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The Eco-Industry and Trade Agreements

Solveig Delabroye

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The Eco-Industry and Trade Agreements[*]

Solveig Delabroye [†]

Résumé/abstract

L'industrie environnementale est un secteur-clé pour notre futur, à la fois sur le plan économique (le secteur représente environ 3% du PIB dans les pays développés) et comme instrument pour répondre aux défis écologiques croissants. Durant la dernière décennie, les organisations internationales (OCDE, OMC) ont appelé à une libéralisation rapide des Biens et Services Environnementaux, qui se distinguent aujourd'hui par des barrières douanières et règlementaires importantes et une concurrence relativement faible. Malgré de nombreuses déclarations politiques, aucun accord de commerce international spécifique à ce secteur n'a été conclu à l'exception de celui ratifié au sein de la Coopération Economique pour l'Asie-Pacifique (APEC) en 2012. Ce rapport se penche sur les raisons de ce qui semble pour l'instant être un échec des négociations internationales, en s'attachant aux spécificités de l'éco-industrie en terme de régulations douanières, mais aussi aux enjeux de ces négociations pour les différentes parties prenantes. Une analyse stratégique des intérêts commerciaux respectifs des pays développés et en développement révèlera des incitations asymétriques et expliquera en partie l'écart entre les déclarations d'intentions et l'absence d'accords effectifs. Enfin, nous examinerons quelques exemples d'accords bilatéraux ou régionaux concernant le commerce ou l'environnement pour voir quelles solutions peuvent être apportées, et interrogerons la pertinence d'accords de commerce en tant qu'outil de facilitation du commerce international des biens et services environnementaux.

Mots clés : Industrie environnementale, marché international, accord de commerce international.

The eco-industry is a key sector for our future, both economically (the industry accounts for 3% of GDP in most developed countries) and as a tool to tackle ecological challenges. For the past decade, international organizations such as the WTO and OECD have pledged for a swift liberalization targeting Environmental Goods and Services (EGS), which are still characterized by high tariffs and non-tariffs barriers and a low level of competition. In spite of many political declarations, no international trade agreements directed specifically at this industry has been reached except from the one adopted by the Asia-Pacific Economic Cooperation (APEC) in 2012. This report examines the reasons for the apparent failure of international negotiations on this issue, specifically focusing on the idiosyncrasies of the eco-industry regarding custom regulations and on what are stakes for each party. Indeed, strategic trade analysis of the respective interests of developing and developed countries reveals asymmetric incentives, which sheds some light on the discrepancies between enthusiastic political statements and the lack of actual agreements. Finally, some past bilateral and regional trade and environmental agreements and the solutions they propose in relation to the current situation in international trade of EGS are considered, and the relevance of global trade agreements as a tool of EGS policy is discussed.

Key words: *Eco-industry, internatioal market, trade agreements.*

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List of abbreviations

APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
DWL	Dead-Weight Loss
EBI	Environmental Business International, Inc.
EG	Environmental Goods
EGS	Environmental Goods and Services
EPPs	Environmentally Preferable Products
EU	European Union
EVSL	Early Voluntary Sectorial Liberalizations
FTA	Free-Trade Agreement
GDP	Growth Domestic Product
GPA	Government Procurement Agreement
HS	Harmonized System
ICTSD	International Center for Trade and Sustainable Development
IISD	International Institute for Sustainable Development
IMF	International Monetary Fund
IT	Information technologies
ITA	Information Technology Agreement
LDC	Least Developed Countries
MFN	Most Favored Nation (principle)
MSEs	Medium and Small Enterprises
NAFTA	North America Free Trade Agreement
NGO	Non-Governmental Organization
NTBs	Non-Trade Barriers
OECD	Organization for Economic Cooperation and Development
PPMs	Production Processes and Methods
PTA	Preferential Trade Agreement
R&D	Research and development
TL	Tariff Line
UN	United Nations
WCO	World Customs Organization
WTO	World Trade Organization

Introduction

On January 24, 2014 at the World Economic Forum in Davos, a group of 14 countries gathering the main players of international trade (among which the European Union, the USA, Japan and China) published a joint statement pledging to "achieve global free trade in environmental goods". [1] This declaration builds upon an agreement in 2011 by the APEC Leaders to reduce tariffs below 5% on a list of 54 environmental goods by 2015. These are only the latest development in what is now more than a decade-long effort to successfully initiate international negotiations on the liberalization of the Environmental Goods and Services (EGS) industry. The Doha Ministerial Declaration of 2001, that launched the currently stalled round of WTO negotiations, called for the "*the reduction or, as appropriate, elimination of tariff and non-tariff barriers to environmental goods and services*" (Paragraph 31, iii).

Figure 1: Countries partaking in the 2014 declaration.
Jointly, they account for 86 % of the world trade in EG.[2]

1. The statement can be found on the US Trade representative website: http://www.ustr.gov/sites/default/files/EGs-Announcement-joint-statement-012414-FINAL.pdf

2. USTR figure, January 2014. The countries are the following: 27 -members EU, Norway, Switzerland, USA, Canada, China, Japan, Australia, New Zealand, Hong Kong, South Korea, Singapore, Taiwan

"*Eliminat[ing] tariffs for goods that we all need to protect our environment and address climate change*", as the Davos statement vows, seemed to be the perfect way to single-handedly "*protect our planet*" and support a dynamic and promising sector while pursuing the ideal of a global free trade system. The business of pollution mitigation and management is indeed a significant one, comparable in size to the aerospace or pharmaceutical industry (Durand & Sinclair-Desgagné 2012), with global value of more than US$ 950 billion in 2012 (ICTSD 2014[3]), and is rapidly growing. The eco-industry is expected to be the 3rd world industry in size by 2020. Nevertheless, discussions have been at a stalemate ever since the initial declaration. A proposition targeting goods relevant to the mitigation of climate change, similar to the Davos one, was put forward at the WTO by the EU and the US in 2007 but never succeeded.

Most of the current work on these issues focuses on how to unlock the negotiations. However, this state of affairs raises a wealth of other interrogations: why is there such an internationally shared desire to conclude trade agreements targeting specifically the EGS industry? Why such a deadlock despite this wide consensus? Given the ongoing difficulties, how did the APEC managed the 2012 deal, and can it be used as a template for future agreements? More importantly, are trade agreements the best way to promote sustainable development and support the EGS industry? These are the questions this paper will attempt to answer.

Due to the scarcity of formal research and modeling on this topic, most of the sources in this work are international institutions (OECD, World Bank, WTO), private organizations (mainly Environmental Business International, Inc.) and NGOs and think-tanks (particularly the International Institute for Sustainable Development and the International Center for Trade and Sustainable Development). The data provided by national governments and regional organizations such as NAFTA and the EU were also used.

I. Why is the liberalization of the EGS industry a crucial issue

a. The eco- industry: a definition and brief history

"The environment industry consists of activities which produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air, and

3. USTR figure. This is the best updated estimate I could find for the size of the EGS industry. It is consistent with Environmental Business International's 2010 estimation of a global revenue of US$ 803 billion at the time and their growth trend previsions.

soil, as well as problems related to waste, noise and eco-systems." This is one of the first operative definitions of the EGS industry, coined by the OECD/Eurostat in its report of 1999, in an attempt to homogenize studies and allow collecting comparable statistics. While the political and academic interest in this sector is quite recent, the activity itself is as old as urbanization.

Firms specializing in domestic waste disposal and wastewater management became prevalent at the end of the 19th century, during the second Industrial Revolution. They often emerged as public-private partnerships in order to tackle rampant health hazards in rapidly growing urban centers.

In the '60s and '70s, the multiplication of environmental regulations launched a new era for the eco-industry, where governments became instrumental in generating demand for the EGS rather than being customers or co-suppliers. The passing of bills on recycling and air quality started the trend, and in the span of a few decades similar regulations targeting diverse health and ecological hazard were adopted in all industrialized countries. This led to a steady growth of the industry and to diversification into many new activities such as CO_X, NO_X and sulphur dioxide abatement, noise reduction, site remediation for disused industrial plants, disposal of various regulated toxic waste (chemicals, nuclear, etc.), safety audits, environmental monitoring, etc.

The '90s finally brought a new regulatory environment: cost/benefit analysis of environmental standards became widespread, and market-based policy instrument tended to replace command-and-control approaches. Emerging concepts led to new requirements. For example, life-cycle thinking prompted the Extended Responsibility of Producers, which requires firms to anticipate and manage the recycling of their products at the end of its use by the consumer. Increasingly exacting industry standards spurred interests toward clean production, built-in pollution prevention, and resource recovery rather than end-of-the-pipe abatement technologies. The provision of goods and services became increasingly intertwined into custom deals where the environmental technology is designed expressly to fit into the polluter's production process, thus increasing value creation for the EGS industry.

The industry also started to structure itself as a political force: industrial syndicates and trade associations came into existence. Strong lobbying about environmental laws became generalized, with new stakeholders such as NGOs adding complexity to the negotiations between polluting industries, abatement suppliers, and governments. The

EGS began to be seen as strategically key for policymakers, not only as an infrastructure, but also as a tool to increase the competitiveness of downstream industries by lowering the cost of compliance to environmental regulations. Moreover, as international trade of EGS having been steadily growing, its potential as a key export sector for industrialized countries started to appear. Finally, whereas the benefits of pollution regulation were usually seen as non-marketable and economically costly, the eco-industry affirmed itself as a channel to create value with pollution abatement: the greening of global value chains became a strategy to create green growth and avoid environmental dumping and race-to-the bottom dynamics.

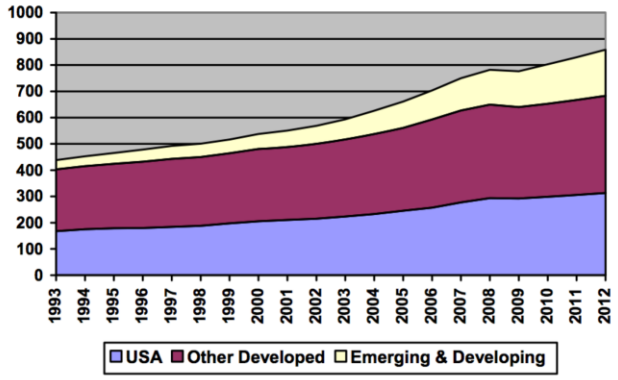
Today, however, the definition of « environmental goods and services » remains problematic. The eco-industry is canonically considered to have two main components: infrastructure goods and services and pollution abatement. Infrastructure activities, i.e. waste management, potable water supply and wastewater management, still represent more than half of the activity in the industry, both in terms of revenue and employment (EBI 2010). They are often ex-public monopolies that have been privatized and retain a public service culture and a fairly concentrated industry structure: a few large, sometimes multinational firms (which account for more than 50% of the global market) and a number of small and medium-sized contractors. On the contrary, the pollution mitigation sector is fragmented, with a number of high-tech small and medium enterprises specializing in niches markets generated by specific local regulation to provide downstream industries with custom-made solutions in pollution monitoring, abatement, and remediation. The renewable energy sectors is generally added to the list. The OECD definition incorporates a number of other goods and services such as natural risk management, eco-tourism, and environmental impact reduction in agriculture and fisheries. We can thus observe that the industry encompasses many very different sectors with diverse constraints, characteristics, corporate cultures. It infringes on a number of other industries (mainly the energy sector, but also construction…). The clean production logic has also blurred the line between abatement activities specialists and environmentally preferable industrials (who use environmentally preferable processes to produce good that are not specifically environmental, e.g. clean energy and sustainable agriculture). In trade negotiations about EGS, the question of sector definition is routinely controversial due the diverse interests of the stakeholders.

b. The international market for EGS today

i. A thriving market

In 2012, the industry was estimated to weigh more than US $ 950 billion globally. The European market is the biggest in the world, with demand driven by the exacting directives of the European Commission, mainly urged by Germany, that apply to every member county (Avery and Boadu 2004). The US market is of similar size, or even bigger depending on estimations. The industry has reached a significant size in developed countries, accounting for 1.7 million jobs in the US (EBI 2010) and representing almost 3 % of GDP in the United States as well as in Europe, whereas it is still nascent in emerging countries. In 2012, the United States accounted for 36% of the global market, Europe for 29%, Japan for 12%, China for 4.3% and India for 1.6% (EBI 2010). For a long time, the big interior markets for EG in the U.S. and the E. U. allowed their eco-industry to rely principally on national sales. However, in the beginning of the 2000s', the sustained growth that the sector had experienced for a few decades started to plateau in developed countries. While the market for the eco-industry is still growing faster than the economy as a whole, forecasted to reach US$ 3 trillion by 2020 (Durand & Sinclair-Desgagné 2012), this growth now largely depends on infrastructure buildup in emerging countries. Over the coming years, the EG demand is expected to grow by 3–5 % in developed countries, compared to between 10 and 15 % in the developing world (Jah 2008).

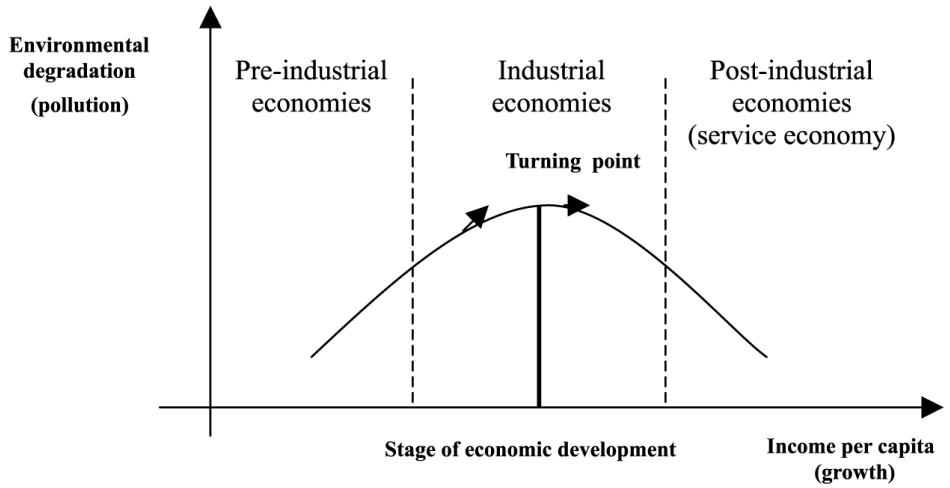
Exhibit 18-2 The Global Environmental Market 1993-2012 ($Bil)



SOURCE: Environmental Business International, Inc., San Diego, Calif., units in US $bil revenues generated by private and public sector entities. Other developed includes Canada, Western Europe, Japan and Australia/New Zealand

Indeed, economic and political theories suggest that in the future, the demand for EGS in developing countries will rise quickly. Environmental quality is arguably following a Kuznets curve: while developing first happens at the expense of the environment, lax environmental standards being necessary to the first steps of industrialisation, continued development brings on a service and/or high-tech economy that allows for more environmental protection.

Figure 2: The Environmental Kuznets Curve



Source: Panayotou (1993)

Political science theories also emphasize the links between development, democracy and the advent of a strong civil society with post-materialist values: as income and education levels get higher, preference changes and private valuation of environmental resources increases, while better representation leads governments to take environmental externalities into account more, and NGOs to become stakeholders in environmental regulations. In practice, democracy, GDP, and demand for EGS are strongly correlated (Avery and Boadu, 2004). All this makes a call by the public opinions of many developing countries for more stringent environmental standards very plausible and their demand for EGS should raise accordingly.

To answer this growing demand of developing countries, and to address the increasingly specialized and high-tech nature of demands, international trade in EGS has been growing faster than its production in the past decade. Between 2001 and 2007, the total value of EGs imports more than doubled, both in developed and developing countries (ICTSD 2012), while the global value of the market “only” increased by 35% over the

same period. In the US, the share of exports in EGS production went from 9.5 to 14.6% between 2000 and 2008 (EBI 2010). These growing trade flows are currently very asymmetric due to the dominance of the American, European and Japanese suppliers who compete to serve their respective markets but also third-party markets. OECD member countries currently account for about 90% of the commercial market for EG (Nimubona 2012). Overall, this context of rapid globalization of trade in EG explains the political exhortations for a timely liberalization.

ii. Trade Barriers

Both tariffs and non-tariff barriers to trade are high in EGS. In 2004, Avery and Boadu conducted a comprehensive study of the drivers of global demand for the U.S. EGS regressing the size of the US import market in different countries on a number of explicative variables. They concluded that degree of economic freedom (quantified by the Heritage Foundation's *Index of Economic Freedom*, which compounds measures of tariff rates, tax rates, government involvement in the economy, and banking environment) was a key determinant of EGS trade, and that "*a 10 % increase in economic liberty leads to over a 30% increase in EGS demand for all regions of the world*".

The average world tariff for EGS is estimated at 8.7 %, while the average applied rate for all goods is around 3 % (ICTSD 2012). In African, Caribbean and Pacific Countries the maximum bound tariffs on environmental goods can be as high as 44%, and the applied tariffs for imports from developed as well as developing nations are around 10%. Tariff rates applied on products under the pollution management category range from 0 to 3% in most developed countries, but they vary between 15 and 30% in many developing countries (Nimubona 2012).

Non-tariff trade barriers are also numerous, the regulatory ones being the most obvious. Since demand in pollution abatement is driven for the most part by the legal requirements to polluting firms, exporting EGS makes it necessary for the eco-industry to adapt to the local specifications, which place them at the disadvantage with the local firm who are used to work with them. The eco-industry being high-tech, the technological gap can also be a barrier to entry, especially for the Least Developed Countries (LDC). In environmental infrastructure activities, high fixed costs create a situation of natural monopoly and make it very difficult for newcomers to enter. Finally,

organized crime sometimes raises barriers to entry in the waste management sector (Sinclair-Desgagné 2008), where they have historically been present.

iii. Lack of Competition

These numerous barriers to entry limit competition and allow the industry to apply a significant mark-up. Following seminal work by David and Sinclair-Desgagné (2005), the recent literature on environmental policy frequently assumes that the EGS industry has some market power and fixes prices above production costs.

In the infrastructure goods, the market structure is original: a handful of very large multinational firms dominate more than 50% of the global market, while a number of small and medium enterprises share the rest. This peculiar situation of oligopoly with a competitive fringe can be attributed to several factors (Sinclair-Desgagné 2008). To begin with, the pool of customers, composed of municipalities and local communities, is vast and very heterogeneous. Combined with the many entry barriers resulting from diverse regulations of the different types of waste (domestic, recyclable, toxic) and from the control of some activities by informal workers and organized crime, this allows for sustainable market niches while providing a few large actors with the opportunity to realize economies of scale on some standard activities such as household waste collection.

The pollution management sector, while fragmented, benefits from market rent potentially protected by intellectual property laws. Because of the existence of many niche markets, firms are often in a situation of monopoly or oligopoly even though they are small. The potentially inelastic demand generated by environmental regulations also allow these firm to set prices above production costs (David and Sinclair Desgagné 2005).

Finally, Nimubona (2012) reports the existence of export cartels for EGS in many developed countries. For example, while firms in the soil and groundwater remediation US industry compete with each other for some projects, the same firms cooperate on other projects through contracting and subcontracting relationships. Liberalization could thus be a powerful instrument to foster international competition and drive down world prices.

c. A "win-win-win" deal: liberalization, development and the environment

In addition to market conditions that would justify trade agreements in EGS, a favorable institutional environment contributed to make it a politically trendy topic. Indeed, it pertains to three big issues that are of particular concern to international institutions: environmental protection, liberalization and development.

Since the Stockholm Conference of the United Nations on the Human Environment in 1972, the environment has become one of the focus points of international governance. Tackling the increasingly pressing climate change and pollution issues while maintaining or improving production capacity is one of the major challenges of the immediate future. While some regulatory agreements and international standards have been implemented (for example, the Montreal Protocol for the Protection of the Ozone Layer in 1985 or the Kyoto Protocol in 1997), lowering the cost of environmental protection to an affordable level and increasing its accessibility is a prerequisite for any successful regulatory solution. In this respect, the continuous research and development and the quick diffusion of clean technologies are crucial.

To this end, liberalization seems like a particularly powerful and relevant tool. There is a long standing consensus in economic theory about the benefits of free trade: strengthening of competition leading to lower prices, increased variety and availability of products, and technology diffusion. Moreover, since the 1980s, the failure of communism and the resulting Washington consensus secured liberalization as a global political agenda. International institutions such as the WTO, World Bank and IMF consider it crucial to the growth of developing and developed countries alike and strive to achieve global free trade. Trade agreements are a traditional and well-accepted tool in international governance for fostering economic well-being, it is thus not surprising that they would promote it as a the best solution to foster the use of environmental goods and services.

Finally, many organizations and NGOs argue that liberalization of EGS would be an incredible opportunity for development. First, developing countries could benefit from it as customers: they face critical pollution issues and are the most affected by climate change. Managing air pollution levels and toxic waste disposal is in many cases a public health and safety issues as much as an environmental one. Recent results in development economics suggest that health issues and lack of proper infrastructure are major impediments of a sustainable growth, and the latest Five Year Plan of the Chinese

government highlighted the role of clean technology in addressing growing domestic environmental challenges. But liberalization of EGS can also be an opportunity for emerging countries as producers: as a fast-growing, high-tech, high value-added infrastructure industry, the environmental sector is a good candidate to base a development strategy and industrial policy on. In *Environmental Goods: Where Do The Dynamic Trade Opportunities For developing Countries Lie*, a 2005 report for the ICTSD, Robert Hamwey asserts that developing countries have considerable export potential in EGS, and that depending on the specifics of the agreement, liberalization of EGS could allow some of them to expand and diversify their production and exports. For many others, trade liberalization of environmentally preferable goods may support rural economies and facilitate integration into global supply chains. Hamwey argues that the export profiles of the different developing regions are sufficiently dissimilar that export competition under liberalization may be less intense than anticipated, and that new flows of South-South trade could be generated.

II. Reasons of the deadlock

a. Technical idiosyncrasies of EGS

In spite of all these potential benefits of liberalizing the eco-industry, several characteristics of environmental goods and services contributed to make it particularly difficult to draw trade agreements, and partly explain the current situation of stalemate. First of all, in the EGS industry, goods and services are complementary and increasingly interlocked. They are often sold as a package by the eco-industry company: diagnosis, proposal of technical solution, supply of the part, customization/installation of the technology are all part of the same deal. However, agreements for goods and services are often separate and have different negotiation processes: environmental goods fall under the Non-Agricultural Market Access (NAMA) negotiation of the Doha round and the Committee on Trade and Environment meeting in Special Session (CTE-SS), while environmental services are currently regulated by the General Agreement in Trade in Services (GATS) and further trade facilitation is discussed in the context of the Trade in Services Agreement (TiSA) talks. This disconnection of the discussions on environmental goods and environmental services is one of the reasons why a specific agreement on the eco-industry would be a good thing. However, even when restricting our scope to environmental good, as is often the case, there are characteristics of

environmental goods that make it difficult to deregulate them internationally at the custom level.

In his 2005 paper for the OECD trade directorate, *Liberalising Trade in "Environmental Goods": Some Practical Considerations,* Ronald Steenblik details these complications.

i. The HS conundrum

Trade agreements targeting specific goods are defined using the Harmonized Commodity Description and Coding System tariff nomenclature, often simply called Harmonized System (HS), which is administered by the World Custom Organization. It is a multipurpose international product nomenclature, under which products are arranged in a legal and logical structure supported by well-defined rules. It divides goods into narrowing categories, down the 6-digit level: a 4-digit HS code will refer to a broad category of goods, then divided into a hundred more specific denominations at the 6-digits level. However, most environmental goods don't have an individual HS code and are embedded in larger categories comprising non-environmental goods. Steenblik explains how, due to the rapidly growing range of internationally traded manufactured goods, "*quite a few HS sub-headings have become catch-alls for many types of manufactured goods not elsewhere specified*". This is particularly frequent with environmental goods. One example "*that stands out in this regard is HS 8479.89, which refers to "other" machines and mechanical appliances having individual functions not specified or included elsewhere in Chapter 84 (nuclear reactors, boilers, machinery and mechanical appliances; parts thereof). This sub-heading could potentially cover such diverse products as ultrasonic cleaning devices, machinery and apparatus for cleaning the soil, and trash compactors*." Similarly, solar photovoltaic panels are categorized as "Other" under the subclassification for light-emitting diodes (LEDs) (World Bank 2007). This makes it difficult to design an agreement with sufficient specificity to target environmental goods precisely.

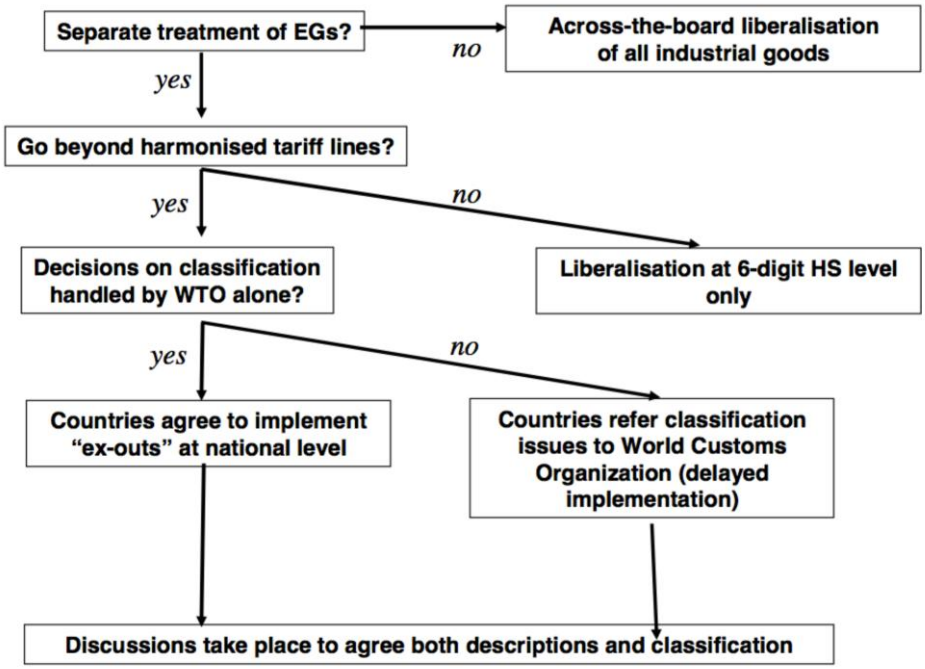
Most countries keep national tariffs nomenclatures based on HS, and some are very detailed, containing up to 15 000 separate tariff lines. A potential solution would thus be to use these national nomenclatures, which are sometimes detailed down to the 8 or 10-digits level, to define the goods to be liberalized. However, national nomenclature are not harmonized, all countries can have a different code for the same good beyond the six first digits. In international trade, this is called an "ex-out": a specific products for

which no uniform code exists beyond six digits. It considerably lengthen the negotiations because all the countries have to agree to the exact definition of the good and to make sure it corresponds to one of their tariff lines, rather than relying on a classification made by a third party, the HS code.

In the short term, amending the HS classification in order for it to have specific codes for EG is not feasible. The HS is already very complex: most of the 10^6 available codes are already attributed, and the codes created for EG would need to be consistent with their category at the 4- or 5-digit level. Moreover, the WCO's council considers amendment in four-year circles, which makes any short-term change impossible. Harmonizing the national nomenclatures is easier (it has already been done in some regional economic organization, the ASEAN for example) but it is ultimately non-binding, and does not have the force of a third party definition in case of dispute.

The flowchart below lists the different decisions concerning classification and definition of goods that have to be taken while drafting a trade agreement for EG. We see that before the question of tariff cuts is even addressed, many points of agreement have to be reached, which explains the slowness and, so far, inconclusiveness of these discussions.

Figure 3
Partial decision tree for negotiations on environmental goods: questions of classification



Source: Steenblik (2005)

ii. Dual use

Another impediment is that of dual use. Many EG, especially parts and components, are "environmental" only because of their use, but can also be used for non-environmental purpose. For example, centrifuges are a frequent part of abatement equipment, but only 10 % of centrifuges are sold for environmental purposes. Any trade agreement on EG would have to define how to deal with this dual use problem. There are several solutions. First, a threshold share under which the good is not liberalized could be set. This principle has been used before in the "initiative on Trade in Pharmaceutical Products" during the Uruguay Round, where negotiators decided to include a given active ingredient if more than half of its consumption was used in the production of pharmaceutical products. Similarly, an industrial component could be deemed "environmental" if its end use is environmental more than 50% of the time.

A second solution would be to cut taxes for all versions of the good, no matter what its end use is (this would result in liberalization exceeding by far the scope of environmental goods, but it is not necessarily a bad thing from the point of view of the WTO). For the 2012 APEC Agreement, a intermediary solution was chosen: it was decided to generally include goods without concerns of their end use, unless a country requested that the tariff cut was limited to environmental uses for a given good, maybe not wanting to see items on which they levied high tariffs targeted for liberalization. In these case, ex-outs where used when possible to pick out the version of the goods that are environmental. When the distinction was not possible even at the national tariff level, the good was simply dropped. This resulted in a shorter list but it allowed quite a number of "less sensitive" products with multiple uses to remain on the list.

Finally, the products could also be differentiated by expected end use. This has been done in the 1973 Agreement on Trade in Civil Aircraft, where the problem was to differentiate between military and civil planes. However, in the case of planes, this was easily done by checking manufacturer's number because of the limited number of aircraft types in the world. For EG, it would then be the responsibility of exporters (i.e. producers) to provide distinguishing features, through labeling or marketing, that would allow custom agents to quickly and inexpensively distinguish environmental products from their non-environmental counterparts. Given the large and diverse pool of suppliers *and* customers for environmental goods, this would present a real challenge.

Whichever solution is chosen, compliance invariably implies post-import monitoring and enforcement, which can be costly and administratively burdensome. Moreover, some developing countries fear that increasing the complexity of custom formalities

might create additional incentive to bribe customs officials to have goods classified more favorably.

iii. Goods with environmental PPMs

Some goods have been proposed for liberalization that are not traditionally considered to be "environmental" but that use environmentally preferable Productions Processes and Methods (PPMs). A good example is organic agriculture. However, while it makes sense to consider that these goods could be liberalized on the ground of being less harmful to the environment during the production stage, the WTO national treatment principle that "*products imported from the territory of any member be accorded treatment no less favorable than that accorded to like products of national origin and to like products originating in any other country*". Whether different production methods, even sanctioned by a certification, are enough to make a product different remains unclear. Steenblik remarks that "*While the important concept of 'like product' has been variously interpreted by WTO dispute settlement panels and the Appellate Body, a fairly limited role has been allowed to date for distinguishing products on the basis of their PPMs*". However, the Shrimp-Turtle ruling in 2001 allowed the US to discriminate against East-Asian shrimps based on the fact that they did not comply with US regulation on protecting sea-turtles from by-catch while fishing. This "*may have opened the doors to the permissibility of trade measures based on PPMs*" (World Bank 2007). The issue remains controversial.

iv. Relative and evolving "environmentally preferable" technologies

Another type of goods that has been proposed for liberalization, in particular by Japan, is High-Efficiency appliances. These goods, just as EG, benefit to the environment during their use, but not as their main function. Instead, they are environmental *relatively* to the other products performing the same function that use more energy, water or other natural resource than them. Similarly "green" energies are green compared to our traditional way of producing energy from fossil fuels. This creates two issues.

First, how do we draw the line between what is environmental or climate-friendly and what is not ? For example, Qatar proposed that natural gas was liberalized because it generate less greenhouse gases emission than other fossil fuels and is often used as backup for wind and photovoltaic system. (Word Bank 2007) However, if natural gas is "green" compared to coal, it still produces way more greenhouse gases emissions than

ethanol of wind power. The issue is important because liberalizing a technology as "relatively environmental" can favor its adoption and shape R&D decision, thus framing what technologies will be available in the future (Mytelka 2007). In that respect, it is important to advantage only the alternatives that are really clean, and not only lesser evils.

Besides, high-efficiency products are improving every year. While it is possible (if controversial) to create separate HS lines for products with given technical characteristics (such as energy efficiency ratios above a certain value), continuous technological progress makes it necessary to agree beforehand on consensual mechanisms and/or institutions to update the classification criteria, incorporate new technologies to the list and strike off the outdated ones, for example by using one of the many labeling scheme that diverse countries have implemented (Steenblik 2005). Without a regime for review and revision, the list would eventually protect producers of yesterday's technologies to the detriment of cost- effective innovative environmental technologies, which would be completely counter-productive (Cosbey et al. 2010).

Creating consensual institutions involving the trade interests of so many countries requires transparence in the processes and inclusive governance; institution-building is a slow process. The experience of other environmental agreements, such as the Stockholm convention on Persistent Organic Pollutants, or the Convention on International Trade of Endangered Species, show that the legitimacy of scientific revision committees can be problematic if they are not geographically balanced, and that funding strong and reactive institutions is not easy.

v. Trade of entire plants

Environmental goods are quite often sold as an entire plant : a geothermal power plant for example or a sewage water treatment plant, for example. Creating a HS heading for entire environmental plants would thus facilitate the import of all the subparts for a plant by regrouping them under a single code, defining their end-use easily and reducing the uncertainty due to technological change: when a part's technology becomes outdated and it is modified, the new part still benefits of the low tariff as an item of then plant. This has been done before: their exist a heading for food processing plants, among others. However, this would also imply to agree on custom clearance procedure for the different parts, since plants are rarely shipped in one piece,

and to whether or not the agreement covers spare parts and accessories, because these points have proven to generate disputes in the past.

b. Divergent interests of developing countries

The technical difficulties that we exposed above are often put forward in international institution's (OECD, World Bank) reports on how to unlock the negotiations. However, on top of these technical complexities there are a number of political and strategic reasons that explain the lockdown, which are probably the real obstacles preventing a trade agreement in ESG. The gist of it is that an EG liberalization will be very advantageous for the developed world, while the benefits for developing countries are far less obvious.

i. Controversy in the scope of liberalization

As we have said earlier, the first issue is to define EG. The OECD definition is very broad, encompassing many very different types of goods, which makes it complicated to draw a hard-and-fast line between what EGS are and what they are not. This is quite a rare issue: in most trade discussions, the negotiators at least agree on which products they are talking about! Being a prerequisite to any effective trade barrier removal, this issue has stalled the progress of discussions considerably.

The eco-industry as recognized by developed countries includes almost only goods in which they largely dominates supply: many studies agree that developed countries represent more than 75% of EG exports while they represent "only" about 60% of import value. In case of the goods included in the APEC list, for example, "*the developed countries make up **79** per cent of environmental goods exports, the developing countries about 20 per cent and the least developed countries less than one per cent*" (Bora and Teh, 2004). It is thus not surprising that developing countries would challenge this definition and try to make it more favorable to their own needs.

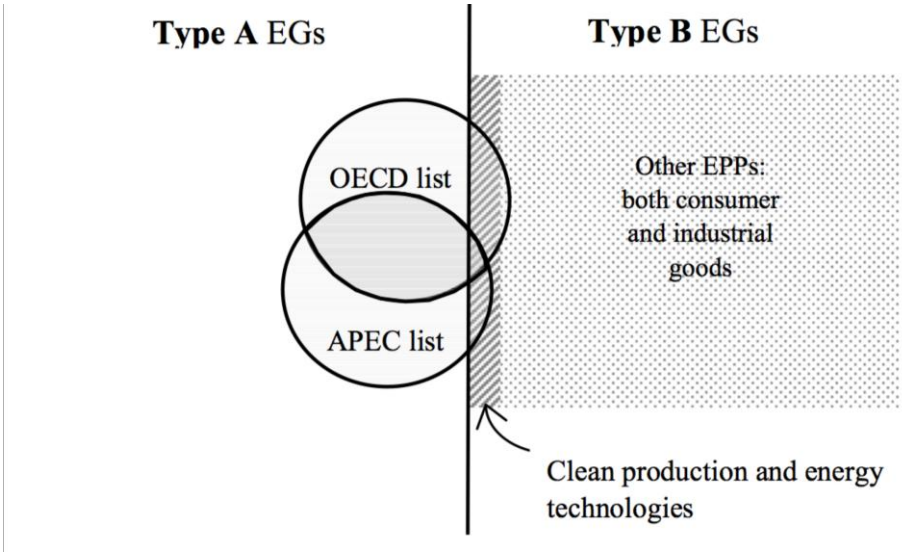
In his 2005 working paper prepared to support discussions at the Sixth WTO Ministerial Conference in Hong Kong (*Environmental Goods: Where Do the Dynamic Trade Opportunities for Developing Countries Lie?*), Robert Hamwey argues that an agreement could actually be very beneficial to developing countries if it included not only EGS but also environmentally preferable goods (EPPs, or "type B Environmental goods). Those are goods not used directly in the provision of environmental services but producing a positive (or reduced negative) environmental impact relative to similar substitute goods. High-efficiency house appliances, but also a range of organic goods

such as organic agricultural goods, biodegradable natural fibres such as jute, and biofuels are parts of this category. Some are less harmful to the environment because of their production process, such as organic food, while others limit pollution or save resources during their end use or their disposal, such as biodegradable corn-based bags vs. plastic bags.

These goods are generally omitted in EGS talks, but Hamwey alleges that renewable power technologies, that have always been considered as part of the eco-industry, *are* EPPs and that there is thus no reason not to include in liberalization all the non-industrial EPPs based on raw or processed natural resource, such as health and cosmetic products, clothing, furniture, home products and building materials, "*all of which are of considerable export interest to developing countries*".

As shown in the following diagram, both the APEC list of environmental goods chosen for liberalization in 2012 and the list established by the OECD in 1996 in trying to define the eco-industry, which is agnostic of trade considerations, are composed mainly of what Hamwey calls "Type A EG", i.e. goods destined to waste, water, air and pollution management.

Figure 4: The environmental goods universe
Type A (EG) vs. Type B (EPPs)



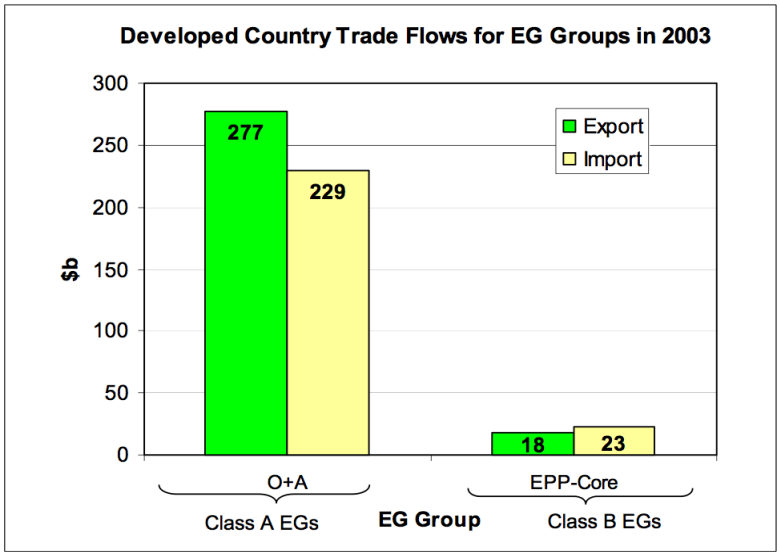
Source: Hamwey (2005)

However, these lists do contain some EPPs, predominantly clean/resource efficient production and energy technologies, and a few industrial or consumer EPPs such as fluorescent lamps, water based paints and recycled paper. In 2003, developed countries

were net exporters of the goods from the combined lists, and developing countries net importers.

The following charts show the imbalances of trade flows between developed and developing countries in Type A EG (as defined by the combined OECD and APEC lists; "O+A" on the graph) compared to Type B (defined by a "core" list of Environmentally Preferable Products established by the UN Commission for Trade and Development in 2005). We see that developing countries have a comparative advantage in EPPs, which could help to compensate for their huge trade deficit in EGS in a liberalization.

Figure 5: Developed country trade flows in EGs by EG type in 2003
(trade with World). Source: Hamwey 2005



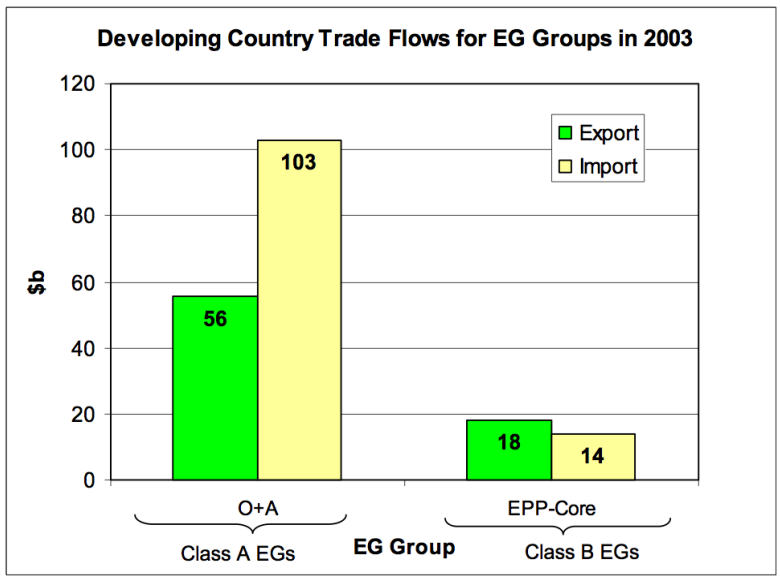


Figure 5: Developing and developed country trade flows in EGs by EG type in 2003
(trade with World). Source: Hamwey 2005

A typical example of this specialization in non-industrial EPPs can be found in Environment Business International's assessment of the market for EGS in NAFTA: sustainable agriculture and ecotourism are by far the biggest exports of EG from Mexico to the US and Canada (30 to 50 % of their EG export in each case), and the only sector in which they have a trade surplus, whereas these sector are a negligible part of US and Canada exports to Mexico (less than 5%). Brazil, among others, has proposed organic food and biofuels as goods to be included in the WTO negotiations, but it has encountered much reluctance so far.

The idea to enlarge the scope of liberalization to make it mutually beneficial is actually a standard result from the classical theory of international trade: free trade is beneficial if all countries can trade a good in which they have at least a comparative advantage, which implies goods with different characteristics and requiring different inputs are comprised in the agreement. From this perspective, wanting to restrict liberalization to one industry is a bit surprising, if not unheard of (the 1996 Information Technology Agreement reduces all tariffs to zero for IT goods between WTO countries).

However, there are several reasons why developing countries as a group have tended to keep high tariffs in EGS rather than try and negotiate a broader and more balanced agreement. The two main ones are the infant industry agreement and issues of rent.

ii. Infant Industry argument

Indeed, considering that infrastructure goods and environmental services are crucial for development and will be key industries in the future, many developing countries allege that due to their unfavorable position on the global value-chain, their eco-industry needs temporary protection from Western and Japanese competition before any liberalization is possible, in order to reach a sufficient size and be able to compete with them on an equal footing in the future. The high research and development and/or infrastructure start-up costs that characterize the industry (Baumol 1995) and the financial fragility of environmental MSEs supports this claim. Moreover, the environmental industries are characterized by "*considerable dynamic returns to scale*" (Fees and Muehlheusser, 2002) with a strong learning-by-doing effect. Industrialized countries have tended to impose stringent environmental laws to push their national EGS industry up this learning curve. Developing countries can hardly do the same since in the current state of things, creating strong environmental would mainly mean

increasing demand for foreign industries. They are thus using high tariffs as a way to support the development of their eco-industry. In this light, the calls for an EGS liberalization from industrialized nations looks like an attempt to secure a share in the emerging market for environmental activities, while on the contrary the developing countries try to develop their own supply to be able to answer to strong internal demand in the future without having to rely too heavily on imports. In their 2003 article *Is environmental policy a secondary trade barrier?* Ederington & Minier (2003) and Nimubona (1012) indeed show that trade barriers and environmental regulations can be substitutable to protect or favor an industry.

Tariffs also favor foreign direct investments (FDIs) and joint-venture: when facing a high tariff, firms prefer to produce locally rather than to import. For developing countries, hosting foreign plants in EGS is very valuable because it generates technology transfers and allows the locals to learn specialized skills.

Finally, many environmental services in developing countries are performed by the informal sectors, often by very low-skill workers, such as children recycling materials they find in landfills. Some governments might be concerned that opening to foreign, conventional supply of environmental services will lead to a crisis in this labor-intensive informal sector and create a lot of unemployment for workers who would be difficult to redirect to other sectors because of their very low qualifications.

The study of tariff patterns corroborates this notion that developing countries are protecting their EGS industry though tariffs. OECD countries impose low tariffs rates on their EG imports, ranging between 0.5 and 3 % on average, with preferential and differential treatment toward developing countries. On the other hand, developing countries impose high tariffs on EG imports, around 9% on average.

Table 1: Bound and applied tariffs on environmental goods (%AVE)

		Importer				
		ACP*	BIC*	Developing	OECD	WTO
		Bound tariffs				
Exporter	ACP	44.9	27.6	25.7	2.5	15.5
	BIC	41.8	31.7	24.1	2.4	7.0
	Developing	41.3	16.3	24.1	2.3	7.8
	OECD	38.7	12.2	23.5	3.0	9.5
	WTO	40.0	13.7	23.7	2.7	8.7
		Applied tariffs**				
	ACP	10.7	12.1	7.9	0.4	4.8
	BIC	11.7	14.1	5.5	1.7	2.7
	Developing	11.4	8.5	5.8	0.6	2.2
	OECD	8.1	8.5	4.0	1.9	3.3
	WTO	9.6	8.8	4.5	1.6	3.0

Source: Laborde & Lakatos, 2012.

** ACP - African, Caribbean and Pacific Countries, BIC - Brazil India and China.*

*** Applied tariff as used in this context refers to both applied tariffs on an MFN basis and applied preferential tariffs depending on whether the trading partner is awarded preferences or not. It also assumes a full utilisation of preferences.*

The incentives are thus very asymmetric: for developed countries, liberalization would lead to a substantial lowering of the tariff barriers to access emerging countries, whereas the gain would be minimal the other way around. The above table details the average bound and applied tariff rates for African Caribbean and Pacific (ACP) countries, Brazil India and China (BIC) and OECD countries. It is true that there are big opportunities in the liberalization of South-South trade: one notices that the highest applied tariffs are those of BIC and ACP countries toward each other. However, these exchange are still marginal enough (they represent less than 15% of international trade in EGS) that they don't constitute a concern for these countries in the context of international negotiations.

iii. Tariff revenues and rent extraction

Another reason for these high tariffs and reluctance to liberalizations in developing and least developed countries is tariffs revenues. A 2010 topic note on liberalization of trade in EGS by the IISD underlines that import taxes can represent a substantial share of government revenues for many LDCs where income or value-added taxes are low, inexistent or difficult to collect due to the pervasiveness of the informal sector. This makes them particularly sensitive of dual-use issues: if they are ready to accept liberalization of goods that are critical for environmental purposes, they are wary about a so-called EGS opening to trade that would result in tariff-cutting for a vast array of products exceeding the scope of the actual eco-industry, resulting in large revenue losses.

Developed countries have argued that this argument was invalid because of the inefficiency created by taxes: by distorting price and thus reducing demand, they create a dead-weight loss of the transactions that don't occur, which is detrimental for the consumer's surplus as much as for the suppliers.

However, given the particularities of EGS's market, the developing countries' strategy might be justified. First, developing countries tend to have lax environmental regulations and low income, which would arguably make the price elasticity of demand quite high. This means most of the cost of the tariffs will be borne by foreign producers who will prefer to incorporate it than to pass it on to their price-sensitive consumers with the risk to lose them. Thus, the "consumer surplus" to be gained from liberalization would be relatively little compared to producer surplus of foreign exporting firms. On the other hand, developing countries trying to enter OECD's EGS market would face

relatively inelastic demand because of strong environmental regulations and higher income. They would thus be able to pass most of the price of the tariff on to their consumer, and wouldn't mind the presence of custom taxes as much.

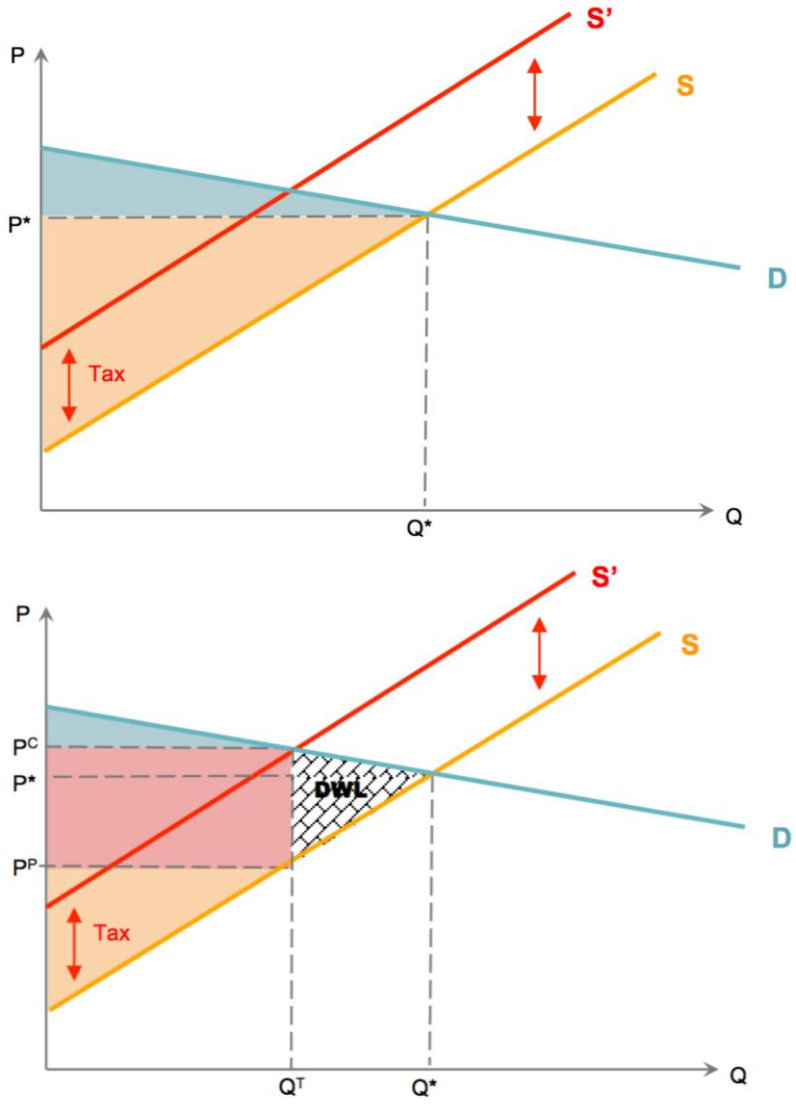


Figure 6: Surplus repartition with high elasticity of demand (developing consumer, developed exporter)

The graphs show the difference in consumer surplus (in green), producer surplus (in orange), government revenue (in red) and dead-weight loss induced by a custom tax with high and low price-elasticity of demand. We see above that with high elasticity (developing-country consumer), the difference between the price paid by the consumer with the tariff (P^C) and the equilibrium price (P*) is minimal, while the price the producer gets is much lower. The consumer's surplus decrease is quite small, and when we add the new government revenue, we see that the importing country's total social

surplus actually increased, whereas the producer surplus of the exporter is reduced. There are thus strategic incentive to restrict trade.

On the contrary, in the case of the developing country exporting to the developed one with inelastic demand in EGS, the cost of the tariff is borne mainly by the consumer (i.e. developed country), whose surplus is diminished, while the producer's surplus is nearly unchanged. Overall, we see that the terms of trade would be largely improved for developed country following a liberalization, but only slightly better for developing ones.

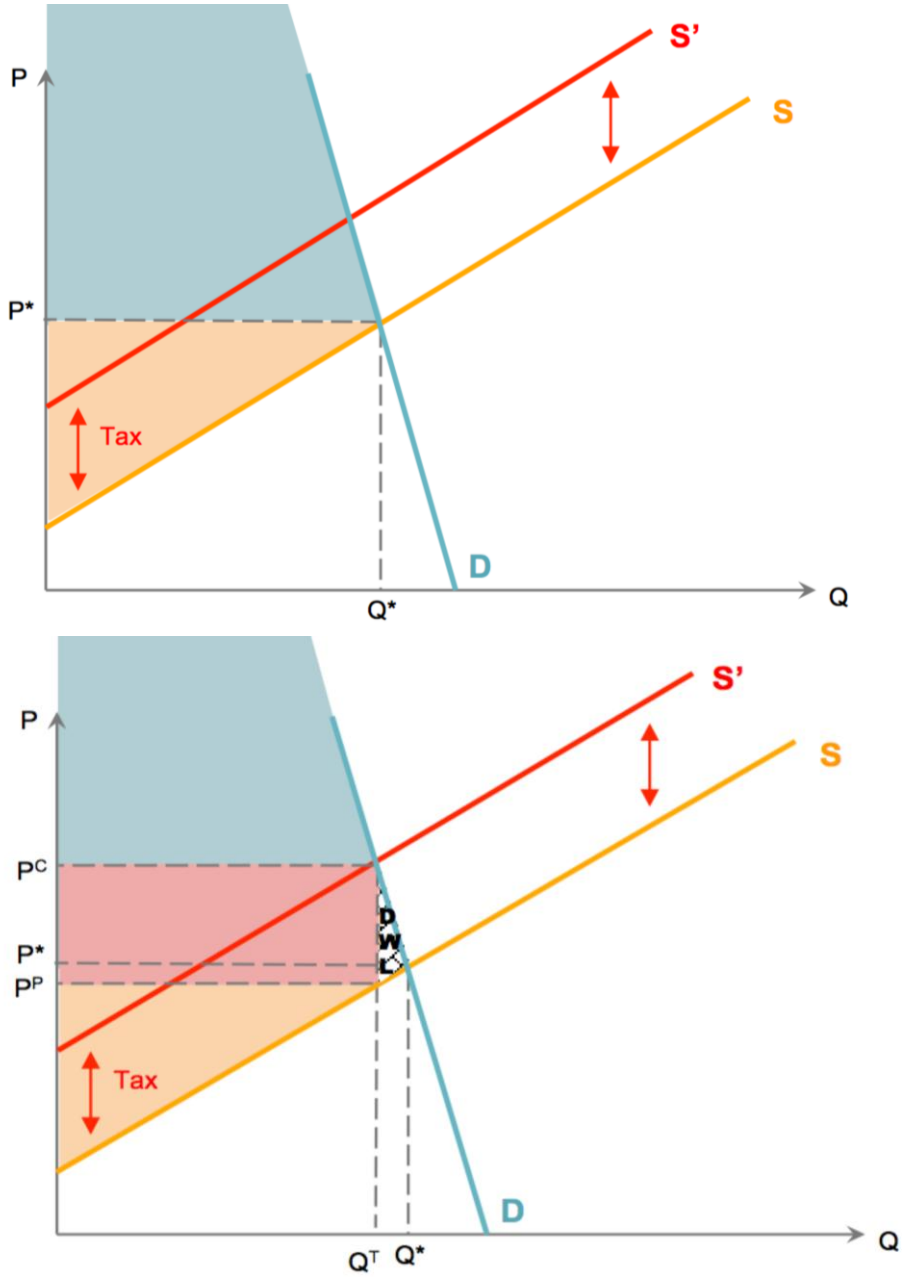


Figure 7: Social surplus with inelastic demand (developed consumer, developing exporter)

Moreover, Nimubona (2012) reminds us that since Western EGS firms tend to have market power and to benefit from a monopoly rent, the developing countries have an incentive to extract this rent through tariffs.

The last graph shows how, when an exporting monopoly restricts supply to the quantity Q^M to set its marginal cost of production equal to its marginal revenue and fix a monopoly price P^M higher than both costs C and the equilibrium price P*, the importing country can set up a tariff equal to the mark-up to extract the monopoly's rent and make it into tariff revenues.

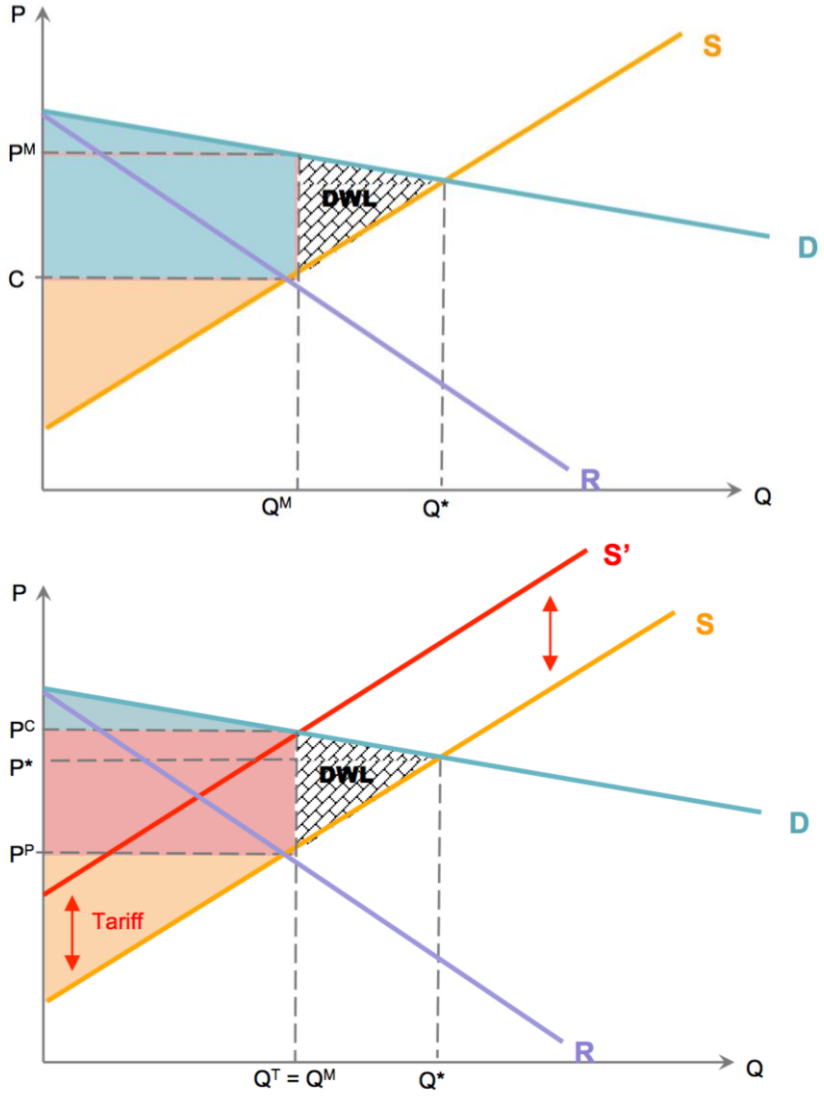


Figure 8: extraction of monopoly rent through tariffs

Nimubona's article is very interesting because he shows the ambiguous effect of EGS liberalization in a model where a developing countries who has no eco-industry and import all of their needs in EGS from a monopolistic foreign eco-industry (which is quite realistic given the stylized facts we presented earlier). The results are quite

surprising: free trade is almost always harmful for the total social welfare of the developing countries through loss of government revenue because of the market power exercised by the foreign eco-industry. Moreover, despite the fall in abatement price, the developing country has an incentive to lower his environmental regulation as a second-best way to protect its polluting industry from the monopoly power of the foreign firm. As a result, total emission might increase even though EG consumption increases too, because of an increase in the total output in the polluting industry. Nimubona's model highlights that while liberalization ensure a growth in the EGS market, which benefits developed countries eco-industry, the result of liberalization in terms of environmental quality and welfare for developing countries is uncertain. This model alone could explain the current state of negotiations.

We thus see that the political economy of trade in EGS is a complex subject, marked by the interaction of trade policy, industrial development policy and environmental policy. Polluting firms, EGS firms, and environmentalists lobby in various directions, and the idea that liberalization in necessarily a "win-win-win" for a country's social surplus seems a bit simplistic. In formal studies of the subject, results are often counter intuitive.

For example, Canton (2008) explains how polluting and EGS firms who interact repeatedly might enter long-term contracts and "*introduce a more complex relationship than a price-quantity one*". While polluting industries are at first sight expected to lobby against environmental standards, upstream and downstream firms have sometimes been known to become a vertical industry lobby advocating for specific technological regulations siding together in lobbying rather than advocate opposite solutions. The polluting industry might support stringent environmental regulations if it allows their EGS partners to impose a particular technology at the international level. She takes as an example German car manufacturers, who have supported exacting European regulation on car polluting emissions because it favored their sub-contractors in catalytic converters rather than a less efficient French solution of low-emission motors. It allowed them to have a competitive edge in the new regulatory environment while keeping a technology and supply chain they were used to. This interplay of different interests makes the subject complex and the final effect of any given policy difficult to predict.

There are a number of reasons why developing countries remain wary about liberalization of EGS and refuse to lower tariffs on certain sensitive goods. To allow for

benefits in the liberalized trade of EGs and EPPs without blocking negotiations with developing countries, Hamwey (2005) advises a "wide but selective liberalization" of EGS: targeting high-tech, industrial *and* raw goods while allowing countries to "*choose from the WTO list a limited 'best-fit' subset of goods for its tariff reduction commitment*". This "à la carte" type of agreement with built-in flexibility would allow each country to keep protecting the goods that are the most sensitive. However, the environmental benefits would be uncertain and the advancement of free trade limited: the focus becomes neither general liberalization nor the environment but the development opportunity of developing countries.

iv. List approach vs. project approach

The whole debate described above about the extension to EPPs or on the contrary exclusion of products with issues of dual-use or infant-industry took place within the so called "*list*" approach that have been proposed by northern countries at the beginning of the negotiation and have tended to prevail ever since. It is a good-by-good negotiation based on voluntary propositions, to establish a list of goods to be liberalized, as is traditional in trade negotiations. This is the approach favored by the APEC since the beginning of their effort to facilitate the trade of EG with voluntary sectoral liberalization in 1997. However, given the aforementioned difficulties to agree on a list, competing approaches have been proposed, generating more debate on what was the correct process.

Many NGOs remarked that a list of goods would result in a agreement defined by mercantilist considerations rather than environmental ones, and that the benefits in terms of lowering of pollution abatement costs might be minimal. They advised to start by agreeing on *principles* and *definitions* rather than trying to establish a list of goods (Cosbey et al. 2010, Cosbey 2014) in order to then be able to adopt a systematic agreement liberalizing all environmental goods; or to focus on the *cost of environmental compliance* (Sugathan 2013) to liberalize in priorities goods that would have a strong environmental

On the other hand, a number of developing countries objected that a list approach was an open door to dual-use goods and the liberalization of goods without actual environmental benefits, and did not ensure synergy of good and services in environmental activities. In opposition, a "*project approach*" or "*integrated approach*" was put forward by India. They proposed that liberalization should be limited to goods

involved in the environmental projects and activities that had been be approved by a designated national authority based on criteria developed by the WTO Committee on Trade and Environment (CTE). This would allow to focus on gods for which the end-use is known, and to cut tariffs more easily on contracts mixing goods and services. Further, domestic implementation of these criteria would be subject to WTO dispute settlement. Another submission involved restricting liberalization to activities that implement multilateral environmental agreements such as Kyoto Protocol's Clean Development Mechanism (CDM), where developed countries invest in abatement or clean production activities in developing countries in exchange for carbon emission credits.

OECD countries expressed concerns that this approach would create very heavy bureaucratic procedures, discriminating against small enterprises, and have a limited and unpredictable impact on trade flows, and that it was inconsistent with WTO's Most Favored Nation principle. Concerns have also been raised regarding the time taken to develop multilateral criteria as well as time needed for dispute-settlement proceedings relative to the duration of a project (World Bank 2007). Thus far, no consensus has emerged on the question of approaches to liberalizing environmental goods and this has proven to be a major cause of deadlock in the negotiations.

III. Lessons from other negotiations

Given this unfavorable context, the sheer existence of the 2012 agreement on the APEC list of environmental goods is surprising. We will now expose what enabled this agreement, what are the other agreements in existence and how this fares for liberalization of EGS through trade agreement in the future.

a. The APEC deal

While this first international trade on the liberalization of EG is beyond doubt a political success, there are a number of reasons why it has limited impact in term of tariffs lowering and is not necessarily a sign that a global liberalization agreement in EGS can and are going to be reached in the near future. Rene Vossenaar realized an in-depth analysis of the agreement for the International Center of Trade and International Development in 2013, *The APEC List of Environmental Goods: An Analysis of the Outcome & Expected Impact.*

i. A long process

Talks about liberalization of EG at the APEC have a long story since they started in 1997 with Early Voluntary Sectorial Liberalizations (EVSL). APEC was the first to single out EGs as a category for trade liberalization purposes. The EGs EVSL was based on rapid liberalization of a set of products that would be individually nominated by APEC members and then arranged according to an agreed classification system. As the aim of the APEC EVSL list was to obtain more favorable tariff treatment for EGs, APEC member economies limited themselves to specific goods that could be readily distinguished by customs agents and treated differently for tariff purposes (Sugathan 2013).

In 2008, the APEC launched a Work Program on EGS "*designed to help APEC reach agreement on actions to support sustainable growth in the region, advance work to increase utilization and dissemination of EGS, reduce existing barriers and refrain from introducing new barriers to trade and investment in EGS, and enhance capabilities of economies to develop their EGS sectors*" (APEC leader's 2011 declaration). One of the stated goals of the Work Program was to "*come up with ways to support the negotiations (about EGS) in the WTO*" in the context of paragraph 31 (iii) of the Doha declaration. This incremental process led in the 2011 APEC Leader's declaration a pledge to cut tariffs to 5% or less at the 2015 horizon on a list of environmental goods to be determined, and published a resulting list of 54 goods that was attached to the 2012 declaration. It is thus obvious that this result stems from a tradition of promoting the eco-industry and a quite old and carefully politically constructed intention to liberalize EGS through cooperation.

ii. A flexible list

The list is composed of 54 6-digit HS sub-headings. For 45 of them, narrower "ex-outs" are proposed, allowing the countries to decide which national tariffs line they correspond to. Sometimes a precise definition of the environmental good to be targeted is provided (for example "solar water heater" within the non-electric water heaters sub-heading), while on others there is only a suggestion of the goods it "may include". This list does not encompass the whole EGS industry, it was elaborated on a request-and-offer rather than systematic approach, and some items were rejected after examinations,

such as wind turbine towers and thermostats. However, most parts of the eco-industry are represented in the list: it contains goods pertaining to environmental monitoring and air pollution, wastewater and hazardous solid waste management, but also renewable energy production technologies and one environmentally preferable natural resource (bamboo). These 54 sub-headings represented about 500 billion US $ in exports in the world in 2011, which is considerable, but when only the relevant ex-outs are taken into account, the volume of trade involved in tariff cuts will be significantly lower (Vossenaar 2013).

It is often difficult to determine what portion of the 6-digit sub-heading will be considered as an "environmental good" by each country, and thus to estimate the effective scope of the liberalization. Some countries, such as Korea, have highly detailed tariff schedule, down to the 10-digits level, which allows them to easily single out environmental goods, but in other cases environmental goods may be imported under the provisions of basket item" tariff lines that serve for all products of a sub-heading not falling under a specific tariff line of a particular sub-heading. This is more frequents in countries that have made less progress in implementing specific environmental policies, and makes it difficult to cut tariff on the concerned good without including all the unrelated non-environmental goods with which it shares the tariff line.

Moreover, commitments are undertaken on a voluntary basis: APEC agreements are non-binding and do not open proceeding before the WTO settlement body. The agreement also states that countries' economic circumstances will be taken into account, without prejudice to the countries' position in WTO. This flexible and voluntary approach to trade liberalization has positively contributed to reaching consensus, but makes the impact more difficult to predict.

iii. A limited impact

Beyond the ever-present questions of scope, what limits the impact of this agreement is its geographic position: the APEC is a zone with low tariffs in general (2.6 % in overall simple average MFN-applied tariffs on EG), and it covers many free- and preferential-trade zones, such as NAFTA and ASEAN. Moreover, certain APEC economies have already implemented significant autonomous tariff reductions on environmental grounds. None of the countries that have actively challenged the list-based approach during the WTO sessions or have very high tariffs on EGs (India,

Brazil, African nations) are part of the APEC.

Vossenaar used the WTO Tariff Download Facility to extract the MFN-applied import tariffs by each of the 20 APEC countries (excluding Russia) on the 54 HS sub-headings of the 2012 list of EGs, and then broke them down to the tariff-line (TL) level to see what are the tariff-cut implications of the 5% rule.

Table 2: APEC list of environmental goods: Tariff profile of APEC economies

Sub-headings in APEC economies sorted by maximum MFN-applied tariffs	Number		MFN applied rates at TL level		
	Sub-headings	Tariff lines (TL)	Simple Average	Min	Max
Max applied rates above 5%	234 (21.7 %)	808	8.4	5.6	35
- All national TL above 5%	128 (11.9 %)	282	9.2	5.6	35
- Some national TL above 5%	106 (9.8 %)	526	7.4	0	30
Max applied rates 5% or less	842 (78.3 %)	1854	1.0	0	5
- of which duty-free	578 (53.7 %)	1163			
Total	1076	2662	2.6	0	35

Source: Vossenaar 2013

The results show that APEC tariffs on environmental goods are already quite low: only 1 in 5 of the subheadings of the list contain at least one TL with an applied tariff of more than 5%, among which the average applied rate is 8.4 %. More than half of all sub-heading imports of the list are duty-free. In many cases, when environmental goods are ex-outs of a subheading where some of the applied rates are above 5% and others below, the TL concerning the relevant ex-out already has a tariff below 5%. In a few cases, 'environmental goods' may be hidden under TLs with MFN-applied tariffs of more than 5 % that also include other unrelated products. Countries may then wish to create new national TLs with a view to reducing tariffs only for 'environmental goods' or ex-outs, but not for the other products. In value terms, more than two thirds of APEC imports under this list correspond to subheadings with maximum applied tariffs of 5% or less, and the imports under headings with all nationals TL rates of 5 percent or more represented less than 7% of value.

Important non-tariffs measures have also been taken. The APEC 2011 leader's declaration resolved to eliminate local content requirements that distort trade in environmental goods and services by the end of 2012 and refrain from adopting new ones included as part of domestic clean energy policy, and make sure that government procurement practices don't restrict trade. These are important non-tariff measures that

often have a greater impact on trade than tariffs cuts do. However, this is not enough. Other NTBs such as subsidies and restrictive standards can impede greater trade flows in these products. (Sugathan & Brewer 2012). Finally, trade in environmental *services* will also be important, and the regulatory barriers to it have thus far not been addressed by the APEC.

In conclusion, this agreement is politically significant because it is the first successful attempt at multilateral liberalization of a list of environmental goods. However, it is still unclear how some ex-outs will be defined at the national tariff line level, and how many goods will benefit from tariff reductions, but we can already assess that the impact will be quite limited given the meagre proportion of EG ex-outs that actually face tariffs above 5%. These low stakes, combined with the absence of LDCs or dual-use sensitive countries, points to no obvious exit for the current deadlock at the WTO level. Interestingly, while the low- and middle-income APEC countries (Indonesia, Malaysia, the Philippines, Thailand, Vietnam, Papua-New-Guinea, Mexico, Chile, Peru, and Russia) obviously agreed to the 2012 list, they didn't take part in the January 2014 declaration in Davos to further the APEC agreement at the WTO level. China, who is the first trade power in the APEC, is also the only emerging country to actively engage in the EGS liberalization process, probably because of its already sizable eco-industry (in particular in the photovoltaic sector) and activist export policy. One can think that rapidly emerging countries such as India and Brazil simply need some time to develop their eco-industry in order to find themselves in a position of powerful trade partner similar to that of China and let go of their infant-industry logic.

b. Other Bilateral and Plurilateral Agreements

In the wake of the APEC agreement, bilateral or plurilateral agreement have been suggested as a better way to reach EGS liberalization than WTO negotiations. Indeed, a bottom-up approach of partial, voluntary or regional agreements might facilitate trade more readily than overreaching global negotiations.

i. Lessons from WTO sectorial agreements

The WTO has had to work around controverted sectorial liberalizations before. Two cases are often cited as relevant to the EGS situation: the Information Technology Agreement (ITA) and the Government Procurement Agreement (GPA).

The ITA, which was endorsed in 1996, displays a number of features that are strikingly similar to what would be needed for EGs: it is specific to the Information

Technology sector, which is exponentially growing and key in terms of growth, infrastructure and technology diffusion. When liberalizations discussions started, some developing countries were wary because they were not significant suppliers of IT goods, and there was much debate about product coverage, with many countries seeking to exempt certain sensitive products. All this is very similar to the current situation for EGS. By implementing "special and differential treatment" to developing countries that were not competitive producers and allowing more flexibility in terms of longer implementation periods for the tariff cuts, an agreement was reached in 1996. A built-in mechanism for periodic review was created to mitigate disappointment over the initial exclusion of certain items. However, this revision mechanism has never been used to this day: no item has been added to the list of IT liberalized goods. The ITA was a success, with tariffs reduced to zero by January 2000. It is also a model in the sense that it shows how taking into account the qualms of developing countries and finding compromise around them can unlock negotiations. However, these agreements cannot be copy-pasted to the EGS negotiations: it focuses only on tariffs and provides no improvement on Non-Tariff barriers, which is enough in IT but wouldn't do much for the eco-industry.

The GPA is a plurilateral agreement, which means countries enter on a voluntary basis, as opposed to multilateral agreements where a critical mass of traders of the concerned goods (often 90%) have to agree in order for it to take effect. It first entered into force in 1981, and has been renegotiated several times since. Plurilateral agreements are very rare: the generally applied principle is that of "single undertaking". It implies that every item of negotiation is part of a whole and indivisible package (the WTO membership) and cannot be agreed to separately. In other words, nothing is agreed until everything is agreed by everybody. The Agreement on Government Procurement (GPA), together with the 1973 Agreement on Trade in Civil Aircraft, constitute the only two "plurilateral" agreements in the WTO, which means they extend to only a narrower group of signatories rather than the whole WTO membership. The advantage of an agreement of that type is it would come into effect immediately. Only the signatories would extend as well as receive the benefits of trade liberalization in climate-friendly products: it would not constitute ground for the application of the Most Favored Nation principle. Non-signatory members would have time to work out harmonized product descriptions or ex-out coding for various products, as well as identify their sensitive products and technical assistance required before they join. Once

a critical level of membership is attained for the plurilateral agreement, it could be integrated within the single undertaking, with trade benefits extending on an MFN basis to all members. A progressive approach might be the answer.

ii. Similarities with the Carbon Linkage agreements

It has been pointed that the current situation for EG is quite homologous to that of carbon markets linking. Following the implementation of the Kyoto protocol in 1997, many schemes of cap-and-trade regulation of carbon emissions carbon permits markets have been implemented separately in diverse regions of the world, sometimes at the state or province level (Québec, California), and sometimes at the national or even regional level (like the E.U Emission Trade scheme, for example). Economic efficiency would dictate that the carbon markets were linked, or open, so that places where carbon emission are limited could sell their emission allowances to place that struggle to meet their abatement targets. However, global negotiations on the linkage of carbon markets have been at a stalemate. The reason is that opening trade between two different cap-and-trade systems requires regulatory harmonization that can be technically tricky to implement, but also convergence in allowance prices, for which developed and developing countries have opposite priorities: ensure emission reduction on one side, secure low prices to favor growth on the other. A planetary scheme for carbon trading is thus for the moment something of an unattainable objective. However, regional linkage through bilateral and plurilateral agreements has recently started to give good results (Ranson & Stavins 2014). The benefits of opening two carbon trading markets to each other are numerous: on top of the increased efficiency in abatement due to the increase diversity of agents, it reduces competitive distortions and price volatility. Besides, the alignment of two cap-and-trade markets requires a lot of cooperation, sharing of information, and borrowing from each-other program design. Before trade even starts, it can bring administrative benefits and program design improvements. Moreover, contribute to the momentum of further cooperation, which is critical to achieving meaningful emission reductions, and is an important step in building political willingness for a global agreement (Burtraw et alii, 2013). In this respect, carbon markets linking can be a model for EGS liberalization, and the current dynamic of incremental bilateral agreements could be replicated.

iii. Bilateral agreements and regulatory convergence

An important stylized fact in EGS trade is that regulations are actually far more

important than tariffs, both as drivers of demand and as technical barriers to entry. EBI's *Examination of Trade in Environmental Goods and Services in the NAFTA Region* in 2004 found no increase in the trade of EGS following the implementation of the free trade agreement (!). NAFTA's Commission for Environmental Cooperation attribute this surprising situation to a number of non-tariff impediments to trade: low consumer awareness of the environmental effects of purchasing habits, confusion about eco-labeling, difficulties in financing small companies in this field, lack of understanding about the best use of market-based approaches to support environmental protection and the conservation and sustainable use of biodiversity. This kind of results explains EGS trade specialist Aaron Cosbey's skepticism is his commentary of the January 2014 joint statement ("*The Green Goods Agreement: Neither green Nor Good?*"): there is not much to be expected from an agreement that focuses on tariff cuts since tariffs are not the "*real obstacle to trade*" in this sector. Similarly, in her analysis of the APEC agreement, Vossenaar remarks that "*tariff reductions alone may have little impact on the deployment of renewable-energy technologies if they are not implemented as part of broader policies and strategies that include targets, incentives and regulations*." In this regard, bilateral and regional trade agreements (RTAs) might be more efficient than global negotiations because the smaller number of countries involved and lesser heterogeneity of participants enables addressing non-tariff barriers much more efficiently. On the other hand, RTAs may also create trade diversion and penalize countries that are the most effective at producing climate-friendly technologies if those countries are excluded from the agreement (World Bank 2007).

There is currently no bilateral trade agreement specific to EGS, but a number of general preferential and free-trade agreements (PTA/FTA) mention them, especially in PTAs between a developed and a developing country, often aiming at the harmonization of environmental regulation and the enabling of technology transfers. In their book *Preferential Trade Agreements Policies for Development: A Handbook,* J.P. Chauffour and J.C. Maur point out that "*the provision of EGS in PTAs have so far been in the form of broad commitments to cooperate rather than of concrete obligations to liberalize trade*." Developed countries also often take the opportunity of general PTAs with developing countries to impose environmental obligations which can in turn be instrumental in generating demand for EGS. The impact of this kind of indirect approach is difficult to quantify, but it might be critical in the long term. Agreements

between Japan and Mexico, between the US and Morocco, and between the European Union and the Cariforum, among others, express the will to facilitate and promote the use and bilateral trade of EGS. Some FTA provide more precise objectives: the 2002 Canada-Costa Rica Free Trade Agreement provided immediate duty-free access to most EG while the 2001 United States-Jordan Free Trade Agreement sought to eliminate tariffs on many EG over a ten-year period. The China-Canada ongoing FTA negotiations mention the need to "*advance mutually beneficial environmental protection goals*" on top of trade liberalization of EGS[4].

A few public-private initiatives also exist, such as the Asia-Pacific Partnership on Clean Development and Trade, successor of the US-Asia Environmental Partnership, which is a program of the US Agency for International Development (USAID). This program implements exchange of best environmental practices and technology to promote cleaner and more efficient cities and industries in Asia. This has more to do with capacity building[5] than trade liberalization, but once again it might be as efficient as a trade agreement in increasing demand for imports in EGS.

IV. Conclusions

As of late march, signatories of the January 2014 declaration have started to state their goals for this negotiation. The proposition entails that whatever is agreed on would only take effect once a critical mass of players in EGS trade would join in. The countries currently involved in the discussions represent 86 % of the trade in EGS, which is not far from the threshold of 90% retained previously by the WTO in a similar situation. However, given that all the main players of the sector are already part of these talks, reaching a critical mass would require convincing a number of emerging nations that have historically been very reluctant in EGS negotiation, such as India and Brazil. The probability of a global agreement in coming years is low. In light of the preceding negotiations, and considering the number of drawbacks of entering a trade agreements in EGS for developing countries we have exposed, my personal opinion is that the probability for a meaningful global agreement to be reached in the coming years is quite low. As underlined by Steenblik (2005), a general agreement on non-agricultural goods in the Doha round, effectively undercutting tariffs in EG, might be reached before an

4. Website of Foreign Affair, Trade and Development Canada: http://www.international.gc.ca/trade-agreements-accords-commerciaux/agr-acc/china-chine/study-comp-etude.aspx

5. This approach to development has become quite prevalent in the past few years. It focuses of addressing the obstacles that inhibit development and on enhancing the abilities of governments, businesses and people to allow them to achieve autonomous results rather than depend on aid.

agreement specific to the eco-industry emerges. The rekindling of the Doha round of negotiations at the WTO with the Bali Package in December 2013 might be taken as a clue in that direction.

The deadlock, while seemingly still unshakable, will disappear naturally when terms of trade change and developing countries, particularly India, become powerful players in this industry. This will give them incentive in liberalizing two-way trade on a more equal footing, and to start competing with the U.S, Japan and the EU to provide environmental activities in LDCs.

In the mean-time, a bottom-up approach of plurilateral or regional liberalization can bring interesting results. However, harmonization of regulations and capacity building are probably more efficient, if less visible, ways to spread the use of green technologies than trade agreements, and those should be increased. Low consumer awareness, lack of environmental policies, weak intellectual property regimes and local content requirements are bigger obstacles to trade in EGS than tariffs.

Anyway, a win-win-win objective is not plausible. Introducing environmental considerations into trade negotiations makes the objectives unclear. An agreement prioritizing the environment would imply the use of a different methodology or the creation of new institutions that would have the authority to set international standards of environmental efficiency and decide what is an environmental good. This is very different from the list approach based on voluntary propositions and mutual trade benefit that prevails in trade agreements. An agreement based on that last approach would obviously also benefit the environment by lowering the costs of pollution abatement a little, but would be firstly motivated by mercantile interests. A successful negotiation will have to prioritize its objectives to avoid a dialogue of the deaf.

Last but not least, we could greatly benefit from a formal political economy model of international trade in ESG. While the political economy of environmental regulation has been abundantly studied (Oates and Portney 2003, Ederington and Minier 2003, Canton 2008, Geaker and Rosendahl 2006, to cite but a few) the implications of trade liberalization on environmental issues have rarely be studied. In that respect, Nimubona's work is groundbreaking, and needs to be furthered. Taking into account the divergent interests and interactions of polluting industries, eco-industry, environmental regulation and trade policy, could yield extremely rich results.

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