; environmentalists requiring an environmental outcome additional to the baseline and funding agencies' reluctance to provide additional support from the fear of diversion of overseas development assistance funds for environment. This leads both to omit no regret potentials (which should be tapped anyway) and to exclude infrastructure projects from CDM since their "avoided" emissions are difficult to ascertain.

In the absence of pursuing Brazilian proposal of a compliance fund or the extension of the share of the proceeds on mechanisms (both that would provide funding complementary to carbon revenues), the developing countries have reasons to perceive the offer of the Annex B as an empty promise of pawning the real present welfare for the unreal future gains.

### 1.2. Fairness of the Burden Sharing: an impossible accord on normative equity principles

The equity issues surrounding the climate affair were obvious from the outset and it is remarkable that economists, rather silent about their theoretical framing[3], restricted themselves to studying the outcomes of competing ethical intuitions.

The most challenging of these intuitions is the equal per capita distribution of emissions rights (Agarwal & Narain 1991). Arguably, such an allocation may be inequitable since individuals live in very different ambient climate, spatial constraints and energy access (Godard 2000, Neumayer 2002); but the rhetorical proximity between the notions of equity and equality, transformed this principle into a political icon for those who saw in the grandfathering principle *"an environmental colonialism"*. This icon was strong enough to be retained at Marrakech (2001).

The debate could not be anything but intense. The grandfathering principle is widely accepted as the basis of international agreements such as multilateral fishing quotas (Sterner 2002), milk quotas in Europe (Burton 1985) or SO2 regime in the US (Joskow et al. 1999). It rests on a real ethical legitimacy; any new environmental regulation is a renegotiation of the social contract and it is fair to account for interests vested under the existing contract[4], all the more since previous generations were not informed of the consequences of their behaviors (Claussen et al. 1998). But

[3] About the few exceptions see Chichilisky & Heal (2000).

[4] The Brazilian attempt of translating the principle of historical responsibilities (den Elzen et al. 1999) confronts directly this difficulty.

distributing rights for the future use of atmosphere, based on grandfathering, would lead to inequitable future contracts which the developing countries cannot accept.

Since searching for a consensus on explicit principles turned into harsh ideological disputes, two pragmatic options were explored: a) rules starting from grandfathering and supporting a contraction and convergence process (Meyer, 2002; Ghersi et al. 2003) towards equal per capita emissions in the long run; b) rules referring (at least indirectly) to the ability to pay in combination with other criteria: Jacoby et. al. (1999); triptych approach (Phylipsen et al. 1998), Groenenberg et al. 2000, Jansen *et al.* 2001, proposals from Norway (1996), Australia (1997) and Island (1997) at the *Ad Hoc* Group on the Berlin Mandate).

Given the conflicts of interests, no rule can ensure consensus since the uncertainty about the links between the levels of emissions cap, the carbon prices and their macroeconomic consequences generates a "veil of ignorance" shrouding the fuzzy 'contracts'. The implication is that countries implicitly end up accepting one of the rules despite their divergent positions. In a systematic review, Lecocq and Crassous (2003) show this to be risky because country preferences are very unstable and conditional on the baselines assumptions and the time horizon: China and Europe, starting from different situations reject rules with a high weights to convergence towards 2030 but accept it if they consider the immediate post 2012 period only. It can be argued that setting targets for every five years creates a learning process. But this helps solving the problem only marginally. The possibility of drastic revisions of the allocation rules is indeed limited by the political costs of reversing any diplomatic *fait accompli* and by the risk of undermining the dynamic efficiency of the system since countries can lower their abatement efforts in order to renegotiate lax targets for future periods (Helioui 2002).

On top of these difficulties two political obstacles emerge. First, governments face the task of trading off between various assessments criteria: maximizing the funds inflow from carbon trading and minimizing the costs for the low income classes may indeed not lead to the same vision of the burden. Second, contradictions arise in cross country comparisons: poor citizen of a rich country do contribute far less to global warming than rich citizen of developing countries.

In fact the overall problematique is an impasse since a 'fair' burden includes a burden in the form of trade-offs with wider development agenda. Political acumen would have made this obvious but the vulgate of Kantian ethics used in international meetings overshadowed the Machiavelli's saying that 'States are cold monsters' meant to defend the selfish interest of their constituents. The only way out is to return to Pareto improving policies; moving afar from the focus on 'burden sharing' and 'property rights entitlement'[5]. Emissions quotas are then no longer rights but transitory allowances; and the relevant question then is under what conditions cap and trade can be used as a tool for removing barriers to development. This re-framing does not eliminate debates about equity and responsibility; it puts them in the perspective of reshaping

[5] Note that little progress has been made so far on rights over the global commons and that negotiations on forest (and related biodiversity) have reinforced national sovereignty over natural resources.

development instead of capping it. The challenge is now to demonstrate that postulating the existence of win-win options is not another wishful thinking to reconcile contradictory interests.

## 2. Aligning Development Pathways and Long term Climate Change Policies

### 2.1. An intellectual discipline: starting from the suboptimal and real baselines

Detecting the synergies between climate and development is inhibited by the common practice of projecting secular growth baselines (often optimistic for reasons of political correctness) and to represent environment policies as influences alterating these trends. More appropriate would be to start by delineating the real baselines that incorporate barriers to the materialisation of the growth potential. This intellectual outlook prevailed at Stockholm (1972) where the attention to disruptions of local environments reinforced the diagnosis[6] about perverse effects of on going growth patterns (distorted choices of techniques, structural unemployment, unfulfilled basic needs, drift from the land).

This outlook needs to be revisited today in a context of evolving links between capital scarcity, infrastructure requirements and social dualism. Cumulative energy investments between 2001 and 2030 should reach 2.2 T$ in China, 2.1 T$ in the rest of Asia and 1.3 T$ in Latin America (IEA, 2003). M. Fay and T. Yepes (2003) estimate that, from 2005 to 2010, 6.7% of the GDP in Asia and 5.5% in Africa will have to be invested in energy, transportation, water distribution and sanitation infrastructures. Since 40% to 60% of savings will have to be invested in buildings anyway, funding infrastructure investments will remain critical either for reasons of capital scarcity (Africa's saving rate is 8% of the GDP) or of inefficient allocation in countries with high savings. The latter may in addition not sustain a capital intensive growth when their savings rates decline such as in China where the inversion of age pyramid between 2020 and 2030 would cause a decline of savings from the present 40% to 8% in 2050 (INGENUE, 2005). This may cause a debt trap as in Brazil in the late seventies where 30% of the debt was from investments in the energy sector. This may curtail infrastructure programs and enhance resource conflicts between populations with very different access to energy, water and transportation.

Managing energy demand is becoming even more critical when energy security is increasingly perceived as a prime development objective by nations competing for resources in an era of sustained volatility of energy prices. Recent trends only confirm the warnings of the World Energy Conference as early as 1979, about the emergence of developing countries as major oil and gas consumers as a source of major world tensions beyond 2000; the diagnosis that was re-iterated at the WEC at Montréal by James Schlessinger ten years later (1989). Regardless of controversies about the timing of the peak oil production, the conventional oil reserves remain indeed increasingly concentrated in politically sensitive regions.

[6] The vital lead of Myrdal's 'Asian Drama', Sen's early contributions, R. Dumont's 'Afrique Noire est mal partie', the UNCTAD group (R. Prebisch) was to raise questions both about the trickling down of the Western economic growth to developing countries (Rostow) and about the replication in these countries of the socialist primitive capital accumulation.

The question is thus to what extent a climate regime can help tackling these energy related obstacles and, beyond, trigger an upward move of the production frontier of developing countries through the value of carbon. In principle the creation and sharing of a carbon benefit can produce such a leverage effect through two channels: enhancing the profitability of foreign investments and compensating the transaction costs of Pareto improving domestic policies. The following section is meant to explain why such a mechanism is not wishful thinking and that win-win options exist to trigger it.

## 2.2. Development and Climate Synergies: Illustrations from India

This may sound like a new claim for no-regret policies enhancing both environment quality and economic income. The counterargument to this notion is that, if a no-regret potential exists, it will be tapped anyway. The heterogeneous set of examples used in this section is meant to articulate a perspective that is not isomorphic to the suboptimal selection of instruments and technologies in the nineties (Jaffe and Stavins 1994; IPCC, 1995); it relates to whether climate policies can facilitate an upward shift in the development baselines and whether the new baselines present a higher potential for decarbonization.

### *2.1. Conjoint Market for Local and Greenhouse Gas Emissions*

Major developing countries are in transit through a stage of urbanization and industrialization when local air pollution reaches its zenith. Resulting problems of health and human development are linked to climate change since local air pollutants and GHGs are often emitted conjointly. In India the electricity sector consumes 70 % coal (CMIE, 2003) and emits most sulfur dioxide ($SO_2$). In the year 2000, two-thirds of India's $CO_2$ and $SO_2$ came from 500 large point sources of which seventy percent by the 82 coal based power plants, most of the rest by transport, steel and cement manufacturing (Shukla et al., 2004).

Since the electric sector in India lack efficient emissions control, opportunities exist for creating conjoint emissions control mechanisms. Interestingly though the relationship between sulfur and carbon control is asymmetric (Pandey and Shukla 2002; Garg et al 2003). Whereas cost-effective measures like better combustion efficiency and fuel-switch from coal to gas reduce sulfur emissions to greater extent than carbon emissions, the cost-effective sulfur control measures like use of clean coal technologies or low sulfur diesel have little impact on carbon emissions. But local pollution received earlier attention of national policy makers than climate change, and this sequencing of $SO_2$ and $CO_2$ markets is sub-optimal since the singular measures to control local pollution fail to net the co-benefits of concurrent $SO_2$ and $CO_2$ mitigation. There is thus a scope for a policy designed to align both markets and optimize co-benefits. At a low carbon price of \$20/t$CO_2$, the aggregate mitigation cost in the next 25 years in the conjoint system would be lower by \$400 million compared to under the two separately operating markets. Besides, the conjoint system would deliver 520 Mt of additional $CO_2$ mitigation and thereby add \$2.6 billion to the carbon benefits (Menon-Choudhary et al., 2004). Correcting this asymmetry and incongruence actions typically demand institutional financial arrangements at the national level that should benefit from a climate regime.

### *2.2.2 Synergy of electricity market reforms and revenues from carbon trading*

After India's electricity sector reforms in early 1990's the sector became more dependent on domestic coal, as hydropower was confronting high capital costs, anti-large dams movements and interstate water disputes. Barriers to hydro and bottlenecks in coal supplies made the electricity supply to shift to gas market where the combined cycle gas technology offered advantages of low investment, short gestation and low local emissions. Despite this shift the carbon content of electricity increased as the hydro share continued its secular decline, although, it slowed in comparison with the business-as-usual (Shukla et al., 2004).

Globally the reforms remain fossil fuel oriented. However "India Vision 2020" (Planning Commission, 2002) envisions an alternative "Best Case Scenario (BCS)" that could bifurcate the sector's development towards alternative pathway through modernizing existing plants, early adoption of advanced technologies, improved T&D efficiency, energy conservation, regional energy co-operation and higher shares of hydro and renewable energy. Carbon emissions in 2020, under BCS, would be 81 MtC below the BAU (822 MtC cumulated up to 2020).

Let us now envisage a sector based agreement through which the carbon abatements in this sector could be sold on the world carbon market[7]. The implementation of BCS policies (including carbon taxation and subsidies to renewable technologies) would have three conjoint effects: a) lower profitability of coal plants and increased profitability of gas and renewables; b) this relative higher profitability of investments in the sector and the alleviation of barriers to foreign investors would induce an inflow of foreign capital which would substitute a part of Indian investments in the power sector in the reference scenario c) this would reorient the domestic investments towards other sectors. If used to reinforce this mechanism carbon revenues would generate a leverage effect the main determinants of which (regardless of lower public expenditures to compensate local externalities) would be: for a given value of carbon:

- the gaps between social marginal profitability of energy investments with or without BCS policies including taxation on coal,
- the gap between the social marginal profitability of energy and non energy investments,
- the share of foreign investments, function of the foreign investor's internal return rate

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With a value of 10$/tC and a linear increasing tax level reaching 30% of coal prices in 2035, we demonstrated that (Mathy et al 2001) the mechanism generates an additional income of 1.6 to 7 $ for each dollar of carbon credit depending upon assumptions on the marginal productivity in the power sector and in the rest of the economy.

### *2.2.3. Climate Regime and the Co-benefits from Regional Co-operation*

[7] For a detailed description of the methodology refer to Mathy et al. (2001).

Regional cooperation exhorted in the principle 9 of Rio declaration on Environment is supported by obvious compelling arguments; at the same time countries are so diverse in terms of institutional capacities and political structure that deploying their complementarities is complex. In South-Asia region[8] for example (Nair et al., 2003; Heller and Shukla, 2004) the countries have diverse endowments in energy resources- with coal in India, gas in Bangladesh, hydro potential in Himalayan nations of Bhutan and Nepal and strategic location of Pakistan for the transit routes linking South-Asia with the vast gas and oil resources of Central Asia and the Middle East; yet there is little energy and electricity trade in the region.

Assuming a regional cooperation, Heller and Shukla (2004) show that the energy trade would yield direct economic benefits due to energy savings from improved fuel and technology choices and would lower investments in energy supply. The benefits are valued at US$319 billion from 2010 to 2030. The economic growth of the region would increase by 1% each year benefiting overwhelming number of world's poor. This, cooperation would in addition deliver a cumulative carbon saving of 1.4 GT for the period 2010-30, or 70% of the global mitigation by Kyoto Protocol over the estimated baseline emissions (Chandler et. al, 2002), including the original commitment by USA at Kyoto in 1997. The energy changes would also reduce loads of $SO_2$ in the region by nearly 30%. In addition, balanced hydro development would yield spill-over benefits that are synergistic with adaptation needs among which are enhanced water supply and flood control.

### *2.2.4. Infrastructure, Development and Climate Vulnerability*

Infrastructures are designed to withstand variability of current climate and their long-life renders them vulnerable to climate change. A typical example of such long-life assets is the recently constructed Konkan Railway. Located on the coastal strip of land bounded by the Sahayadri hills and Arabian Sea on the western coast of India covers a distance of 760 km, it costed US$745 million and commenced operations in 1998. It passes through mountainous region and has 179 major bridges, 1819 minor bridges and nine tunnels exceeding 2.2 km (KRCL, 1999). Future climate projections for the area (Mitra et al, 2002) show increase in mean and variability of the distribution of the key climate parameter causing impact - the "days with more than 200 mm precipitation" (Nagrajan et al., 2000). Besides rainfall, the development pattern affecting the geology, soil structure, and vegetation cover in the region also has key influence on landslides.

In monsoon, the train schedules are disrupted due to water logging and landslides with 140 reported incidences in 2000 (Kapshe et al., 2003). The railway company spends 6% of revenue on repair and maintenance and 20% of this expenditure is for minimizing climate related impacts. The future impacts could only be larger due to compounded effects of climate change and the aging railway infrastructure. It would be prudent to protect this infrastructure but adaptation measures like improving climate predictions, reinforcing the vulnerable points and making maintenance regimes more efficient would require committing public expenditure, which cannot

[8] This region comprising of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka holds nearly a quarter of world population

be fully recovered by taxes in India. This is a typical case where a climate regime should deliver new forms of assistance which can accrue the development, mitigation and adaptation co-benefits.

## 3. The Kyoto architecture re-interpreted, amended, completed

The complexity of climate – development nexus may be an argument for what Jacoby metaphorically calls a *favela* regime (Jacoby, 2005), namely a self organizing process instead of the hopeless pursuit of Grand Architecture (Bodanski, 2003). But *favelas* turned more often into a self-reproducing pocket of violence, slavery and poverty than into an innovative urban style. On the contrary, architectures exists which are modest and flexible.

One should not forget that main reason for a common architecture is that the key sectors for the climate control are capital intensive with investments spanning over decades. Early and credible signals launched in their direction are thus critical to avoid lock-ins in carbon intensive systems. This does not mean a fully-fledged architecture in 2012 but the feeling that the process will converge on some viable system, backed by a strong political momentum. The flaws of the KP have been extensively pointed out (Victor, 2001) but there are two reasons why it remains the framework that could support this convergence. The first is political: it is diplomatically discomforting to write off a treaty ratified by all countries but two and which is now part of the geopolitical game. The second is the "for lack of anything better" argument that no proposed substitute provides the same potential to untie the development-environment knot.

An internationally coordinated carbon tax (Cooper 1998, Nordhaus 1994) confronts the same equity issue as a cap and trade system (higher marginal welfare loss for a given carbon price in low income population) while not providing ways to compensate it through generous allocations of quotas (Chichilnisky and Heal, 2000). In these countries, middle class represents a small share of population compared with low income classes which makes difficult to operate such compensation domestically through a reshaping of fiscal systems. Net foreign inflows may thus be helpful and whether they could come from overseas aid at a similar order of magnitude as the transfers from carbon trading is, to say the less, questionable.

An acceleration of R&D efforts disconnected from any economic signal is a technological push only model which works for large scientific ventures (space exploration, conventional electronuclear, fusion) but is less effective when innovation has to be deployed in hundreds of end-use services and under large controversies about the most promising technologies on the supply side. The six country initiative "Asia-Pacific Partnership for Clean Development and Climate" proposes cooperative voluntary actions for development, deployment and transfer of technologies in function of countries own development objectives. The question remains however whether such cooperation could deliver its full potential in the absence of any economic signal.

In the absence of anything better, the question is thus what reinterpretation and amendment of the KP would alleviate its current flaws. There is no positive answer unless putting the cap and trade system in a new paradigm of climate negotiations.

### 3.1. Shifting the bargaining paradigm, shifting the status of the climate regime

In the reordering of the world since Kyoto, far reaching structural transitions are witnessed in major developing countries which are altering the dynamics of the new rounds of any international negotiation. These countries are conscious that their enrichment creates grounds for demanding from them acceptance of emissions limitations; their attitude will depend upon whether they will consider that investing in back-bone infrastructures may lock them into unsound development pattern, and whether they will grasp implications of the climate affair for energy security concerns (Heller and Shukla, 2003). Symptomatically, the initial national communications to the UNFCCC of many developing countries suggest such an alignment of climate and development objectives and their governments have multiple declarations in that direction: Millennium Declaration at the UN Millennium Summit (2000), the Johannesburg Declaration at the World Summit on Sustainable Development (2002) and the Delhi Declaration on Sustainable Development and Climate Change at the Eighth Conference of Parties (2003).

But the final response will depend on the quality of 'offers' made by the North and realism dictates to recognize that the situation is more difficult than in 1992 and 1997 because of an inconvenient timing. Indeed, significant transfers to embark developing countries in climate action have to be accepted in developed countries as threatening jobs. This is why the latter have to be serious about why they want climate policies: is it solely for environmental reasons? Or because of the political instability that climate change could cause in low adaptative capacity areas? Or as part of the geopolitics of energy?

The recent declaration of the G8 indicates the acceptance of broadening the negotiation paradigm :*"We will act with resolve and urgency now to meet our shared and multiple objectives of reducing greenhouse gas emissions, improving the global environment, enhancing energy security and cutting air pollution in conjunction with our vigorous efforts to reduce poverty"* (G8 declaration, July 2005)**.** Climate policies would thus be one element for transforming economic globalization into a mutually benefiting process instead of a harsh competition amongst nations and to prevent new threats on security (energy, climate refugees and local political instability). One step forward is to reinforce these negative arguments by positive ones. The demand for infrastructures in developing countries offers 'a moment of opportunity' (G8 2005) and the Marshall Plan of the world reports in the seventies (Carter et al. 1976, Tinbergen 1976, Brandt 1980) could become a useful characterization of the opportunities to be seized for enhancing world growth potential

This new bargaining paradigm has two implications for the role of a climate regime:

a) this regime does not pretend to dictate many of the core decisions contributing to the decarbonization of the economy. Instead it views all related policy processes as opportunities to internalize long term signals of the social value of carbon abatements,

b) its architecture is "minimal"; instead of dictating uniform solutions it is - i) flexible enough to crystallize bottom-up initiatives of regional or sector-based cooperation, and ii) integrated enough to prevent the traps of a "favella" approach.

### 3.2. Basic principles for a 'Minimal Architecture' in a dynamic world

Such architecture can be build with a few amendments to the KP which suppose a) to re-interpret it as a flexible tool for untying the environment-development knot b) to depart from intellectual penchant seeing in any flexibility to the system a threat for environmental integrity.

#### *3.2.1. Using carbon prices as an inducement, not as the unique driver of climate policies*

Decarbonisation will depend of a wider set of signals than the sole carbon prices: interest rates, insurance premiums, certification of clean technologies, tax systems, regulation of the labor market, price of land and real estates, road pricing and other transport regulations, local environment regulations. This should no incite to minimize the role of carbon prices but to turn the logic upside down: they are signals against which climate benefits of any form of initiative to change these parameters can be measured.

In this perspective, carbon revenues will not grant only the additional carbon abatement coming from pure climatic centric measures as it would be the case in a world market confronting 'factories' specialized in a precisely measured product, GHGs abatement. In fact the KP organizes strictly a carbon market amongst countries[9]. Governments control the selection of sectors to which emissions allowances are redistributed and they can play on a large spectrum of other policy tools than carbon markets[10] in function of their own objectives; for example, the emissions avoided by a speed limit on vehicles for road security reasons or by the upgrading of regional cooperation in the South Asia in order to save capital cannot be exchanged individually on a carbon market; they will nevertheless increase the export capacities of the countries on a world carbon market.

This view of world carbon markets provides a large flexibility to overcome the difficulty on the existence of a unique carbon price. Governments are not forced to increase all their domestic energy prices by the level of the international carbon price; they have any latitude to play on other policy parameters in function of their domestic objectives or constraints.

#### *3.2.2. Terms of the negotiation: diversified pledges aligned on long term price signals*

[9] to minimize market powers and the strategic use of carbon trading by governments, one important addition to the Marrakech accord would be to impose that all imports and exports between governments take place through transparent auctioning on a state regulated clearinghouse.

[10] To this respect the European Carbon Trading System is not a small scale model of an international trading system; it is one specific modality adopted by some governments to meet their targets

A pre-condition for making cap and trade acceptable to developing countries is to abandon the Malthusianism tinted idea of commitments to emissions constraints. This can be done first through diversifying the menu of pledges. Binding global commitments for Annex B (and countries reaching an agreed threshold level of a per capita income) would co-exist with:

- non binding global quotas (Philibert and Pershing, 2002): countries could export carbon if they meet their targets but would not be penalized in case of overshoot,
- binding sector based targets allowing countries to participate the global system selecting sectors of which participation could bring development benefits,
- clean development mechanisms extended to programs in order to support action in countries and sectors not mature enough to adopt any pledge in terms of emissions limits.

This diversification of commitments may look like a slackening of objectives. In fact the alternative is developing countries not even considering any pledge or negotiating very lax quotas that Annex B countries may concede to have them on board. The option of non binding commitments may thus render countries more inclined to a good faith dialogue; applicant countries, freed from the fear of economic burden, will indeed be also interested in regulating the system so that the carbon value does not deflate and the gains of their entry are secured.

A second way of getting rid of from the notion of cap on development and is to base targets on performance criteria rather than absolute caps for non-Annex B countries. This have the additional advantage of limiting the risks of hot air coming from the volatility of economic growth rates[11] : whether fast growing countries experience a 8% growth rate or only a 6% one makes a significant 9.8% difference on a five year period[12].

### *3.2.3. Linking inducements to comply and assistance to DC participation*

The following contradiction undermines any climate regime: its efficacy depends on the credibility of governments' commitments whereas many countries (not only the US) will not accept a system limiting the sovereignty of their legislative institutions. The European experience of sovereignty transfers is very specific and international affairs will likely remain a matter of pledges and review. The question is thus how to secure compliance in such a context.

For countries with binding commitments the difficulty is that, given uncertainty about compliance costs, good faith governments will commit themselves only for lax targets. To facilitate an accord on ambitious targets, a price cap was proposed in 1997 (Kopp, Morgenstern and Pizer 2000); operating as a safety valve (in the worst case countries would pay the agreed price) it would hedge against bad surprises whereas the optimists, proponents of ambitious climate action, should not be concerned since, if abatement costs are low, the safety valve will not

[11] a floor price of carbon can provide an additional hedge against deflated carbon prices.

[12] Chinese per capita growth rate was 2% in 1990 and 13% in 1992; Argentina experienced a -8% in 1989 and a 9% in 1991.

be triggered. A price-cap forms, if complemented by a floor price, an hybrid system 'à la Roberts et Spence' (1976) in which information about the price – quantity relationship is increasingly richer guiding long term expectations and facilitating the tightening of the system.

The critics against this idea point out that the Parties may not be sanctioned for not fulfilling their 'legally binding' objectives. They are symptomatic of a misperception of the notion of 'legally binding'. Military actions set aside, the only effective sanction in international affairs can ultimately come from economic and political reprisals; but these reprisals depends from other tools of international coordination than the climate convention and will never be triggered regardless of related issues. Without such linkages, the compliance provisions cannot go, such as in the Marrakech accord, beyond allowing de facto an accumulation of environmental debts.

A price-cap adds economic 'teeth' to the system since the missing abatements are paid and upgrades its environmental efficacy if the collected funds are used to restore part of them. It can also provide an additional incentive to the participation of DC if the funds are managed by an restoration fund (similar to the Compliance Fund proposed by Brazil (UNFCCC, 1997)) selecting abatement projects through auctioning in non-Annex B countries.

### *3.2.4. Special treatment of energy intensive industries exposed to global competition*

When passing from general declarations to the implementation of real policies; the policy makers face, in all countries, the implicit veto of companies working in energy and carbon intensive industries under the argument of asymmetrical constraints in international competition. These risks are often overstated as regards of the products markets: the likely impact of carbon prices on production costs are one order of magnitude lower than the large oscillations in exchange rates experienced since three decades (Quirion and Hourcade 2004) and the increase in transportation cost operates as a countervailing factor. The risk is far higher in terms of equity in allocations of quotas; though in a closed economy it can be eliminated by allocating a minor share of quotas for free (Goulder 2004); and in an open economy the risks can be covered by the harmonization of quota allocation rules, especially the share between free allocated and auctioned quotas.

Although it can be argued that there are many other sources of differences in competitive conditions (including wages), the political economy of the negotiation amply show that no governments are in position to resist the pressure to protect jobs. The way out is to take stock of the fact that, ultimately, governments will operate internally a differentiation of targets and carbon prices to households and industry (as they do for energy prices) and can, in this context accept price equalisation as an inescapable condition for exposed energy intensive industry. The potential for conflicts at the WTO is large in this domain and this is why it may be important to rely on international sector based agreements in the few concerned industries on the quota allocation rules. With national policies endorsing these agreements, most of the concerns about international competition could be addressed.

### 3.3. Reconciling long term goals and immediate pressures from shifting context of ODA

Given the long lags of the benefits of decarbonisation (carbon revenues, avoided damages) the entire political process may be blocked by the absence tangible short term gains for countries under urgent pressures. This is all the more important that the development process generates a need for more carbon intensive technologies (substituting motorized transports for bicycling or animal traction, deforestation to increase food production) and that short term action is necessary to avoid future carbon intensive lock-ins.

At this point the question of the articulation of climate policy tools with the reforms of overseas aid and multilateral financing cannot be eluded. This debate was framed so far in terms of avoiding the crowding out of public aid by transfers submitted to environmental conditionality. This risk can be avoided by provisioning resources additional to carbon trading in the climate regime (price-caps, share of proceeds of carbon trading, tax on bunkers and international aviation). But how to raise money is far less difficult than to guarantee their efficient use in conjunction with other funding mechanisms. This is all the more complex as developing countries evolve quickly in very different directions.

Rapidly emerging countries are now main recipients of international private investments; but the flows are very volatile and may not meet the quantum and quality of investment requirements needed to respond to decarbonization objectives. Public funds may thus play a critical role but less for project financing support and more for technical and institutional facilitation (structural reforms, multilateral agencies, credit exportation agencies, third-party financing) in a context of public-private partnerships. On the contrary, Less Developed Countries (LDCs), which can generate only limited of volumes of emissions reduction potentials remain dependent on ODA for the construction of infrastructures and for enlarging access to basic needs.

Climate policies offer, in whatever context, the opportunity of adding a quantifiable dimension (the emissions levels) for evaluating ODA efficiency, for disciplining the investor and the host country and for assuring "good quality money". This monitoring capacity can also be used indirectly by Development Finance Institutions to provide new risk mitigation instruments. The PLANTAR project (sustainable fuelwood under the PCF) in Minas Gerais (Brazil) could not find no currency-risk insurance beyond 2 years; with carbon finance revenues ($- or €-denominated) placed on offshore escrow account, an OECD commercial bank agreed to lend for 5 years and the loan amortization is structured to match expected payments for CERs. So, insurance packages could be dedicated to bring funds prior to project completion like it is the case of Emission Reduction Purchase Agreements (ERPA). It generates high quality cash-flow which can avoid currency risk, and it induces lenders to provide upfront cash flow.

**Conclusion**

Envisaging the climate policies as an isolated item of the international agenda devoted to meet objectives of environmental integrity, overlooks the most important opportunities of engaging developing countries into a pro-active position. Typical of this bias is, envisaging the cap and trade system as an architecture encompassing all gases, sectors, economic actors and

governments. In doing so, the focus remains on securing that any traded ton of carbon is precisely measured while the core challenge was to avoid future emissions from quickly expanding infrastructures where counterfactual baselines are impractical to measure. Missed were the opportunities for accruing the co-benefits of climate and development actions which rest primarily on these new infrastructures. Finally, this polarizes the debate on sharing the burden of carbon abatement rather than on mainstreaming the climate actions with development agenda and abetted the concern that the cap and trade system would be a constraint on development.

Fortunately there are mechanisms through which climate policies may exert a leverage effect on development. They necessitate a mix of price signals, capital inflows and technological transfers which can be generated by carbon trading systems, but the crux of the matter is an institutional design in which revenues from carbon trading are directed to removing obstacles to development. This demands integration with development policies. The diversity of configurations for such integration requires bottom-up structures for facilitating actors to coordinate diverse initiatives and organize cost-effective and welfare maximizing actions for gaining co-benefits vis-à-vis different development objectives.

The nature of problem makes it neither politically feasible nor economically prudent to start from a full-fledged "grand architecture" or to rely only on self organizing processes such as the Victor's 'Madisonian approach' (Victor et al. 2005) setting ambitious but non-binding goals which do not generate the credible and stable policy signals that are required to secure carbon saving investment on infrastructures.

The way out is not to abandon a Protocol ratified by overwhelming majority countries but to re-interpret it by inverting the climate centric view which has prevailed so far. The technical instruments of this inversion are the diversification of pledges, non binding commitments, safety-valves, voluntary agreements in some key sectors of the world industry, re-design of the CDM in direction to infrastructures programs and. All these tools can be aligned to secure that a diversity of initiatives will not result in an atomization of efforts. But the key is to recognize the diversity of issue linkages (energy security, local environment issues, debt traps or social dualism, reshaping of international funding and overseas aid and early attention to adaptation). This would make the climate regime part and parcel of attempts to master economic globalization and to narrow the North-South divide by overcoming the Pareto improving policies paradox (Stiglitz 1998).

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