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# Liberalizing trade of environmental goods and services: How to address the free-rider problem

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Reducing trade barriers in environmental goods and services (EGS) makes adoption of environmental technologies cost effective for different industries. Hence, the members of the Asia-Pacific Economic Cooperation (APEC) devised a list of 54 environmental goods (EGs) and committed to reduce their applied tariffs to 5 percent or less by the end of 2015. This is anchored on the goal of promoting green growth and sustainability while addressing climate change in the region.

Despite the economic benefits from liberalizing trade in EGS, the distributional impact of the APEC EGs Initiative among its members remains untapped. This *Policy Note* is a summary of a paper that explores how APEC can liberalize trade in EGs and make it economically advantageous for its members to adopt. It articulates the concept of open regionalism and applies it in the liberalization of trade in EGs based on the most-favored-nation (MFN) principle (Wonnacott 1994).

By using the predominant supplier approach, this paper aims to provide APEC members with evidence-based guidance on the implementation of the APEC mandate. Theoretically, this approach addresses the

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This *Policy Note* is culled from a research study titled "Evaluation of the APEC Environmental Goods Initiative: A Dominant Supplier Approach" funded by the Philippine APEC Study Center Network (PASCN). The paper evaluates the feasibility of sectoral liberalization of environmental goods for the Asia-Pacific Economic Cooperation (APEC). It also examines the distributional impact of the proposed scheme on the individual members, particularly on the trade interest of the Philippines.

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free-rider problem. Free riders are countries that are not members of APEC but benefit from tariff reduction of APEC without reducing their own barriers. This paper seeks to identify the key candidates for sectoral liberalization from the APEC EGs list. It also attempts to rank EGs based on purely economic criteria of APEC supply predominance and comparative advantage.

## Research design and methodology

The APEC adheres to the MFN principle of the General Agreement on Tariffs and Trade. All tariff cuts negotiated within APEC therefore must also be extended to nonmembers. Under the APEC EGs Initiative, which is committed to reduce tariffs, free riders can enjoy lower tariffs without reducing their own barriers. This free-rider problem, however, must not prevent APEC from implementing the pledge, considering a strong case for trade liberalization in EGs (WB 2007; Hufbauer and Kim 2010; Yoo and Kim 2011). To minimize this free-rider problem, the predominant supplier approach suggested by Wonnacott (1994) can be used.

The predominant supplier approach applies the principle of open regionalism to merchandise trade. Under this approach, only the products where APEC is a dominant global supplier would be considered for liberalization. In principle, if the source of the actual or prospective supply is within the APEC area, APEC members will mostly benefit from tariff reductions on the chosen goods.

The analysis is done in three steps. First, the goods in the APEC EGs list where the concentration of supply within the APEC area is highest are identified. The value of APEC exports, as a percentage of world exports excluding intra-European Union (EU) trade, is then estimated for each good.[1] For each good, the APEC supply predominance indicator designated as *ASP* is computed. A small *ASP* value means that the APEC supply of the good is small relative to world supply. In this case, the benefits of liberalizing trade for that particular good by APEC can spill over to non-APEC suppliers, who may continue to maintain high tariffs for that good. This indicates a high free-rider incidence. Conversely, a large *ASP* indicates less free riding, as the countries that benefit from tariff reduction are APEC members.

Second, the comparative advantage of APEC—as a collective and then for the Philippines—in each subset of EGs corresponding to different cutoff levels of *ASP* is calculated. This is done by estimating the difference between a member's share of the products in exports and imports for the combination of goods above each cutoff level.

Third, the importance in trade of products in which APEC countries are the principal suppliers is measured to assess the potential gains from liberalizing trade in these

[1] The equations used for each step are provided in the full report. See http://dirp3.pids .gov.ph/webportal/CDN/PUBLICATIONS/pidsdps1534.pdf.

products for the Philippines. The value of imports of all other APEC countries from all sources is calculated. This value became a proxy measure of the market to which the Philippines would have improved access when tariffs are reduced.[2] The policy objective is to determine the cutoff level that will give the Philippines the highest comparative advantage.

Commodities are examined at the 6-digit level based on the Harmonized System (HS) Commodity Classification Code. The 2013 data available in Trade Map, a website developed by the International Trade Centre, are used.

## Findings

In 2013, APEC member-economies supplied over 28 percent of world exports of each good in the APEC list. On average, about 56 percent of the goods were sourced from APEC suppliers.

For analytical purposes, the 54 HS subheadings can be grouped into seven major categories:[3] (1) air pollution control (APC), (2) environmental monitoring analysis and assessment equipment (EMAA), (3) environmentally preferable products (EPP), (4) natural risk management (NR), (5) renewable energy and clean technology production (REP & CTP), (6) waste water management and potable water treatment (WWM & PWT), and (7) management of solid and hazardous waste and recycling systems (S/H).

Table 1 provides the APEC predominance supply in world exports of the different EGs categories. Overall, the shares of APEC suppliers in total world exports among these categories are not trivial. Ranking the categories according to the magnitude of their respective APEC shares will help identify the categories to prioritize for liberalization. Of these categories, APEC predominance in supply is highest for products under REP & CTP at about 64 percent. This is followed by products under APC, WWM & PWT, and NR at about 61 percent, 60 percent, and 56 percent, respectively.

This analysis raises the major point of determining the optimal benchmark or cutoff for ASP to define the subset of EGs where APEC is a principal supplier. However, there is no clear-cut answer to this question as *ASP* is a policy variable and is usually determined through a political process.

Yet, the predominant supplier approach offers an objective way to determine the optimal benchmark that works best for each member-economy. The outcome of this exercise could serve as a springboard from which reasonable trade policies on trade liberalization in EGS can be crafted.

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[2] However, the value is not an actual measure of the gains the Philippines would obtain as other exporters, including both APEC and non-APEC countries, would have better access to these markets as well. Moreover, other factors may also affect the distribution of gains, such as the change in tariff levels before and after liberalization and the presence of nontariff barriers to trade, among others.

[3] These categories were suggested by the Friends of the Chair of the EGS Group in WTO. See WTO document JOB (07)/54.

**Table 1. Categories of EGs and the APEC predominant supplier approach, 2013**

| | EG Category | No. of Subheadings | Share in APEC EGs | APEC Exports | World Exports | World Exports Excluding Intra-EU Trade | APEC Exports as a Percentage of World Exports | APEC Exports as a Percentage of World Exports, Excluding Intra-EU Trade |
|---|---|---|---|---|---|---|---|---|
| APC | Air pollution control | 5 | 9.26 | 11.38 | 26.55 | 21.16 | 52.24 | 60.96 |
| EMAA | Environmental monitoring analysis and assessment equipment | 15 | 27.78 | 46.80 | 96.90 | 96.90 | 47.92 | 47.92 |
| EPP | Environmentally preferable products | 1 | 1.85 | 0.28 | 1.85 | 0.97 | 15.03 | 28.64 |
| NR | Natural risk management | 1 | 1.85 | 3.37 | 5.99 | 5.99 | 56.32 | 56.32 |
| REP & CTP | Renewable energy and clean technology production | 15 | 27.78 | 183.08 | 254.56 | 228.68 | 54.92 | 64.40 |
| S/H | Management of solid and hazardous waste and recycling systems | 12 | 22.22 | 35.57 | 74.64 | 62.21 | 45.70 | 54.39 |
| WWM & PWT | Waste water management and potable water treatment | 5 | 9.26 | 20.34 | 39.91 | 31.58 | 48.15 | 60.01 |
| Total | | 54 | 100.00 | 301 | 500 | 447 | 49.34 | 56.06 |

Note: Except for percentages, units are in USD billion.
Source of basic data: Trade Map (ITC 2015)

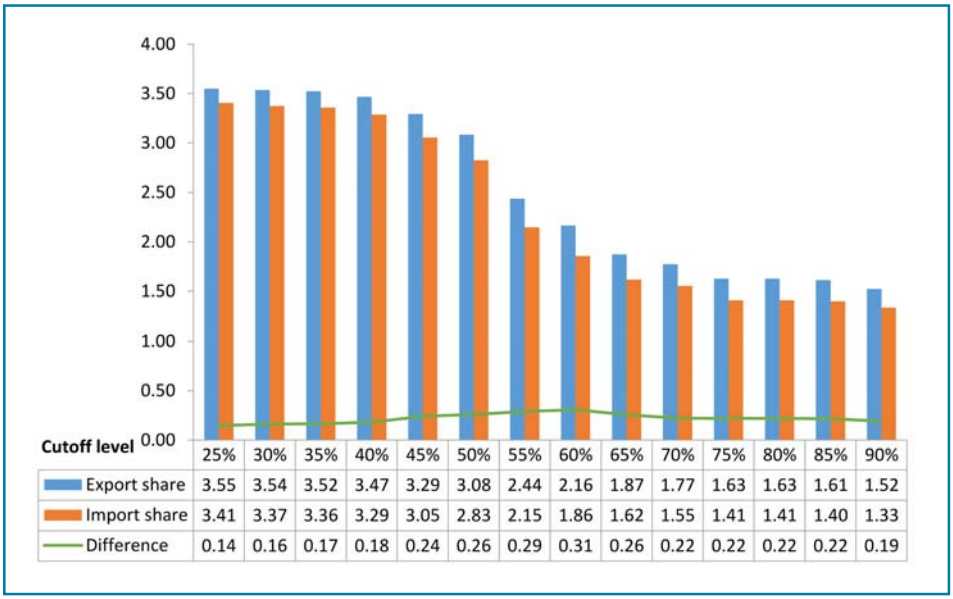
Interestingly, APEC, as a whole, has some comparative advantages in EGs across cutoff levels. This is evident in Figure 1 in which trade shares are presented in column bars and the differences across cutoff levels are marked with a green line. Notice that the difference between export and import shares is highest at 60 percent cutoff level. Furthermore, for each cutoff level, the difference between export and import shares of APEC is positive but not large. This suggests that not only is APEC a predominant exporter of EGs but is an importer as well.

Alternatively, Figure 2 presents the trade shares of the entire APEC relative to the different EGs categories. As indicated by the difference between the export and import shares, the category with the highest potential in the APEC region is REP & CTP, with a comparative advantage of 21 percent. Recall from Table 1 that among the different categories, it is in

REP & CTP where the share of APEC exports in the world is highest. There is also comparative advantage with reference to goods under the categories WWM & PWT and NR, with net export shares of 0.03 percent and 0.01 percent, respectively. However, there are three categories of EGs where APEC turns out to be a net importer: EMAA, APC, and S/H. Finally, the extent of APEC trade in the sole EPP appears rather marginal.

Figure 3 presents the trade shares of and the potential market faced by the Philippines across cutoff levels. Note that as the level of cutoff benchmark increases, the corresponding share of these products in total export and import of the Philippines diminishes. At 60 percent cutoff level, the difference in export and import shares is highest at 2.32 percent.

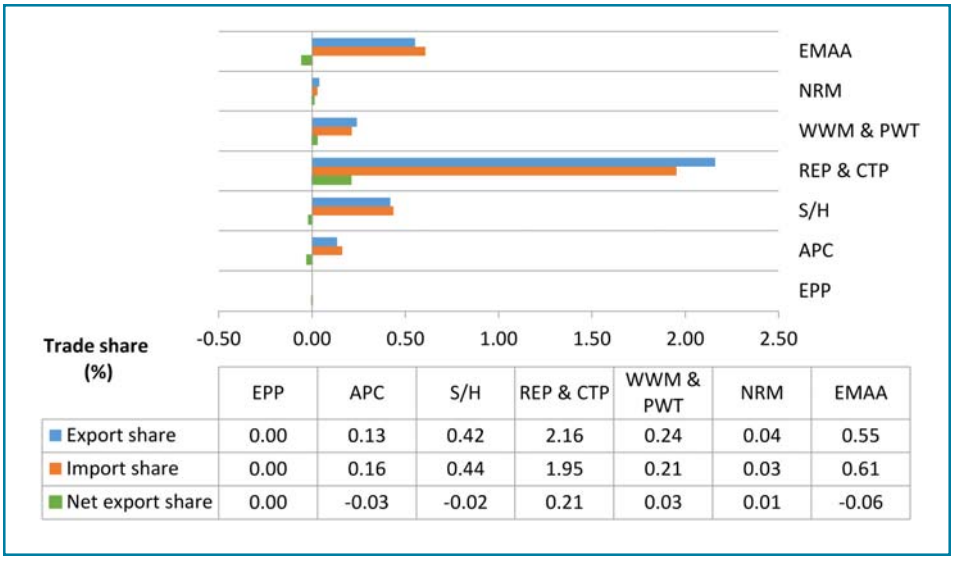
**Figure 1. Importance of the 54 APEC EGs in 2013 APEC trade, by cutoff level**




| Cutoff level | 25% | 30% | 35% | 40% | 45% | 50% | 55% | 60% | 65% | 70% | 75% | 80% | 85% | 90% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Export share | 3.55 | 3.54 | 3.52 | 3.47 | 3.29 | 3.08 | 2.44 | 2.16 | 1.87 | 1.77 | 1.63 | 1.63 | 1.61 | 1.52 |
| Import share | 3.41 | 3.37 | 3.36 | 3.29 | 3.05 | 2.83 | 2.15 | 1.86 | 1.62 | 1.55 | 1.41 | 1.41 | 1.40 | 1.33 |
| Difference | 0.14 | 0.16 | 0.17 | 0.18 | 0.24 | 0.26 | 0.29 | 0.31 | 0.26 | 0.22 | 0.22 | 0.22 | 0.22 | 0.19 |

Source of basic data: Trade Map (ITC 2015)

**Figure 2. Importance of the 54 APEC EGs in 2013 APEC trade, by category**

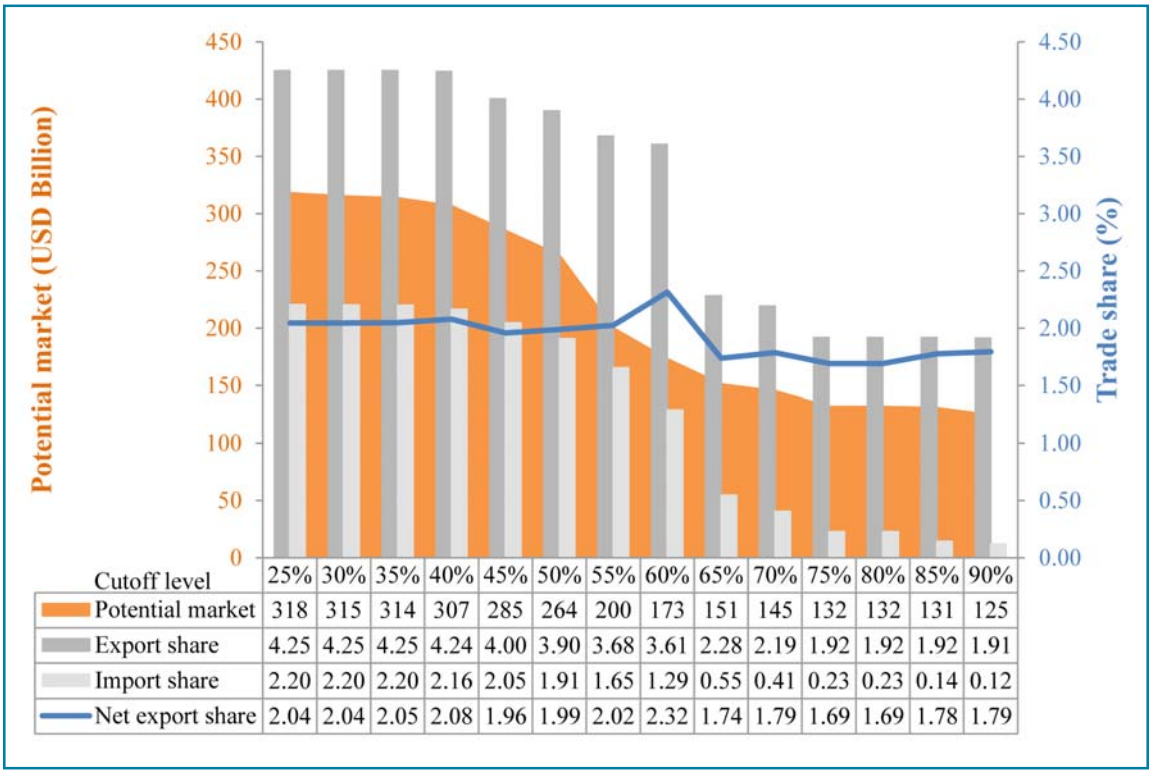



| Trade share (%) | EPP | APC | S/H | REP & CTP | WWM & PWT | NRM | EMAA |
|---|---|---|---|---|---|---|---|
| Export share | 0.00 | 0.13 | 0.42 | 2.16 | 0.24 | 0.04 | 0.55 |
| Import share | 0.00 | 0.16 | 0.44 | 1.95 | 0.21 | 0.03 | 0.61 |
| Net export share | 0.00 | -0.03 | -0.02 | 0.21 | 0.03 | 0.01 | -0.06 |

Note: For the meaning of categories, refer to Table 1.
Source of basic data: Trade Map (ITC 2015)

This suggests that from the point of view of the Philippines, it is rational to set the ceiling of trade negotiations at the level where APEC principally supplies 60 percent of exports. This corresponds to 16 EGs, which are worth 3.61 percent of Philippine exports and 1.29 percent of Philippine imports in 2013. At this cutoff level, the

**Figure 3. Importance of the 54 APEC EGs in 2013 Philippine trade, by cutoff level**




| Cutoff level | 25% | 30% | 35% | 40% | 45% | 50% | 55% | 60% | 65% | 70% | 75% | 80% | 85% | 90% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Potential market | 318 | 315 | 314 | 307 | 285 | 264 | 200 | 173 | 151 | 145 | 132 | 132 | 131 | 125 |
| Export share | 4.25 | 4.25 | 4.25 | 4.24 | 4.00 | 3.90 | 3.68 | 3.61 | 2.28 | 2.19 | 1.92 | 1.92 | 1.92 | 1.91 |
| Import share | 2.20 | 2.20 | 2.20 | 2.16 | 2.05 | 1.91 | 1.65 | 1.29 | 0.55 | 0.41 | 0.23 | 0.23 | 0.14 | 0.12 |
| Net export share | 2.04 | 2.04 | 2.05 | 2.08 | 1.96 | 1.99 | 2.02 | 2.32 | 1.74 | 1.79 | 1.69 | 1.69 | 1.78 | 1.79 |

Source of basic data: Trade Map (ITC 2015)

Philippines could have an improved access to a market worth USD 173 billion.[4]

## Conclusions

One of APEC's contributions to foster trade in environmental goods and services is to put forward its own list of 54 EGs slated for sectoral liberalization. Liberalization of these EGs on an MFN basis, however, generates free-rider problems. To address this, the dominant supplier approach is employed in ranking the elements in the APEC list according to their *ASP*. There is a considerable share of APEC environmental product exports to world exports, with *ASP* values ranging from 28 to 99 percent.

Determining a cutoff benchmark for APEC, as a whole, is a policy variable and would most likely be a negotiated outcome. However, in terms of commercial viability, an *ASP* cutoff of 60 percent, which corresponds to the greatest comparative advantage and covers 16 products, is a good benchmark.

Moreover, the APEC EGs list can be grouped into seven functional categories. Under this system of classification, the most promising

[4] Incidentally, the comparative advantage for APEC, as a whole, is also highest at 60 percent cutoff level.

category is the one that has the highest share of exports relative to world exports; namely, renewable energy and clean technology production.

Yet, the benefits of MFN liberalization of the APEC list is not distributed uniformly among the APEC member-economies. Those that specialize on exports of the EGs would more likely benefit from liberalization. Looking at the impact of the APEC list on the Philippines, a cutoff of 60 percent seems to be a promising benchmark for which comparative advantage is greatest. If the country were to choose a subset of environmental products to liberalize ahead of the others, the products falling within the 60-percent cluster are the promising candidates for the Philippines.

In terms of accelerated liberalization, the category with the highest potential is renewable energy and clean technology production. In 2013, the Philippines faced a potential APEC market for these products worth USD 182.9 billion.

The APEC EGs Initiative is a positive contribution to the global effort of fostering sustainable development. The most promising approach, taken from the global welfare standpoint, is sectoral liberalization at the multilateral level. However, the multilateral agenda is hindered by the presence of issues such as the free-rider problem. Using the predominant supplier approach could address free riding and provide the stimulus needed to foster free trade in EGS.

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