EXPORT-IMPORT BANK OF INDIA

WORKING PAPER NO. 69

TRADE IN ENVIRONMENTAL GOODS: A PERSPECTIVE

December 2017

CONTENTS

Project Team:

Mr. Ashish Kumar, Deputy General Manager
Mr. Rahul Mazumdar, Chief Manager
Mr. Mayank Khurana, Officer Trainee

LIST OF BOXES

LIST OF EXHIBITS

LIST OF TABLES

LIST OF ANNEXURES

Executive Summary

The world is becoming increasingly conscious of the adverse impact caused due to the vagaries of an ever changing environment. In such a situation, a two pronged strategy could be undertaken to protect the nature. First, to create a mechanism to mitigate the cause of these changes, and second, to facilitate wider usage of goods which prevent, reduce, and eliminate environmental degradation in any form.

The former could involve a host of international and national bodies, Government agencies, amongst many others, who disseminate information and knowledge, identify challenges, and prescribe a way forward towards preserving the environment. However, in terms of the latter, there has been no consensus with regard to identifying, as also encouraging free trade of environmental goods which could possibly alleviate pollution and create a sustainably better environment.

In this context, identification of what may be called "environmental goods" becomes important. One of the many mechanisms that is being currently deliberated upon, at the global level, is to leverage international trade in facilitating environment protection and climate change mitigation.

International trade is crucial for diffusion of clean technologies, thereby opening up opportunities globally. Unlocking this latent potential in clean and environmental goods will not only facilitate its growth and encourage innovation, but also provide energy security.

COMMITTEE ON TRADE AND ENVIRONMENT SPECIAL SESSION

The initial discussions on trade in environment-related goods began in November 2001, at the Doha Ministerial Conference of the WTO, where it was agreed to launch negotiations on certain issues related to trade and environment. This led to the initial discussions on environmental goods. The mandate of this negotiation in Paragraph 31 (iii) of the Doha Agenda called for "*the reduction or as appropriate, elimination of tariff and non-tariff barriers to environmental goods and services*". Consequently, the Committee on Trade and Environment Special Session (CTESS) was established to take forward the negotiations for the mandate contained in Paragraph 31 of the Doha Ministerial Declaration. Thereafter, the negotiations for arriving at an agreed list of environmental goods began under the CTESS

After various rounds of discussions, the WTO secretariat came up with a list of 480 items in November 2005, as a result of individual submissions of Environmental Goods (EGs) to the WTO's CTESS during 2002-2005, by 9 countries, viz. Canada, the European Community, Japan, Korea, New Zealand, Qatar, Switzerland, Chinese Taipei and the United States. Additionally, during the period 2005 to 2007, alternative approaches to EGs, namely, 'List Approach'; 'Environmental Project Approach and Integrated Approach'; and 'Request and Offer Approach' were proposed by three members i.e. India, Argentina and Brazil, respectively. However, there was no consensus at the CTESS on these approaches.

ENVIRONMENTAL GOODS AGREEMENT AND WTO

The discussion under the WTO ambit gained a concrete shape when the Environmental Goods and Services Agreement concluded among the members of the Asia-Pacific Economic Cooperation (APEC). In September 2012, the APEC Leaders' Declaration contained a commitment to lower applied tariff rates to 5% or less on an agreed list of 54 environmental goods by 2015. This led to the launch of plurilateral negotiations for the establishment of

the Environmental Goods Agreement (EGA) in July, 2014. The latest round of negotiations was held in December, 2016, with 18 participants representing 46 WTO members. The objective of the discussions was to reduce the tariff on the list of agreed EGs.

There are two broad categories of EGs that have featured in the WTO discussions. First, Class A or Traditional Environmental Goods, which have an objective of addressing an environmental problem and include goods such as crushing machines, valves, filters etc. Second, Class B or Environmentally Preferable Products (EPPs), which have certain environmental benefits such as organic agricultural products, natural dyes, water based paints etc. In addition, the intention is also for the EGA to become a 'living agreement' which would allow the addition of new products in the future, and address other issues in the sector (including non-tariff barriers, services, etc.).

While the differences have narrowed down significantly since the preliminary rounds of discussions in 2001 at Doha, varied opinions on definitions, and modalities of implementing a meaningful agreement still remain. The developing countries have maintained a stand that there is a need to show a clear developmental and environmental benefit from the identified set of environmental goods. There have been various issues that have come up during discussions. First, the challenge of classifying dual-use/multiple-use goods (i.e., the goods that may be considered environmental but can also be used in ways that do not necessarily facilitate clean environment). Second, the challenge of a 'living list' of goods, that is, a list which is open to change over time. Third, the lack of clarity on who benefits out of this agreement, developing or developed economies, has dissuaded many developing economies, including India, not to participate in the discussions.

INTERNATIONAL TRADE IN ENVIRONMENTAL GOODS

There have been various submissions to WTO with respect to the list of EGs. Initially, 480 items had been identified as environmental goods by nine WTO Members and compiled into an informal document by the WTO Secretariat in November 2005. Following this, a better aligned comprehensive list of 153 items in 2009 was submitted jointly by the so-called 'Friends of Environmental Goods' group, also known as the 'Friends' List'. Finally, in early 2014, the WTO agreed to transform the environmental goods from a multilateral to plurilateral negotiating initiative. This stated that the countries would build off the APEC list of 54 environmental goods as a starting point for their negotiations. It is interesting to note that out of 54 EGs in the APEC List, which served as a starting point for EGA, 48 are those that are part of 153 goods proposed under the 'Friends' List'.

Friends' List (153 items)

Global exports of items identified in the Friends' List of 153 EGs stood at US$ 960.1 billion in 2015, as against India's exports of US$ 9.8 billion, implying that the country had a share of a little over 1% in the global exports of such items.

A breakdown of the list of 153 EGs reveals that India's share in world exports of items identified under the 'Environmentally Preferable Products, Based on End Use or Disposal Characteristics' category was significantly higher at 17.2%. However, the share of this category of EGs in India's total exports of EGs was relatively low at 0.9% as against the items identified under 'Management of Solid and Hazardous Waste and Recycling Systems' and 'Air Pollution Control' categories, which together accounted for a share of 21.6% in India's overall exports of EGs.

[1]List of countries include Canada, the European Union, Japan, Korea, New-Zealand, Norway, Chinese Taipei, Switzerland and the United States

Many of the large exporting countries were also among the largest importers of EGs items. For instance, China was the largest exporter of these items in 2015 (share of 16%) and also the second largest importer (share of 10%). Similarly, Germany was the 2nd largest exporter (share of 14%) and also 3rd largest importer (share of 7%). India remained the 25th largest exporter of these items (share of 1%) and 15th largest importer (share of 2%) in 2015. The top 10 items together accounted for almost 40% of the total exports of 153 items in 2015.

India's exports of 153 EGs, as prescribed by the Friends' List, registered an annual average growth (AAGR) of 4.3% between 2011 and 2015, increasing from US$ 8.3 billion to US$ 9.8 billion during this period. However, imports showed a marginal decline from US$ 17.7 billion to US$ 16.8 billion, recording an AAGR of (-) 1%, during the same period. India's trade deficit hence, registered a decline from US$ 9.4 billion in 2011 to US$ 7.0 billion in 2015. The combined share of these 153 products in India's total exports increased from 2.8% in 2011 to 3.7% in 2015, while their share in the country's imports increased from 3.8% to 4.3% during the same period.

The major export markets for India for the EGs from the Friends' List of 153 goods in 2015 included the USA (share of 17%), UAE (share of 7%), The UK (share of 5%), Saudi Arabia (share of 4%) and Germany (share of 4%). The top 10 destinations together accounted for 52% of total exports of 153 EGs from India. As compared to this, the major sources from where India imported these 153 products (from the Friends' List) in 2015 were China (31%), Germany (13%), the USA (11%), Japan (7%) and South Korea (5%). The top 10 sources together comprised 81% of total value of 153 EGs imported by India during 2015.

APEC List (54 items)

World exports of items identified as EGs in the APEC list stood at US$ 492.4 billion in 2015, as compared to India's exports of US$ 3.1 billion, implying a share of 0.64% for the country in global exports of such identified items.

Within the APEC list of 54 items, India's share in world exports of items identified under the 'Natural Risk Management' category stood at 1.5%, followed by 'Management of Solid and Hazardous Waste and Recycling Systems' at 1.1%. The items categorised as 'Renewable Energy Plant' and 'Management of Solid and Hazardous Waste and Recycling Systems' together accounted for more than half of the share in India's total exports of EGs during 2015 under the APEC list.

The largest exporters of the APEC list of EGs have also been amongst the key importers of such products in the world. China, which was the largest exporter of EGs during 2015 (share of 18%), was also the largest importer (share of 20%). Germany, which was the second largest exporter with a share of 12%, was the third largest importer of such items, with a share of 6%. The trade in environmental goods, both exports and imports, thus remains highly concentrated. Out of the 54 items, the US was the largest importer for 19 items, followed by China, which was the largest importer for 16 items. With regard to exports, Germany was the largest exporter for 16 items, while the US and China were the largest exporters for 14 items each. Also, the top 10 imported items accounted for almost 59% of the global EG imports in 2015.

India's trade deficit in 54 EGs stood at US$ 6.5 billion in 2015. The imports of India's EGs stood at US$ 9.6 billion in 2015, while the exports stood at US$ 3.1 billion. During 2011 to 2015, the exports of EGs from India, registered an AAGR of 1.4%, better than the AAGR for imports of EGs by India, which witnessed a decline of (-) 0.2%.

India's share in world exports of EGs for top 10 commodities by value has marginally increased from 0.8% in 2011 to 0.9% in 2015. The same has

increased from 0.5% in 2011 to 1.1% in 2015, if the top commodities are analysed by their growth (AAGR) rates. In terms of imports, India's share in the top 10 imported EGs in the world has increased both in terms of the set of top EGs by value, as also by AAGR. This share has increased from 1.9% in 2011 to 2.3% in 2015, by value and from 1.8% in 2011 to 3.2% in 2015, by AAGR.

Comparative Advantage for India in EGs and Possible Diversification

The Study has undertaken an analysis with the objective of identifying EGs, where domestic capacities can be strengthened and the markets which can be targeted. Based on this analysis, the items have been classified as 'Product Champions (have maximum potential)'; 'Underachievers (need to recover lost ground from competing suppliers and increase exports)'; 'Growth in Declining Market (need to diversify and put resources to better use)'; and 'Losers in Declining Market (need to identify new markets)'.

Seven products which together constituted around 18.7% of India's total EGs exports by value, i.e., US$ 574.8 million in 2015, have been identified as Product Champions. The underachievers contributed 56.1% to India's EGs exports in 2015 and were 29 in number with a combined value of US$ 1752.4 million.

STRENGTHENING EGs SECTOR IN INDIA: POSSIBLE WAY AHEAD

Joining EGA negotiations as an option: Pros and Cons

The welfare benefits arising out of India joining the EGA negotiations could give the country access to environmental goods at relatively lower costs, resulting in driving domestic demand and usage of such products in the country. Also, being a part of the discussion would give India the opportunity to provide options like agreeing to a gradual reduction of tariffs over a period of time, subject to the participating countries, especially those from the developed economies, committing to make minimum threshold investments into India. India could also consider examining the value chain approach to receive investments as well. For example, in the IT sector, the finished products (for e.g. mobile phones), are essentially an assembly of many other disintegrated products produced in various parts of the world. India can strengthen the EG value chain and create opportunities to specialize in some of them, and gradually capture a certain proportion of its value while garnering export earnings from it. Given the huge market that India has on clean energy, firms from developed countries may be attracted to produce locally and serve both the domestic and overseas markets, making India a manufacturing hub.

However, in contrast, it may be argued that, there are various bottlenecks in terms of processes (including technology) that developing countries like India face, which leaves them behind in their growth curve. Such countries take a number of years to reach a level, to compete internationally. Additionally, export share of India for only four EGs exceeded 3% of the world exports during 2015. A granular analysis for India's export destinations for these four EGs reveals that, most of its markets are developing countries, which are not a part of the EGA negotiations. In fact, the top export destination for three out of four EGs was Philippines, which is not a party to the EGA negotiations. In such circumstances, India can enjoy benefits through 'free riding' on the negotiating efforts of others. Even though the negotiations are being conducted plurilaterally, the benefits would be accrued to all WTO members, irrespective of their participation in EGA, once the 'critical mass' is reached.

Further, an analysis has been done to showcase the tariff structure of the 54 EGs in a mix of developing and developed countries (Argentina, India, Brazil, China, the EU and the USA). Here, it is observed that, on an average, the tariff charged by the nations, which are not part of the EGA negotiations, is high, compared

to the nations which are part of the negotiations.

Creating export capability of environmental goods

Global exports of environmental goods are concentrated in the developed countries, and hence, in a country such as India, which has a huge domestic market, the domestic producers may lose a significant market share to the imports from developed markets, should the tariffs be reduced.

The response by India, in such a situation, could be to broaden the export capability of environmental goods through appropriate policies, which would help in attracting greater investments in this sector. If the basket of environmental products based on end-use includes products, that show actual or potential export-growth for developing countries, those could be promoted to generate meaningful export earnings. The broadened export basket could also consider inclusion of important intermediate parts and components. Investments into such categories would augment production and export capabilities, thereby feeding into the global supply-chains in the environmental industry. Also, products under categories such as 'Renewable Energy Plant' and 'Management of Solid and Hazardous Waste and Recycling Systems' together constituted more than 50% of the US$ 3.1 billion exports in 2015 and therefore, should be an ideal recipient of export thrust.

Create avenues for technology transfer of EGs

According to the Ministry of Environment and Forests, Government of India, an estimated investment of US$ 2.5 trillion is required for implementation of India's Intended Nationally Determined Contributions at 2014-2015 prices, which would require mobilization of funds, both from domestic and international sources.

This would entail devising measures which would facilitate investments in the environmental goods space, thereby enabling creation of numerous jobs and trade opportunities. Learnings from some of the policy initiatives undertaken in other sectors could provide valuable insights, which could then be replicated or suitably adapted for the environmental goods sector. One such approach could be the policy framework adopted for the development of the automotive sector in India, which is considered to have achieved significant success in technology transfer, capability enhancement, value chain development, among others.

Such an approach also played a major role in the development of Indian auto-components industry. Many multinational OEM firms also joined hands with Indian auto-component firms for sourcing, transferring technologies and imparting skills. Another approach could be to use an Offset Policy, as has been the case in the Defence Procurement Procedure (DPP). Offsets essentially benefit the Indian industry, which gets technology / capability from a foreign vendor selling to India. In its approach towards EGs, India could perhaps consider deploying a suitably modified version of DPP.

Duty Rebate according to the goods defined for the project

The negotiations for the EGA, since the very start, have faced the issue of dual or multiple usage of Environmental Goods while defining them. Developing countries have argued that there was a need to show a clear developmental and environmental benefits from the items mentioned in the list of Environmental Goods. The Government or any other institution as defined by the Government, can refund the duties to an extent defined, or full, as the case maybe, to the importers who are using those goods in that particular project. This essentially would mean that such 'environmental goods' would qualify for reimbursement of duties paid, subject to them being used/utilised in the value chain for a product that is environmentally friendly. Here, India can work towards promoting sustainable environment, without being a part of the EGA.

Discussions on environmental goods under the aegis of ISA

India could lead the discussions on Environment Goods, under the umbrella of the International Solar Alliance. Being the anchor of ISA, India could work with like-minded countries to establish an agreement which could be on the lines of the EGA, but with a greater thrust on investment promotion and technology transfer, albeit only for solar related items. Such a deal would give rise to a lower probability of dispute among what goods to include since there would be a fair degree of agreement among stakeholders on what goods and services are important for the solar supply chain even if some of these may include dual-use goods i.e. with non-solar related applications as well. However, such discussions need to be voluntary, unlike the EGA, which is binding. Though a voluntary agreement may not give the private sector across the globe the predictability it needs, it can certainly play a role in shaping production decisions and trade flows and thus better optimize the supply-chains. The objective essentially is to promote technology transfer, investment cooperation, and eventually tariff reduction over a period of time, thereby facilitating greater movement and utilisation of solar goods and augmenting solar power generating capacity across the world. Devising investment norms, facilitating technology know-how and bettering trade objectives could be considered under the ambit of ISA. Trade, therefore, could also be used as an instrument, facilitating technology dissemination for global good.

SUM UP

For a developing country like India, which has already put so much at stake through its international commitments, it would make sense to support the usage of quality, and state of the art, pollution prevention and environmentally sustainable products, which would foster climate change mitigation. At the same time, such environmental goods should be made available at the cheapest price possible. India, thus, could explore all possible options and weigh the opportunity, with regard to promotion of investments through the EGA negotiations.

There are multiple options that are available for India to promote the growth of environmental goods in the country - from incentivising technology transfer, administering duty drawbacks based on end use, attracting and facilitating investments, to eventually supporting gradual reduction in tariffs, which would create export opportunities besides protecting the global environment. The negotiating platform could be used to achieve these desired objectives.

As far as EGA is concerned, it may not be the ultimate solution towards mitigating climate change, but it is definitely a means towards an end, facilitating trade of goods, which have the potential to reduce the cost of implementing climate change mitigation. The impact of tariff reduction can be extended to economic activity, where India can have an edge in products in which it has a comparative advantage.

1. ENVIRONMENTAL GOODS: AN INTRODUCTION

The world today is becoming increasingly conscious of the adverse impact caused due to the vagaries of an ever changing environment. In such a situation, a two pronged strategy could be undertaken to protect nature. One could be to create and structure a mechanism to mitigate the cause of these changes, and second could be to facilitate wider usage of goods which prevent, reduce, and eliminate environmental degradation in any form.

With regard to the former, there exist a host of international and national bodies, Government agencies, amongst many others, who disseminate information and knowledge, identify challenges, and prescribe the way forward towards preserving the environment. Such issues have been discussed at various international platforms, and numerous studies have been undertaken to assess the cause and effect of climate change. Based on such discussions and studies, and even independently, means and mechanism have been gradually put in place to mitigate the adverse impact of climate change. At times, these efforts have been conscious and voluntary, whilst at other times, they have entailed enforcement through legislations.

However, there has been no consensus with regard to identifying goods which could possibly alleviate pollution and create a sustainably better environment. In this context, identification of what may be called "environmental goods" becomes important. One of the many mechanisms that is being currently deliberated upon, at the global level, is to leverage international trade in engendering environment protection and climate change mitigation. This can be achieved primarily through efforts aimed at liberalizing trade in products that help make the world cleaner and greener.

International trade is crucial for diffusion of clean technologies, thereby opening up opportunities globally. Unlocking this latent potential in clean and environmental goods will not only facilitate its growth and encourage innovation, but also provide energy security.

Committee on Trade and Environment Special Session (CTESS)

In November 2001, at the Doha Ministerial Conference of the WTO, it was agreed to launch negotiations on certain issues related to trade and environment. This led to the initial discussions on environmental goods. The mandate of this negotiation in Paragraph 31 (iii) of the Doha Agenda called for *"the reduction or as appropriate, elimination of tariff and non-tariff barriers to environmental goods and services"*[2].

The CTESS[3] was established to deal and take forward the negotiations for the mandate contained in paragraph 31 of the Doha Ministerial Declaration. Hence, the process of listing of environmental goods began under special session convened by Committee on Trade and Environment, which works under the ambit of the WTO.

The 'Environmental Goods' were not defined in Doha declaration. However, a substantial amount of work to identify the scope of environmental goods had already been undertaken by the OECD and APEC, resulting in two product lists of candidate goods, one from each organisation.

The two lists - APEC list and OECD list (Box 1) - had very less in common in product lines, and hence WTO decided to go beyond these two lists provided by OECD and APEC. The discussions about these two different lists happened under the ambit of CTESS, which involved production process on whether a good is ecologically manufactured, and the end use of the goods.

[2]https://www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_e.htm

[3]The CTE was estabilised in 1995. Since the Doha Ministerial Conferance, in 2001, work on trade & enviroment within WTO has split into two separate tracks: the negotiating track conducted in CTE special session (CTESS) and regular work in CTE regular session.

There has been an issue here, on whether products could be considered environmental, based on the way they have been processed or produced. While it might sound reasonable to include products with better production methods, the current WTO rules do not allow members to differentiate among 'like products' based on their process and production methods. For this reason, WTO members have sought to avoid including Environmentally Preferable Products (EPP)[4] in the negotiations.

During 2002-2005, nine countries[5] made individual submissions of Environmental Goods (EGs) to the WTO's CTESS. Consequently, the WTO secretariat came up with a list of 480 items in November 2005. Most of the items in this list were in the area of waste water management (118), solid and hazardous waste management (108) and renewable energy (108). In fact, 56% of the items in the list fell in the area of "pollution management"[6] which includes sub categories such as air pollution control, environmental monitoring and analysis, noise and vibration abatement, remediation and clean-up, solid and hazardous waste management, and waste water management. Other categories that featured

Box 1: Environmental Goods: OECD and APEC List Approaches

The OECD and Eurostat define environmental goods and services industry to consist of activities which produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air and soil, as well as problems related to waste, noise and ecosystems. The OECD list has broadly classified goods and services under three categories - Pollution Management (air pollution control, wastewater management, solid waste management etc.); Cleaner Technologies and Products; and Resources Management Group (indoor air pollution control, water supply, recycled material etc.).

The APEC defines environmental goods and services as an industry sector devoted to solving, limiting or preventing environmental problems. The industry should be involved in manufacturing and/or services related to water or air pollution, waste management, recycling, renewable energy, monitoring, analysis and assessment. The APEC list was classified into various environmental activities such as Air Pollution Control; Heat/Energy Management; Monitoring/Analysis; Noise/Vibration Abatement; Other Recycling Systems; Potable Water treatment; Remediation/Clean up; Solid/Hazardous Waste; and Wastewater Management[7].

The objectives of the two lists, however, were different.

- The OECD's larger list was created deductively, starting from general categories based on classifications appearing in the environment industry manual, and adding more specific examples, where available, in order to produce an estimate of average tariffs on a previously undefined class of goods.
- The APEC approach started with nominations, not unlike the request/offer procedures traditionally used in trade negotiations, yielding a list of goods which was then arranged according to an agreed classification system[8].

[4]EPPs have been defined as products that cause significantly less 'environmental harm' at some stage of their 'life-cycle' than alternative products serving the same purpose or goods that have a high environmental performance or low environmental impacts. It has been stressed, however, that the EPP concept should be utilised only when the product to which it refers can be identified by end-use or disposal characteristics. It has also been stressed that goods that rely on product distinctions based on processes or production methods should be excluded from the list.

[5]9 group of friends - Japan, Chinese Taipei, European Union, Republic of Korea, New Zealand, Canada, The USA, Switzerland and Qatar

[6]Synthesis of Submission on Environmental Goods, 17 November 2005, Informal Note by the Secretariat

[7]World Trade Organization, "List of Environmental Goods — Paragraph 31 (iii) — Note by the Secretariat", Document No. TN/TE/W/18, 20 November 2002, Geneva

[8]A Comparison of the APEC and OECD Lists, 2005
https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=78474,78529,103869,53093,50662,61291,46603,2219,2298&CurrentCatalogueIdIndex=7&FullTextHash=&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True

in the list of 480 items were "Clean technology and products", and "Resources Management".

During the period 2005 to 2007, proposals on alternative approaches (Box 2) to EGs were notified by three members i.e. India, Argentina and Brazil.

Environmental Goods Agreement and WTO: A Brief

There have been several rounds of discussions that have taken place, since the Doha round. However, the discussions gained a direction when Environmental Goods and Services Agreement concluded within the Asia-Pacific Economic Cooperation (APEC). In September 2012, the APEC Leaders' Declaration contained a commitment to lower applied tariff rates to 5% or less on an agreed list of 54 environmental goods by 2015.

This led to the launch of plurilateral[9] negotiations for the establishment of the Environmental Goods Agreement (EGA) in July, 2014. The latest round of negotiations was held in December, 2016, with 18 participants representing 46 WTO members. The objective of the negotiations is to reduce tariffs on a list of environmental goods that is to be agreed upon.

It may be noted that there exists a 'Chairs list' as well - a list of 536 codes at HS-6 digit level, which includes the 54 APEC products, that have been under consideration in the negotiations. However, the list under discussions is currently confidential and known only to the negotiators, and not available in public domain.

There are two broad categories of Environmental Goods (EGs) that have featured in the WTO discussions. These are:

- Class A or Traditional Environmental Goods, which have an objective of addressing an environmental problem and include goods such as crushing machines, valves, filters etc.
- Class B or Environmentally Preferable Products (EPPs), which have certain environmental benefits such as organic agricultural products, natural dyes, water based paints etc.

In addition, the intention is also for the EGA to become a 'living agreement' which would allow the addition of new products in the future, and address other issues in the sector (NTBs, services, etc.).

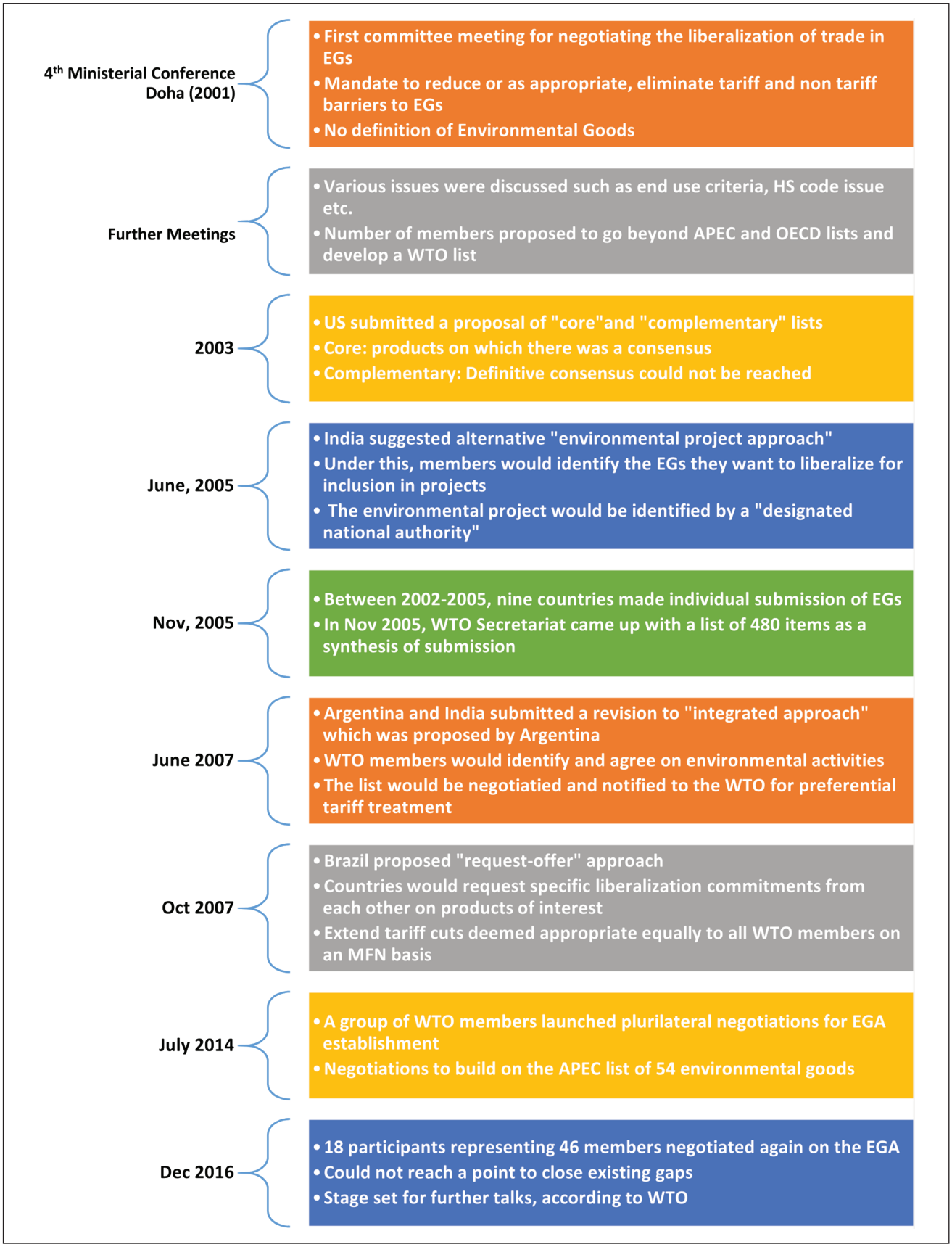
The potential to trade in environmental goods and benefits arising as a result of it, exist for both the developing and developed nations. According to a June 2016 report on Environment Technologies by the U.S. Department of Commerce, the global market for environmental technologies goods and services reached US$ 1.05 trillion in 2015. The USA was host to the single largest market and accounted for US$ 303 billion of the global market in 2015. The U.S. industry for environmental technologies employed approximately 1.6 million people and had revenues of US$ 320.4 billion. The report also observes that key environmental technologies market in 2016 is estimated to have touched US$ 60.7 billion in China, and US$ 16.3 billion in India. Other key markets include Mexico, Brazil, South Korea, Saudi Arabia, Indonesia, Turkey, Poland, and UAE.

Issues during discussions

The list of Environmental Goods that are currently under discussions are diversified and selective at the same time. However, while the differences have narrowed down significantly since the preliminary rounds of discussions in 2001 at Doha, varied opinions on definitions, and modalities of implementing a meaningful agreement still remain. The developing countries have maintained a stand that there is a need to show a clear developmental and environmental benefit from these items.

[9]At this stage, only some WTO members have chosen to take part in the talks. This is why they are described as 'plurilateral'. Once a critical mass is reached to get an agreement, the benefits of this plurilateral initiative will be applied to all WTO members using the Most Favoured Nation (MFN) principle. Ideally, the agreement would be made part of the package of WTO agreements so other WTO members could open up their markets.

Exhibit 1.1: Environmental Goods Agreement: Timeline



Source: WTO; Exim Bank Research

The differences in opinion can broadly be framed as follows:

- Firstly, the challenge of classifying dual-use / multiple-use goods (i.e., the goods that may be considered environmental but can also be used in ways that do not necessarily facilitate clean environment) still continues. For example, within the APEC list of 54 identified environmental goods, 'Gas turbines of a power > 5.000 kW' (HS code- 841182) could be used to generate power from clean sources such as landfill gas, biogas etc. However, they could alternatively be used to generate power from ordinary natural gas - a CO2 emitting fossil fuel. The issue is therefore, whether the list will benefit and encourage only buyers who have environmental objectives, or also buyers, who buy with no special environmental consideration.

- Secondly, the challenge of a 'living list' of goods, i.e, a list that is open to change over time, has also been faced during these discussions. A product may be found to be environment friendly in one country but not in other. Similarly, with the evolution of technology, a good which is environment friendly at present, can be of no environmental use or anti-environment in the future as was witnessed in the case of evolution of Chlorofluorocarbons to Hydro Chlorofluorocarbons to Hydro fluorocarbons. Similarly, ten years ago, compact fluorescent bulbs could have been considered a more environment friendly product than any other product in lighting segment. However, in present time, LED light bulbs are considered to be more environment friendly.

- The third and perhaps the most important and significant one, pertains to who benefits out of this agreement, developing or developed economies. This has, in fact, caused many developing economies, including India, not to be directly involved in the discussions. However, some issues have been specific to the developing nations due to which, many of them could not be a part of the latest discussions on this agreement. The needs and interests for both the developing and developed economies have been found to be different in terms of environmental goods. For example, most of the goods in the APEC and OECD (see Box 1) lists are Class A goods, whose major exporters and importers are developed countries and this has been criticised by the developing economies. Developing economies have argued to not only include industrial products but also agricultural goods of particular interest to them, such as organic agricultural products, biodegradable natural fibres like jute, sisal and coir, natural dyes, ethanol, natural rubber etc., as well. These goods are mostly raw and processed natural resource based commodities, and the developing world sees huge export opportunity in them.

Box 2: Different approaches discussed under the negotiations

During the course of discussions on Environmental Goods since 2001, a host of approaches were suggested by various countries, which were either a part of the discussions or not a part of it. Some of the alternative approaches are discussed below.

List Approach

The United States, in 2003, proposed that a "core list" and a "complementary list" be developed. The "core list" would comprise products on which there is consensus that they constitute environmental goods. A second "complementary list" could be developed for additional products on which definitive consensus could not be reached, but for which there is a high degree of acknowledgement that they can have significance for environmental protection, pollution prevention or remediation, and sustainability.

China, in 2004, suggested setting up a "common list" and a "development list". The "common list" would include specific product lines, on which there is consensus that they constitute environmental goods. For the products in this common list, members would be committed to reduce or eliminate tariff and non-tariff barriers. The "development list" would be a list of environmental goods for special and differential treatment born from the "common list". It would comprise those products selected by developing and least-developed country members from the common list for exemption, or a lower level of reduction commitments.

Environmental Project Approach and Integrated Approach

India suggested an alternative 'environmental project approach' in 2005, to the ongoing negotiations. The approach aimed to "address the diversity in environmental standards with common but differentiated responsibilities[10] and would bring in trade liberalization to meet the environmental as well as the developmental goals".[11] The environmental goods which would be relevant in this aspect were to be identified and if approved by 'Designated National Authority ',[12] would qualify for specified concessions for the duration of the project[13].

It may be noted that later in 2007, India and Argentina came up with a revised 'integrated approach'. Under this, WTO members would prepare the list on the identification and agreement on environmental activities and subsequently, identify the entities that carry out these activities. After the notification to the WTO and negotiations on this list, goods falling under this category would be given a preferential tariff treatment.

Request and Offer Approach

The Request and Offer approach was proposed by Brazil in 2007 in which countries would request specific tariff cut commitments on products of interest and then extend these tariff-cuts to all WTO members based on the MFN clause. Some developing countries perceived that this approach would shield them from a formula-based on across-the-board tariff reduction.

Hybrid Approach

The Hybrid approach was proposed by Australia, Colombia, Hong Kong, Norway and Singapore. The proposal combined various elements that were being addressed in various other approaches like - an agreed core list on which all members would take commitments (proponents of this Hybrid approach have identified 26 HS-6 digit codes); a complementary self-selected list (mainly for developed countries); a complementary request-offer approach, the outcome of which would be multilateralized on an MFN basis.

[10]A common responsibility for every country to work for the environment but the responsibilities will be different as the environmental projects would be identified by a Designated National authority

[11]An Alternative Approach for Negotiations under Paragraph 31(iii) – Submission by India, 3 June 2005, (TN/TE/W/51)

[12]An authority which would identify projects that could be aimed at meeting national environmental objectives as well as objectives of any bilateral or multilateral environmental agreement

[13]https://docsonline.wto.org/dol2fe/Pages/SS/DirectDoc.aspx?filename=t%3A%2Ftn%2Fte%2F14.doc&

2. INTERNATIONAL TRADE OF ENVIRONMENTAL GOODS

With regard to trade per se, there has been a structural change post-WTO. As WTO rules and regulations prevailed, the world witnessed numerous and innovative ways to get attached to one another through mutually beneficial trade agreements, manifested in the form of FTAs, CEPAs, etc. Amidst this, discussions began on a niche set of goods which were considered under the ambit of 'Environmental Goods', and it revolved around forging a common understanding in what is being termed as the 'Environmental Goods Agreement' (EGA). The classification of what constitutes environmental goods (EGs) as detailed in the previous section, has come a long way due to the issues and concerns associated with it.

There have been various submissions to WTO with respect to the list of EGs. The process however, has been gradual, involving multiple rounds of discussions.

- Initially, 480 items had been identified as environmental goods by nine WTO Members and compiled into an informal document by the WTO Secretariat in November 2005. This list, however, had issues with regard to duplicity of product references at HS codes at various levels, unavailability of assigned HS codes, amongst others.
- Following this list was a much better and well aligned comprehensive list of 153 items in 2009, submitted jointly by the so-called 'Friends of Environmental Goods' group[14], also known as the 'Friends' List'. This list was a result of the revision and downsizing of a previous list of 480 items in 2005.
- The discussions took a more concrete turn with the Asia Pacific Economic Cooperation (APEC) identifying a list of 54 items (HS codes) as EGs, and reached an agreement of lowering applied tariffs to 5% or less by 2015. Following this successful initiative of APEC, its members, led by the US, persuaded WTO to adopt a plurilateral approach for arriving at a consensus to forge the Environmental Goods Agreement.
- Consequently, in early 2014, the WTO agreed to transform the environmental goods from a multilateral to plurilateral negotiating initiative. On 24 January 2014, at Davos, a group of WTO members[15] issued a joint statement stating that they would initiate negotiations toward a plurilateral agreement[16]. The announcement stated that the countries would build off the APEC list of 54 environmental goods as a starting point for their negotiations.

This chapter of the Study makes an attempt to analyse the Friends' List of 153 items, whilst undertaking a detailed analysis of the APEC List of the 54 EGs which was a starting point in the negotiations under the EGA, and could be modified goiong forward.

Category wise comparison of Friends' List (153) and APEC list of EGs (54)

It may be interesting to note that out of 54 EGs in the APEC List, which served as a starting point for EGA, 48 are those that are part of 153 goods proposed under the 'Friends' List'. The six additional ones have been detailed in Table 1.

[14]Comprised Canada, the E.U., Japan, Korea, New Zealand, Norway, Switzerland, Taiwan (Chinese Taipei), and the U.S.
[15]The group consisted of Australia; Canada; China; Costa Rica; the EU; Hong Kong; Japan; South Korea; New Zealand; Norway; Singpore; Switzerland; Chinese Taipei; and the US.
[16]Plurilateral Trade Agreements are binding for those Members that have accepted them, and are binding on those Members only but do not create either obligations or rights for Members that have not accepted them.

Friends' List

The analysis undertakes a comparison of the the identified HS codes, classified under various categories on the basis of their end use or utility, both for Friends' List of 153 items and APEC List of 54 items.

Detailed categorywise Lists are presented in Annexure 1 and Annexure 2. The categorywise classifications have been done by the "Friends of Environmental Goods"[17] which proposed the Friends' List.

Global exports of items identified in the Friends' List of 153 EGs stood at US$ 960.1 bn in 2015, as against India's exports of US$ 9.8 bn, implying that the country had a share of around 1% in global exports of such items.

India's share in world exports of items identified under the 'Environmentally Preferable Products, Based on End Use or Disposal Characteristics' category was significantly higher at 17.2% (Table 2). However, its share in India's exports of EGs was relatively low at 0.9%. Also, the items identified under 'Management of Solid and Hazardous Waste and Recycling Systems' and 'Air Pollution Control' categories together accounted for a share of 21.6% in India's overall exports of EGs, classified under the Friends' List.

Table 1: Items from APEC list which are not part of the Friends' List

HS code	Item/ Description
441872	Flooring panels, multilayer, assembled, of wood (excluding for mosaic floors)
841199	Parts of gas turbines, n.e.s.
841290	Parts of non-electrical engines and motors, n.e.s.
850490	Parts of electrical transformers and inductors, n.e.s.
901380	Liquid crystal devices, n.e.s. and other optical appliances and instruments not elsewhere specified in chapter 90
901390	Parts and accessories for liquid crystal devices "LCD", lasers and other appliances and instruments not elsewhere specified in chapter 90, n.e.s.

Source: WTO; EXIM Bank Research

Table 2: Share of Products in India's exports of EGs as per the Friends' List (2015)

Category	Share of India in world exports of EGs	Share in India's exports of EGs
Air Pollution Control	1.1%	10.6%
Clean Up or Remediation of Soil and Water	1.3%	1.0%
Cleaner or More Resource Efficient Technologies and Products	0.1%	0.1%
Environmental Monitoring, Analysis and Assessment Equipment	0.4%	4.2%
Environmentally Preferable Products, Based on End Use or Disposal Characteristics	17.2%	0.9%
Heat and Energy Management	1.6%	2.7%
Management of Solid and Hazardous Waste and Recycling Systems	1.0%	11.0%
Natural Resources Protection	4.0%	0.5%
Natural Risk Management	1.2%	0.9%
Noise and Vibration Abatement	1.4%	9.1%
Renewable Energy Plant	0.9%	26.5%
Waste Water Management and Potable Water Treatment	1.3%	32.5%

Source: WTO; UN Comtrade; EXIM Bank Research

[17]Countries proposing it are Canada, the E.U., Japan, Korea, New Zealand, Norway, Switzerland, Taiwan (Chinese Taipei), and the U.S.

APEC List

A similar categorywise analysis is done for the APEC's List of 54 EGs as well. World exports of items identified as EGs in the APEC list stood at US$ 492.4 bn in 2015, as compared to India's exports of US$ 3.1 bn, implying a share of 0.64% for the country in global exports of such identified items.

India's share in world exports of items identified under the 'Natural Risk Management' category stood at 1.5%, followed by 'Management of solid and Hazardous Waste and Recycling Systems' at 1.1% (Table 3). Also, the items categorised as 'Renewable Energy Plant' and 'Management of Solid and Hazardous Waste and Recycling Systems' together accounted for more than half of the share during 2015, in India's total exports of EGs under the APEC list. Categories like 'Waste Water Management and Potable Water Treatment' and 'Environmental Monitoring, Analysis and Assessment Equipment' also had significant shares of 12.2% and 11.4%, respectively, in India's EGs exports during 2015.

Table 3: Share of Products in India's exports of EGs as per the APEC List (2015)

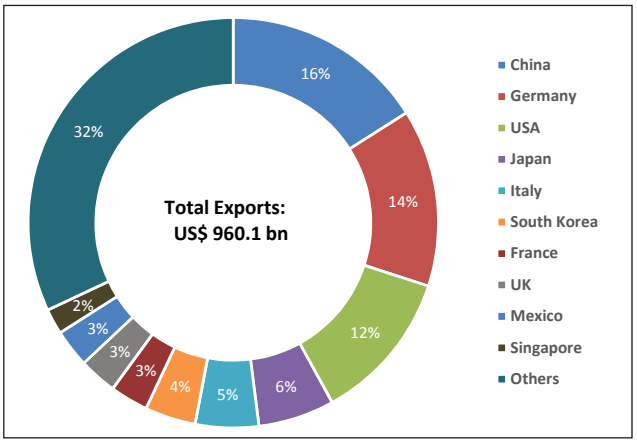
Category	Share of India in world exports of EGs	Share in India's exports of EGs
Air Pollution Control	1.0%	10.8%
Environmental Monitoring, Analysis And Assessment Equipment	0.4%	11.4%
Management Of Solid And Hazardous Waste And Recycling Systems	1.1%	24.4%
Natural Risk Management	1.5%	2.1%
Renewable Energy Plant	0.7%	30.0%
Waste Water Management And Potable Water Treatment	0.9%	12.2%
Others	0.2%	9.2%

Source: WTO; UN Comtrade; EXIM Bank Research

GLOBAL TRADE IN FRIENDS' LIST OF ENVIRONMENTAL GOODS

Many of the largest exporters were also the largest importers of EGs items (Exhibit 2.1 & 2.2). For instance, China was the largest exporter of these items in 2015 (share of 16%) and the second largest importer (share of 10%). Similarly, Germany was the 2nd largest exporter (share of 14%) and 3rd largest importer (share of 7%), whilst the United States was the 3rd largest exporter (share of 12%) and top importer (share of 15%). It is to be observed that Mexico, which was the 9th largest exporter (3%) of these 153 items, was the 4th largest importer (share of 4%). Additionally, India remained the 25th largest exporter of these items (share of 1%) and 15th largest importer (share of 2%) in 2015.

Exhibit 2.1: Major Global Exporters of 153 EGs under the Friends' List (2015)

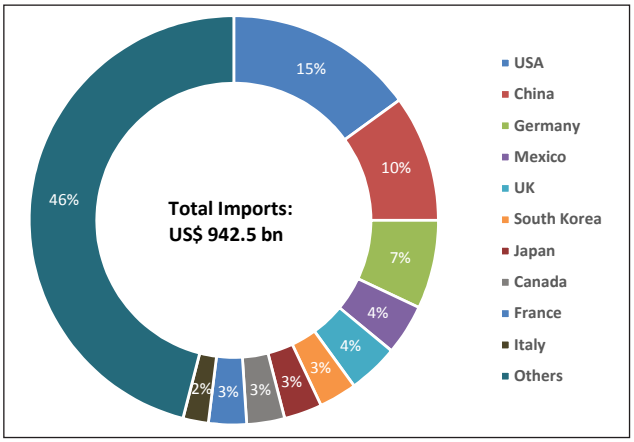


Source: Data derived from UN Comtrade; EXIM Bank Research

Globally, the top 10 imported items together accounted for almost 40% of the total exports of 153 items, identified under the Friends' List. The share has remained the same when compared to 2011 (Table 4).

It may be noted that the pace of cumulative decline of the 153 EGs, identified under the Friends' List was significantly lower (at an AAGR of -0.3%) as compared to the decline in overall world imports (at an AAGR of -2.6%) during the period 2011-2015, reflecting the resilient charactersistic of such products in the face of global trade slowdown.

Exhibit 2.2: Major Global Importers of 153 EGs under the Friends' List (2015)



Source: Data derived from UN Comtrade; EXIM Bank Research

The highest imported item globally was 'Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes' (HS Code-854140) with imports aggregating to US$ 55.5 bn in 2015, implying a share of 5.9%, lower than its share of 7.7% in world imports of the 153 EGs during 2011.

The shares of most other items amongst the 10 major EG imports have however shown an increase during 2011 to 2015. 'Static converters' (HS code-850440), with imports being US$ 50.8 billion (5.4% share), was the second largest imported item, followed by 'Appliances for pipes, boiler shells, tanks, vats or the like (excluding pressure-reducing valves, valves for the control of pneumatic power transmission, check "non-return" valves and safety or relief valves)' (HS code-848180) with imports amounting to US$ 48 bn in 2015.

Table 4: World Import of Top 10 EGs by value under Friends' List (2015)

		Imports (US$ Billion)					Share in percent (2011)	Share in percent (2015)	AAGR in percent (2011-2015)
HS Code	Item / Description	2011	2012	2013	2014	2015			
854140	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes	74.1	55.2	51.4	54.8	55.5	7.7	5.9	-6.1
850440	Static converters	51.8	49.7	51.8	53.3	50.8	5.4	5.4	-0.4
848180	Appliances for pipes, boiler shells, tanks, vats or the like (excluding pressure-reducing valves, valves for the control of pneumatic power transmission, check "non-return" valves and safety or relief valves)	43.7	47.8	50.3	52.5	47.9	4.6	5.1	2.6
853710	Boards, cabinets and similar combinations of apparatus for electric control or the distribution of electricity, for a voltage <= 1.000 V	36.2	40.3	45.4	46.1	45.7	3.8	4.8	6.1
732690	Articles of iron or steel, n.e.s. (excluding cast articles or articles of iron or steel wire)	37.1	38.3	40.8	43.2	40.4	3.9	4.3	2.3
847989	Machines and mechanical appliances, n.e.s.	35.7	34.1	34.7	37.2	35.1	3.7	3.7	-0.3
840991	Parts suitable for use solely or principally with spark-ignition internal combustion piston engine, n.e.s.	32.2	32.3	32.5	33.9	31.2	3.4	3.3	-0.7

HS Code	Item / Description	Imports (US$ Billion)					Share in percent (2011)	Share in percent (2015)	AAGR in percent (2011-2015)
		2011	2012	2013	2014	2015			
840999	Parts suitable for use solely or principally with compression-ignition internal combustion piston engine "diesel or semi-diesel engine", n.e.s.	35.3	33.2	32.2	33.1	29.6	3.7	3.1	-4.1
903289	Regulating or controlling instruments and apparatus; automatic, other than hydraulic or pneumatic	23.6	23.6	24.1	24.3	22.5	2.5	2.4	-1.1
903180	Instruments, appliances and machines for measuring or checking, not elsewhere specified in chapter 90 (excl. optical)	17.5	19.8	20.1	22.0	21.2	1.8	2.3	5.2
Top 10 imported commodities by share		**387**	**374**	**384**	**400**	**380**	**40.4**	**40.3**	**-0.4**
Total 153 items imports		**959**	**957**	**979**	**1017**	**943**	**100**	**100**	**-0.3**
Total World Imports		**18041**	**18111**	**18476**	**18458**	**16147**	**-**	**-**	**-2.6**

Source: Data derived from UN Comtrade; EXIM Bank Research

India's International Trade in Friends' List of Environmental Goods

India's exports of EGs, as prescribed by the Friends' List (153 nos. HS codes), exhibited an AAGR of 4.3% during 2011 and 2015, increasing from US$ 8.3 bn to US$ 9.8 bn (Table 5). However, imports showed a marginal decline from US$ 17.7 bn to US$ 16.8 bn, recording an AAGR of (-) 1%, during the same period. India's trade deficit hence, registered a decline from US$ 9.4 bn in 2011 to US$ 7.0 bn in 2015. In terms of share, India's exports and imports of these goods as a percentage of India's total exports and imports have also exhibited an increase during the analysed period. Share of these products in India's total exports has increased from 2.8% in 2011 to 3.7% in 2015, whereas import share has increased from 3.8% to 4.3% during the same period.

India's Exports of EGs under the Friends' List

The largest exported EG item under the Friends' List by India in 2015 was, 'Appliances for pipes, boiler shells, tanks, vats or the like (excluding pressure-reducing valves, valves for the control of pneumatic power transmission, check "non-return" valves and safety or relief valves)' (HS code 848180), having a share of 7.1% and registering an AAGR of 10.6%, during 2011 to 2015, with exports increasing from US$ 491.7 million in 2011 to US$ 699.1 million in 2015 (Table 6).

This was followed by 'Parts suitable for use solely or principally with compression-ignition internal combustion piston engine "diesel or semi-diesel engine", n.e.s.' (HS Code- 840999), accounting for a share of 6.7%, with exports aggregating to US$ 658.7 million in 2015.

Table 5: India's Trade in EGs under the Friends' List

	Value (US$ Million)					Share in India's Exports (%)		AAGR (%)
	2011	2012	2013	2014	2015	2011	2015	2011-15
Total EG exports from India	8307.2	8556.6	9601.3	9766.9	9784.5	2.8	3.7	4.3
Total EG imports by India	17744.8	17475.9	15571.5	15239.6	16822.5	3.8	4.3	-1.0
Trade Deficit in EGs	9437.6	8919.3	5970.2	5472.7	7038.0	-	-	-4.6

Source: Data derived from UN Comtrade; EXIM Bank Research

It may be observed that the share of top 10 EG exports from India in the world EG exports has increased from 1.2% in 2011 to 1.4% in 2015. At the same time, for all the top 10 items, the share in the global EG exports has experienced an increase, barring two items, namely - 'Air pumps, air or other gas compressors and ventilating or recycling hoods incorporating a fan, whether or not fitted with filters, having a maximum horizontal side > 120 cm (excluding vacuum pumps, hand-or-foot-operated air pumps, compressors for refrigerating equipment and air compressors mounted on a wheeled chassis for towing)' (HS code-841480) and 'Parts For Electric Motors, Generators, Generating Sets And Rotary Converters' (HS code- 850300).

Table 6: Top 10 EGs Exported by India under the Friends' List by value (2015)

HS Code	Item / Description	Exports (US$ Million)					Share in percent in India's EG exports (2011)	Share in percent in India's EG exports (2015)	Share in percent in global EG exports (2011)	Share in percent in global EG exports (2015)	AAGR of Exports in percent (2011-2015)
		2011	2012	2013	2014	2015					
848180	Appliances for pipes, boiler shells, tanks, vats or the like (excluding pressure-reducing valves, valves for the control of pneumatic power transmission, check "non-return" valves and safety or relief valves)	491.7	681.2	775.8	717.7	699.1	5.9	7.1	1.1	1.4	10.6
840999	Parts suitable for use solely or principally with compression-ignition internal combustion piston engine "diesel or semi-diesel engine", n.e.s.	605	483.3	527.8	584.9	658.7	7.3	6.7	1.6	2.0	3.1
732690	Articles of iron or steel, n.e.s. (excluding cast articles or articles of iron or steel wire)	474.3	490	530.1	454.7	571.1	5.7	5.8	1.4	1.5	5.7
850440	Static converters	436.9	390.8	311.8	453.2	508.3	5.3	5.2	0.9	1.0	6.7
730820	Towers and lattice masts, of iron or steel	223.3	285.4	277.2	274.3	357.6	2.7	3.7	5.7	11.4	13.6
848190	Parts of valves and similar articles for pipes, boiler shells, tanks, vats or the like, n.e.s.	248.4	257.5	329.6	337.4	340.7	3.0	3.5	1.7	2.2	8.8
853710	Boards, cabinets and similar combinations of apparatus for electric control or the distribution of electricity, for a voltage <= 1000 V	116.5	179.3	262.1	320.9	316.6	1.4	3.2	0.3	0.7	30.3

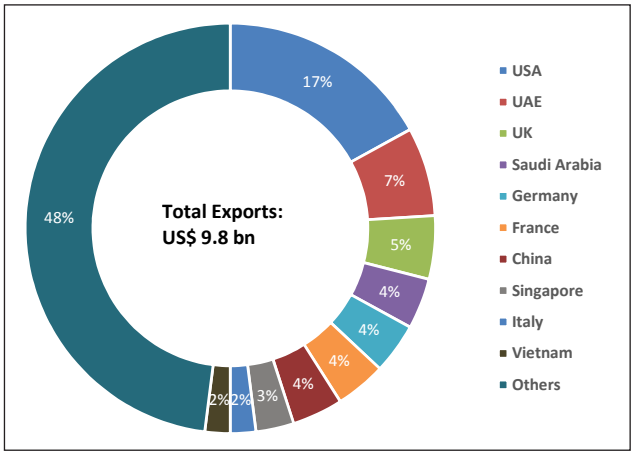
HS Code	Item / Description	Exports (US$ Million)					Share in percent in India's EG exports (2011)	Share in percent in India's EG exports (2015)	Share in percent in global EG exports (2011)	Share in percent in global EG exports (2015)	AAGR of Exports in percent (2011-2015)
		2011	2012	2013	2014	2015					
841480	Air pumps, air or other gas compressors and ventilating or recycling hoods incorporating a fan, whether or not fitted with filters, having a maximum horizontal side > 120 cm (excluding vacuum pumps, hand- or foot-operated air pumps, compressors for refrigerating equipment and air compressors mounted on a wheeled chassis for towing)	382	368	398.7	327.2	306	4.6	3.1	1.8	1.5	-4.9
847989	Machines and mechanical appliances, n.e.s.	178.7	202.7	235	341.5	303.1	2.2	3.1	0.5	0.9	15.9
850300	Parts For Electric Motors, Generators, Generating Sets And Rotary Converters	344.6	278.5	292.9	246.8	274	4.1	2.8	1.7	1.6	-4.7
Top 10 exported EGs by share		**3501.4**	**3616.5**	**3941**	**4058.5**	**4335.2**	**42.1**	**44.3**	**1.2**	**1.4**	**5.5**
Total EG exports from India		**8307.2**	**8556.6**	**9601.3**	**9766.9**	**9784.5**	**100**	**100**	**0.9**	**1.0**	**4.3**
Total Exports		**301483**	**289565**	**336611**	**317545**	**264381**	**-**	**-**	**-**	**-**	**-2.5**

Source: Data derived from UN Comtrade; EXIM Bank Research

The major export markets for India for the EGs from the Friends' List of 153 goods in 2015 included The US (17%), UAE (7%), The UK (5%), Saudi Arabia (4%) and Germany (4%). The top 10 destinations together accounted for 52% of total exports of 153 EGs from India (Exhibit 2.3).

On analysing productwise export destinations of the top 10 exported items under the Friends' List, the US appears in 8 of the 10 products, as the top export destination . In fact, most of these products are being exported by India to the developed countries like Germany, France, South Korea, Singapore, etc., while developing markets include Iran, Thailand, Kenya, etc. (Table 7).

Exhibit 2.3: India's Major Export Destinations of EGs under the Friends' List (2015)



Source: Data derived from UN Comtrade; EXIM Bank Research

Table 7: Major Export Destinations for India for the top 10 EGs under the Friends' List

HS code	Item / Description	Major export destinations for India*
848180	Appliances for pipes, boiler shells, tanks, vats or the like (excluding pressure-reducing valves, valves for the control of pneumatic power transmission, check "non-return" valves and safety or relief valves)	The US (19.7), UAE (13.7), Saudi Arabia (6.7), Singapore (4.6), The UK (4.6)
840999	Parts suitable for use solely or principally with compression-ignition internal combustion piston engine "diesel or semi-diesel engine", n.e.s.	The US (31.8), The UK (9.3), Germany (9.3), France (9.3), Iran (3.9)
732690	Articles of iron or steel, n.e.s. (excluding cast articles or articles of iron or steel wire)	The US (34.5), The UK (6.9), Germany (6.4), UAE (5.1), Thailand (4.4)
850440	Static converters	The US (18.5), France (15.4), Viet Nam (9.7), China (6.9), The Netherlands (6.3)
730820	Towers and lattice masts, of iron or steel	Saudi Arabia (19.6), Chile (12.4), Peru (9.3), Kenya (6.3), United Republic of Tanzania (5.8)
848190	Parts of valves and similar articles for pipes, boiler shells, tanks, vats or the like, n.e.s.	The US (31.0), Germany (7.3), The UK (7.1), Singapore (6.4), UAE (5.0)
853710	Boards, cabinets and similar combinations of apparatus for electric control or the distribution of electricity, for a voltage <= 1000 V	The US (16.2), Japan (10.6), Singapore (5.8), UAE (5.7), South Korea (5.6)
841480	Air pumps, air or other gas compressors and ventilating or recycling hoods incorporating a fan, whether or not fitted with filters, having a maximum horizontal side > 120 cm (excluding vacuum pumps, hand- or foot-operated air pumps, compressors for refrigerating equipment and air compressors mounted on a wheeled chassis for towing)	France (20.7), Saudi Arabia (14.0), The US (11.9), Germany (5.4), Thailand (4.6)
847989	Machines and mechanical appliances, n.e.s.	The US (19.5), Saudi Arabia (10.5), UAE (7.1), Bangladesh (5.3), Turkey (3.9)
850300	Parts For Electric Motors, Generators, Generating Sets And Rotary Converters	The US (23.5), Democratic Republic of the Congo (9.0), Turkey (8.3), China (5.0), Viet Nam (4.0)

Source: Data derived from UN Comtrade; EXIM Bank Research

*Figures in parenthesis indicate share of that country in India's export of respective EGs.

India's Imports of EGs under the Friends' List

The AAGR of India's total imports of EGs, under the Friends' List registered a decline of (-) 1%, during 2011 to 2015. However, India's share in world imports of EGs has almost remained the same at 1.8%. (Table 8).

During 2015, the top imported EG by India under the Friends' List was 'photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes' (HS 854140), accounting for a share of 12.2% in India's total imports of EGs in 2015. The import of this product has also grown significantly – from US$ 1332.8 million in 2011 to US$ 2056.7 million in 2015, thereby registering an AAGR of 31.5% during this period.

This was followed by 'Static Converters' (HS Code 850440), which accounted for a share of 5.1% in 2015 and recorded an AAGR of 2%, with its imports increasing from US$ 804.6 million in 2011 to US$ 856.8 million in 2015.

Other major EGs imported by India during 2015 included 'Appliances for pipes, boiler shells, tanks, vats or the like (excluding pressure-reducing valves, valves for the control of pneumatic power transmission, check "non-return" valves and safety or relief valves)' (HS 848180); 'Machines and mechanical appliances, n.e.s.' (HS 847989); and 'Air pumps, air or other gas compressors and ventilating or recycling hoods incorporating a fan, whether or not fitted with filters, having a maximum horizontal side > 120 cm (excluding vacuum pumps, hand- or foot-operated air pumps, compressors for refrigerating equipment and air compressors mounted on a wheeled chassis for towing)' (HS 841480).

Also, it is noted that, out of top 10 imported EGs from the Friends' List, India's share in the world imports for six items has increased in 2015, vis-à-vis 2011. India's import share for these top 10 EGs in the world imports has also increased from 2.0% in 2011 to 2.3% in 2015.

Table 8: Top 10 EGs Imported by India under the Friends' List by value (2015)

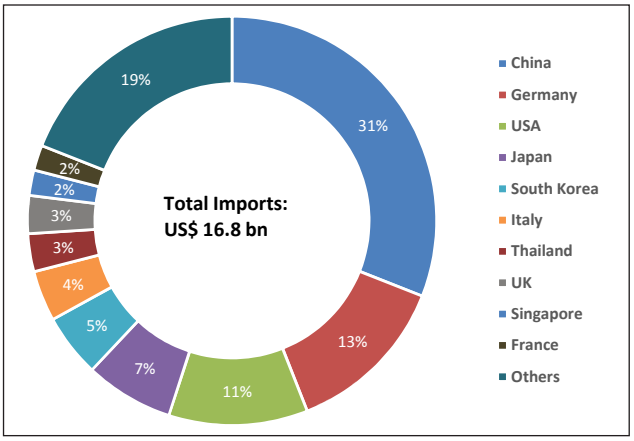
HS Code	Item / Description	Imports (US$ Million)					Share in percent in India's EG imports (2011)	Share in percent in India's EG imports (2015)	Share in percent in global EG imports (2011)	Share in percent in global EG imports (2015)	AAGR of Imports in percent (2011-2015)
		2011	2012	2013	2014	2015					
854140	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes	1332.8	871.9	1069.5	774.8	2056.7	7.5	12.2	1.8	3.7	31.5
850440	Static converters	804.6	715.3	759.1	754.7	856.8	4.5	5.1	1.6	1.7	2.0
848180	Appliances for pipes, boiler shells, tanks, vats or the like (excluding pressure-reducing valves, valves for the control of pneumatic power transmission, check "non-return" valves and safety or relief valves)	672.2	816.9	693.1	711.1	806.1	3.8	4.8	1.5	1.7	5.6

HS Code	Item / Description	Imports (US$ Million)					Share in percent in India's EG imports (2011)	Share in percent in India's EG imports (2015)	Share in percent in global EG imports (2011)	Share in percent in global EG imports (2015)	AAGR of Imports in percent (2011-2015)
		2011	2012	2013	2014	2015					
847989	Machines and mechanical appliances, n.e.s.	942.4	884.7	912.3	750.7	734.3	5.3	4.4	2.6	2.1	-5.7
841480	Air pumps, air or other gas compressors and ventilating or recycling hoods incorporating a fan, whether or not fitted with filters, having a maximum horizontal side > 120 cm (excluding vacuum pumps, hand- or foot-operated air pumps, compressors for refrigerating equipment and air compressors mounted on a wheeled chassis for towing)	397.1	470.6	442.8	574.8	559.5	2.2	3.3	2.0	3.0	9.9
732690	Articles of iron or steel, n.e.s. (excluding cast articles or articles of iron or steel wire)	350.2	405.1	436.8	492.9	551.1	2.0	3.3	0.9	1.4	12.0
903180	Instruments, appliances and machines for measuring or checking, not elsewhere specified in chapter 90 (excl. optical)	483.3	538.7	493.2	518.4	519.7	2.7	3.1	2.8	2.4	2.1
840999	Parts suitable for use solely or principally with compression-ignition internal combustion piston engine "diesel or semi-diesel engine", n.e.s.	591	666.9	502.5	547.6	491	3.3	2.9	1.7	1.7	-3.3
850300	Parts For Electric Motors, Generators, Generating Sets And Rotary Converters	825	553.2	434	409.2	463.9	4.6	2.8	4.5	2.9	-11.7
841490	Parts of : air or vacuum pumps, air or other gas compressors, fans and ventilating or recycling hoods incorporating a fan, n.e.s.	544.7	544.2	438.5	405.9	447.4	3.1	2.7	3.4	2.9	-4.2
Top 10 Imported EGs		**6943.3**	**6467.6**	**6181.6**	**5939.9**	**7486.5**	**39.1**	**44.5**	**2.0**	**2.3**	**2.7**
Total EG imports by India		**17744.8**	**17475.9**	**15571.5**	**15239.6**	**16822.5**	**100**	**100**	**1.9**	**1.8**	**-1.0**
Total Imports by India		**462403**	**488976**	**466046**	**459369**	**390745**	**-**	**-**	**-**	**-**	**-3.8**

Source: Data derived from UN Comtrade; EXIM Bank Research

The major sources from where India imported these 153 products (from the Friends' List) were China (31%), Germany (13%), the USA (11%), Japan (7%) and South Korea (5%) (Exhibit 2.4). The top 10 sources comprised 81% of total 153 EGs imported by India during 2015.

Exhibit 2.4: Major sources of India's 153 EGs imports (2015) with share



Source: Data derived from UN Comtrade; EXIM Bank Research

Out of the top 10 EGs imported by India under the Friend's List, China was the top source for imports for 6 of them (Table 9). Other developing countries, from where India currently imports EGs include Malaysia, Bahrain, and Thailand. The developed countries from where India has been majorly importing the EGs under the Friend's List include Japan, USA, Germany, Italy and South Korea.

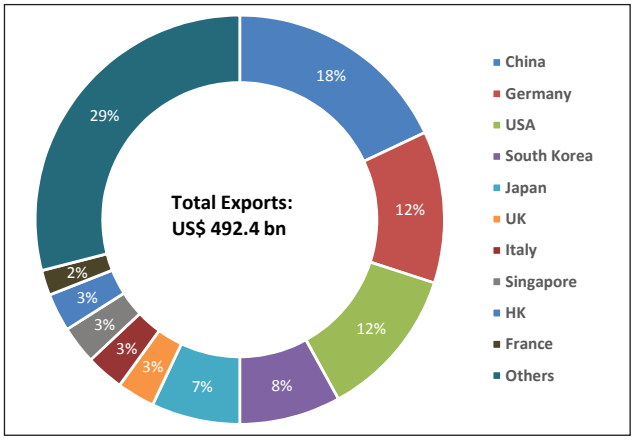
GLOBAL TRADE IN APEC LIST OF 54 EGs

Global exports of the APEC list of EGs, 54[18] in number, stood at US$ 492.4 billion in 2015. It has been observed that the largest exporters of EGs have also been amongst the key importers of such products in the world. For instance, China which was the largest exporter of EGs during the year (share of 18%), was also the largest importer (share of 20%). Similarly, many other major exporters of EGs, were also major importers. Thus, for example, Germany, which was the second largest exporter with a share of 12%, was the third largest importer, with a share of 6%. USA, which was the third largest exporter, with a share of 12%, was the second largest importer, with a share of 12%. Similarly, both Japan and South Korea were also in the list of top exporters and top importers (Exhibit 2.5 and 2.6).

In terms of the number of items, out of the 54 items, the US was the largest importer for 19 items, followed by China, which was the largest importer for 16 items. With regard to exports, Germany was the largest exporter for 16 items, while the US and China were the largest exporters for 14 items each. The trade in environmental goods, both exports and imports, thus remains highly concentrated amongst these countries.

India had a share of 0.64% in the world exports of 54 EGs and was ranked 26th in the world in 2015; the country's share in world imports of 54 EGs was significantly higher at 2.0%, making it the 12th largest importer of EGs in the world during 2015.

Exhibit 2.5: Major Global Exporters of EGs under the APEC List (2015)



Source: Data derived from UN Comtrade; EXIM Bank Research

[18]Here, the list has been taken for 53 goods as the trade data for 'Flooring panels, multilayer, assembled, of wood (excluding for mosaic floors)' (HS code- 441872) is not available for 2014

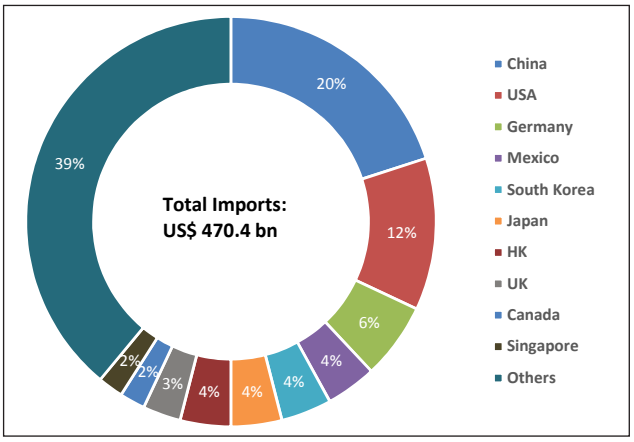
Table 9: India's Major Sources for Imports of top 10 EGs under the Friends' List during 2015

HS code	Item / Description	Major import sources for India*
854140	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes	China (78.2), Malaysia (10.8), Japan (2.5), USA (2.1), Singapore (1.3)
850440	Static converters	China (44.1), Germany (13.8), Thailand (4.8), Japan (4.3), South Korea (4.1)
848180	Appliances for pipes, boiler shells, tanks, vats or the like (excluding pressure-reducing valves, valves for the control of pneumatic power transmission, check "non-return" valves and safety or relief valves)	USA (19.7), Germany (14.5), China (13.2), Italy (12.5), Japan (6.9)
847989	Machines and mechanical appliances, n.e.s.	China (25.3), Germany (12.9), Japan (12.3), USA (9.9), Italy (9.8)
841480	Air pumps, air or other gas compressors and ventilating or recycling hoods incorporating a fan, whether or not fitted with filters, having a maximum horizontal side > 120 cm (excluding vacuum pumps, hand- or foot-operated air pumps, compressors for refrigerating equipment and air compressors mounted on a wheeled chassis for towing)	China (47.6), Germany (12.1), USA (9.5), Thailand (9.3), Japan (5.4)
732690	Articles of iron or steel, n.e.s. (excluding cast articles or articles of iron or steel wire)	China (17.8), Japan (11.5), Germany (9.8), Bahrain (9.7), Thailand (8.2)
903180	Instruments, appliances and machines for measuring or checking, not elsewhere specified in chapter 90 (excl. optical)	USA (21.8), Germany (19.6), Japan (12.1), China (10.3), UK (4.6)
840999	Parts suitable for use solely or principally with compression-ignition internal combustion piston engine "diesel or semi-diesel engine", n.e.s.	The US (17.7), Germany (16.9), South Korea (15.9), China (12.5), The UK (5.7)
850300	Parts For Electric Motors, Generators, Generating Sets And Rotary Converters	China (47.3), Germany (11.5), Spain (8.6), Japan (7.2), Romania (6.3)
841490	Parts of : air or vacuum pumps, air or other gas compressors, fans and ventilating or recycling hoods incorporating a fan, n.e.s.	Germany (24.7), China (16.9), The US (10.8), Japan (6.9), Belgium (6)

Source: Data derived from UN Comtrade; EXIM Bank Research

*Figures in parenthesis indicate share of that country in India's export of respective EGs.

Exhibit 2.6: Major Global Importers of EGs under the APEC List (2015)



Source: Data derived from UN Comtrade; EXIM Bank Research

The top 10 imported items by share, account for almost 59% of the global EG imports. In terms of items (Table 10), the highest imported item, globally was 'Liquid crystal devices, not elsewhere specified and other optical appliances and instruments not elsewhere specified' (HS Code-901380), with imports touching US$ 57.8 billion (12.3% share) in 2015. This was followed by 'Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels' (HS code-854140), with exports being US$ 56.7 billion (12.1% share). The least imported EG in 2015 was, 'Condensers for steam or other vapour power units' (HS code-840420), with imports being merely US$ 0.3 billion.

In fact, an analysis of products having more than US$ 2 bn in global imports in 2015 reveals that the top 41 EGs constituted 96.4% of the global EG imports. Some other insights from this analysis shows that:

- The highest AAGR within these EGs, was registered by 'Gas or smoke analysis apparatus' (HS Code-902710) at 8.9% and its imports increased from US$ 3.4 billion in 2011 to US$ 4.5 billion in 2015 (Table 11).
- This was followed by 'Optical Instruments, appliances and machines for measuring or checking, not elsewhere specified or included in chapter 90' (HS Code-903149) with imports increasing from US$ 4.7 billion in 2011 to US$ 6.4 billion in 2015.
- In fact, two items, 'Instruments, appliances and machines for measuring or checking, not elsewhere specified in chapter 90 (excl. optical)' (HS Code-903180) and 'Machinery and apparatus for filtering or purifying gases (excl. isotope separators and intake air filters for internal combustion engines)' (HS Code-842139) feature in the list of top 10 imported items by absolute value as well as growth (AAGR).

In terms of growth for all the 54 EGs, the highest AAGR was recorded for 'Machinery for liquefying air or other gases '(HS code- 841960) at 20.9%, during 2011 to 2015, as its imports grew from US$ 0.9 billion in 2011 to US$ 1.5 billion in 2015, while the lowest AAGR was recorded by 'Parts of steam and other vapour turbines, n.e.s' (HS code- 840690) at (-) 9.5%, as its imports fell from US$ 5.2 billion in 2011 to US$ 3.5 billion in 2015.

Table 10: Top 10 Globally Imported EGs under the APEC List by value (2015)

		Imports (US$ Billion)					Share in percent (2011)	Share in percent (2015)	AAGR in percent (2011-2015)
HS Code	Item / Description	2011	2012	2013	2014	2015			
901380	Liquid crystal devices, n.e.s. and other optical appliances and instruments not elsewhere specified in chapter 90	65.8	67.7	67.2	61.7	57.8	13.2	12.3	-3.1
854140	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes	74.1	55.1	51.4	54.8	56.7	14.8	12.1	-5.5

HS Code	Item / Description	Imports (US$ Billion)					Share in percent (2011)	Share in percent (2015)	AAGR in percent (2011-2015)
		2011	2012	2013	2014	2015			
847989	Machines and mechanical appliances, n.e.s.	35.6	34.0	34.6	37.1	34.9	7.1	7.4	-0.4
903289	Regulating or controlling instruments and apparatus; automatic, other than hydraulic or pneumatic	23.6	23.6	24.1	24.3	22.4	4.7	4.8	-1.2
903180	Instruments, appliances and machines for measuring or checking, not elsewhere specified in chapter 90 (excl. optical)	17.5	19.7	20.1	22.0	21.2	3.5	4.5	5.1
841199	Parts of gas turbines, n.e.s.	19.2	20.6	20.1	20.7	19.9	3.9	4.2	1.0
842139	Machinery and apparatus for filtering or purifying gases (excl. isotope separators and intake air filters for internal combustion engines)	16.5	16.1	17.5	19.8	18.7	3.3	4.0	3.6
850300	Parts For Electric Motors, Generators, Generating Sets And Rotary Converters	18.4	19.0	17.1	17.1	16.1	3.7	3.4	-3.1
847990	Parts of machines and mechanical appliances, n.e.s.	15.9	15.8	15.7	16.2	15.6	3.2	3.3	-0.3
842199	Parts of machinery and apparatus for filtering or purifying liquids or gases, n.e.s.	11.2	11.2	12.1	12.7	11.6	13.2	2.5	1.1
Total	**Top 10 imported commodities by share**	**297.8**	**282.8**	**279.9**	**286.4**	**274.9**	**57.4**	**58.5**	**-1.9**
	Total EG imports	**498.7**	**487.6**	**488.5**	**497.3**	**470.4**	**100.0**	**100.0**	**-1.4**

Source: Data derived from UN Comtrade; EXIM Bank Research

Table 11: Top 10 Globally imported EGs under the APEC List (by Growth – AAGR) (2015)

HS Code	Item / Description	Imports (US$ Billion)					Share in percent (2011)	Share in percent (2015)	AAGR in percent (2011-2015)
		2011	2012	2013	2014	2015			
902710	Gas or smoke analysis apparatus	3.4	3.8	5.2	4.5	4.5	0.7	1.0	8.9
903149	Optical instruments, appliances and machines for measuring or checking, not elsewhere specified or included in chapter 90	4.7	5.3	5.2	6.3	6.4	0.9	1.4	8.2
902620	Instruments and apparatus for measuring or checking pressure of liquids or gases (excluding regulators)	6.1	6.7	7.3	8.1	7.9	1.2	1.7	6.6
903180	Instruments, appliances and machines for measuring or checking, not elsewhere specified in chapter 90 (excl. optical)	17.5	19.7	20.1	22.0	21.2	3.5	4.5	5.1
902680	Instruments or apparatus for measuring or checking variables of liquids or gases, n.e.s.	2.6	2.9	3.1	3.2	3.0	0.5	0.6	4.6
902720	Chromatographs and electrophoresis instruments	2.6	2.7	2.8	2.8	3.0	0.5	0.6	3.7

HS Code	Item / Description	Imports (US$ Billion)					Share in percent (2011)	Share in percent (2015)	AAGR in percent (2011-2015)
		2011	2012	2013	2014	2015			
842139	Machinery and apparatus for filtering or purifying gases (excl. isotope separators and intake air filters for internal combustion engines)	16.5	16.1	17.5	19.8	18.7	3.3	4.0	3.6
842121	Machinery and apparatus for filtering or purifying water	6.3	6.4	6.6	7.2	7.0	1.3	1.5	3.0
840290	Parts of vapour generating boilers and superheated water boilers, n.e.s.	2.7	2.4	3.1	2.6	2.8	0.6	0.6	2.4
902610	Instruments and apparatus for measuring or checking the flow or level of liquids (excl. meters and regulators)	4.8	5.0	5.4	5.5	5.1	1.0	1.1	1.7
Total	**Top 10 imported commodities by AAGR**	**67.2**	**71.0**	**76.3**	**82.0**	**79.6**	**13.4**	**17.0**	**4.4**
	Total EG imports	**498.7**	**487.6**	**488.5**	**497.3**	**470.4**	**100.0**	**100.0**	**-1.4**

Source: Data derived from UN Comtrade; EXIM Bank Research

India's International Trade in APEC list of 54 Environmental Goods

India's trade deficit in 54 EGs stood at US$ 6.4 billion in 2015. The imports of India's EGs stood at US$ 9.6 billion in 2015, while the exports stood at US$ 3.1 billion. During 2011 to 2015, the exports of EGs from India, registered an AAGR of 1.4%, better than the AAGR for imports of EGs by India, which witnessed a decline of (-) 0.2%. It is observed that while India's overall trade in EGs have increased, it has been led in absolute value terms by India's increasing import appetite rather than exports.

India's Exports of EGs under the APEC List

The largest exported EG item by India (Table 12) in 2015 was 'Machines and mechanical appliances, n.e.s.' (HS code – 847989), having a share of 9.8% and registering an AAGR of 16.1% during 2011 to 2015, with exports increasing from US$ 178.7 million in 2011 to US$ 305.1 million in 2015. This was followed by 'Parts for Electric Motors, Generators, Generating Sets and Rotary Converters' (HS Code-850300), accounting for a share of 8.9%, with exports aggregating to US$ 278.1 million in 2015.

An analysis of those EGs whose exports from India were more than US$ 10 mn in 2015 shows that, there are 43 such EGs out of 54, that are being exported by India. A US$ 10 mn threshold has been set with the objective of focusing on EGs that have reached a critical mass in terms of exports from India, indicating that the country already has a reasonable capacity to export which can be further upscaled, depending on demand side factors. Further, these 43 goods accounted for as high as 98% of the total EGs exported from the country, during 2015.

- The highest growth (AAGR) within these 43 EGs was recorded for 'Instruments and appliances used in geodesy, topography, hydrography, oceanography, and hydrology' (HS Code-901580) at 45.2%, during 2011 to 2015 with exports witnessing a jump from US$ 19.1 million in 2014 to US$ 65.4 million in 2015.
- This was followed by 'Condensers for steam or other vapour power units' (HS Code-840420), which recorded an AAGR of 45.1%.Interestingly, the items 'Regulating or controlling instruments and apparatus; automatic, other than hydraulic or pneumatic' (HS Code-903289), 'Parts of

vapour generating boilers and superheated water boilers, n.e.s.' (HS Code-840290) and 'Machinery and apparatus for filtering or purifying gases (excl. isotope separators and intake air filters for internal combustion engines)' (HS Code-842139) are a part of India's top 10 exported EG items, both by value and growth.

It may be observed that India's share in world exports of EGs for top 10 commodities by value has marginally increased from 0.8% in 2011 to 0.9% in 2015 (Table 12). The same has increased from 0.5% in 2011 to 1.1% in 2015, if the top commodities are analysed by their growth (AAGR) rates (Table 13).

Table 12: Top 10 EGs Exported by India under the APEC List by value (2015)

HS Code	Item / Description	Exports (US$ Million)					Share in percent in India's EG exports (2011)	Share in percent in India's EG exports (2015)	Share in percent in global EG exports (2011)	Share in percent in global EG exports (2015)	AAGR of Exports in percent (2011-2015)
		2011	2012	2013	2014	2015					
847989	Machines and mechanical appliances, n.e.s.	178.7	203.0	235.0	344.1	305.1	6.0	9.8	0.5	0.9	16.1
850300	Parts For Electric Motors, Generators, Generating Sets And Rotary Converters	357.3	279.0	292.9	248.2	278.1	12.0	8.9	1.7	1.6	-5.0
903289	Regulating or controlling instruments and apparatus; automatic, other than hydraulic or pneumatic	63.7	62.7	92.4	159.9	199.1	2.1	6.4	0.3	1.0	35.8
850490	Parts of electrical transformers and inductors, n.e.s.	162.7	155.1	189.3	171.4	186.8	5.5	6.0	1.3	1.8	4.2
854140	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes	327.5	111.8	200.8	174.7	146.4	11.0	4.7	0.4	0.3	-3.9
840290	Parts of vapour generating boilers and superheated water boilers, n.e.s.	75.7	105.5	136.1	140.4	142.1	2.5	4.5	1.5	4.2	18.2
847990	Parts of machines and mechanical appliances, n.e.s.	246.4	160.9	153.4	138.2	123.5	8.3	3.9	1.4	0.7	-15.0
841990	Machinery, plant and laboratory equipment; parts of equipment for treating materials by a process involving a change of temperature	89.8	74.2	111.8	84.5	122.0	3.0	3.9	1.4	1.9	13.3
841989	Machinery, plant and laboratory equipment; for treating materials by change of temperature, other than for making hot drinks or cooking or heating food	233.3	153.3	137.6	145.9	118.2	7.8	3.8	3.0	1.6	-14.4

HS Code	Item / Description	Exports (US$ Million)					Share in percent in India's EG exports (2011)	Share in percent in India's EG exports (2015)	Share in percent in global EG exports (2011)	Share in percent in global EG exports (2015)	AAGR of Exports in percent (2011-2015)
		2011	2012	2013	2014	2015					
842139	Machinery and apparatus for filtering or purifying gases (excl. isotope separators and intake air filters for internal combustion engines)	42.2	59.6	93.4	104.6	117.1	1.4	3.7	0.3	0.7	30.5
Total	**Top 10 exported EGs by share**	**1777.3**	**1365.1**	**1642.7**	**1711.9**	**1738.4**	**59.6**	**55.6**	**0.8**	**0.9**	**0.7**
	EG exports from India	**2981.2**	**2767.4**	**3000.9**	**3170.6**	**3127.8**	**100.0**	**100.0**	**0.56**	**0.64**	**1.4**
	EG exports from world (US$ bn)	**530.3**	**523.5**	**517.4**	**530.1**	**492.4**	**-**	**-**	**-**	**-**	**-1.8**

Source: Data derived from UN Comtrade; EXIM Bank Research

Table 13: Top 10 EGs Exported by India under the APEC List (by Growth– AAGR) (2015)

HS Code	Item / Description	Exports (US$ Million)					Share in percent in India's EG exports (2011)	Share in percent in India's EG exports (2015)	Share in percent in global EG exports (2011)	Share in percent in global EG exports (2015)	AAGR in percent (2011-2015)
		2011	2012	2013	2014	2015					
901580	Instruments and appliances used in geodesy, topography, hydrography, oceanography, hydrology	37.9	30.5	26.3	19.1	65.4	1.3	2.1	0.7	1.5	45.2
840420	Condensers for steam or other vapour power units	5.7	11.8	9.9	8.1	16.9	0.2	0.5	2.6	7.7	45.1
842129	Machinery and apparatus for filtering or purifying liquids (excl. such machinery and apparatus for water and other beverages, oil or petrol-filters for internal combustion engines and artificial kidneys)	16.3	22.1	22.4	28.1	55.4	0.5	1.8	0.2	0.7	39.9
903289	Regulating or controlling instruments and apparatus; automatic, other than hydraulic or pneumatic	63.7	62.7	92.4	159.9	199.1	2.1	6.4	0.3	1.0	35.8
842139	Machinery and apparatus for filtering or purifying gases (excl. isotope separators and intake air filters for internal combustion engines)	42.2	59.6	93.4	104.6	117.1	1.4	3.7	0.3	0.7	30.5
841919	Heaters; instantaneous or storage water heaters, non-electric, other than instantaneous gas water heaters	15.2	11.0	16.1	13.5	29.2	0.5	0.9	0.8	1.8	29.7
847420	Crushing or grinding machines for solid mineral substances	23.5	39.6	54.5	64.1	56.8	0.8	1.8	0.6	2.0	28.2

HS Code	Item / Description	Exports (US$ Million)					Share in percent in India's EG exports (2011)	Share in percent in India's EG exports (2015)	Share in percent in global EG exports (2011)	Share in percent in global EG exports (2015)	AAGR in percent (2011-2015)
		2011	2012	2013	2014	2015					
850164	AC generators "alternators", of an output > 750 kVA	29.2	47.3	48.3	56.4	57.1	1.0	1.8	0.7	2.0	20.5
902620	Instruments and apparatus for measuring or checking pressure of liquids or gases (excluding regulators)	16.8	22.2	30.5	38.1	31.3	0.6	1.0	0.3	0.4	19.1
840290	Parts of vapour generating boilers and superheated water boilers, n.e.s.	75.7	105.5	136.1	140.4	142.1	2.5	4.5	1.5	4.2	18.2
Total	**Top 10 exported EGs by AAGR**	**326.2**	**412.3**	**529.9**	**632.3**	**770.4**	**10.9**	**24.5**	**0.5**	**1.1**	**24.0**
	EG exports from India	**2981.2**	**2767.4**	**3000.9**	**3170.6**	**3127.8**	**100.0**	**100.0**	**0.56**	**0.64**	**1.4**
	EG exports from world (US$ bn)	**530.3**	**523.5**	**517.4**	**530.1**	**492.4**	**-**	**-**	**-**	**-**	**-1.8**

Source: Data derived from UN Comtrade; EXIM Bank Research

Imports of EGs under the APEC List by India

The highest imported EG by India in 2015 (Table 14) was 'Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes' (HS code- 854140), accounting for a share of 21.5%. The import of this product has also grown significantly – from US$ 1332.8 million in 2011 to US$ 2056.7 million in 2015, thereby registering an AAGR of 31.5% during this period. This was followed by 'Machines and mechanical appliances, n.e.s.' (HS Code- 847989) having a share of 7.7% in 2015 and an AAGR of -5.7%, due to the fall in its imports from US$ 942.4 million in 2011 to US$ 734.3 million in 2015.

An analysis of the 54 EGs imported by India reveals that the top 40 EGs accounted for approximately 98% of the total EG imports in 2015, with import of each of these 40 EGs amounting to at least US$ 30 million or above in 2015. Other inferences that can be drawn out include the following:

- The highest AAGR within these 40 EGs was recorded for 'Parts and accessories for liquid crystal devices LCD, lasers and other appliances and instruments not elsewhere specified in chapter 90, n.e.s.' (HS Code-901390). The item registered an AAGR of 64.1% during 2011 to 2015, with imports rising from US$ 29.1 million in 2011 to US$ 123.6 million in 2015 (Table 15).
- This was followed by 'Electric generating sets; (excluding those with spark-ignition or compression-ignition internal combustion piston engines), other than wind powered' (HS Code-850239), which recorded an AAGR of 48.5%.
- The commodities 'Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes' (HS Code-854140), 'Machinery, plant and laboratory equipment; for treating materials by change of temperature, other than for making hot drinks or cooking or heating food' (HS Code-841989) and 'Instruments and apparatus for physical or chemical analysis, or for measuring or checking viscosity, porosity, expansion, surface tension or the like, or for measuring or checking quantities of heat, sound or light, n.e.s.' (HS Code-902780), were a part of India's top 10 imported EG items, both by value and growth (AAGR).

Additionally, India's share in the top 10 imported EGs in the world has increased both in terms of the set of top EGs by value, as also by AAGR. This share has increased from 1.9% in 2011 to 2.3% in 2015, by value and from 1.8% in 2011 to 3.2% in 2015, by AAGR.

Table 14: Top 10 Imported EGs by India under the APEC List by value (2015)

HS Code	Commodity Description	Imports (US$ Million)					Share in percent in India's EG imports (2011)	Share in percent in India's EG imports (2015)	Share in percent in global EG imports (2011)	Share in percent in global EG imports (2015)	AAGR in percent (2011-2015)
		2011	2012	2013	2014	2015					
854140	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes	1332.8	871.9	1069.5	774.8	2056.7	13.5	21.5	1.8	3.6	31.5
847989	Machines and mechanical appliances, n.e.s.	942.4	884.7	912.3	750.7	734.3	9.5	7.7	2.6	2.1	-5.7
903180	Instruments, appliances and machines for measuring or checking, not elsewhere specified in chapter 90 (excl. optical)	483.3	538.7	493.2	518.4	519.7	4.9	5.4	2.8	2.5	2.1
850300	Parts For Electric Motors, Generators, Generating Sets And Rotary Converters	825.0	553.2	434.0	409.2	463.9	8.3	4.9	4.5	2.9	-11.7
903289	Regulating or controlling instruments and apparatus; automatic, other than hydraulic or pneumatic	382.5	349.2	353.8	396.3	432.5	3.9	4.5	1.6	1.9	3.4
901380	Liquid crystal devices, n.e.s. and other optical appliances and instruments not elsewhere specified in chapter 90	271.7	253.0	202.3	308.5	325.7	2.7	3.4	0.4	0.6	7.8
841989	Machinery, plant and laboratory equipment; for treating materials by change of temperature, other than for making hot drinks or cooking or heating food	220.9	325.3	281.3	242.8	324.7	2.2	3.4	2.7	4.0	13.5
850490	Parts of electrical transformers and inductors, n.e.s.	283.1	311.3	359.3	320.5	302.5	2.9	3.2	2.6	3.0	2.2

HS Code	Commodity Description	Imports (US$ Million)					Share in percent in India's EG imports (2011)	Share in percent in India's EG imports (2015)	Share in percent in global EG imports (2011)	Share in percent in global EG imports (2015)	AAGR in percent (2011-2015)
		2011	2012	2013	2014	2015					
902780	Instruments and apparatus for physical or chemical analysis, or for measuring or checking viscosity, porosity, expansion, surface tension or the like, or for measuring or checking quantities of heat, sound or light, n.e.s.	203.5	245.0	264.3	286.0	299.2	2.1	3.1	1.9	2.7	10.3
842199	Parts of machinery and apparatus for filtering or purifying liquids or gases, n.e.s.	230.5	266.9	266.5	283.3	291.2	2.3	3.0	2.1	2.5	6.2
Total	**Top 10 Imported EGs by share**	**5175.7**	**4599.2**	**4636.5**	**4290.5**	**5750.4**	**52.3**	**60.1**	**1.9**	**2.3**	**4.1**
	EG imports by India	**9895.6**	**9753.6**	**8743.0**	**8042.2**	**9560.8**	**100.0**	**100.0**	**1.98**	**2.03**	**-0.2**
	EG imports by world (US$ bn)	**498.7**	**487.6**	**488.5**	**497.3**	**470.4**	**-**	**-**	**-**	**-**	**-1.4**

Source: Data derived from UN Comtrade; EXIM Bank Research

Table 15: Top 10 Imported EGs by India under the APEC List (by Growth – AAGR) (2015)

HS Code	Commodity Description	Imports (US$ Million)					Share in percent in India's EG imports (2011)	Share in percent in India's EG imports (2015)	Share in percent in global EG imports (2011)	Share in percent in global EG imports (2015)	AAGR in percent (2011-2015)
		2011	2012	2013	2014	2015					
901390	Parts and accessories for liquid crystal devices "LCD", lasers and other appliances and instruments not elsewhere specified in chapter 90, n.e.s.	29.1	63.8	169.3	132.7	123.6	0.3	1.3	0.3	1.5	64.1
850239	Electric generating sets; (excluding those with spark-ignition or compression-ignition internal combustion piston engines), other than wind powered	82.2	166.2	17.5	15.5	45.3	0.8	0.5	1.3	0.9	48.5
854140	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes	1332.8	871.9	1069.5	774.8	2056.7	13.5	21.5	1.8	3.6	31.5
842121	Machinery and apparatus for filtering or purifying water	71.9	75.4	71.9	82.6	156.4	0.7	1.6	1.2	2.2	26.1

HS Code	Commodity Description	Imports (US$ Million)					Share in percent in India's EG imports (2011)	Share in percent in India's EG imports (2015)	Share in percent in global EG imports (2011)	Share in percent in global EG imports (2015)	AAGR in percent (2011-2015)
		2011	2012	2013	2014	2015					
903290	Parts and accessories for regulating or controlling instruments and apparatus, n.e.s.	125.5	130.1	137.5	189.3	209.3	1.3	2.2	1.9	4.1	14.4
841989	Machinery, plant and laboratory equipment; for treating materials by change of temperature, other than for making hot drinks or cooking or heating food	220.9	325.3	281.3	242.8	324.7	2.2	3.4	2.7	4.0	13.5
901580	Instruments and appliances used in geodesy, topography, hydrography, oceanography, hydrology	74.8	75.8	74.9	111.6	111.2	0.8	1.2	1.8	2.7	12.2
902780	Instruments and apparatus for physical or chemical analysis, or for measuring or checking viscosity, porosity, expansion, surface tension or the like, or for measuring or checking quantities of heat, sound or light, n.e.s.	203.5	245.0	264.3	286.0	299.2	2.1	3.1	1.9	2.7	10.3
854390	Electrical machines and apparatus; parts of the electrical goods of heading no. 8543	163.0	281.8	190.7	133.1	173.6	1.6	1.8	2.2	2.4	10.2
902720	Chromatographs and electrophoresis instruments	130.9	152.0	127.4	145.9	179.4	1.3	1.9	5.1	6.1	9.4
Total	**Top 10 Imported EGs by AAGR**	**2434.6**	**2387.3**	**2404.3**	**2114.3**	**3679.4**	**24.6**	**38.5**	**1.8**	**3.2**	**15.2**
	EG imports by India	**9895.6**	**9753.6**	**8743.0**	**8042.2**	**9560.8**	**100.0**	**100.0**	**1.98**	**2.03**	**-0.2**
	EG imports by world (US$ bn)	**498.7**	**487.6**	**488.5**	**497.3**	**470.4**	**-**	**-**	**-**	**-**	**-1.4**

Source: Data derived from UN Comtrade; EXIM Bank Research

Comparative Advantage for India in EGs and Possible Diversification

This section undertakes an analysis with the objective of identifying EGs, where domestic capacities can be strengthened and the markets which they can target.

Methodology

Revealed Comparative Indices are used to identify categories of exports, in which an economy has a comparative advantage by way of comparison of the country's trade scenario with the world scenario. The basic assumption underlying the concept of revealed comparative advantage is that, trade profile reflects the inter-country differences in terms of relative costs as well as non-price aspects. As per Balassa's (1965) measure, index for country i, commodity j is-

$$RCA_{ij} = \frac{(X_{ji}/X_i)}{(X_{jw}/X_w)}$$

Where,

Xji: exports of commodity j from country i

Xi: total exports from country i

Xjw: total exports of commodity j from world
Xw: total exports from world

The RCA index ranges from 0 to infinity, with 1 as the break-even point. That is, an RCA value of less than 1 means that the product has no export comparative advantage, while a value above 1 indicates that the product has a comparative advantage. Although, useful in examining whether a country has a comparative advantage in specific products, it has its limitations in reflecting the extent of comparative advantage. In order to overcome this limitation, the Normalized Revealed Comparative Advantage (NRCA) index is used. NRCA index reveals the extent of comparative advantage that a country has in an item more precisely and consistently than other alternative RCA indices. NRCA can be defined in the following manner

$$NRCA^{ij} = \frac{RCA_{ij} - 1}{RCA_{ij} + 1}$$

NRCA ranges from -1 to 1 with 0 as the break-even point. That is, an NRCA value of less than 0 and greater than -1, means that the product has no export comparative advantage, while a value above 0 and less than 1, indicates that the product has a comparative advantage. The extent of comparative advantage/disadvantage can be gauged from the proximity of the NRCA values to the extreme data points, viz. +1 and -1.

Based on the NRCA and the AAGR, products can be divided into four categories, as described in Table 16.

Accordingly, with the aforesaid criteria, products have been classified into the four categories (Exhibit 2.7) as product champions, underachievers, growth in declining markets, and losers in declining market. The highest number of goods (29) fell in the category of underachievers where India can push itself to enhance its capacity in order to be internationally competitive, while 7 products were categorized as product champions in which capacity addition can be a required action.

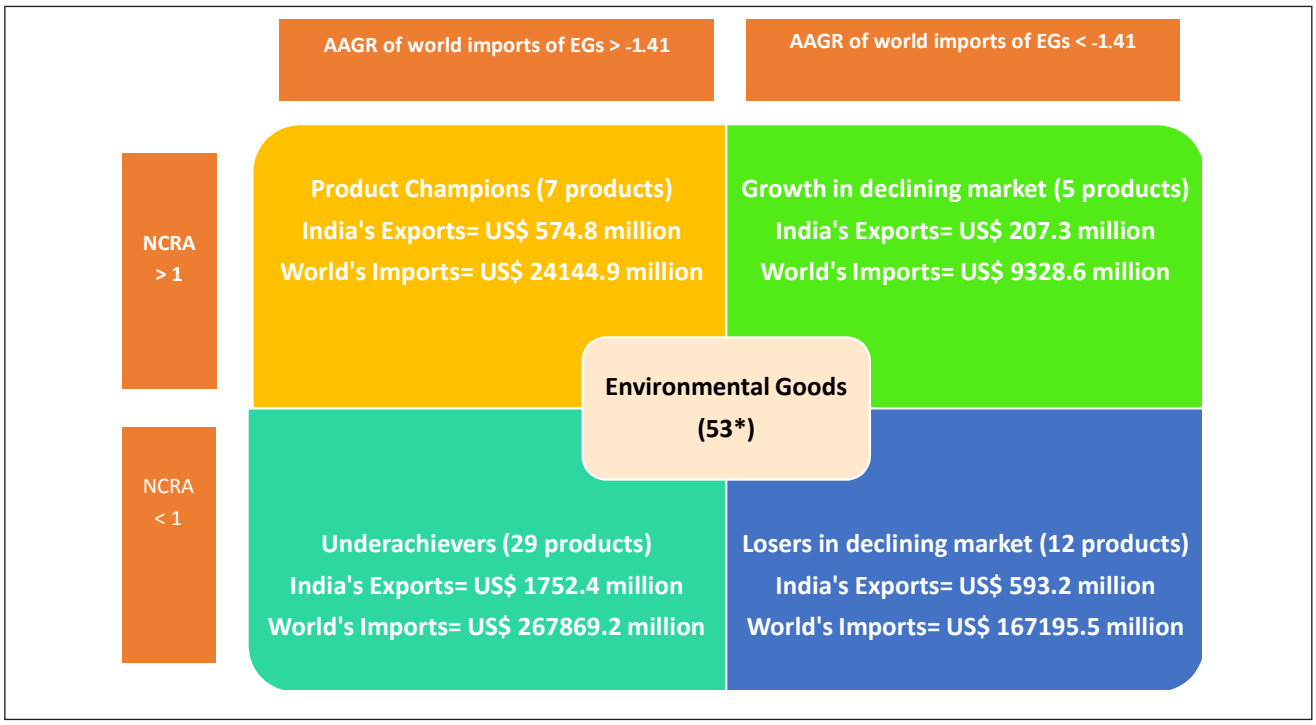
While the overall world imports have fallen at an AAGR of (-) 2.6% during the period 2011 to 2015, the world imports of EGs have declined at a slower average pace of (-) 1.4%. It may be noted that the period under observation also coincides with one of the lowest trade performances globally.

Table 16: Product Growth Matrix Description

Category	World Imports	NRCA	Showcases need for
Product Champions (have maximum potential)	AAGR of World imports of these products > AAGR of World's total EGs imports	Positive; indicative of competitive exports	Market Diversification; Capacity Additions
Underachievers (need to recover lost ground from competing suppliers and increase exports)	AAGR of World imports of these products > AAGR of World's total EGs imports	Negative; indicative of uncompetitive export	Enhance Competitiveness; Build Capacities
Growth in Declining Market (need to diversify and put resources to better use)	AAGR of World imports of these products < AAGR of World's total EGs imports	Positive; indicative of competitive exports	Product Diversification
Losers in Declining Market (need to identify new markets as already losing in declining markets)	AAGR of World imports of these products < AAGR of World's total EGs imports	Negative; indicative of uncompetitive export	Product Diversification

Source: Exim Bank Research

Exhibit 2.7: Categorization of the APEC list of Environmental Goods (2015)



* Total 53 EGs considered (instead of 54 identified EGs), as export figure of HS Code 441872 i.e. 'Flooring panels, multilayer, assembled, of wood (excluding for mosaic floors)' for India is not available for 2015
Source: Exim Bank Research

Product Champions

Product champions have the maximum potential as the growth in the demand for these products is higher than the overall average growth in the demand for all the EGs. Also, Indian exports of EGs under this category are competitive. Accordingly, 7 products are identified as product champions (Table 17) which together constituted around 18.7% of India's EGs exports by value, i.e., US$ 574.8 million.

At the same time, it may be noted that out of the 7 identified product champions, 2 products, while exhibiting an NRCA of more than zero, have experienced declining NRCA during the period between 2011 and 2015. These 2 products can be called as 'pseudo-product champions' and include - Parts of electrical transformers and inductors, n.e.s. (HS 850490), and AC generators "alternators", of an output > 750 kVA (HS 851065).

Underachievers

The underachievers contributed 56.1% to India's EGs exports in 2015 and were 29 in number. It is a category where the global demand of the products is increasing but the Indian exports for these products are not competitive, evidenced in their negative NRCA values. In the underachievers category (Table 18), 'Machines and mechanical appliances, n.e.s.' (HS code- 847989) had the highest export, that is, US$ 305.1 million in 2015. The 29 products that have been identified under this category together had an export of US$ 1752.4 million in 2015.

Table 17: Product Champions from the list of EGs for India

		Exports (US$ Million)				
HS Code	**Item / Description**	**2011**	**2012**	**2013**	**2014**	**2015**
850490	Parts of electrical transformers and inductors, n.e.s.	162.7	155.1	189.3	171.4	186.8
840290	Parts of vapour generating boilers and superheated water boilers, n.e.s.	75.7	105.5	136.1	140.4	142.1
841990	Machinery, plant and laboratory equipment; parts of equipment for treating materials by a process involving a change of temperature	89.8	74.2	111.8	84.5	122.0
850164	AC generators "alternators", of an output > 750 kVA	29.2	47.3	48.3	56.4	57.1
840490	Boilers; parts of auxiliary plant, for use with boilers of heading no. 8402 and 8403 and parts of condensers for steam or other vapour power units	25.1	32.0	27.9	34.8	26.5
851430	Electric industrial or laboratory furnaces and ovens (excl. resistance heated, induction, dielectric and drying furnaces and ovens)	25.3	31.7	28.0	30.6	23.4
840420	Condensers for steam or other vapour power units	5.7	11.8	9.9	8.1	16.9
	Total of Product Champions	**413.5**	**457.6**	**551.2**	**526.2**	**574.8**

Source: Data derived from UN Comtrade; EXIM Bank Research

Table 18: Underachievers from the list of EGs for India

		Exports (US$ Million)				
HS Code	**Commodity Description**	**2011**	**2012**	**2013**	**2014**	**2015**
847989	Machines and mechanical appliances, n.e.s.	178.7	203.0	235.0	344.1	305.1
903289	Regulating or controlling instruments and apparatus; automatic, other than hydraulic or pneumatic	63.7	62.7	92.4	159.9	199.1
847990	Parts of machines and mechanical appliances, n.e.s.	246.4	160.9	153.4	138.2	123.5
841989	Machinery, plant and laboratory equipment; for treating materials by change of temperature, other than for making hot drinks or cooking or heating food	233.3	153.3	137.6	145.9	118.2
842139	Machinery and apparatus for filtering or purifying gases (excl. isotope separators and intake air filters for internal combustion engines)	42.2	59.6	93.4	104.6	117.1
842199	Parts of machinery and apparatus for filtering or purifying liquids or gases, n.e.s.	85.7	111.3	118.0	109.4	114.6

		Exports (US$ Million)				
HS Code	**Commodity Description**	**2011**	**2012**	**2013**	**2014**	**2015**
842121	Machinery and apparatus for filtering or purifying water	63.8	87.2	86.9	85.2	101.5
854390	Electrical machines and apparatus; parts of the electrical goods of heading no. 8543	86.0	84.8	54.6	100.2	91.2
901580	Instruments and appliances used in geodesy, topography, hydrography, oceanography, hydrology	37.9	30.5	26.3	19.1	65.4
903180	Instruments, appliances and machines for measuring or checking, not elsewhere specified in chapter 90 (excl. optical)	58.7	57.0	83.4	75.8	64.6
842129	Machinery and apparatus for filtering or purifying liquids (excl. such machinery and apparatus for water and other beverages, oil or petrol-filters for internal combustion engines and artificial kidneys)	16.3	22.1	22.4	28.1	55.4
841290	Parts of non-electrical engines and motors, n.e.s.	39.5	39.0	42.0	48.4	52.6
902610	Instruments and apparatus for measuring or checking the flow or level of liquids (excl. meters and regulators)	38.4	44.4	48.0	49.8	46.7
841199	Parts of gas turbines, n.e.s.	106.9	45.9	39.2	57.7	37.0
902620	Instruments and apparatus for measuring or checking pressure of liquids or gases (excluding regulators)	16.8	22.2	30.5	38.1	31.3
902690	Instruments and apparatus; parts and accessories for those measuring or checking the flow, level, pressure or other variables of liquids or gases	27.1	24.3	32.0	29.8	30.3
847982	Mixing, kneading, crushing, grinding, screening, sifting, homogenising, emulsifying or stirring	15.5	19.6	29.0	28.8	27.8
902680	Instruments or apparatus for measuring or checking variables of liquids or gases, n.e.s.	19.5	12.3	16.5	19.3	24.7
903190	Instruments, appliances and machines; parts and accessories for those measuring or checking devices of heading no. 9031	15.2	16.3	21.8	29.2	23.5
902780	Instruments and apparatus for physical or chemical analysis, or for measuring or checking viscosity, porosity, expansion, surface tension or the like, or for measuring or checking quantities of heat, sound or light, n.e.s.	15.9	20.6	22.6	24.0	21.9
841790	Parts of industrial or laboratory furnaces, non-electric, incl. incinerators, n.e.s.	15.5	15.6	17.2	19.8	20.4
902790	Microtomes and parts and accessories thereof	13.6	13.5	24.3	16.4	20.1

		Exports (US$ Million)				
HS Code	**Commodity Description**	**2011**	**2012**	**2013**	**2014**	**2015**
841939	Dryers (excl. dryers for agricultural products, paper pulp, paper or paperboard, yarns, fabrics and other textile products, dryers for bottles or other containers, hair dryers, hand dryers and domestic appliances)	15.7	15.6	14.8	28.1	18.6
841960	Machinery for liquefying air or other gases	14.5	11.1	15.9	12.7	13.2
902710	Gas or smoke analysis apparatus	5.6	6.1	6.6	12.4	8.9
902730	Spectrometers, spectrophotometers and spectrographs; using optical radiations (UV, visible, IR)	4.7	11.2	7.1	6.8	6.3
902720	Chromatographs and electrophoresis instruments	6.8	2.6	6.5	6.2	5.6
903149	Optical instruments, appliances and machines for measuring or checking, not elsewhere specified or included in chapter 90	8.8	9.6	9.2	7.0	4.4
902750	Instruments and apparatus; using optical radiations (UV, visible, IR), (other than spectrometers, spectrophotometers and spectrographs)	4.4	4.1	3.9	4.9	3.5
	Total of Underachievers	**1497.0**	**1366.2**	**1490.3**	**1750.2**	**1752.4**

Source: Data derived from UN Comtrade; EXIM Bank Research

Growth in Declining Market

These are the products for which global demand has been falling, although exports from India have witnessed a growth. These products together constitute just 6.7% of Indian EGs exports and are 5 in number. The total exports of these 5 products amounted to US$ 207.3 million in 2015 (Table 19).

Table 19: Growing Products in Declining Market from the list of EGs for India

		Exports (US$ Million)				
HS Code	**Commodity Description**	**2011**	**2012**	**2013**	**2014**	**2015**
903300	Parts and accessories for machines, appliances, instruments or other apparatus in chapter 90, specified neither in this chapter nor elsewhere	130.2	220.6	128.4	104.6	80.3
847420	Crushing or grinding machines for solid mineral substances	23.5	39.6	54.5	64.1	56.8
841919	Heaters; instantaneous or storage water heaters, non-electric, other than instantaneous gas water heaters	15.2	11.0	16.1	13.5	29.2
851490	Parts of electric industrial or laboratory furnaces and ovens, incl. of those functioning by induction or dielectric loss, and of industrial or laboratory equipment	17.9	25.1	26.8	22.9	26.4
851420	Furnaces and ovens functioning by induction or dielectric loss	16.9	22.2	16.8	32.8	14.6
	Total of growing products in declining market	**203.7**	**318.5**	**242.5**	**238.0**	**207.3**

Source: Data derived from UN Comtrade; EXIM Bank Research

Losers in Declining Market

These are the products for which the global demand as well as the growth of Indian exports has been falling. These contribute 18.4% to the total EGs exports from India and are 12 in number. Also, the exports of these EGs were US$ 593.3 million in 2015 (Table 20) and registered an AAGR of -7.6% during 2011 to 2015.

Table 20: Losing Products in Declining Market from the list of EGs for India

		Exports (US$ Million)				
HS Code	**Commodity Description**	**2011**	**2012**	**2013**	**2014**	**2015**
850300	Parts for Electric Motors, Generators, Generating Sets and Rotary Converters	357.3	279.0	292.9	248.2	278.1
854140	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes	327.5	111.8	200.8	174.7	146.4
840690	Parts of steam and other vapour turbines, n.e.s.	31.5	47.3	43.0	51.9	49.0
903290	Parts and accessories for regulating or controlling instruments and apparatus, n.e.s.	29.1	53.3	40.2	31.2	31.7
841182	Gas turbines of a power > 5.000 kW (excluding turbojets and turbopropellers)	40.4	51.3	21.2	15.4	28.7
850239	Electric generating sets; (excluding those with spark-ignition or compression-ignition internal combustion piston engines), other than wind powered	14.4	13.2	11.5	17.0	23.1
840410	Boilers; auxiliary plant, for use with boilers of heading no. 8402 or 8403 (e.g. economisers, super-heaters, soot removers, gas recoverers)	8.3	7.8	9.3	8.5	10.7
901380	Liquid crystal devices, n.e.s. and other optical appliances and instruments not elsewhere specified in chapter 90	4.5	1.2	2.8	10.4	7.8
841780	Industrial or laboratory furnaces and ovens, non-electric, incl. incinerators	6.6	11.6	10.6	7.8	6.0
851410	Resistance heated industrial or laboratory furnaces and ovens (excluding drying ovens)	3.1	3.6	3.9	6.0	5.1
850231	Generating sets, wind-powered	41.1	43.8	76.3	83.0	4.7
901390	Parts and accessories for liquid crystal devices "LCD", lasers and other appliances and instruments not elsewhere specified in chapter 90, n.e.s.	3.1	1.2	4.4	2.0	2.2
	Total of losing products in declining market	**867.0**	**625.0**	**716.9**	**656.3**	**593.3**

Source: Data derived from UN Comtrade; EXIM Bank Research

Trade Opportunity for India in the Product Champions Category

The product champions as mentioned before, are the ones which have a growing demand globally, as well as, where the Indian exports are growing. For all the product champions (7), the position of the NRCA in 2015 vis-à-vis 2011 has improved. Out of the 7 product champions, 4 had a negative NRCA in 2011 which turned positive in 2015. Also, out of the 7 product champions, 5 reached their maximum NRCA in 2015 during 2011 to 2015.

Table 21: Product champions, their top importers and India's share (2015)

HS code	Description	Top importers	Major suppliers with share	India's share in major importing countries in percent	India's share in world in percent
850490	Parts of electrical transformers and inductors, n.e.s.	China, Hong Kong SAR	China (69.41), Japan (6.17), The USA (5.58), Germany (3.48), The Philippines (2.96)	0.4	2.4
		China	Japan (11.57), Germany (10.21), South Korea (6.51), The USA (5.78), Malaysia (2.97)	0.6	
		The USA	China (23.83), Mexico (17.51), Canada (12.41), Germany (10.3), India (4.99)	5.0	
		Germany	The United Kingdom (22.4), Slovakia (9.09), China (9.09), Italy (8.86), Austria (6.91)	2.0	
		India	China (24.88), Germany (20.1), The USA (5.67), China, Hong Kong SAR (5.24), Thailand (5.05)	NA*	
840290	Parts of vapour generating boilers and superheated water boilers, n.e.s.	Saudi Arabia	China (31.1), Japan (23.59), South Korea (12.48), Germany (7.36), The USA (5.59)	1.7	2.4
		Viet Nam	China (95.2), Singapore (2.94), South Korea (1.22), Germany (0.26), Thailand (0.07)	0.1	
		The USA	South Korea (37.88), China (14.96), Portugal (13.02), Canada (9.35), Viet Nam (8.63)	0.7	
		The Philippines	India (13.55), China (10.35), Germany (4.88), Finland (3.18), Singapore (1.9)	13.6	
		Malaysia	South Korea (42.51), Japan (21.46), Philippines (13.85), China (8.2), The United Kingdom (3.19)	1.1	
841990	Machinery, plant and laboratory equipment; parts of equipment for treating materials by a process involving a change of temperature	The USA	China (17.99), Switzerland (10.6), Thailand (10.56), Germany (9.2), Canada (8.91)	1.1	1.9
		Germany	Switzerland (16.62), France (10.34), Italy (9.25), Sweden (7.14), Austria (6.95)	1.2	
		Canada	The USA (58.57), India (9.4), China (8.97), Italy (5.53), Germany (4.81)	9.4	
		China	Sweden (14.73), Japan (11.69), Germany (10.42), France (8.54), The USA (8.18)	1.5	
		Japan	China (57.58), The USA (6.59), South Korea (6.28), Italy (4.17), Germany (3.8)	0.5	

HS code	Description	Top importers	Major suppliers with share	India's share in major importing countries in percent	India's share in world in percent
850164	AC generators "alternators", of an output > 750 kVA	The USA	Japan (18.2), China (13.57), Viet Nam (11.73), Mexico (10.76), Germany (7.52)	0.4	1.3
		Germany	Serbia (45.36), France (11.29), Austria (10.79), Italy (9.8), The USA (5.17)	0.8	
		Algeria	The USA (83.45), Austria (12.74), Italy (3.05), Canada (0.62), France (0.06)	0.0	
		South Korea	Japan (28.91), Italy (25.16), The USA (19.37), Finland (7.4), China (5.49)	0.4	
		Saudi Arabia	The USA (48.08), South Korea (23.32), Poland (17.14), Japan (2.94), Canada (2.75)	0.1	
840490	Boilers; parts of auxiliary plant, for use with boilers of heading no. 8402 and 8403 and parts of condensers for steam or other vapour power units	Saudi Arabia	China (40.84), The USA (16.93), Germany (11.29), South Korea (9.8), Romania (8.28)	0.5	2.3
		The USA	Mexico (34.23), Israel (20.04), China (14.19), Germany (8.28), South Korea (6.2)	0.4	
		Indonesia	China (73.03), South Korea (15.18), Japan (5.14), The USA (3.38), India (0.81)	0.8	
		South Korea	Japan (51.71), China (13.62), Germany (6.62), Indonesia (5.99), Sweden (5.59)	0.0	
		The Philippines	China (18.62), India (4.42), The USA (0.3), Japan (0.28), Thailand (0.26)	4.4	
851430	Electric industrial or laboratory furnaces and ovens (excl. resistance heated, induction, dielectric and drying furnaces and ovens)	Malaysia	China (94.03), Japan (1.08), The USA (0.79), Germany (0.73), Sweden (0.65)	0.1	0.7
		China	Germany (30.6), The USA (26.14), Japan (19.17), South Korea (7.87), Austria (2.06)	0.0	
		Viet Nam	China (65.46), Japan (9.57), South Korea (9.33), Germany (5.75), Thailand (1.29)	NA*	
		Brazil	Italy (68.74), Switzerland (13.97), The USA (9.37), Portugal (2.37), Austria (1.93)	NA*	
		Indonesia	China (88.24), Japan (5.44), The USA (1.07), Singapore (0.99), Turkey (0.78)	0.1	
840420	Condensers for steam or other vapour power units	Saudi Arabia	Germany (31.57), South Korea (30.15), Indonesia (26.58), China (7.79), Thailand (1.55)	0.1	2.5
		United Arab Emirates	South Korea (98.45), Japan (0.39), China (0.35), India (0.18), Italy (0.16)	0.2	
		Mexico	The USA (50.17), Spain (39.31), South Korea (5.9), China (2.98), India (0.51)	0.5	
		Thailand	Japan (72.49), South Korea (10.75), China (9.67), Singapore (3.24), Germany (1.97)	1.7	
		Australia	Viet Nam (99.73), China (0.09), Italy (0.07), The United Kingdom (0.03), South Africa (0.02)	NA*	

Source: Data derived from UN Comtrade; EXIM Bank Research
NA* - no exports to that country

Trade Opportunities for India in the Underachievers Category

Underachievers are the items which have a growing demand and can therefore be a source of providing impetus to any economy, if given a push. Among all the Underachievers (29), the position of the NRCA of 22 underachievers in 2015 vis-à-vis 2011 has improved.

Table 22: Underachievers, their top traders and India's share (2015)

HS Code	Description	Top importers	Major suppliers with share	India's share in major importing countries in percent	India's share in world in percent
841199	Parts of gas turbines, n.e.s.	The USA	Mexico (15.91), Hungary (10.39), Japan (9.69), France (8.89), Italy (7.86)	0.2	0.4
		Mexico	The USA (78.97), Japan (9.52), Hungary (7.03), Germany (1.38), Switzerland (0.93)	0.0	
		Germany	The USA (23.65), Switzerland (18.49), China (11.32), The United Kingdom (8.9), Italy (7.6)	0.4	
		Algeria	The USA (34.44), France (14.09), Turkey (12.9), Italy (11.46), Hungary (7.26)	0.2	
		Italy	The USA (19.07), France (18.22), Germany (14.79), The United Kingdom (11.16), The Netherlands (8.23)	0.1	
841290	Parts of non-electrical engines and motors, n.e.s.	The USA	China (32.46), Mexico (11.53), Brazil (8.48), Germany (7.53), Canada (5.67)	1.8	1.4
		Germany	Portugal (16.85), Spain (12.75), China (10.69), Denmark (9.45), The USA (8.26)	0.5	
		Canada	The USA (63), China (7.47), Germany (7.42), Canada (6.25), Brazil (3.22)	0.7	
		Poland	China (20.47), Italy (20.22), Denmark (17.38), Spain (12.08), Germany (11.69)	1.5	
		The United Kingdom	Denmark (23.76), Germany (21.55), The USA (11.73), China (6.98), Turkey (4.98)	2.8	
841790	Parts of industrial or laboratory furnaces, non-electric, incl. incinerators, n.e.s.	Viet Nam	China (88.99), Indonesia (3.68), Japan (0.86), Italy (0.78), The Netherlands (0.75)	0.1	1.1
		The USA	Canada (35.58), Italy (16.83), Germany (9.12), China (7), The United Kingdom (3.63)	0.4	
		Indonesia	China (86.91), Belgium (3.09), Japan (2.93), Italy (2.34), The USA (1.65)	0.0	
		Germany	Luxembourg (30.09), Italy (11.73), Turkey (9.99), China (8.96), Spain (6.68)	0.4	
		Saudi Arabia	Germany (27.18), Italy (20.32), South Korea (6.72), The USA (6.71), China (6.32)	2.9	

HS Code	Description	Top importers	Major suppliers with share	India's share in major importing countries in percent	India's share in world in percent
841939	Dryers (excl. dryers for agricultural products, paper pulp, paper or paperboard, yarns, fabrics and other textile products, dryers for bottles or other containers, hair dryers, hand dryers and domestic appliances)	China	Germany (25.76), Japan (12.91), The USA (11.41), South Korea (10.11), Italy (9)	0.2	1.0
		The USA	Germany (18.19), Italy (15.03), China (10.01), The United Kingdom (9.69), Canada (9.43)	0.9	
		Viet Nam	China (39.63), South Korea (29.86), Japan (7.31), Italy (4.14), Thailand (2.92)	0.7	
		Saudi Arabia	Japan (29.21), South Korea (24.6), China (12.02), Germany (8.55), The USA (6.83)	4.8	
		Mexico	The USA (50.26), Germany (10.95), China (8.2), Italy (7.62), South Korea (5.5)	0.0	
841960	Machinery for liquefying air or other gases	Russian Federation	China (26.36), Italy (17.74), The USA (6.89), Thailand (3.67), South Korea (0.75)	NA*	0.8
		Saudi Arabia	South Korea (44.78), Japan (17.68), The USA (11.98), Germany (6.63), Italy (4.04)	2.2	
		Australia	Thailand (56.72), The USA (33.21), Spain (9.19), China (0.3), The United Kingdom (0.25)	NA*	
		The USA	Spain (57.29), South Korea (9.19), China (9.12), Canada (6.63), The Netherlands (3.85)	0.5	
		Norway	The United Kingdom (92.25), The USA (2.67), South Korea (1.94), China (0.95), The Netherlands (0.89)	NA*	
841989	Machinery, plant and laboratory equipment; for treating materials by change of temperature, other than for making hot drinks or cooking or heating food	Russian Federation	Germany (18.21), Italy (13.66), Japan (8.55), South Korea (8.48), Malaysia (7.25)	1.7	1.3
		China	Germany (28.24), The USA (10.73), Japan (10.27), Switzerland (9.14), Italy (6.27)	1.4	
		The USA	Germany (19.77), Canada (15.91), China (12.81), South Korea (10.91), Japan (7.43)	1.3	
		South Korea	The USA (18.42), Japan (17.16), China (13.53), France (11.08), Germany (10.12)	0.6	
		India	South Korea (27.93), China (27.05), Germany (8.7), The USA (5.78), France (4.72)	NA*	
842121	Machinery and apparatus for filtering or purifying water	The USA	China (27.39), Canada (19.67), Mexico (12.82), Germany (6.71), Japan (4.97)	0.8	1.2
		China	South Korea (21.2), Germany (19.64), The USA (10.27), France (6.45), Japan (5.14)	0.0	
		Canada	The USA (69.3), China (8.93), Hungary (7.19), Germany (2.34), Mexico (1.48)	0.3	
		Germany	The United Kingdom (13.81), Switzerland (12.88), Austria (11.57), China (11.55), Italy (7.28)	0.1	
		France	Germany (16.46), China (10.89), The USA (9.28), Spain (8.03), Belgium (7.94)	3.3	

HS Code	Description	Top importers	Major suppliers with share	India's share in major importing countries in percent	India's share in world in percent
842129	Machinery and apparatus for filtering or purifying liquids (excl. such machinery and apparatus for water and other beverages, oil or petrol-filters for internal combustion engines and artificial kidneys)	China	Germany (30.86), Japan (23.98), The USA (11.65), South Korea (5.38), France (4.8)	0.7	1.1
		The USA	Germany (16.42), Ireland (11.07), Mexico (10.65), China (10.24), Japan (9.5)	0.7	
		Germany	France (28.62), The USA (16.45), The United Kingdom (11.78), Japan (5.76), China (4.87)	0.6	
		France	The USA (30.98), Germany (22.3), The United Kingdom (9.36), Ireland (6.54), Japan (6.5)	0.7	
		Mexico	The USA (59.5), Germany (13.07), Japan (7.56), Italy (3.87), China (3.63)	0.3	
842139	Machinery and apparatus for filtering or purifying gases (excl. isotope separators and intake air filters for internal combustion engines)	The USA	Mexico (36.54), South Africa (10.87), China (9.35), Canada (8.61), Germany (8.43)	0.3	0.7
		Germany	South Africa (28.87), Republic of Macedonia (18.2), Czech (11.01), Sweden (9.56), The United Kingdom (6.63)	0.1	
		Mexico	The USA (80.72), Germany (5.55), Japan (2.13), China (1.82), Italy (1.35)	0.3	
		Canada	The USA (75.67), Mexico (9.64), China (2.84), South Africa (2.55), Germany (2.49)	0.4	
		China	Germany (23.24), South Korea (17.71), Japan (13.69), The USA (13.24), Italy (2.86)	0.2	
842199	Parts of machinery and apparatus for filtering or purifying liquids or gases, n.e.s.	China	The USA (34.56), Germany (18.61), Japan (13.61), South Korea (6.89), The United Kingdom (3.62)	0.5	1.1
		The USA	China (18.78), Germany (11.46), Canada (10.78), Japan (8.51), Mexico (7.17)	2.0	
		Germany	Austria (12.95), The USA (12.19), Italy (8.6), China (7.49), Switzerland (7.28)	0.6	
		France	Germany (24.26), The USA (21.44), Ireland (8.42), Italy (6.68), The United Kingdom (6.64)	0.7	
		Canada	The USA (55.36), South Korea (14.4), China (5.92), Mexico (4.9), Germany (4.52)	3.3	
847982	Mixing, kneading, crushing, grinding, screening, sifting, homogenising, emulsifying or stirring	China	Germany (30.85), The USA (11.65), Japan (11.13), South Korea (8.03), Italy (6.16)	0.4	1.2
		The USA	Germany (30.16), Canada (19.01), China (9.71), Italy (6.29), Switzerland (5.28)	1.3	
		Germany	Denmark (24.14), Poland (18.6), Switzerland (12.27), Austria (7.62), Italy (6.16)	0.9	
		Indonesia	China (50.46), Canada (9.46), The USA (7.59), Germany (7.15), Japan (5.23)	2.5	
		South Korea	Germany (19.47), Japan (16.49), The USA (16.28), China (12.12), The United Kingdom (5.98)	0.0	

HS Code	Description	Top importers	Major suppliers with share	India's share in major importing countries in percent	India's share in world in percent
847989	Machines and mechanical appliances, n.e.s.	China	Japan (24.95), South Korea (17.83), Germany (17.1), The USA (10.57), Singapore (2.77)	0.2	0.6
		The USA	Germany (16.29), China (15.96), Japan (14.98), Canada (12.4), Mexico (4.5)	0.5	
		South Korea	The USA (33.42), Norway (12.25), Japan (10.06), Germany (9.8), China (7.53)	0.1	
		Mexico	The USA (34.6), Germany (21.18), Japan (14.17), South Korea (6.08), Italy (4.61)	0.2	
		Germany	The USA (16.17), Switzerland (15), China (8.17), Japan (6.86), Italy (6.64)	0.5	
847990	Parts of machines and mechanical appliances, n.e.s.	The USA	Germany (13.76), Japan (13.14), Mexico (12.56), Canada (11.11), China (10.77)	1.4	0.6
		South Korea	Japan (28.44), The USA (17), The United Kingdom (9.03), Norway (8.77), Germany (7.82)	0.2	
		Germany	Switzerland (15.89), Czech (15.51), Sweden (8.59), The USA (8.25), Italy (7.44)	0.6	
		Singapore	The USA (19.55), Japan (17.64), Malaysia (14.86), China (8.78), Germany (8)	0.7	
		China	Germany (31.46), Japan (18.07), The USA (11.26), South Korea (11.01), France (2.69)	0.3	
854390	Electrical machines and apparatus; parts of the electrical goods of heading no. 8543	China	China (47.9), Singapore (12.64), The USA (8.2), Japan (6.22), Indonesia (5.2)	0.0	1.0
		Singapore	Indonesia (19.56), China (18.36), Japan (11.41), The USA (10.34), Malaysia (7.58)	5.3	
		China, Hong Kong SAR	China (77.49), Japan (5.15), USA (4.06), Germany (1.75), Singapore (1.72)	0.1	
		The USA	Japan (29.55), China (20.8), Mexico (6.83), Germany (6.06), The United Kingdom (4.9)	0.4	
		Germany	France (27.18), China (14.76), The USA (13.45), Italy (5.52), Japan (4.8)	0.1	
901580	Instruments and appliances used in geodesy, topography, hydrography, oceanography, hydrology	The USA	Canada (27.09), The United Kingdom (16.49), France (13.04), China (9.21), Norway (6.3)	0.5	0.2
		China	The USA (40.69), Germany (9.93), Canada (7.18), Switzerland (6.58), Finland (5.34)	0.0	
		Singapore	The USA (39.76), Norway (21.2), The United Kingdom (10.6), Malaysia (9.54), Canada (3.89)	0.1	
		The United Kingdom	The United Kingdom (31.51), The USA (29.06), Norway (10.36), Spain (4.21), Canada (3.82)	0.1	
		Malaysia	Thailand (45.58), Norway (22.37), Singapore (10.33), The USA (7.51), Germany (6.4)	NA*	

HS Code	Description	Top importers	Major suppliers with share	India's share in major importing countries in percent	India's share in world in percent
902610	Instruments and apparatus for measuring or checking the flow or level of liquids (excl. meters and regulators)	The USA	Mexico (28.5), China (13.6), Germany (11.82), The United Kingdom (11.66), France (5.24)	1.2	0.8
		China	Germany (24.21), The USA (23.61), France (9.86), Japan (7.62), Switzerland (4.25)	0.1	
		Germany	France (23.81), The USA (19.53), The Netherlands (14.77), Switzerland (8.79), The United Kingdom (5.7)	0.3	
		Canada	The USA (63.71), Germany (6.04), The United Kingdom (5.4), Mexico (5.26), China (4.3)	0.1	
		The United Kingdom	Norway (20.88), The USA (17.14), Germany (16.68), France (8.89), The United Kingdom (8.73)	0.7	
902620	Instruments and apparatus for measuring or checking pressure of liquids or gases (excluding regulators)	The USA	Mexico (29.4), China (13.73), Germany (12.14), Japan (10.44), The United Kingdom (9.76)	0.9	0.5
		China	Germany (23.06), Japan (20.19), The USA (14.29), China (4.8), Malaysia (4.11)	0.1	
		Germany	Switzerland (14.85), The USA (12.24), Malaysia (9.67), The United Kingdom (9.08), China (7.54)	0.6	
		The Netherlands	Mexico (27.41), China (21.29), Malaysia (17.52), Germany (10.37), Japan (8.52)	0.1	
		South Korea	The USA (16.62), China (14.11), Japan (13.46), The United Kingdom (10.83), France (9.02)	0.1	
902680	Instruments or apparatus for measuring or checking variables of liquids or gases, n.e.s.	The USA	Japan (23.03), Mexico (16.09), Germany (14.54), China (7.62), Canada (6.67)	0.3	0.3
		Spain	Germany (25.4), The USA (25.22), France (20.32), The United Kingdom (16.42), Italy (1.64)	0.1	
		China	Japan (28.32), Germany (28.24), The USA (17.97), The United Kingdom (3.64), Switzerland (3.27)	0.0	
		Germany	Switzerland (47.49), The United Kingdom (9.18), The USA (8.75), China (6.37), France (3.69)	0.3	
		The United Kingdom	Germany (21.13), Japan (20.56), The USA (13.87), China (8.72), The Netherlands (5.88)	0.3	
902690	Instruments and apparatus; parts and accessories for those measuring or checking the flow, level, pressure or other variables of liquids or gases	Japan	The United Kingdom (47.95), China (17.08), The USA (10.99), Germany (8.04), Malaysia (4.91)	0.3	1.0
		The USA	China (21.26), Mexico (16.93), Germany (11.23), Thailand (8.06), Switzerland (6.81)	1.9	
		China	The USA (19.6), Germany (16.33), Thailand (13.25), China (9.9), Japan (9.49)	0.7	
		Germany	Switzerland (27.29), The USA (21.83), China (7.98), The Netherlands (7.59), France (5.78)	0.9	
		Mexico	The USA (43.97), Thailand (14.67), Japan (10.66), China (8.58), Germany (6.8)	0.6	

HS Code	Description	Top importers	Major suppliers with share	India's share in major importing countries in percent	India's share in world in percent
902780	Instruments and apparatus for physical or chemical analysis, or for measuring or checking viscosity, porosity, expansion, surface tension or the like, or for measuring or checking quantities of heat, sound or light, n.e.s.	China	The USA (34.28), Japan (17.1), Germany (12.5), Singapore (9.09), Switzerland (6.88)	0.0	0.1
		The USA	Germany (17.34), Singapore (15.51), Japan (10.59), China (10.22), The United Kingdom (8.74)	0.1	
		Germany	The USA (28.55), Switzerland (20.59), Singapore (12.89), Japan (10.73), China (8.43)	0.1	
		South Korea	Japan (41.24), The USA (21.29), Germany (14.04), France (3.28), The United Kingdom (2.97)	0.1	
		China, Hong Kong SAR	China (41.38), The USA (29.27), Japan (5.37), Germany (5.06), Singapore (4.19)	0.1	
902790	Microtomes and parts and accessories thereof	The USA	Japan (19.95), Germany (16.8), China (11.17), Singapore (7.19), The United Kingdom (7.02)	0.2	0.2
		Germany	The USA (27.89), Switzerland (15.74), Japan (12.91), China (6.99), The United Kingdom (5.92)	0.0	
		China	The USA (32.29), Japan (19.53), Germany (14.53), China (6.62), Switzerland (4.27)	0.1	
		Singapore	The USA (37.74), Ireland (17.39), Germany (9.63), The United Kingdom (6.89), Malaysia (6.13)	0.4	
		Japan	The USA (30.25), China (21.39), Germany (13.33), The United Kingdom (6), Indonesia (4.54)	0.1	
903180	Instruments, appliances and machines for measuring or checking, not elsewhere specified in chapter 90 (excl. optical)	China	Germany (20.3), Japan (16.51), The USA (16.39), South Korea (9.3), China (3.75)	0.1	0.2
		The USA	Germany (15.29), Japan (14.11), China (13.07), Canada (8.66), The United Kingdom (5.97)	0.6	
		Germany	Philippines (16.45), The USA (12.97), Switzerland (9.27), South Korea (7.88), China (7.68)	0.2	
		South Korea	Germany (17.86), The USA (15.49), Japan (13.45), Viet Nam (10.23), China (9.95)	0.1	
		Mexico	The USA (38.67), China (13.25), Germany (11.93), Japan (9.12), South Korea (7.65)	0.2	
903190	Instruments, appliances and machines; parts and accessories for those measuring or checking devices of heading no. 9031	China	The USA (22.7), Germany (13.89), Japan (10.74), South Korea (10.52), The United Kingdom (10.05)	0.0	0.6
		Japan	The USA (33.52), China (16.04), Germany (10.1), The United Kingdom (5.01), South Korea (4.62)	0.6	
		The USA	Germany (20.86), Japan (8.49), The United Kingdom (8.48), Canada (8.38), China (8.3)	0.9	
		Germany	Austria (15.7), Switzerland (13.02), The USA (12.26), Hungary (9.46), Italy (5.83)	0.3	
		South Korea	The USA (20.05), The United Kingdom (17.87), Japan (16.21), Germany (12.08), China (5.21)	0.1	

HS Code	Description	Top importers	Major suppliers with share	India's share in major importing countries in percent	India's share in world in percent
903289	Regulating or controlling instruments and apparatus; automatic, other than hydraulic or pneumatic	China	Japan (22.08), Germany (21.25), The USA (13.92), South Korea (11.53), France (3.97)	0.2	1.0
		The USA	Mexico (28.61), Germany (14.72), Japan (12.95), Canada (10.54), China (9.33)	0.6	
		Germany	Hungary (30.56), France (12.22), The USA (11.1), The United Kingdom (6.63), Belgium (4.93)	0.1	
		Mexico	The USA (65.15), Japan (6.2), China (5.59), Germany (4.8), Thailand (4.73)	0.6	
		Japan	The USA (27.62), China (24.15), Germany (12.26), Philippines (8.86), Thailand (5.25)	4.2	
902710	Gas or smoke analysis apparatus	The USA	Germany (28.86), Japan (28.21), Mexico (12.51), The United Kingdom (8.07), Canada (5.37)	0.1	0.2
		China	Germany (25.58), Japan (22.36), The USA (15.79), South Korea (11.91), The United Kingdom (6.86)	0.1	
		Germany	Japan (43.80), The USA (18.83), Poland (18.79), The United Kingdom (5.57), Brazil (2.29)	0.1	
		South Korea	Germany (25.17), The USA (22.81), Japan (18.60), Vietnam (13.74), The United Kingdom (6.04)	0.0	
		Canada	The USA (64.89), Germany (8.26), Japan (7.43), The United Kingdom (5.87), Mexico (4.53)	0.0	
902730	Spectrometers, Spectrophotometers, Spectrographs using optical radiations (UV, visible, IR)	China	Germany (28.13), The USA (23.83), Japan (11.40), Singapore (8.22), The United Kingdom (6.90)	0.0	0.2
		The USA	Germany (17.92), The United Kingdom (11.79), China (10.87), Singapore (10.31), Malaysia (8.90)	0.1	
		Germany	The USA (26.35), Malaysia (16.25), Japan (14.43), China (8.96), Switzerland (8.45)	1.28	
		Singapore	Malaysia (61.45), Ireland (15.88), The USA (6.76), The United Kingdom (4.16), Germany (3.15)	0.0	
		South Korea	The USA (30.08), Germany (18.34), Singapore (15.11), Japan (12.30), The United Kingdom (5.00)	0.0	
902720	Chromato-graphs and electro- phoresis instruments	China	Germany (25.46), The USA (19.18), Japan (16.69), Singapore (13.15), China (13.05)	NA*	0.2
		China, Hong Kong SAR	China (60.90), The USA (9.69), Sweden (9.58), Germany (9.39), Japan (7.78)	0.0	
		The USA	China (26.08), Sweden (21.46), Singapore (14.78), Japan (11.13), Germany (7.93)	0.0	
		India	Singapore (26.01), Germany (24.65) Japan (15.43), The USA (13.69), Austria (4.09)	NA*	
		Germany	China (40.00), The USA (22.11), The United Kingdom (9.08), Japan (7.29), Sweden (5.43)	NA*	

HS Code	Description	Top importers	Major suppliers with share	India's share in major importing countries in percent	India's share in world in percent
903149	Optical instruments, appliances and machines for measuring or checking, not elsewhere specified or included in chapter 90	China	Japan (19.99), South Korea (17.19), The USA (13.00), Germany (12.04), Singapore (4.88)	0.0	0.2
		The USA	Germany (25.26), Canada (17.40), China (13.14), Japan (12.75), Mexico (6.81)	0.0	
		Germany	Switzerland (17.67), Japan (16.57), The USA (14.10), China (10.25), South Korea (4.96)	0.2	
		South Korea	Japan (17.45), The USA (16.35), China (12.55), Germany (11.24), Thailand (8.13)	0.0	
		China, Hong Kong SAR	China (17.68), South Korea (14.76), Israel (13.25), The USA (10.87), Japan (10.27)	0.1	
902750	Instruments and apparatus; using optical radiations (UV, visible, IR), (other than spectro-meters, spectro-photo- meters and spectrographs)	China	The USA (33.00), Japan (26.71), Germany (11.68), Singapore (8.09), The United Kingdom (3.62)	0.0	0.0
		The USA	Singapore (16.99), Japan (16.93), China (12.84), Germany (11.18), The United Kingdom (7.22)	0.1	
		Germany	Japan (38.77), Switzerland (17.74), The USA (14.36), China (8.78), Singapore (4.73)	0.0	
		The Netherlands	The USA (52.75), Singapore (18.83), Germany (7.81), Japan (2.90), China (2.14)	0.0	
		The United Kingdom	Germany (30.45), The USA (26.18), The Netherlands (13.01), China (6.90), Belgium (6.45)	0.0	

Source: Data derived from UN Comtrade; EXIM Bank Research

3 STRENGTHENING ENVIRONMENTAL GOODS SECTOR: POSSIBLE WAY AHEAD FOR INDIA

As discussed in the previous chapters, there has been an increasing consciousness about the changing climatic conditions around us, which has catalysed efforts to promote environmental goods, inter alia, through efforts aimed at promoting their cross-border trade for wider usage and applications worldwide. The negotiations on the modalities of enhancing international trade in EGs are currently being deliberated under the Environmental Goods Agreement (EGA), with 46 participating WTO countries.

Besides the EGA negotiations which began in 2014, countries across the world adopted an international climate agreement at the U.N. Framework Convention on Climate Change (UNFCCC), Conference of the Parties (COP21) in Paris in December 2015 to undertake targeted efforts to counter climate change. The central goal of the COP21 Agreement is to *"strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius above pre-industrial levels"*. The Agreement further specified, *"to reach these ambitious goals, appropriate financial flows, a new technology framework and an enhanced capacity building framework will be put in place, thus supporting action by developing countries and the most vulnerable countries, in line with their own national objectives"*. Under Article 4 of the COP 21, the countries pledge, *"to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty"*.

As a lead up to the Agreement, countries charted the climate actions they intended to take under this Agreement, known as their Intended Nationally Determined Contributions (INDCs). The climate actions communicated in these INDCs form the key components which will have a strong bearing on whether the world achieves the aforementioned central goals of the Agreement.

On its part, India along with France, anchored the setting up of the International Solar Alliance as a common platform for cooperation among countries with rich solar irradiation (essentially lying between the Tropics of Cancer and Capricorn) with the objective of significantly scaling up solar energy not only as a source of electricity but also as a mechanism to curb global greenhouse gas emissions.

Simultaneously in 2015, India also announced its revised National Climate Change Policy, with the commitment to invest in tackling climate change while addressing issues pertaining to poverty, food security and access to healthcare and education. India's INDCs, inter alia, centre around its policies and programmes on promotion of clean energy, especially renewable energy and enhancement of energy efficiency. The country has set a target of installing 175 gigawatts (GW) of renewable energy capacity by 2022, out of which 100 GW has been allocated to solar and 60 GW to wind. Further, the country has set a new target to increase its share of non-fossil fuel-based energy from 30% to about 40% by 2030 and committed to reduce its emissions intensity per unit GDP by 33% to 35%, below the level that prevailed in 2005, by 2030, and create an additional carbon sink of 2.5 to 3 billion tonnes of CO_2, through additional tree cover.

Whilst such endeavours are commendable, especially in the context of the country's stage of

development, there are other areas where a little impetus could bear significant positive outcomes. One such measure is to create an ecosystem for augmenting the usage of environmental goods in the country. This would entail attracting investments to produce environmental goods domestically, inter alia by facilitating technology transfer from developed countries.

STRENGTHENING ENVIRONMENTAL GOODS SECTOR IN INDIA: SELECT MEASURES

Joining EGA negotiations as an Option: Pros and Cons

Presently, India is not a party to EGA negotiations, although in the past, it has suggested approaches such as Environmental Project Approach and Integrated Approach (along with Argentina) for arriving at a consensus list of EGs.

One of the key issues pertaining to the ongoing EGA negotiations since July 2014 has been reducing tariffs on products used in a variety of environmentally-related functions such as improving energy and resource efficiency, reducing air, water and soil pollution, noise abatement, etc. The discord between the developing and the developed countries, as highlighted in the first chapter, is reflected in the reluctance of developing countries to reduce the tariff to the developed countries level. Whilst the oft-cited reason stems from the need to protect their own domestic enterprises, in the case of India, trade analysis with respect to the 54 EGs under the APEC List reveals yet another dimension.

Exporters of the 54 EGs under the APEC List, are predominantly developed countries. Nonetheless, there are certain EGs within this list where exports from non-participating developing countries are also reasonably substantial, accounting for a share of at least 3% in world exports of that EG in 2015. In fact, there are 17 such instances where the export share of developing nations (used for the analysis) for a particular EG exceeded 3% of the world exports during 2015. The highest instances occur for Mexico (in 7 products), followed by India (in 4 products) and Malaysia (in 3 products). It is interesting to note that other than China, the other two developing countries, viz. Turkey and Costa Rica, which are a part of negotiations, have no EGs in the APEC List, which is having a share greater than 3% of the world exports (Table 23).

A granular analysis for India's export destinations for the aforementioned 4 EGs, where its export share in the world was greater than 3% in 2015, reveals that most of its markets are developing countries, which are not a part of the EGA negotiations. In fact, the top export destination for 3 out of 4 EGs was Philippines, which is not a party to the EGA negotiations. Even Iran, which was the top importer from India for 'Electric industrial or laboratory furnaces and ovens (excl. resistance heated, induction, dielectric and drying furnaces and ovens)' (HS code-851430) accounting for a share of more than 40% in India's exports, is not a party to EGA negotiations (Table 24). Besides this fact that the current exports for most EGs are predominantly to countries which are not party to the negotiations, another argument that can be built for India not joining EGA is that, if at all there are reductions in tariffs, developing countries like India can enjoy benefits through 'free riding' on the negotiating efforts of others. Even though the negotiations are being conducted plurilaterally, the benefits would be accrued to all WTO members, irrespective of their participation in EGA, once the 'critical mass' is reached.

The welfare benefits arising out of India joining the EGA negotiations, could give the country access to environmental goods at relatively lower costs, resulting in driving domestic demand and usage of such products in the country. The question that arises would be, whether India should at all

Table 23: Instances where a Developing Country has a significant share (3% and above) in world exports of an EG from APEC list of 54 EGs

HS code	Item/Description	Share in % (2015)	Rank
Brazil			
850164	AC generators "alternators", of an output > 750 kVA	3.4	10
India			
840290	Parts of vapour generating boilers and superheated water boilers, n.e.s.	4.2	8
840490	Boilers; parts of auxiliary plant, for use with boilers of heading no. 8402 and 8403 and parts of condensers for steam or other vapour power units	3.2	8
851430	Electric industrial or laboratory furnaces and ovens (excl. resistance heated, induction, dielectric and drying furnaces and ovens)	3.6	9
840420	Condensers for steam or other vapour power units	7.7	4
Indonesia			
841960	Machinery for liquefying air or other gases	7.4	4
441872	Flooring panels, multilayer, assembled, of wood (excluding for mosaic floors)	5.3	7
Malaysia			
854140	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes	6.7	3
902620	Instruments and apparatus for measuring or checking pressure of liquids or gases (excluding regulators)	3.4	10
902730	Spectrometers, spectrophotometers and spectrographs; using optical radiations (UV, visible, IR)	3.3	7
Mexico			
903289	Regulating or controlling instruments and apparatus; automatic, other than hydraulic or pneumatic	8.6	5
842139	Machinery and apparatus for filtering or purifying gases (excl. isotope separators and intake air filters for internal combustion engines)	8.2	3
841199	Parts of gas turbines, n.e.s.	4.2	7
902620	Instruments and apparatus for measuring or checking pressure of liquids or gases (excluding regulators)	6.7	5
841919	Heaters; instantaneous or storage water heaters, non-electric, other than instantaneous gas water heaters	22.2	1
902690	Instruments and apparatus; parts and accessories for those measuring or checking the flow, level, pressure or other variables of liquids or gases	4.3	7
840490	Boilers; parts of auxiliary plant, for use with boilers of heading no. 8402 and 8403 and parts of condensers for steam or other vapour power units	3.3	7

Source: UNCOMTRADE, EXIM Bank Research

Table 24: Major export destinations for select Indian EGs from APEC List

HS Code	Item/Description	Major export destinations
840290	Parts of vapour generating boilers and superheated water boilers, n.e.s.	Philippines (14.4%), Canada (10.4%), Honduras (6.1%), Morocco (5.8%), Thailand (5.2%)
840490	Boilers; parts of auxiliary plant, for use with boilers of heading no. 8402 and 8403 and parts of condensers for steam or other vapour power units	Philippines (16.0%), Saudi Arabia (15.1%), Thailand (9.1%), Russian Federation (7.6%), Malaysia (5.8%)
851430	Electric industrial or laboratory furnaces and ovens (excl. resistance heated, induction, dielectric and drying furnaces and ovens)	Iran (41.5%), Bangladesh (16.6%), Kenya (11.3%), South Africa (4.2%), China (3.6%)
840420	Condensers for steam or other vapour power units	Philippines (49.0%), Pakistan (8.2%), South Africa (6.6%), Indonesia (6.4%), The US (4.3%)

Source: UNCOMTRADE, EXIM Bank Research

consider being a part of the EGA. Those in favour can argue that being a part of the discussion would give India the opportunity to provide options like agreeing to a gradual reduction of tariffs over a period of time, subject to the condition that the participating countries, especially those from the developed economies, committing to make a minimum threshold investments into India. India may look at the disintegrated approach to receive investments as well. For example, in electronics value chain, the finished products (mobile phone for e.g.) in general, are essentially an assembly of many other disintegrated products produced across various parts of the world. In the case of India, it may also like to strengthen the EG value chain and create opportunities to specialize in some of them, and gradually capture a certain proportion of its value while garnering export earnings from it. Given the huge market that India has on clean energy, firms from developed countries may be attracted to transfer technology, produce locally, and sell both locally and abroad, making India a manufacturing hub for select EGs.

Those not favouring India joining the EGA negotiations, may also argue that there are various bottlenecks in terms of processes (including technology) which developing countries like India face, which leaves them behind in their growth curve. Such countries take a number of years to reach a level, to compete internationally. At times, some resort to the famous 'infant-industry' argument and adopt protectionism whilst creating tariff barriers, so as to avoid flooding of goods that are relatively less costly (possibly technologically better), and hence more competitive vis-à-vis products sold in the host country.

An analysis has been done to showcase the tariff structure of the 54 EGs in a mix of developing and developed countries (Table 25). The tariff table includes six nations, namely, Argentina, India, Brazil, China, the EU and the USA, of which, the first three are not part of the EGA negotiations. The table uses the Most Favoured Nation (MFN)[19] Tariffs for analysis. Though MFN may appear in common parlance as providing a special treatment to a nation, in practice, it essentially means non-discrimination in tariffs.

Table 25 highlights the fact that, on an average, the tariff charged by the nations, which are not part of the EGA negotiations, is high, compared to the nations which are part of the negotiations. As has been discussed in the first chapter, this disparity in tariff remains a bone of contention, which has kept most developing countries, sans China, away from the EGA discussions.

[19]MFN tariffs are what countries promise to impose on imports from other members of the WTO, unless the country is part of a preferential trade agreement (such as a free trade area or customs union). This means that, in practice, MFN rates are the highest (most restrictive) that WTO members charge one another.

Table 25: Average of Ad Valorem duties for MFN Applied Tariff of identified Environmental Goods in Select Economies (in percent)

HS Code	Description	Not part of EGA negotiations			Part of EGA negotiations		
		Argentina	India	Brazil	China*	EU	The USA
441872	Flooring panels, multilayer, assembled, of wood (excluding for mosaic floors)	14.0	10.0	14.0	4.0	0.0	2.7
847420	Crushing or grinding machines for solid mineral substances	14.0	7.5	14.0	5.0	0.0	0.0
847982	Mixing, kneading, crushing, grinding, screening, sifting, homogenising, emulsifying or stirring	14.0	7.5	14.0	7.0	1.7	0.0
847990	Parts of machines and mechanical appliances, n.e.s.	15.0	7.5	15.0	0.0	1.7	0.0
850300	Parts for electric motors, generators, generating sets and rotary converters	14.0	7.5	14.0	6.5	2.7	3.1
901580	Instruments and appliances used in geodesy, topography, hydrography, oceanography, hydrology	14.0	7.5	14.0	5.0	3.1	0.9
847989	Machines and mechanical appliances, n.e.s.	12.0	7.5	12.0	0.0	1.7	0.9
842199	Parts of machinery and apparatus for filtering or purifying liquids or gases, n.e.s.	7.0	7.5	7.0	7.5	1.7	0.0
854140	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes	4.4	0.0	4.4	0.0	0.0	0.0
841199	Parts of gas turbines, n.e.s.	0.0	7.5	0.0	5.0	4.1	0.8
841290	Parts of non-electrical engines and motors, n.e.s.	14.0	7.5	14.0	5.0	2.4	0.0
841780	Industrial or laboratory furnaces and ovens, non-electric, incl. incinerators	9.3	7.5	9.3	9.2	1.7	3.9
841790	Parts of industrial or laboratory furnaces, non-electric, incl. incinerators, n.e.s.	14.0	7.5	14.0	7.0	1.7	3.9

HS Code	Description	Not part of EGA negotiations			Part of EGA negotiations		
		Argentina	India	Brazil	China*	EU	The USA
841939	Dryers (excl. dryers for agricultural products, paper pulp, paper or paperboard, yarns, fabrics and other textile products, dryers for bottles or other containers, hair dryers, hand dryers and domestic appliances)	35.0	7.5	14.0	9.0	1.7	0.0
842121	Machinery and apparatus for filtering or purifying water	14.0	8.3	14.0	11.7	1.7	0.0
842129	Machinery and apparatus for filtering or purifying liquids (excl. such machinery and apparatus for water and other beverages, oil or petrol-filters for internal combustion engines and artificial kidneys)	8.4	7.5	8.4	5.0	1.7	0.0
842139	Machinery and apparatus for filtering or purifying gases (excl. isotope separators and intake air filters for internal combustion engines)	16.8	7.5	11.5	6.0	1.7	0.0
902610	Instruments and apparatus for measuring or checking the flow or level of liquids (excl. meters and regulators)	13.0	0.0	13.0	0.0	0.0	0.0
902620	Instruments and apparatus for measuring or checking pressure of liquids or gases (excluding regulators)	18.0	0.0	18.0	0.0	0.0	0.0
902680	Instruments or apparatus for measuring or checking variables of liquids or gases, n.e.s.	18.0	0.0	18.0	0.0	0.0	0.0
902690	Instruments and apparatus; parts and accessories for those measuring or checking the flow, level, pressure or other variables of liquids or gases	16.0	0.0	16.0	0.0	0.0	0.0
902750	Instruments and apparatus; using optical radiations (UV, visible, IR), (other than spectrometers, spectrophotometers and spectrographs)	11.7	0.0	11.7	0.0	0.0	0.4

HS Code	Description	Not part of EGA negotiations			Part of EGA negotiations		
		Argentina	India	Brazil	China*	EU	The USA
902780	Instruments and apparatus for physical or chemical analysis, or for measuring or checking viscosity, porosity, expansion, surface tension or the like, or for measuring or checking quantities of heat, sound or light, n.e.s.	8.8	0.0	8.8	2.8	0.4	0.0
902790	Microtomes and parts and accessories thereof	3.5	7.5	3.5	0.0	1.7	1.2
903180	Instruments, appliances and machines for measuring or checking, not elsewhere specified in chapter 90 (excl. optical)	10.7	7.5	10.7	5.0	2.7	0.6
903190	Instruments, appliances and machines; parts and accessories for those measuring or checking devices of heading no. 9031	14.0	7.5	14.0	0.0	0.9	1.6
903289	Regulating or controlling instruments and apparatus; automatic, other than hydraulic or pneumatic	15.2	7.5	15.2	7.0	2.8	0.8
840690	Parts of steam and other vapour turbines, n.e.s.	8.4	7.5	8.4	2.0	2.7	2.5
841919	Heaters; instantaneous or storage water heaters, non-electric, other than instantaneous gas water heaters	20.0	8.8	20.0	35.0	2.6	0.0
841989	Machinery, plant and laboratory equipment; for treating materials by change of temperature, other than for making hot drinks or cooking or heating food	12.0	7.5	12.0	0.0	2.2	1.4
850164	AC generators "alternators", of an output > 750 kVA	14.0	8.1	14.0	7.3	2.7	2.4
850490	Parts of electrical transformers and inductors, n.e.s.	15.2	7.5	15.2	7.3	1.3	1.0
854390	Electrical machines and apparatus; parts of the electrical goods of heading no. 8543	13.0	7.5	13.0	0.0	3.7	1.2

HS Code	Description	Not part of EGA negotiations			Part of EGA negotiations		
		Argentina	India	Brazil	China*	EU	The USA
850239	Electric generating sets; (excluding those with spark-ignition or compression-ignition internal combustion piston engines), other than wind powered	0.0	7.5	0.0	10.0	2.7	1.3
841182	Gas turbines of a power > 5.000 kW (excluding turbojets and turbopropellers)	0.0	7.5	0.0	3.0	4.1	1.3
841990	Machinery, plant and laboratory equipment; parts of equipment for treating materials by a process involving a change of temperature	12.0	7.5	12.0	2.0	0.9	0.7
902710	Gas or smoke analysis apparatus	14.0	10.0	14.0	7.0	2.5	2.5
903290	Parts and accessories for regulating or controlling instruments and apparatus, n.e.s.	12.0	7.5	12.0	5.0	2.8	0.8
903300	Parts and accessories for machines, appliances, instruments or other apparatus in chapter 90, specified neither in this chapter nor elsewhere	16.0	7.5	16.0	6.0	3.7	4.4
903149	Optical instruments, appliances and machines for measuring or checking, not elsewhere specified or included in chapter 90	4.7	7.5	4.7	3.3	1.4	2.4
851410	Resistance heated industrial or laboratory furnaces and ovens (excluding drying ovens)	14.0	7.5	14.0	0.0	2.2	0.0
851430	Electric industrial or laboratory furnaces and ovens (excl. resistance heated, induction, dielectric and drying furnaces and ovens)	14.0	7.5	14.0	0.0	2.2	1.3
850231	Generating sets, wind-powered	0.0	7.5	0.0	8.0	2.7	1.3
851490	Parts of electric industrial or laboratory furnaces and ovens, incl. of those functioning by induction or dielectric loss, and of industrial or laboratory equipment	14.0	7.5	14.0	4.0	2.2	2.0
840290	Parts of vapour generating boilers and superheated water boilers, n.e.s.	14.0	7.5	14.0	2.0	2.7	4.3

HS Code	Description	Not part of EGA negotiations			Part of EGA negotiations		
		Argentina	India	Brazil	China*	EU	The USA
840490	Boilers; parts of auxiliary plant, for use with boilers of heading no. 8402 and 8403 and parts of condensers for steam or other vapour power units	14.0	7.5	14.0	8.5	2.7	3.5
841960	Machinery for liquefying air or other gases	14.0	7.5	14.0	11.7	1.7	2.1
901380	Liquid crystal devices, n.e.s. and other optical appliances and instruments not elsewhere specified in chapter 90	9.0	3.8	9.0	8.5	1.6	4.2
901390	Parts and accessories for liquid crystal devices "LCD", lasers and other appliances and instruments not elsewhere specified in chapter 90, n.e.s.	14.0	3.8	14.0	7.3	2.4	6.8
902720	Chromatographs and electrophoresis instruments	2.8	0.0	2.8	0.0	0.0	0.0
902730	Spectrometers, spectrophotometers and spectrographs; using optical radiations (UV, visible, IR)	9.3	0.0	9.3	0.0	0.0	0.0
851420	Furnaces and ovens functioning by induction or dielectric loss	14.0	7.5	14.0	0.0	2.2	2.1
840420	Condensers for steam or other vapour power units	14.0	7.5	14.0	14.0	2.7	5.0
840410	Boilers; auxiliary plant, for use with boilers of heading no. 8402 or 8403 (e.g. economisers, super-heaters, soot removers, gas recoverers)	14.0	7.5	14.0	8.5	2.7	3.5
Average		**12.1**	**6.3**	**11.6**	**5.0**	**1.8**	**1.5**

Source: Tariff Download Facility, WTO Integrated Data Base; Exim Bank Research
* Year for China is 2015 and for rest is 2016

Creating export capability of environmental goods

Global exports of environmental goods are concentrated in the developed countries, and hence, from a market-access perspective, removal of tariffs and Non-Tariff Barriers (NTBs) to environmental goods through EGA negotiations is perceived by most developing countries, including India, to be mainly beneficial to developed countries. A country such as India, which has a huge domestic market, may lose a significant share of its market to the imports from developed markets, should the tariffs be reduced.

The response by India, in such a situation, could be to broaden the export capability of environmental goods through appropriate policies, which help in

attracting greater investments in this sector. If the basket of environmental products based on end-use includes products, that show actual or potential export-growth for developing countries, those could be promoted to generate meaningful export earnings.

The broadened export basket could also consider inclusion of important intermediate parts and components. Investments into such categories would augment production and export capabilities, thereby feeding into the global supply-chains in the environmental industry.

Analysis done in the previous chapter revealed some interesting facts. While in the Group of Friend's List of 153 EGs, India's share in global exports increased marginally from 0.9% in 2011 to 1.0% in 2015, in the APEC List of 54 EGs which is currently under discussion, India's share in global exports of these products have increased from 0.59% to 0.66% in the same period. A further analysis has been undertaken and the inferences are discussed in the previous chapter, to find out product champions within these APEC List of 54 EGs – results show that 7 products from India fall under this category (Table 17). In the underachievers' category, India's share of the 29 products stood at 2.7% (Table 18). With significant thrust, the share of exports of these products will definitely witness an upsurge.

Besides, as highlighted in Table 3 of the previous chapter, the category-wise analysis shows that goods identified under 'Renewable Energy Plant' and 'Management of Solid and Hazardous Waste and Recycling Systems' together constituted more than 50% of the US$ 3.1 bn exports in 2015. Products under such categories should be an ideal recipient of export thrust.

Create avenues for technology transfer of EGs

In its submission of the INDC in 2015, India has stated that the successful implementation of INDC is contingent upon an ambitious global agreement to reduce climate change, including additional means of implementation to be provided by developed countries, technology transfer and capacity building, following Articles 3.1 and 4.7 of the United Nations Framework Convention on Climate Change.

Article 3.1 refers to the principle of equity and common but differentiated responsibility, as well as the need for developed countries to take the lead in combating climate change. Article 4.7 of the convention says, "*The extent to which developing countries will effectively implement their commitments under the convention will depend on the effective implementation by developed countries of their commitments related to financial resources and transfer of technology and will take fully into account the fact that economic and social development and poverty-eradication are the first and overriding priorities of developing countries.*"

According to the Ministry of Environment and Forests, Government of India, an estimated investment of US$ 2.5 trillion is required for INDC implementation at 2014-2015 prices, which would require mobilization of funds, both domestic and from international sources.

Given the aforesaid situation, India needs to devise measures which would facilitate investments in the environmental goods space, thereby enabling creation of numerous jobs and trade opportunities. Learnings from some of the policy initiatives undertaken in other sectors could provide insights, which could then be replicated or suitably adapted for the environmental goods sector. One such approach could be the policy framework adopted for the development of the automotive sector in India, which is considered to have achieved significant success. Earlier, the automotive industry had only 3 major producers viz., Hindustan Motors, Premier Automobiles, and Standard Motors. These three manufacturers could not cater to the growing demand for cars in India. The approach adopted during liberalization (1991 onwards) was encouraging joint ventures between Indian and global majors (mainly with Japanese, American and European manufacturers), and technology transfers. Upon opening up of the sector for foreign investments, 17 new joint ventures were established, of which

Box 3: Defence offset clause

India is the world's largest importer of defence equipment, with 60% of its requirements met from outside the country. This, in itself, translates into a great business opportunity for those building domestic capabilities in defence. The policy on offsets was introduced in 2005 as part of DPP and since then, the revisions have taken place in 2006, 2008, 2009, 2011, 2013 and 2016. According to the DPP 2013, "The key objective of the Defence Offset Policy is to leverage capital acquisitions to develop Indian defence industry by (i) fostering development of internationally competitive enterprises, (ii) augmenting capacity for Research, Design and Development related to defence products and services and (iii) encouraging development of synergistic sectors like civil aerospace and internal security." The minimum contract value for which offsets are mandatory has now been revised from Rs 300 crore to Rs 2,000 crore in 2016.

The latest revisions to DPP are expected to push the 'Make in India' initiative of the Government of India, even further. All defence acquisition proposals were required to be classified under one of the five categories until 2016 revision. However, in the latest revision, another category of 'Indian (Designed, Developed and Manufactured)', or Buy (IDDM) was added which replaced 'Buy (Indian)' as the most preferred category in the hierarchical order of procurement categories. Besides these two categories, the hierarchy of categories consists of 'Buy and Make (Indian)', 'Buy and Make', and 'Buy (Global)', in that order.

16 were for manufacture of cars. Similarly, the two wheelers segment also saw surge in technological collaborations with foreign investments. Such policy framework also played a major role in the development of Indian auto-components industry. Many multinational OEM firms also joined hands with Indian auto-component firms for sourcing. The policy for buyer-supplier relationship was framed enabling the suppliers to supply to multiple firms, and the OEMs sourcing from single supplier. Now, with the enabling policy framework, almost all the global auto companies have established manufacturing facilities in India, either as subsidiary or through joint ventures. India has now emerged as the world's largest truck manufacturer, 2nd largest manufacturer for two wheelers and buses, 5th largest manufacturer of heavy trucks, 6th largest car manufacturer, and 8th largest commercial vehicle manufacturer. Many Indian automotive players (including component manufacturers) have complied with international quality, and have received the coveted Deming Prize.

Another approach could be to use an Offset Policy, as has been the case in the Defence Procurement Procedure (DPP). Offsets essentially benefit the Indian industry, which gets technology / capability from a foreign vendor selling to India (Box- 3). In its approach towards EGs, India could perhaps consider deploying a suitably modified version of DPP.

Duty Rebate according to the goods defined for the project

The negotiations for the EGA, since the very start, have faced the issue of dual or multiple usage of Environmental Goods while defining them. The developing countries have argued that there was a need to show a clear developmental and environmental benefits from the items mentioned in the list of Environmental Goods. The Government or any other institution as defined by the Government, can refund the duties to an extent defined or full, as the case maybe, to the importers who are using those goods in that particular project. This essentially would mean that such 'environmental goods' would qualify for reimbursement of duties paid, subject to them being used/utilised in the value chain for a product that is environmentally friendly. A good example is a pipe, which if used as an input for a renewable energy plant or a waste water treatment plant would qualify for such a benefit, but will not qualify, if used in transporting oil. Here, India can work towards promoting sustainable environment,

without being a part of the EGA.

Discussions on Environment Goods under the aegis of ISA

India could lead the discussions on Environment Goods, albeit only for solar related items, under the umbrella of the International Solar Alliance. The International Solar Alliance (ISA) was conceived at the side-lines of the COP21, to boost usage of solar energy among the 121 member countries. The main objective of ISA is to undertake joint efforts required to reduce the cost of finance and the cost of technology, mobilize more than US$ 1000 billion of investments needed by 2030 for massive deployment of solar energy, and pave the way for future technologies adapted to the needs of 121 countries lying fully or partially between the Tropics.

Being the anchor of ISA, India could work with likeminded countries to establish an agreement which could be on the lines of the EGA, but with a greater thrust on investment promotion and technology transfer, albeit only for solar related items. The objective will be to promote technology transfer, investment cooperation, and eventually tariff reduction over a period of time, thereby facilitating greater movement and utilisation of solar goods and augmenting solar power generating capacity across the world. This may also be hugely beneficial for countries which have the ability, or gather the strength, to manufacture such goods and sell to other ISA member countries, especially in Africa.

An effort is made towards analysing country wise MFN tariffs of 121 countries, from WTO tariff line database of five identified solar related products (that are included in the APEC list of EGs and as classified by ICSTD), namely,

- Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels, light emitting diodes (HS 854140);
- Nuclear reactors, boilers, machinery and mechanical appliances parts thereof (HS 841989);
- Parts of machinery, plant and laboratory equipment, whether or not electrically heated, for the treatment of materials by a process involving a change of temperature, and of non-electric instantaneous and storage water heaters (HS 841990)
- Generating sets (excluding wind-powered and powered by spark-ignition internal combustion piston engine) (HS 850239);
- Instantaneous or storage water heaters, non-electric (excluding instantaneous gas water heaters and boilers or water heaters for central heating) (HS 841919)

Most of the African countries have a higher MFN tariffs for HS 854140, despite the fact that these countries have a very good opportunity to promote off-grid solar due to paucity of transmission lines.

If successful, such an arrangement under the ISA could be a game changer. ISA's experience can possibly be even replicated, or be an alternative to the Environmental Goods Agreement (EGA) discussions, while working towards the greater good of the environment.

Table 26: Average of Ad Valorem duties for MFN Applied Tariff of identified Solar Related products in ISA economies (in percent)

Country	HS-854140	HS-841989	HS-841990	HS-850239	HS-841919
Algeria	5	30	23.7	5	30
Angola	2	2	2	2	2
Antigua and Barbuda	5	5	5	5	20
Argentina	4.4	12	12	0	20
Australia	0	5	5	2.5	5
Bahamas	35	35	35	35	40
Bangladesh	2.5	2	2	2	10
Barbados	5	5	5	5	20
Belize	0	5	5	5	20
Benin	0	10	5	5	12.5
Bolivia	2.5	4	10	0	5
Botswana	0	0	7.5	0	7.5
Brazil	4.4	12	12	0	20
Brunei Darussalam	0	3.3	3	5	0
Burkina Faso	0	10	5	5	12.5
Burundi	0	0	0	0	0
Cabo Verde	1	0	0	5	2.5
Cambodia	7	15	15	0	0
Cameroon	10	10	10	10	20
Central African Republic	10	10	10	10	20
Chad	10	10	10	10	20
Chile	6	6	6	6	6
China	0	0	2	10	35
Colombia	0	2.9	5	0	15
Congo	10	10	10	10	20
DR Congo	7.5	20	7.5	5	5
Costa Rica	0	0	0	0	9
Côte d'Ivoire	0	10	5	5	12.5
Cuba	10	10	10	10	10
Djibouti	13.5	26	26	26	26
Dominica	5	0	0	5	40
Dominican Republic	0	0	0	0	0
Ecuador	0	14	10	7.5	20
Egypt	0	5	2	5	2.5
El Salvador	0	0	0	0	10
Fiji	5	5	10	5	15
Gabon	10	10	10	10	20

Country	HS-854140	HS-841989	HS-841990	HS-850239	HS-841919
The Gambia	20	0	0	10	0
Ghana	0	10	5	5	12.5
Grenada	5	5	5	5	20
Guatemala	0	0	0	0	10
Guinea	10	10	5	5	12.5
Guinea-Bissau	0	10	5	5	12.5
Guyana	5	5	5	5	20
Haiti	0	5	5	5	2.5
Honduras	0	0	0	0	10
India	0	7.5	7.5	7.5	8.75
Indonesia	7.5	5	5	6.25	5
Jamaica	0	5	2.5	0	20
Japan	0	0	0	0	0
Kenya	0	0	0	0	0
Lao PDR	5	10	10	5	10
Liberia	7.5	11	11	7.5	11
Madagascar	0	5	10	2.5	5
Malawi	0	0	0	0	0
Malaysia	0	0	13.75	0	15
Maldives	25	20	20	20	20
Mali	0	10	5	5	12.5
Mauritania	5	13	20	5	5
Mauritius	0	0	0	0	0
Mexico	0	4.7	0	4	6.25
Mozambique	7.5	5	5	5	5
Myanmar	7.5	1	1	1	1
Namibia	0	0	7.5	0	7.5
New Zealand	0	5	3.3	5	5
Nicaragua	0	0	0	0	10
Niger	0	10	5	5	12.5
Nigeria	0	10	5	5	12.5
Oman	0	0	0	5	5
Panama	0	1.5	3	10	6.6
Paraguay	1	0	3	0	20
Peru	0	0	0	0	0
Philippines	0	1	1	1	1
Rwanda	0	0	0	0	0
Samoa	20	8	8	8	8
Saudi Arabia	0	0	0	5	5
Senegal	0	10	5	5	12.5

Country	HS-854140	HS-841989	HS-841990	HS-850239	HS-841919
Seychelles	0	0	0	0	0
Sierra Leone	20	5	5	5	5
Singapore	0	0	0	0	0
Solomon Islands	5	0	0	7.5	0
South Africa	0	0	7.5	0	7.5
Sri Lanka	0	0	0	0	0
St Kitts and Nevis	5	5	5	5	25
St Lucia	0	0	0	0	20
St Vincent and the Grenadines	5	5	5	5	20
Suriname	5	5	5	5	20
Tanzania	0	0	0	0	0
Thailand	0	0	0	7.5	10
Togo	0	10	5	5	12.5
Tonga	15	3	3	3	3
Trinidad and Tobago	5	5	5	5	20
Uganda	0	0	0	0	0
United Arab Emirates	0	0	0	5	5
United States of America	0	1.4	0.6	1.25	0
Vanuatu	0	0	0	0	0
Venezuela	4.4	12.2	12	0	20
Vietnam	0	0	0	0	10
Yemen	5	5	5	5	5
Zambia	0	5	5	0	15
Zimbabwe	0	5	5	0	0

Data is available for 101 countries out of 121 ISA solar courtiers
Source: Tariff Download Facility, WTO Integrated Data Base; Exim Bank Research

SUM UP

For a developing country like India, which has already put so much at stake through its international commitments, it would make sense to support the usage of quality, and state of the art, pollution prevention and environmentally sustainable products, which would enable climate change mitigation. At the same time, such environmental goods should be made available at the cheapest price possible.

India may like to explore all possible options and weigh the opportunity, with regard to promotion investments through the EGA negotiations. India does not have a very positive experience from a similar Agreement for IT products, viz. the Information Technology Agreement (ITA), which required to eliminate tariffs on the IT products, covering amongst others, computers, semiconductors, data storage and telecommunication equipment and their parts and accessories. However, it cannot be denied that the reduced custom duties implemented gradually on goods, particularly computers during the 1990s, was one of the reasons which helped India in becoming a major software export hub.

The need of the hour, thus, is to alleviate environmental degradation while looking at the larger picture and

promoting investment in the environmental goods sector in the country.

As far as EGA is concerned, it may not be the ultimate solution towards mitigating climate change, but it is definitely a means towards an end, facilitating trade of goods, which have the potential to reduce the cost of implementing climate change mitigation. India may explore other alternatives to EGA as well, and seek technology transfer, investments, and eventually gradual reduction of tariffs, over an extended period of time, for the identified goods. The impact of tariff reduction can be extended to economic activity, where India can have an edge in the products, in which it has a comparative advantage. It could also be argued that not being a part of EGA negotiations could be conceived as a missed opportunity for developing countries, as it could potentially enable wider usage of EGs and enable, bringing in the latest and most efficient technological know-how in this field. Going forward, this may even help India to emerge as a manufacturing hub for EGs.

Additionally, it is also important to consider EGA negotiations as a mechanism to achieve a common global good, which is of protecting the environment. As has been discussed, there are multiple options that are available for India to promote the growth of environmental goods in the country - from incentivising technology transfer, administering duty drawbacks based on end use, attracting and facilitating investments, and eventually supporting gradual reduction in tariffs, it would create export opportunities besides protecting the global environment.

Annexure 1: Friends' List of EGs

HS Code	Item/ Description	Remarks / Environmental Benefits
AIR POLLUTION CONTROL		
840420	Condensers for steam or other vapour power units	Used to cool gas streams to temperatures which allow the removal of contaminants, e.g. volatile organic compounds (VOC) like benzene.
840490	Parts of auxiliary plant of heading 8402 or 8403 and condensers for steam or other vapour power units, n.e.s.	These parts are used in the repair and maintenance of the equipment classified under HS code 840410 above. This secondary equipment is also used to support waste heat recovery processes, such as boilers mentioned above, in waste treatment, or renewable energy resource recovery applications.
840510	Producer gas or water gas generators, with or without their purifiers; acetylene gas generators and similar water process gas generators, with or without their purifiers (excluding coke ovens, electrolytic process gas generators and carbide lamps)	Purifiers remove contaminants (such as cyanide or sulphur compounds) produced in the manufacture of gases.
841410	Vacuum pumps	Air handling equipment. Used in a number of environmental applications, e.g. flue gas desulphurisation (the process by which sulphur is removed from combustion exhaust gas).
841430	Compressors for refrigerating equipment	Air handling equipment. Transport or extraction of polluted air, corrosive gases or dust.
841440	Air compressors mounted on a wheeled chassis for towing	Air handling equipment. Transport or extraction of polluted air, corrosive gases or dust.
841459	Fans (excluding table, floor, wall, window, ceiling or roof fans, with a self-contained electric motor of an output <= 125 W)	Air handling equipment. Transport or extraction of polluted air, corrosive gases or dust. Transport or extraction of polluted air and corrosive gases or dust.
841480	Air pumps, air or other gas compressors and ventilating or recycling hoods incorporating a fan, whether or not fitted with filters, having a maximum horizontal side > 120 cm (excluding vacuum pumps, hand- or foot-operated air pumps, compressors for refrigerating equipment and air compressors mounted on a wheeled chassis for towing)	Air handling equipment. Transport or extraction of polluted air, corrosive gases or dust.
841490	Parts of : air or vacuum pumps, air or other gas compressors, fans and ventilating or recycling hoods incorporating a fan, n.e.s.	Air handling equipment. Transport or extraction of polluted air, corrosive gases or dust. Transport or extraction of polluted air and corrosive gases or dust.

HS Code	Item/ Description	Remarks / Environmental Benefits
841960	Machinery for liquefying air or other gases	For separation and removal of pollutants through condensation.
841989	Machinery, plant or laboratory equipment, whether or not electrically heated, for the treatment of materials by a process involving a change of temperature such as heating, cooking, roasting, sterilising, pasteurising, steaming, evaporating, vaporising, condensing or cooling, n.e.s. (excluding machinery used for domestic purposes and furnaces, ovens and other equipment of heading 8514)	For processing water and waste water and the separation and removal of pollutants through condensation. Includes fluidised bed systems (bubbling, circulating, etc.) and biomass boilers. Can also help anaerobic digestion of organic matter.
842139	Machinery and apparatus for filtering or purifying gases (excluding isotope separators and intake air filters for internal combustion engines)	Physical, mechanical, chemical or electrostatic filters and purifiers for the removal of COV, solid or liquid particles in gases, etc.
902610	Instruments and apparatus for measuring or checking the flow or level of liquids (excluding meters and regulators)	Monitors to measure air pollution; basis for possible correcting measures (notably in view of health effects).
902610	Instruments and apparatus for measuring or checking the flow or level of liquids (excluding meters and regulators)	Monitors to measure air pollution; basis for possible correcting measures (notably in view of health effects).
CLEAN UP OR REMEDIATION OF SOIL AND WATER		
842119	Centrifuges, incl. centrifugal dryers (excluding isotope separators, cream separators and clothes dryers)	Equipment used to remove oil floating on water and is commonly used for oil spill remediation
842191	Parts of centrifuges, incl. centrifugal dryers, n.e.s.	Used for the maintenance and repair of equipment that removes oil floating on water and is commonly used for oil spill remediation.
851629	Electric space-heating and soil-heating apparatus (excluding storage heating radiators)	Use heat to disinfect or remove organic compounds (e.g. pesticides, hydrocarbons) from soil, and to dry contaminated soil prior to treatment processes.
890790	Rafts, tanks, coffer-dams, landing stages, buoys, beacons and other floating structures (excluding inflatable rafts, vessels of heading 8901 to 8906 and floating structures for breaking up)	Floating barriers to oil can prevent an oil slick from reaching sensitive locations or spreading out further. Oil absorbents soak up and remove the oil.
CLEANER OR MORE RESOURCE EFFICIENT TECHNOLOGIES AND PRODUCTS		
732111	Appliances for baking, frying, grilling and cooking and plate warmers, for domestic use, of iron or steel, for gas fuel or for both gas and other fuels (excluding large cooking appliances)	Uses solar thermal energy for cooking, thereby producing no air pollution. The use of solar stoves is replacing heating with firewood or other non-renewable energy sources (e.g. oil, gas) and allows for preservation of firewood (especially important in arid areas) and is suitable for off-grid usage.

HS Code	Item/ Description	Remarks / Environmental Benefits
732190	Parts of domestic appliances non-electrically heated of heading 7321, n.e.s.	Parts are used in the maintenance and repair of solar stoves
850680	Primary cells and primary batteries, electric (excluding spent, and those of silver oxide, mercuric oxide, manganese dioxide, lithium and air-zinc)	Fuel cells use hydrogen or hydrogen-containing fuels such as methane to produce an electric current, through a electrochemical process rather than combustion. Fuel cells are clean, quiet, and highly efficient sources of electricity.
850980	Electromechanical domestic appliances, with self-contained electric motor (excluding vacuum cleaners, dry and wet vacuum cleaners, food grinders and mixers, fruit or vegetable juice extractors, and hair-removing appliances)	These items are used to break down food and other garbage from households and the food industry. Such products help inter alia to reduce land fill volumes.
ENVIRONMENTAL MONITORING, ANALYSIS AND ASSESSMENT EQUIPMENT		
901530	Levels	Includes levels used for environmental purposes such as measuring the ozone layer, elements of climate change etc.
902620	Instruments and apparatus for measuring or checking pressure of liquids or gases (excluding regulators)	Manometers (devices that measure pressure) are used in power plants, water delivery systems, and other applications such as monitoring indoor air. There are two principal types: digital manometers and tube manometers, both of which have important environmental applications.
902680	Instruments or apparatus for measuring or checking variables of liquids or gases, n.e.s.	These instruments include heat meters that are used to monitor and measure the distribution of heat from geothermal or biomass district heating systems.
902690	Parts and accessories for instruments and apparatus for measuring or checking the flow, level, pressure or other variables of liquids or gases, n.e.s.	These are parts for the instruments and devices in 9026.10, 9026.20, and 9026.80.
902710	Gas or smoke analysis apparatus	Gas analysers are designed to continuously monitor single or multiple gas components, and such an instrument is used to analyse air emissions from automobiles.
902720	Chromatographs and electrophoresis instruments	Gas and liquid chromatographs use an analytical method where a physical separation of the sample components occurs prior to detection. These instruments can be used to monitor and analyse air pollution emissions, ambient air quality, water quality, etc. Electrophoresis instruments can be used to monitory and analyse materials such as particulates emitted from incinerators or from diesel exhaust.

HS Code	Item/ Description	Remarks / Environmental Benefits
902730	Spectrometers, spectrophotometers and spectrographs using optical radiations, such as UV, visible, IR	Spectrometers are used in a wide range of environmental applications, including to identify and characterise unknown chemicals and in environmental applications to detect toxins and identify trace contaminants. They are also used for qualitative and quantitative analysis inter alia in quality control departments, environmental control, water management, food processing, and agriculture and weather monitoring.
902750	Instruments and apparatus for physical or chemical analysis, using UV, visible or IR optical radiations (excluding spectrometers, spectrophotometers, spectrographs, and gas or smoke analysis apparatus)	These instruments can be used for chemical, thermal, or optical analysis of samples, including water quality photometers which are used to determine the concentration of a solution from its colour intensity.
902780	Instruments and apparatus for physical or chemical analysis, or for measuring or checking viscosity, porosity, expansion, surface tension or the like, or for measuring or checking quantities of heat, sound or light, n.e.s.	These instruments include: magnetic resonance instruments which are used in biologic and geologic analysis; and mass spectrometers which are used to identify elements and compounds.
902790	Microtomes; parts and accessories of instruments and apparatus for physical or chemical analysis, instruments and apparatus for measuring or checking viscosity, porosity, expansion, surface tension or the like, instruments and apparatus for measuring or checking quantities of heat, sound or light, and of microtomes, n.e.s.	These instruments include microtomes which are devices that prepare slices of samples for analysis. Also included here are parts of the instruments classified in 9027 and described above.
903010	Instruments and apparatus for measuring or detecting ionising radiations	These items are used for the purpose of detecting the presence of ionizing radiation and may, for instance, include Geiger counters that are useful in performing surveys for radioactivity contamination.
903020	Oscilloscopes and oscillographs	Oscilloscopes are used to translate an electronic signal into a pattern on a screen. These instruments are used for testing and calibrating laboratory equipment.
903031	Multimeters for voltage, current, resistance or electrical power, without recording device	These products measure electrical flow, including current, resistance, voltage, frequency, temperature and in this way are used to identify electronic and electrical problems in equipment.
903039	Instruments and apparatus for measuring or checking voltage, current, resistance or electrical power, with recording device (excluding multimeters, and oscilloscopes and oscillographs)	These instruments include single function meters. An ammeter measures current, a voltmeter measures voltage, and an ohmmeter measures resistance. These instruments are also used to find problems in equipment.

HS Code	Item/ Description	Remarks / Environmental Benefits
903089	Instruments and apparatus for measuring or checking electrical quantities, without recording device, n.e.s.	These instruments are similar to those above, and are used to identify electrical faults.
903090	Parts and accessories for instruments and apparatus for measuring or checking electrical quantities or for detecting ionising radiations, n.e.s.	See above goods of subheading 9030.
903120	Test benches for motors, generators, pumps, etc.	Test benches are used to test designs and equipment, such as components or subsystems of a solar power plant.
903149	Optical instruments, appliances and machines for measuring or checking, not elsewhere specified or included in chapter 90	Equipment used in the measurement, recording, analysis and assessment of environmental samples or environmental impact.
903180	Instruments, appliances and machines for measuring or checking, not elsewhere specified in chapter 90 (excluding optical)	These products include inter alia, items such as vibrometers (that measure vibrations and assess structural and other effects of such vibrations) and electron microscopes for laboratory and testing applications.
903190	Parts and accessories for instruments, appliances and machines for measuring and checking, n.e.s.	These are parts for the equipment classified in 9031 and described above.
903210	Thermostats	Products include thermostats that control the efficiency of air conditioning, refrigeration or heating systems.
903220	Manostats (excluding taps, cocks and valves of heading 8481)	Manostats measure and monitor pressure and are used for controlling pumps and chemical feed equipment in applications such as wastewater treatment.
903281	Hydraulic or pneumatic regulating or controlling instruments and apparatus (excluding manostats and taps, cocks and valves of heading 8481)	These include control-related instruments and apparatus which have many environmental applications such as water treatment, wastewater treatment, air pollution control as well as efficient process controls for many industrial applications.
903290	Parts and accessories for regulating or controlling instruments and apparatus, n.e.s.	These are the parts for the automatic regulating and control instruments classified in 9032 and described.
903300	Parts and accessories for machines, appliances, instruments or other apparatus in chapter 90, specified neither in this chapter nor elsewhere	These are the parts and accessories for the products described above.
902740	Exposure meters	Exposure meters are used, inter alia, to control light sources and for measurements in agriculture, horticulture, and other natural resources applications.

HS Code	Item/ Description	Remarks / Environmental Benefits
903083	Instruments and appliances for measuring or checking electrical quantities, with recording device (excl. appliances specially designed for telecommunications, cathode-ray oscillographs and apparatus for measuring or checking semiconductor wafers or devices)	These instruments are similar to those above, but include componentry that is a recording device - these add a further technical element to the process of identifying electrical problems in equipment.
903130	Profile projectors	Profile projectors are used for critical tasks in engineering such as measuring and inspecting high precision, complex parts in many applications and industries.
ENVIRONMENTALLY PREFERABLE PRODUCTS, BASED ON END USE OR DISPOSAL CHARACTERISTICS		
530310	Jute and other textile bast fibres, raw or retted (excluding flax, true hemp and ramie)	The natural fiber composition differentiates jute from alternative synthetic materials due to its biodegradability and sustainable sources. Jute fibers are used for packaging and woven fabric.
560721	Binder or baler twine, of sisal or other textile fibres of the genus Agave	More biodegradable than synthetic fibre alternatives and made from a renewable resource.
630510	Sacks and bags, for the packing of goods, of jute or other textile bast fibres of heading 5303	More biodegradable than synthetic fibre alternatives and made from a renewable resource.
530410	Sisal and other textile fibres of the genus Agave, raw	The natural fibre composition differentiates sisal from alternative synthetic materials due to its biodegradability and sustainable sources. Sisal fibres also used in recycled paper.
530490	Sisal and other textile fibres of the genus Agave, processed but not spun; tow and waste of such fibres, incl. yarn waste and garneted stock	The natural fibre composition differentiates sisal from alternative synthetic materials due to its biodegradability and sustainable sources. Sisal fibres also used in recycled paper.
560710	Twine, cordage, ropes and cables, whether or not plaited or braided and whether or not impregnated, coated covered or sheathed with rubber or plastics - Of jute or other textile bast fibres	More biodegradable than synthetic fibre alternatives and made from a renewable resource.
HEAT AND ENERGY MANAGEMENT		
701931	Mats of irregularly laminated glass fibres	These mats help save energy and reduce noise levels in buildings.
841950	Heat-exchange units (excluding instantaneous heaters, storage water heaters, boilers and equipment without a separating wall)	Some heat exchangers are specifically designed for use in relation to renewable energy sources such as geothermal energy.
902810	Gas meters, incl. calibrating meters therefor	Meters are necessary to measure and regulate use and hence enable more efficient use of the resource. In particular, these gas meters are generally designed for use with natural gas and propane, but may include those designed for other gases such as helium.

HS Code	Item/ Description	Remarks / Environmental Benefits
902820	Liquid meters, incl. calibrating meters therefor	These liquid meters include those designed to measure potable water consumption to allocate costs, assist the financial management of water systems, and encourage conservation of a scarce resource.
902830	Electricity supply or production meters, incl. calibrating meters therefor	These products include those designed to measure electricity flow in residential, commercial, and industrial consumption of electricity.
902890	Parts and accessories for gas, liquid or electricity supply or production meters, n.e.s.	These are parts and accessories for the gas, liquid, and electricity meters classified in 9028 and described above.
MANAGEMENT OF SOLID AND HAZARDOUS WASTE AND RECYCLING SYSTEMS		
392010	Plates, sheets, film, foil and strip, of non-cellular polymers of ethylene, not reinforced, laminated, supported or similarly combined with other materials, without backing, unworked or merely surface-worked or merely cut into squares or rectangles (excluding self-adhesive products, and floor, wall and ceiling coverings of heading 3918)	Used to line landfills to prevent leachate (water run-off) from contaminating groundwater resources. Also used to cover landfills and prevent methane from escaping into atmosphere. These membrane systems are also used for the reinforcement and protection of soil, including under oil refineries, gas stations etc.
761290	Casks, drums, cans, boxes and similar containers, incl. rigid tubular containers, of aluminium, for any material (other than compressed or liquefied gas), of a capacity of <= 300 l, n.e.s.	Containers of any material, of any form, for liquid or solid waste, including for municipal or dangerous waste.
840219	Vapour generating boilers, incl. hybrid boilers (excluding central heating hot water boilers capable also of producing low pressure steam)	Boilers for the production of heat and power on the basis of (renewable) biomass fuels.
840290	Parts of vapour generating boilers and superheated water boilers, n.e.s.	Parts for the biomass boilers described above.
840410	Auxiliary plant for use with boilers of heading 8402 or 8403, e.g. economizers, superheaters, soot removers and gas recoverers.	Components of industrial air pollution control plant which minimise the release of pollutants into the atmosphere. This equipment is also used to support waste heat recovery processes in waste treatment, or renewable energy resource recovery applications.
841780	Industrial or laboratory furnaces and ovens, non-electric, incl. incinerators (excluding those for the roasting, melting or other heat treatment of ores, pyrites or metals, bakery ovens, drying ovens and ovens for cracking operations)	These products are used to destroy solid and hazardous wastes. Catalytic incinerators are designed for the destruction of pollutants (such as VOC) by heating polluted air and oxidation of organic components.

HS Code	Item/ Description	Remarks / Environmental Benefits
841790	Parts of industrial or laboratory furnaces, non-electric, incl. incinerators, n.e.s.	These parts can help maintain and repair products that are used to destroy solid and hazardous wastes. Similarly, the parts for catalytic incinerators can help maintain and repair items that can assist in the destruction of pollutants (such as VOC) by heating polluted air and oxidation of organic components.
841940	Distilling or rectifying plant	Desalination plants remove salt from water and are particularly important in conditions of water scarcity. Proper disposal of by-products is also required. - Biogas refinement equipment "upgrades" biogas resulting from organic matter to give it the same properties as natural gas. Allows the recovery and reuse of solvents, e.g. solvents used in the printing, painting or dry cleaning industries.
842220	Machinery for cleaning or drying bottles or other containers (excluding dishwashing machines)	Used to clean and dry bottles so that they can be recycled and re-used.
842290	Parts of dishwashing machines, packing or wrapping machinery and other machinery and apparatus of heading 8422, n.e.s.	Parts are used to assemble and maintain the above equipment.
842940	Self-propelled tamping machines and road rollers	Used in solid waste treatment or recycling.
846291	Hydraulic presses for working metal (excluding forging, bending, folding, straightening and flattening presses)	Assists in compacting and compressing metals, including for recycling.
846596	Splitting, slicing or paring machines, for working wood	Used for recycling wood and other waste.
846599	Machine tools for working wood, cork, bone, hard rubber, hard plastics or similar hard materials (excluding machines for working in the hand, machines of subheading 8465.10, sawing machines, planing, milling or moulding "by cutting" machines, grinding, sanding or polishing machines, bending or assembling machines, drilling or mortising machines and splitting, slicing or paring machines)	Assists in recycling of wood and other waste.
846694	Parts and accessories for machine tools for working metal without removing material, n.e.s.	Assists in compacting and compressing metals, including for recycling.
847420	Crushing or grinding machines for solid mineral substances	Used for solid waste treatment or recycling.

HS Code	Item/ Description	Remarks / Environmental Benefits
847982	Mixing, kneading, crushing, grinding, screening, sifting, homogenising, emulsifying or stirring machines, n.e.s. (excluding industrial robots)	Used to prepare waste for recycling; mixing of wastewater during treatment; preparing organic waste for composting; (composting can minimise the amount of waste going to landfill as well as recovering the valuable nutrient and energy content of the waste).
847989	Machines and mechanical appliances, n.e.s.	Machines and appliances designed for a wide range of areas of environmental management including waste, waste water, drinking water production and soil remediation. In-vessel composting systems can handle large amounts of waste and speed up decomposition. Trash compactors reduce the volume of solid waste, allowing more efficient transport and disposal.
847990	Parts of machines and mechanical appliances, n.e.s.	Machines and appliances designed for a wide range of areas of environmental management including waste, waste water, drinking water production and soil remediation. In-vessel composting systems can handle large amounts of waste and speed up decomposition. Trash compactors reduce the volume of solid waste, allowing more efficient transport and disposal.
850590	Electromagnets and electromagnetic lifting heads, and their parts (excluding magnets for medical use); electromagnetic or permanent magnet chucks, clamps and similar holding devices and their parts, n.e.s.	Used to remove metal content from waste for recycling.
851410	Resistance heated industrial or laboratory furnaces and ovens (excluding drying ovens)	These products are used to destroy solid and hazardous wastes. Catalytic incinerators are designed for the destruction of pollutants (such as VOC) by heating polluted air and oxidation of organic components.
851420	Furnaces and ovens functioning by induction or dielectric loss	These products are used to destroy solid and hazardous wastes. Catalytic incinerators are designed for the destruction of pollutants (such as VOC) by heating polluted air and oxidation of organic components.
851430	Electric industrial or laboratory furnaces and ovens (excluding resistance heated, induction, dielectric and drying furnaces and ovens)	Catalytic incinerators are designed for the destruction of pollutants (such as VOC) by heating polluted air and oxidation of organic components.

HS Code	Item/ Description	Remarks / Environmental Benefits
851490	Parts of electric industrial or laboratory furnaces and ovens, incl. of those functioning by induction or dielectric loss, and of industrial or laboratory equipment for the heat treatment of materials by induction or dielectric loss, n.e.s. (other than for the manufacture of semiconductor devices on semiconductor wafers)	Parts for the equipment listed will facilitate the destruction of pollutants (such as VOC) by heating polluted air and oxidation of organic components.
NATURAL RESOURCES PROTECTION		
560811	Made-up knotted fishing nets of man-made textile materials (excluding landing nets)	Use of Turtle Excluder Devices (TEDs) reduces turtle mortality by 90-100 per cent.
560890	Knotted netting of twine, cordage, ropes or cables, by the piece or metre; made-up fishing nets and other made-up nets, of vegetable textile materials (excluding hairnets, nets for sporting purposes, incl. landing nets, butterfly nets and the like)	Use of Turtle Excluder Devices (TEDs) reduces turtle mortality by 90-100 per cent.
950720	Fish-hooks, whether or not snelled	These rounded, "circle-shaped" hooks reduce sea turtle mortality 60-90 per cent over conventional "J-shaped" hooks.
NATURAL RISK MANAGEMENT		
901540	Photogrammetrical surveying instruments and appliances	Photogrammetry is an aerial remote sensing technique which forms the baseline of many Geographic Information Systems (GIS) and Land Information Systems (LIS), which are important for monitoring and managing natural risks such as floods, earthquakes.
901580	Instruments and appliances used in geodesy, topography, hydrography, oceanography, hydrology, meteorology or geophysics (excluding compasses, rangefinders, theodolites, tachymeters "tacheometers", levels and photogrammetrical surveying instruments and appliances)	Includes instrument and appliances necessary for measuring the ozone layer and to monitor, measure and assist planning for natural risks such as earthquakes, cyclones, tsunamis etc.
901590	Parts and accessories for instruments and appliances used in geodesy, topography, photogrammetrical surveying, hydrography, oceanography, hydrology, meteorology or geophysics, and for rangefinders, n.e.s.	Parts used in maintenance and repair of the items 389, 390 and 388 with the attendant environmental benefits.
NOISE AND VIBRATION ABATEMENT		
450410	Tiles of any shape, blocks, plates, sheets and strip, solid cylinders, incl. discs, of agglomerated cork	Assists in the reduction of noise levels in buildings.

HS Code	Item/ Description	Remarks / Environmental Benefits
840991	Parts suitable for use solely or principally with spark-ignition internal combustion piston engine, n.e.s.	Industrial mufflers are used for reducing engine noise.
840999	Parts suitable for use solely or principally with compression-ignition internal combustion piston engine "diesel or semi-diesel engine", n.e.s.	Industrial mufflers are used for reducing engine noiset.
903110	Machines for balancing mechanical parts	Environmental applications of these machines include balancing of parts and equipment to minimise noise and vibration.
RENEWABLE ENERGY PLANT		
730820	Towers and lattice masts, of iron or steel	Used to elevate and support a wind turbine for the generation of renewable energy.
761100	Reservoirs, tanks, vats and similar containers, of aluminium, for any material (other than compressed or liquefied gas), of a capacity of > 300 l, not fitted with mechanical or thermal equipment, whether or not lined or heat-insulated (excluding containers specifically constructed or equipped for one or more types of transport)	Tanks, vats and containers for the production of biogas, waste water management, drinking water production and solar thermal energy purposes.
840681	Steam and other vapour turbines, of an output > 40 MW (excluding those for marine propulsion)	Turbines designed for the production of geothermal energy (renewable energy) and co-generation ((CHP) which allows for a more effective use of energy than conventional generation).
840682	Steam and other vapour turbines, of an output <= 40 MW (excluding those for marine propulsion)	Steam turbines are used to drive electrical generators to derive electrical power from environmental energy recovery operations. Note that these have an output capacity "not exceeding 40 MW".
840690	Parts of steam and other vapour turbines, n.e.s.	Parts used for repair and maintenance of energy recovery turbines listed in items 212 and 213 above.
841011	Hydraulic turbines and water wheels, of a power <= 1.000 kW (excluding hydraulic power engines and motors of heading 8412)	Hydroelectric power generation produces no greenhouse gas emissions.
841090	Parts of hydraulic turbines and water wheels incl. regulators	Hydroelectric power generation produces no greenhouse gas emissions.
841181	Gas turbines of a power <= 5.000 kW (excluding turbojets and turbopropellers)	Gas turbines for electrical power generation from recovered landfill gas, coal mine vent gas, or biogas (clean energy system). Note that these turbines do "not exceed 5,000 kW".

HS Code	Item/ Description	Remarks / Environmental Benefits
841182	Gas turbines of a power > 5.000 kW (excluding turbojets and turbopropellers)	Gas turbines for electrical power generation from recovered landfill gas, coal mine vent gas, or biogas (clean energy system). Note that these turbines do "exceed 5,000 kW".
841581	Air conditioning machines incorporating a refrigerating unit and a valve for reversal of the cooling-heat cycle "reversible heat pumps" (excluding of a kind used for persons in motor vehicles and self-contained or "split-system" window or wall air conditioning machines)	Such systems transfer ("pump") the heat available in land and water masses to either heat or cool buildings.
841861	Heat pumps (excluding air conditioning machines of heading 8415)	Such systems transfer ("pump") the heat available in land and water masses to either heat or cool buildings.
841869	Refrigerating or freezing equipment (excluding refrigerating and freezing furniture)	Such systems transfer ("pump") the heat available in land and water masses to either heat or cool buildings.
841919	Instantaneous or storage water heaters, non-electric (excluding instantaneous gas water heaters and boilers or water heaters for central heating)	Uses solar thermal energy to heat water, producing no pollution. Use of solar water heating displaces the burning of other, pollution-creating fuels.
841990	Parts of machinery, plant and laboratory equipment, whether or not electrically heated, for the treatment of materials by a process involving a change of temperature, and of non-electric instantaneous and storage water heaters, n.e.s.	Parts used in the maintenance and repair of solar water heaters (etc.) which use solar thermal energy to heat water, producing no pollution. Use of solar water heating displaces the burning of other, pollution- creating fuels.
848340	Gears and gearing for machinery (excluding toothed wheels, chain sprockets and other transmission elements presented separately); ball or roller screws; gear boxes and other speed changers, incl. torque converters	Gearboxes transform the (relatively slow) rotation of the blades of wind turbines into the speed required to produce (renewable) electricity
848360	Clutches and shaft couplings, incl. universal joints, for machinery	Used for initial assembly, repair, and maintenance of wind energy systems
850161	AC generators "alternators", of an output <= 75 kVA	Used in conjunction with boiler and turbines (also listed here) to generate electricity in renewable energy plants. Must use these turbines and generators in combination to produce electricity from renewable fuels (e.g., biomass). Size is "not exceeding 75 kVA".
850162	AC generators "alternators", of an output > 75 kVA but <= 375 kVA	Used in conjunction with boiler and turbines (also listed under HS Code 840681 and HS Code 840682) to generate electricity in renewable energy plants. Must use these turbines and generators in combination to produce electricity from renewable fuels (e.g., biomass). Size is "exceeding 75 kVA but not exceeding 375 kVA"

HS Code	Item/ Description	Remarks / Environmental Benefits
850163	AC generators "alternators", of an output > 375 kVA but <= 750 kVA	Used in conjunction with boiler and turbines (also listed here under HS Code 840681 and HS Code 840682) to generate electricity in renewable energy plants. Must use these turbines and generators in combination to produce electricity from renewable fuels (e.g., biomass). Size is "exceeding 375 kVA but not exceeding 750 kVA."
850164	AC generators "alternators", of an output > 750 kVA	Used in conjunction with boiler and turbines (also listed under HS Code 840681 and HS Code 840682) to generate electricity in renewable energy plants. Must use these turbines and generators in combination to produce electricity from renewable fuels (e.g., biomass). Size is "exceeding 750 kVA."
850231	Generating sets, wind-powered	Electricity generation from a renewable resource (wind).
850239	Generating sets (excluding wind-powered and powered by spark-ignition internal combustion piston engine)	Combined heat and power systems produce usable power (usually electricity) and heat at the same time. Micro combined heat and power systems are very efficient for domestic use, particularly in places where reticulated natural gas and hot water central heating are the norm. 'Distributed generation' also minimises transmission losses through national grids, reducing the need to increase centralised generating capacity and transmission networks.
850300	Parts suitable for use solely or principally with electric motors and generators, electric generating sets and rotary converters, n.e.s.	Parts of the generators and generating sets listed under HS Code 850231 (for renewable energy systems). Relevant parts include for instance nacelles and blades for wind turbines.
850440	Static converters	Converts solar energy into electricity and can be used to convert DC current from the photovoltaic/ solar cells into conventional AC electricity which can run many household and office products such as, kitchen appliances, microwaves, TV's, radios, computers and so on.
850720	Lead acid accumulators (excluding spent and starter batteries)	Provides for energy storage in off-grid PV systems. Are designed to be discharged down to 50per cent or more without damage so that they can supply power over a long period of time.
853710	Boards, cabinets and similar combinations of apparatus for electric control or the distribution of electricity, for a voltage <= 1.000 V	Device to control the functioning of the PV system.
854140	Photosensitive semiconductor devices, incl. photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes (excluding photovoltaic generators)	Solar photovoltaic cells generate electricity in an environmentally benign manner (with no emissions, noise or heat generated). They are particularly suited to electricity generation in locations remote from an electricity grid.

HS Code	Item/ Description	Remarks / Environmental Benefits
900190	Lenses, prisms, mirrors and other optical elements, of any material, unmounted (excluding such elements of glass not optically worked, contact lenses and spectacle lenses)	Used to concentrate and intensify solar power in a solar energy system.
900290	Lenses, prisms, mirrors and other optical elements, mounted, of any material, being parts of or fittings for instruments or apparatus (excluding objective lenses for cameras, projectors or photographic enlargers or reducers, such elements of glass not optically worked, and filters)	Used to concentrate and intensify solar power in a solar energy system.
903289	Regulating or controlling instruments and apparatus (excluding hydraulic or pneumatic, manostats, thermostats, and taps, cocks and valves of heading 8481)	These include other automatic voltage and current regulators which have renewable energy applications as well as other process control instruments and apparatus for temperature, pressure, flow and level, and humidity applications.
WASTE WATER MANAGEMENT AND POTABLE WATER TREATMENT		
560314	Nonwovens, whether or not impregnated, coated, covered or laminated, n.e.s., of man-made filaments, weighing > 150 g	Used to ensure efficient leachate or gas landfill drainage.
691010	Ceramic sinks, washbasins, washbasin pedestals, baths, bidets, water closet pans, flushing cisterns, urinals and similar sanitary fixtures of porcelain or china (excluding soap dishes, sponge holders, tooth-brush holders, towel hooks and toilet paper holders)	Waterless urinals and composting toilets minimise water use. Composting toilets also provide self-contained sewage treatment on site, with no need for sewers and treatment plants. These items also do not pollute ground or surface water or soil (unlike septic tanks or pit latrines) and produce safe, useful compost.
730300	Tubes, pipes and hollow profiles, of cast iron	These items facilitate the delivery of safe drinking water and sanitation.
730431	Tubes, pipes and hollow profiles, seamless, of circular cross-section, of iron or non-alloy steel, cold-drawn or cold-rolled "cold-reduced" (excluding cast iron products and line pipe of a kind used for oil or gas pipelines or casing and tubing of a kind used for drilling for oil or gas)	These items facilitate the delivery of safe drinking water and sanitation.
730439	Tubes, pipes and hollow profiles, seamless, of circular cross-section, of iron or non-alloy steel, not cold-drawn or cold-rolled "cold-reduced" (excluding cast iron products, line pipe of a kind used for oil or gas pipelines, casing and tubing of a kind used for drilling for oil or gas)	These items facilitate the delivery of safe drinking water and sanitation.

HS Code	Item/ Description	Remarks / Environmental Benefits
730441	Tubes, pipes and hollow profiles, seamless, of circular cross-section, of stainless steel, cold-drawn or cold-rolled "cold-reduced" (excluding line pipe of a kind used for oil or gas pipelines, casing and tubing of a kind used for drilling for oil or gas)	These items facilitate the delivery of safe drinking water and sanitation.
730449	Tubes, pipes and hollow profiles, seamless, of circular cross-section, of stainless steel, not cold-drawn or cold-rolled "cold-reduced" (excluding line pipe of a kind used for oil or gas pipelines or of a kind used for drilling for oil or gas)	These items facilitate the delivery of safe drinking water and sanitation.
730451	Tubes, pipes and hollow profiles, seamless, of circular cross-section, of alloy steel other than stainless, cold-drawn or cold-rolled "cold-reduced" (excluding line pipe of a kind used for oil or gas pipelines, casing and tubing of a kind used for drilling for oil)	These items facilitate the delivery of safe drinking water and sanitation.
730459	Tubes, pipes and hollow profiles, seamless, of circular cross-section, of alloy steel other than stainless, not cold-drawn or cold-rolled "cold-reduced" (excluding line pipe of a kind used for oil or gas pipelines, casing and tubing of a kind used for drilling for oil)	These items facilitate the delivery of safe drinking water and sanitation.
730490	Tubes, pipes and hollow profiles, seamless, of non-circular cross-section, of iron or steel (excluding products of cast iron)	These items facilitate the delivery of safe drinking water and sanitation.
730630	Tubes, pipes and hollow profiles, welded, of circular cross-section, of iron or non-alloy steel (excluding products having internal and external circular cross-sections and an external diameter of > 406,4 mm, or line pipe of a kind used for oil or gas pipelines or casing and tubing of a kind used in drilling for oil or gas)	These items facilitate the delivery of safe drinking water and sanitation
730640	Tubes, pipes and hollow profiles, welded, of circular cross-section, of stainless steel (excluding products having internal and external circular cross-sections and an external diameter of > 406,4 mm, and products of a kind used for oil or gas pipelines or of a kind used in drilling for oil or gas)	These items facilitate the delivery of safe drinking water and sanitation

HS Code	Item/ Description	Remarks / Environmental Benefits
730650	Tubes, pipes and hollow profiles, welded, of circular cross-section, of alloy steel other than stainless (excluding tubes and pipes having internal and external circular cross-sections and an external diameter of > 406,4 mm, and line pipe of a kind used for oil or gas pipelines or casing and tubing of a kind used in drilling for oil or gas)	These items facilitate the delivery of safe drinking water and sanitation
730661	Tubes and pipes and hollow profiles, welded, of square or rectangular cross-section, of iron or steel	These items facilitate the delivery of safe drinking water and sanitation
730669	Tubes, pipes and hollow profiles, welded, of non-circular cross-section, of iron or steel (excluding tubes and pipes having internal and external circular cross-sections and an external diameter of > 406,4 mm, line pipe of a kind used for oil or gas pipelines or casing and tubing of a kind used in drilling for oil or gas, and tubes and pipes and hollow profiles of square or rectangular cross-section)	These items facilitate the delivery of safe drinking water and sanitation
730690	Tubes, pipes and hollow profiles "e.g., open seam, riveted or similarly closed", of iron or steel (excluding of cast iron, seamless or welded tubes and pipes and tubes and pipes having internal and external circular cross-sections and an external diameter of > 406,4 mm)	These items facilitate the delivery of safe drinking water and sanitation
730900	Reservoirs, tanks, vats and similar containers, of iron or steel, for any material other than compressed or liquefied gas", of a capacity of > 300 l, not fitted with mechanical or thermal equipment, whether or not lined or heat-insulated (excluding containers specifically constructed or equipped for one or more types of transport)"	Containers of any material, of any form, for liquid or solid waste, including for municipal or dangerous waste. The containers can be of assistance in the conversion of waste to gas, which can be used to generate energy.
731010	Tanks, casks, drums, cans, boxes and similar containers, of iron or steel, for any material, of a capacity of >= 50 l but <= 300 l, n.e.s. (excluding containers for compressed or liquefied gas, or containers fitted with mechanical or thermal equipment)	For handling and storage of wastewater/sewage during treatment. Containers of any material, of any form, for liquid or solid waste, including for municipal or dangerous waste.
731029	Tanks, casks, drums, cans, boxes and similar containers, of iron or steel, for any material, of a capacity of < 50 l, n.e.s. (excluding containers for compressed or liquefied gas, or containers fitted with mechanical or thermal equipment, and cans which are to be closed by soldering or crimping)	Containers of any material, of any form, for liquid or solid waste, including for municipal or dangerous waste.

HS Code	Item/ Description	Remarks / Environmental Benefits
732490	Sanitary ware, incl. parts thereof (excluding cans, boxes and similar containers of heading 7310, small wall cabinets for medical supplies or toiletries and other furniture of chapter 94, and fittings, complete sinks and washbasins, of stainless steel, complete baths and fittings)	Water conserving showers (provided with a specific water-efficiency shower head) and dry closets (operating on the basis of composting) are designed to conserve water.
732510	Articles of non-malleable cast iron, n.e.s.	These items facilitate the delivery of safe drinking water and sanitation
732690	Articles of iron or steel, n.e.s. (excluding cast articles or articles of iron or steel wire)	These items facilitate the delivery of safe drinking water and sanitation, which are key SDG priorities
841320	Hand pumps for liquids (excluding those of subheading 8413.11 and 8413.19)	For handling and transport of wastewater or slurries during treatment.
841350	Reciprocating positive displacement pumps for liquids, power-driven (excluding those of subheading 8413.11 and 8413,19, fuel, lubricating or cooling medium pumps for internal combustion piston engine and concrete pumps)	For handling and transport of wastewater or slurries during treatment.
841360	Rotary positive displacement pumps for liquids, power-driven (excluding those of subheading 8413.11 and 8413.19 and fuel, lubricating or cooling medium pumps for internal combustion piston engine)	For handling and transport of wastewater or slurries during treatment.
841370	Centrifugal pumps, power-driven (excluding those of subheading 8413.11 and 8413.19, fuel, lubricating or cooling medium pumps for internal combustion piston engine and concrete pumps)	For handling and transport of wastewater or slurries during treatment.
841381	Pumps for liquids, power-driven (excluding those of subheading 8413.11 and 8413.19, fuel, lubricating or cooling medium pumps for internal combustion piston engine, concrete pumps, general reciprocating or rotary positive displacement pumps and centrifugal pumps of all kinds)	Water handling equipment. Pumps are integral components of water treatment plants.
841939	Dryers (excluding dryers for agricultural products, for wood, paper pulp, paper or paperboard, for yarns, fabrics and other textile products, dryers for bottles or other containers, hairdryers, hand dryers and domestic appliances)	Device used in waste water management, which requires sludge to be treated
842121	Machinery and apparatus for filtering or purifying water	Used to filter and purify water for a variety of environmental, industrial and scientific applications, including water treatment plants and wastewater treatment facilities.

HS Code	Item/ Description	Remarks / Environmental Benefits
842129	Machinery and apparatus for filtering or purifying liquids (excluding such machinery and apparatus for water and other beverages, oil or petrol-filters for internal combustion engines and artificial kidneys)	Used to remove contaminants from wastewater, by chemical recovery, oil/water separation, screening or straining.
842199	Parts of machinery and apparatus for filtering or purifying liquids or gases, n.e.s.	Including sludge belt filter presses and belt thickeners.
842833	Continuous-action elevators and conveyors for goods or materials, belt type (excluding those for underground use)	For transport of waste around the treatment plant.
848110	Pressure-reducing valves	For handling and transport of wastewater or slurries during treatment.
848110	Pressure-reducing valves	For handling and transport of wastewater or slurries during treatment.
848120	Valves for oleohydraulic or pneumatic transmission	These items facilitate the delivery of safe drinking water and sanitation, which are key SDG priorities.
848130	Check "non-return" valves for pipes, boiler shells, tanks, vats or the like	These items facilitate the delivery of safe drinking water and sanitation, which are key SDG priorities.
848130	Check "non-return" valves for pipes, boiler shells, tanks, vats or the like	These items facilitate the delivery of safe drinking water and sanitation, which are key SDG priorities.
848140	Safety or relief valves	These items facilitate the delivery of safe drinking water and sanitation, which are key SDG priorities.
848140	Safety or relief valves	These items facilitate the delivery of safe drinking water and sanitation, which are key SDG priorities.
848180	Appliances for pipes, boiler shells, tanks, vats or the like (excluding pressure-reducing valves, valves for the control of pneumatic power transmission, check "non-return" valves and safety or relief valves)	These items facilitate the delivery of safe drinking water and sanitation, which are key SDG priorities.
848180	Appliances for pipes, boiler shells, tanks, vats or the like (excluding pressure-reducing valves, valves for the control of pneumatic power transmission, check "non-return" valves and safety or relief valves)	These items facilitate the delivery of safe drinking water and sanitation, which are key SDG priorities.
848190	Parts of valves and similar articles for pipes, boiler shells, tanks, vats or the like, n.e.s.	For effective management, control, handling and transport of water.
854390	Parts of electrical machines and apparatus, having individual functions, n.e.s. in chapter 85	Water disinfection.
854389	Electrical machines and apparatus, having individual functions, not specified or included elsewhere in chapter 85	UV light is extremely effective in killing and eliminating bacteria, yeasts, viruses, moulds and other harmful organisms. UV systems can be used in conjunction with sediment and carbon filters to create pure drinking water. Water disinfection Ozone (O3) can be used as an alternative to chlorine for water disinfection.

Source: Job(09)/132; Committee on Trade and Environmental Session: October 9, 2009

Annexure 2: APEC List of EGs

HS Code	Item/Description	Remarks/Environmental Benefits
AIR POLLUTION CONTROL		
842139	Machinery and apparatus for filtering or purifying gases (excl. isotope separators and intake air filters for internal combustion engines)	Physical, mechanical, chemical or electrostatic filters and purifiers for the removal of VOC, solid or liquid particles in gases, etc.
902610	Instruments and apparatus for measuring or checking the flow or level of liquids (excl. meters and regulators)	Monitors to measure air pollution; basis for possible correcting measures (notably in view of health effects).
841989	Machinery, plant and laboratory equipment; for treating materials by change of temperature, other than for making hot drinks or cooking or heating food	For processing water and waste water and the separation and removal of pollutants through condensation. Includes fluidised bed systems (bubbling, circulating, etc.) and biomass boilers. Can also help anaerobic digestion of organic matter.
840490	Boilers; parts of auxiliary plant, for use with boilers of heading no. 8402 and 8403 and parts of condensers for steam or other vapour power units	These parts are used in the repair and maintenance of the equipment classified under 840410. This secondary equipment is also used to support waste heat recovery processes, such as boilers mentioned above, in waste treatment, or renewable energy resource recovery applications.
841960	Machinery for liquefying air or other gases	Air Pollution Control. Used in condensation to remove condense contaminants from vapour to liquid form for easier removal and storage.
840420	Condensers for steam or other vapour power units	Used to cool gas streams to temperatures which allow the removal of contaminants, e.g. volatile organic compounds (VOC) like benzene.
ENVIRONMENTAL MONITORING, ANALYSIS AND ASSESSMENT EQUIPMENT		
902620	Instruments and apparatus for measuring or checking pressure of liquids or gases (excluding regulators)	Manometers (devices that measure pressure) are used in power plants, water delivery systems, and other applications such as monitoring indoor air.
902680	Instruments or apparatus for measuring or checking variables of liquids or gases, n.e.s.	These instruments include heat meters that are used to monitor and measure the distribution of heat from geothermal or biomass district heating systems.
902690	Instruments and apparatus; parts and accessories for those measuring or checking the flow, level, pressure or other variables of liquids or gases	These instruments are used to measure, record, analyse and assess environmental samples or environmental influences.
902750	Instruments and apparatus; using optical radiations (UV, visible, IR), (other than spectrometers, spectrophotometers and spectrographs)	These instruments can be used for chemical, thermal, or optical analysis of samples, including water quality photometers which are used to determine the concentration of a solution from its colour intensity.

HS Code	Item/Description	Remarks/Environmental Benefits
902780	Instruments and apparatus for physical or chemical analysis, or for measuring or checking viscosity, porosity, expansion, surface tension or the like, or for measuring or checking quantities of heat, sound or light, n.e.s.	These instruments include: magnetic resonance instruments which are used in biologic and geologic analysis; and mass spectrometers which are used to identify elements and compounds.
902790	Microtomes and parts and accessories thereof	For use with Thermal Cyclers, DNA Sequencers, Polymerase Chain Reaction (PCR) Systems, etc. Thermal Cyclers, Serving multiple environmental purposes, for example Environmental Monitoring.
903180	Instruments, appliances and machines for measuring or checking, not elsewhere specified in chapter 90 (excl. optical)	These products include inter alia, items such as vibrometers (that measure vibrations and assess structural and other effects of such vibrations) and electron microscopes for laboratory and testing applications.
903190	Instruments, appliances and machines; parts and accessories for those measuring or checking devices of heading no. 9031	These instruments are used to measure, record, analyse and assess environmental samples or environmental influences.
902710	Gas or smoke analysis apparatus	Gas analysers are designed to continuously monitor single or multiple gas components, and such an instrument is used to analyse air emissions from automobiles.
903290	Parts and accessories for regulating or controlling instruments and apparatus, n.e.s.	These are the parts for the automatic regulating and control instruments classified in HS9032.
903300	Parts and accessories for machines, appliances, instruments or other apparatus in chapter 90, specified neither in this chapter nor elsewhere	Parts used in maintenance and repair of the liquid, electricity, radiation and measurement instruments.
903149	Optical instruments, appliances and machines for measuring or checking, not elsewhere specified or included in chapter 90	Equipment used in the measurement, recording, analysis and assessment of environmental samples or environmental impact.
902720	Chromatographs and electrophoresis instruments	Gas and liquid chromatographs use an analytical method where a physical separation of the sample components occurs prior to detection. These instruments can be used to monitor and analyse air pollution emissions, ambient air quality, water quality, etc. Electrophoresis instruments can be used to monitory and analyse materials such as particulates emitted from incinerators or from diesel exhaust.
902730	Spectrometers, spectrophotometers and spectrographs; using optical radiations (UV, visible, IR)	Used in a wide range of environmental applications, including identification of unknown chemicals, toxins and trace contaminants. Also used for qualitative and quantitative analysis in quality control departments, environmental control, water management, food processing, agriculture and weather monitoring.

HS Code	Item/Description	Remarks/Environmental Benefits
ENVIRONMENTALLY PREFERABLE PRODUCTS, BASED ON END USE OR DISPOSAL CHARACTERISTICS		
441872	Flooring panels, multilayer, assembled, of wood (excluding for mosaic floors)	Renewable bamboo-based products are substitutions of wooden necessities. Since bamboo is characterized by short growing cycle, these environment-friendly products can save a great deal of water, soil and air resources.
MANAGEMENT OF SOLID AND HAZARDOUS WASTE AND RECYCLING SYSTEMS		
847420	Crushing or grinding machines for solid mineral substances	Used for solid waste treatment or recycling.
847982	Mixing, kneading, crushing, grinding, screening, sifting, homogenising, emulsifying or stirring	Used to prepare waste for recycling; mixing of wastewater during treatment; preparing organic waste for composting; (composting can minimise the amount of waste going to landfill as well as recovering the valuable nutrient and energy content of the waste).
847990	Parts of machines and mechanical appliances, n.e.s.	Parts thereof waste separator/ compactor machines. Parts used for the maintenance and repair of waste separators and compactor machines, with the attendant benefits, for example, membrane systems which can be assembled to recover resources from waste.
847989	Machines and mechanical appliances, n.e.s.	Very broadly, products under HS847989 are machines and appliances designed for a wide range of areas of environmental management, including waste, waste water, drinking water production and soil remediation.
841780	Industrial or laboratory furnaces and ovens, non-electric, incl. incinerators	These products are used to destroy solid and hazardous wastes. Catalytic incinerators are designed for the destruction of pollutants (such as VOC) by heating polluted air and oxidation of organic components.
841790	Parts of industrial or laboratory furnaces, non-electric, incl. incinerators, n.e.s.	These parts can help maintain and repair products that are used to destroy solid and hazardous wastes.
851410	Resistance heated industrial or laboratory furnaces and ovens (excluding drying ovens)	These products are used to destroy solid and hazardous wastes. Catalytic incinerators are designed for the destruction of pollutants (such as VOC) by heating polluted air and oxidation of organic components.
851430	Electric industrial or laboratory furnaces and ovens (excl. resistance heated, induction, dielectric and drying furnaces and ovens)	Catalytic incinerators are designed for the destruction of pollutants (such as VOC) by heating polluted air and oxidation of organic components.
851490	Parts of electric industrial or laboratory furnaces and ovens, incl. of those functioning by induction or dielectric loss, and of industrial or laboratory equipment	Parts for the equipment listed will facilitate the destruction of pollutants (such as VOC) by heating polluted air and oxidation of organic components.

HS Code	Item/Description	Remarks/Environmental Benefits
840290	Parts of vapour generating boilers and superheated water boilers, n.e.s.	Parts for the boilers for the production of heat and power on the basis of (renewable) biomass fuels.
851420	Furnaces and ovens functioning by induction or dielectric loss	These products are used to destroy solid and hazardous wastes. Catalytic incinerators are designed for the destruction of pollutants (such as VOC) by heating polluted air and oxidation of organic components.
840410	Boilers; auxiliary plant, for use with boilers of heading no. 8402 or 8403 (e.g. economisers, super-heaters, soot removers, gas recoverers)	Components of industrial air pollution control plant which minimise the release of pollutants into the atmosphere. This equipment is also used to support waste heat recovery processes in waste treatment, or renewable energy resource recovery applications.
NATURAL RISK MANAGEMENT		
901580	Instruments and appliances used in geodesy, topography, hydrography, oceanography, hydrology	Includes instrument and appliances necessary for measuring the ozone layer and to monitor, measure and assist planning for natural risks such as earthquakes, cyclones, tsunamis etc.
RENEWABLE ENERGY PLANT		
850300	Parts For Electric Motors, Generators, Generating Sets And Rotary Converters	Parts and accessories for electricity generation from renewable resource.
854140	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light emitting diodes	Solar photovoltaic cells generate electricity in an environmentally benign manner (with no emissions, noise or heat generated). They are particularly suited to electricity generation in locations remote from an electricity grid.
903289	Regulating or controlling instruments and apparatus; automatic, other than hydraulic or pneumatic	These include other automatic voltage and current regulators which have renewable energy applications as well as other process control instruments and apparatus for temperature, pressure, flow and level, and humidity applications.
840690	Parts of steam and other vapour turbines, n.e.s.	Turbines designed for the production of geothermal energy (renewable energy) and co-generation ((CHP) which allows for a more effective use of energy than conventional generation).
841919	Heaters; instantaneous or storage water heaters, non-electric, other than instantaneous gas water heaters	Uses solar thermal energy to heat water, producing no pollution. Use of solar water heating displaces the burning of other, pollution-creating fuels.
850164	AC generators "alternators", of an output > 750 kVA	Used in conjunction with boiler and turbines to generate electricity in renewable energy plants. Must use these turbines and generators in combination to produce electricity from renewable fuels (e.g., biomass). Size is "exceeding 750 kVA."

HS Code	Item/Description	Remarks/Environmental Benefits
850239	Electric generating sets; (excluding those with spark-ignition or compression-ignition internal combustion piston engines), other than wind powered	Combined heat and power systems produce usable power (usually electricity) and heat at the same time. Micro combined heat and power systems are very efficient for domestic use, particularly in places where reticulated natural gas and hot water central heating are the norm. 'Distributed generation' also minimises transmission losses through national grids, reducing the need to increase centralised generating capacity and transmission networks.
841182	Gas turbines of a power > 5.000 kW (excluding turbojets and turbopropellers)	Gas turbines for electrical power generation from recovered landfill gas, coal mine vent gas, or biogas (clean energy system).
841990	Machinery, plant and laboratory equipment; parts of equipment for treating materials by a process involving a change of temperature	Parts used in the maintenance and repair of solar water heaters (etc.). Which use solar thermal energy to heat water, producing no pollution. Use of solar water heating displaces the burning of other, pollution-creating fuels.
850231	Generating sets, wind-powered	For wind turbines. Used to generate electricity from wind power - a form of renewable energy.
WASTE WATER MANAGEMENT AND POTABLE WATER TREATMENT		
842199	Parts of machinery and apparatus for filtering or purifying liquids or gases, n.e.s.	Including sludge belt filter presses and belt thickeners
841939	Dryers (excl. dryers for agricultural products, paper pulp, paper or paperboard, yarns, fabrics and other textile products, dryers for bottles or other containers, hair dryers, hand dryers and domestic appliances)	Device used in waste water management, which requires sludge to be treated.
842121	Machinery and apparatus for filtering or purifying water	Used to filter and purify water for a variety of environmental, industrial and scientific applications, including water treatment plants and wastewater treatment facilities.
842129	Machinery and apparatus for filtering or purifying liquids (excl. such machinery and apparatus for water and other beverages, oil or petrol-filters for internal combustion engines and artificial kidneys)	Used to remove contaminants from wastewater, by chemical recovery, oil/water separation, screening or straining.
854390	Electrical machines and apparatus; parts of the electrical goods of heading no. 8543	Parts thereof UV disinfection ozonisers. Parts used in maintenance and repair of the UV disinfection instruments. UV light is extremely effective in killing and eliminating bacteria, yeasts, viruses, moulds and other harmful organisms.

HS Code	Item/Description	Remarks/Environmental Benefits
	OTHERS	
841199	Parts of gas turbines, n.e.s.	Gas turbines are used for electrical power generation from recovered landfill gas, coal mine vent gas or biogas. Lower emission of pollutants compared with traditional fire power generation methods.
841290	Parts of non-electrical engines and motors, n.e.s.	Parts used for repair and maintenance of wind turbines with the attendant benefits.
850490	Parts of electrical transformers and inductors, n.e.s.	Used to convert DC current from renewable energy generating sets into conventional AC electricity.
901380	Liquid crystal devices, n.e.s. and other optical appliances and instruments not elsewhere specified in chapter 90	Heliostats orient mirrors in concentrated solar power systems to reflect sunlight on to a CSP receiver.
901390	Parts and accessories for liquid crystal devices "LCD", lasers and other appliances and instruments not elsewhere specified in chapter 90, n.e.s.	Heliostats orient mirrors in concentrated solar power systems to reflect sunlight on to a CSP receiver.

Source: Asia Pacific Economic Cooperation (APEC)

About Exim Bank's Working Paper Series

As part of its endeavour in enriching the knowledge of Indian exporters and thereby to enhance their competitiveness, Exim Bank periodically conducts research studies. These research studies are broadly categorized into three segments, viz. sector studies, country studies and macro-economic related analysis. These studies are published in the form of Occasional Papers, Working Papers and Books. The research papers that are brought out in the form of Working Papers are done with swift analysis and data collation from various sources. The research papers under the series provide an analytical overview on various trade and investment related issues.

Previous Working Papers brought out by Exim Bank

Paper No. 34	Enhancing India's Bilateral Ties with Cambodia, Lao PDR, Myanmar, Vietnam: A Brief Analysis, November 2014
Paper No. 35	Indian Handloom Industry: A Sector Study, March 2015
Paper No. 36	Turkey: A Study of India's Trade and Investment Potential, March 2015
Paper No. 37	Study on Indian Pharmaceutical Industry, March 2015
Paper No. 38	Enhancing India's Trade Relations with ECOWAS: A Brief Analysis, May 2015
Paper No. 39	Potential for Enhancing India's Trade with Iran: A Brief Analysis, June 2015
Paper No. 40	Potential for Enhancing India's Trade with Pakistan: A Brief Analysis, June 2015
Paper No. 41	Potential for Enhancing India's Trade with China: An Update, August 2015
Paper No. 42	Potential for Enhancing India's Trade with Russia: A Brief Analysis, August 2015
Paper No. 43	Enhancing India's Trade Relations with LAC: Focus on Select Countries, October 2015
Paper No. 44	Turkey: A Study of India's Trade and Investment Potential, October 2015
Paper No. 45	Enhancing India's Trade Relations with Africa: A Brief Analysis, October 2015
Paper No. 46	Indian Leather Industry: Perspective and Strategies, November 2015
Paper No. 47	Make in India for the World: Realizing Export Potential of Railways, December 2015
Paper No. 48	Export from West Bengal: Potential and Strategy, January 2016
Paper No. 49	Act East: Enhancing India's Engagements with Cambodia, Lao PDR, Myanmar, Vietnam (CLMV), January 2016
Paper No. 50	Focus Africa: Enhancing India's Engagements with Southern African Development Community (SADC), March 2016
Paper No. 51	India's Service Sector - An Analysis, March 2016
Paper No. 52	Defence Equipment Industry: Achieving Self-Reliance and Promoting Exports, March 2016
Paper No. 53	International Solar Alliance: Nurturing Possibilities, March 2016
Paper No. 54	India-Africa Healthcare Cooperation: Way Forward, May 2016
Paper No. 55	Sustainable Investment Opportunities in Africa: Prospects for BRICS, October 2016
Paper No. 56	Intra-BRICS Trade: An Indian Perspective, October 2016
Paper No. 57	Enhancing India's Ties with Middle East and North Africa (MENA), October 2016
Paper No. 58	Enhancing India's Trade Relations with Latin America and the Caribbean (LAC) Region: Focus on Select Countries, November 2016
Paper No. 59	The Indian Automotive Industry: An International Trade Perspective, February 2017
Paper No. 60	India's Investments in Select East African Countries: Prospects and Opportunities, March 2017
Paper No. 61	International Trade in Processed Food: An Indian Perspective, March 2017
Paper No. 62	Machinery Sector in India: Exploring Options for Neutralizing Trade Deficit , March 2017
Paper No. 63	Feed Africa : Achieving Progress through Partnership, May 2017
Paper No. 64	Water, Sanitation and Healthcare in Africa: Enhancing Facility, Enabling Growth, May 2017
Paper No. 65	Integrate Africa: A Multidimensional Perspective, May 2017
Paper No. 66	Manufacturing in Africa: A Roadmap for Sustainable Growth, May 2017
Paper No. 67	Power Sector in Africa: Prospect and Potential, May 2017
Paper No. 68	Indian Investments in East Africa: Recent Trends and Prospects, November 2017