Making Green Trade Happen

– Environmental Goods and Indispensable Services

Kommerskollegium
National Board of Trade

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Executive Summary

Today, competitive sales of goods rely on a substantial offer of services. This is an example of servicification, the process whereby manufacturing firms are becoming more and more dependent upon services in order to stay competitive. Trade in environmental goods is part of this trend. Usually a number of services are sold together with the environmental product as a package and the customer would not demand the product without the services. These accompanying services are therefore not only instrumental but also indispensable for trade in environmental goods to take place.

This study is based on interviews with companies selling or buying goods on the APEC list of environmental goods. In the light of the ongoing plurilateral discussion on green trade liberalisation, the study identifies a number of services which are indispensable for the trade in environmental goods. Due to the strong inter-linkage between environmental goods and 'indispensable services', barriers that hamper trade in these services will hamper trade in environmental goods. Or to put it succinctly: without services, no trade. Hence, the potential benefit of any zero tariff proposals is likely to be much greater if indispensable services are also liberalised.

The study identifies the following services as some of those that are indispensable: assembly and installation, technical testing and analysis, educational services, advisory and consultative services, managing and repairs, computer services, R&D, and 'traditional' environmental services.

The services are supplied before and in relation to the delivery of a goods, but also after the delivery, as part of the continuous operations. The trade in accompanying services takes place under all four GATS modes of supply, with mode 3 (commercial presence) and mode 4 (movement of natural persons) being predominant, as the provision of services typically entails physical presence at the customer's site. Some mode 1 supply (cross-border trade) is also involved, e.g. in cases where monitoring of operations is conducted via the Internet.

The study should be seen in the context of the National Board of Trade's research of servicification of the economy. A general conclusion of this research is that trade negotiations must deal in tandem with both goods and services in order to facilitate companies' trade. The plurilateral initiative of green trade liberalisation, launched at the beginning of 2014, provides a first and important opportunity to bridge the gap between goods and services negotiations.

1. Introduction

At the beginning of 2014, a number of World Trade Organisation (WTO) members[1] revived the international discussions on trade and environment by declaring their 'commitment to achieve global free trade in environmental goods'. The new plurilateral initiative will build upon the commitment of the Asia-Pacific Economic Cooperation (APEC)[2] leaders to reduce tariffs on an agreed list of 54 environmental goods. Besides reducing tariffs on additional goods, the new initiative opened up for an agreement addressing 'other issues in the sector (…) that can also directly and positively contribute to green growth and sustainable development'.

So far the plurilateral discussions have focussed on which goods should be considered as environmentally friendly. However, they also create a window of opportunity for a more targeted trade negotiation that supports actual environmental trade by comprising both liberalisation of environmental goods and services indispensable to these goods.

In the light of the ongoing discussions on green trade liberalisation, this study aims to provide insights into the characteristics of services that accompany trade in environmental goods. The so-called 'environmental goods' (hereinafter 'EGs') are present on the APEC list, i.e. goods that have been agreed to have environmentally beneficial effects. The study identifies a number of accompanying services that are indispensable to the EGs sales[3] and ought to be addressed in trade negotiations in order to make free trade in EGs effective. Compared with earlier literature[4], the point of departure is not environmental services or activities as such but any service necessary to ensure an efficient EGs trade.

The study identifies a number of services that are indispensable to the sales of environmental goods and should be addressed in trade negotiations in order to make free trade in environmental goods truly effective.

This study should be seen in the context of the National Board of Trade's research on the ongoing process of servicification of the economy; the process whereby manufacturing companies in many different sectors use, produce and sell more and more services in order to stay competitive.[5] A general conclusion is that, given the synergetic relationship between goods and services, trade negotiations must deal with both areas in tandem in order to facilitate companies' trade. This study emphasises this message by visualising the servicification of EGs sales. The EGs sector is a clear example of how the distinction between sales of goods and services has become blurred. Manufacturing producers of EGs must be able to deliver a number of services to sell their goods and to stay competitive.

The study builds primarily on the insights from interviews[6] with companies that sell or buy EGs. Eight of the 54 goods on the APEC list[7] are examined, see list of goods in Appendix 1. Fifteen companies have been interviewed (see table in Appendix 2), thus some of the goods are traded by several of the companies.

All the companies are located in Sweden but their business is of a global nature, typical of today's companies. They import and export inputs and outputs worldwide and the majority are also multinational in terms of corporate structure, e.g. they have either subsidiaries in different parts of the world or are themselves subsidiaries of a foreign parent company.

In-depth studies of an industry, such as company interview-based studies, are necessary in order to capture the existence and the importance of trade in accompanying services. One reason for this is that these services are not in general visible in the service statistics. As the companies usually do not charge for goods and accompanying services separately, the value of the services tends to be part of the price of the product, i.e. affecting the trade in goods statistics but not the trade in services statistics.

Definition of Environmental Services

The services that accompany the trade in EGs are in general not covered by the sector classified as 'environmental services' commonly used by WTO-members in trade negotiations. This sector only covers traditional environmental services such as sewage and refuse disposal, sanitation and nature protection services. These services are environmentally friendly *per se* since their end-use is purely environmental. However, there is no agreed definition of environmental services in the WTO. The indispensable services identified in this study might well be included in a pragmatic definition of environmental services aimed at achieving the objective of sustainable development. In the specific context, i.e. when accompanying the EG, the services have an environmental end-use as they are indispensable for the sales of the EG. In trade negotiations countries have the possibility to narrow down the services categories and make commitments for only those services that are linked to EGs.

2. Services Accompanying the Sales of Environmental Goods

This chapter examines which services the interviewed companies consider to be indispensable for their sale/purchase of EGs. In 2.1 the different services and the modes of services supply are listed (table 1) and subsequently described and illustrated with some real-business examples. In 2.2, two 'case studies' are provided to illustrate the wide range of services that can be involved in relation to a single company's trade of an EG. Section 2.3 summarises the insights from the previous sections by highlighting the characteristics of EGs that explain the strong inter-linkage between EGs and services.

2.1 Review of Services

In this section the services identified as indispensable in relation to trade in EGs are listed and described. The breakdown of services (i.e. Type of Services) is based on the United Nations provisional Central Product Classification (CPC prov)[8]. However, the services are not strictly defined by the specific CPC codes, but rather described more freely with the aim of reflecting the relevant services as appropriately as possible.[9]

Table 1. List of Indispensable Services Accompanying Environmental Goods[10]

Type of Services	Purposes of the Services	Stage in Relation to the Delivery of Goods	Mode of Services Supply
Assembly and installation	Guarantee the basic functioning of the product	▪ In connection with delivery (when associated with spare parts it can be a part of after-sales)	1, 2, 3, 4
Technical testing and analysis services	Guarantee the basic functioning of the product, e.g. fulfil regulatory demands	▪ In connection with delivery ▪ After delivery	1, 2, 3, 4
Educational services	Guarantee a proper use of the product, Improve product and user efficiency	▪ In connection with delivery	2, 3, 4
Advisory and consultative services	Increase customer satisfaction, Fulfil regulatory demands	▪ Before delivery	1, 3, 4
Maintenance and repair services	Guarantee the basic functioning of the product	▪ After delivery	1, 3, 4
Computer Services	Guarantee the basic functioning of the product	▪ Before delivery ▪ In connection with delivery ▪ After delivery	1, 4
Research and development	Customise the product, e.g. fulfil regulatory demands and adapt to local conditions	▪ Before delivery ▪ After delivery (related to upgrades)	1, (3, 4)
Environmental protection services	Comply with regulations	▪ Before delivery ▪ After delivery	1, 3, 4

Facts

Modes of Supply

The last column in table 1 shows the modes of services supply as defined by the GATS: **mode 1** cross-border trade (i.e. the supplier is not present in the country in which the service is supplied); **mode 2**, consumption abroad (i.e. an individual travels to a foreign country where the service is supplied); **mode 3**, commercial presence (i.e. a service is supplied through a subsidiary established in the host country); and **mode 4**, movement of natural persons (i.e. an individual travels abroad to supply a service in host country or to work as an intra-corporate transfer under mode 3).

Note, if the services are supplied in the host country by an individual[11] employed by a subsidiary established in the host country the trade goes via mode 3. In this study, the interviewed companies with foreign subsidiaries switch between supplying from a local subsidiary (mode 3) and from abroad (mode 4) depending on what is most convenient in the specific situation.

Assembly and installation services

Several of the goods on the APEC list are of such that they must be assembled and/or installed. Furthermore, due to the complexity of the goods (e.g. part of high-tech machines and systems), specialised know-how and special equipment are often required for proper assembly and installation. Examples of such goods are rotary converters for wind turbines and parts of vapour generating boilers.

In almost all cases assembly and/or installation services accompany the sales of goods examined in this study. The interviewed companies who offer these services explained that the customer expects these services to be included in the goods package, since they are necessary to guarantee the basic functioning of the goods.[12]

Typically, the services are supplied in connection with the delivery of the goods, but they can also be a part of 'after-sales' since - usually - spare parts also have to be installed. Mode 3 and 4 are the predominant modes of supply as the assembly and installation work often requires a physical presence at the customer's site (see box 1).

According to the CPC prov, assembly and installation services are classified differently depending on which product they are linked to. The most relevant category of services related to the goods on the APEC list is, according to the 'Explanatory Notes for the CPC', *Services incidental to the manufacture of metal products, machinery and equipment* (CPC 885)[13], as this category is related to industrial goods. But some services may, for instance, come under the group *Architectural, engineering and other technical services* (867) or *Installation work* (516) under the division of construction work. Assembly and installation services related to software are part of computer related services, see below.

Technical testing and analysis services

Technical testing and analysis services (TTA) incidental to sales of goods are provided in order to guarantee the basic functioning of the goods. Due to the many standards and rules related to environmental concerns, TTA services can be expected to be particularly important with regard to the goods on the APEC list whose 'function' is to address an environmental problem[14].

A majority of the interviewed companies provide TTA, many times both in connection with delivery and after delivery of the goods. An example is a company producing and exporting different instruments for measuring liquids and gases, for instance an instrument for detecting oil leaks from an engine. Regulated maximum levels for how much an engine may leak (i.e. environmental rules) is the key driver for demand of such an instrument. To ensure that the instrument is measuring accurately, calibration (and adjustment[15]) has to be done at regular intervals. Therefore the company offers calibration on a yearly basis, as a minimum, in relation to the goods' sales – both in relation to the installation of the instruments and as part of after-sales support.

In many cases a single company uses more than one mode of supply. For instance, the company mentioned above offers customers the choice of whether they want the instruments to be calibrated at the company's facility or at their own premises, and if the latter is preferred, the company sends personnel from either the Swedish parent company or from one of the foreign affiliates depending on what is most convenient, i.e. involving mode 2, 3, and 4. Mode 1 is also relevant when it comes to calibration being done from a distance with the help of digital solutions.

In terms of the CPC definitions, TTA services are generally found in class 8676. In some cases the services might also sort under CPC 94 that contains the explicitly defined 'environmental services'. TTA related to software fine tuning or up-grades come under *Computer related services* (CPC 84), see below.

Technical support and educational services

It can be expected that the more complex a product is, the larger is customer demand for technical support as an accompanying service. Not surprisingly, such services are – in almost all cases – accompany trade in the EGs examined in this study. Interestingly, the support is quite often rather extensive and supplied as an 'educational package' with a work plan containing a lot more than just technical support.

For instance, a company selling amalgam and sink separators to dental clinics offers an educational package containing information not only about how to operate the goods, but also about environmental issues (e.g. the negative impact of amalgam on the environment) and national regulations (e.g. regarding contaminated waste), as well as how to self-regulate business activities pursuant to such regulations. Many companies offer training comprising know-how about maintenance and repair of the goods with the aim of teaching the customer how to perform such services by themselves, when needed.

Usually educational services are provided in connection with the delivery of the goods. The training course typically lasts between a few days to a few weeks at the customer's site (hence delivered through mode 3 or 4) and in some cases at the manufacturing company's facility (mode 2). With regard to major environmental projects, such as in connection with the purchase of wind turbines, it is common that the training takes place at different occasions over several years (see case study). The personnel who provide the educational services are often highly skilled but do not necessarily have an academic degree.

Technical support and educational services are not always easy to match with the CPC codes. They might be sorted in one of the two categories of *Adult education* (924) and *Other education* (929) which are provided outside the public educational system. However, the education might be seen more as training as the services are less theoretical and very job-related compared to academic courses[16]. Hence, these services might better be sorted under the subclass *Other business services n.e.c* (87909). In addition, training can also be classified under *Integrated engineering* services for turnkey projects (8673).

Advisory and consultative services

Various types of advisory and consultative services are offered in connection with the sales of EGs, e.g. a company that sells solar panels provides architectural advice about how to incorporate the solar panels into new buildings in order to achieve maximum energy efficiency.

It is also common that such services accompany goods sold as part of a major environmental project. For instance, one of the interviewed companies sells filters for purifying water as part of a new wastewater plant (see case study). In this case the company's engineers provide architectural advice regarding the construction of the plant, such as the size of the basins.

The advisory and consultative services reported by the interviewed companies come under the categories *Advisory and pre-design architectural services* (86711) and *Advisory and consultative engineering services* (86721) which both explicitly include services concerning environmental issues (e.g. studies of the environmental impact of an activity). The services are delivered in an early phase of a project, i.e. before delivery of goods. The reported most relevant modes of supply are 3 and 4, as the services require some presence at the customer's site. Information is also sent via the Internet, hence involving mode 1.

Maintenance and repair services

Maintenance and repair services are usually part of the after-sales services that accompany sales of EGs. A common arrangement described by the interviewed companies is to offer such support services along with the warranty of the product (i.e. 'free' services during the years the warranty is in effect) with the option to extend the support at a competitive price thereafter. Often the customers continue to buy the services from the manufacturing company for many years and the maintenance and repair service, along with the sales of spare parts, are in these cases a substantial part of the




companies' turnover. In certain cases the customers did not need to buy maintenance and repair services as they had learned how to perform such services by themselves - during the educational sessions (described above) or working along with the staff from the manufacturing company during the 'warranty years'.

Quite often customers (i.e. users) are in need of on-call duty repair services. To be able to offer such services, many of the manufacturing companies have outsourced them to local distributors or established foreign subsidiaries (mode 3). Some companies however send personnel cross-border (mode 4) and use creative ways to handle lengthy visa procedures (see chapter 3).

According to the 'Explanatory Notes' for the CPC, maintenance and repair services concerning industrial goods come under CPC 88, i.e. *Agricultural, mining and manufacturing services*. Repair services of *machinery and equipment* come under CPC 8862.

Computer related services

Due to technological advances, computer related services are becoming a central feature in many goods. EGs are part of this trend. They include more and more digital solutions that rise efficiency and durability.

Computer services are essential for two reasons. Firstly, they include software necessary for the installation and operation of the EG. Secondly, they are carriers of other services delivered over the Internet, such as, for instance, technical testing, consulting, educational services, and R&D.

Focusing here on computer services in the form of software, many EGs include software and are connected to the Internet. For example, a wind turbine includes software that monitors and controls the performance and measures wear and tear. The software can, in this case, be programmed to adapt the wind turbine to the current wind velocity or to send information to a remotely situated controller

(which in turn sends instructions back to the wind turbine to adapt to the velocity).

Computer services are used at all stages of the EGs' supply chain. In the preparatory phase, computer services can be used to analyse the local conditions, e.g. water quality or levels of air pollution – information that is sent to the manufacturer to ensure that the proper product is sold (with the right settings). During the delivery phase, computer services are needed during, for example, installation of the product where downloading of software and fine-tuning of programs might be needed. In the after-sales phase, computer services are essential for operating and monitoring the EG. This includes software updates.

Often the delivery of computer services is done through mode 1 over the Internet. However, mode 4 might be necessary during all three stages described above. For instance, in the preparatory phase a computer specialist might need to visit the location where the EG will be used to ensure that the right data is collected. Physical presence might also be needed during installation to guarantee that the software is installed correctly. Finally, upgrades and monitoring might also necessitate movement of IT-specialists.

Almost all services related to software come under CPC 84.

Research and development (R&D)

Due to different national environmental regulations and standards as well as different local conditions (e.g. climate and nature), traded EGs often need to be customised. For most of the interviewed companies, R&D services form part of the customising process. R&D can also be a part of the continuous relationship with the customer in order to, for example, develop product improvements based on the performance of the sold product. The companies described the R&D as a necessary accompanying service as the customer would not demand a non-customised goods.[17]

Typically, R&D is conducted before the goods are manufactured and the R&D service is an incorporated part of the sold product and not delivered as a service. However, as part of the process of customising a goods or developing a new version of the goods, specific and separate services activities might be necessary, making the R&D service an indispensable service. Hence, even if the final result of the R&D process becomes an input into the product, some activities along the way are relevant from a trade policy perspective.

For instance, many of the interviewed companies stated that specific knowledge of local conditions is often a necessity to ensure that the EG meets the customers' specificities. For example, knowledge of water characteristics (e.g. the presence of particles in the water) might be required for the production of a customised filter for water purification. In order to acquire this specific knowledge the companies, oftentimes, have to send their R&D personnel overseas (hence involving mode 4). Issues of data transfer (i.e. mode 1) are also relevant in those cases where information is transmitted electronically between customer and R&D personnel.

R&D services sort under the CPC 85. The relevant services could come under *Interdisciplinary*

R&D (853), which explicitly includes services on environmental sciences or under *R&D on natural sciences and engineering* (851). Services concerning development on software come under *Computer related services* (842).

Environmental protection services

The services deemed 'environmental' in the CPC prov (the 94th division) comprise only traditional environmental services that have no other end-use than the environmental one[18]. Depending on the interpretation of the service classification system, some of the services described above might come under CPC 94, especially under the *Other environmental protection services not elsewhere classified* (9409).

There are also companies that trade in services more clearly in line with the traditional definition of environmental services. One example among the interviewed firms is a manufacturing company (referred to previously) that sells amalgam and sink separators to dental clinics. In relation to this sale the company offers collection and disposal of the heavy metals and heavy metal contaminated dismantled separators, i.e. refuse disposal services (9402), as well as cleaning of the contaminated separators used and collecting the wastewater for further treatment, i.e. sewage services (9401). These services are provided at the customer's site by personnel from the company, either from the parent company or from some of the foreign subsidiaries, i.e. through mode 3 or 4. In some cases the waste had to be transported cross-border, hence involving mode 1. Different national rules for cross-border transportation of hazardous waste had resulted in long detours.

Another example is a company importing a wind-powered rotary converter as part of a wind farm construction project. In this case analysis of possible environmental damage is necessary in order to fulfil environmental regulations for the location of a wind farm. This service might come under *nature and landscape protection services* (9406).

2.2 One Environmental Product, Many Services – Two Examples

In this section two examples are provided to highlight the wide range of services that can be involved in relation to a single company's trade in an EG. Both of the EGs are part of an environmental activity, the first (2.2.1) the construction of a wastewater plant and the second (2.2.2) the construction of a wind farm. The first case illustrates, among other things, the large number of short-term missions that are involved, i.e. it highlights how important movement of people is for the trade in EGs. The other case highlights the large number of services needed to get an environmental project up and running - even more than those presented in the former chapter. The case is also an example of how different EGs can be related.

2.2.1 Filter for purifying water

Figure 1. Indispensable Services Accompanying the Sales of Filter for Purifying Water

Before delivery of goods	In connection to delivery of goods	After delivery of goods
▪ Installation of test filter ▪ Monitoring and TTA of test filter ▪ R&D in order to customise the filter ▪ Advisory and consultative services ▪ Computer services	▪ Installation ▪ Monitoring and TTA ▪ Educational services ▪ Computer services	▪ Monitoring and TTA ▪ Maintenance and repair services ▪ Computer services

The figure illustrates the services a manufacturing company provides in relation to their export of sand filters for water treatment (classified under HS Code 84 21 21), for instance as part of a project for a new municipal wastewater plant[19].

The Company

The interviewed company is a medium size multinational company with the parent company in Sweden and affiliated companies in other EU countries and in Brazil, China, Singapore and Norway. The filters are produced mainly in Sweden and distributed worldwide through one of the companies or by representatives.

During the first phase of the wastewater plant project, a test filter is installed at the selected location for the plant, in order to examine the filter's impact on the local water quality. Installation, monitoring, and technical testing and analyses (TTA) of the test filter are provided on site by the company's engineers and technicians. The first stay is a few weeks long. Thereafter the technicians return to the plant every two months for as long as the test filter is in place, which may be up to two years. During the construction phase, the filter and/or the devices connected to the filter are customised, involving sometimes R&D services. Other services provided are advisory and consultative services, for instance architectural advice regarding the construction of the plant.

Software that, for instance, facilitates monitoring is often connected to the filter and various kinds of related computer services, such as programming and installation of software, are conducted either on-site or from home through data transfer. There is the possibility of installing software in order to monitor and control the plant via data transfer from the office in Sweden, and this is sometimes done if the plant is located within the EU but almost never otherwise, due to national security restrictions.

When the real filter is delivered, installation, monitoring and TTA services of the filter are again provided, as well as computer services related to the software. Education services, mainly regarding management of the filter (i.e. technical support), are provided by the company's highly-skilled personnel, usually in the form of two training sessions of one week each on-site at the plant.

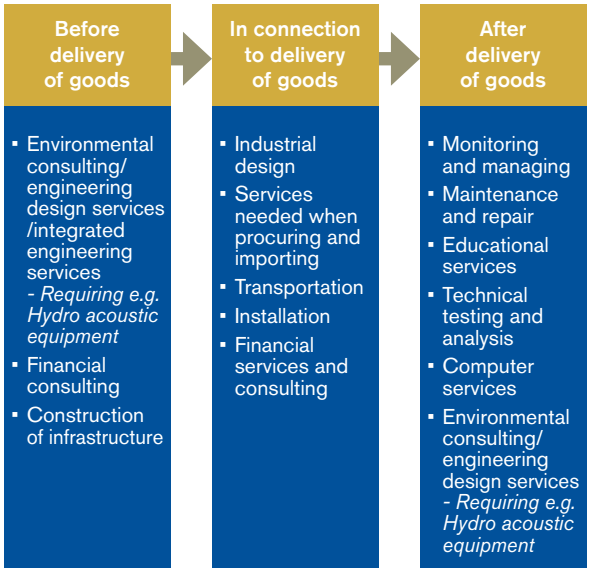
Once the plant is in operation, the company often continues to supply several services. Basic support services such as testing, maintenance and repair services etc. are included in the warranty (up to five years) and thereafter in most cases sold separately. An annual routine check is recommended by the company, as well as a more in-depth inspection, upgrades of software, and replacement of worn parts every five years. Sometimes the customers also demand more extensive support contracts, including, among other things, testing and analysis. Many countries regulate water purification, which is why continuous testing of the purifying water is therefore crucial.

All services except for some computer related services are performed on-site at the plant by personnel either from the parent company (i.e. personnel traveling cross-border) or from one of the many foreign affiliate companies, depending on, among other things, availability of personnel with the relevant expertise. For TTA services it is almost always staff from the parent company.

This case is a typical example of how important it is for manufacturing companies to be able to move their personnel. Inefficiencies related to this movement, as for instance lengthy and burdensome visa procedures, imply inefficient trade in goods.

2.2.2 Wind-powered rotary converter

Figure 2. Services in an off-shore wind farm process chain in Sweden



Wind-powered rotary converters (HS Code 85 02 31) constitute a central part of a wind turbine. Figure 2 describes services needed during a company's process of preparing, procuring, installing, and operating an off-shore wind park in Sweden.

Some of the services listed in figure 2 are included in the list of services indispensable for EGs (see table 1), but the figure also included other services that are needed to prepare, install and run a wind park. These latter services are not indispensable as defined in this study[20] but they are nonetheless important for processing the wind park project, which is of course crucial for the demand of wind-powered rotary converters.

Before delivery of the EG: Building a wind park requires detailed and time-consuming preparatory work. A fundamental task is to find the right location, which entails, among other things, environmental consulting services. Here specific equipment is needed. In the case of an off-shore wind park, imported hydro acoustic equipment is needed to assess fish stocks and possible damage to the marine environment. Hydro acoustic equipment (HS Code 90 15 80) is identified as an EG in the APEC list.

In connection to delivery: The rotary converter and other parts of the wind park are procured abroad (in this case from Denmark or Germany) and usually specially adapted to the specifics of the location where the wind park will be erected. The producer is in charge of delivery and, with the help of specialised construction firms, installing the wind park. The producer manages and monitors the operation of the wind park during the warranty period (two – five years) as well as handles maintenance and repair. During this period the buyer's staff is educated in the handling of the wind park

The Company

The interviewed company is part of a group whose parent company is German-owned. The group build, own and operate wind farms. The Swedish company is a small company in terms of employees and does not build the windmills themselves, but imports them from Germany and Denmark.

and the responsibility for running the wind park is gradually handed over.

After delivery: Day-to-day managing and monitoring of the wind park, as well as software upgrading, is done from a location that is not in the vicinity of the wind park (cross-border during at least the warranty period). Likewise, fulfilment of guarantees of performance and availability is measured and analysed from a distance.

Maintenance and repair is mostly carried out by trained local personnel but might also require specialists from headquarters. Finally, environmental impact must be measured after a certain period of time (e.g. two years) – again necessitating the usage of environmental consulting services and EGs like hydro acoustic equipment.

2.3 Characteristics of Environmental Goods Affecting Trade in Services

Despite the fact that the companies interviewed for this study sell or buy goods of quite different nature, the services and the modes of supply that the companies identified as indispensable to trade in these goods are remarkably similar. A probable reason for this is that the EGs have a lot of similar characteristics in terms of product characteristics and the context which they are part of. That is, these characteristics[21] probably affect the characteristics of trade in accompanying services, e.g. the amount and the type of services. As described in the previous chapter:

- Several EGs are sophisticated and complex, requiring a high level of support services by specialist personnel in order to install and use the goods properly (involving especially mode 3 and 4).
- Several EGs are part of an environmental project that typically requires local knowledge and a continuous local presence, facilitated by establishment abroad (mode 3).
- Often the EGs contain, or must be connected to, software components and are dependent on data transfer for their continuous operations (mode 1).
- Traded EGs usually need to be customised in order to fulfil different national regulations and standards, as well as to be adapted to different local conditions, e.g. to the climate (commonly involving several modes).
- The EGs are aimed at remedying or preventing an environmental problem for which there are usually regulations. As a consequence, some kind of evaluation of the impact of the goods is often required in order to guarantee that the environmental objectives are fulfilled (commonly involving several modes).

The Board has not analysed all goods on the APEC list, however many goods on the list hold similar characteristics as the ones covered in this study.

As previously noted, the phenomenon that manufacturing producers supply services in connection to the sales of their goods is not unique to the EG sector. On the contrary, this is a common feature of business models of today and a similar pattern can be seen in other sectors.

3. Implications for Trade Negotiations

Drawing conclusions on the basis of the company interviews described in the previous chapter, this chapter points to several policy recommendations. In relation to the policy discussions with regard to mode of supply, those barriers to trade in services that the companies mentioned during the interviews are described.

A Targeted Liberalisation Approach Including Goods AND Indispensable Services

As described in chapter 2, the characteristics of many EGs imply that a lot of accompanying services are indispensable for trade to take place. Hence, the potential benefit of liberalising trade in goods is likely to be much greater if indispensable services would be liberalised in tandem.

➔ To ensure effective liberalisation, trade negotiations should focus on how EGs and services liberalisation can support each other and should not, as in the case today, treat goods and services related to the environment as different entities. More specifically, trade in EGs and indispensable services should preferably be targeted in the same negotiation.

In order to secure commercially meaningful commitments the classification of services is fundamental. As discussed in chapter 2, most of the indispensable services are not classified as environmental in the GATS classification, but can be found under other sectors.

There have been a lot of discussions about the drawbacks of the current classification of environmental services (e.g. that it is outdated and does not reflect market realities) and a number of WTO Members have argued for reclassification of the CPC and W/120[22]. However, the limitations of the current classification should not stop the negotiation on environmental trade proceeding as the Members are not bound by the classification - as long as they provide a sufficiently detailed definition that avoids any ambiguity as to the scope of the commitment.

➔ Members should narrow the CPC or W/120 categories to only include those services that are related to an EG and make commitments for such a sub-category.

A cluster approach (i.e. a check-list of services that should be committed)[23] would make it easier for member states to identify the relevant services. Moreover, a cluster approach has the advantage of making classification discussions redundant by enabling countries to group sub-services that do not constitute a sector but are related to a specific kind of product, i.e. an EG, without requiring a reorganisation of existing classifications.

Facilitate Movement of Natural Persons

The services indispensable for EGs are of such a type that they usually need to be provided by personnel at the customer's/user's facilities. Many of the interviewed companies described the option to send personnel cross-border as crucial for trade in EGs to take place[24]. Some companies also need to receive the client at their own facilities in the home country.

The business missions are commonly short, ranging from a few days to a few weeks, and mostly there is no necessity to apply for work permits; a valid visa, if needed, is often enough. However, many of the companies pointed out that visa applications are often a cumbersome and time-consuming procedure. Some companies had missed business opportunities due to problems with visas, e.g. related to the need for a personal invitation from the customer in order to get a visa. In two cases the market was considered to be totally inaccessible due to the visa requirements.

Visa demands, or rather the lengthy and complex procedures, are especially cumbersome when companies have to dispatch a person on short notice, for example when there is an immediate need to repair broken equipment. One company handled this by ensuring that certain staff always possessed valid visas to export countries. This is a clear administrative burden and, since they export to many markets, they need a large 'warehousing' of valid visas.

➔ The facilitation of cross-border movement of people who supply services related to EGs is vital for an efficient trade in EGs. Countries should make substantial commitments, enhance transparency and initiate a discussion about procedural facilitation for mode 4, not least for non-investment related categories, i.e. contractual services suppliers and independent suppliers. Discussions should include administrative procedures regarding visa requirements.

Remove Barriers to Commercial Presence

Due to the strong need for on-site service support in relation to an EG, companies with a great volume of business in a foreign country often find it convenient to establish in that country. In some cases the companies said that establishment abroad is crucial for the trade in EGs to take place. This was especially apparent for the EG that forms part of an environmental project that requires continued presence and local knowledge.

Several of the interviewed companies had faced restrictions to establishment, mainly requirements for joint ventures and employment of local workforce. Companies were most concerned with the former. The employment requirements were typically seen as less of a problem, since hiring local staff is often a necessity for acquiring knowledge about the local conditions.

➔ Trade barriers which hinder establishment of subsidiaries which provide services indispensable for EGs should be eliminated in order to streamline the liberalisation of EGs. This might be particularly important for EGs that form an integrated part of projects such as the building of a wastewater plant or a wind park.

Ensure Cross-Border Data Transfer

Just as many technologically advanced goods, several of the EGs rely on transfer of data[25]. There are at least four instances when data transfer is needed: i) installing the software necessary for making the goods function, ii) installing software needed for monitoring performance, iii) remote operation of the goods and iv) software up-grades.

Despite the extensive use of data transfer few interviewed companies had experienced barriers in this regard. The barriers mentioned were linked to some security regulations, such as remote operation of public goods or transfer of confidential information about local conditions.

➔ Due to the linkage between software and many EGs, the issue of data transfer needs to be included in discussions on EGs and services. A first measure would be to ensure that data transfers between countries are dealt with in trade agreements while safeguarding sensitive data like private information and national security information. In addition, commitments made should preferably be 'technology-neutral', that is, scheduling should not prejudge future technological developments.

Multimodality in Commitments

As the company interviews show, trade in indispensable services takes place under all modes of supply. Furthermore, the interviews indicate that companies generally consider modes of supply to be supplementary. There might be situations where a service is better delivered through a specific mode of supply and being forced to deliver through another mode could entail unnecessary costs.

➔ Negotiations should have a holistic approach and entail commitments that include all modes of supply related to the specific services to be liberalised.

4. Concluding Remark

In this study, the National Board of Trade pinpoints a number of services indispensable to the sales of environmental goods. We argue that these services need to be addressed in order to make any trade initiative on environmental goods truly effective. While removing tariffs is an important step, trade in environmental goods will still face serious barriers if these indispensable services are not addressed. Or to put it succinctly: without services, no environmental goods trade.

This claim might be more apparent in those cases where the company producing and selling the goods is also the one providing the related services. For the interviewed companies in this study, this is a common business model as the competitive advantage for the company often lies in the offer of a package of a certain producut and related services. Furthermore, many services (e.g. technical support for complex products) are also of such nature that the manufacturing company is the one most suited to provide the services. However, it is important to note that regardless of whether the related services are offered by the exporting manufacturing company or some other company/companies an efficient trade in indispensable services is fundamental as this preserves the market competition for these services in the host country.

To conclude, this study, along with other studies by the National Board of Trade and others, illustrates through concrete examples, how goods and services are inter-linked and that the distinction between goods and a services is blurred (i.e. servicification).

However, trade negotiations still address goods and services separately. The ongoing plurilateral negotiation on green trade liberalisation provides a first and important opportunity to apply in practice these empirical insights and to bridge the gap between goods and services negotiations. As a minimum, trade negotiations on environmental goods should also comprise negotiations on services indispensable for trade in these goods, i.e. goods and services should be targeted in the same negotiation.

As discussed, optimally negotiations should lead to indispensable services being fully liberalised across the board. However, commitments to facilitate short term visits for business purposes and the establishment of business abroad are especially relevant for services indispensable for trade in environmental goods.

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Appendix

Table 1. List of Environmental Goods Covered in the Study

HS Code	Product Description
84 02 90	Parts of vapour generating boilers and super-heated water boilers, n.e.s.
84 17 90	Furnace burners - biomass
84 19 19	Solar water heaters
84 21 21	Machinery and apparatus for filtering or purifying water
85 02 31	Electric generating sets and rotary converters: Wind-powered
85 41 40	Photosensitive semiconductor devices, including photovoltaic cells whether or not assembled in modules or made up into panels; light-emitting diodes
90 15 80	Instruments and appliances used in geodesy, topography, hydrography, oceanography, hydrology, meteorology or geophysics
90 26 80	Instruments or apparatus for measuring or checking variables of liquids or gases, n.e.s.

Table 2. List of Companies Interviewed

AquaBiota	SES Combustion
ComfortZone	Solvatten
Corthus Energy	Sweden Recycle
Höganäs	Swemodule
Globe Water	Veg Tech
Nolek	Windforce
Nordic Water	wpd Offshore Stockholm
OrganoClick	

Notes

1 Australia, Canada, China, Costa Rica, the European Union, Hong Kong - China, Japan, Korea, New Zealand, Norway, Singapore, Switzerland, Chinese Taipei, and the United States. The joint statement was announced in January 2014 on the sidelines of the World Economic Forum in Davos, Switzerland.

2 APEC has 21 members: Australia, Brunei Darussalam, Canada, Chile, People's Republic of China, Hong Kong - China, Indonesia, Japan, Republic of Korea, Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, The Philippines, Russia, Singapore, Chinese Taipei, Thailand, The United States, and Vietnam.

3 Services needed for *producing* the goods (i.e. services inputs) or services needed for the delivery of goods (e.g. general kinds of transport services) are not examined. Furthermore, services that are supplied in connection with the sales of EGs, but not considered to be related to the environmental feature of the goods, are not discussed in this study either.

4 See for instance Steenblick et al. (2005), Steenblick and Grosso (2011) and USITC (2013).

5 National Board of Trade (2012) and other studies.

6 The interviews have been conducted with open-ended questions, face-to-face or over the telephone. Interview requests were sent out to companies primarily based on whether they had a substantial trade in goods during the last six months. In the sample there are more companies exporting than importing. The exporting companies are all in charge of the manufacturing process. There is also a predominance of small and medium size companies, which might affect the kind of services supplied (and not supplied), as well as the modes of supply.

7 The APEC list is based on the Harmonized Commodity Description and Coding System (HS) for classifying traded products. The list falls under sub-headings of the HS 6-digit level.

8 CPC prov is the base for the Services Sectoral Classification List (MTN.GNS/W/120), also called 'W/120', used in GATS.

9 There are ongoing discussions about revision of classification issues in various sectors, e.g. the environmental sector. See for example World Trade Organization, Committee on Specific Commitments, JOB/SERV/180, 14 March 2014.

10 The list is not to be seen as an exhaustive list of services indispensable for the sales of EGs. If additional companies (trading in the same kind of goods or trading in other goods on the APEC list) had been interviewed the list would certainly be much longer. Nevertheless, the table is believed to show some of the services that in general are indispensable for many EGs.

11 Nationals of the host country.

12 Most of the manufacturing companies had installing engineers in-house. In some cases such personnel were leased by the manufacturing company.

13 The label is somewhat misleading as assembly and installation services are not associated with the process of manufacturing, but rather with the manufactured goods.

14 APEC PSU Policy Brief No. 5.

15 Calibration and adjustment services can also be seen as part of maintenance services (described more below), which according to the 'Explanatory Notes' for the CPC come under *Agriculture, mining and manufacturing services* (CPC 88).

16 In CPC version 2 the CPC 924 and 929 have merged into a single category entitled *Other education and training services.*

17 As the added value of customisation is quite clear for the customer, companies are usually able to charge for R&D. In those cases where R&D is involved, it often constitutes a large percentage of the company's turnover.

18 However, as mentioned in the sections above, the CPC prov also explicitly spells out some other activities relevant for the provision of environmental services and for the protection of the environment more generally that are classified under other items, such as, for instance, business and construction services.

19 The company sell filters both for sewage removal and filters for purification of water for human use. In the former case, but not in the latter, most of the services come under CPC 9401 (*Sewage services*). The European Union has proposed to include water for human use in this code. (S/CSS/W/38).

20 That is, they are not related to the environmental feature of the goods (see footnote 3). The reason for including these services in the figure is to highlight the fact that efficient goods delivery relies on more services than those presented in this paper.

21 Similarities in terms of company characteristics probably also affect the kinds of services and modes of services supply. For instance, larger companies may have the ability to offer more services, and may operate more through local subsidiaries, than small and medium size companies do.

22 The European Union has proposed an updating of the W/120 loosely based on the OECD/Eurostat definition of environmental services. (UNCTAD 2003)

23 Suggested by among others Steenblik and Grosso, 2011. Cluster approach has been used in trade negotiations. One example is a communication of a collective request co-sponsored by eleven Members regarding the energy services sector, which was submitted to the WTO in 2007 [WTO, CTS/SS JOB(07)/208]. Another example is a communication from the EU regarding environmental services [WTO, S/SCC/W/38] submitted to the WTO in 2000.

24 See also National Board of Trade (2013a) about visa-restrictions and trade. This study discusses in-depth reasons why companies must use movement of persons to meet their business needs. National Board of Trade (2013b).

25 See National Board of Trade (2014) about cross-border data transfer.

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Kommerskollegium
National Board of Trade

Box 6803, S-113 86 Stockholm, Sweden
Phone +46 8 690 48 00 Fax +46 8 30 67 59
E-mail registrator@kommers.se www.kommers.se