

Trade, Sustainable Development and a Green Economy: Benefits, Challenges and Risks

**Aaron Cosbey
UNCTAD Advisor on Green Economy**

INTRODUCTION

This paper explores potential trade opportunities and risks from a transition to a green economy, and examines trade policy options that are relevant for this transition. It is written in the lead up to the UN Conference on Sustainable Development (UNCSD), to be held in June 2012 in Rio de Janeiro, and is a complement to two other papers also focused on the green economy in the context of sustainable development and poverty eradication: one on the macroeconomic aspects of the green economy and the other on development, poverty and the green economy. A synthesis of the three papers is also being produced. In the section that follows this, it discusses the transition to a green economy, asking why it is desirable, and in what ways trade policy might help. The third section explores the impacts, both positive and negative, that might be expected by countries whose trading partners are pursuing a green economy. The fourth section asks what role there might be for the international community in ensuring that trade and investment policy and practice contribute to a widespread and equitable pursuit of the green economy, and last section offers some concluding thoughts.

TRANSITIONING TO A GREEN ECONOMY

The move to a green economy is a significant transition, on par with other grand transitions in human socio-economic history. If it can be carried off—and we have strong reasons to hope that it can—it will differ from previous waves of change in that it was at least in part intentional, and in that it paid more careful attention to the welfare of those that might otherwise be caught in the painful process of unplanned structural change. This section briefly reviews why the global community should have an interest in such a transition in the first place, surveying arguments from the perspective of development, environment and economic objectives. It then asks what role trade and investment policies might play.

Why move to a green economy?

The green economy is more than just environmental in scope; it is also about development and the economy. From a development perspective there are a number of ways in which a green economy might benefit both developed and developing countries. A green economy should not only maintain, but should enhance the value that the poor in developing countries derive from agriculture, fisheries and forest harvest – all activities that depend fundamentally on a sound environment. It should help reduce energy poverty through the provision of low-cost distributed renewable energy systems. And if successful it should help reduce the vulnerability of the poor to the impacts of unchecked climate change, desertification ocean degradation and loss of biodiversity, as well as the impacts of local air, soil and water pollution.

In developed and developing countries alike it should be the spur for new innovative activities – activities that create more jobs than traditional sectors, and increase energy security and industrial efficiency. There are growing opportunities for investment in the buildings, transport, energy and waste sectors in particular, as well as in manufacturing, agriculture and others. The services sector support that is needed in many of these sectors will also be an important part of the green economy.

A green economy also has environmental benefits, and these are obvious enough to need no lengthy enumeration. It should help address global challenges such as climate change, loss of biodiversity and desertification. It should also contribute to efforts at the national and regional levels to address local pollution of air, water and soil.

A shift to a green economy will also generate economic benefits (clearly, any such shift involves risks and costs as well, and some of these are considered later in this paper). One obvious potential advantage to a green economy is the opening up of new export markets. Some of these are explored in greater depth below, but well-known examples include significant new markets for biofuels, and for renewable energy technologies such as solar panels and wind turbines. Opportunities in these markets may be driven by demand in export markets alone, or by a combination of foreign demand and domestic capacity development in response to stringent domestic environmental standards.

As well as opening up new markets, a shift to a green economy may help to maintain existing market share. Environment-related product and process standards (technical regulations), regulatory regimes and restrictions in most OECD markets are steadily ratcheting up, with tough implications for developing country exporters.¹⁵ Even more significant for some exporters is the rise of sustainable development-related standards and codes employed by private buyers.¹⁶ And the ascendancy of climate change as an urgent policy problem threatens to give rise to new types of non-tariff barriers, such as border carbon adjustment.¹⁷

Maintaining market share in the face of steadily increasing stringency of specifications is not a straightforward matter, but it can be aided by two key aspects of a push to a green economy. First, governments can focus on enabling exporters to meet such standards, working with the private sector to communicate the content of the regulations and to help firms identify, acquire and assimilate the technologies needed. In the same vein, governments can help build accredited national or regional capacity to test and certify goods as compliant; this might involve building laboratories, working with foreign accreditation bodies, supporting technical training, etc.¹⁸ Second, governments can work on propounding and enforcing domestic standards that are not too far from those required internationally. Such standards are important in building up private sector capacity to

¹⁵ UNCTAD (2006). In the last five years in the EU alone has promulgated three pieces of far-reaching legislation: the Restriction of Hazardous Substances Directive (ROHS), the Registration, Evaluation and Authorization of Chemicals (REACH) programme and the Directive on Waste Electronics and Electrical Equipment (WEEE).

¹⁶ Potts *et al.* (2010).

¹⁷ Cosby (2009).

¹⁸ Aldaz-Carroll (2006); UNCTAD (2006); Cosby (2004); Hufbauer *et al.* (2001).

successfully export to demanding key markets.¹⁹ They also incidentally result in less local pollution, resource use and waste. Domestic standards regimes have an important role in helping firms adapt to any such new standards.

Can trade and investment policies help in the transition?

A green economy has several important international dimensions. First, international trade is a powerful driver of growth, and so it is imperative to direct that potential in ways that contribute, rather than detract, from progress toward a green economy. This section explores the potential benefits of liberalizing trade in environmental goods and services, and of reducing fossil fuel subsidies, and asks how trade's contribution might be helpful in diversifying away from resource-intensive export-led growth paths. Second, trade law is important in shaping the bounds of possible government actions in pursuit of a green economy. This section explores the ways in which investment agreements and trade-related intellectual property rights might foster or frustrate that pursuit.

Liberalizing trade in environmental goods and services

One obvious way that trade policy might help in the greening of economies is by lowering tariff and non-tariff barriers to goods such as wind turbines and efficient lightbulbs, and services such as environmental engineering. There is a mandate in the WTO's Doha Round to liberalize trade in so-called environmental goods and services (EGS),²⁰ though environmental goods in particular have yet to be definitively defined in those talks.²¹ EGS offer tangible environmental benefits to importers, particularly in developing countries where access to distributed renewable energy can be a key plank in addressing poverty, and where many governments are now beginning to grapple in earnest with urban environmental issues such as water treatment, sanitation and local air pollution.²² Moreover, to the extent that EGS can address global concerns such as climate change and biodiversity, *all* countries have an interest in their rapid and widespread uptake – a process in which trade and investment would play a key role.

One of the tensions that have plagued the WTO negotiations is the fact that many countries pursuing a green economy are looking to foster domestic competitive sectors to produce and export EGS, and are reluctant to relinquish tariff protection as an instrument by which they might do so. This is not, however, a tension between environment and economy; both objectives depend alike on the success of the policies employed. If such policies are successful in producing globally competitive innovating firms, then they will compensate for the initial environmental and economic costs of sheltering inefficient green infants; more innovation and competition is clearly better. If they are not, then the supporting country (and the world) is worse off both economically and environmentally, having achieved less environmental improvement than was possible for the resources spent; it would have been better simply to rely on foreign producers and investors.²³

¹⁹ Yu *et al.* (2010).

²⁰ WTO (2001a); Paragraph 31(iii).

²¹ Cosbey *et al.* (2010) offer a discussion of the issues of definition, and a suggested taxonomy. See also Jha (2008). Stillwell (2007) also discusses definitions, and offers a history of the negotiations.

²² Vickleaev (2003); Steenblik (2006).

²³ Point Carbon (2008) offers the sobering example of the pursuit of national excellence in wind energy by the Ukraine, the result of which was that as of 2007 average cost of installed capacity in wind power was 2-3 times higher than average global costs.

As such, the question of whether developing countries should be allowed to shelter EGS infants should hinge on whether it can or cannot be done effectively. In the end, governments looking to support domestic green sectors will inevitably pick losers as well as winners. But this is not a blanket admonition against trying. Decades of experience with traditional government efforts in this area show us that there are ways to limit the chances of wasted support—such as providing help only to activities that are new to the domestic economy, and those that have good potential for spillover effects—and ways to limit the damage when losers are picked—such as making continued support time-limited and conditional on explicit criteria for success.²⁴ These sorts of conditions might be the *quid pro quo* for special and differential treatment in the EGS negotiations.

The stakes are high for those that succeed. Growth in environmental goods and services (variously defined) has tended to exceed growth of merchandise exports since at least the mid-1990s²⁵ as well as growth of GDP (see table 1). DIW (2009) estimates that the global market will grow to between USD 1.2 and 1.9 trillion by 2020. Sharp (2009) reaches a far higher estimate even of the current market using a rigorous bottom-up compilation of the sector, estimating its size in 2007/2008 to be £3 trillion, or roughly 6 trillion USD, and noting major growth in the area of low-carbon goods and services and renewables.²⁶

Table 1: World Market for Environmental Goods and Services
Average annual rate of growth 2004-2010: High and low growth estimates

	GDP Growth	Environmental Expenditures		Environmental Imports (import region)	
		High	Low	High	Low
Europe	2.5	5.4	2.1	6.5	3.0
North America	3.3	9.9	6.3	11.5	8.0
Asia	4.8	8.3	6.0	12.2	9.7
Rest of world	3.8	9.0	7.0	10.7	8.7
World as a whole	3.5	7.7	4.7	9.4	6.4

Source: DIW (2009)

It is important to note that while most environmental goods are produced in OECD countries, the tensions over liberalization are not a clear cut North-South divide; developing countries are increasingly important producers and consumers of EGS. Figure 1 shows China’s phenomenal rise from 2005 to 2009 as an exporter. Vossenaar (2010) notes that many developing countries are now adopting renewable energy targets, and need technologies that may not be locally available. He observes that developing countries have become the world’s largest and fastest growing markets for environmental goods, the markets in developed countries being mature by comparison.

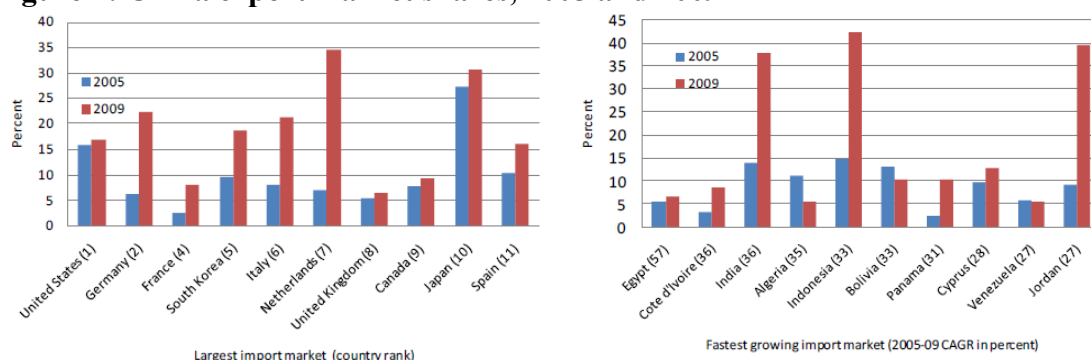
²⁴ Rodrik (2004).

²⁵ Bijit and The (2004).

²⁶ It should be noted that this analysis includes, as a large and unspecified portion of the estimate, nuclear energy under the heading alternative fuels.

Even where countries choose to rely on foreign expertise in certain EGS, trade policy's contribution to their rapid uptake needs to be put in perspective. Most analysts find that non-tariff barriers such as subsidies to traditional energy sources, regulatory and legal barriers, lack of infrastructure, traditional investment risk and other factors figure much more prominently as obstacles to dissemination than do tariffs.²⁷ Many of those barriers are not subject to trade policy remedies. As such, while trade policy may be necessary to the spread of EGS as part of a drive to green economy, it will probably not be sufficient.

Figure 1: China export market shares, 2005 and 2009



Source: Wyden (2010); Figure 4.

Reducing fossil fuel subsidies

IEA (2010a) estimates that subsidies for the consumption of fossil fuels in 2009 reached at least \$312 billion.²⁸ Almost all of those were administered in developing countries rich in fossil fuel resources. On the production side, subsidies to the production of fossil fuels (most often used in OECD countries) have been estimated at another \$100 billion per year.²⁹

This is a formidable sum spent in furtherance of critical environmental damage. IEA (2010a) estimates that completely removing consumption subsidies would lower demand and result in a 6% reduction in energy-related CO₂ emissions by 2020 – equivalent to the combined current emissions of Germany, France, United Kingdom and Italy. As well, subsidies to traditional fuels are a formidable obstacle to the uptake of renewable energy, and the implementation of energy conservation and energy efficiency measures.³⁰

Fossil fuel subsidies also present economic challenges. While most consumption subsidies do not involve actual cash outlays, they do involve opportunity costs, since excess cheap fuel consumed at home cannot then be exported. The sums involved are staggering; Iran's subsidies in 2009 amounted to almost 35% of GDP,³¹ and Indonesia's direct subsidy payments in 2007 were close to 25% of its budget.³² This is money that

²⁷ Jha (2008), Vickleaev (2003); Vossenaar (2010), Wooders (2010).

²⁸ The analysis used the price gap method (difference between world reference price and domestic prices) for a survey of 37 countries.

²⁹ GSI (2010).

³⁰ Wooders *et al.* (2010).

³¹ IEA (2010a).

³² Asian Development Bank, cited in UNEP (2008).

cannot then be directed to important public policy goals. And low domestic prices are a disincentive to investment in domestic refining capacity, so much so that major exporters such as Nigeria, Iran and Kazakhstan are actually forced to import refined fuel.³³

Fossil fuel subsidies are often defended as pro-poor, particularly in energy-poor countries such as India. But IEA analysis indicates that only 15% of consumption subsidies actually reaches the poor; the rest is consumed by the middle class, who own automobiles and air conditioners.³⁴

It has been proposed that, just as the WTO is now negotiating ways to reduce or eliminate environmentally perverse fisheries subsidies, it should also work to forge similar agreement on fossil fuel subsidies.³⁵ This would represent a significant contribution of trade policy to achieving a green economy.

Intellectual property rights

Many of the green economy's challenges are issues with considerable history. Of none is this more true than the role of intellectual property rights (IPRs) and specifically patents—a policy tool that has been hotly debated for over a hundred years. While there has been ample (but inconclusive) analysis of whether strong IPRs foster trade and investment, and of their international distributional impacts, the key question with respect to the green economy is how they might help or hinder countries to gain access to cleaner technologies.³⁶

One of the basic tensions is this: the willingness to invest in innovation depends to some degree on the products of that innovation being protected from low-cost imitation. This is particularly true for technologies where the costs of research and development are high and the cost of imitation is low. But the very fact of protecting innovation also raises the cost of its products for many years, and may frustrate derivative innovation that builds on the original work, the final result hampering dissemination. So the key goal is balance – finding the point at which protection manages to provide incentives to innovate, but does not overly restrict dissemination and further innovation.

There are other well-known tensions. At early stages of development, countries throughout history have used weak IPR regimes to foster domestic capacity to innovate.³⁷ Under such regimes innovation begins with imitation and reverse engineering, and ideally over time evolves to the point where domestic firms are creating intellectual property that needs strong IP protection.³⁸ As such, from a development perspective it is impossible to

³³ *Ibid.*

³⁴ *Ibid.* See also Shenoy (2010), UNEP (2008).

³⁵ Lang, Wooders and Kulovesi (2010).

³⁶ This paraphrases Barton *et al.* (2002:24), who were concerned with the impact of IPRs on development, and who conducted a thorough survey of the existing literature on trade, investment and technology transfer impacts.

³⁷ This is true of the United States, Japan, Korea and Taiwan, among others, all of which were racing to catch up to trading partners that were much more advanced as fonts of innovation. See Chang (2002), Barton *et al.* (2002).

³⁸ Kim and Dahlman (1992).

describe a single IPR regime that suits all countries at all stages of development. In the interests of growing national innovative cultures that help push the global community toward a green economy, IPR regimes should be tailored to countries' development status.³⁹

It can be argued, though, that even at low levels of development IPRs play an important role. They may result in more imports of high-tech goods that, in themselves, represent technology transfer – goods that exporters would be reluctant to export to countries with weak IP protection. Similarly, they might result in increased incidence of firm-to-firm licensing of technologies, which in its own way results in increased domestic technological capacity. The downside is that strong IPRs at the same time will tend to wipe out low-tech innovators that rely on imitation. Again a delicate balance must be struck.⁴⁰

Domestic capacity to innovate is key to translating technology into real development and lasting environmental gain.⁴¹ It allows firms to effectively assimilate new technology from abroad, to adapt foreign innovations to local circumstances, and to spawn innovations of their own. Government support is critical to creating national systems of innovation, among other things through investment in education, support of research and development, linking public research and private sector users, and the promulgation of facilitative IP law. There is a clear role for international support to developing countries in carrying out these functions.⁴²

The details of IP law and practice matter a great deal to their final impact. It was noted above that balance was important, so the length of patent protection is obviously a key issue. Many IP provisions in modern free trade agreements go beyond WTO provisions to provide for longer protection periods.⁴³ Scope is also important – some national patent regimes allow firms to use broad “gateway” patents that can strategically block competitors from lucrative (and publicly valuable) lines of innovation.⁴⁴ “Stacking” multiple patents around various aspects of a single innovation has the same prohibitive effect.

³⁹ Correa (2000).

⁴⁰ Policy makers will face difficult challenges in finding that balance; different sectors will evolve at different rates, and most countries will find that as leading sectors clamour for stronger IPR protection many other sectors lobby to maintain the protection *they* are offered by weak IP laws.

⁴¹ Cannady (2009).

⁴² The WTO's TRIPS Agreement commits to some limited support of this type. Article 66.2 commits developed countries to provide incentives to their firms for technology transfer to LDCs. More broadly, Article 7 declares that the purpose of IPRs should be the promotion of innovation and technology transfer.

⁴³ Gervais (2007). Many such agreements also allow for protection of testing data and the re-registering of patents if new uses are found for an existing innovation. More important in the area of pharmaceuticals than industrial patents, these allow for much longer periods of effective protection.

⁴⁴ For example, the US Patent Office in 1986 and 1988 granted patents for sunflower seed with high oleic acid content, *regardless of how it was derived* (U.S. Patent nos. 4,627,192 and 4,743,402). Heller and Eisenberg (1998) called this *the tragedy of the anti-commons* – wherein not enough people access scarce resources (innovations) because they are blocked by strategic patents.

All of this is well understood in the context of pharmaceutical patents, which have been the subject of a great deal of analytical work, and for which WTO members have gone so far as to explicitly confirm the TRIPS Agreement's flexibilities.⁴⁵ But it is important to note the differences between pharmaceuticals and industrial patents in environmentally sound technologies. Barton (2009) argues that while IPRs offer developers of particular medicines a solid monopoly on their products, innovators in the area of wind power, biofuels and solar PV have many competitors to whom buyers can go for similar products, decreasing the power of patents to block affordable access.⁴⁶ This assumes, of course, that innovators will actually license their technologies. What limited evidence we have from clean energy technologies seems to indicate a willingness to licence more or less in line with that found in other sectors.⁴⁷

To the extent that current IP law and practice suffers from the problems described above, it means that the world is not reaping the potential benefits that innovation might bring. In the context of a green economy, this is a critical global problem. Lee *et al.* (2009) calculate, for example, that in order to achieve the minimum required climate change mitigation as estimated by the IPCC, we will need to *double* our rate of clean energy technology diffusion by 2025. They make a number of recommendations designed to help that happen, including open innovation mechanisms such as technology prizes, boosting technology standards, and other forms of international cooperation on developing, demonstrating and diffusing new technologies.

Is there anything new about the issues surrounding IPRs when we consider their impact in the context of the green economy? Arguably there is. There has always been a moral argument for developed countries to engage in technology cooperation, capacity building and other efforts to help developing countries access and assimilate the technologies they need for development. But the arguments become even more compelling in the context of technologies that are urgently needed to avoid environmental problems that have a global scope, such as climate change, and biodiversity loss.⁴⁸

Investment law and policy

Investment is fundamental for the green economy, and for sustainable development more broadly. It is the vehicle by which old infrastructure and productive capacity are transformed into new and greener stock. And it is needed in abundance. The IEA estimates that, just in the area of energy, an average incremental investment—that is, over the baseline case—of more than a trillion dollars per year is needed between now and 2050 to achieve even the minimum required mitigation as described by the Intergovernmental Panel on Climate Change (with some two thirds of that investment needed in developing countries).⁴⁹

⁴⁵ WTO (2001b).

⁴⁶ Lee *et al.* (2009) find low-carbon sectors to be heterogeneous, with many but not all of them characterized by highly concentrated patent ownership.

⁴⁷ UNEP/EPO/ICTSD (2010).

⁴⁸ Tomlinson, Zorlu and Langley (2008).

⁴⁹ IEA (2010b) forecasts the need for \$46 trillion incremental investment between 2007 and 2050 to halve global energy-related carbon emissions. Achieving the IPCC 50% minimum target by 2050 *also* depends on reductions in non-carbon greenhouse gas emissions.

But while the need for torrents of new investment is indisputable, not all investment is helpful in promoting a green economy. Industrialized countries have over the years developed strong domestic regulatory regimes to help ensure that investment does not result in over-exploitation of renewable resources, or damage to the environment or human health. Many developing countries, faced with the environmental and health impacts of the development process, are now experimenting with the same sorts of regulatory innovations. Moreover, states may seek to give preference to new investment that contributes to sustainable development – investment with good prospects for generating backward and forward linkages in the economy, and which aligns with their development priorities.

The existing international investment “regime”—a web of over 2,700 bilateral investment treaties, investment provisions in a growing number of free trade agreements, and a host of firm/project specific host government agreements—is not particularly good at helping states discriminate between the desired and the undesirable forms of investment. In fact, provisions in many of those international investment agreements (IIAs) may actually act as obstacles to that sort of discrimination.⁵⁰

In the last decade private sector actors have increasingly used investment dispute settlement provisions in BITs and FTAs to compel states into binding arbitration, arguing that new environmental regulations amount to an expropriation of their investments, or that they violate provisions on fair and equitable treatment by changing the rules of the game.⁵¹ The arbitral panels hearing such cases are not bound by precedent and have delivered contradictory rulings, meaning that states aiming to tighten up existing environmental regulations face considerable legal uncertainty.⁵² A number of countries have moved to amend their treaty texts to prevent such cases, but these represent a drop in the proverbial bucket.⁵³

Host government agreements are contracts between governments and firms governing the conditions under which the firm’s investment takes place. Often these contain particularly restrictive language—the product of disparate negotiating capacity between smaller host states and multinationals—in so-called stabilization clauses. Most often used for large capital-intensive investments in the extractives sectors, many of them guarantee regulatory certainty for time periods of up to 99 years, with compensation promised for breaches.⁵⁴

Many “new generation” IIAs, and the WTO TRIMS Agreement, also prohibit the use of so-called performance requirements.⁵⁵ These are conditions of establishing an investment, or conditions for preferential treatment, that are linked to the use of domestic

⁵⁰ Cosbey *et al.* (2004).

⁵¹ See Been and Beauvais (2003); Tollefson (2003); Mann and Soloway (2002).

⁵² Cosbey *et al.* (2004).

⁵³ New model IIA text that addresses these problems is now used by Canada, Columbia, Norway and the United States, but these have no effect on treaties already in place.

⁵⁴ Shemberg (2008).

⁵⁵ UNCTAD (2006b).

resources, to export performance, to technology transfer, and so on. The key question here is whether these sorts of policies are effective or ineffective at fostering economic development (in the present case we are concerned specifically about green development). If effective—and while there is no consensus, there is evidence that at least some sorts of performance requirements have worked⁵⁶—then these prohibitions are another way that investment law can constitute an obstacle to achieving a green economy.

Investment law is a valuable governing influence, allowing for greater investor certainty and potentially fostering more robust flows of investment to developing countries.⁵⁷ But certain aspects of many of the agreements in force today may be problematic from the green economy perspective.

Shifting away from commodity-dependence in export-led growth

The green economy being a sub-set of sustainable development, it bears asking if and how it might help move economies away from current modes of *unsustainability*. One such mode is over-dependence on natural resource-intensive exports – a state that engenders both economic and environmental problems. Environmentally, economies that rely on such growth may suffer significant environmental damage in terms of land degradation and pollution.⁵⁸ The economic problems associated with commodity dependence are usually discussed as three separate but related challenges:⁵⁹

- Terms of trade impacts – the long run deterioration of commodity prices vis-à-vis prices of manufactured goods;
- The high volatility of prices in commodity markets, which accentuate economic cycles and thus lead to lower levels of growth in the long term; and
- The relatively small share of the value chain appropriated by producers of commodities – a problem associated most acutely with low-income countries.

Dependence on *high-rent* commodities has its own set of particular problems, often discussed in the literature on the *resource curse*.⁶⁰

- So-called “Dutch disease”: the appreciation of exchange rates arising from resource booms, and the subsequent crowding out of other tradable sectors; and
- Institutional impacts: the damaging effects of rent-seeking that can be spawned by the presence of high resource rents.

⁵⁶ Moran (1999, 2001); UNCTAD (2003) find that export-related performance requirements are effective at creating linkages and spillover effects within the host economy, while those related to technology sharing and joint ventures are on the whole ineffective. See also Kumar (2005).

⁵⁷ For a survey of the evidence on IIAs’ impacts on FDI see Mann and Cosbey 2004.

⁵⁸ Schaper (1999) describes the structural change toward such growth in nine Latin American and Caribbean economies in the ‘80s and early 90’s, and the attendant environmental impacts.

⁵⁹ UNCTAD (2008).

⁶⁰ See Sachs and Werner (1995), Auty (2004), Ross (2001). For a good survey of the resource curse literature, see Stevens (2003). Rudiger (2006) is an excellent analysis of the available strategies for addressing the problem.

Commodity dependence is a concern for a large number of developing countries, particularly in Africa, the Middle East and Latin America. Figure 2 shows that the concentration index for developing countries in the last 15 years has been more or less double that of developed countries, and has been slowly but steadily rising over that time. LDCs are particularly badly afflicted; of the 33 African LDCs 12 of them have extractives as more than 50% of their export streams, and another 7 are similarly dependent on agricultural exports.⁶¹

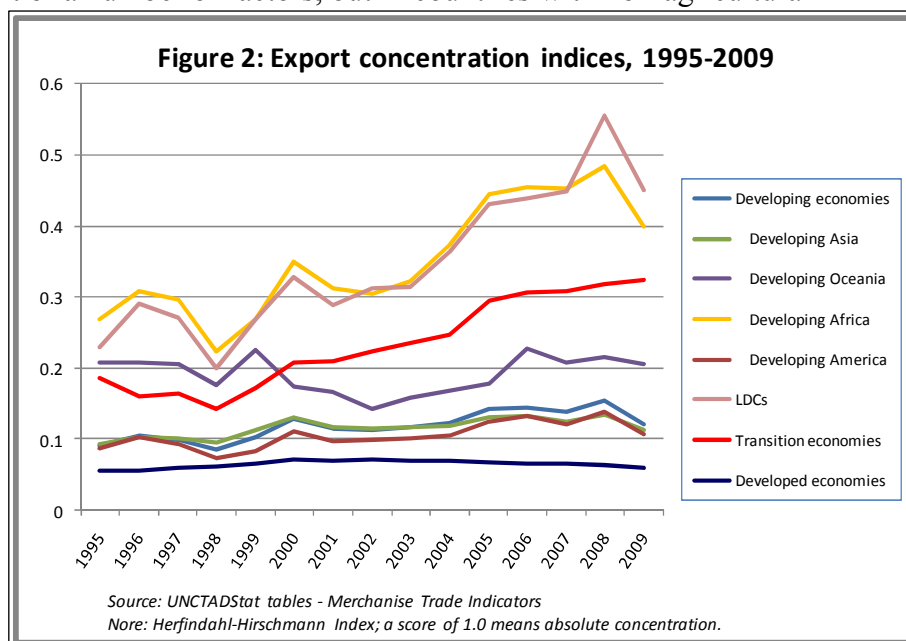
Figure 2 shows a drop in concentration for some countries in 2009. Over the period of 2003 to 2008 – the longest and strongest commodity boom of the past century – the prices of metals and minerals rose by almost 300%.⁶² But in 2009 commodity prices plummeted, responding to the global financial crisis and reducing the extent to which many economies were dominated by the value of key commodity exports. As of this writing many commodities’ prices are again reaching the peaks seen in 2008.

The commodities boom (centred mostly on metals and minerals rather than agricultural commodities) was the result of a number of factors, but in countries with non-agricultural commodity dependence one of the impacts was a crowding out of the manufacturing sector, reversing gains in diversification that had been previously made.⁶³

Can a transition to a green economy offer anything of value to economies facing these challenges?

Arguably it can. For one thing, the move to a green economy for many countries will mean a structural shift to new forms of economic activity. For those countries that are currently heavily reliant on commodity exports—particularly those dependent on the energy- and resource-intensive mining and minerals sectors—this will probably mean a shift to a more diversified economy as a whole.

It should be noted, however, that the hard realities of structural transformation dictate that countries will be most successful if they start to build on assets they already possess. Moving into new sectors of activity will demand a constellation of inputs – services,



⁶¹ Cosby (*forthcoming*).

⁶² World Bank (2009).

⁶³ Gallagher and Porzecanski (2010) document this dynamic in Latin America.

expertise, technologies, legal and regulatory regimes—that may or may not already exist to serve existing sectors.⁶⁴ The most obvious starting points in diversification are those that draw most heavily on the inputs already present in the economy, exploiting existing capabilities.⁶⁵ For economies that rely heavily on extractives, for example, the most feasible near-term course is to focus first on process improvements to existing activities. Expertise developed in reducing energy and resource inputs, and reducing or reusing wastes, not only makes the sector more competitive and less environmentally damaging (which does nothing to address commodity dependence), but can also eventually form the basis for exportable new business services and technologies (which *does* help). A second focus would involve different classes of activity, but which draw on some of the same sorts of inputs needed for exiting activities. Depending on the sector involved, this might involve moving up the value chain from extraction to processing to light manufacturing, for example, or building from agricultural production to pursue agricultural biotechnology. The boom years for commodity producers offer the fiscal “space” in which to pursue these sorts of initiatives.

Obviously, not every country can build up competitive sectors in every aspect of the green economy. Given their respective starting points there may be some economies that will find very few, if any, appropriate sectors; the green economy does not transcend the realities of global competition. That said, the opportunities are real; competitiveness is a dynamic state, and has through history been subject to significant influence by policy making (though not always successfully).⁶⁶

A move to a green economy can also be helpful if it involves institutional improvements. UNEP (*forthcoming*) argues that in some countries the shift to a green economy will involve improved governance as one of many enabling conditions, and discusses how transparency and accountability contribute to that end. To the extent that countries follow this guidance, they are decreasing the probability that high resource rents will give rise to rent-seeking behaviour and the resulting misallocation of resources.

There are ways in which a green economy can help move states away from resource-based export-led models and the commodity dependence that they often spawn. Ultimately, one of the many faces of the green economy is wise industrial policy.⁶⁷ To the extent that a commodity dependent export model is both economically and environmentally undesirable, the strategies employed to reach a green economy may provide some helpful antidotes.

⁶⁴ Hausmann and Rodrik (2003).

⁶⁵ Hausmann and Rodrik (2006).

⁶⁶ Amsden (2001).

⁶⁷ Industrial policy here is used in the broad sense employed by Cimoli, Dosi and Stiglitz (2009) to mean not only infant industry support, but also science and technology policies, government procurement, and policies on investment, IPRs and allocation of financial resources.

IMPACTS OF THE TRANSITION IN MAJOR TRADING PARTNERS

The previous section analyzed the possible reasons for, and impacts of, a shift to the green economy at the country level, also asking how trade and investment law and policy might help or hinder the transition. This section focuses more on trade and investment as vehicles rather than tools; the question is what impacts there might be for the trading partners of countries that are moving toward a green economy.

Opportunity in structural change

As countries undergo the structural change inherent in the move toward a green economy, new export opportunities may open up. A host of national-level studies have found strong potential in future markets for environmental goods and services variously defined.⁶⁸ The strongest growth seems to be not in the traditional environmental sector, dominated by environmental management technologies such as remediation and management of pollution, but rather in low-carbon technologies and renewable energy technologies and services.⁶⁹

Much of this market is pushed by regulatory demands in OECD countries. The EU Biofuels Directive, for example, mandates a 10% minimum share of transport fuels to be “sustainably derived” biofuels by 2020.⁷⁰ That mandate is estimated to significantly raise the demand for imports of biofuels to the EU market, with imports of some 9 Mt by 2020 of bioethanol and 1.6 Mt of biodiesel.⁷¹ Similarly, The EU’s 2007 Energy Directive mandates a 20% share for renewables in the overall energy mix by 2020 – a goal which has spawned, among other things, a move to construct a highly ambitious network of concentrated solar and wind-powered generation facilities in Northern Africa, with transmission capability to Europe. If it materializes as planned, “Desertec” could provide up to 15% of Europe’s electricity needs by 2050, and represent a 100% increase in solar capacity worldwide – a significant export opportunity.⁷²

A number of developing country firms have already gained significant market share in new technologies. China in 2009 exported over \$10 billion worth of solar panels and cells, more than twice as much as the second biggest exporter and almost 80 times the value exported only ten years earlier, when it was not even among the top 5 world exporters.⁷³ India’s Suzlon Energy is now a global power in supplying wind turbines, with a 6.4% share of the global market.⁷⁴ Three Chinese companies now rank in the top ten for market share in wind power as well, though they are almost exclusively focused on meeting domestic demand.⁷⁵ Both China and India’s sizable domestic markets have

⁶⁸ Eco-Canada (2010); Wyden (2010); Sharp (2009); DIW (2004).

⁶⁹ Sharp (2010).

⁷⁰ European Commission (2008).

⁷¹ Banse and Grethe (2008).

⁷² Pfeffer (2009); Desertec Foundation (n.d).

⁷³ UN Comtrade database. (HS 854140: Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes).

⁷⁴ BTM Consult (2009).

⁷⁵ *Ibid.*

been springboards for export success, driven as in the OECD countries by ambitious domestic targets for renewable energy generation.

The obvious question is whether these are special cases; China and India in many ways are not representative of other developing countries. Does their success have relevance for the rest and, in particular, for least developed economies? It is true that much of the green economy will be based on goods and services that require a workforce with advanced technical training, supporting industries and services in the high tech area, access to finance and ample government assistance, and that domestic market size is important, all of which would seem to favour larger emerging developing countries over smaller economies. That said, however, green goods and services are a heterogeneous group, and not all have the same demanding character. For example Steenblik (2006) argues that biofuels, solar thermal and geothermal are all lower-tech technologies in which less developed countries have either existing expertise, or good chances of developing competitive exports streams. The most relevant lesson from both China and India is the importance of concerted support by governments in the drive to succeed in the green economy, though the characteristics of that success will vary from country to country. Both countries used a judicious mix of government support and domestic targets to stimulate their respective green sectors.

There will probably be economic opportunities for some developing countries as the international climate change regime converges on consensus for a post-2012 architecture. Whatever regime follows on from the Kyoto Protocol's first commitment period will probably contain a market mechanism similar to the Clean Development Mechanism (but likely available only to the poorest developing countries). There will probably also be mechanisms for sizable transfer payments to cover reduced emissions from deforestation and forest degradation (REDD) and to reward nationally appropriate mitigation actions (NAMAs). It remains to be seen how broad a scope there will be for any of these mechanisms, and what levels of funding, but it is worth noting that NAMAs and REDD are essentially transfer payments to governments for taking certain policy actions. While this sort of revenue stream is fiscally (and environmentally) very helpful, it is not strictly speaking trade, and may have enclave development characteristics with few domestic linkages. CDM, by creating incentives for private sector actions, may suffer less from that shortcoming, but is likely to be rather limited in scope, both because of its project-by-project characteristics⁷⁶ and because major drivers of demand such as the EU's ETS will probably limit purchases to LDC-generated credits only. While this is good news for LDCs, there are ultimately few CDM candidate mitigation projects available in those countries, emissions being very low.

One of the classic barriers to increased trade opportunities, particularly for developing countries, is the plethora of different export market product energy performance standards, testing procedures and labelling requirements. Harmonizing these standards at a high level would be a huge boon for small and medium sized exporters in particular, for whom meeting different requirements in every country of export is disproportionately

⁷⁶ To the extent the CDM can manage to ramp up approval of programmes of activities, which it has not managed to do to date, this shortcoming could be overcome. See Beaurain and Schmidt-Traub (2010).

difficult. And it could have enormous environmental benefits as well, more quickly disseminating energy efficient products at lower cost.

The risks of structural change

The opportunities described above are the product of structural change in countries driving to a green economy. Not all impacts will be positive, however; as the world moves toward a green economy and demand for environmentally preferable goods increases, the demand for environmentally damaging goods will of course drop. Whatever the overall global balance of impacts, some countries will suffer worsening terms of trade under a green economy, and some firms suffer a loss of markets. Perhaps the best studied case is the impact of climate change response measures on oil producing states. Müller (2005) surveys the literature to find a range of predicted results from implementing the Kyoto Protocol, all negative, ranging from the minor (0.2% decline in real GDP by 2010) to the significant (13% drop in oil revenues, or a 5.5% drop in GDP assuming the 2004 ratio of oil exports/GDP).⁷⁷

But the magnitude and character of impacts are not determined by a country's economic structure alone. They also depend in large part on that country's policy choices. Any policies that successfully diversify away from known long-run losers will blunt the negative impacts of a green economy. Social policies can help cushion the blow and facilitate adjustment for those who lose jobs and income. And industrial policy aimed at fostering competitiveness in sectors important to the green economy can help tilt the balance of impacts from negative to positive.

While the individual losers are clearly important, it is also important to put the pain of adjustment into perspective. To take the example of climate change again, it has been well documented that the costs of action are far less than the costs of inaction.⁷⁸ In the long run, perpetuating unsustainable livelihoods is not in anyone's interest.

Managing the adjustment is not an easy task even for countries with well developed social safety nets and ample fiscal capacity. In developing and least developed countries international assistance will be needed. The purveyors of official development assistance have increasingly become cognizant of the need for development to be sustainable, and will need to understand in each partner country's case how a shift to a green economy might change the nature of the challenges and opportunities they face.

The risks of protectionism⁷⁹

New market opportunities may, as noted above, be a positive spin-off from the pursuit of green development by a country's trading partners. Those benefits, however, are dependent on market access. At the First Preparatory Committee for the UNCSA in May 2010, there was cautious praise for the idea of a green economy and its potential

⁷⁷ Note that in all these results there is still an increase in total revenues, but there is a widening gap between those revenues and revenues derived in the baseline case.

⁷⁸ Stern (2007) contrasts the costs of action, at around 1% of global GDP, with the costs of inaction, at 5 – 20% of GDP annually.

⁷⁹ This section draws heavily on Cosby (2011).

contribution to sustainable development.⁸⁰ But several countries also cautioned that the green economy as a paradigm should not provide cover for, or legitimize, protectionism that in the end works against sustainable development and harms the poor and marginalized.

Cosbey (2011) analyzes a comprehensive range of policy measures that governments might take in pursuit of a green economy, to parse out those most relevant to these concerns. The large majority of potential measures are domestically focused and have few or no trade or investment implications. They include environmental regulations focused on non-tradable sectors such as buildings and transportation, public education, strengthening integrated planning, improved transparency and accountability, effective enforcement of laws, reform of environmental laws, and better measurement and use of indicators to monitor trends of interest.

Another tranche of measures does have trade and investment implications, but these arise from the impacts, both positive and negative, of structural change—the risks and opportunities discussed above.

A final category of measures may in fact be problematic, in that they might be used to deliberately protect and promote domestic green industries at the expense of foreign competitors. There are relatively few such measures:

- Conditioned support for green sectors, designed to foster green infant industries
- RD&D support to domestic green sectors
- Regulations, standards and prohibitions based on production and processing methods
- Environmental levies and taxes on transport

Support for green sectors comes in the form of investment incentives or operational support, as low-interest loans, outright grants, export credit financing, tax breaks, below-market-value land grants and other forms of benefit. Often that support is conditional on the use of domestic inputs, on export performance, on some percentage of domestic ownership or on technology transfer – all measures that aim to foster domestic capacity in the area.

To the extent that such measures are successful, they may indeed have adverse impacts on foreign competitors – particularly those whose governments are unable to match such spending. Some varieties of conditioned support are prohibited under the WTO's Agreement on Subsidies and Countervailing Measures.⁸¹ On the other hand, it was noted above that some conditioned support might be effective in fostering domestic capacity. As well, if it results in capable new global innovators and competitors in those sectors, conditioned support may create global environmental benefits. As such, a number of

⁸⁰ Spence and Vavilov (2010).

⁸¹ Article 3 deems subsidies conditioned on use of local inputs, or on export performance, prohibited. Depending on the nature of the measures, conditioned support may also breach commitments made under The Agreement on Trade-Related Investment Measures and the General Agreement on Trade in Services.

countries do engage in support of this type aimed precisely at fostering green infant industries. Ignoring for the moment the strictures of WTO law (something often done, in this context), there is nothing close to international agreement on the propriety and ideal character of such support, which is liberally granted by developed and developing countries alike.⁸²

Support for research, development and dissemination of new environmental technologies is also a widespread practice. If successful it is also destined to alter the terms of competition between countries. That said, it is more or less recognized that support at this part of the innovation chain is within the bounds of acceptable sovereign practice. This kind of support is widely spread across developed and developing economies. Support for *mature* industries, however, may raise more acute trade and competitiveness issues, and has been taken to WTO dispute settlement on several occasions.⁸³

Regulations, standards and prohibitions based on production and processing methods (PPMs) are troubling because they are easy to specify in ways that advantage domestic producers. An infamous 1902 German measure gave special tariff treatment to “large dappled mountain cattle or brown cattle reared at a spot at least 300 metres above sea level and which have at least one month’s grazing each year at a spot at least 800 metres above sea level.”⁸⁴

The potential for protectionism in PPM-based measures is legitimate, but not all such measures are protectionist. From an environmental perspective a PPM-based approach is indispensable; how a product is made is one of the most important determinants of its final environmental impact. This leaves us with a pressing need for agreed rules governing how and when such measures can be employed.

The types of measures in question include border carbon adjustment: levies on imported goods that attempt to “level the playing field” between domestic (carbon constrained) firms and foreign (presumably unregulated) firms, with charges based in some fashion on the embodied carbon in the imported goods. Even if they can be supported in theory, on the grounds that they are aimed at preventing leakage, these measures may be so administratively complex that they leave significant room for protectionist influence.⁸⁵ Trade lawyers seem split on the question of whether BCA can be designed so as to

⁸² As of this writing, there are two ongoing WTO disputes alleging such support: DS 412 - *Canada — Certain Measures Affecting the Renewable Energy Generation Sector* (Complainant: Japan); and DS 419 - *China — Measures concerning wind power equipment* (Complainant: United States of America).

⁸³ See in particular DS 316 - *European Communities and Certain Member States – Measures Affecting Trade in Large Civil Aircraft*, Panel Report, June 30, 2010; and the ongoing DS 353 - *United States of America — Measures Affecting Trade in Large Civil Aircraft — Second Complaint* (Complainant: European Communities).

⁸⁴ Cited in Charnovitz (2001). While this is an example of using PPM-based standards to circumvent most-favoured-nation treatment (in favour of Switzerland and Austria, in this case), it illustrates more generally how the right specifications can be used to create *de facto* discrimination.

⁸⁵ Moore (2010).

conform to WTO law (and still be feasible).⁸⁶ And developing countries argue that a level playing field violates the UNFCCC principle of common but differentiated responsibility.

Also noteworthy among PPM-based measures are carbon footprint labels, or labels that display the amount of greenhouse gases a product emits over its life cycle. At present these are mostly propounded by private sector, but are becoming of increasing interest to governments.⁸⁷ As with BCA, the design of these instruments is key to their final impact; differing assumptions about scope (e.g., do we consider emissions from land use change? How many years back do we go?) mean that different labels arrive at impact figures that differ by orders of magnitude.⁸⁸ Considering just the transport segment of the life cycle—as do food miles labels—can lead to results that favour local producers – unfairly so, since the method of production may make a far bigger difference to final impact than transport.⁸⁹ And as with BCA, while there is applicable WTO law (the TBT Agreement, in this case), the law says nothing particularly helpful about best practice. Where private-sector labels are concerned, there is no consensus on whether WTO law is even applicable.⁹⁰

PPM-based standards, like conditioned subsidies, are covered by WTO law—in this case the GATT or TBT. But there is considerable uncertainty about what can and cannot be done under those strictures. It is a good bet that any BCA regime that comes into force will be challenged in the WTO's dispute settlement system. PPM-based standards, such as those for sustainable biofuels or carbon footprint labels, are also likely to face challenges. So while there are existing rules to guide practice in this area, there are two problems. First, in many cases it's not clear *ex ante* what that law says. We could simply wait for clarity from a WTO dispute settlement process, but that gives policy makers no certainty about what they can and cannot do. Second, it unwisely burdens the WTO dispute settlement mechanism with issues that are caustic to the regime, since the dispute is not a case of interpreting rules that reflect agreed principles, but rather of contesting fundamental disagreements. Far better would be to hammer out some agreement (whether inside or outside of the WTO) that would identify best practice in the application of BCA, of labelling, or even of conditioned support – the design of the instrument being the key that determines its good or bad character in the end.⁹¹

Environmental levies and taxes on transport are being considered by UNFCCC negotiators (and in the respective trade associations) as a way to address maritime transport and air transport's contributions to climate change. These would be inherently

⁸⁶ Gros and Egenhofer (2010), Ismer and Neuhoff (2007), and Paewelen (2007) argue that BCA can be compatible with WTO law. McLure (forthcoming), Bordoff (2009) and Cosbey (2009) are more sceptical.

⁸⁷ Bolwig and Gibbon (2009) estimate 20 labels in use as of that time, all private. France has introduced product carbon footprint labelling as of 2011 for some goods, and the EU is conducting studies to explore the feasibility of PCF schemes – a possible precursor to an EU-wide voluntary scheme (Kommerskollegium 2010a; 2010b).

⁸⁸ Cornellsen and Dehue (2009); Zah (2009).

⁸⁹ DEFRA (2005); Sim *et al.* (2007).

⁹⁰ Joshi (2004); Vranes (2011).

⁹¹ Agreement within the WTO would be the first best solution, but such matters are not likely to be taken up until at least the conclusion of the Doha Round.

punishing for traded goods vis-à-vis locally produced goods. One of the key negotiating issues is how to build special and differential treatment into such a scheme so that small and vulnerable economies are not harmed. Small island states dependent on tourism trade, for example, would face potential reduced demand from an undifferentiated scheme, and depending on the scheme design those exporters relying on air freight might face significant impacts. The final result is not protectionism *per se*, but the design of the scheme might be subject to protectionist influences.

WHAT ROLE FOR THE INTERNATIONAL COMMUNITY?

The analysis in this paper has highlighted a number of ways in which the international community might collaborate in fostering a green economy through trade and trade-related policies. These can be broken down into: first, the ways that developed countries can support developing countries in their efforts to create a domestic green economy and cope with the impacts of global green economic pursuit, and; second, the ways that the community of nations can come together to find agreement on a way forward.

Support for developing countries

Much of the move toward a green economy will necessarily take place at the national, sub-national and local levels. For countries with low financial, technical and managerial capacity there will be elements of the effort that need support from the international community. The domestic efforts that this paper has highlighted as necessary, where international support could be critically important, are:

- Help exporters meet stringent international environmental and social standards, both private and public. This means, among other things, information brokering to the private sector, building technical capacity nationally or regionally for accredited testing and certification, and creating/maintaining a strong domestic standards regime.
- Set nationally appropriate and ambitious targets for clean energy provision, accompanied by incentives such as feed-in tariffs or quotas, and by removal of obstacles such as subsidies for polluting energy sources and technologies.
- Engage in “smart” industrial policy geared toward the green economy of the future, aimed at diversifying the economy and protecting it from the shocks of the coming global structural changes. Ensure that priority is given to the many areas of positive potential for the poorest.
- Strengthen social systems to help cushion and facilitate the transition with minimal negative social impacts.
- Work to create vibrant national systems of innovation, among other things through investment in education and training, support for research and development, linking public research and private sector users, financing for demonstration projects, and promulgating facilitative IP law.
- Identify and dismantle non-tariff barriers to imports of environmental goods and services, particularly in those sectors where it is unrealistic to expect domestic champions to arise.

There are a number of vehicles through which such support could appropriately flow, depending on the nature of the challenge: bilateral aid (focused on aid for trade, environmental cooperation or traditional development aims), multilateral development banks, other multilateral institutions (e.g., the Global Environment Facility, funding arms of multilateral environmental agreements), or *ad hoc* bodies charged with fostering a green economy that works for developing countries.

International collaboration

Beyond support to developing countries in meeting the challenges of a green economy, there are ways in which international cooperation or agreement is needed to allow the global community to move toward green economic growth:

- Agreement at the WTO on reduction or elimination of tariffs and non-tariff barriers to trade in environmental goods and services. There should be some constrained flexibility for developing countries intent on fostering national champions in particular sectors, but the concerns over liberalizing dual-use goods should take a back seat to the urgency of need for new technologies.
- Agreement on a concerted effort to “oil the innovation chain” – to get new technologies more quickly to market. This might include global demonstration programs; support for open innovation programs and national commitments to make public research common intellectual property; international R&D cooperation; publicly backed patent pools; support for financing, etc.
- Agreement that IPR regimes, including TRIPS, should be sensitive to the country’s level of development, respecting the reality that strong national-level innovative capacity is in the global interest.
- Agreement, based on economic evidence, that some specific forms of performance requirements are acceptable practice (particularly in developing countries) since they can be (have been) effectively used to foster globally competitive firms that can positively contribute to a green economy.
- Agreement on what should be acceptable (and/or best) practice in the pursuit of the green economy with respect to PPM-based measures such as BCA and carbon footprint labelling, and with respect to subsidies designed to foster national champions. At the end of the day in some cases this might simply re-affirm the current WTO rules, but widespread “stretching” of those rules suggests the need for a dedicated dialogue. In the case of subsidies, for example, we might think about the careful revival of non-actionable subsidies as a category in the WTO SCM Agreement.

These efforts might be part of a grand concerted push to foster a green economy globally. Or, more likely, they could be tackled separately in the fora most appropriate to each, but under the loose framework of such a concerted effort.

CONCLUSIONS

Most of the issues treated in this paper are not new. The global community has for years been debating the (often illusory) tensions between trade and environment, development

and environment, and arguing about the advisability of industrial policy. The need for policy space, the role of intellectual property rights and international investment agreements, subsidies, investment incentives – these are all well-trodden roads of discourse. Indeed, even the policies and practices necessary to get us to a green economy are not entirely new; many are even now in wide use,⁹² though as yet not wide enough.

What is new in the present context is the heightened urgency for international cooperation, and the stronger argument for assistance to developing countries, particularly the least developed among them. Given the urgency of the multiple global environmental crises facing us⁹³—climate change, loss of biodiversity, desertification, ocean degradation—, the urgency of the need to narrow the gap between rich and poor globally and at the national level,⁹⁴ and the security that development and environmental health bring to the global community,⁹⁵ it is in the common interest that the green economy be widely achieved. That urgency should trump many concerns about competitiveness in both the developed and developing countries. It is urgent, for example, that developing countries become incubators for globally competitive innovative green firms, and capable adopters of new technologies, and trade rules need to find room for that to occur. It is also urgent that there be lower barriers to trade in environmental goods and services, even if that means also liberalizing trade in dual use goods. And it is urgent that standards be used—fairly, but effectively—to force needed environmental improvement.

An open rules-based system of trade is a global good, even though there are superficially appealing arguments for national-level mercantilism. It is valuable enough that nations have committed to making it happen, through mutually beneficial actions that often appear to be sacrifices at the national level. In the same way the green economy, adopted and promoted in all countries, is a global good valuable enough that it should outweigh narrow national competitiveness concerns.

Not all countries will be clear winners in the coming transition, and some will do better than others. It would be misleading to suggest that least developed countries will soon be developing export streams in high tech capital-intensive sectors such as solar PV and carbon capture and storage. But as argued above the green economy is also based on relatively low tech activities, in which developing countries have already been successful, such as biofuels, solar thermal and geothermal energy. Many of the action items for international cooperation are aimed at equitably spreading the benefits of the green economy, and at supporting governments in their drive to make their economies capture the full potential, and avoid the risks, of green structural change.

⁹² OECD (2009); UNEP (2011).

⁹³ Rockström *et al.* (2009) offer a disturbing survey of the various planetary boundaries that we have already crossed or are soon to cross.

⁹⁴ There is some significance to the fact that eradicating poverty and hunger is the first of the Millennium Development Goals, adopted in the Millennium Declaration by all 192 UN member countries and at least 25 international organizations. (UNGA, 2000).

⁹⁵ Kaplan (2000); Mathews (1989).

Some sectors will feel the pain of transition, and countries that specialize in those sectors will be challenged accordingly. But while the individual losers are clearly important, it is also important to put the pain of adjustment into perspective. As noted above, it has been well documented that the costs of action are far less than the costs of inaction. In the long run, perpetuating unsustainable livelihoods is not in anyone's interest.

This paper finds that there is a role for trade policy in the pursuit of a green economy; trade and investment are critically important drivers of growth and structural change. The challenge—and it is an *achievable* challenge—is to ensure that all countries grow and change in ways that have benefits both nationally and globally.

REFERENCES

Aldaz-Carroll, Enrique. 2006. "Regional Approaches to Better Standards Systems." *World Bank Policy Research Working Paper* No. 3948, June.

Amsden, Alice H. 2001. *The rise of the rest: Challenges to the West from late-industrializing economies*. Oxford: Oxford University Press.

Bance, Martin and Grethe, Harold. 2008. "Effects of a potential new biofuels directive on EU land use and agricultural markets. Paper presented at the 107th EAAE Seminar "Modelling of Agricultural and Rural Development Policies", Sevilla, Spain, January 29th -February 1st.

Barton, John H. 2007. "Intellectual Property and Access to Clean Energy Technologies in Developing Countries: An Analysis of Solar Photovoltaic, Biofuel and Wind Technologies." Geneva: International Centre for Trade and Sustainable Development.

Barton, John H., Daniel Alexander, Carlos Correa, Ramesh Mashelkar, Gill Samels and Sandy Thomas. 2002. *Integrating Intellectual Property Rights and Development Policy* (Report of the Commission on Intellectual Property Rights). London.

Beurain, François and Guido Schmidt-Traub. 2010. *Developing CDM Programmes of Activities: A Guidebook*. Paris: CDC Climat et al.

Been, Vicki and Joel C. Beauvais. 2003. "The Global Fifth Amendment? NAFTA's Investment Protections and the Misguided Quest for an International 'Regulatory Takings' Doctrine," 78 *New York University Law Review* 30.

Bordoff, Jason. 2009. "International trade law and the economics of climate policy: Evaluating the legality and effectiveness of proposals to address competitiveness and leakage concerns." In Isaac Sorkin and Lael Brainard (eds.), *Climate Change, Trade and Competitiveness: Is a Collision Inevitable?* Brookings Institution Press.

Bowlig, Simon and Peter Gibbon. 2009. "Counting Carbon in the Marketplace: Part I – Overview Paper." Paper presented at the *OECD 2009 Global Forum on Trade: Trade and Climate Change*. Paris: OECD.

- BTM Consult. 2009. *BTM World Market Update 2009*. Copenhagen: BTM Consult.
- Cannady, Cynthia. 2009. "Access to Climate Change Technology by Developing Countries: A Practical Strategy." Geneva: International Centre for Trade and Sustainable Development.
- Chang, Ha-Joon. 2002. *Kicking Away the Ladder: Development Strategy in a Historical Perspective*. London: Anthem Press.
- Charnovitz, Steve. 2001. "Solving the Production and Processing Methods Puzzle." Occasional Paper, WTO Series No. 5, Program for Study of International Organizations. Geneva: Graduate Institute of International Studies.
- Cimoli, Mario, Giovanni Dosi and Joseph E. Stiglitz. 2009. "The political economy of capabilities accumulation: The past and future of policies for industrial development," in Mario Cimoli, Giovanni Dosi and Joseph E. Stiglitz (eds.) *Industrial Policy and Development*. New York: Oxford University Press.
- Cornelissen, Stijn and Bart Dehue. 2009. "Summary of approaches to accounting for indirect impacts of biofuel production." Paper commissioned for the *Roundtable on Sustainable Biofuels*. Utrecht: Ecofys.
- Correa, Carlos, 2000. "Integrating Public Health Concerns into Patent Legislation in Developing Countries." Geneva: South Centre.
- Cosbey, Aaron. (forthcoming). "Competitiveness Impacts of Climate Change on LDCs' Export Trade." London: Commonwealth Secretariat.
- Cosbey, Aaron. 2011. "Are There Downsides to a Green Economy? The Trade, Investment and Competitiveness Implications of Unilateral Green Economic Pursuit," in *The Road to Rio+20: The Green Economy, Trade and Sustainable Development*. Geneva: UNCTAD.
- Cosbey, Aaron. 2009. "Border Carbon Adjustment: Questions and Answers (but more of the former)." Background paper produced for the Global Trade and Development Forum/International Institute for Sustainable Development Round Table Discussion: *Toward International Agreement on Border Measures for Climate Change*, November 12, 2009, Geneva.
- Cosbey, Aaron. 2004. *Lessons Learned on Trade and Sustainable Development: Distilling Six Years of Research from the Trade Knowledge Network*. Winnipeg: International Institute for Sustainable Development.
- Cosbey, Aaron, Soledad Aguilar, Melanie Ashton and Stefano Ponte. 2010. "Environmental goods and services negotiations at the WTO: Lessons from multilateral environmental agreements and ecolabels for breaking the impasse." Winnipeg: International Institute for Sustainable Development.

Cosbey, Aaron, Howard Mann, Luke Eric Peterson and Konrad von Moltke. 2004. *Investment and Sustainable Development: A Guide to the Use and Potential of International Investment Agreements*. Winnipeg: International Institute for Sustainable Development.

de Cendra, Javier. 2006. "Can emissions trading schemes be coupled with border tax adjustments? An analysis vis-à-vis WTO law." *RECIEL*, 15 (2), 131–145.

Defra. 2005. "The Validity of Food Miles as an Indicator of Sustainable Development." London: Department for Environment, Food and Rural Affairs.

Desertec Foundation (n.d.). Red Paper: An Overview of the DESERTEC Concept.

DIW (German Institute for Economic Research). 2009. "Global Demand for Environmental Goods and Services on the Rise: Good Growth Opportunities for German Suppliers." Berlin: DIW.

European Commission. 2008. Directive of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources. (COM(2008)19 final), Brussels, January 23.

Eco-Canada. 2010. "Canadian Environmental Sector Trends: Labour Market Study." Ottawa: Environmental Careers Organization.

Gallagher, Kevin P., and Roberto Porzecanski. (2010). *The Dragon in the Room: China and the Future of Latin American Industrialization*. Palo Alto, CA: Stanford University Press.

Gallagher, Kevin P. and Nagesh Kumar. 2007. "Relevance of 'Policy Space' for Development: Implications for Multilateral Trade Negotiations." RIS Discussion Paper No. 120. New Delhi: Research and Information System for Developing Countries.

Gervais, Daniel (ed.). 2007. *Intellectual Property, Trade and Development: Strategies to Optimize Economic Development in a TRIPS-Plus Era*. New York: Oxford University Press.

Gros, Daniel and Christian Egenhofer. 2010. *Climate Change and Trade: Taxing Carbon at the Border?* Brussels: Centre for European Policy Studies.

Hausmann, Ricardo and Dani Rodrik. 2003. "Economic development as self-discovery." *Journal of Development Economics*. 72: 603-633.

Hausmann, Ricardo and Dani Rodrik. 2006., "Doomed to Choose: Industrial Policy as Predicament," John F. Kennedy School of Government, Harvard University, September 2006.

Heller, Michael and Rebecca S. Eisenberg. 1998. "Can Patents Deter Innovation? The Anticommons in Biomedical Research," *Science*, vol. 280: 698-701.

Hufbauer, Gary Clyde, Barbara R Kotschwar and John S. Wilson. 2001. "Trade Policy, Standards, and Development in Central America." World Bank Policy Research Working Paper No. 2576

IEA. 2010a. *World Energy Outlook 2010*. Paris: International Energy Agency.

IEA. 2010b. *Energy Technology Perspectives 2010*. Paris: International Energy Agency.

Ismer, Roland and Karsten Neuhoff. 2007. "Border tax adjustments: A feasible way to support stringent emissions trading." *European Journal of Law and Economics*, 24, 137–164.

Jha, Veena. 2008. "Environmental Priorities and Trade Policy for Environmental Goods: A Reality Check." Geneva: International Centre for Trade and Sustainable Development.

Joshi, Manoi. 2004. "Are Eco-Labels Consistent with World Trade Organization Agreements?" *Journal of World Trade*, Vol. 38(1):69-92.

Kaplan, Robert D. 2000. *The Coming Anarchy: Shattering the Dreams of the Post Cold War*. New York: Random House.

Kommerskollegium 2010a. "France prepares for carbon labelling." *Newsletter* (Swedish Climate Standards Project), No. 2/10.

Kommerskollegium 2010b. "European Commission launches studies on carbon footprint methodologies." *Newsletter* (Swedish Climate Standards Project), No. 2/10.

Kumar, Nagesh. 2005. "Performance Requirements as Tools of Development Policy: Lessons from Experiences of Developed and Developing Countries for the WTO Agenda on Trade and Investment," in Kevin Gallagher (ed.) *Putting Development First*. London: Zed Press.

Kumar, Nagesh. (2003). "Intellectual Property Rights, Technology and Economic Development: Experiences of Asian Countries", *Economic and Political Weekly*, 38(3) January 18:209-226.

Lang, Kerry, Peter Wooders and Kati Kulovesi. 2010. "Increasing the Momentum of Fossil-Fuel Subsidy Reform: A Roadmap for international cooperation." Geneva/Winnipeg: Global Subsidies Initiative/International Institute for Sustainable Development.

Lee, Bernice, Ilian Iliev and Felix Preston. 2009. *Who Owns our Low Carbon Future? Intellectual Property Rights and Energy Technologies*. London: Chatham House.

Mann, Howard and Aaron Cosbey. 2004. "International Investment Agreements: Trends and Impacts for Developing Countries," Background paper for *Global Economic Prospects 2005: Trade, Regionalism and Development*. Washington, DC: World Bank.

Mann, Howard and Julie Soloway. 2002. "Untangling the Expropriation and Regulation Relationship: Is there a way forward?" A Report to the *Ad Hoc* Expert Group on Investment Rules and the Department of Foreign Affairs and International Trade (Canada), March 31.

Mathews, Jessica Tuchman. 1989. "Redefining Security." *Foreign Affairs*, Vol. 68(2): 162-177.

McLure, Charles J. (*forthcoming*) "The GATT Legality of Border Tax Adjustments for Carbon Taxes and the Cost of Emissions Permits: a Riddle Wrapped in a Mystery Inside an Enigma," *Florida Tax Law Review*.

Moore, Michael O. 2010. "Implementing Carbon Tariffs: A fool's errand?" World Bank Policy Research Working Paper No. 5359. Washington: World Bank.

Moran, Theodore H. 2001. *Parental Supervision: The New Paradigm for Foreign Direct Investment and Development*. Washington, D.C.: Institute for International Economics.

Moran, Theodore H. 1999. "Foreign Direct Investment and Development: A Reassessment of the Evidence and Policy Implications." In *OECD, Foreign Direct Investment, Development and Corporate Responsibility*, Paris: OECD. pp. 43-55.

Müller, Benito. 2005. "Modeling in the context of the impact of the implementation of response measures." Presentation to the *UNFCCC Expert Meeting on Response Measures*, 23-24 November 2005, Montreal.

OECD. 2009. *Eco-Innovation in Industry: Enabling Green Growth*. Paris: Organization for Economic Cooperation and Development.

Pfeiffer, Tom. 2009. "Europe's Saharan Power Plan: Miracle or Mirage?" *Reuters*, August 23.

Point Carbon. 2008. "Clean Energy Investment in the Former Soviet Union (Ukraine and Kazakhstan): The Domestic Context." Winnipeg: International Institute for Sustainable Development.

Potts, Jason, Jessica van der Meer, Jaclyn Daitchman. 2010. *The State of Sustainability Initiatives Review 2010: Sustainability and Transparency*. Winnipeg: International Institute for Sustainable Development.

Rockström, Johan, Will Steffen, Kevin Noone, Åsa Persson, F. Stuart Chapin, Eric F. Lambin, Timothy M. Lenton, Marten Scheffer, Carl Folke, Hans Joachim Schellnhuber, Björn Nykvist, Cynthia A. de Wit, Terry Hughes, Sander van der Leeuw, Henning Rodhe, Sverker Sörlin, Peter K. Snyder, Robert Costanza, Uno Svedin, Malin Falkenmark, Louise Karlberg, Robert W. Corell, Victoria J. Fabry, James Hansen, Brian Walker, Diana Liverman, Katherine Richardson, Paul Crutzen and Jonathan A. Foley. 2009. "A Safe Operating Space for Humanity." *Nature*, Vol. 461 (24 Sept.): 472-475.

Rodrik, Dani. 2004. "Industrial Policy for the 21st Century." Faculty Research Working Paper No. RWP04-047. John F. Kennedy School of Government, Harvard University.

Schaper, Marianne. 1999. "Impactos ambientales de los cambios en la estructura exportadora en nueve países de América Latina y el Caribe: 1980 – 1995." Working Paper 19, Environment and Development Series. Santiago de Chile: CEPAL/ECLAC.

Sharp, John. 2009. "Low Carbon and Environmental Goods and Services: an industry analysis." (Report commissioned by the UK Department for Business and Regulatory Reform.) London: BERR.

Shemberg, Andrea. 2008. "Stabilization clauses and human rights." (A research project conducted for IFC and the United Nations Special Representative to the Secretary General on Business and Human Rights). International Finance Corporation/Office of the UN High Commissioner for Human Rights.

Shenoy, Bhamy V. 2010. "Lessons Learned from Attempts to Reform India's Kerosene Subsidy." Geneva/Winnipeg: Global Subsidies Initiative/International Institute for Sustainable Development.

Sim, Sarah, Mike Barry, Roland Clift and Sarah J. Cowell. 2007. "The relative importance of transport in determining an appropriate sustainability strategy for food sourcing. A case study of fresh produce supply chains." *International Journal of Life Cycle Assessment* 12: 422-431.

Spence, Chris and Andrey Vavilov. 2010. "Summary of the First Prepcom for the UN Conference on Sustainable Development: 17-19 May 2010." *Earth Negotiations Bulletin* Vol. 27(1).

Steenblik, Ronald. 2006. "Liberalisation of Trade in Renewable Energy and Associated Technologies: Biodiesel, Solar Thermal and Geothermal Energy." OECD Trade and Environment Working Paper No. 2006-01. Paris: OECD.

Steenblik, Ronald and Joy Aeree Kim. 2009. "Facilitating Trade in Selected Climate Change Mitigation Technologies in the Energy Supply, Buildings, and Industry Sectors." OECD Trade and Environment Working Paper No. 2009-02. Paris: OECD.

Stern, Nicholas. 2007. *The Economics of Climate Change* (The Stern Review). Cambridge University Press.

Stilwell, Matthew. 2007. "Advancing the WTO environmental goods negotiations: Options and opportunities." EcoLomics Occasional Paper Series No. 08-1. Geneva: EcoLomics International.

Tomlinson, Shane, Pelin Zorlu and Claire Langley. 2008. "Innovation and Technology Transfer: Framework for a Global Climate Deal." London: E3G and Chatham House.

UNCTAD. 2006a. *Trade and Environment Review 2006*. Geneva: UNCTAD.

UNCTAD. 2006b. *International Investment Arrangements: Trends and Emerging Issues*, UNCTAD Series on International Investment Policies for Development. Geneva: UNCTAD.

UNCTAD. 2008. *Trade and Development Review 2008*. Geneva: UNCTAD

UNCTAD. 2003. *Foreign Direct Investment and Performance Requirements: New Evidence from Selected Countries*. New York and Geneva: United Nations.

UNEP. 2011. *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication*. Geneva: United Nations Environment Programme.

UNEP. 2008. "Reforming Energy Subsidies: Opportunities to contribute to the climate change agenda." Geneva: United Nations Environment Programme.

UNEP/EPO/ICTSD. 2010. *Patents and Clean Energy: Bridging the Gap between Evidence and Policy*. Geneva: United Nations Environment Programme/European Patent Office/International Centre for Trade and Sustainable Development.

UNGA (United Nations General Assembly). 2000. "United Nations Millennium Declaration." (A/RES/55/2). Sept. 18.

Vikhlyaev, Alexey. 2003. "Environmental goods and services: Defining negotiations or negotiating definitions?" in UNCTAD, *Trade and Environment Review 2003*. Geneva: UNCTAD, pp. 33-60.

Vossenaar, Rene. 2010. "Climate-related single-use environmental goods." Geneva: International Centre for Trade and Sustainable Development.

Vranes, Erich. 2011. "Climate Labelling and the WTO: The 2010 EU Ecolabelling Programme as a Test Case under WTO Law." in Christoph Herrmann and Jörg Philipp Terhechte (eds.), *European Yearbook of International Economic Law 2011*, Springer, pp 205-238.

Wooders, Peter. 2010. "Greenhouse gas emission impacts of liberalizing trade in environmental goods." Winnipeg: International Institute for Sustainable Development.

World Bank. 2009. *Global Economic Prospects 2009: Commodities at the Crossroads*. Washington, DC: World Bank.

WTO. 2001a. "Ministerial Declaration" (Doha Declaration). WT/MIN(01)/DEC/1, 20 November.

WTO. 2001b. "Declaration on the TRIPS Agreement and Public Health." WT/MIN(01)/DEC/2, 14 November.

Wyden, Senator Ron. 2010. "U.S. trade in environmental goods: Updated report to major opportunities and challenges to U.S. exports of environmental goods." Office of Sen. Ron Wyden, United States Senate, December 14.

Yu Lixin, Jason Morrison, Yu Ling, Jiang Qiner. 2010. "Standards for Sustainable Development," in Mark Halle and Long Guoqiang (eds.) *Elements of a Sustainable Trade Strategy for China*. Winnipeg: International Institute for Sustainable Development.

Zha, Ranier. 2009. "Accounting for Carbon: Methodological issues in life cycle assessment." Presentation for the *OECD 2009 Global Forum on Trade: Trade and Climate Change*. Paris: OECD.