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Advancing Free Trade
for Asia-Pacific Prosperity

Study for Final Review of Environmental Services Action Plan (ESAP)

APEC Group on Services

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1 Introduction

1.1 Background

1.1.1 Services in the APEC Region

Services are generally considered one of the three main segments of an economy; the others being manufacturing and raw materials. As economies develop, services tend to account for a larger proportion of gross domestic product (GDP). In a rapidly developing APEC, which has a number of fast-growing economies, services are playing an increasingly important economic role.[1] In developing APEC economies, services typically represent around 55% of employment, but that figure can reach over 80% in the region's most advanced economies. Within APEC, the services sector is dominated by transportation and business, with finance, public services and insurance trailing behind.[2]

In 2015, APEC economies had a combined commercial services trade value of $5.86 trillion USD, and the sector has only expanded since.[3] From 2010 to 2017, trade in commercial services across APEC grew at an annual rate of 5%, which is greater than average growth of individual APEC economies and the globe as a whole.[4] From 2016 to 2018, trade in services exports averaged 4.9% growth, while services imports averaged 4.8% growth.[5] APEC's share of the global services trade is approximately 40%.

In 1994, APEC established the Bogor Goals, which pursue "the long-term goal of free and open trade and investment in the Asia-Pacific".[6] APEC regularly develops initiatives to promote general trade and prosperity in the region, and many of these are centered around the achievement of the Bogor Goals, one of the organization's cornerstone agreements. APEC has made services a high priority since 2015, in a final push to achieve the goals by their 2020 deadline.

1.1.2 Trade in Environmental Goods & Services

Economies around the globe are establishing and striving to achieve new goals to slow the degradation of the environment and operate more sustainably (e.g. Paris Agreement on Climate Change, UN Sustainable Development Goals). The liberalization of trade in environmental goods and services (EGS), by increasing accessibility to environmentally beneficial technologies and service providers, is considered increasingly crucial to these efforts.[7]

Reducing trade barriers for both environmental goods and services is important due to the complementarities between the two. Trade in environmental goods often involves products and technologies that are packaged in projects that include environmental services. In the case of wind power technology, for example, trade in the turbines themselves often comes alongside trade in services to ensure that the equipment is properly installed, managed and maintained. The APEC Study Report on Environmental Services-Related Technology Market (2013) found that approximately 70% of environmental services delivered in the region are connected to the use of environmental goods.[8]

While international trade negotiators recognize the value of EGS, it is widely understood that the environmental services sector is systematically defined too narrowly, and that there is a need for classification systems to consider a broader set of services that contribute to environmental protection. Economies and international organizations are also increasingly aware of the need to further share best policy practices and capacity-building measures to educate and train domestic workforces.[9]

APEC leaders have been involved in programs to address the aforementioned needs, and have established several relevant initiatives, including the Environmental Goods and Services Work Program, which was established in 2009 and followed by the leaders' declaration to "increase the dissemination and utilization of environmental goods and services" through liberation of trade in EGS.[10] In 2012, APEC leaders endorsed the APEC List of Environmental Goods, agreeing to reduce tariffs applied to these goods to five percent by 2015[11]. This list provided the foundation for the World Trade Organization (WTO) Environmental Goods Agreement (EGA), discussions around

which began in 2014 but have not yet proven fruitful.[12] Of the 18 economies involved in EGA negotiations, 10 are members of APEC.[i]

1.1.3 Restriction of Trade in Services

There are fundamental differences between the restriction of trade in goods and in services. Goods are primarily restricted through tariffs, which are fixed or variable fees attached to products originating from a particular economy. To liberalize trade in goods, economies can agree to eliminate or lower these tariffs. Examples of agreements to liberalize trade in goods include the WTO General Agreement on Tariffs and Trade (GATT), and the APEC List of Environmental Goods.

Restrictions on trade in services can fall into one of two categories: Market Access or National Treatment.[13] Market Access restrictions refer to the ability of foreign service suppliers to establish physical outlets in an economy and supply services through those outlets. National Treatment restrictions affect the operations of a foreign service supplier after it has entered the market in way that is different to domestic services providers. Therefore, an economy might choose to restrict the number of licenses disseminated to foreign companies to supply certain services (e.g. waste management), and also not grant licensed foreign companies the same access to benefits (e.g. tax breaks) received by domestic firms.

1.1.4 The Environmental Services Action Plan

Alongside progress on the liberalization of trade in environmental goods, APEC leaders have expressed the need for complimentary liberalization of trade in environmental services, as well as capacity-building efforts to develop the sector.[14] In 2015, APEC Ministers introduced the Environmental Services Action Plan (ESAP)[15]. The overarching goal of ESAP is to "promote liberalization, facilitation, and cooperation in environmental services."

ESAP began with a series of reports from the APEC Policy Support Unit (PSU) on the state of the region's environmental services sector. These reports were on regulatory measures relating to environmental services in APEC economies, as well on the renewable energy, energy efficiency, and environmental remediation industries.[16]

In 2018, the APEC Committee on Trade and Investment (CTI) endorsed the Interim Review of ESAP. After review of the PSU studies, the APEC specified in the Interim Review the leading challenges to the ESAP agenda:

- Widening the range of environmental services
- Liberalizing trade in environmental services
- Optimizing domestic regulatory measures in environmental services
- Developing human resources in environmental services
- Raising awareness about environmental services.

Based on these findings and a workshop on environmental services in Ha Noi, Viet Nam, APEC produced a list of action items to address each of these challenges (see Table 2), to be carried out in an ensuing report - the "Study for the Final Review of ESAP".[17] The challenge of raising awareness about environmental services was addressed in an accompanying workshop - the "Environmental Services Workshop: Contribution to the Final Review of ESAP". This workshop, held online, convened diverse stakeholders from the public and private sectors to discuss progress achieved under the plan, and how APEC economies might advance the ESAP agenda in the future.

The importance of the ESAP agenda is heightened by the COVID-19 pandemic, as environmental services are important to the avoidance of air quality dangers known to exacerbate the effects of the virus. Moreover, the efficiencies and capacity building facilitated by international trade are key to pursuing swift economic recoveries.[18]

Environmental products and services remain critical to human wellbeing, particularly as the globe deals with the combined threats of the pandemic, climate change, and the degradation of air and water quality. APEC economies

[i] Australia; Canada; China; Hong Kong, China; Japan; Korea; New Zealand; Singapore; Chinese Taipei; United States.

are rightly seeking to expand their efforts to provide all residents with high-quality environmental services. Despite temptation for economies to withdraw into isolation and protectionism, endeavors to facilitate the flow of these essential services should not be abandoned in these trying times.

Table 1: ESAP Phases & Actions

Phase	Year	Action
1	2016	PSU Study: Survey of Regulatory Measures in Environmental Services
	2017	PSU Study: Energy Efficiency Businesses
		PSU Study: Environmental Damage Remediation Services
		PSU Study: Renewable Energy Services
		APEC Workshop on Environmental Services, Ha Noi
2	2018	Interim Review of the Environmental Services Action Plan
3	2020	Study for Final Review of the Environmental Services Action Plan
		Workshop on the Environmental Services Action Plan
		Final Review of the Environmental Services Action Plan

Source: APEC

1.2 Study for the Final Review of Environmental Services Action Plan

This study builds on the previous APEC PSU reports that have contributed to ESAP. Each section of the report seeks to address established action items intended to advance the liberalization of trade in environmental services (Table 2).

The first section builds on previous research that has found the scope of environmental services to be too narrow. These studies have suggested that definitions for the environmental sector could be expanded to include additional services that contribute to environmental protection by preventing pollution and mitigating climate change, as opposed to mainly addressing environmental waste and degradation ex-post. International alignment may be necessary for such a change to occur, but securing multilateral agreement has so far been difficult.

The second section addresses how flawed domestic regulations can hinder international trade in environmental services by discouraging the participation of foreign service providers. Documents such as the APEC Non-Binding Principles for Domestic Regulation of the Service Sector (2020) suggest regulatory provisions that economies should seek to introduce in order to create competitive, business-friendly markets. Existing good practices in APEC economies are profiled.

The third section is based on the understanding that building domestic human capacity to deliver environmental services helps both to ensure high quality service provision and to encourage economies to adopt more progressive positions regarding trade liberalization. The study identifies the needs of developing economies in this area, as well as some existing measures and good practices.

Table 2: Study Sections and Accompanying ESAP Goals

Study Section	Action Item
1) Explore methodologies to identify the scope of environmental services	Stocktaking discussions regarding coverage of environmental services through reviewing existing suggestions of classifications of environmental services
	Providing a more comprehensive picture to depict the relationship between environmental goods and services in trade
2) Gather good regulatory practices and to propose a capacity-building plan on licensing and approval procedures	Collecting and sharing good regulatory practices from actual cases regarding encouraging trade in environmental services

3) Identify capacity building needs of technicians and workers in the sectors of environmental services	Identifying capacity building needs to elevate human resources availability in environmental projects through measures related to technicians and workers

Source: Washington CORE & APEC CTI

The research includes findings from discussions with experts from government, industry, and academia in APEC and beyond.[ii] Stakeholders from various fields and professional backgrounds were consulted in order to produce a study that reflects a range of perspectives and negotiating positions. Assessing a diversity of positions is key to the ultimate goal of encouraging APEC-wide alignment on trade in environmental services that has so far proven elusive. Insights gathered from interview candidates should not be considered to represent the official positions of their organizations.

Table 3: Expert Interviewees

Name	**Organization**	**Economy**
Mr David Waskow	World Resources Institute	United States
Mr Vicente Paolo B. Yu III	Independent Consultant[iii]	Russia
Mr Gregoire Garsous	OECD	France
Dr Jane Kelsey	University of Auckland	New Zealand
Mr Ian Smallburn	Auckland Council	New Zealand
Mr Atsushi Kubota	City of Yokohama	Japan
[Restricted]	National Environment Agency[iv]	Singapore
[Restricted]	Private provider of environmental services	[Restricted]

Source: Washington CORE

[ii] Some interviewees preferred to keep their names and organizations private.

[iii] Mr Yu is also the former Deputy Executive Director of the South Centre, and consultant to various agencies of the United Nations.

[iv] Additional input also provided by Singapore's Energy Market Authority and Public Utilities Board.

2 Defining Environmental Services

2.1 Overview

2.1.1 Summary

Commitments to liberalize trade in environmental services are made through the multilateral General Agreement on Trade in Services (GATS) and bilateral or regional Free Trade Agreements (FTAs). In these agreements, the definition of environmental services is based on the UN Statistical Commission (UN Stats) Central Product Classification (CPC), first published in the early 1990s and only lightly edited since. Since 1998, economies have recognized the need for an updated definition of environmental services that better reflects the full range of services that the sector entails. Despite this, the CPC still remains the only agreed-upon way to define environmental services in trade agreements. This can partially explain why there has been little progress on the liberalization of environmental services globally since the turn of the millennium.

Around 2000, the "Core and Cluster" (cluster) approach emerged as a popular proposal for how to define environmental services for the purpose of trade liberalization. The cluster approach uses the CPC to define a "core" set of environmental services, and also a suite of "cluster" services that are important to the delivery of core environmental services. Liberalization of the cluster ensures that environmental service providers can freely engage in all activities crucial to their operations. However, the cluster approach has not been adopted on a multilateral level, in large part due to concerns among a number of economies that it would lead to the unintentional liberalization of some economic sectors.

Two suggestions by economies weary of the cluster approach were the Environmental Projects Approach (EPA) and Integrated Approach. The EPA proposed that economies should define environmental projects for which imported services would be liberalized. The Integrated Approach proposed that economies should define environmental activities, list the entities responsible for those activities, and liberalize all services imported by those entities. The EPA in particular received significant pushback from economies including the United States and Korea, and neither approach is now actively pursued.

In addition, the Organization of Economic Cooperation and Development (OECD)[v] and the European Statistical Office (Eurostat) have jointly developed widely-circulated definitions for environmental services. However, these classifications are primarily intended for statistical record-keeping, not trade agreements. Also, some academics highlight the fact that a universally accepted definition of environmental services is not strictly required, and that economies are free to develop their own classification systems to use in FTAs.

Table 4: Approaches for Defining Environmental Services for Trade

Approach	Details
Cluster	Liberalizes environmental services and other services important for the delivery of environmental services.
Environmental Projects	Defines environmental projects and liberalizes goods and services used for these projects.
Integrated	Defines environmental activities, identifies entities responsible for these activities, liberalizes goods and services used by these entities.

Source: Washington CORE (WTO)

The cluster approach should be considered the best option to revive negotiations regarding the liberalization of trade in environmental services. The approach accounts for the integration of environmental services with other trade sectors, and avoids some of the legal and administrative pitfalls that led to the eventual dismissal of the other approaches. Nonetheless, the cluster approach does have drawbacks that concern developing economies in particular, such as the potential to foster over-liberalization. Any renewed negotiations will need to address these concerns, learning from past failures by placing more value on compromise.

[v] The Organization of Economic Cooperation and Development (OECD) is an intergovernmental economic organisation with 37 member economies, most of which are high-income.

Adoption of the cluster approach alone will not solve the issues that have delayed progress on trade liberalization. The cluster is still based on the CPC, which in many cases does not allow for distinction between services that may benefit or harm the environment. Economies will need to consider the extent to which the CPC can remain the basis for nuanced trade agreements that cover such a sensitive sector. Furthermore, beyond the definition of environmental services, there have been provisions included in trade agreements have made some economies apprehensive about pursuing further liberalization. New approaches to trade negotiations may be needed to bring more economies, particularly developing ones, on side.

2.1.2 General Agreement on Trade in Services

The General Agreement on Trade in Services (GATS) was a historic agreement between all members of the World Trade Organization (WTO), which entered into force in 1995. Any efforts to enhance the liberalization of trade in environmental services require a focus on GATS, which is the only multilateral services agreement that utilizes a negotiated definition of environmental services. The successes and failures of GATS provide some important lessons for future discussions.

The purpose of GATS was to liberalize trade in services, which at the time were responsible for over two-thirds of global production and employment but only 25% of trade.[19] Under GATS, all economies are required to adhere to a set of obligations that cover all service sectors. Each economy also has the discretion to lay out sector-specific commitments with regards to Market Access and National Treatment of foreign service suppliers. Market Access addresses the extent to which foreign service providers can act within a given economy, while National Treatment covers differences between the rights afforded to domestic and foreign providers. For an economy to be fully liberalized, Market Access and National Treatment restrictions must be eliminated.

Table 5: Restrictions on International Trade in Services

Category	Definition	Example
Market Access	Restrictions on ability to establish physical outlets and supply services	Limits on licenses granted to foreign firms
National Treatment	Discriminatory treatment of established foreign firms compared to domestic firms	Foreign firms ineligible for tax breaks received by domestic firms

Source: Washington CORE (OECD)

Services covered in each sector in GATS commitments are defined in the WTO Services Sectoral Classification List, also known as W/120. This list is based on the Provisional version of the UN Central Product Classification (CPC) system.[20]

Table 6: W/120 Environmental Services

Service	Prov. CPC Code
Sewage services	9401
Refuse disposal services	9402
Sanitation and similar services	9403
Cleaning services of exhaust gases*[vi]	9404
Noise abatement services*	9405
Nature and landscape protection services*	9406

Source: WTO

Internationally-traded services can be delivered through any of four “Modes of Supply”. In GATS, economies were able to specify Market Access and National Treatment commitments and restrictions concerning each of the modes. Table 7 suggests environmental services that might be covered in each mode of supply.

[vi] * denotes services grouped as “Other” in the W/120.

Table 7: Trade Agreement Modes of Supply

Mode (No.)	Definition	Example
Cross-border supply (1)	Services supplied from the territory of one economy into the territory of any other economy	Company remotely controls equipment for remediation of site based in another economy
Consumption abroad (2)	Services supplied in the territory of one economy to the service consumer of any other economy	Company sends engineers abroad to further their knowledge of energy efficiency through a course organized by foreign experts
Commercial presence (3)	Services supplied by a service supplier of one economy, through commercial presence, in the territory of any other economy	Company operates a wastewater treatment plant outside its home economy
Presence of natural persons (4)	Services supplied by a service supplier of economy, through the presence of natural persons of an economy in the territory of any economy	Company sends engineers abroad to direct performance of local workers in development of sewage facility

Source: Washington CORE

Of all service sectors in GATS, environmental services have amongst the fewest liberalization commitments. Only 10 of the 21 APEC member economies have environmental services commitments in GATS, and many of these come with significant restrictions. China, for example, excludes any environmental quality monitoring and pollution source inspection from its environmental services schedule. Australia is one of many economies that made no commitments in Mode 1 trade, as cross-border supply of the included environmental services was widely considered technologically unfeasible when GATS was signed. On the other hand, the United States is one of the most liberalized APEC economies, with no restrictions on National Treatment and only some Mode 4 restrictions on Market Access.

There are myriad reasons why economies have typically been unwilling to commit to full liberalization of the environmental services sector, many of which were synthesized in Cuba's comments to the WTO in 2002.[21] These comments echoed the reservations of a number of economies concerned that domestic companies would be ill-equipped to compete with international service providers. The fact that many OECD economies have chosen not to liberalize suggests that this concern is not restricted to developing economies. There is also reluctance to expose critical natural resources to potentially harmful activities by foreign service providers, which may have less incentive to act in an environmentally sustainable manner. Moreover, a perceived lack of export opportunities has contributed to a lack of proactive engagement in liberalization discussions on behalf of some developing economies.[22]

Liberalization can also affect an economy's ability to enact domestic regulations. As a result of GATS Article VI, service providers that consider regulatory changes as constituting "unnecessary barriers to trade" can trigger costly and high-profile WTO disputes.[23] Economies are keen to maintain the right to implement environmental and other regulations without worrying about the grievances of foreign service providers.

2.1.3 Bilateral and Regional Trade Agreements

While relatively few APEC economies have environmental services commitments in GATS, the vast majority have such commitments in at least one free trade agreement (FTA) with other APEC economies (see Table 8). Economies are more prone to liberalization when negotiating on bilateral basis, as there are fewer actors that may create unfavorable outcomes for the economy. New Zealand, for example, might liberalize environmental services in an FTA with another economy only because that economy does not have the capacity to undercut New Zealand's domestic service providers. Knowing this with certainty is far more difficult at the multilateral level.

Commitments in bilateral and regional FTAs can be scheduled in two ways. A positive listing approach requires economies to specify the services that are set for liberalization. All services and sectors not included in the list are assumed excluded from the terms of the agreement (e.g. GATS). A negative listing approach is the opposite, with

all services assumed liberalized under the terms of the agreement unless specifically stated otherwise. In some recent discussions surrounding liberalization, the negative list approach has been presented as the favorable option.[24] A major drawback of the positive list approach, particularly with regards to an evolving sector like environmental services, is that it discriminates against new products and services, which are not protected under past commitments.

Many APEC economies can be considered to have liberalized trade in environmental services in FTAs, even if they have not done so in the GATS. On most occasions, this is because the economies have used the negative list approach and not specifically excluded environmental services. In positive lists, when environmental services are included, the CPC categories are used. In the China-Australia FTA (CHAFTA), for example, China uses a positive list approach, while Australia uses the negative.[25] China lists liberalization commitments in all of the environmental services as defined in the Provisional CPC. Australia makes no mention of environmental services in its Schedule of Non-Conforming Measures, so they are presumed liberalized.[vii]

Economies can also directly address the liberalization of environmental services in negatively-listed FTAs, although specific commitments are not scheduled. In the negatively-listed Korea-Australia FTA (KAFTA), for example, the Chapter on Environment states that both economies will "endeavour to facilitate and promote trade and investment in environmental goods and services, including environmental technologies, sustainable renewable energy, and energy efficient goods and services, including through addressing related non-tariff barriers."[26] Similarly, the United States-Mexico-Canada Agreement (USMCA) requires that the economies strive to address non-tariff barriers to trade in environmental goods and services, and cooperate in international fora to further liberalize this trade.[27] Strong commitments notwithstanding, these agreements do not seek to establish an exact scope of the environmental services sector.

Thus, although economies are free to adopt their own classification systems for scheduling commitments in FTAs, the CPC retains significant influence. When using positive lists, WTO economies have only organized their schedules of commitments according to CPC classifications of environmental services. When using the negative lists, no specific mention of environmental services is required. No alternative to the CPC has been adopted for the purposes of international trade.

[vii] Non-Conforming measures are not subject to some or all of the obligations imposed by the agreement.

Table 8: Environmental Services Commitments in Trade Agreements with APEC Economies

Economy	GATS	FTAs
Australia	✓	✓
Brunei Darussalam	X	✓
Canada	✓	✓
Chile	X	✓
China	✓	✓
Hong Kong, China	X	✓
Indonesia	X	✓
Japan	✓	✓
Korea	✓	✓
Malaysia	X	✓
Mexico	X	✓
New Zealand	X	✓
Papua New Guinea	X	X
Peru	X	✓
The Philippines	X	✓
Russia	✓	✓
Singapore	X	✓
Chinese Taipei	✓	✓
Thailand	✓	✓
United States	✓	✓
Viet Nam	✓	✓

Source: APEC PSU[28]

2.2 Central Product Classification

2.2.1 Background

The CPC has gone through numerous iterations. The latest version, CPC 2.1, was adopted in 2013.[29] Environmental services are still found in Division 94, but are now categorized in six major groups. The services in Table 9, widely described as "core" environmental services, are not covered elsewhere in the CPC.

Table 9: CPC 2.1 Environmental Services Groups

Service	Code
Sewage services	941
Waste Collection Services	942
Waste Treatment and Disposal services	943
Remediation Services	944
Sanitation and Similar Services	945
Other environmental protection services	949

Source: UN Stats

Categories in the CPC are mutually exclusive, so the environmental services division cannot include services that fall within the scope of other sectors, such as business, construction, engineering, or education. Each two-digit CPC division (e.g. 94) is comprised of more granular groups (three digits), then classes (four digits) and sub-classes (five digits) to specifically define services in each category.

When the CPC was first developed in the 1990s, environmental services were traditionally understood to relate to infrastructure that allows for the provision of public services, such as wastewater treatment.[30] For this reason, environmental services found in the CPC and W/120 are typically provided by local and regional governments, prone to natural monopolies, and rarely priorities for international trade or market-based competition.

Over time, however, there has been growth in the provision of such services by the private sector. By the early 2000s, due to a lack capacity on behalf of municipalities, particularly in developing economies, foreign participation was increasingly encouraged through public-private partnerships and other alternatives to full privatization. Moreover, officials from numerous WTO economies had called for the classification of environmental services to move beyond just infrastructure, and to include other services such as air pollution control, and support services such as environmental consulting. New regulatory requirements for the management and control of pollution, growing public sensitivity to environmental problems, and increasing private demand for environmental services all led to a perceived need for a new way to define the sector.

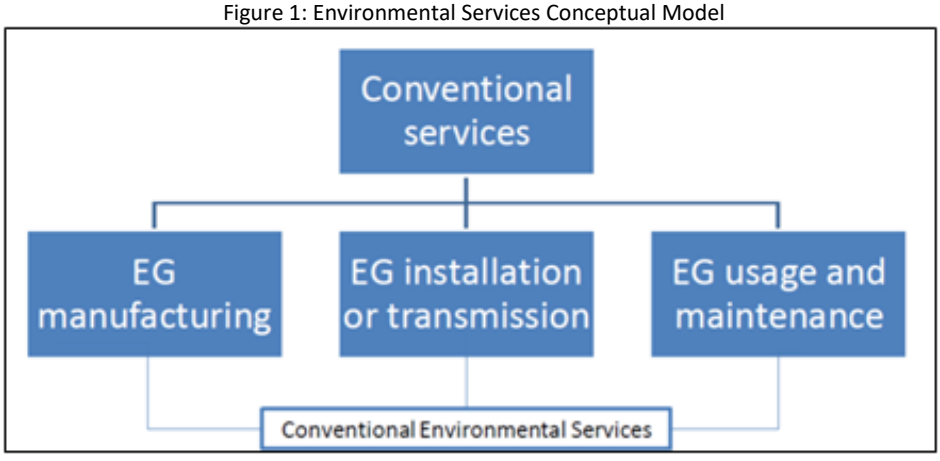
2.2.2 Shortfalls & Criticism

The WTO officially recognized the deficiencies of the CPC classification of environmental services as early as 1998. A note from the WTO Council for Trade in Services notes that "the present and narrow definition of environmental services failed to create incentives for firms to adopt cleaner technologies and prevent the creation of pollution in the first place."[31]

The classification has long been considered by academics and international trade experts as a reflection of an "earlier conception" of the environmental industry.[32] A 2007 report from the International Institute for Sustainable Development remarked that some WTO members did not believe the CPC classification method was consistent with the commercial reality of the way the industry operates.[33] Similarly, a 2014 paper by Italian research center Fondazione Eni Enrico Mattei (FEEM) says that the CPC fails to reflect the current market and policy characteristics of the environmental services sector.[34] Moreover, there has been a shift in the sector from pollution control towards pollution prevention through the adoption of cleaner technologies for production and products. FERDI[viii], a French think-tank, noted in 2015 that the current classification fails to include a prevention-oriented vision of environmental services and other important services classified elsewhere necessary for implementing environmental projects.[35]

A 2017 UNESCAP[ix] paper states that environmental services can be used to refer to any service which has direct benefits to the environment, and that the CPC classification is inadequate given the rapid evolution of the industry.[36] According to the report, many services can be classified as being environmentally beneficial insofar as they assist with the implementation of environmentally friendly projects and increased resource efficiency (e.g. assisting construction of a solar farm from design through to maintenance). A conceptual model of various forms of environmental services is presented in Figure 1.[x]

Figure 1: Environmental Services Conceptual Model



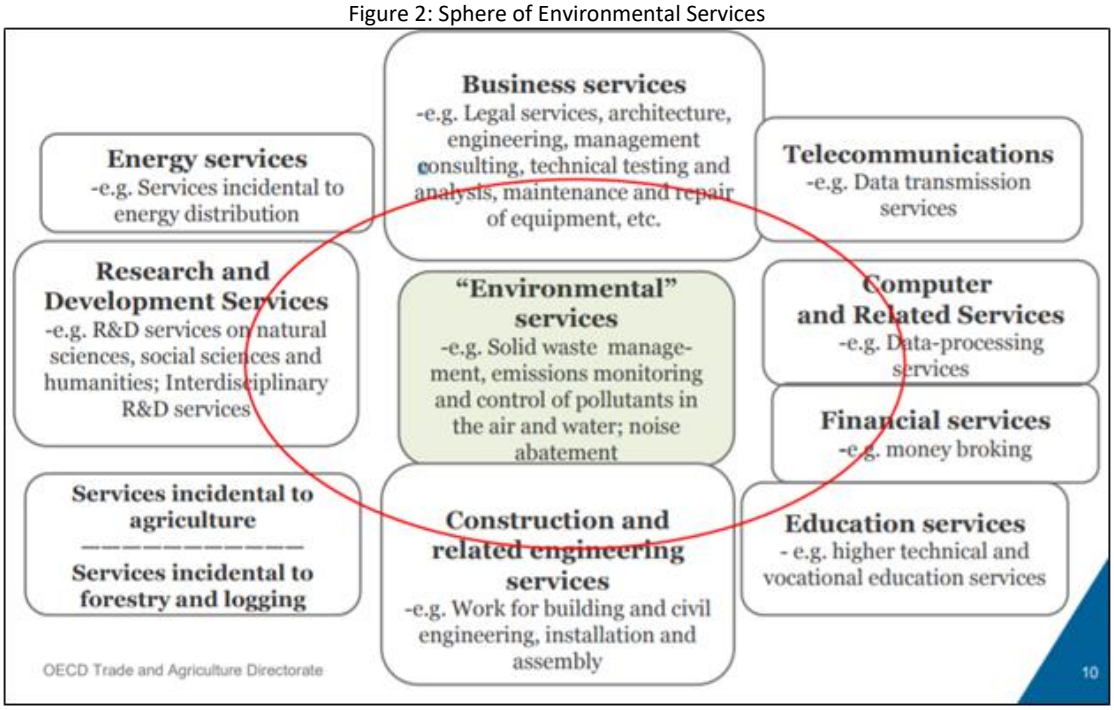
Source: UNESCAP[37]

[viii] FERDI stands for the Foundation pour les Etudes et Reserches sur le Developpment International.
[ix] United Nations Economic and Social Commission for Asia and the Pacific
[x] EG stands for Environmental Goods

However, the UNESCAP report also recognizes the inherent difficulty in defining environmental services due to the rapid expansion of the environmental industry. As many new climate mitigating technologies and policies are under development, any single definition or list of environmental services is unlikely to be exhaustive and would become quickly outdated.

In 2014, OECD analysts described the difficulties in defining the scope of environmental services. Figure 2 is a depiction of the broad sphere of what could be considered environmental services.

Figure 2: Sphere of Environmental Services



Source: OECD[38]

Several services with clear environmental end-uses can be found in CPC 2.1 divisions other than 94. Table 10 includes the subclasses that can be considered to make clear reference to environmental activities (e.g. energy production, recycling) or environmental media (e.g. air, water, soil) in the CPC. These references to environmental media can be in the name of the service (e.g. environmental consulting) or in the CPC 2.1 description (e.g. urban planning services include "studies of environmental impact").

Table 10: Environmental Services Outside Division 94 of CPC 2.1

Division	Subclass	Code
Constructions (53)	Sewage and water treatment plants	53253
Construction services (54)	Septic system installation services	54342
Professional, technical and business services (83)	Urban planning services	83221
	Engineering services for waste management projects	83326
	Environmental consulting services	83931
	Engineering services for water, sewerage and drainage projects	83327
	Engineering services for power projects	83324
Professional, technical and business services (83)	Environmental consulting services	83931
Other manufacturing services; publishing, printing and reproduction services; materials recovery services (89)	Metal waste and scrap recovery (recycling) services, on a fee or contract basis	89410
	Non-metal waste and scrap recovery (recycling) services, on a fee or contract basis	89420
Services of membership organizations (95)	Services furnished by environmental advocacy groups	95992

Source: UN Stats

While the services in Table 10 refer to specific environmental media, many additional services could be considered environmental in nature. In addition to many of those listed in Table 10, the APEC Sector Study on Energy Efficiency Businesses (2017)[39] categorized energy efficiency service providers as falling under a number of additional groups, including those shown in Table 11. These tables highlight the issue that, if an economy were to liberalize environmental services only according to the CPC definition, clearly related services, such as those for septic system installation, would be excluded.

Table 11: Additional CPC 2.1 Groups for Energy Efficiency Service Providers

Division	Code
General construction services of buildings	541
Financial services	711
Leasing or rental services concerning machinery and equipment without operator	811
Architectural services, urban and land planning and landscape architectural services	832

Source: APEC PSU

The CPC definition of environmental services has faced constant criticism because it fails to account for a significant number of services that can be considered critical to environmental protection. However, no agreement has yet been reached to significantly update Division 94 of the CPC, nor have economies found alternative ways to define environmental services for the purpose of trade liberalization. Numerous ways to supplement the CPC and enhance its ability to foster deeper liberalization have been suggested, but no consensus on these has been reached by WTO members. The following section details the most prominent among these proposals, the most important of which is the Core & Cluster approach.

2.3 Proposed Approaches for Defining Environmental Services

2.3.1 Core & Cluster Approach

Summary

From 2000, the WTO Committee on Specific Commitments was exploring ways to modernize the existing GATS classification of environmental services. Several economies made proposals for alternative definitions of environmental services, to be used when economies made liberalization offers and requests. The European Commission (EC) submitted a proposal which centered around considered "purely environmental", which and could be described as "core" environmental services.[4041] These core services were classified as shown in Table 12.

Table 12: The European Commission's Proposed Core Environmental Services

Sector	Services	Prov. CPC Codes
Water for human use & wastewater management	- Water collection, purification and distribution services through mains, except steam & hot water - Waste Water Services	Part of 18000, 9401, 94010
Solid/hazardous waste management	- Refuse disposal services - Sanitation & similar services	94020, 94030
Protection of ambient air and climate	- Services to reduce exhaust gases and other emissions and improve air quality	94040
Remediation and cleanup of soil & water	- Treatment, remediation of contaminated/polluted soil and water	Part of 94060
Noise & vibration abatement	- Noise abatement services	94050
Protection of biodiversity and landscape	- Nature & landscape protection services	Part of 94060
Other environmental & ancillary services	- Other services not classified elsewhere	Part of 94090

Source: WTO

The EC proposal also accounted for services that, while not purely environmental and classified elsewhere in the CPC or W/120, could have environmental end uses. These services could be considered part of the environmental services "cluster", and could be scheduled for liberalization as part of sectors other than the environment. The EC intended the cluster to be used primarily as a checklist of services to which trading partners could refer when they engaged in negotiations on the environmental sector. These cluster services included are shown in Table 13.

Table 13: The European Commission's Proposed Cluster Environmental Services

Sector	Services	Prov. CPC Codes
Business services with an environmental component.	- Architectural services - Services related to recycling on a fee or contract basis	861, 88493
R&D with an environmental component	- Environmental R&D services	85101, 85103, 85109, 85202, 85300, 8530
Consulting, contracting & engineering with an environmental component	- Design & Engineering - Education, Training and Technical Assistance - Consulting services - Integrated engineering services - Project management services - Composition & purity testing & analysis services - Modelling - Monitoring & testing - Subsurface & surface surveying services	867, 924, 929, 867, 86729, 8650, 86732, 86729, 86761, 8424, 8672, 8676, 9490, 86752, 86753
Construction with an environmental component	- Septic system installation services - Construction services - Installation services of other goods - Insulation services	51620, 51340, 51350, 511, 512, 513, 514, 515, 516, 517, 518, 88590, 51650, 5165
Distribution with an environmental component	- Wholesale & retail trade services of waste, scrap, and other material for recycling - Storage	62278, 62113, 63299, 7422
Transport with an environmental component	- Land transportation under various modes - Water transportation under various modes	7112, 7123, 7139, 721, 722
Others with an environmental component	- Repair services of machinery & equipment - Urban planning services - Others	88620, 86741

Source: WTO

While the term "environmental component" could be open to interpretation, the EC proposal included examples of specific services that might meet the criteria for each cluster sector. For example, acceptable design & engineering services could include feasibility studies and design of waste water treatment plants, and acceptable construction services might include the laying of sewers or water pipelines.

International Response: Support

Some WTO member economies effectively endorsed the cluster classification. In 2001, Australia's negotiating proposal noted that the EC proposal would capture a large portion of Australia's environmental services industry, were it adopted.[42] The United States' submission was also supportive of the liberalization of services related to the "core" environmental services already listed under the CPC.[43]

Switzerland[44] defined core environmental services along similar lines to the EC, and suggested that a cluster system was required to enable members to make specific commitments in the following fields:

- Professional services relating to the environment
- Research and development relating to the environment
- Consultancy, sub-contracting and engineering relating to the environment
- Construction relating to the environment.

Colombia's WTO delegation called the EC cluster a useful working basis for liberalizing environmental services not envisioned included in the CPC or W/120, and also advocated for the inclusion of services related to the following:

- The implementation and auditing of environmental management systems
- The evaluation and mitigation of environmental impact
- Advice in the design and implementation of clean technologies.[45]

Around this time, OECD offered a similar approach that would involve the creation of a list of core plus "intrinsically related" services, separately classified but key to the delivery of the core services.[46] OECD suggested that the list would focus on architectural, engineering, computer modelling, and analytical, testing, and construction services, and also noted that some CPC boundaries may need to be changed. For example, recycling services could become one of the "core" environmental services classifications. OECD also recommended introducing a new item to the W/120, "Services for Sustainable Resource Use", which would include consultancy services and operational program services for the implementation and review of strategies and systems to promote sustainable agriculture, fishing, forestry, mining, and public awareness campaigns.

International Response: Opposition

The cluster approach received significant pushback from economies concerned that it would lead to unintended, crosscutting commitments in a broader set of services activities than had been originally envisaged (e.g. under architectural services, business, or transportation).[47] These economies took issue with the possibility for all services in the EC's proposed clusters to be liberalized, whether or not they were environment-related. As shown in Table 13, in many cases the EC's cluster includes broad CPC groups, not more specific classes or subclasses. For example, the proposed "Transport with an environmental component" would liberalize the movement of waste material by ship, but the corresponding CPC codes (721, 722) encompass all water transport services, including non-environmental activities such as passenger transportation by ferry.

In addition, the EC's proposal to liberalize services related to water also caused concerns that some governments would ultimately lose control over their vulnerable natural resources.[48] The inclusion of water services may be largely responsible for stalling GATS negotiations, as it invited suspicion about the end-goals of liberalization. The fear that private companies might take over the provision of critical water services from public authorities and price vulnerable populations out of water markets galvanized opposition from civil society groups, trade unions, and others across the world.[49]

Implementation Discussion

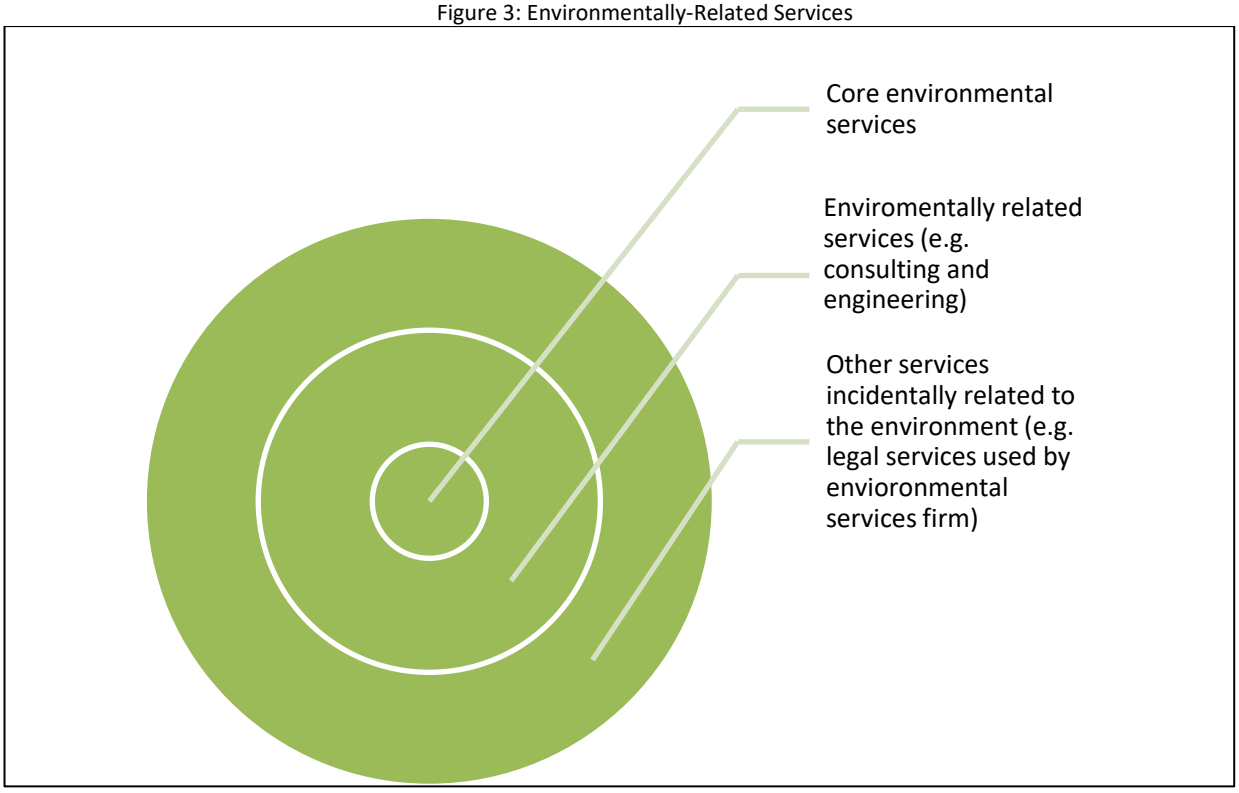
The cluster approach has also been considered for other service sectors that are inadequately addressed in GATS. In 2000, a coalition of Central American economies proposed a tourism cluster that would help eliminate the barriers to trade in tourism services, especially in the related transportation services and travel distribution systems. This cluster was more specific than the EC environmental services cluster, and defined the included services as those "which would cease to exist in meaningful quantity or those for which the level of consumption would be significantly reduced in the absence of visitors."[50] Each of the listed services corresponded to a specific subclass in CPC 1.1 (e.g. Hotel and motel lodging services, 63110), and thus eliminated concern that clusters would necessarily include services unrelated to the sector of interest. This approach is comparable to the approach taken to develop APEC's List of Environmental Goods, in which each product is listed with its 6-digit code from the UN's Harmonized Commodity Description and Coding Systems. However, there is no existing way to incorporate all services critical to environmental services without including some that also apply to other sectors, so concerns about over-liberalization will remain.

While the cluster approach failed to garner widespread acceptance, it has remained a part of the discussion around how to define environmental services. A 2017 OECD paper, "Trade in Services Related to the Environment", tackles the issue of how the environmental services cluster might be defined.[51] One possibility would consider the purpose for which the services were applied. Thus, a distinction could be made between construction of a sports stadium and of a waste-recycling facility, although they both fall under the CPC subclass covering general construction services of other civil engineering works (54290). Even with this approach, however, there would remain plenty of room for interpretation. Some may argue for the inclusion of every single service used in any given environmental project, while some might want to exclude less critical services

from liberalization. For example, there may be contention over whether the phone and internet services associated with a wastewater treatment plant should be liberalized, as arguments about whether such services are critical and environment-related could easily be made on both sides.

Based on previous OECD frameworks, the authors suggest that whether services should be included in the environmental cluster might be based on "market operation" and "relativity". Market operation refers to how critical a related service is to the provision of a core service. Relativity considers how important a particular service is to the core service, relative to other services. For example, one could argue that the phone and internet services of the wastewater treatment plant are essential to its operations (so meet the market-operation criterion) but that their economic importance is relatively minor compared with that of other services, such as the maintenance of the plant (so fail the relativity criterion). Discussions about how to apply these criteria would likely produce their own set of conflicts. Figure 3 offers a depiction of the degree to which different services relate to the environment.

Figure 3: Environmentally-Related Services



Source: OECD

Conclusion

The potential benefits of a cluster approach to liberalizing environmental services have been proven empirically. Evidence finds that restrictions to trade in engineering services, computer and related services, architecture services, and construction services are significantly and negatively correlated with the supply of core environmental services by foreign firms established in Europe.[52] Trade restrictiveness may have an even more depressing impact on the environmental services exports of the host economy. By creating a sheltered sector, an economy removes incentives that would otherwise lead to its firms becoming internationally competitive. Moreover, restrictions on the import of lower-cost, quality services can mean that domestic firms are unable to make use of offerings (e.g. back-office computer services) that would allow them to provide their own services abroad at more competitive rates.

The relatively broad scope of the cluster approach ensures a degree of certainty for service providers, as there is less concern that new services that they utilize or supply will be subject to trade restrictions. Moreover, the approach allows greater potential for technological advancement. New environment-related services could enter

the market under one of the cluster sectors, which would not be the case were only the Division 94 services liberalized. This is key in a rapidly developing sector.

Despite the drawbacks and opponents, some version of the cluster approach is the most likely to gather widespread acceptance and allow economies to experience the full benefits of liberalization. The cluster approach is consistent with the principles of international trade, and reflects the actual, integrated manner in which providers of environmental services operate. Still, it is worth exploring alternative proposed methodologies for defining environmental services, as it gives insight into the preferences of dissenting stakeholders, and could inform changes to the cluster approach that more parties may find amenable.

2.3.2 Environmental Projects Approach

Summary

As mentioned above, some economies expressed concern about the potential for a cluster approach to lead to the unintentional liberalization of services that are not considered environment-related. Furthermore, some stakeholders felt that the existing list approach had mainly served to expand Market Access for firms located in more developed economies, but offered few benefits to developing ones.

In 2005, during discussions on the identification of environmental goods, India put forth a method that would also have affected environmental services. The Environmental Projects Approach (EPA), linked temporal reduction or elimination of tariffs in goods and enhanced Market Access in services to governmental programs and actions in the field of environmental policies.[53] Under the EPA, goods and services essential for the implementation of environmental projects would qualify for reduced or eliminated barriers to trade. Projects would be certified as environmental by a Designated National Authority (DNA) in each economy, and the broad criteria for this designation could be agreed upon by the WTO Committee on Trade and Environment in Special Session (CTESS). Preliminarily, India proposed that the designated environmental projects could be related to the following:

- Air Pollution Control
- Water and Waste Management
- Solid Waste Management
- Remediation and Clean-up
- Noise and Vibration Abatement
- Environmental Monitoring and Analysis
- Process Optimization
- Energy Saving Management
- Renewable Energy Facilities
- Environmentally Preferable Products

International Response

To address the issue of how to define the goods and services, Uruguay and Qatar submitted proposals suggesting that the existing system of multilateral environmental agreements could be used to define the scope of relevant projects under the EPA. However, these suggestions may be undermined by cases in which significant WTO economies are not party to these environmental agreements, as is the case of the United States with the Paris Agreement on Climate Change and the Convention on Biodiversity.

During a 2006 meeting of the WTO's Committee on Trade and Environment, India was forced to defend its position against heavy criticism from various WTO members.[54] A prevalent argument against the EPA was that the approach failed to bring about binding commitments, since liberalization of goods and services would be determined on a case by case basis, dependent on the project. The regulatory stability afforded by binding commitments allows service providers to operate efficiently and plan for the future, while a project-based approach introduces constant uncertainty. Other arguments also mentioned the induced unpredictability for providers and goods and services, and noted that defining what constituted an environmental project would prove administratively difficult for the CTESS.

In its own criticisms, the United States focused on the point that, under the EPA, a given product, if used for an environmental project, would receive a lower tariff rate than the exact same product used for some other purpose, or imported by a direct consumer. The delegation argued that this was inconsistent with the most-favored-nation (MFN)[xi] principle of the General Agreement on Tariffs and Trade (GATT), as identical products from two different sources could be subject to differential tariff treatment.

Other critiques noted that regulating trade in environmental goods under this approach could be considered particularly difficult. Impractical and expensive border measures would be required to distinguish between goods meant for the defined environmental projects and those to be used for any other purpose.

Conclusion
The EPA has some similarities to the cluster approach. It attempts to address the fact that environmental activities are highly integrated with services drawn from various sectors of the economy, and that liberalization of only CPC environmental services does not reflect the true nature of how the industry operates. Concurrently, the EPA was designed to circumvent the main drawback of the cluster approach - the potential for over-liberalization. Ultimately, for legal and administrative reasons, EPA proposals were unsuccessful, and they are no longer actively pursued.

2.3.3 Integrated Approach

Summary
In 2007, India and Argentina jointly proposed an updated approach based on the EPA, again in the context of exchanges about environmental goods. This "Integrated Approach" was no longer based upon specific projects, but on the entities usually responsible for undertaking environmental activities.[55] Under the proposal, WTO members would agree on a list of high-priority environmental activities, which could include, amongst others:

- Air pollution control
- Water and waste water management
- Soil and soil conservation
- Solid waste management
- Environmental monitoring and analysis
- Energy saving management
- Renewable energy

After economies had agreed upon the actual list, each would submit a list of public or private entities responsible for carrying out any of the listed activities. All goods or services imported by the notified entities for carrying out any of the agreed environmental activities would be granted preferential tariff and non-tariff treatment.

International Response
The Integrated Approach gathered support from a few Latin American economies, including Mexico. One of its primary benefits was to circumvent the need for an agreed-upon list of environmental goods, which WTO economies had struggled to produce.

Yet this approach also received pushback, much of this from APEC economies including the United States; Korea; Japan; and Australia.[56] Some critical parties highlighted the fact that new public or private entities would, at least initially, not be included on the list, and therefore would be unable to compete with established, listed entities. Another comment was that, if listed entities were confined to those solely involved in environment-related activities, the scope for liberalization would be greatly reduced due to the exclusion of entities involved with a wide range of goods and services.

[xi] The Most Favored Nation principle means that, under WTO agreements, economies cannot normally discriminate between their trading partners.

In addition, depending on the number of listed institutions allowed for each economy, the approach could require tens of thousands of entities to be negotiated in order to produce the complete lists. Even if feasible, this task would constitute a significant administrative burden. The negotiations would also need to be renewed frequently to account for new entities and any changes in activity on behalf of established ones.

Conclusion

The Integrated Approach was an attempt to ensure that environmental services firms would be able to freely access and provide the entire range of services crucial to their operations. In this way, it was similar to the cluster approach and EPA. Still, while it facilitated a lively discussion amongst the WTO Committee on Trade and Environment Special Session, the Integrated Approach was widely deemed unworkable. Therefore, India and Argentina did not proceed to flesh out their proposal in-depth, and it was never close to achieving WTO acceptance.

2.3.4 OECD/Eurostat Classifications

2001 OECD Report

In 2001, OECD released a classification of the environmental services sector designed to help policymakers modernize GATS.[57] This classification is very similar to the EC's proposed cluster approach, developed around the same time. Environmental services were broken into two macro categories and several more granular service types, as summarized in Table 14.

Table 14: OECD Environmental Services Classification

Classification	Services
Services provided for one or more environmental protection, pollution, remediation, or prevention activity	- Design consulting and engineering - Preparation of sites and construction installation and assembly repair and maintenance - Project management services - Environmental research and development - Analytical services, data collection, testing, analysis and assessment - Remediation and cleanup of soil, surface water and groundwater - Eco-system and landscape protection services - Environmental education, training and information
Services provided for specific environmental media	- Water and wastewater management - Solid and hazardous waste management - Air pollution control - Noise and vibration abatement

Source: OECD

The same report goes on to advocate for an effective cluster approach to GATS negotiations, here called a "core plus intrinsically related" approach. Moreover, the report suggests a number of changes to the definitions some core environmental services, as shown in Table 15.

Table 15: OECD Proposed Changes to W/120 Environmental Services

W/120 Service	Definition Update	Examples
Sewage	Update to cover water services for human use and management	Removal, treatment, disposal of industrial sewage
Refuse and Disposal	Update to cover non-hazardous and hazardous solid waste management services	Collection, processing and resale of recycled materials
Cleaning Services of Exhaust Gases	Update to cover services for protection of air quality and climate	Systems to control and monitor emissions from power stations
Noise Abatement	Update to cover pollution prevention, abatement, and control services	Installation of noise and vibration reduction systems and programs
Landscape and Nature Protection	Update to cover services for protection of biodiversity and habitat	Consultancy services for implementation and review of public awareness campaigns
Other Environmental Services	Introduce new item to cover services for remediation and prevention services for polluted soil and water	Cleanup and longer-term rehabilitation services
Services for Sustainable Resource Use[xii]	Consultancy services and operational program services for the implementation and review of strategies and systems to promote sustainable agriculture, fishing, forestry, mining, and public awareness campaigns.	n/a

Source: OECD

OECD/Eurostat Handbooks

The Statistical Office for the European Communities (Eurostat) and OECD have jointly developed manuals on how to collect, interpret and present data in the environmental goods and services sector, the most recent of which was released in 2009.[58] The handbooks are developed for purposes of harmonized data collection and are influenced by the ease of statistical assessment of various activities and products. The classifications are designed

[xii] Services for Sustainable Resource Use was a proposed new service category

to be as complete and flexible as possible to classify the present state of the industry while allowing for the development of new types of environmental services.

In 1999, the OECD/Eurostat classified the environmental goods and services sector into three categories: pollution management; cleaner technologies and products; resource management.[59] Details of these categories can be found in the table below.

Table 16: OECD/Eurostat Categories for Environmental Goods & Services (1999)

Category	Details
Pollution Management	Goods and services that are clearly supplied for an environmental purpose only and that have significant impact in reducing pollution emissions (e.g. core environmental services, environmental R&D, engineering, and contracting).
Cleaner Technologies & Products	Goods and services which reduce or eliminate negative environmental impacts, but which are often supplied for other than environmental purposes (e.g. cleaner or resource efficient products).
Resource Management	Goods and services which may be associated with environmental protection, although their prime purpose is not environmental protection (e.g. renewable energy plants)

Source: OECD

In the 2009 handbook, environmental services are defined as those carried out for "environmental purposes" that are either environment-specific or environment-connected.[26] The purpose of environment-specific services can be either environmental protection or resource management, as shown in the following table.

Table 17: OECD/Eurostat Categories for Environmental Goods & Services (2009)

Category	Details
Environment-connected	Environmental protection services such as the maintenance of septic tanks, and resource management services like the installation of renewable energy production technologies.
Environmental protection	Pollution or degradation prevention and treatment, measurement, administration, and education (e.g. waste management activities
Resource management	Natural resource depletion prevention, reduction, measurement, administration, and education (e.g. energy saving activities).

Source: OECD

2.3.5 Individualized Approach

Some experts have suggested that formal revision/expansion of the CPC classification is unnecessary, as GATS allows members to use any classification system they wish. Therefore, economies are actually free to pursue environmental services liberalization along the lines of the cluster approach. Some have even argued that insisting on a fully homogenized classification system as a pre-requisite for undertaking specific commitments gives easy excuses to those wishing to avoid entering into negotiations.[60]

According to the now defunct International Center for Trade and Sustainable Development (ICTSD), economies are free to specify their commitments on the related services across different sectors in their schedules within the current structure of CPC classification once they agree on the definition of targeted services (e.g. environmental services, sustainable energy).[61] To limit liberalization to services related to sustainable energy projects, for example, economies could specify items in their schedules such as 'engineering services for power projects', 'industrial projects aimed at mitigating climate change through energy efficiency improvement', or 'building projects that aim at improving energy performance'. A similar argument could be extended to the entire

suite of environmental services, with the services in other sectors liberalized only if they relate to environmental projects. For example, one might specify 'architectural services for waste management facilities.'

If possible from a legal or practical standpoint, such an approach would require an agreed-upon definition of what constitutes an environmental purpose. Using the examples above, there would be contention over which energy sources could be considered environmental, or which climate change mitigation techniques were desirable. However, it would be more straightforward to settle these disputes on a bilateral basis than a multilateral one. An international trade system with varying definitions for environmental terms (e.g. renewable energy) may be difficult to navigate, but many economies may also simply follow the precedent set by early movers.

2.4 Defining the Environmental Services Core & Cluster

2.4.1 Summary

The cluster approach would best enable APEC economies to realize the full potential of liberalization of trade in environmental services. The approach would not discriminate against particular services providers (as the EPA), would not favor incumbent firms over emerging ones (as the Integrated Approach), and would apply to numerous agreements by creating a standardized framework (unlike the Individualized Approach). The cluster approach gives environmental service providers assurances that they will be unrestricted in providing and receiving all services critical to their operations.

2.4.2 Core Environmental Services

A well-defined core will contain services now central to the environmental services industry, including those related to renewable energy, energy efficiency, and emissions monitoring of various liquids and gases. While many of the core services from the EC's proposal could stay intact, negotiators should be open to making significant changes that reflect changes in the sector. A modern categorization could be based on the APEC List of Environmental Goods, which can be broken down as shown in Table 18.[62]

Table 18: APEC List of Environmental Goods Categories

Category	Examples
Environmentally Preferable Products	Bamboo Flooring Panels
Air Pollution Control	Filtering and purifying machinery and apparatus for gases
Management of Solid and Hazardous Waste and Recycling Systems	Furnaces, ovens and incinerators to destroy solid waste and pollutants
Renewable Energy Production	Products for the generation of wind, solar, biomass, biogas, geothermal energy
Waste Water Management and Potable Water Treatment	Sludge driers, water filters, water purification machines, parts of UV disinfection ozonizers
Natural Risk Management	Surveying instruments and appliances
Environmental Monitoring Analysis and Assessment Equipment	Manometers, gas and smoke analyzers, spectrometers, chromatographs, microtomes

Source: APEC CTI

A combination of both the APEC and EC approaches could ensure a comprehensive set of core environmental services. While the EC proposal declined to include services related to renewable energy production, the APEC List has no specific categorization for products that fall under environmental remediation, noise & vibration abatement, or protection of biodiversity & landscape. Therefore, the table below could act as the foundation for core services in renewed negotiations regarding the cluster approach. This excludes services related to water for human use, as history has shown that inclusion of these services is likely to be unpopular and mobilize widespread opposition.

It has also been suggested that negotiations regarding how to define environmental goods and services focus heavily on industrial approaches to environmental protection, which can be seen to represent the trade interests

of economies with advanced technical capabilities. This is to the detriment of developing economies that may have comparative advantages in, for example, agriculture-based solutions.[63] While not reflected here, a more inclusive core may encourage additional parties to engage in future negotiations by creating potential for enhanced export opportunities.

Table 19: Potential Core Environmental Services

Services	Examples
Pollution Control (Air, Water, Soil, Noise)	Services to retrofit power plants with sulfur scrubbing equipment
Management of Solid and Hazardous Waste and Recycling Systems	Waste collection services
Renewable Energy Production	Engineering services for hydropower projects
Environmental Remediation and Cleanup	Excavation services to remove contaminated soil from a site
Environmental Monitoring Analysis and Assessment	Geological, geophysical and other prospecting services
Protection of Biodiversity and Landscape	Services to halt the spread of invasive species

Source: Washington CORE

2.4.3 Cluster Environmental Services

Assuming the CPC remains the basis for liberalization commitments, the EC proposal also provides a strong basis for the services that should be included in the cluster. In a number of sectors, broad liberalization commitments are inevitable. For example, in CPC 2.1, it appears that most subclasses of construction services (Division 54) could be beneficial for the delivery of environmental services. Similar can be said for other sectors included in the EC cluster, such as engineering and R&D services. Without specifying the end uses of these services, it is difficult to eliminate the possibility that liberalization will extend to sectors other than the environmental.

However, there are ways to make clear that cluster negotiations are not construed as efforts to foster deeper liberalization than an economy would otherwise consider, as happened previously with GATS. Even if clusters cannot avoid including some non-environmental services, they should only do so when necessary. Otherwise, the proposal risks appearing disingenuous and intent on broad liberalization rather than only that of the environmental services sector. In renewed negotiations, there are services from the EC proposal that could be omitted for this reason. For example, as mentioned earlier, the EC inclusion of Prov. CPC codes 721 and 722 (water transport services) would liberalize some environment-related services, but also unrelated activities such as passenger transportation by ferry. In this case, one could replace the previous codes with 7212 and 7222, which focus on the water transportation of freight, not passengers. Similarly, the EC included Prov. CPC code 513 (Construction work for civil engineering), but could have excluded subclass code 51371, which relates to stadia and sports grounds.

Another area in which the EC proposal will need updating is where it does not account for services that have only recently become applicable to the environmental sector. For example, in GATS, many economies declined to liberalize Mode 1 trade (cross-border supply) in environmental services as it was deemed not “technically feasible”. With technological advancements having made possible services such as remote operation of sewage treatment plants and renewable energy facilities, a comprehensive cluster must include a suite of digital services not previously considered. Computer and related services (Prov. CPC Division 84) are not included in the EC’s proposed cluster, but should be considered going forwards. In addition, an updated core including renewable energy production should be accompanied by cluster services related to the transmission and distribution of electricity (CPC 2.1 Class 8631).

2.4.4 Conclusion

It is likely that any attempt at the cluster approach will face significant opposition. Without a way to limit liberalization to services with environmental end uses, some services caught in the cluster will cause tension. For example, using CPC 2.1, many services for renewable energy products will fall under subclass 83324 (Engineering services for power projects). This does not allow for a distinction to between renewable energy projects and those that are considered not only unrelated but actively detrimental to the environment (e.g. most coal-fired power plants).

To avoid conflict that will again stall progress, negotiators must explore ways to distinguish between services that can be classified under the same CPC subclass, depending on their environmental credentials. A starting point for such discussions could be to liberalize services that utilize products on the APEC List of Environmental Goods (which includes solar cells and wind turbines blades, but not coal-fired turbines). As this approach fails to account for environmentally harmful services that use some listed environmental goods, another method could exclude from liberalization services that utilize certain goods deemed harmful.

2.5 Facilitating Productive Environmental Services Negotiations

2.5.1 Summary

Simply agreeing upon an expanded definition of environmental services will not be sufficient to ensure further liberalization. Early in the Doha Development Round of GATS negotiations, which began in 2001, OECD economies promoted the benefits of liberalization of trade in environmental services. OECD reports highlighted the environmental benefits (e.g. expanded access to clean water and waste management services), economic benefits (e.g. creation of skilled and unskilled jobs for local workers), and trade benefits (e.g. companies gaining new opportunities to deploy their skills and technologies) in order to encourage liberalization in developing economies.[64]

These arguments have merit and are based in significant empirical evidence. However, given the lack of progress in this area, it is fair to conclude that attempts to promote liberalization through expounding the potential for economic efficiencies have fallen short. Pro-liberalization reports have been criticized for failing to adequately address potential negative impacts, including higher fees for consumers and loss of employment within existing domestic service providers.[65] Thus, claims that liberalization produces 'win-win' outcomes are not always considered objective.[66] A new angle may be required to convince more economies of the benefits of liberalization.[67]

2.5.2 Reconsidering GATS Provisions

There are a number of provisions in GATS that many economies have struggled to embrace, and these have proven influential in failed negotiations. As mentioned earlier in this report, some economies have expressed concern about liberalization impinging on their ability to regulate critical resources, as Article VI sets standards to minimize the regulatory burden on service providers. Moreover, no agreement has been reached on Article X, relating to emergency safeguard measures which would allow economies to legally restrict the import of services deemed to threaten a domestic industry. Therefore, it appears that GATS contains no mechanism by which economies can legally protect themselves, even in the short term, from liberalization moves that have resulted in deleterious effects.

All of this is compounded by Article XXI, which states that if economies intend to modify their GATS schedules they must first negotiate compensation with economies affected by the move. While the compensation requirement is understandable, so too is the fact that, regarding a sensitive sector, economies can be unwilling to make commitments that would be expensive to later edit. Although economies can include limitations, they may be wary of the fact that a significant proportion of limitations in GATS schedules have been filed incorrectly, according to WTO analysis.[68]

In recent years, the focus on the international stage has shifted away from multilateral agreements to regional and bilateral ones. Re-negotiating the above provisions in GATS may be unworkable, but ensuring that FTA negotiations approach measures such as emergency safeguards and domestic regulations differently could help facilitate progress on the liberalization of trade in environmental services.

2.5.3 Sustainability Impact Assessments

When GATS was signed in 1994, a key provision was Article XIX, which required that a new round of negotiations on progressive liberalization begin within 5 years (the basis for the Doha Development Round). The article also states that the negotiations would be based on "an assessment of trade in services in overall terms and on a sectoral basis with reference to the objectives of this Agreement", namely those related to the best interests of developing economies. The ensuing stagnation suggests that developing economies would have valued in-depth analyses addressing potential gains and losses from trade liberalization, which may have made further commitments more likely.

On the multilateral and regional levels, an approach that could address questions about overall gains from trade is the use of Sustainability Impact Assessments (SIAs). SIAs are heavily employed by the European Union (EU) in its economic partnership agreements. These reports produce detailed quantitative and qualitative analyses of the potential economic, social, human rights, and environmental impacts of ongoing trade negotiations.[69]

SIAs are open to stakeholder comment, address positive and negative impacts of proposed terms, and attempt to foster a transparency that could make economies more comfortable with the liberalization of their environmental services sectors. The reports focus on overall trade impacts, as well as on particular sectors. Thus, in addition to analyzing the environmental impacts, the responsible entities could be required to specifically address effects on the environmental services sector.

APEC economies could negotiate terms for the SIA process, the publishing of interim and final results, the economic models used, and the criteria for selecting any entities to be consulted. By ensuring that all parties have access to empirical and balanced projections in international trade negotiations, SIAs have the potential to foster further liberalization of services beyond just the environmental.

2.5.4 Protection of Regulatory Space

Economies can also resist liberalization due to the potential impacts on their ability to implement regulations in line with domestic policy goals. To address this, negotiated agreements could include provisions that protect domestic authority over matters regarding issues such as climate change and human health.[70] Existing and previous FTAs include provisions to permit actions taken to protect domestic security interests. Article 29 of the Trans-Pacific-Partnership (TPP), for example, stated that nothing in the agreement should "preclude a Party from applying measures that it considers necessary for the fulfilment of its obligations with respect to the maintenance or restoration of international peace or security, or the protection of its own essential security interests."[71]

Similarly, future APEC trade agreements could state that they do not preclude parties from applying measures to pursue particular sustainability development goals (SDGs). Regarding environmental services, the most pertinent of these would be Good Health and Well-Being (SDG 3), Clean Water and Sanitation (SDG 6), Affordable and Clean Energy (SDG 7), and Climate Action (SDG 13). While this approach does not address concerns about international service providers outcompeting domestic firms, it would help to allay fears about liberalization leading to harmful environmental and social impacts.

2.6 Conclusion

Progress on the liberalization of trade in environmental services has proven difficult for a number of reasons discussed in this section. All proposed classifications for the environmental services sector have come with drawbacks and have been met with fair but stifling criticism. The multi-use nature of many services means that airtight definitions for specific sectors are more difficult to produce for services than for goods.[72]

A cluster approach, utilizing a modernized set of core services and a more nuanced cluster, is the most viable path forwards. However, any attempt at the cluster approach will face serious challenges while the CPC remains its underpinning. Economies can and have pursued the use of negative lists in trade agreements, which circumvent the need to specifically define environmental services before liberalizing them. Yet negative lists effectively work backwards from complete liberalization, and so economies can be reluctant to risk mistakes or oversights, particularly in agreements involving more than just a few close trading partners.[73]

Even with a functioning definition of the sector, trade in environmental services will remain restricted if the conditions of the trade agreements themselves are not widely accepted. As progress stalled on GATS, economies have recalibrated their efforts to focus on smaller agreements with fewer parties, in which negotiations are more straightforward. Recent evidence for this trend can be seen in the Agreement on Climate Change, Trade, and Sustainability (ACCTS), negotiations for which began in 2019. The ACCTS involves New Zealand with Costa Rica, Fiji, Iceland and Norway, and seeks to advance the elimination of tariffs on environmental goods as well as new commitments on environmental services.[74]

As the sector continues to evolve and environmental issues become salient to an increasing proportion of the global population, demand for high quality environmental services, wherever sourced, will grow. By working together to better define environmental services and foster more productive negotiations, APEC can build upon the list of environmental goods, and continue to lead.

3 Good Regulatory Practices in Licensing and Approval

3.1 Overview

3.1.1 Summary

Businesses can be deterred or hindered from expanding their operations into economies with poor regulatory practices. Thus, establishing good regulatory practice is a means by which economies can unilaterally promote the liberalization of trade in environmental services. APEC has directed significant attention to this topic, and in 2018 adopted the APEC Non-binding Principles for Domestic Regulation of the Services Sector, a set of principles by which economies and regulatory authorities should seek to abide. In 2020, APEC published a commissioned study of these principles in practice, with focus on measures intended to enhance transparency and predictability in rulemaking.[75]

In this section, good regulatory practices are defined as those promoted by organizations including APEC, the Office of the United States Trade Representative, and ASEAN.[xiii] The APEC Survey of Regulatory Measures in Environmental Services identified licensing and approval measures as the category of regulations that most frequently applies to environmental service providers. The list of good practices referenced in this section (Table 21) therefore includes those that can most reasonably be applied to licensing and approval measures. Furthermore, this section focuses only on licensing and approval measures related to sewerage, waste collection, waste management, and renewable energy services. The aforementioned APEC report identified the former three as the service areas in which the most APEC economies have licensing and approval measures.

New Zealand; Singapore; and Japan were chosen for further analysis of good practices. These economies have historically been pro-liberalization, and reflect a diversity of regulatory approaches. For each economy, economy-wide and regional measures related to the licensing and approval of the in-focus services are profiled. Provisions that match the list of good regulatory practices are highlighted, and capacity-building needs for these provisions to be replicated across the APEC region are identified.

3.1.2 Domestic Regulation of Environmental Services

In 2015, APEC economies jointly developed the APEC Services Competitiveness Roadmap (2016-2025), which seeks to address barriers that inhibit businesses from trading in service markets and undertake concrete actions to facilitate trade. A key factor identified as enabling international trade was good regulatory practice at the economy-wide and local levels.[76] The importance of domestic regulation to international trade is addressed in Article VI of GATS, which dictates that measures relating to qualification requirements and procedures, technical standards, and licensing requirements should not constitute unnecessary barriers to trade in services.

The APEC PSU Survey of Regulatory Measures in Environmental Services (2016) identified 12 major categories of regulatory measures applied by economies and regulatory bodies (see Table 20). Within the APEC region, the measures most frequently applied to the environmental services sector are licensing and approval procedures.[77] Such measures can include licenses required to operate facilities, approvals for particular businesses to open, and permissions needed to engage in specific activities, such as discharging pollution into the air or water.

Table 20: Regulatory Measures by Type

Measure	Form of control
Limits on foreign investment	Investment screening or approval requirements, foreign equity limits, limits on foreign shareholding
Restrictions on type of legal entity	Joint venture, local incorporation requirements, local presence requirements
Restrictions on scope of service	Limits on number or type of services, geographical or location requirements

[xiii] ASEAN is comprised of Thailand, Indonesia, Malaysia, the Philippines, Singapore, Thailand, Brunei Darussalam, Viet Nam, Lao PDR, Myanmar, and Cambodia.

Economic needs tests	Limits on the number of service suppliers based on economic need
Licensing and approval procedures	Authorization, approval requirements and associated requirements
Nationality and residency requirements	Mandated citizenship or residency for establishment or services delivery
Controls on workers	Controls on employment/hiring foreign workers, temporary entry requirements for business persons (excludes general visa controls), labor controls
Professional qualification requirements	Qualification and licensing requirements for workers
Government procurement restrictions	Whether services are open or closed to foreign participation, existence of preferences for domestic providers
Controls on use of land	Restrictions/limitations on foreign land ownership
Local content requirements	Mandated use of domestic content or service providers, domestically manufactured goods or technology or workers
State owned enterprises	Where there are state owned enterprises in the provision of environmental or similar services
Other	Existence of preferential subsidies for domestic suppliers, existence of government incentives for environmental services

Source: APEC PSU

Licensing and approval procedures do not act as barriers to trade as directly as, for example, limits on foreign investment or local content requirements. The measures are rarely crafted with the primary intention of protecting domestic operators from international competition, and typically apply uniformly to domestic and foreign firms. However, there are characteristics of licensing and approval measures that can put foreign service providers at a distinct disadvantage, impeding trade and competition. For example, language can be a barrier when regulations are only written in the languages of the host economy. Distance can act as a barrier when procedures cannot be completed online, requiring more remote firms to receive and submit documents in person or via mail.

International service providers may also be concerned with non-transparent regulations that offer little protection against discrimination. Of particular note are measures for which a significant amount of discretion is afforded to the regulatory body or issuer of relevant permissions. In non-transparent systems, authorities might reject permit applications on whatever grounds they choose, and may not be required to justify decisions to applicants or the public. Such systems do not include processes of appeal or objection, and may be hostile to re-submission.

Even measures that do not disproportionately impact foreign firms can discourage their market entry. Requirements that overlap multiple jurisdictions and require firms to interact with multiple supervisory authorities necessitate time-intensive and costly actions to achieve full compliance. Uncertainty is introduced when no clear rules are in place to govern application processing times or fees, and firms can have their mobility limited when licensing exams are held infrequently or irregularly. Another prominent barrier results from the delegation of central government powers to regional authorities. These authorities can diverge significantly in how they interpret central government guidelines and thus have vastly different requirements for companies operating within their respective jurisdictions. The complexity inherent in simultaneously complying with numerous regulatory regimes within an economy creates difficulty for domestic and foreign firms alike.

The nature of traditional environmental services means that they have commonly been provided by public authorities and funded, directly or indirectly, by taxpayers. This, along with the significance of many environmental services to public health and natural resources, can explain the stringent regulatory measures often in place. Yet these regulations need not be a hindrance to trade - there is strong evidence to suggest that tough environmental regulations serve to increase demand for environmental services and competition within the sector.[78] Article VI of GATS, while supporting trade-friendly regulations, does not promote restrictions that

reduce service quality. Moreover, several APEC economies show that regulatory regimes conducive to trade do not need to sacrifice high standards for health, safety, or environmental wellbeing.

3.1.3 Good Practices for Licensing and Approval Measures

In order to address the importance of good regulatory practices to trade liberalization, the APEC Committee on Trade and Investment (CTI) produced the APEC Non-binding Principles for Domestic Regulation of the Services Sector. This is a set of principles by which economies and regulatory authorities should seek to abide.[79] Similarly, ASEAN published its Good Regulatory Practice Core Principles in 2018.[80] Moreover, FTAs involving APEC economies, such as the United States-Mexico-Canada Agreement (USMCA), contain chapters detailing agreed-upon good regulatory practices.[81]

Based on the aforementioned principles and additional measures identified in regulatory regimes throughout the region, Table 21 breaks down good practices regarding licensing and approval procedures for the provision environmental services into five categories - Simplicity, Transparency, Accountability, Accessibility, and Cooperability.

Simplicity refers to measures that work to limit unnecessary burden on service providers that have begun the application process. For example, publishing regulations in multiple languages removes the need for some providers to use translation services to fully understand requirements. Transparency measures are those that ensure regulatory authorities inform companies about how their applications are being processed. Accountability measures mean that regulatory authorities have standards against which they can be judged, ideally by external organizations. Accessibility measures lower restrictions that may hinder companies from filing applications, such as distance from the regulatory authority's headquarters. Cooperability measures are less often defined in statute, but aid companies navigating the application process.

Table 21: Good Regulatory Practices for Licensing and Approval Measures

Category	Provisions
Simplicity	License applicants are required to approach only one regulatory authority
	Relevant laws are published and open to any potential license applicants
	Relevant laws and regulations are accessible in multiple languages
	Regional regulatory authority standardizes regulations with others
	Regional authority recognizes licenses from others.
Transparency	Applicants are informed in writing of the outcome of their application
	License applicants can track status of applications
	License applicants are informed of reasons for applications being unsuccessful
	License application fees are legally bound (and non-prohibitive)
	Duration of validity of successful licenses is standardized
Accountability	Unsuccessful license applicants can appeal decisions without penalty
	Alternative authorities exist to oversee license application appeals
	Regulatory authority provides indicative timeframes for processing of applications
Accessibility	License applications can be submitted throughout the year
	License applications can be received completed and submitted electronically
	License examinations are frequently and regularly held
Cooperability	Unsuccessful license applicants are allowed to re-submit applications
	Regulatory authority provides potential license applicants with information on how to submit successful applications (e.g. checklist)
	Regulatory authority has clear mechanisms for fielding inquiries into license applications
	Potential license applicants can access lists of other licensed service providers

Source: Washington CORE (APEC, ASEAN, Unites States Trade Representative)

3.2 Case Study Selection

3.2.1 Environmental Services in Focus

The environmental services in focus in this section are as follows:

- Sewerage
- Waste collection
- Waste treatment and disposal
- Development of Renewable Energy Facilities

According to the APEC Survey of Regulatory Measures in Environmental Services, the environmental services for which the greatest number of APEC economies have known licensing and approval measures are sewerage and sewage treatment (14), waste collection (20), and waste treatment and disposal (20). Therefore, significant value can be found in assessing good practices in these sectors across the region, with hopes of encouraging the adoption of similar measures elsewhere. Other environmental services, while important, are less often associated with such regulations. Sanitation services, for example, are known to have accompanying licensing and approval measures in only two APEC economies.

Table 22: APEC Economies' Licensing and Approval Measures

	CPC 2.1 Codes	No. of Economies
All Environmental Services	94	14
Sewerage	941	14
Waste Collection	942	20
Waste treatment and disposal	943	20
Remediation	944	7
Sanitation	945	2
Other	949	5

Source: Washington CORE (APEC PSU)[82]

As economies take actions to fight climate change and other concerns such as water and air quality, those that are able will need to incorporate increasing levels of renewable energy into the power mix. Solar, wind and hydro power facilities all require technical skills in installation, operation, and maintenance. Particularly in developing economies in the early stages of diversifying their grids, much of this technical capacity will be imported. Reviewing and showcasing positive examples of relevant licensing and approval measures is therefore necessary for this report.

While not profiled in this report, environmental consulting services are worthy of an honorary mention. As noted earlier in this report, only 10 APEC economies have environmental services commitments under GATS, and many those economies have limited their commitments to environmental consulting services only. Consulting services, particularly those delivered via the internet, are a low-cost and accessible means of building capacity and sharing expertise and knowledge with developing economies. However, most economies do not yet appear to have licensing and approval measures in place regulating the provision of these services. If and when such provisions arise, this will be an area upon which liberalization efforts should focus.

3.2.2 Case Study Economies

New Zealand; Singapore; and Japan were the APEC economies chosen for further analysis of good regulatory practices in the environmental services sector. The selection of these economies facilitates case studies that reflect APEC's diversity in terms of physical and population size, environmental landscape, language, and regulatory approach. The diversity of regulatory approach is perhaps the most significant difference between these economies. Both New Zealand and Japan, large island economies with significantly different populations (5 million vs 126 million) operate more decentralized economies, with regional authorities ultimately responsible for

the implementation of laws generated by central government agencies. Singapore, a small island of under 300 square miles but with a population of nearly 6 million, is directly regulated by the central government.

Each of these economies have historically been strong proponents and beneficiaries of international trade liberalization. New Zealand and Singapore placed first and second, respectively, in the World Bank Group's 2019 Doing Business report, which ranks 190 economies in terms on the ease with which businesses can operate within their borders.[83] Japan and New Zealand both score impressively on the OECD's Services Trade Restrictiveness Index (STRI) for sectors closely related to environmental services such as engineering and construction (Singapore is not included).[xiv] While not yet available, the OECD plans to develop an index to score trade restrictions relating to the environmental sector.

All of the case study economies also have particular standout measures in the sphere of licensing and approval measures that deem the economy worthy of further exploration. New Zealand's wide-reaching Resource Management Act (RMA) creates the regulatory basis for 'Resource Consents'. The RMA is model legislation for good regulatory practice, while Resource Consents are special in that they cover permits for the pollution of natural resources, while also regulating numerous aspects of urban and coastal development. Singapore has the unique GoBusiness Licensing portal, an online system through which companies can manage all necessary business licenses. The Japan External Trade Organization (JETRO) is well-known worldwide for promoting Japan's international trade interests. The organization does this through offices in 54 economies, including most APEC members. JETRO hosts multiple Invest Japan Business Support Centers (IBSCs), which creates a positive environment for foreign companies by offering services to help establish and expand businesses in Japan.

Each case study highlights good practices found in regulations that apply to the economy's environmental services sector. These regulations, as well as others relevant to the sector but not profiled in this report, are summarized more broadly in the APEC PSU Survey of Regulatory Measures in Environmental Services.

3.3 Case Study: New Zealand

3.3.1 Profile

Both public and private entities are involved in New Zealand's sewerage sector. While there are well over 300 publicly-owned wastewater treatment plants in the economy,[84] many are operated and maintained by foreign companies, such as Veolia, a French water services firm. Similarly, foreign firms are involved in the waste management sector. Leading members of WasteMINZ, the economy's foremost waste management industry group, include the Chinese-owned Waste Management NZ, and SULO (N.Z) Ltd, a German-owned firm best known for its waste containers and associated services.[85]

New Zealand already has a largely decarbonized power sector, with around 80% of the economy's electricity coming from renewable sources. Clean energy primarily comes from hydro and geothermal sources, but there are growing shares of wind and solar power, too.[86] According to the New Zealand Wind Energy Association, the vast majority of approved and active wind farms in the economy are operated by domestic firms, but international trade still plays a role. Ventus Energy, a Canadian firm with a New Zealand subsidiary, is currently erecting wind turbines on New Zealand's North Island.[87]

Before commencing work on environment-related projects, developers must obtain licenses that relate to all activities expected to significantly impact natural resources. These 'Resource Consents' are designed to minimize environmental impacts, are the foremost licensing and approval measures with which environmental service providers in New Zealand must contend. In addition, providers can be required by local authorities to obtain permits to deliver waste management services.

[xiv] The STRI quantifies restrictions in numerous economies and economic sectors that apply to foreign entry and the movement of people, barriers to competition, regulatory transparency and other discriminatory measures that impact the ease of doing business.

While there are some measures that can act to restrict international trade in environmental services, New Zealand does not have in place licensing and approval measures that apply only or differently to foreign service providers.[88] New Zealand's official written languages are English and Maori, and all relevant regulations are publicly available in English.

3.3.2 Economy-wide Regulation: Resource Management Act

In New Zealand, much of the authority for the regulation of environmental services is determined by the Resource and Management Act (RMA), originally crafted in 1991. The Act is designed to ensure the sustainable use and treatment of the economy's natural resources, but also covers permissions related to urban development and land use not typically related to the environmental sector.

A central tenant of the RMA around which economy-wide and local licensing and approval regulatory measures are based is the Resource Consent. Resource Consents are documents of approval that allow the use of or discharge of contaminants into natural resources (air, land, or water) in such a manner that is otherwise prohibited.[8990] For example, entities can only discharge waste into waterways in quantities beyond that allowed by environmental standards if in possession of a Resource Consent. Of the five types of Resource Consent, the most relevant to services regarding the in-focus environmental services are water permits, land use consents and discharge permits. The other types are subdivision consents and coastal permits.[91] The authority empowered to grant a particular Resource Consent is known as the consent authority, which may be the council of either the city/district or the region.

Consent authorities are permitted to place conditions on the approval of Resource Consent applications. The RMA ensures transparency by stating that consent authorities can only impose conditions on individual consents that relate to relevant activities restricted by government authorities.[92] Any conditions imposed must directly relate to adverse environmental impacts or applicable rules at the local or central government levels.[93] The RMA specifies the conditions that may be included, ensuring that such rulings are transparent and subject to minimal discretion. Among possible conditions, consent authorities are empowered to demand the applicant make a financial contribution, engage in environmental remediation efforts, meet performance standards, or engage in practices that minimize the adverse environmental impacts of the activity.[94] Financial contributions can only be imposed in accordance with purposes specified in the regional environmental plans, which means funds collected must be spent on projects to offset any negative effects of the consented activity. Consent authorities can also require applicants to provide information relating to the exercise of the Resource Consent, which may require the applicant to conduct and share measurements, surveys, and investigations.

Consent authorities are expected to inform Resource Consent applicants of the decisions within 20 working days of receiving the application (as long as the application is not notified)[xv], thus introducing certainty to the process and ensuring that processing time expectations are uniform in jurisdictions across the economy.[95] RMA requires that all decisions are transparent. Approval and denial notifications are provided in writing, and must state reasons for the decision as well any laws and plans that were considered.[96] Consent authorities must note any primary issues of contention, and the main findings regarding these issues. Some Resource Consents (Land-Use and Subdivision) are granted for 5 years, unless otherwise specified, meaning that the consented entity has 5 years to give effect to the consent (e.g. build the facility). Once the consent has been exercised, it lasts indefinitely.[97] Other consents (Discharge and Coastal Permits) have a maximum duration of 35 years before re-application is necessary. The rationale for this is because the activities permitted under these consents have impacts on the natural environment and could cause irreversible damage.[98] If a consent authority grants a consent for a shorter period than is standard, it is required to explain why.

[xv] The notification process allows anyone (usually affected parties) to comment on or appeal a consent before it is granted. The consent authority has 20 working days to decide whether an application will be notified. Final application decisions must be delivered within 60, 100, or 130 days depending on the notification procedures that follow.

As a strong accountability measure, the RMA allows applicants to act if they take significant issue with a decision, whether it be a Resource Consent denial or conditions attached to an approval.[99] Under most circumstances, applicants have the right to appeal to the Environment Court[xvi] within 15 days of receiving the decision notice from the consent authority.[100] As part of an appeal against Resource Consent conditions, an applicant can request that such an appeal is determined by the Environment Court as opposed to the original consent authority. In these cases, the consent authority is required to provide the Environment Court with the materials used to make its original decision, including the consent authority's own report on the application.[101] This incentivizes consent authorities to ensure that conditions imposed on Resource Consents are well-reasoned and have strong legal foundations.

Although some aspects of Resource Consent requirements vary across jurisdictions, Schedule 4 of the RMA provides a comprehensive list of the information that must be included, allowing for a degree of economy-wide standardization.[102] An application can be returned to the applicant if the consent authority deems it to be incomplete. The RMA prohibits hostility to re-submission by dictating that any application returned due to incompletion and then re-submitted must be treated as a new application.[103]

The RMA contains a significant number of provisions designed to provide certainty and transparency for service providers, while holding regional authorities accountable. In some APEC economies, the approach to licensing requirements and the discretion afforded to regulatory authorities is far less transparent. For example, some regulations allow for the regulatory authority revoke or suspend licenses at any time and without providing written justification, as long as the authority perceives non-compliance on behalf of the licensee.[104] In other cases, authorities are allowed to add or remove conditions imposed upon permissions without reason or notice.

Table 23: Resource Management Act Good Regulatory Practices

Category	Provision
Transparency	Limits on conditions that may be attached to consents
	Timeframes for standard consent validity period
	Consent authorities give written reasons for rejecting applications
Accountability	Timeframes for application processing
	Applicants can appeal against both rejections and conditions
	Appeals handled by the Environment Court, independent of the original consent authority
Simplicity	Law published and accessible online
	Common information that must be included in applications to all consent authorities
Cooperability	Applicants can re-submit returned documents to consent authority without penalty

Source: Washington CORE (New Zealand Ministry for Environment)

3.3.3 Local Regulation: Auckland Council Resource Consents

Sewerage services in Auckland are entirely provided by the local public water utility, but foreign-owned firms are particularly active in the provision of waste management services. For example, Waste Management NZ, a subsidiary of the Chinese Beijing Capital Group, operates multiple landfills in the region. Once a company is established in Auckland, there are no differences in Resource Consent requirements between domestically and foreign-owned companies. Applications from foreign firms at times take slightly longer to process as representatives from other economies can be less familiar with regulations particular to New Zealand and Auckland. To streamline the process, these companies tend to employ local planning agents to help manage Resource Consent applications.[105]

Auckland Council hosts a webpage designed to streamline and simplify the Resource Consent application process, which is full of good licensing and approval regulatory practices.[106] Instructions are available for how to apply

[xvi] The Environment Court of New Zealand is a specialist court that deals with issues arising under the Resource Management Act.

online, by post, or in person. For in person and by mail applications, the required forms can be downloaded directly from the Auckland Council webpage. Applicants are informed both by email and post about their application decisions.

The council webpage directs applicants to resources that facilitate the appeals to the Environment Court regarding rejected applications or conditions imposed upon approved ones. Of the 12,000 Resources Consents processed by Auckland Council each year (related and unrelated to environmental services), an average of only around 25 appealed.[107] Under the RMA, certain projects (often large, complex projects with significant environmental impacts) must be "notified". Notification means that details of the application must be made publicly available, that the public are able to submit comments about the application to the consent authority, and that a public hearing about the application may be held before the consent is granted or denied. These notified cases are responsible for attracting most appeals, which may be lodged on behalf of either the applicant or a member of the public.

The council's Resource Consent rules state that entities whose applications are not assessed within 20 working days may be entitled to a discount. Around 80% of applications are processed within the specified timeframe, but particularly complex applications may take longer. Discounts are adjusted based on the number of extra days the council takes to complete the process. Notified cases and other complex cases that cannot reasonably be completed quickly can have extended timelines.[108]

Online applicants can track the status of their application, while others can do so by speaking to a council representative. The council is also transparent about the criteria it reviews in the processing of Resource Consent applications, which include how the consent fits in with other existing regional plans, the appropriateness of the proposed location, potential environmental impacts of the consent.[109]

In addition to all of these regulatory procedures, contact information for departments to which potential applicants can direct enquiries is also readily available, and the council provides a significant amount of material designed to help applicants with the submission process, including checklists and information sheets.

Table 24: Auckland Council Good Regulatory Practices

Category	Provision
Simplicity	Application conditions published online
Accessibility	Applications received online, by mail, in person
	Application forms available for download from council website
Transparency	Applicants informed of decisions by email and post
	Applicants can track application status
Accountability	Slowly processed applications (>20 days) eligible for discount
Cooperability	Abundant assistance offered to navigate application process

Source: Washington CORE (Auckland Council)

3.4 Case Study: Singapore

3.4.1 Profile

Singapore does not have licensing and approval measures that apply only or discriminately to foreign companies delivering environmental services.[110] Singapore's regulatory framework is designed to ensure fair competition, and can be described as agnostic on the ownership of firms. As such, both local and foreign companies actively participate in the environmental services sector. Companies eligible to receive Singapore business licenses do need to be registered by residents of Singapore, so foreign firms establishing operations in the economy must have at least one Singapore-based officer or partner.[111]

The regulations profiled in this section relate heavily to the waste management sector, which receives both domestic and foreign investment. For example, German firm ALBA Group and its local joint-venture partner Wah & Hua Pte Ltd recently secured the Public Waste Collection contract for Singapore's Jurong sector, which runs from April 2020 to March 2027. Singapore's Sewerage and Drainage Act (SDA) is structured similarly to the

regulations profiled in the following subsections. The SDA governs the construction, maintenance, operation and use of sewerage and land drainage systems.

The economy also requires licenses for firms engaging in the generation of electricity (units >10 MW) under the Electricity Act. Currently, Singapore's power generation sector is dominated (~95%) by natural gas.[112] As the penetration of solar power increases, the Electricity Act and regulating body (Energy Market Authority) will become more important to studies of the domestic environmental services industry. As yet, few of the licensed electricity providers do so using predominantly renewable power.[113] Singapore welcomes both foreign and domestic firms to participate in the solar power industry, which is an open and competitive market. An example of this is Total Solar Distributed Generation, a wholly-owned subsidiary of French energy company Total, which has its regional headquarters in Singapore.[114]

Singapore has 4 official languages - Malay, Tamil, Mandarin Chinese, and English. Regulations are publicly available primarily in English. While Mandarin and Malay are also widely spoken across APEC, the availability of English text makes Singapore's legal framework accessible to individuals from more economies across APEC and the world at large.

3.4.2 Economy-wide Regulation: Environmental Protection and Management Act

The Environmental Protection and Management Act (EPMA) is Singapore's primary law for the regulation of waste and pollution, including for hazardous substances. The Director-General of Environmental Protection is responsible for the administration of the Act, and resides within the National Environment Agency (NEA), the leading government body.

The EPMA requires anyone responsible for the discharge of any trade effluent, oil, chemical, sewage or other pollution into public drains or land to first acquire a permit from the Director-General, lest they be subject to punishment.[115] Such permissions can include text specifying how the firm must treat the pollution prior to discharge, and the Director-General is empowered to impose requirements on how the firm operates its facilities.[116] A good practice is displayed here in that applicants are entitled to appeal license refusals within 14 days of receiving the decision notice. Moreover, such appeals are handled by the Minister of Sustainability and the Environment, part of Singapore's Cabinet office and independent of the NEA.[117] Appeals are rare and assessed on a case-by-case basis.[118]

A good practice in the area of simplicity found in the EPMA is the 'single license provision.' When an entity is required under the Act to obtain more than one license, they may instead be granted a single license to cover all of the activities for which they applied.[119]

Supplemental to the EPMA are additional regulations that govern more narrow sections of the environmental services sector (e.g. hazardous substances).[120] The law again ensures transparency by establishing the maximum fines (S$50,000)[xvii] and prison sentences (2 years) that can result from failure to comply with these regulations. Although not necessarily applicable to environmental service providers, the regulations governing the storage and supply of hazardous substances under the EPMA lay out the fees that NEA may charge for license renewals and amendments.[121]

3.4.3 Economy-wide Regulation: Environmental Public Health Act

Singapore's Environmental Public Health Act (EPHA) has numerous provisions regarding the economy's treatment of waste, sewage, and public cleanliness. The EPHA provisions most relevant to the profiled environmental services require that any person collecting, removing, transporting or storing any waste is required to first received a waste collector license from the Director-General of Public Health, part of the NEA.[122] Similarly, licenses are required for anyone establishing or operating a waste disposal facility.[123] As with the EPMA, anyone aggrieved

[xvii] S$ refers to Singapore Dollars (SGD)

by an NEA decision regarding a license application can appeal to the Minister of Sustainability and the Environment, whose office will make the final decision on the case.[124]

Similar to the EPMA, the EPHA has supplemental regulations governing specific regulated areas (e.g. General waste disposal facilities). In 2017, the regulatory regime for the licensing of General Waste Disposal facilities was updated with some additional details. The updated regulations note that licensees must only engage in the management of specific types of waste for which they are approved.[125] The regulations usefully specify the costs associated with applications for licenses grants or renewals (S$300) and amendments (S$70).[126] There are similar supplemental regulations that apply to entities engaging in other areas, including the transport and removal of toxic industrial waste.[127]

The regulations are supplemented well with NEA's waste disposal licensing page, which provides a pathway to the online application portal. The information provided includes licensing criteria, application considerations, licensing fees and the period of license validity (2 years).[128] Another positive practice on display is the listing of other licensed operators, including a breakdown of ones that have applied for legal exemptions.

Table 25: Singapore Environmental Laws Good Regulatory Practices

Category	Provision
Simplicity	Laws published and accessible online
	Possibility for single license to cover multiple licensed activities
Accountability	Applicants can appeal license application rejections
	Appeals handled by Minister of Sustainability and the Environment, independent of the NEA
Transparency	Magnitude of non-compliance fines defined in statute
	Standardized duration of license validity
Cooperability	Publicly available list of licensed entities
	Unified online portal for license management (GoBusiness)

Source: Washington CORE (Singapore National Environment Agency)

3.4.4 Economy-wide Measure: GoBusiness Licensing Portal

Perhaps Singapore's most standout regulatory practice with regards to licensing and approval measures is the establishment of the GoBusiness Licensing Portal.[129] To promote a pro-enterprise environment in which digital technology is applied to serve businesses better, Singapore's Ministry of Trade & Industry (MTI), Smart Nation and Digital Government Office (SNDGO), and Government Technology Agency (GovTech) collectively launched the GoBusiness Licensing portal in October 2019. The portal is a central location through which individuals and companies can complete applications for all business licenses, in the environmental services sector and otherwise.

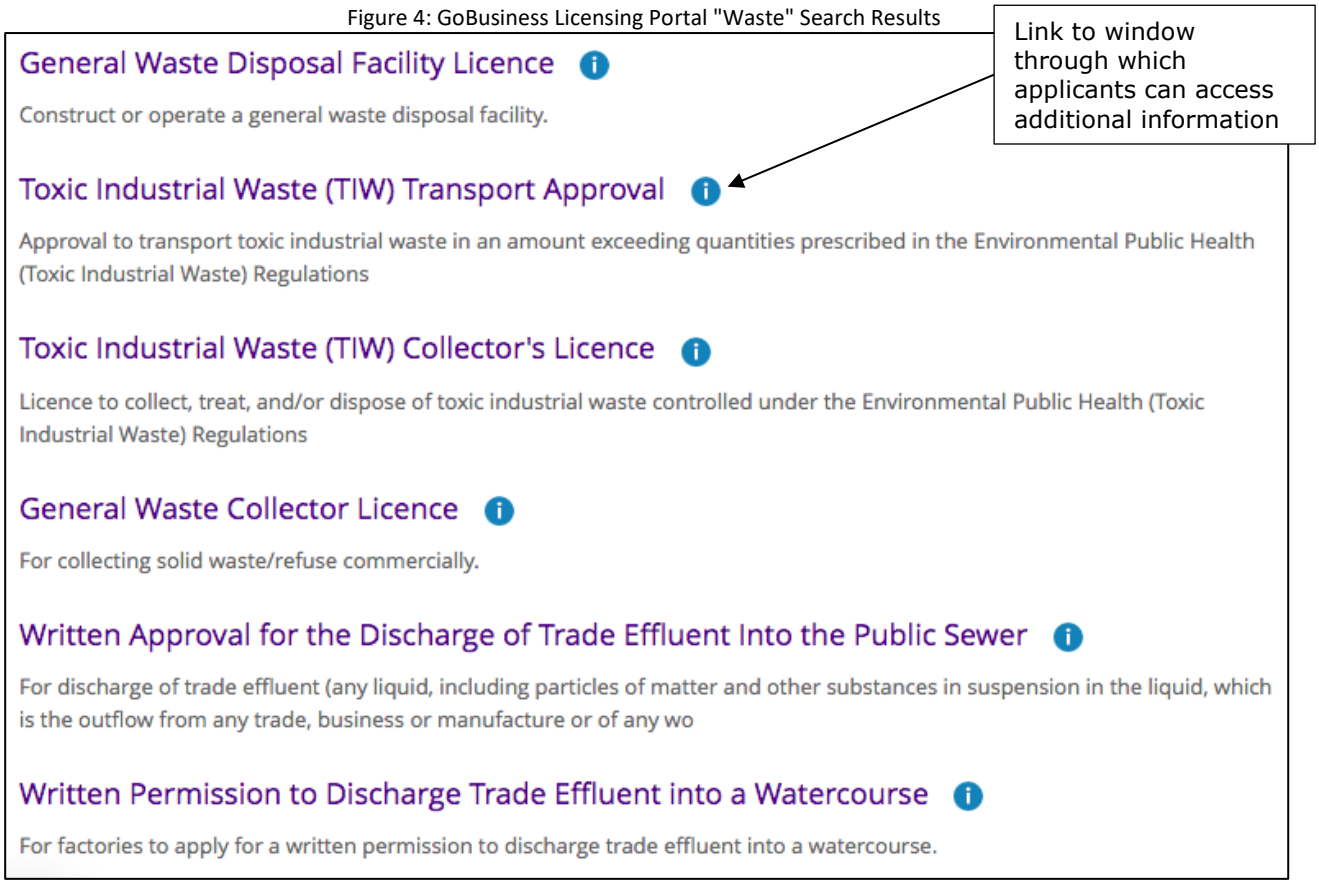
Firms across sectors can search for keywords (e.g. waste, discharge) to access relevant licenses via the self-service feature. Each license on the portal is accompanied by information that explains the circumstances under which an application must be completed, the information an applicant may be required to provide as part of the license application process, and other critical details. For example, potential license applicants for general waste disposal construction/operation can use the portal to answer questions including:

- Who needs to apply for this license?
- Why do I need to apply for this license?
- What information do I need to provide?
- What supporting documents do I need to submit?
- How much does this license cost and how long is it valid for?
- How soon can my application be processed?
- Who can I contact for further details?

Entities can also use the portal to amend or cancel existing licenses as well as renew expiring ones. Integrated companies that deliver services across a range of economic sectors may benefit most from the GoBusiness Licensing portal, which provides a simplistic and efficient solution for license management. The portal is also integrated with SingPass and CorpPass, authentication systems that allow Singapore citizens and businesses to transact online with the government.

Figure 4 shows the results that interested parties receive when using the keyword search function to search for licenses relating to "waste" on the GoBusiness Licensing portal's self-service feature.

Figure 4: GoBusiness Licensing Portal "Waste" Search Results



Source: Singapore Government

The GoBusiness Licensing portal now incorporates a guided journey for food services business owners. The responsible public agencies took a "user-centric" approach to the development of the guided journey, taking time to review existing licensing processes and the burdens placed on service providers.[130] Based on this review, the food services guided journey feature was designed with the goal of simplifying the process of applying for multiple licenses, especially for first time business owners, which saves both time and money.

3.5 Case Study: Japan

3.5.1 Profile

Japan does not have licensing and approval measures that apply only or discriminately to foreign companies delivering environmental services.[131] In a move designed to promote trade, in 2015, Japan abolished the requirement that at least one representative director of must have an address in Japan in order to register the Japanese subsidiary of a foreign company.[132] Still, there are particular certifications required to establish companies that are subsidiaries of foreign firms.[133] These include:

- Documents to certify the profile of the foreign company
- Documents to certify the representative authority of the foreign company's local representative
- Documents to certify the authenticity of the signature of the foreign company's local representative
- Certificates of signature for those responsible as directors of the subsidiary company.

Compared to the other case study economies, Japan is not always thought of as an economy that attracts significant levels of FDI, although this perception has been changing in recent years.[134] Any reputation for trade restrictiveness is mainly down to the language barrier. According to a survey conducted by the Japan External Trade Organization (JETRO) in 2019, difficulty communicating in non-Japanese languages is the second greatest obstacle to doing business in Japan (behind difficulty finding human resources).[135]

All publicly available regulations governing the environmental services sector are written and maintained in Japanese, which is the economy's only official language. In addition, Japan's Ministry of Environment (MOE) has an English language website through which it publishes copies of many of its laws in English.[136] While these copies do not always reflect the most recent iteration of the law, the availability of relevant regulations in multiple languages is a good regulatory practice that can help facilitate trade. As many MOE regulations are interpreted and implemented at the regional level, repeating the practice of publishing regulations in multiple languages locally would be ideal, although this does not yet appear to be the case.

3.5.2 Economy-wide Regulation: Waste Management and Public Cleansing Law

Japan's Waste Management and Public Cleansing Law regulates the processing and recycling of waste (industrial and municipal) by both companies and households. The law states that no entity is allowed to engage in the collection, transportation, disposal, or recycling of municipal solid waste without permission from the prefectural governor with the jurisdiction over the area in which the service is delivered.[137]

License applicants are afforded some certainty, as the law states that approved permissions are valid for a minimum of one year, subject to renewal. Potential applicants are informed that permissions are only granted if the municipality determines that the application is in step with the local solid waste management plan, and it would be difficult for the local authority to carry out the work itself. Granted permissions may come with conditions attached, but the regulation assures applicants that any conditions must be related to the conservation of the living environment. The law also clarifies the conditions under which an entity might have a license revoked, which include breaking the law, failing to maintain adequate facilities for the service at hand, and violating any of the conditions attached to the permission.[138] According to officials from the city of Yokohama, firms are usually able to appeal decisions to reject or repeal permits.[139] Companies are cautious to ensure that they meet all requirements, so cases of rejection and repeal are rare (the most recent example was in 2016). The city publishes the details of these cases online.[140]

Anyone wishing to install and operate municipal solid waste facility requires permission from the prefectural governor.[141] In this case, the law specifies which information about the proposed facility and associated services must be included in the application, including the type of waste to be managed, disposal capacity of the facility, and plans to ensure the prevention of disasters associated with disposed waste. Again, the law states the criteria against which applications will be judged and the conditions that may be applied. The text also confirms that, prior to granting permissions, the authority must consult with experts regarding the potential local environmental impacts. Applicants can appeal license application rejections.

For the above regulations, a detailed record of all further application requirements is laid out in an ordinance from the Ministry of Environment.[142] These include documents such as financial records, business plans, and proof of assets. Moreover, detailed technical standards for the construction and operation of waste facilities are laid out in the ordinance. Failure to meet these standards is one of the situations in which an application may be refused or a permission revoked.

Table 26: Waste Management and Cleansing Law Good Regulatory Practices

Category	Provision
Simplicity	Law published and accessible online
	Laws published in multiple languages (Japanese and English)
Accountability	Applicants can appeal license application rejections
Transparency	Standardized duration of license validity
	Limits on conditions that may be applied to consents
Cooperability	Common information that must be included in applications to all local authorities

Source: Washington CORE (Japan Ministry of the Environment)

3.5.3 Local Regulation: Tokyo Metropole Waste Management Facility Permits

The Tokyo Metropolitan Government's Bureau of Environment is responsible for locally implementing the Waste Management and Public Cleansing Law. Pursuant to Article 8 of the MOE regulation, which regards the installation of waste management facilities, the bureau outlines the permit process governing such operations in its jurisdiction.[143]

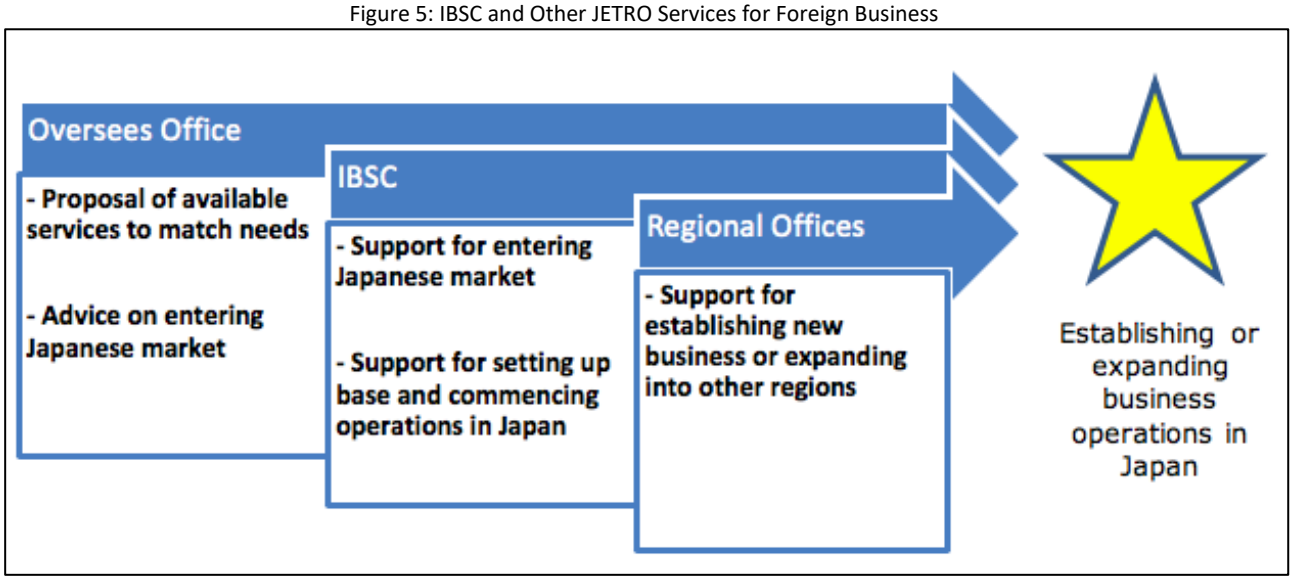
The Bureau of Environment's Waste Management division lays out the requirements of the application, which include a standard application form and a series of accompanying documents. In addition, applicants are told to complete a Living Environment Impact survey, which address the potential air and water quality impacts of the installed facility. Depending on the facility type (e.g. waste treatment, incineration, final disposal site), application fees can cost either 110,000 or 130,000 yen (JPY). The governor's office examines the technical/environmental aptitude of the application, along with the public consultation process. When the applicant acquires the construction permit, the waste management facility must be inspected by the representatives from the governor's office before commencing operations. The inspectors check whether the facility's construction and operational capacities are in accordance with plan submitted in the operator's application. To assist with the application process, the Waste Management division provides potential applicants with application form templates and exemplars.

3.5.4 Economy-wide Measure: JETRO Invest Japan Business Support Center

JETRO is a government-related non-profit organization that seeks to promote Japanese exports abroad, as well stimulate foreign direct investment (FDI) into Japan. JETRO's mission is to support mutually beneficial trade and investment between Japan and its commercial partners around the globe.[144]

To help facilitate FDI into Japan, JETRO operates the Invest Japan Business Support Center (IBSC) in six major cities (Tokyo, Yokohama, Osaka, Nagoya, Kobe and Fukuoka). The IBSC provides business support services to foreign companies attempting to establish themselves in Japan.

Figure 5: IBSC and Other JETRO Services for Foreign Business



Source: JETRO

Through IBSC, companies can access a range of services offered by JETRO specialists.[145] These include assistance with procedural requirements (e.g. visa applications, tax procedures), and guidance regarding regulations and relevant legal systems (e.g. information on procedures to obtain necessary permits and licenses). All of this serves to simplify the process of establishing operations in Japan, make companies more comfortable with the process of expansion into a new market, and facilitate international trade in services.

Other APEC economies have government departments through which they offer similar services. For example, Australia encourages FDI through its Trade and Investment Commission, while the United States supports foreign investors via the SelectUSA program, which is operated by the economy's International Trade Commission (ITA). What sets JETRO's IBSC apart is the provision of temporary office space to firms attempting to establish footholds in Japanese localities. For a number of months, companies can operate out of IBSC offices for free or at reduced rates, which allows proximity to major government offices and major business centers. This service smooths the processes of filing applications, completing registrations, and conducting business negotiations while attempting to set up business in Japan.

The benefits of IBSC regularly extend to the environmental sector, as foreign companies are involved in the provision of renewable energy services to the Japanese public. An example of such a company is WPD Japan, a subsidiary of WPD Group, which is a German firm that is a major developer and operator of offshore wind power projects. In early 2018, WPD expanded its operations into Japan in order to pursue the development of wind power plants across the economy.[146] JETRO through IBSC provided temporary office space to WPD for 4-5 months, the first three months of which were free.[147] Moreover, JETRO provided the company with consultation on registration requirements, introduced them to service providers, shared market information, and offered business matching services.

3.6 Building Capacity for Good Regulatory Practice

3.6.1 Regulatory Review

APEC economies should seek to implement good regulatory practices so that licensing and approval measures do not act as impediments to international trade. A foundation to building this capacity is willingness to conduct in-depth reviews of existing measures in order to understand the requirements placed on service providers, and to determine whether such measures are indeed necessary to achieve the desired policy outcomes.

In 2012, the OECD Regulatory Policy Committee recommended that economies "conduct systematic programme reviews of the stock of significant regulation against clearly defined policy goals, including consideration of costs and benefits, to ensure that regulations remain up to date, cost justified, cost effective and consistent, and deliver the intended policy objectives."[148] Systematic program review was also a leading recommendation to emerge from the APEC Workshop on Best Practices Sharing to Improve Application of the APEC Non-Binding Principles for Domestic Regulation of the Services Sector (2020)[149].

Companies operating in the environmental services sector are well-placed to comment on the measures that are most burdensome in terms of time and financial resources. These firms also have experience dealing with regulations that overlap jurisdictions, have become redundant, or are largely duplicated elsewhere. While the private companies should not be expected or permitted to themselves create the laws by which they are regulated, a collaborative approach can allow governments to optimize measures in terms of simplicity and efficiency while maintaining regulatory integrity.

This approach of review and consultation has been heavily employed in Singapore. While the GoBusiness Licensing portal in its current form was launched in 2019, it is built upon almost 20 years of work on the economy's Online Business Licensing System (OBLS).[150] In 2000, Singapore's business community expressed displeasure about the state of the business licensing system, which often required various applications, payments, and approvals from different agencies. Three public agencies, the Ministry of Trade and Industry (MTI), the Ministry of Finance (MoF), and Infocomm Development Authority (IDA)[xviii] formed a task force to solve this issue, and subsequently began the OBLS project.

[xviii] The Infocomm Development Authority (IDA) was a government organization responsible for the growth and development of the information technology and telecommunications industries in Singapore. It is now the Infocomm Media Development Authority (IMDA).

The initial stages of the project involved a comprehensive review of over 150 licenses (across sectors including restaurant, childcare, and education). Some licenses were deemed redundant were scheduled for elimination. Licenses that overlapped significantly with each other were merged, while other licenses had some elements amended, such as renewal requirements. Beyond this, the task force developed a license review model, which it used to identify further areas for streamlining. The model involved assessing whether a license's requirements matched the associated policy objective, and removing overly prescriptive procedures. The team then approached the licensing system from a business standpoint to assess the administrative formalities that obtaining each license might entail. This involved considering procedures for application renewal and termination, as well as documentation, levels of approval, and fees. The review process provided the foundation for the development of the OBLS portal, which was upgraded to the LicenseOne platform, which later became the GoBusiness Licensing portal.

Questions for OBLS License Review

- What is the rationale for the license?
- What are the requirements for obtaining the license?
- Why were these requirements selected?
- How often are these requirements waived and why?
- What is the fee charged for the license and why?
- How often is an application rejected and why?
- How often are inspections conducted?
- How often are violators caught?
- Is there a need to meet the applicant in person, and if yes, what is the purpose of the meeting?

Reviewing regulations in consultation with business can also be beneficial beyond facilitating enhanced efficiency, by allowing regulatory authorities to understand how their procedures may be discriminatory. A common way for economies to build infrastructure is for government agencies to allow companies to competitively apply for the right to carry out certain projects, such as the development of renewable energy facilities. According to an environmental service provider operating in the region, in some APEC economies, the conditions under which companies compete for these project development permits are unfair to foreign firms.[151] For example, in their applications, companies are often required to showcase their prior experiences with successfully delivering similar projects. However, some government agencies only allow companies to mention their experiences from within that specific economy. Thus, foreign firms attempting to newly establish themselves in the economy are immediately a disadvantage. While such measures are often not necessarily designed to hinder to international trade or competition, they are oftentimes outdated, favoring incumbent and domestic service providers.

In APEC economies committed to the principles of liberalization, discriminatory policies can be eliminated only if they are identified. By consulting businesses about the environments in which they operate, government agencies can reveal hidden or unforeseen effects of legislation. Before significant investment is made to improve regulatory environments in APEC economies, the flaws and strengths of existing laws must be fully understood.

3.6.2 Additional Measures

Good regulatory practice is often structural, determined in large part by the size and scope of the responsible government agency. Many measures, such as the implementation of an external body to process appeals, are dependent on significant structural changes, and cannot be reached through relatively straightforward capacity building initiatives. However, there are further measures that economies can adopt to enhance their capacities to implement good regulatory practices.

Development of Singapore's OBLS was only made possible by significant investment in digital resources beginning in the 1980s, when the government committed to e-governance reforms to modernize public administration and service delivery. Even for practices less comprehensive than GoBusiness, government investment in digital capabilities is critical to good practices. This investment can facilitate the creation user-friendly interfaces upon which laws can be published, and allows agencies to build the capacity to offer additional resources, such as digital application forms, interactive instructions, and downloadable exemplars.

In globalized economies, there is no reason for language to act as a barrier to trade and investment, yet many APEC economies still have laws published in only one language. A solution here is for government agencies to place higher value on bilingual capabilities, in order to facilitate hires of individuals able to publish texts in languages other than the official ones of the host economies. If government agencies recognize the importance of such measures but lack the personnel, such work can be contracted to private firms.

On a related note, many government agencies in APEC economies may lack a critical mass of employees that would enable the implementation of good regulatory practice, particularly those related to accountability. For example, while removing redundancies from the application process would help, some agencies simply do not have the staff to enable them to make promises regarding the amount of time an application should take. These same agencies may also claim to not have the resources to allow an appeals process, year-round submissions, or re-filing of rejected or incomplete applications. Alongside any structural changes, APEC economies will need to make certain that their government agencies are adequately staffed.

In addition, APEC governments can perhaps do more to encourage regulatory alignment between regional authorities. In New Zealand, despite the strengths of the RMA and Resource Consent process, there is little cooperation between regional authorities in terms of implementation, and so requirements for consent applications can diverge greatly from location to location.[152] Government agencies may promote increased alignment by more tightly defining requirements in statute, facilitating discussions between regional authorities, or providing incentives for these authorities to reach a concurrence.

3.7 Conclusion

While economies work to liberalize trade in environmental services through international agreements, optimizing domestic regulation offers an opportunity to do so without the complexity of bilateral and multilateral negotiations. Crucially, moves to make licensing and approval measures more efficient, government agencies more accountable, and regulations more transparent, are unlikely to be met with stiff opposition. APEC has already worked to optimize domestic regulations with the APEC Non-Binding Principles for Domestic Regulation of the Services Sector (2018). Combining aspects of this document with similar principles from other organizations allows for the identification good practices that can be best applied to licensing and approval measures, which fall into the categories of Simplicity, Accessibility, Transparency, Accountability, and Cooperability.

New Zealand; Singapore; and Japan are liberalized economies that show how licensing and approval measures can be optimized through regulation, and how economies can implement these laws in different ways. New Zealand and Japan have laws at the central government level which direct systems of permissions that are ultimately controlled by local authorities. In these cases, regulatory requirements can differ between municipalities, depending on the extent to which the central law allows for local interpretation. Elsewhere, as in Singapore, the central government both publishes and enforces the regulation.

New Zealand's RMA is a law centered around transparency and accountability on behalf of local authorities. The RMA contains plentiful good regulatory practices, and provides the basis for a sweeping system of permissions called Resource Consents. Singapore's online system for permit application and management, GoBusiness, is a world-leading example of good practice in Simplicity and Accessibility. GoBusiness is a user-friendly and efficient system made possible by the economy's long commitment to digital governance initiatives. Japan's JETRO IBSC ensures that foreign firms have all of the support they can require to establish operations in Japan, showcasing a great deal of cooperation on behalf of the economy's government. More international providers of environmental services will surely benefit from IBSC services as the sector expands and FDI proliferates.

In terms of building the capacity to deliver good regulatory practices, the priority for APEC economies should be to review their established systems of licenses and approvals for providers of environmental services. Doing so in collaboration with the regulated entities will allow government agencies to focus their efforts on areas of the process in which reform will be most impactful. To complement the APEC Non-Binding Principles for Domestic Regulation of the Services Sector (2016), APEC should seek to produce frameworks by which economies can

review and judge their existing regulations in various categories, including licensing and approval measures, limits on foreign investment, and controls on use of land.

4 Capacity Building Needs for Technicians and Workers

4.1 Overview

In the realm of environmental services, high-level expertise is extremely valuable. Through the provision of key services, skilled and experienced workers can improve the quality of public infrastructure, stimulating further employment and economic growth. According to the American Wind Energy Association, wind energy supported over 120,000 jobs in the US in 2019 across a variety of fields including project operation, planning, manufacturing, construction, and others.[153] For many economies, environmental infrastructure is heavily dependent on international trade in environmental services, as the capacity of domestic workers and companies to complete these projects is insufficient to meet the need. Still, as discussed earlier, there is concern that international trade can lead to foreign firms undermining and outcompeting the domestic service providers that do exist. While this can occur, the efficiencies allowed by trade in environmental services should ultimately create more projects and opportunities for domestic workers of varying skill levels.

Capacity building can occur at various levels, helping to create accountable institutions organizations, enforceable regulations, effective project financing mechanisms, and more. In this report, the focus is on capacity building to enhance domestic human capacity, although training alone cannot overcome institutional capacity weakness.[154]

Local human capacity is important for three main reasons. The first is to unlock the potential for the domestic environmental services industry to flourish, creating a base of qualified individuals to own and staff valuable firms. The existence of strong domestic capacity can allay fears about liberalization acting only as a threat. Instead, with strong domestic firms able to withstand competition, liberalization can be approached as a means of generating a competitive market that only benefits from foreign participation. Moreover, as environmental service providers become internationally-competitive, they create export opportunities, which attune domestic officials to the benefits of more open global markets.

The second reason is that strong domestic capacity can attract foreign investment in environmental projects. Many environmental services projects, especially those related to complex large-scale infrastructure such as power plants and transmission infrastructure, require a critical mass of highly skilled professionals. An economy's ability to attract foreign companies with the capacity to administer these projects is heightened when these firms recognize the potential to employ, contract, or partner with local workers to carry out development projects as well as operate and maintain infrastructure. The third, closely related, point is that domestic service capacity can reduce the need for foreign firms to import workers, which can undermine liberalization benefits in terms of direct job creation.

Crucially, one must consider that the domestic environmental services sector's growth is heavily dependent on domestic demand for those services. Such demand arises out of increased public awareness of environmental issues and subsequent desire for services to bolster environmental protections. As the middle classes of economies expand, this demand, along with the number and strength of environmental regulations implemented by governments, tends to grow. Thus, policies to support broader economic growth and environmental education can be boons to the environmental services sector.

Engineers are deeply involved throughout the entire spectrum of environmental services, instrumental in the design, operation and maintenance of large-scale infrastructure and household level appliances key to environmental wellbeing. As mentioned earlier in this report, almost all engineering services in the CPC could reasonably apply to the environmental sector. Despite this, all renewable energy sub-sectors report skill shortages for engineers and technicians[155], a statement true in both developed and developing economies and likely to extend to other environmental services. Therefore, while exploring capacity building actions needed in developing economies to enhance human capacity of environmental services workers, it is worth placing particular emphasis on engineers. Successfully doing so will help create a wealth of well-paying jobs that are vital to the transition of developing economies into prosperity while tackling various forms of environmental degradation and promoting sustainable energy.

4.2 Producing Qualified Professionals

A common subject brought up regarding capacity in developing economies to develop technical industries is the relative lack of an adequately educated and certified population. When possible, economies need to provide financial and other support to universities and other institutions offering degrees and lower-level accreditations in engineering and related subjects. In some instances, this will mean institutions offering qualifications directly related to core environmental services at both the undergraduate and graduate levels.[156] Examples of such offerings within APEC economies can be found in Table 27.

Table 27: Higher Education Qualifications for Environmental Services

Qualification	Institution	Economy
Postgraduate Certificate in Geothermal Energy Technology	University of Auckland	New Zealand
Bachelors in Photovoltaics and Solar Energy	University of New South Wales	Australia
Advanced Diploma in Sustainable Energy and Building Technology	Humber College	Canada
Bachelor of Bio-Resource Science	University of Tsukuba	Japan
Master of Environmental Technology Management	Universiti Putra Malaysia	Malaysia

Source: Washington CORE

In other cases, more general engineering qualifications should offer specialist courses focusing on environmental services, which can expose students to relevant technology and provide experience considered valuable by potential employers.

When possible, qualifications should be accompanied by internship or apprenticeship requirements that enable graduates to enter the employment market with a degree of experience. Education programs and work experiences should be offered on a range of environmental services, and at various project stages. Many budding engineers tend to steer clear of careers delivering affordable and critical services for basic needs, which can be considered lower status “low technology engineering”.[157] Thus, graduates might be attracted to building large-scale infrastructure, such as hydropower dams, but less interested in operations and maintenance of such dams, or the development of smaller-scale infrastructure such as sewage or solar home systems. Historically, career guidance initiatives may have relied too heavily on “flashy” projects to attract individuals to engineering, at the expense of less glamorous services just as critical to environmental wellbeing. APEC economies should be cognizant of this imbalance when promoting professional development schemes.

Another critical tool for building a critical mass of highly skilled environmental services professionals is the creation of inclusive workplace and educational environments, particularly along the lines of gender and ethnicity. In order to ensure that the best possible candidates are pursuing careers in the environmental services sector, women and individuals of all ethnicities and social classes must feel confident that they will be entering a non-discriminatory environment in which equal opportunities are available to all. The foundation for this inclusive environment can be developed and perpetuated in the institutions responsible for the education and training of environmental services workers.

Good Practice: E-Mentoring Program

The Australian Women in Resources Alliance (AWRA) is a workforce gender diversity initiative facilitated by the Australian Resources and Energy Group (AMMA), the economy's resource industry group. The Women in Renewables Initiative (WiR) aims to support, empower, and highlight women working in Australia's renewable energy industry.

To encourage the participation and advancement of women in the industry, AWRA introduced e-mentoring as an alternative to traditional, face-to-face mentoring, which is sometimes not possible. In 2018, WiR took part in the e-mentoring program. During this time, mentees were also given access to online modules, webinars and handbooks.

Many capacity building initiatives focus on the "training of trainers", meaning placing emphasis on producing capable leaders in various fields. [158] Doctoral programs can play a major role in building capacity in environmental services by helping to produce a large suite of skilled educators. At present, PhD students focusing on environmental services in developing economies often receive lower quality education due to persistent issues such as low-quality infrastructure and lack of accountability on behalf of their supervisors.[159] A key but fixable shortfall is that, according to students, much of the research is not impact oriented, as academics independently set their own research projects without consultation with government and industry. When doctoral programs and governmental goals are more closely aligned, this provides researchers with opportunities to collaborate with prospective research users. Researchers are then able to engage with end users, including local communities, small business, and government, allowing them to gain applicable experience tailoring projects to the needs of key stakeholders. APEC economies would do well to support doctoral programs that train specialists in environmental services that are key to the future plans of the economy. This will ensure that critical services are delivered to the highest possible quality, and mean PhD holders will not be forced to migrate in order to deliver services for which they are best qualified.

4.3 Producing Hirable Professionals

In the context of trade in environmental services, it is critical that economies are on a path towards ensuring that qualifications are internationally recognized and competitive. This makes international linkages between qualifications a key capacity building need. These linkages make it possible for employers and contractors to understand the content, level, and quality of qualifications from unfamiliar economies.[160] Mutually-recognized qualifications are important for cases in which foreign companies are assessing the skills of workers available locally when making investment decisions. They can ensure that these firms are confident to hire local professionals rather than import talent, which may ordinarily provide more certainty but come at greater expense.

Good Practice: Solar Training Network
From 2016-2019, the U.S. government funded The Solar Training Network, an initiative to connect job seekers, employers, and training providers, this program helped bridge the gap between supply and demand in the solar jobs market.

Over the course of the program, the Solar Training Network hosted or supported 14 career fairs, and reached over 1,000 job seekers.

This program was designed to help meet an economy-wide goal to train 75,000 solar workers by 2020. Eight regional training centers were established across the economy.

At a general engineering level, developing economies should commit to build, implement and maintain engineering education, professional registration or licensing systems and frameworks that comply with the standard of internationally recognized benchmarks. [161] One such framework is the Washington Accord, maintained by the International Engineering Alliance. Economies that are part of the Washington Accord agree to grant the same rights and privileges to graduates of programs accredited by the other member economies as they grant to graduates from their own programs. Signatories joined the Washington Accord with the intention of enhancing the standards of engineering education and the competence of their engineers in the international market.[162] To ensure that qualifications gained in all member economies adhere to particular standards, the Washington Accord in 2013 agreed upon a set of attributes that engineering graduates of accredited programs should possess. The graduate attributes categorize what graduates should know, the skills they should demonstrate and the attitudes they should possess, as shown in Table 28.

Table 28: Washington Accord Graduate Attribute Profile

Element	Attributes
Engineering Knowledge	Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
Problem Analysis	Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences
Design/Development of Solutions	Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health, and safety, cultural, societal and environmental considerations.
Investigation	Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.
Modern Tool Usage	Create, select and apply appropriate techniques, resources and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitations.
The Engineer and Society	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems.
Environment and Sustainability	Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts.
Ethics	Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.
Individual and Teamwork	Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
Communication	Communicate effectively on complex engineering activities with the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.
Project Management and Finance	Demonstrate knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work as a member and leader in a team, to manage projects and in multi-disciplinary environments.
Lifelong Learning	Recognize the need for, and have the preparation and ability to engage in, independent and life-long learning in the broadest context of technological change.

Source: International Engineering Alliance[163]

Of the 15 Washington Accord signatories, 10 are APEC economies. In addition, China and the Philippines are among the economies that hold provisional status. A provisional economy becomes a full member only when current members unanimously agree that its standards and processes have reached an appropriate level. For economies not yet involved with the Washington Accord, developing engineers through programs in line with international standards will help boost the quality of domestic companies, attract foreign investment, and create potential for the export of services in future.

A similar system is the APEC Engineer register. The register is fostered by an agreement among APEC economies to recognize "substantial equivalence" of professional competence in engineering. APEC economies can become members of the agreement by demonstrating that they have systems that allow the competence of engineers to be assessed to the agreed international standard set by the APEC Engineer agreement. 15 APEC economies, represented by their respective engineering associations, are part of the Agreement, which facilitates movement of engineers within the region (see Table 29).[164]

APEC Engineers are expected to satisfy technical issues specific to the economy in which they are providing services.[165] These professionals can be approved for independent practice in a number of different engineering disciplines (civil, structural, geotechnical, environmental, mechanical, electrical, industrial, mining, chemical), all of which can be critical to the provision of various environmental services.

Table 29: Membership of APEC Economies in Mutual Recognition Agreements for Engineering

Economy	Washington Accord	APEC Engineer
Australia	✓	✓
Brunei Darussalam	X	X
Canada	✓	✓
Chile	X	X
People's Republic of China	O[xix]	X
Hong Kong, China	✓	✓
Indonesia	X	✓
Australia	✓	✓
Republic of Korea	✓	✓
Malaysia	✓	✓
Mexico	X	X
New Zealand	✓	✓
Papua New Guinea	X	X
Peru	X	✓
The Philippines	O	✓
Russia	✓	✓
Singapore	✓	✓
Chinese Taipei	X	✓
Thailand	X	✓
The United States	✓	✓
Viet Nam	X	X

Source: Washington CORE (APEC, International Engineering Alliance)

These programs highlight the importance of developing engineering qualifications in line with the standards existing in other economies, particularly those with more advanced sectors. For the few APEC economies currently not part of either of the above agreements (Brunei; Chile; Mexico; Papua New Guinea; Viet Nam), these present ready-made opportunities to build domestic capacity to provide and export environmental services.

Economies can pursue these goals in multiple ways, including through bilateral and plurilateral trade agreements. The Indonesia-Australia Comprehensive Economic Partnership Agreement (IA-CEPA), signed in 2020, includes a "Side Letter on Mutual Recognition for Professional Engineers".[166] Amongst other provisions, the letter notes that, once Indonesia reaches Washington Accord provisional status, the two economies will "encourage their relevant bodies to enter into negotiations on mutual recognition of professional engineers, including in the field of mining engineering, with a view to establishing a framework to enable professional engineers to engage in independent practice and achieve mutually beneficial outcomes in the two [economies]".

APEC economies could also pursue internationally-recognized training and qualification programs specific to the provision of environmental services. A relevant example is the EU's Windskill initiative, which ran from 2006 to 2009. The program was designed to address issues caused by the incompatibility of qualification certificates in different economies for operations and maintenance workers across the EU. One such issue was employment bottlenecks, caused when service providers were unable to tap foreign economies for talent in the absence of consistent skill profiles. Windskill attempted to provide a transnational reference framework for qualifications for

[xix] O denotes provisional membership

wind energy operations and maintenance workers. It did so by creating an EU qualification profile and developing a training program to help workers meet the qualifications.[167]

Similarly, Directive 2009/28/EC of the European Parliament required member states to establish qualification schemes for installers of small-scale biomass boilers and stoves, solar photovoltaic and solar thermal systems, shallow geothermal systems and heat pumps.[168] The Directive was aimed at promoting the use of renewable energy, and laid out that the qualifications schemes in each member state were to be recognized in all others, and meet a set of criteria also laid out in the Directive. To ensure effective implementation of the Directive, the EU's QualiCert program (2009-2011) assessed qualification schemes across the region and developed a manual containing best practices and recommendations for training programs for workers concerning each respective technology.[169]

APEC economies might seek to develop their own common training frameworks for workers in environmental services, or base future programs on tried and tested frameworks in other regions, such as the EU. In either case, if able to attain internationally-recognized certifications, workers in environmental services will be better equipped to face up to competition, both at home and abroad.

4.4 Resource Sharing for Existing Workers

While the quality of education and qualifications of environmental service workers are critical to building domestic capacity, there are numerous ways to improve the environment for those already in the field. A key area here is expanding opportunities for engineers and other technical workers to access professional development resources.[170]

As discussed elsewhere in this report, a defining characteristic of the environmental services sector is its rapid evolution. As such, domestic workers will require access to courses that enable them to update their knowledge and skillsets in line with the evolution of the sector. Especially for the sake of competitiveness, these capacity upgrades will ideally be accompanied by certifications that can be verified by potential contractors and employers. Workers must be able to prove not only that they can provide quality services, but that they are familiar with the latest industry techniques and technologies.

When possible, professional development training should be available as an add-on to employment, or online, so that professionals are not forced to choose between their current employment and pursuing opportunities to further their careers. Where internet access is not a barrier, online courses increase accessibility to professional development for those with travel or time constraints.

GreenEducation.US is a good model for other APEC economies, as similar offerings are valuable for environmental services professionals regardless of whether institutions within the economy itself provide the materials. Economies without a wealth of certification and

qualification programs will still benefit from sharing training resources with domestic workers, even if the resources were developed elsewhere.

Resource sharing can be useful for building individual capacity even if it does not result in official qualifications. Despite their benefits, certifications can be inaccessible to workers due to barriers including time requirements and cost. Therefore, APEC economies can work to improve the access of environmental services workers to resources such as good practice guides, case studies, technical papers, journals, and magazines in their relevant fields. Workers in the solar energy industry, for example, should have access to resources such as PV Magazine, which provides news and insight about the latest developments in solar power. [171] Versions are available that cover global developments, while others focus on specific economies, including the United States; Mexico; Australia; and China. When possible, APEC economies should facilitate either access to existing resources (through subscription subsidization) or the creaViet NamViet Nation of domestic periodicals that keep workers informed. The dissemination of print copies of informative material can reduce the impact of inconsistent or limited internet access.

Good Practice: GreenEducation.US

GreenEducation.US, a web-based is an online learning management system focused on the environmental services industry. Through the website, waste management professionals can discover and access qualifications, courses, and informative webinars.

As one example, the system provides links to the Certificate in Sustainable Resource Management, which covers topics including solid waste, recycling, reuse, composting, and Zero Waste.[i] The certification can be completed entirely remotely, and the package includes:

- Self-paced courses
- A certification test preparation class
- Short assignments based on real-world application and research
- A student discussion forum
- A supplemental resource list and reading materials
- Additional pre-recorded and live webinars

On a similar note, the World Bank's Energy Sector Management Assistance Program (ESMAP) has published material from its Renewable Energy Training Program, which was run in 2012 and available to World Bank Group staff and interested energy sector stakeholders.[172] Through ESMAP, interested professionals can access case studies and presentations, compiled by international experts on various environmental technologies, that were originally intended for the Renewable Energy Training Program. One available presentation is from General Electric International, a U.S conglomerate that manufacturers wind turbines, about advancements of turbine blades, towers, and control technology. [173] Access to information can help foster creativity, encourage local workers to seek out new resources, and spur demand for more training courses by increasing exposure and piquing curiosity.

4.5 Providing Access to Professional Networks

APEC economies should also seek to establish professional networks and support systems that can be utilized by engineers and other workers in the environmental services sector. According to the World Federation of Engineering Organizations (WFEO), foundational to the engineering profession is the ability to seek support in terms of mentorship and exchange of ideas.[174] As mentioned earlier, workers need access to technical tools, including codes of practices, guidelines, and case studies. Yet practitioners in developing economies can often to

lack these resources, which are provided to their counterparts elsewhere by sectoral institutions or educational establishments.

When possible, economies should look to construct central facilities for workers in different roles and segments in the environmental services sector. In these facilities, which can be virtual or physical, workers should be able to access educational and technical material. Moreover, here should reside opportunities to seek mentorship and advice about career development or specific tasks. In addition, environmental services workers should be able to access open forums in which they can ask questions, share ideas, and receive feedback, as well as engage in professional discourse.

Good Practice: International Journal of Environmental Pollution and Remediation

The International Journal of Environmental Pollution and Remediation (IJEPR) is a peer-reviewed journal. IJEPR has adopted an open-access model, meaning all interested audiences have free access to the journal's homepage and articles with no need for subscription.

IJEPR welcomes research and review papers related to a number of critical environmental services, including:

- Air Pollution and Treatment
- Climate Change
- Groundwater Issues
- Pollution and Health Issues
- Renewable and Non-Renewable Energies
- Soil Pollution and Treatment
- Wastewater Management and Treatment
- Water Pollution and Treatment

To augment all of this, economies should seek to facilitate regular in-person opportunities for environmental services workers to meet, network, and collaborate. These opportunities could come in the form of conferences, workshops, or other events.

Such networks can enhance the knowledge of domestic workers, and also provide them with spaces in which their voices are heard and ideas recognized. A positive environment can be help economies to retain professionals that may have otherwise feel isolated and that they might need to migrate in order to seek opportunities for professional growth. Networks also create the potential for collective action, and for environmental services workers to combine to advocate on behalf of themselves and the sector at large. Situations may arise in which professionals need to express needs and concerns, perhaps in terms of funding, employment opportunities, or government priorities. Again, for many workers, a feeling of agency may be the difference between remaining in an economy and taking their talents abroad.

Many economies cannot offer these resources, often because they have communities of environmental services workers too small to organize effective mutual support systems. These economies should seek to build capacity of their workers by way of collaboration with neighboring economies that indeed have such resources available, or the potential for such resources. As mentioned earlier, economies should provide access to public training materials produced in other economies. Similarly, partnerships within APEC would allow more workers to access collaborative networks. Such partnerships could only foster more creativity by having a wider range of projects, issues, and solutions under discussion. In this way, coalitions of APEC economies might develop joint web portals and publications, and hold joint conferences for workers in the energy, waste, and environmental remediation sectors, respectively.

Good Practice: Hazardous Substances Management Workshop

WasteMINZ, New Zealand's largest waste management industry group, in 2019 hosted a 'Hazardous Substances Management Workshop'.

The workshop provided practical information to aide professionals in interpreting safety information and managing hazardous substances. The event was open to all, and useful to waste management workers whether they were managers/supervisors, new employees, or long-term employees looking to refresh their knowledge bases.

The workshop was split into 6 sections:

- Overview (Hazardous Substances and Dangerous Goods)
- Legal aspects – relevant legislation and overview of key legal principles
- Safety data sheets
- Safe storage of chemicals
- Emergency response and spill management
- Hazardous waste management

4.6 Conclusion

Building capacity of domestic workers in the environmental services sector is important on a number of fronts, each of which can promote trade liberalization. Capacity building can help domestic environmental services sectors reach their potential, encourage FDI, and convince firms to hire skilled local workers rather than import talent. As with many technical sectors, engineering is a professional field of particular importance and is relevant to most aspects of the delivery of environmental services. This can be confirmed in the CPC, in which any set of cluster services would likely include the majority of the division relating to engineering services.

APEC economies are already working to promote initiatives that can help build the capacity of engineers, through initiatives such as APEC Engineer and the Washington Accord. These programs promote internationally recognized standards for the development of engineers, which allow individuals across APEC to have their abilities acknowledged and professionally appreciated by firms in economies that are not their own. This facilitates the movement of skilled workers around APEC, but also means that foreign firms entering a new economy can more readily recognize the skills of local workers. APEC economies have also entered into bilateral agreements regarding mutual recognition of engineering qualifications, to the same effect. Economies that are not part of these initiatives would benefit from working towards membership. When this is not viable, economies should still look to replicate the principles that underlie the internationally-recognized qualifications in their own domestic training programs.

APEC economies should also consider ways to grow the employment pool in the environmental services sector. Fundamentally, cultivating inclusive environments helps ensure that the best candidates are applying and being considered for all roles within the environmental services sector. In addition, increasing the availability and quality of courses directly related to the environmental sector will filter more people into the closely-linked professions. A key component of this is also working to make sure engineers and other technicians are not only attracted by major infrastructure projects, but also smaller scale works still vital to the everyday lives of most people.

The work does not with producing qualified individuals. APEC economies also need to provide consistent support to workers in burgeoning service sectors. This may be through expanding access to professional networks,

facilitating access to technical materials, or hosting workshops and seminars at which workers can find themselves part of an integrated and evolving group. All of these serve to guarantee that more workers are equipped with sufficient resources that will allow them to pursue professional growth domestically.

APEC itself has a significant role to play in capacity building efforts in the environmental services sector. Building on the successes of APEC Engineer, the organization should encourage economies to collaborate to align skills and qualifications specific to the environmental services sector. This could include skills to provide services in installation, such as for septic tank or solar power systems, or broader areas such as environmental remediation. APEC could also seek to develop such initiatives itself, and strive to bring member economies on board. In addition, APEC should encourage member economies to explore the potential for collaboration on other joint capacity building measures, such as professional workshops and training programs for environmental services workers.

5 Final Thoughts

In the wake of the COVID-19 pandemic, APEC leaders have acknowledged the central role that international trade should play in helping economies to both recover economically and build resiliency against future shocks. Environmental services are wide-ranging, and have the potential to support the region's transition to a "new normal" in myriad ways. Private firms have the capacity to provide high quality environmental services and develop critical infrastructure projects ranging from renewable energy to waste management. Frictionless trade in these services can provide employment, spur competition, and help to enhance quality of life for residents in all APEC economies.

Stakeholders around the globe have recognized this potential. APEC has devoted significant resources to ESAP since its endorsement in 2015, which has led to insightful reports and concrete actions, the most recent of which a lively online workshop held in August 2020. ESAP has succeeded in facilitating crucial discussions about the importance of environmental services in the context of a fragile global environment and changing economy. APEC is not the only international organization giving attention to environmental services; the OECD has plans to extend the STRI to cover environmental services. Crucially, the index will also include related sectors such as engineering and construction. A working group within the WTO is exploring ways to break deadlocks on multilateral environmental services negotiations.

As APEC economies engage in services negotiations at various levels, the hope is for the publication of this report to give added context and perspective to both actors and keen observers. Understanding the challenges that have historically hindered multilateral or even plurilateral alignment on environmental services is key for negotiators to develop proposals with the best chances for success in future. The case studies in this report show that a diverse set of measures can be implemented domestically to promote trade in environmental services, even just relating to licensing and approval. There are many other regulatory areas that economies can target for optimization, which should be reason for optimism. In addition, the report aims to encourage APEC economies to consider readily available solutions to support environmental services professionals, and to otherwise explore opportunities for regional collaboration on capacity building initiatives.

A useful next step to build on this study would be for APEC to conduct surveys of member economies to learn about measures that have been implemented to support the environmental services sector. Similar work was conducted for APEC's Manufacturing-related Services Action Plan (MSAP), and produced useful results. Future studies could also look more broadly at good regulatory practices related to the environmental services sector, including areas other than licensing and approval, such as local content requirements. Ultimately, an extensive repository of best practices could be a beneficial resource for policymakers. Finally, again on the topic of domestic regulation, APEC should facilitate dialogues about how developing economies can balance the need to regulate environmental services providers with the need to attract FDI.

APEC will continue to support efforts to ensure that regulations in member states are transparent, efficient, and implemented with clear policy goals in mind. The ESAP agenda will remain consistent with wider APEC commitments to pursue free trade in the Asia-Pacific, and to facilitate healthy and sustainable environments for all residents.

Appendix A: Key Acronyms

Acronym	Name
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
CPC	Central Product Classification
CTESS	Committee on Trade and Environment in Special Session (WTO)
CTI	Committee on Trade and Investment (APEC)
EC	European Commission
EGS	Environmental Goods and Services
EPA	Environmental Projects Approach
EPHA	Environmental Public Health Act (Singapore)
EPMA	Environmental Protection and Management Act (Singapore)
ESAP	Environmental Services Action Plan
EU	European Union
FTA	Free Trade Agreement
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
IBSC	Invest Japan Business Support Center
JETRO	Japan External Trade Organization
METI	Ministry of Economy, Trade and Industry (Japan)
MFN	Most Favored Nation
OECD	Organisation for Economic Co-operation and Development
PSU	Policy Support Unit (APEC)
R&D	Research and Development
RMA	Resource Management Act (New Zealand)
SDG	Sustainable Development Goal
SIA	Sustainability Impact Assessment
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
US	The United States
WTO	World Trade Organization

Appendix B: Relevant APEC Studies

Name	Description
Study Report on APEC Environmental Services Related Technology Market (2014)	This project is designed to enhance the understanding of Environmental Services (ES) and ES-related technology and examine and learn the general information on the ES-related technology market in Asia-Pacific region by capacity building, needs and supply assessment, so as to promote ES trade and ES-related technology market and improve capacities of APEC economies to develop this sector.
APEC Workshop on Environmental Services in the 21st Century: Challenges and Opportunities for Sustainability (2015)	This report looks at how the discussion over key issues, challenges and opportunities posed for environmental services, in addition to the sharing of current and best practices in environmental services and environmental services industries facilitated the development and liberalisation of environmental services in APEC member economies in the promotion of environmentally-responsible economic growth.
Survey of Regulatory Measures in Environmental Services (2016)	Prepared in support of the APEC Environmental Services Action Plan, this report presents an overview of regulatory measures for environmental services in APEC economies. It includes a summary of the scope and coverage of services and measures; an overview of the institutional frameworks, the incidence of regulatory measures and the extent of liberalisation in trade agreements of environmental services identified across APEC economies; and summary outcomes of measures identified in each APEC economy. While the findings show considerable variations across the member economies, some trends are apparent. One such trend is that while not all economies have committed to market opening of environmental services in the WTO GATS, all have improved on WTO liberalisation outcomes in subsequent FTAs.
Sector Study on Environmental Services: Energy Efficiency Businesses (2017)	This study is one of three sector studies on environmental services prepared in support of the APEC Environmental Services Action Plan. It aims to build and enhance the understanding of energy efficiency services among APEC economies, with a view to identifying key challenges. Understanding and addressing challenges and opportunities faced by energy efficient equipment manufacturers and service providers will empower APEC economies to rapidly employ energy efficiency and conservation strategies. The report contains a detailed analysis of energy efficiency service providers - business models, market conditions and challenges facing the sector, including the interactions between the service providers and other energy efficiency stakeholders. It also describes technology trends in the energy efficiency market as well as the demand drivers and opportunities facing the energy efficiency services sector.

Name	Description
Sector Study on Environmental Services: Environmental Damage Remediation Services (2017)	This study is one of three sector studies on environmental services prepared in support of the APEC Environmental Services Action Plan. Remediation services encompass the treatment, removal and disposal of contaminated material, typically soil, water and groundwater, building decommissioning and demolition works, and decontamination of workplaces, buildings, vessels or other internal occupied spaces. Goods and services associated with remediation services delivery include technical and scientific consulting, construction and engineering, equipment and chemical manufacture, research and development, and others (treatment and disposal, analytical, litigation, insurance services etc.). The report provides an overview of the remediation services sector, followed by details of the sector in each APEC member economy. It then concludes with possible next steps for the development of the sector; these include the need for APEC economies to prioritize and develop transparent regulations and standards for contamination management and remediation, and strengthen effective enforcement of the regulations and standards. Availability of funding mechanisms for site assessment and remediation commensurate with the level of effort required for such services is also key in sustaining remediation efforts.
Sector Study on Environmental Services: Renewable Energy (2017)	This study is one of three sector studies on environmental services prepared in support of the APEC Environmental Services Action Plan. It seeks to build and enhance understanding of environmental services in the renewable energy sector, specifically in the power generation sector which uses technologies associated with solar photovoltaics, wind turbines, and hydroelectricity. This would include services in project development and project financing. The report starts with a brief discussion of coverage and competing definitions of renewable energy and renewable energy services and the conventions. It then gives an overview of key market characteristics and trends of the renewable energy sector, followed by a discussion of business models in the solar photovoltaics, wind-power and small hydropower sectors. The report next focuses on barriers to trade in renewable energy services, before it concludes with remarks on policy priorities that may be considered in defining renewable energy services.
Study on APEC's Non-binding Principles for Domestic Regulation of the Services Sector (2020)	The study on APEC's Non-Binding Principles for Domestic Regulation of the Services Sector examines the process of developing domestic regulations, focusing on the transparency provisions of APEC's Non-Binding Domestic Regulation Principles: publishing and making information available, advanced notice and opportunity to comment, and establishment of enquiry points. It is complemented by inputs from an APEC workshop held in Chile in August 2019 and provides an analysis of transparency and predictability principles in select recent trade agreements and initiatives. Preliminary findings present a general outlook of APEC member commitments to transparency principles and challenges and gaps in upholding them.

Name	Description
Workshop on Best Practices Sharing to Improve Application of the APEC Non-Binding Principles for Domestic Regulation of the Services Sector (2020)	This report provides policy recommendations based on a one-day workshop held on 19 August 2019, in Puerto Varas, Chile to collect various views from relevant international organizations and share best practices in applying the APEC principles to not only sector-specific but also cross-cutting issues. The workshop aimed at promoting awareness on the APEC principles as a guideline for implementing effective regulatory reform; share member economies' best practices in applying the APEC principles on sector-specific and cross-cutting issues; identify possible challenges and opportunities in implementing the APEC principles; and discuss ways to harmonize the APEC principles with economies' right to regulate, and to improve the principles for better regulation.

Appendix C: ESAP Workshop Presentation

Please see separate document.[xx]

[xx] A presentation summarizing the findings from this study was delivered August 19th, 2020, during the Workshop on ESAP. The full name of the event was: Workshop on Manufacturing-Related Services and Environmental Services - Contribution to the Final Review of Manufacturing Related Services Action Plan and Environmental Services Action Plan 2020.
The meeting documents, including the presentation slide on the current study, can be downloaded from the APEC Meeting Document Database (MDDB):
http://mddb.apec.org/Pages/search.aspx?setting=ListMeetingGroup&DateRange=2020/08/01%2C2020/08/end&Name=Workshop%20on%20Manufacturing-Related%20Services%20and%20Environmental%20Services%20-%20Contribution%20to%20the%20Final%20Review%20of%20Manufacturing%20Related%20Services%20Action%20Plan%20and%20Environmental%20Services%20Action%20Plan%202020&APECGroup=%22Group%20on%20Services%20%28GOS%29%22

Appendix D: Environmental Services Schedules in GATS

A number of APEC economies have Environmental Services commitments in GATS, which can be seen in the tables below. The following are useful definitions for interpreting the schedules:

- None: There are no liberalization limitations for either Market Access or National Treatment relating to the scheduled services.
- Unbound: The Member wishes to remain free in a given sector and mode of supply to introduce or maintain measures inconsistent with market access or National Treatment.
- Horizontal Commitments: Stipulate limitations that apply to all of the sectors included in the schedule; these often refer to a particular mode of supply.
- Numbers in parentheses (x): Relate to the particular mode of supply.

Australia

Sector or Sub-Sector	Limitations	
	Market Access	National Treatment
ENVIRONMENTAL SERVICES A. Sewage services (9401) B. Refuse disposal services (9402) C. Sanitation and similar services (9403)	(1) Unbound (2) None (3) None (4) Unbound except as indicated in the horizontal section	(1) Unbound (2) None (3) None (4) Unbound except as indicated in the horizontal section

Canada

Sector or Sub-Sector	Limitations	
	Market Access	National Treatment
ENVIRONMENTAL SERVICES A. Sewage services (9401) B. Refuse disposal services (9402) C. Sanitation and similar services (9403) D. Other Cleaning services of exhaust gases (CPC 9404)	(1) None (2) None (3) None (4) Unbound except as indicated in the horizontal section	(1) None (2) None (3) None (4) Unbound except as indicated in the horizontal section

China

Sector or Sub-Sector	Limitations	
	Market Access	**National Treatment**
ENVIRONMENTAL SERVICES (excluding environmental quality monitoring and pollution source inspection) A. Sewage Services (CPC 9401) B. Solid Waste Disposal Services (CPC 9402) C. Cleaning Services of Exhaust Gases (CPC 9404) D. Noise Abatement Services (CPC 9405) E. Nature and Landscape Protection Services (CPC 9406) F. Other Environmental Protection Services (CPC 9409) G. Sanitation Services (CPC 9403)	(1) Unbound except for environmental consultation services. (2) None (3) Foreign services suppliers engaged in environmental services are permitted to provide services only in the form of joint ventures, with foreign majority ownership permitted. (4) Unbound except as indicated in horizontal commitments.	(1) None (2) None (3) None (4) Unbound except as indicated in horizontal commitments.

Japan

Sector or Sub-Sector	Limitations	
	Market Access	**National Treatment**
ENVIRONMENTAL SERVICES		
A. Sewage Services (9401)	1) Unbound[xxi] 2) None 3) None 4) Unbound except as indicated in HORIZONTAL COMMITMENTS	1) Unbound 2) None 3) None except as indicated in HORIZONTAL COMMITMENTS 4) Unbound except as indicated in HORIZONTAL COMMITMENTS
B. Refuse Disposal Services (9402)	1) Unbound 2) None 3) The number of licences conferred to service suppliers of waste oil disposal at sea from vessels may be limited. 4) Unbound, except as indicated in the horizontal section	1) Unbound 2) None 3) None except as indicated in HORIZONTAL COMMITMENTS 4) Unbound except as indicated in HORIZONTAL COMMITMENTS
C. Sanitation and Similar Services (9403)	1) Unbound 2) None 3) None 4) Unbound except as indicated in HORIZONTAL COMMITMENTS	1) Unbound 2) None 3) None except as indicated in HORIZONTAL COMMITMENTS 4) Unbound except as indicated in HORIZONTAL COMMITMENTS
D. Other Cleaning services of exhaust gases (9404) Noise abatement services (9405) Nature and landscape protection services (9406) Other environmental protection services (9409)	1) Unbound 2) None 3) None 4) Unbound except as indicated in HORIZONTAL COMMITMENTS	1) Unbound 2) None 3) None except as indicated in HORIZONTAL COMMITMENTS 4) Unbound except as indicated in HORIZONTAL COMMITMENTS

[xxi] Mode 1 supply unbound due to lack of technical feasibility.

Korea

Sector or Sub-Sector	Limitations	
	Market Access	**National Treatment**
ENVIRONMENTAL SERVICES		
A. SEWAGE SERVICES Refuse Water Disposal Services [9401[xxii]]	1) Unbound 2) None 3) The number of service suppliers is limited to twenty-five (25). 4) Unbound except as indicated in ALL SECTORS	1) None 2) None 3) None 4) Unbound except as indicated in ALL SECTORS
B. REFUSE DISPOSAL SERVICES Industrial Refuse Disposal Services [9402[xxiii]]	1) Unbound 2) None 3) Establishment of a commercial presence is subject to the economic needs test. Refuse collection and transport service suppliers may conduct business only within the jurisdiction of the respective Regional Environment Office which has granted them approval for operation. 4) Unbound except as indicated in ALL SECTORS	1) None 2) None 3) None 4) Unbound except as indicated in ALL SECTORS
C. OTHER Cleaning Services of Exhaust Gases and Noise Abatement Services [9404, 9405[xxiv]]	1) None 2) None 3) None 4) Unbound except as indicated in ALL SECTORS	1) None 2) None 3) None 4) Unbound except as indicated in ALL SECTORS
Environment Testing and Assessment Services [9406, 9409[xxv]]	1) None 2) None 3) Establishment of a commercial presence is subject to the economic needs test. 4) Unbound except as indicated in ALL SECTORS	1) None 2) None 3) None 4) Unbound except as indicated in ALL SECTORS

[xxii] Only collection and treatment services of industrial waste water under CPC 9401.
[xxiii] Only collection, transport and disposal services of industrial refuse under CPC 9402.
[xxiv] Services other than construction work services under CPC 9404 and 9405.
[xxv] Only environmental impact assessment services under CPC 9406 and 9409.

Russia

Sector or Sub-Sector	Limitations	
	Market Access	**National Treatment**
ENVIRONMENTAL SERVICES (Except for treatment of radioactive wastes/contamination). A. Sewage services (CPC 9401) B. Refuse disposal services (CPC 9402) C. Sanitation and similar services (CPC 9403) D. Other: Cleaning services of exhaust gases (CPC 9404) Noise abatement services (CPC 9405) Nature and landscape protection (CPC 9406) Environmental impact assessment services (CPC 9409).	(1) Unbound, except the following: - for environmental impact assessment services (CPC 9409*) - none; - for consultancy/advisory services - none. (2) None. (3) None, except the following: - with respect to treatment of hazardous wastes: commercial presence is allowed only in the form of a juridical person of the Russian Federation. (4) Unbound except as indicated in Part I "Horizontal commitments".	(1) Unbound, except the following: - for environmental impact assessment services (CPC 9409*) - none; - for consultancy/advisory services - none. (2) None. (3) None, except as indicated in the column "Limitations on market access". (4) Unbound except as indicated in Part I "Horizontal commitments".

Chinese Taipei

Sector or Sub-Sector	Limitations	
	Market Access	**National Treatment**
ENVIRONMENTAL SERVICES A. Sewage Services (9401); Refuse Disposal Services (9402); Sanitation and Similar Services (9403); Others (9404, 9405, 9409)	(1) Unbound (2) None (3) None (4) Unbound except as indicated in the horizontal section	(1) None (2) None (3) None (4) Unbound except as indicated in the horizontal section.
B. Consulting Services Incidental to Nature and Landscape Protection (9406)	(1) None (2) None (3) None (4) Unbound except as indicated in the horizontal section.	(1) None (2) None (3) None (4) Unbound except as indicated in the horizontal section.

Thailand

Sector or Sub-Sector	Limitations	
	Market Access	**National Treatment**
ENVIRONMENTAL SERVICES		
Environmental Consultancy on Sewage System, Refuse Disposal, Hazardous Waste Management, Air Pollution and Noise Management, Sanitation and Other Environmental Management Services (CPC 9401) Environmental Protection and Environmental Abatement Services (CPC 9401)	1) None 2) None 3) None other than that indicated in the horizontal section 4) As indicated in the horizontal section	1) None 2) None 3) No limitations as long as foreign equity participation does not exceed 49 per cent 4) None
Sewage Services (including industrial waste water treatment system) (CPC 9401) Refuse Disposal Services (including hazardous waste management and incinerator) (CPC 9402) Sanitation and Similar Services (CPC 9403) Other Cleaning services of exhaust gases (including industrial emission abatement) (CPC 9404) Noise abatement services (CPC 9405) Nature and landscape protection services (CPC 9406) Other environmental protection services (CPC 9409)	1) Unbound 2) None 3) None other than that indicated in the horizontal section 4) As indicated in the horizontal section	1) Unbound 2) None 3) No limitations as long as foreign equity participation does not exceed 49 per cent 4) None

United States

Sector or Sub-Sector	Limitations	
	Market Access	**National Treatment**
eENVIRONMENTAL SERVICES[xxvixxvii]		
A. Sewage Services (contracted by private industry)	1) None 2) None 3) None 4) Unbound, except as indicated in the horizontal section	1) None 2) None 3) None 4) None
B. Refuse Disposal Services (contracted by private industry)	1) None 2) None 3) None 4) Unbound, except as indicated in the horizontal section	1) None 2) None 3) None 4) None
C. Sanitation and Similar Services	1) None 2) None 3) None 4) Unbound, except as indicated in the horizontal section	1) None 2) None 3) None 4) None
D. Other (Cleaning services of exhaust gases; Noise abatement services; Nature and landscape protection services; Other environmental services, n.e.c.)	1) None 2) None 3) None 4) Unbound, except as indicated in the horizontal section	1) None 2) None 3) None 4) None

[xxvi] In each of the following subsectors, US commitments are limited to the following activities: implementation and installation of new or existing systems for environmental cleanup, remediation, prevention and monitoring; implementation of environmental quality control and pollution reduction services; maintenance and repair of environment-related systems and facilities not already covered by the US commitments on maintenance and repair of equipment; on-site environmental investigation, evaluation, monitoring; sample collection services; training on site or at the facility; consulting related to these areas.

[xxvii] Nothing in this offer related to transportation should be construed to supersede the existing US commitments on transportation or related MFN exemptions

Viet Nam

Sector or Sub-Sector	Limitations	
	Market Access	**National Treatment**
ENVIRONMENTAL SERVICES[xxviii]		
Sewage Services (CPC 9401)[xxix]	(1) Unbound, except related consulting services. (2) None. (3) None, except: Confirming that services supplied in the exercise of governmental authority as defined in Article I:3(c) may be subject to public monopolies or exclusive rights granted to private operators. Upon accession joint ventures with foreign capital contribution not exceeding 51 % are allowed during 4 years after accession. After that, none. (4) Unbound, except as indicated in the horizontal section	(1) Unbound, except related consulting services. (2) None. (3) None. (4) Unbound, except as indicated in the horizontal section.
Refuse disposal services (CPC 9402)[xxx]	(1) Unbound, except related consulting services. (2) None. (3) None, except: Confirming that services supplied in the exercise of governmental authority as defined in Article I:3(c) may be subject to public monopolies or exclusive rights granted to private operators. Foreign ownership is limited to 51 % during 4 years after accession. After that, none. For the purpose of ensuring public welfare, foreign-invested enterprises are restricted from collecting refuse directly from households. They are only permitted to provide services at the refuse collection points as specified by local municipal and provincial authorities. (4) Unbound, except as indicated in the horizontal section.	(1) None (2) None (3) None (4) Unbound, except as indicated in the horizontal section.
Other services - Cleaning services of exhaust gases (CPC 94040) and noise abatement services (CPC 94050)	(1) Unbound, except related consulting services. (2) None.	(1) Unbound, except related consulting services. (2) None. (3) None.

[xxviii] Access to certain geographic areas may be restricted for national security reasons.

[xxix] Foreign companies are allowed to do business activities in Viet Nam in the form of build-operate-transfer (BOT) and build-transfer-operate (BTO).

[xxx] Foreign companies are allowed to do business activities in Viet Nam in the form of build-operate-transfer (BOT) and build-transfer-operate (BTO).

	(3) None, except: Confirming that services supplied in the exercise of governmental authority as defined in Article I:3(c) may be subject to public monopolies or exclusive rights granted to private operators. Foreign ownership is limited to 51 % during 4 years after accession. After that, none. (4) Unbound, except as indicated in the horizontal section	(4) Unbound, except as indicated in the horizontal section.
Environmental impact assessment services (CPC 94090*)	(1) None. (2) None. (3) None, except that foreign ownership is limited to 51% during 4 years after accession. After that, none. (4) Unbound, except as indicated in the horizontal section.	(1) None. (2) None. (3) None. (4) Unbound, except as indicated in the horizontal section.

Appendix E: References

[1] "Structural Reform Services", APEC, 2017. https://www.apec.org/Publications/2017/06/Structural-Reform-and-Services

[2] "Trade in Services", APEC, 2010. https://www.apec.org/Publications/2010/10/Trade-in-Services-in-the-APEC-Region-Patterns-Determinants-and-Policy-Implications-October-2010

[3] "Policy Support Unit Baseline Indicators", APEC, 2017. https://www.apec.org/Publications/2017/11/APEC-Services-Competitiveness-Roadmap-Baseline-Indicators

[4] "APEC in Charts 2018", APEC, 2018. https://www.apec.org/Publications/2018/11/APEC-in-Charts-2018

[5] "Regional Trends Analysis 2019", APEC, 2019. https://www.apec.org/Publications/2019/11/APEC-Regional-Trends-Analysis-Counting-What-Counts

[6] "APEC History", APEC, 2020. https://www.apec.org/About-Us/About-APEC/History

[7] "Trade in Services Related to the Environment", OECD, 2017. https://www.oecd-ilibrary.org/docserver/dc99bf2b-en.pdf?expires=1585079763&id=id&accname=guest&checksum=19A077F3FBE0800FAD2F1A6D92A91340

[8] "Study Report on APEC Environmental Services-Related Technology Market", APEC, 2013. Pp 10. https://www.apec.org/Publications/2013/10/Study-Report-on-APEC-Environmental-Services-Related-Technology-Market

[9] "Best Practices and Case Studies for Industrial Energy Efficiency Improvement", UNEP, 2016.

[10] "2010 Leaders' Declaration", APEC, 2010. https://www.apec.org/Meeting-Papers/Leaders-Declarations/2010/2010_aelm.aspx#:~:text=We%2C%20the%20Leaders%20of%20APEC,paths%20to%20realize%20that%20vision.

[11] "APEC List of Environmental Goods: Annex C", APEC, 2012. https://www.apec.org/Meeting-Papers/Leaders-Declarations/2012/2012_aelm/2012_aelm_annexC.aspx

[12] "Environmental Goods Agreement (EGA)", WTO. https://www.wto.org/english/tratop_e/envir_e/ega_e.htm

[13] "Trade In Services – Market Access Opportunities And The Benefits Of Liberalization For Developing Economies", UNCTAD, 2002. Pp 14. https://unctad.org/en/Docs/itcdtab20_en.pdf

[14] "APEC Workshop on Environmental Services in the 21st Century", APEC, 2015. https://www.apec.org/-/media/APEC/Publications/2015/6/APEC-Workshop-on-Environmental-Services-in-the-21st-Century-Challenges-and-Opportunities-for-Sustain/2nd-revised-version--Final-Report-for-APEC-Environmental-Workshop_08062015.pdf

[15] "Meeting Document of the 57th GOS Meeting", APEC, 2016. https://www.trade.gov.tw/App_Ashx/File.ashx?FilePath=../Files/PageFile/48edec3b-6458-441b-b4d7-8fdbf29bfebb.pdf

[16] APEC PSU (2016) Survey of Regulatory Measures in Environmental Services; (2017) Sector Study on Environmental Services: Environmental Damage Remediation Services; (2017) Sector Study on Environmental Services: Energy Efficiency Businesses; and (2017) Sector Study on Environmental Services: Renewable Energy

[17] "2018 CTI Report to Ministers - Appendix 5", APEC, 2018. https://www.apec.org/Publications/2018/11/2018-CTI-Report-to-Ministers

[18] "Statement on COVID-19 by APEC Ministers Responsible for Trade", APEC, 2020. https://www.apec.org/Meeting-Papers/Sectoral-Ministerial-Meetings/Trade/2020_trade

[19] "The General Agreement on Trade in Services (GATS): objectives, coverage and disciplines", WTO. https://www.wto.org/english/tratop_e/serv_e/gatsqa_e.htm

[20] "Central Product Classification Version 1.1", UN Statistical Commission, 2002. Pp 142. https://unstats.un.org/unsd/publication/SeriesM/SeriesM_77ver1_1E.pdf

[21] "Communication from Cuba (S/CSS/W/142)", WTO. 2002. https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=45024,66233,41180,82732,64394,14980,2537,2849&CurrentCatalogueIdIndex=1&FullTextHash=&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True

[22] "Trade in Environmentally Sound Technologies: Implications for Developing Countries", UNEP, 2018. Pp 20. https://wedocs.unep.org/bitstream/handle/20.500.11822/27595/TradeEnvTech.pdf?sequence=1&isAllowed=y

[23] "General Agreement of Trade in Services", WTO. Article VI.

[24] "Supporting The Internet As A Platform For International Trade: Opportunities For Small And Medium-Sized Enterprises And Developing Countries", Brookings Institution, 2014. https://www.brookings.edu/wp-content/uploads/2016/06/02-international-trade-version-2_REVISED.pdf

[25] "China-Australia FTA: Annex 3", Australian Department of Foreign Affairs and Trade, 2015. https://www.dfat.gov.au/sites/default/files/chafta-annex-iii-services-schedules-of-australia-and-china.pdf

[26] "Korea-Australia Free Trade Agreement: Chapter 18", Australia Department of Foreign Affairs and Trade, 2014. https://www.dfat.gov.au/sites/default/files/KAFTA-chapter-18.pdf
[27] "United States-Mexico-Canada Agreement: Chapter 24", Office of the United States Trade Representative, 2020. https://ustr.gov/sites/default/files/files/agreements/FTA/USMCA/Text/24-Environment.pdf
[28] "APEC PSU Survey of Regulatory Measures in Environmental Services" APEC PSU, 2017. Pp 14. https://www.apec.org/-/media/APEC/Publications/2016/11/Survey-of-Regulatory-Measures-in-Environmental-Services/216_PSU_APECEnviroServices_CompleteReport_Final11Nov.pdf
[29] "Central Product Classification Version 2.1", UN Statistical Commission, 2015. Pp 135. https://unstats.un.org/unsd/classifications/unsdclassifications/cpcv21.pdf
[30] "Managing Request-Offer Negotiations under the GATS", OECD, 2005. Pp 4. https://www.oecd-ilibrary.org/docserver/276102368237.pdf?expires=1585060613&id=id&accname=guest&checksum=7A72E602C227FE114913D72355DD34C1
[31] "Environmental Services: Background Note by the Secretariat (S/C/W/46)", WTO, 1998. https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=108590,78119,61556,2537,9499&CurrentCatalogueIdIndex=4&FullTextHash=&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True
[32] "Trade in Services Related to the Environment", OECD, 2017. Pp 13. https://www.oecd-ilibrary.org/docserver/dc99bf2b-en.pdf?expires=1585079763&id=id&accname=guest&checksum=19A077F3FBE0800FAD2F1A6D92A91340
[33] "Environmental Services", International Institute for Sustainable Development, 2007. Pp 88. https://www.iisd.org/pdf/2007/trade_and_env_10.pdf
[34] "Barriers to Trade in Environmental Goods and Environmental Services: How Important Are They? How Much Progress at Reducing Them?", Fondazione Eni Enrico Mattei, 2014. Pp 8. https://www.feem.it/m/publications_pages/NDL2014-036.pdf
[35] "Trade Liberalization at Environmental Goods Agreement Negotiations: What is on the Table? How much to Expect?", Foundation pour les Etudes et Reserches sur le Developpment International, 2015. Pp 18. https://www.greengrowthknowledge.org/sites/default/files/Young_Presentation_0.pdf
[36] "Policy Landscape of Trade in Environmental Goods and Services", UNESCAP, 2017. Pp 33. https://www.unescap.org/sites/default/files/AWP%20No.%20166.pdf
[37] "Policy Landscape of Trade in Environmental Goods and Services", UNESCAP, 2017. Pp 35. https://www.unescap.org/sites/default/files/AWP%20No.%20166.pdf
[38] "The Relevance of Services for the Delivery of Environmental Goods", OECD, 2014. Pp 10. http://www.ictsd.org/sites/default/files/event/J.%20Sauvage%20-%20OECD%20Presentation.pdf
[39] "Sector Study on Environmental Services: Energy Efficiency Businesses", APEC PSU, 2017. Pp 4. https://www.apec.org/Publications/2017/10/Sector-Study-on-Environmental-Services-Energy-Efficiency-Businesses
[40] "Communication from the European Communities and their Member States (S/CSS/W/38)", WTO, 2000. https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-Html.aspx?Id=2537&BoxNumber=3&DocumentPartNumber=1&Language=E&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True&Window=L&PreviewContext=DP&FullTextHash=371857150#

[42] "Communication from Australia (S/CSS/W/112)", WTO, 2001. https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=45024,66233,41180,82732,64394,14980,2537,2849&CurrentCatalogueIdIndex=3&FullTextHash=&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True
[43] "Communication from the United States (S/CSS/W/25)", WTO, 2000. https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=45024,66233,41180,82732,64394,14980,2537,2849&CurrentCatalogueIdIndex=7&FullTextHash=&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True
[44] "Communication from Switzerland (S/CSS/W/76)", WTO, 2001. https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=45024,66233,41180,82732,64394,14980,2537,2849&CurrentCatalogueIdIndex=4&FullTextHash=&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True
[45] [45] "Communication from Colombia (S/CSS/W/121)", WTO, 2001. https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=45024,66233,41180,82732,64394,14980,2537,2849&CurrentCatalogueIdIndex=2&FullTextHash=&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True

[46] Environmental Goods and Services", OECD, 2001. Pp 24. https://read.oecd-ilibrary.org/trade/environmental-goods-and-services_9789264193611-en#page20
[47] Environmental Services", International Institute for Sustainable Development, 2007. Pp 89. https://www.iisd.org/pdf/2007/trade_and_env_10.pdf
[48] "Defining Environmental Goods and Services: A Case Study of Mexico", ICTSD, 2005. Pp 20. http://autodiscover.cbd.int/financial/pes/mexico-pesdefining.pdf
[49] "Water almost out of GATS?", Corporate Europe Observatory, 2006. http://archive.corporateeurope.org/water/gatswater2006.pdf
[50] " Communication by Bolivia, Dominican Republic, Ecuador, El Salvador, Honduras, Nicaragua, Panama, Peru And Venezuela ", WTO, 2001. https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=Q:/S/CSS/W107.pdf
[51] "Trade in Services Related to the Environment", OECD, 2017. Pp 17. https://www.oecd-ilibrary.org/docserver/dc99bf2b-en.pdf?expires=1585146445&id=id&accname=guest&checksum=51567392DFD998D8891CFBB9D41B90B8
[52] "Trade in Services Related to the Environment", OECD, 2017. Pp 20. https://www.oecd-ilibrary.org/docserver/dc99bf2b-en.pdf?expires=1585079763&id=id&accname=guest&checksum=19A077F3FBE0800FAD2F1A6D92A91340
[53] "Synthesis of Submissions on Environmental Goods (TN/TE/W/63)", WTO, 2005. https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-Html.aspx?Id=50662&BoxNumber=3&DocumentPartNumber=1&Language=E&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True&Window=L&PreviewContext=DP&FullTextHash=371857150#
[54] "Summary Report on the Sixteenth Meeting of the Committee on Trade and Environment in Special Session (TN/TE/R/16)", WTO, 2006. https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=225364,116515,85523,80943,77103,81350,67659,64675,59072,47816&CurrentCatalogueIdIndex=8&FullTextHash=&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True
[55] "WTO Negotiations on Environmental Goods and Services: A Potential Contribution to the Millennium Development Goals", UN, 2009. Pp 13. https://unctad.org/en/Docs/ditcted20084_en.pdf
[56] "Summary Report on The Nineteenth Meeting Of The Committee On Trade And Environment In Special Session (TN/TE/R/19)", 2007. https://docs.wto.org/dol2fe/Pages/FE_Search/FE_S_S009-DP.aspx?language=E&CatalogueIdList=225364,116515,85523,80943,77103,81350,67659,64675,59072,47816&CurrentCatalogueIdIndex=4&FullTextHash=&HasEnglishRecord=True&HasFrenchRecord=True&HasSpanishRecord=True
[57] "Environmental Goods and Services: The Benefits of Further Global Trade Liberalisation: The Benefits of Further Global Trade Liberalisation", OECD, 2001. Pp 21. https://books.google.com/books?id=-BdsOiWvwIgC&pg=PA21&lpg=PA21&dq=oecd+eurostat+Services+provided+for+one+or+more+environmental+protection,+pollution,+remediation,+or+prevention+activity&source=bl&ots=BDoypswBQd&sig=ACfU3U1n9JmshW-mW2OuA8fCKQC979kzqQ&hl=en&sa=X&ved=2ahUKEwjBmY-kt7vqAhWOY98KHURGBXoQ6AEwAXoECAcQAQ#v=onepage&q=oecd%20eurostat%20Services%20provided%20for%20one%20or%20more%20environmental%20protection%2C%20pollution%2C%20remediation%2C%20or%20prevention%20activity&f=false
[58] "The environmental gods and services sector", EuroStat, 2009. https://ec.europa.eu/eurostat/documents/3859598/5910217/KS-RA-09-012-EN.PDF
[59] "The Environmental Goods and Services Industry: Manual for Data Collection and Analysis", OECD/Eurostat, 1999. Pp 11. https://read.oecd-ilibrary.org/industry-and-services/the-environmental-goods-and-services-industry_9789264173651-en#page11
[60] "Environmental Services and the General Agreement on Trade in Services (GATS): Legal Issues and Negotiating Stakes at the WTO", European Yearbook of International Economic Law 2011, 2011. Pp 247. https://books.google.com/books?id=w0p-wTTc7gkC&pg=PA239&lpg=PA239&dq=Cossy,+M.+(2011).+%E2%80%9CEnvironmental+Services+and+the+General+Agreement+on+Trade+in+Services+(GATS):+Legal+Issues+and+Negotiating+Stakes+at+the+WTO&source=bl&ots=npN9lTmrrn&sig=ACfU3U1z4PAwUQciLV10DsFYMP_vzQTO1A&hl=en&ppis=_e&sa=X&ved=2ahUKEwi8o-SUg7ToAhUamXIEHWzPCusQ6AEwAHoECAwQAQ#v=onepage&q=Cossy%2C%20M.%20(2011).%20%E2%80%9CEnvironmental%20Services%20and%20the%20General%20Agreement%20on%20Trade%20in%20Services%20(GATS)%3A%20Legal%20Issues%20and%20Negotiating%20Stakes%20at%20the%20WTO&f=false
[61] "Trade in Sustainable Energy Services", International Center for Trade and Sustainable Development, Pp 8. http://www.ictsd.org/sites/default/files/downloads/2013/10/trade-in-sustainble-energy-services.pdf
[62] "APEC PSU Policy Brief No. 5: The APEC List of Environmental Goods", APEC PSU, 2012. https://apec.org/Publications/2012/11/The-APEC-List-of-Environmental-Goods

[63] "What's wrong with the WTO's Environmental Goods Agreement: A developing country perspective", VoxEU, 2019. https://voxeu.org/article/what-s-wrong-wto-s-environmental-goods-agreement
[64] "Environmental Services: The "Win-Win" Role of Trade Liberalisation In Promoting Environmental Protection and Economic Development", OECD, 2000. http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=COM/TD/ENV(99)93/FINAL&docLanguage=En
[65] "Trade in Environmental Services: Assessing the Implications for Developing Countries in the GATS", ICTSD, 2006. Pp 12. https://www.ictsd.org/sites/default/files/event/2008/08/egskirkpatrick.pdf
[66] Interview with Vicente Paolo B. Yu III (Independent consultant, formerly of South Centre)
[67] Interview with Gregoire Garsous (Economist, OECD)
[68] "Structure of Commitments for Modes 1, 2 and 3 - Background Note by the Secretariat", WTO, 1999. https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=Q:/S/C/W99.pdf
[69] "Handbook for trade sustainability impact assessments", European Commission 2016. https://trade.ec.europa.eu/doclib/docs/2016/april/tradoc_154464.PDF
[70] Interview with Jane Kelsey (Professor, University of Auckland)
[71] "Trans-Pacific-Partnership - Chapter 29: Exceptions and General Provisions", United States Trade Representative. https://ustr.gov/sites/default/files/TPP-Final-Text-Exceptions-and-General-Provisions.pdf
[72] Interview with Gregoire Garsous (Economist, OECD)
[73] Ibid
[74] "Agreement on Climate Change, Trade, and Sustainability (ACCTS)", New Zealand Foreign Affairs and Trade. https://www.mfat.govt.nz/en/trade/free-trade-agreements/climate/agreement-on-climate-change-trade-and-sustainability-accts-negotiations/
[75] "Study on APEC's Non-binding Principles for Domestic Regulation of the Services Sector". APEC. https://www.apec.org/Publications/2020/01/Study-on-APECs-Non-binding-Principles-for-Domestic-Regulation-of-the-Services-Sector
[76] "APEC Services Competitiveness Roadmap (2016-2025)" APEC, 2015. https://www.mofa.go.jp/files/000205153.pdf
[77] "APEC PSU Survey of Regulatory Measures in Environmental Services" APEC PSU, 2017. Pp 12. https://www.apec.org/-/media/APEC/Publications/2016/11/Survey-of-Regulatory-Measures-in-Environmental-Services/216_PSU_APECEnviroServices_CompleteReport_Final11Nov.pdf
[78] "The Stringency of Environmental Regulations and Trade in Environmental Goods", OECD, 2014. https://www.oecd-ilibrary.org/trade/the-stringency-of-environmental-regulations-and-trade-in-environmental-goods_5jxrjn7xsnmq-en
[79] "APEC Non-binding Principles for Domestic Regulation of the Services Sector" APEC CTI, 2018. https://apec.org/-/media/APEC/Publications/2018/11/2018-CTI-Report-to-Ministers/TOC/Appendix-13---APEC-Nonbinding-Principles-for-DR-Drafting-Group.pdf
[80] "The ASEAN Good Regulatory Practice (GRP) Core Principles", ASEAN, 2018. https://asean.org/storage/2017/11/ASEAN-GRP-Core-Principles-FINAL-ENDORSED.pdf
[81] "United States-Mexico-Canada Agreement" Chapter 28: Good Regulatory Practices. https://ustr.gov/sites/default/files/files/agreements/FTA/USMCA/Text/28_Good_Regulatory_Practices.pdf
[82] "Survey of Regulatory Measures in Environmental Services" APEC PSU, 2016. Tables 7, 10, 13, 16, 19, 22, 25, 28, 31, 34, 37, 40, 43, 46, 49, 52, 55, 58, 61, 64, and 67. https://www.apec.org/Publications/2016/11/Survey-of-Regulatory-Measures-in-Environmental-Services
[83] "Doing Business 2019", World Bank Group, 2019. https://www.doingbusiness.org/content/dam/doingBusiness/media/Annual-Reports/English/DB2019-report_web-version.pdf
[84] "New Zealand Wastewater Treatment Plant Inventory", Water New Zealand. https://www.waternz.org.nz/WWTPInventory
[85] "Services", SULO. http://www.sulo.co.nz/services
[86] "Electricity Statistics", Ministry of Business, Innovation & Employment. https://www.mbie.govt.nz/building-and-energy/energy-and-natural-resources/energy-statistics-and-modelling/energy-statistics/electricity-statistics/
[87] "Consented Wind Farms", New Zealand Wind Energy Association. http://www.windenergy.org.nz/consented-wind-farms
[88] "APEC PSU Survey of Regulatory Measures in Environmental Services - Annex 3: Economy Reports (New Zealand)" APEC PSU, 2017. https://www.apec.org/-/media/APEC/Publications/2016/11/Survey-of-Regulatory-Measures-in-Environmental-Services/TOC/Annex-3---Economy-Reports.zip
[89] "Resource Management Act" Section 9
[90] "Resource Management Act" Section 15
[91] "Resource Management Act" Section 87

[92] "Resource Management Act" Section 87A
[93] "Resource Management Act" Section 108AA
[94] "Resource Management Act" Section 108
[95] "Resource Management Act" Section 115
[96] "Resource Management Act" Section 113
[97] "Resource Management Act" Section 123
[98] Interview with Ian Smallburn (Resource Consent Manager, Auckland Council)
[99] "Resource Management Act" Section 87D
[100] "Resource Management Act" Section 121
[101] "Resource Management Act" Section 87G
[102] "Resource Management Act" Schedule 4
[103] "Resource Management Act" Section 88
[104] "Environmental Protection and Management Act" Part 9 Section 32
[105] Interview with Ian Smallburn (Resource Consent Manager, Auckland Council)
[106] "Apply for a Resource Consent" Auckland Council. https://www.aucklandcouncil.govt.nz/building-and-consents/understanding-building-consents-process/apply-for-consent/Pages/Apply-for-a-resource-consent.aspx
[107] Interview with Ian Smallburn (Resource Consent Manager, Auckland Council)
[108] Ibid
[109] "How we assess your Resource Consent application" Auckland Council. https://www.aucklandcouncil.govt.nz/building-and-consents/understanding-building-consents-process/processing-consent-application/Pages/how-we-assess-your-resource-consent-application.aspx
[110] "APEC PSU Survey of Regulatory Measures in Environmental Services - Annex 3: Economy Reports (Singapore)" APEC PSU, 2017. https://www.apec.org/-/media/APEC/Publications/2016/11/Survey-of-Regulatory-Measures-in-Environmental-Services/TOC/Annex-3---Economy-Reports.zip
[111] "Registering a Business in Singapore: Do I Need to and How?", Singapore Legal Advice. https://singaporelegaladvice.com/law-articles/when-do-i-need-to-register-a-business-or-a-blogshop-in-singapore-how-do-i-register-a-business/
[112] "Singapore Energy Statistics", Energy Market Authority. https://www.ema.gov.sg/Singapore_Energy_Statistics.aspx
[113] "Generation Company", Energy Market Authority. https://www.ema.gov.sg/Licensees_Electricity_Generation_Company.aspx
[114] Ibid.
[115] "Environmental Protection and Management Act" Part 5 Section 15.
[116] "Environmental Protection and Management Act" Part 5 Section 16.
[117] "Environmental Protection and Management Act" Part 9 Section 32.
[118] Ibid
[119] Environmental Protection and Management Act" Part 9 Section 31.
[120] Environmental Protection and Management Act" Part 13 Section 77.
[121] Environmental Protection and Management (Hazardous Substances) Regulations" Part 4 Section 17.
[122] "Environmental Public Health Act" Part 3 Section 31
[123] "Environmental Public Health Act" Part 3 Section 23
[124] "Environmental Public Health Act" Part 10 Section 84
[125] "Environmental Public Health (General Waste Disposal Facility) Regulations 2017" Section 7
[126] "Environmental Public Health (General Waste Disposal Facility) Regulations 2017" The Schedule Fees
[127] "Environmental Public Health (Toxic Industrial Waste) Regulations"
[128] https://www.nea.gov.sg/our-services/waste-management/3r-programmes-and-resources/waste-management-infrastructure/refuse-disposal-facility/waste-disposal/general-waste-disposal-facility
[129] "GoBusiness Licensing", Singapore Government. https://www.gobusiness.gov.sg/licences
[130] "Launch of GoBusiness Licensing Portal", Smart Nation Singapore. https://www.smartnation.gov.sg/whats-new/press-releases/launch-of-gobusiness-licensing-portal
[131] "APEC PSU Survey of Regulatory Measures in Environmental Services - Annex 3: Economy Reports (Japan)" APEC PSU, 2017. https://www.apec.org/-/media/APEC/Publications/2016/11/Survey-of-Regulatory-Measures-in-Environmental-Services/TOC/Annex-3---Economy-Reports.zip
[132] "The investment environment in Japan and JETRO's services for foreign companies", JETRO, 2017. https://www.eas.ee/wp-content/uploads/2017/02/1701-JETRO.pdf
[133] "Laws & Regulations on Setting Up Business in Japan", JETRO, 2008. Pp 10. https://www.jetro.go.jp/ext_images/en/invest/setting_up/pdf/laws_en_202003.pdf

[134] "JETRO Invest Japan Report 2017", JETRO, 2017. Pp 28. http://www.spainjapanfoundation.com/img/documentos/jetro_invest_japan_report_2017en.pdf
[135] "Investing in Japan: Perception of the Business Environment in Japan among Foreign-affiliated Companies", JETRO, 2019. https://www.jetro.go.jp/en/invest/reports/report2019/ch3.html
[136] "Laws", Ministry of Environment. https://www.env.go.jp/en/laws/
[137] "Waste Management and Public Cleansing Law" Article 7.
[138] "Waste Management and Public Cleansing Law" Article 7-3.
[139] Interview with Atsushi Kubota (Human Resources Management, City of Yokohama)
[140] "Performed administrative sanctions for industrial waste treatment companies", City of Yokohama, 2017. https://www.city.yokohama.lg.jp/city-info/koho-kocho/press/shigen/2016/20170110-030-24667.files/phpdDHc22.pdf (Japanese site)
[141] "Waste Management and Public Cleansing Law" Article 8.
[142] "Regulations of the Waste Management and Cleansing Law. https://www.env.go.jp/en/laws/recycle/03.pdf
[143] Tokyo Metropole Bureau of Environment https://www.kankyo.metro.tokyo.lg.jp/resource/general_waste/processing_plant/installation_pro.html#cmskannrennhouki
[144] "About Us", JETRO. https://www.jetro.go.jp/en/jetro/
[145] "Invest Japan Business Support Center", JETRO. https://www.jetro.go.jp/en/invest/ibsc/
[146] "German offshore wind power giant wpd establishes subsidiary in Tokyo", JETRO, 2018. https://www.jetro.go.jp/en/invest/newsroom/2018/677ce5f792700db6.html
[147] https://www.jetro.go.jp/en/invest/newsroom/2018/677ce5f792700db6.html
[148] "Recommendation of The Council On Regulatory Policy And Governance", OECD, 2012. Pp 4. https://www.oecd.org/governance/regulatory-policy/49990817.pdf
[149] "Workshop on Best Practices Sharing to Improve Application of the APEC Non-Binding Principles for Domestic Regulation of the Services Sector", APEC GOS, 2020. Pp 21. http://apec.org/Publications/2020/05/Workshop-on-Best-Practices-Sharing-to-Improve-Application-of-the-APEC-Non-Binding-Principles
[150] "Business Licensing Reforms: Insights From Selected Country Experiences", World Bank Group, 2019. Pp 18. http://documents1.worldbank.org/curated/ru/247941561971098931/pdf/Business-Licensing-Reforms-Insights-from-Selected-Country-Experiences.pdf
[151] Interview with environmental services provider operating within APEC.
[152] Interview with Ian Smallburn (Resource Consent Manager, Auckland Council)
[153] "Wind Powers America Annual Report 2019", American Wind Energy Association, 2020.
[154] "Case Studies in Capacity Development in Power Sector with South-South Cooperation Components", Japan International Cooperation Agency, 2011. Pp 5. https://www.jica.go.jp/usa/english/office/others/pdf/publication_110527.pdf
[155] "Skills and occupational needs in renewable energy", International Labor Organization, 2011. Pp. 94. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_166823.pdf
[156] "Skills and occupational needs in renewable energy", International Labor Organization, 2011. Pp. 108. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_166823.pdf
[157] "Guidebook for Capacity Building in the Engineering Environment", World Federation of Engineering Organizations, 2010. Pp 37. http://www.wfeo.org/wp-content/uploads/stc-capacity_building/WFEO_Capacity_Building_Guidebook_final.pdf
[158] "Increasing the effectiveness of trainings and capacity building programs", Columbia Center on Sustainable Investment, 2016. http://ccsi.columbia.edu/files/2016/04/Outcome-document-Increasing-the-effectiveness-of-trainings-and-capacity-building-programs-FINAL.pdf
[159] "Renewable energy doctoral programmes in sub-Saharan Africa: A preliminary assessment of common capacity deficits and emerging capacity-building strategies", Colebrander et. al, 2015. https://reader.elsevier.com/reader/sd/pii/S2214629614001443?token=1EA742D573871D462F1D78687B95E20223898C29AB4449F355D5364672C7EA87661EF242D4AD9B454C112466B50608AF
[160] "Skills and occupational needs in renewable energy", International Labor Organization, 2011. Pp. 110. https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_166823.pdf
[161] "Guidebook for Capacity Building in the Engineering Environment", World Federation of Engineering Organizations, 2010. Pp 34. http://www.wfeo.org/wp-content/uploads/stc-capacity_building/WFEO_Capacity_Building_Guidebook_final.pdf
[162] "Enhancing Mutual Recognition and Regional Cooperation for Skills and Job Qualifications in the APEC Region", APEC, 2017. Pp 43. https://www.apec.org/Publications/2017/12/Enhancing-Mutual-Recognition-and-Regional-Cooperation-for-Skills-and-Job-Qualifications

[163] "Washington Accord: 25 Years", International Engineering Alliance, 2014. https://www.ieagreements.org/assets/Uploads/Documents/History/25YearsWashingtonAccord-A5booklet-FINAL.pdf
[164] "APEC Agreement", International Engineering Alliance. https://www.ieagreements.org/agreements/apec/
[165] "The APEC Engineer Manual", APEC, 2000. https://www.apec.org/-/media/APEC/Publications/2000/11/The-APEC-Engineer-Manual-The-Identification-of-Substantial-Equivalence-2000/00_hrd_engrgmanual.pdf
[166] "Indonesia-Australia Comprehensive Economic Partnership Agreement - Side Note on Mutual Recognition of Professional Engineers", Australia Government Department of Foreign Affairs and Trade, 2020. https://www.dfat.gov.au/trade/agreements/in-force/iacepa/Pages/indonesia-australia-comprehensive-economic-partnership-agreement
[167] "The Windskill Initiative", European Commission, 2009. https://ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/final_report_the_windskill_initiative.pdf
[168] "Directive 2009/28/EC of the European Parliament: Article 14", European Commission, 2009. https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009L0028&from=EN
[169] "QualiCert Manual", European Commission, 2011. https://ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/qualicert_manual_en.pdf
[170] "Guidebook for Capacity Building in the Engineering Environment", World Federation of Engineering Organizations, 2010. Pp 29. http://www.wfeo.org/wp-content/uploads/stc-capacity_building/WFEO_Capacity_Building_Guidebook_final.pdf
[171] "PV Magazine". PV Magazine. https://www.pv-magazine.com/
[172] "Renewable Energy Training Program", Energy Sector Management Assistance Program. https://esmap.org/node/1354
[173173] "Wind Turbine Overview", GE Energy, 2012. https://esmap.org/sites/esmap.org/files/ESMAP_IFC_Wind_Module_RE_Training_General_Electric_Frick_Optimized_March_2012.pdf
[174] "Guidebook for Capacity Building in the Engineering Environment", World Federation of Engineering Organizations, 2010. Pp 29. http://www.wfeo.org/wp-content/uploads/stc-capacity_building/WFEO_Capacity_Building_Guidebook_final.pdf