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A Review of the APEC List of Environmental Goods

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KEY MESSAGES

- The trade of products in the APEC List of Environmental Goods has grown significantly, worldwide and within the APEC region, since its endorsement in 2012. Between 2012 and 2019, global and intra-APEC trade in the products on the list increased by 6.4 percent and 7 percent, respectively. In contrast, overall global trade (all products) rose by only 1.9 percent.
- Tariff reductions, stronger environmental awareness, implementation of environmental policies and regulatory reforms, enforcement of government regulations to protect the environment, progress in developing alternative energy sources and energy-efficient goods, and high international oil prices have motivated the increase of trade in environmental goods.
- Most APEC economies have been able to implement the commitment under the APEC List of Environmental Goods to reduce tariffs to 5 percent or less.
- Most non-tariff measures affecting environmental goods are export-related. They include subsidies, licences and quotas; discriminatory concessional loans and grants to local exporters; and export tax rebates.
- The current APEC List of Environmental Goods, while serving to improve market access, is not in itself sufficient to support green growth. The literature suggests additional factors should be taken into account.
- The addition of new products to the APEC List of Environmental Goods is worth exploring since technology is moving fast, responses to support climate change adaptation and mitigation are needed, and there is an urgency to achieve environmental sustainability.
- Expanding the list could include contemplating a global value chain approach. Such an approach would allow adapted goods, which are environmentally friendly or cleaner, and whose use is beneficial for environmental protection or resource management, to be factored in. A global value chain approach would also benefit developing economies, as they could produce some of many components that go into certain environmental products.

Introduction

In September 2012, APEC Leaders endorsed the APEC List of Environmental Goods with the commitment to reduce their applied tariff rates to 5 percent or less by the end of 2015, with the intention of improving access to environmental

technologies, and contributing to green growth and trade liberalisation objectives.¹

This Policy Brief aims to evaluate the evolution of the trade in the environmental goods on the list and analyse the main barriers affecting their trade, in the context of the mandate given by the APEC Ministers Responsible for Trade in June 2021 to

¹ The list also includes one environmentally preferable product, namely, bamboo flooring panels. See APEC, "2012 Leaders' Declaration," 8 September 2012,

https://www.apec.org/Meeting-Papers/Leaders-Declarations/2012/2012_aelm

Table 1. APEC List of Environmental Goods, by product category

Category	Sub-headings		Examples
	Number	Share	
Total HS sub-headings	54	100.0%	
Environmentally Preferable Products	1	1.9%	Bamboo flooring panels
Air Pollution Control	5	9.3%	Filtering and purifying machinery and apparatus for gases
Management of Solid and Hazardous Waste and Recycling Systems	12	22.2%	Furnaces, ovens and incinerators to dispose of solid waste and mitigate pollutants
Renewable Energy Production	15	27.8%	Products for the generation of energy from wind, solar, biomass, biogas and geothermal sources
Waste Water Management and Potable Water Treatment	5	9.3%	Sludge driers, water filters, water purification machines, parts of UV disinfection instruments
Natural Risk Management	1	1.9%	Surveying instruments and appliances
Environmental Monitoring Analysis and Assessment Equipment	15	27.8%	Manometers, gas and smoke analysers, spectrometers, chromatographs, microtomes

HS=harmonised system

Source: APEC Policy Support Unit (PSU).

review the implementation of the original list and update the harmonised system (HS) tariff classification codes in the list (by the APEC Ministerial Meeting in November 2021).²

Furthermore, the APEC Ministers Responsible for Trade are considering an instruction to officials to update the list.³ Accordingly, this Policy Brief will discuss the significance of updating the list, as well as some considerations that APEC economies would have to keep in mind when discussing the addition of goods to the list.

APEC List of Environmental Goods

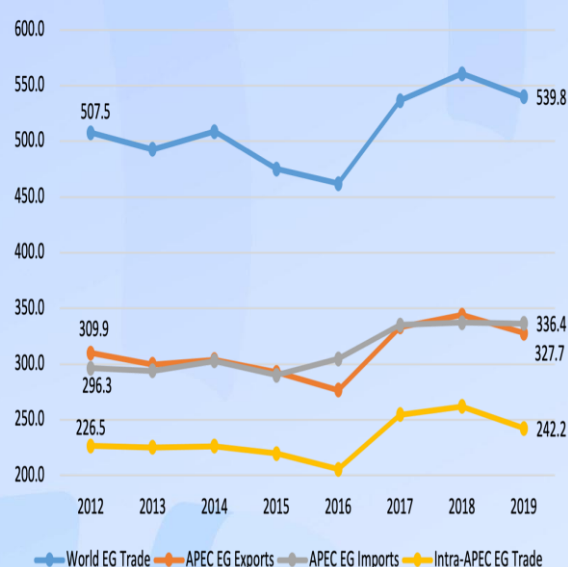
The list includes 54 sub-headings at the 6-digit level in the HS nomenclature concerning different type of products. Table 1 shows that around three quarters of the list are goods related to renewable energy production, environmental monitoring analysis, and management of solid and hazardous waste and recycling systems.

The list also includes a small number of products for air pollution control, wastewater management and potable water treatment. Finally, the list includes one environmentally preferable product and one associated with natural risk management.

Trade Flows

Since the endorsement of the list in 2012, the trade of products in the APEC List of Environmental Goods has grown significantly worldwide and within the APEC region (Figure 1). APEC's exports and imports of those products increased by 5.7 percent and 13.5 percent, respectively, between 2012 and 2019. Similarly, intra-APEC trade in these products

Figure 1. Trade of products in the APEC List of Environmental Goods (USD billion)



EG=environmental goods.

Source: World Integrated Trade Solutions (WITS), World Bank; APEC PSU calculations.

expanded by 7 percent during the same period. The relevance of this list is very significant, as global trade in these products rose by 6.4 percent. In contrast, overall global trade (all products) grew by only 1.9 percent.

Due to 'ex-outs' being included in the list and also to data on trade flow among economies being harmonised only at the HS 6-digit sub-heading level, the trade figures on environmental goods

² APEC, "APEC Ministers Responsible for Trade Meeting Joint Statement 2021," 5 June 2021, https://www.apec.org/Meeting-Papers/Sectoral-Ministerial-Meetings/Trade/2021_MRT

³ APEC, "APEC Ministers Responsible for Trade Meeting Joint Statement 2021."

may be overestimated.⁴ Unfortunately, trade data at further levels of disaggregation (HS 8-, 9- or 10-digit levels) are not harmonised across economies, and not publicly available in some cases, which prevents more precise calculations of the amount of trade in the environmental goods on the list.

Looking at exports and imports in the APEC region with respect to the environmental goods on the list, the largest increase took place among goods for the management of solid and hazardous waste and recycling systems, followed by goods for

Table 2. Trade of products in the APEC List of Environmental Goods, by product category

Product Category	# of HS sub-headings	Exports			Imports		
		USD million 2012	USD million 2019	Change (%) 2012-19	USD million 2012	USD million 2019	Change (%) 2012-19
Environmentally Preferable Products	1	95	5	-94.5%	15	6	-56.1%
Air Pollution Control	5	10,686	15,000	40.4%	13,096	17,754	35.6%
Management of Solid and Hazardous Waste and Recycling Systems	12	46,436	74,750	61.0%	58,737	85,613	45.8%
Renewable Energy Production	15	186,047	148,788	-20.0%	147,841	132,311	-10.5%
Waste Water Management and Potable Water Treatment	5	19,136	27,124	41.7%	18,358	24,586	33.9%
Natural Risk Management	1	2,879	2,450	-14.9%	2,655	2,444	-7.9%
Environmental Monitoring Analysis and Assessment Equipment	15	44,603	59,760	34.0%	55,562	73,680	32.6%

Table 3. APEC List of Environmental Goods: Top 5 products with largest increments in their APEC exports

#	HS Code	Illustrative Description	USD billion		Change (%)
			2019	Change 2012-19	2012-19
1	847989	Machines and appliances designed for a wide range of areas of environmental management, including waste, wastewater, drinking water production and soil remediation	40.2	+22.1	122.4%
2	854140	Solar cells; photosensitive semiconductor devices, including photovoltaic cells.	48.9	+8.5	21.1%
3	847990	Parts of machines and mechanical appliances of heading 84.79; parts of air humidifiers or dehumidifiers and machines and appliances for environmental management	26.1	+8.0	44.4%
4	842139	Filtering or purifying machinery for gases	10.6	+5.0	87.8%
5	854390	Parts of machines and apparatus of heading 85.43; parts for UV disinfection ozonisers (water disinfection)	11.2	+3.8	52.5%

Table 4. APEC List of Environmental Goods: Top 5 products with largest increments in their APEC imports

#	HS Code	Illustrative Description	USD billion		Change (%)
			2019	Change 2012-19	2012-19
1	847990	Parts of machines and mechanical appliances of heading 84.79; parts of air humidifiers or dehumidifiers and machines and appliances for environmental management	30.9	+13.9	81.7%
2	847989	Machines and appliances designed for a wide range of areas of environmental management, including waste, wastewater, drinking water production and soil remediation.	44.0	+13.2	43.0%
3	854140	Solar cells; photosensitive semiconductor devices, including photovoltaic cells	36.9	+7.3	24.6%
4	842139	Filtering or purifying machinery for gases	12.0	+4.6	62.8%
5	903180	Other instruments, appliances and machines; vibrometers and electron microscopes for laboratory and testing applications	15.9	+3.8	31.8%

For tables 2 to 4:

HS=harmonised system

Source: WITS; APEC PSU calculations.

⁴ Ex-outs in any HS 6-digit sub-heading mean that only some of the goods classified under a sub-heading are part of the APEC

List of Environmental Goods. Ex-outs are usually products identified at the HS 8-, 9- or 10-digit level.

environmental monitoring analysis, wastewater management and potable water treatment.

Renewable energy products represent the largest product category in the APEC List of Environmental Goods in USD terms as shown in Table 2, but their trade declined by 20 percent (exports) and 10.5 percent (imports) in terms of value between 2012 and 2019, mostly explained by the fall in trade of solar heliostats, which could not be offset by the growing trade of other renewable energy products in recent years, such as solar photovoltaic cells (panels).

A more thorough analysis of the APEC List of Environmental Goods shows that APEC intensified its exports and imports in a significant majority of the products belonging to this list. From the export perspective, 33 out of 54 HS sub-headings increased their exports during the period 2012–2019.

The largest increase in USD terms was in exports of machines and appliances for environmental management (+USD 22 billion), followed by those of solar photovoltaic cells; parts of machines and

appliances for environmental management; filtering or purifying machines for gases; and parts of machines and apparatuses for water treatment (Table 3). These top five products combined increased their exports by USD 47.3 billion.

From the import perspective, 35 out of 54 sub-headings increased their imports between 2012 and 2019. The two products with the largest import increments were machines and appliances for environmental management and their parts (+USD 27.1 billion), followed by solar photovoltaic cells; filtering or purifying machines for gases and other instruments; and appliances such as vibrometers and electron microscopes for laboratory and testing applications (Table 4). These five products combined reported an upsurge of imports by USD 42.3 billion.

In contrast, some products in the list have experienced a decline in their trade. Between 2012 and 2019, APEC exports went down for 21 HS sub-headings. The most significant fall was seen for solar heliostats (–USD 38.5 billion), followed by parts for solar heliostats (–USD 7.1 billion) as shown in Table 5. Other products with falling

Table 5. APEC List of Environmental Goods: Top 5 products with largest decline in their APEC exports

#	HS Code	Illustrative Description	USD billion		Change (%)
			2019	Change 2012–19	2012–19
1	901380	Optical devices, appliances and instruments not specified; solar heliostats	41.6	-38.5	-48.1%
2	901390	Parts and accessories for optical devices, appliances and instruments not specified; parts for solar heliostats	5.2	-7.1	-58.0%
3	850239	Electric generating sets and rotary convertors, other; biogas and gas generators	0.9	-2.3	-72.5%
4	840290	Steam and other vapour generating boilers, super-heated water boilers and parts	1.5	-2.0	-57.0%
5	840690	Parts of steam turbines and other vapour turbines	1.4	-1.6	-54.2%

Table 6. APEC List of Environmental Goods: Top 5 products with largest decline in their APEC imports

#	HS Code	Illustrative Description	USD billion		Change (%)
			2019	Change 2012–19	2012–19
1	901380	Optical devices, appliances and instruments not specified; solar heliostats	34.4	-18.9	-35.5%
2	901390	Parts and accessories for optical devices, appliances and instruments not specified; parts for solar heliostats	5.8	-2.2	-27.9%
3	850239	Electric generating sets and rotary convertors, other; biogas and gas generators	2.5	-2.0	-44.4%
4	840690	Parts of steam turbines and other vapour turbines	0.9	-0.9	-50.0%
5	847420	Crushing, grinding, waste compactor machines used for solid waste treatment or recycling	1.5	-0.8	-35.5%

For tables 5 and 6:

HS=harmonised system

Source: WITS; APEC PSU calculations.

Figure 2. APEC List of Environmental Goods: Average MFN tariff per economy



AUS=Australia; BD=Brunei Darussalam; CDA=Canada; CHL=Chile; PRC=China; HKC=Hong Kong, China; INA=Indonesia; JPN=Japan; KOR=Korea; MAS=Malaysia; MEX=Mexico; NZ=New Zealand; PNG=Papua New Guinea; PE=Peru; PH=The Philippines; RUS=Russia; SGP=Singapore; CT=Chinese Taipei; THA=Thailand; US=United States; VN=Viet Nam.
MFN=most favoured nation

Source: World Trade Organization (WTO) Tariff Data Database; International Trade Centre (ITC) Market Access Map Database; APEC PSU calculations.

exports are electric generating sets, steam and other vapour generating boilers, super-heated water boilers and parts of steam turbines.

APEC imports declined for 19 HS sub-headings. As with APEC exports, the largest fall was in solar heliostats and their parts (–USD 21.2 billion), followed by electric generating sets; parts of steam turbines; and crushing, grinding and waste compactor machines for solid waste treatment or recycling (Table 6).

While trade flows for some environmental goods may have declined as they became obsolete or less cost-efficient, trade in most of the products in the APEC List of Environmental Goods is increasing. There are several possible reasons for the surge.

First, it is possible that tariff reductions are making these technologies available at a lower cost, therefore making trade more affordable, leading to an increase.

Second, without a doubt, environmental awareness has become stronger and there is a trend to develop and use less polluting technologies as well as more environmentally friendly products. This has motivated governments to give more attention to environmental policy and regulatory reforms, and to pursue multilateral environmental agreements such as the Paris Agreement.

Third, the implementation of government regulations to protect the environment requires the use of environmental goods. Fourth is the progress in developing alternative energy sources and energy-efficient goods. Some governments have provided incentives to firms such as tax refunds, temporary subsidies and other supporting measures.

Finally, high international oil prices have motivated the development of new energy-efficient products and new technologies for renewable energy.

Trade Barriers

Tariffs

The current most favoured nation (MFN) average tariff for most APEC economies is below 5 percent, based on 2020 data from the World Trade Organization (WTO).

From the WTO data, only two APEC economies, Chile and Indonesia, maintain an average tariff of above 5 percent for products on the APEC List of Environmental Goods (Figure 2). Examining MFN tariff levels by individual product and economy, Thailand also has MFN tariffs above 5 percent for three HS sub-headings within the list.

However, the data do not reflect the tariff reduction implemented by Indonesia in early 2021 to fulfil the

commitment to reduce tariffs on those goods to 5 percent or less.⁵ It should also be noted that Chile and Thailand are working toward implementing the commitment. In Chile, a proposal is currently in its second reading in its Senate.⁶ Furthermore, while Chile has a 6 percent flat MFN tariff system across almost all goods, its average applied tariffs, which takes into consideration Chile's comprehensive free trade agreements, is quite low (around 1 percent).⁷ Meanwhile, Thailand has reported that a proposal to meet the commitment is under consideration at the Ministry of Finance.⁸

Non-tariff measures

Trade in environmental goods is also affected by non-tariff measures (NTMs), both technical and non-technical. Technical NTMs refer to the characteristics of a product, its technical specifications and its production process, in order to ensure quality, human health, safety and environmental protection, among others.⁹ Non-technical NTMs are not related to product-specific properties, but to trade requirements. Examples include export and import licences, local content requirements and customs formalities.¹⁰

This Policy Brief focuses on discriminatory non-technical NTMs affecting products in the APEC List of Environmental Goods. These NTMs could distort trade in different ways, for example, through a general fall in trade flows; an increase of trade from subsidised companies at the expense of non-subsidised companies; or an attenuation in the expansion of trade.

Based on Global Trade Alert (as of May 2021), 223 non-technical discriminatory NTMs implemented in the APEC region were affecting products within this list (Table 7). Most of these NTMs are export-related, such as export subsidies, licences and quotas; discriminatory concessional loans and grants to local exporters; and export tax rebates.

Other common non-technical NTMs are subsidies (excluding export subsidies) implemented in the form of: capital injections into firms, in-kind grants, local tax relief and import incentives; local content measures (e.g., localisation requirements) for firms to obtain a benefit; non-automatic import licensing procedures and prohibitions; and contingency trade-protective measures.

Table 7. Non-technical NTMs in the APEC region affecting products in the APEC List of Environmental Goods

Type of NTM (MAST classification)	Number of NTMs	Share (%)
D - Contingency trade-protective measures	14	6.3%
E - Non-automatic import-licensing procedures, prohibitions other than authorisations for SPS or TBT reasons	20	9.0%
F7 - Internal taxes and charges levied on imports	5	2.2%
I1 - Local content measures	35	15.7%
L - Subsidies (excluding export subsidies)	45	20.2%
M - Government procurement measures	9	4.0%
P - Export-related measures (subsidies, licenses or quotas)	91	40.8%
Other measures	4	1.8%
Total	223	100.0%

MAST=Multi-Agency Support Team; NTM=non-tariff measures; SPS=sanitary and phytosanitary measures; TBT=technical barriers to trade.

Source: Global Trade Alert (as of May 2021); APEC PSU calculations.

⁵ APEC Market Access Group, "APEC Advances Environmental Goods Tariffs Cut," 11 March 2021,

https://www.apec.org/Press/News-Releases/2021/0311_MAG

⁶ APEC Market Access Group, "Summary Report – 60th Market Access Group Meeting" (61st Market Access Group Meeting, 12 August 2021), 4,

http://mddb.apec.org/Documents/2021/MAG/MAG2/21_mag2_002.pdf

⁷ Based on World Bank calculations:

<https://data.worldbank.org/indicator/TM.TAX.MRCH.WM.AR.ZS?locations=CL>

⁸ APEC Market Access Group, "Summary Report – 60th Market Access Group Meeting."

⁹ International Trade Centre (ITC), "NTM Survey Classification," accessed 11 October 2021,

<https://ntmsurvey.intracen.org/support-materials/ntm-classification/>

¹⁰ ITC, "NTM Survey Classification."

Drivers of Green Growth and Sustainable Development

Green growth¹¹ and sustainable development, like economic growth, are multidimensional. This means that there are several factors that are needed to achieve them.

A previous study conducted by the APEC Policy Support Unit has already shown that an increase of trade in a limited number of specific products alone cannot be expected to generate improved larger outcomes such as economic growth, increased employment and reduced poverty.¹² In other words, picking certain products as targets for specific government policies may not necessarily have a big impact on growth and sustainable development at the economy-wide level.¹³

This suggests that the impact of the 54 sub-headings in the APEC List of Environmental Goods would not by itself be enough to address and support green growth. The improved market access for environmental goods arising from the implementation of the list is a necessary, but not sufficient condition to generate green growth. Better access for environmental goods will promote their use, which will ensure that economic activity can be handled in a more environmentally sustainable manner; however, to achieve economy-wide green growth, several other factors have to be in place.

A study by the Organisation for Economic Co-operation and Development (OECD) in 2011 identifies additional factors beyond the production and international trade of environmental goods and

services as determinants of green growth:¹⁴ (1) R&D and innovation; (2) international financial flows; (3) prices and taxes (e.g., governments can address negative externalities caused by economic activity affecting the environment through taxes or the suppression of environmentally harmful subsidies); (4) regulations and management approaches (e.g., those promoting energy efficiency); and (5) training and skills development, including raising awareness on environmental issues.¹⁵

Similarly, Capasso et al. conducted a synthesis review of studies analysing green growth and found additional factors that could be critical for green growth.¹⁶ They include: (1) decreasing fossil fuel availability reflected in rising fossil fuel prices, which could lead to more investments in low carbon energy production; and (2) formal and informal institutional factors, for example, the establishment of formal institutions, rule of law, authorities with the capacity to conduct reforms, consumption habits (e.g., recycling) and behavioural changes.

Also, Tawiah, Zakari and Adedoyin found that the source of energy consumption is a critical aspect in achieving green growth, as high energy consumption leads to a decrease of green growth, but more renewable energy use vis-à-vis non-renewable energy use improves green growth.¹⁷

In order to generate green growth, it is clear that APEC economies will have to take into account the aforementioned factors as well as continue to embrace trade in environmental goods. Improving access conditions for a greater number of environmental goods and services will certainly

¹¹ There is no agreed definition for green growth. The Organisation for Economic Co-operation and Development (OECD), for example, says that it means 'fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies' (OECD, "Green Growth and Sustainable Development," accessed 11 October 2021, <https://www.oecd.org/greengrowth/>). The Fifth Ministerial Conference on Environment and Development in Asia and the Pacific defined it as 'a strategy of sustaining economic growth and job creation necessary to reduce poverty in the face of worsening resource constraints and climate crisis' (United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), "Environment and Development: Green Growth," accessed 11 October 2021, <https://www.unescap.org/our-work/environment-development/green-growth>).

¹² This study took a sample of 157 products and found that their trade alone was not expected to result in wholesale rural development. C. Kuriyama, E.A. San Andres and K. Lee, "Promoting Products Contributing to Sustainable and Inclusive Growth through Rural Development and Poverty Alleviation" (Singapore: APEC, 2015), 70–71, <https://www.apec.org/Publications/2015/09/Promoting-Products-Contributing-to-Sustainable-and-Inclusive-Growth-through-Rural-Development-and-Po>.

¹³ Kuriyama, San Andres, and Lee, "Promoting Products."

¹⁴ OECD, "Towards Green Growth – Monitoring Progress" (OECD, 2011), 27–29, <https://www.oecd.org/greengrowth/48224574.pdf>

¹⁵ Capacity building, in particular targeting developing economies, could encourage them to strengthen environmental regulations.

¹⁶ M. Capasso et al., "Green Growth – A Synthesis of Scientific Findings," *Technological Forecasting and Social Change* 146 (2019): 390–402, <https://reader.elsevier.com/reader/sd/pii/S0040162518311028?token=3C1E552E3C2E734F598788C4C486EBA5D5AE2DAC0941F3D328EB1A4AF69CC9ECF21155501490C0D4118F3A56D9386B7B&originRegion=eu-west-1&originCreation=20210906095215>

¹⁷ V. Tawiah, A. Zakari and F.F. Adedoyin, "Determinants of Green Growth in Developed and Developing Countries," *Environmental Science and Pollution Research* 28 (2021): 39227–42, <https://link.springer.com/content/pdf/10.1007/s11356-021-13429-0.pdf>

contribute to generating better and more tangible green growth.¹⁸

Environmental Goods and Green Growth

A myriad of studies show that international trade could improve the environmental quality of an economy by allowing lower-cost access to the technologies to improve environmental conditions and promote competition to spur the development of environmental goods and services.¹⁹

The products in the APEC List of Environmental Goods do support several activities related to environmental protection and resource management. The list describes the environmental features of the agreed products, such as renewable energy production; control and removal of pollutants from the air; destruction of solid and hazardous waste; air and water purification; renewable and environmentally friendly products; and measurement activities to conduct R&D for environmental protection.²⁰

In addition, environmental goods could benefit specific communities, including those producing those goods, and those needing to utilise those goods to address issues of environmental degradation.

In this context, in 2022, it will be 10 years since the endorsement of the APEC List of Environmental Goods, and environmental challenges remain. It is clear that more needs to be done in several areas, including trade, to address and support green growth.

Adding new products to the list could help support environmental protection and resource management.²¹ Some advantages of exploring an expansion are as follows:

- Technology is changing faster, with new products appearing and others becoming obsolete.
- It represents an opportunity to take a global value chain approach to environmental goods

¹⁸ OECD, "Towards Green Growth," 29.

¹⁹ See OECD, "Towards Green Growth"; Tawiah, Zakari and Adedoyin, "Determinants of Green Growth"; and C.I. Fernandes et al., "Green Growth versus Economic Growth: Do Sustainable Technology Transfer and Innovations Lead to an Imperfect Choice?" *Business Strategy and the Environment* 30, no. 4 (2021): 2021–37, <https://doi.org/10.1002/bse.2730>

²⁰ APEC, "2012 Leaders' Declaration: Annex C – APEC List of Environmental Goods," 8 September 2012, https://www.apec.org/Meeting-Papers/Leaders-Declarations/2012/2012_aelm/2012_aelm_annexC

²¹ Liberalising the environmental goods and services trade can support green growth. Fewer barriers to trade could lead to new

that includes not only final goods, but also other intermediate products and components that play an important role in the global value chain of environmental goods. Many developing economies participate in the production of those intermediate products and components. For example, building a concentrated solar power system requires materials such as steel, copper, silica and molten salt, as well as components such as collectors, mirrors, reflector film, steam generators, heat collection elements, heat storage and central control systems.²²

- Greater market access for firms and consumers could facilitate the production and use of environmental goods and services.
- Promoting more products to support climate change adaptation and mitigation and other environmental concerns could help economies meet their environmental targets.
- Achieving greater economic growth while also achieving environmental sustainability requires the generation of more renewable energy, cleaner energy sources, the utilisation of more energy-efficient products and the support of circular economy approaches, among others.

An expansion of the APEC List of Environmental Goods is a positive signal that APEC could send to the world as a leading forum for proposing options to help address environmental issues. APEC as a non-binding forum has a clear advantage to explore and incubate new ideas.

Expanding the APEC List of Environmental Goods: Key Considerations

Any discussion to expand the list should keep in mind certain considerations. A global value chain approach could benefit more APEC economies. In particular, developing economies producing less technology-intensive products could contribute to the manufacture of environmental products as part of their complex global value chains. For example, around 8,000 parts are needed to produce a wind

market opportunities and spur the development of products and services to support environmental protection and resource management. See OECD, "Towards Green Growth," 29.

²² G. Gereffi and K. Dubay, "Concentrating Solar Power: Clean Energy for the Electric Grid," in G. Gereffi, K. Dubay, and M. Lowe, eds, "Manufacturing Climate Solutions: Carbon-Reducing Technologies and U.S. Jobs" (Duke University Center on Globalization, Governance and Competitiveness, 2008), 51–64, https://gvcc.duke.edu/wp-content/uploads/greeneconomy_Fullreport-1.pdf

turbine, and the parts have to be sourced from many different locations.²³

A global value chain approach would also involve discussing dual-use goods, as some goods could be used for both environmental and non-environmental purpose (e.g., pipes are used as components for sewage treatment plants and for transporting gas and oil²⁴).

In addition, APEC economies should contemplate the inclusion of adapted goods, which are ‘goods that have been specifically modified to be more “environmentally friendly” or “cleaner” and whose use is therefore beneficial for environmental protection or resource management’.²⁵ Cleaner and more resource-efficient products like hydrogen compressors are a type of adapted good.²⁶

Hydrogen is a clean energy carrier that could reduce carbon emissions, but it is usually not found by itself. To produce hydrogen, it is necessary to separate it from compounds that contain it.²⁷ While most hydrogen is still produced with fossil fuels, it is expected that more hydrogen will be produced from electricity generated with renewable energy sources in the future.²⁸

Between 2012 and 2019, trade of hydrogen compressors (HS 841480) has grown significantly (Figure 3). APEC members increased their export of hydrogen compressors by 12.3 percent, a much higher rate than the exports growth for the whole APEC List of Environmental Goods (5.7 percent). Likewise, APEC import of hydrogen compressors grew at 14.1 percent, higher than the growth rate of those imports in the APEC List of Environmental Goods (13.5 percent).

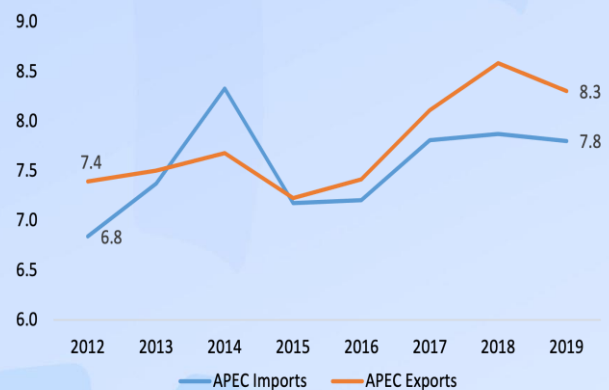
While the average MFN tariff for hydrogen compressors in the APEC region is low, equivalent to 2.9 percent, four APEC economies still charge MFN tariff rates above 5 percent.

In terms of the preferential treatment given by some free trade agreements, the Comprehensive and

Progressive Agreement for Trans-Pacific Partnership (CPTPP) has eliminated tariffs on hydrogen compressors in 8 of its 11 members. The three remaining members will fully liberalise these compressors in periods ranging between 3 and 10 years.

In the case of the Regional Comprehensive Economic Partnership (RCEP), three of its members will fully liberalise hydrogen compressors from the date of entry into force of the RCEP, and seven members will do so within periods ranging from 10 to 20 years. However, one member is only partially liberalising one type of hydrogen compressor and three others are excluding at least one type of such compressors from the liberalisation process.

Figure 3. APEC trade in hydrogen compressors (USD billion)



Source: WITS; APEC PSU calculations.

²³ A.H. Lim, “WTO Work on Trade in Environmental Goods and Services” (presented at the *Training Course on Environmental Goods and Services Negotiations*, United Nations Conference Centre, Bangkok, Thailand, 2–3 March 2017), slide 35, <https://www.unescap.org/sites/default/files/1-2.EGS-Trade2-WTO%20work.pdf>

²⁴ International Centre for Trade and Sustainable Development, “Liberalization of Trade in Environmental Goods for Climate Change Mitigation: The Sustainable Development Context” (presented at the *Trade and Climate Change Seminar*, Copenhagen, Denmark, 18–20 June 2008), 3-4, https://www.nftc.org/default/Trade%20Policy/Climate_Change/CTSD-Climate%20Change%20Mitigation%2008-08.pdf

²⁵ System of Environmental Economic Accounting (SEEA), “SEEA Technical Note: Environmental Goods and Services

Sector (EGSS)” SEEA, 8 July 2016, 6, https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_egss_july_8_2016_draft.pdf

²⁶ SEEA, “SEEA Technical Note: Environmental Goods.”

²⁷ S. Satyapal, “Hydrogen: A Clean, Flexible Energy Carrier,” Office of Energy Efficiency & Renewable Energy, 21 February 2017,

<https://www.energy.gov/eere/articles/hydrogen-clean-flexible-energy-carrier>

²⁸ M. Scott, “Green Hydrogen, The Fuel Of The Future, Set For 50-Fold Expansion,” *Forbes*, 14 December 2020, <https://www.forbes.com/sites/mikescott/2020/12/14/green-hydrogen-the-fuel-of-the-future-set-for-50-fold-expansion/?sh=3f2543ec6df3>

Final Remarks

The APEC List of Environmental Goods has been a positive initiative for supporting the growth of trade in environmental goods and promoting their use. Since its endorsement, APEC economies have reduced their tariffs and experienced a significant increase in their trade flows.

In parallel, governments are facing increasing environmental challenges, and public awareness is growing on these issues. Responding to the challenges requires answers from many areas, not just trade. In fact, generating long-lasting green growth needs appropriate policy decisions in a wide range of areas. Within APEC, it is possible to contribute to these efforts by articulating initiatives across these areas of concern. Indeed, one of the economic drivers in the APEC Putrajaya Vision 2040 on 'strong, balanced, secure, sustainable and inclusive growth' already emphasises the need to promote activities to address all environmental challenges.²⁹

Currently, the APEC List of Environmental Goods only covers 54 HS sub-headings, which means that the list remains limited in its product coverage. From a trade perspective, a more meaningful contribution in support of green growth requires a more comprehensive range of products. APEC economies should explore an expansion of its list of environmental goods, to cover new technologies that could contribute to green growth, but did not exist or had limited applications back in 2012; and encourage APEC economies to consider goods that are cleaner or more environmentally friendly. APEC economies could also discuss an approach that takes into account global value chains for environmental goods and services, which could allow more APEC economies to benefit from any future expansion of the list.

²⁹ See APEC, "APEC Putrajaya Vision 2040" (Annex to the "APEC 2020 Leaders' Declaration," 20 November 2020),

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