Centre for International
Governance Innovation

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International Transfer of Clean Technologies: Mitigating Legal Obstacles

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Table of Contents

About the Author

Bernard Colas is a CIGI senior fellow, effective August 2016. He is also a partner at CMKZ — Colas Moreira Kazandjian Zikovsky, LLP, an international trade and business law firm based in Montreal. He has more than 30 years of experience in international trade and intellectual property law.

Bernard is contributing to CIGI's international environmental law stream through his research on law and governance innovations for simplifying the transfer of environmentally sustainable technologies from North to South. Specifically, Bernard will provide recommendations on how businesses can anticipate and mitigate legal and institutional barriers to the transfer of clean technologies from technologically advanced to less technologically advanced countries.

As a partner at CMKZ, Bernard advises businesses in the negotiation of international transactions, licences and contracts, in their operations and implementation overseas and in international conflict resolution. He also provides advice on the development and enforcement of international trade agreements and helps his clients develop commercial and industrial strategies while taking advantage of international trade laws.

Prior to co-founding CMKZ, Bernard worked at a law firm now called Dentons, at the Organisation for Economic Co-operation and Development in Paris and at the International Federation of Producers of Phonograms and Videograms in London. Bernard has also advised foreign governments, and notably acted as trade law specialist for a Canadian International Development Agency project by assisting Lithuania and Algeria to join the World Trade Organization, and for World Bank projects concerned with liberalizing and privatizing telecommunications and postal services in Togo, Comoros and Mauritania.

Bernard has a doctorate of law (with honours) and a D.E.A. (law of international economic relations and organizations) from the University of Paris 1 (Panthéon Sorbonne), a licence in law from the University of Sherbrooke and an auditor certificate from The Hague Academy of International Law.

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Acronyms and Abbreviations

APEC	Asia-Pacific Economic Cooperation
COP	Conference of the Parties
EGA	Environmental Goods Agreement
FDI	foreign direct investment
GATS	General Agreement on Trade in Services
ICC	International Chamber of Commerce
ICTSD	International Centre for Trade and Sustainable Development
IPCC	Intergovernmental Panel on Climate Change
IPR	intellectual property rights
ISO	International Standards Organization
LCRs	local content requirements
LED	light-emitting diode
NTBs	non-tariff barriers
OECD	Organisation for Economic Co-operation and Development
PCT	Patent Cooperation Treaty
TBTs	technical barriers to trade
TISA	Trade in Services Agreement
TRIPS	Agreement on Trade-Related Aspects of Intellectual Property Rights
UNCTAD	United Nations Conference on Trade and Development
USTR	United States Trade Representative
VATs	value-added taxes
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

Executive Summary

This paper is intended to help exporters identify and anticipate potential issues arising from the international transfer of clean technologies. It seeks to analyze the main legal obstacles faced by exporters in the trade of clean technologies, from technologically advanced to less technologically advanced countries. Identifying barriers and risks can provide predictability in the complex realm of international trade and can help ensure that export transactions are conducted efficiently and are commercially viable. The term "exporter" will refer in this paper to any exporting entity expanding in a foreign market through the export of goods, services, technology or capital in the form of investment.

Along with categorizing the various barriers to technology transfer, this paper's main objective is to propose multiple avenues that exporters can use to mitigate and remove barriers to trade. By being proactive and informed, exporters can collaborate to transform and facilitate the international transfer of clean technologies with the various stakeholders in the industry, including home and foreign governments.

The main obstacles impeding the transfer of clean technologies are categorized into various sections herein. Each section discusses and analyzes the particularities of trade barriers specifically associated with the transfer of goods, services, foreign direct investment (FDI), technologies and related legal and regulatory impediments. Concurrently, each section outlines a range of potential solutions and mitigating actions available to exporters.

Introduction

The transfer of environmentally sustainable technologies toward less technologically advanced countries is widely recognized as a key step in mitigating the anthropogenic effects of climate change.[1] In 2015, at the Twenty-first Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change, the international community agreed to ramp up cooperation on technology transfer as part of its efforts to deal with climate change.[2] Exporters have an important and crucial role to play in such a transfer. Although clean technologies cannot entirely counter climate change, or remedy the profound political and social divisions observed globally on the subject, their use and dissemination can nevertheless play an important role in reversing current climate tendencies, as well as create new business and economic opportunities.

The Intergovernmental Panel on Climate Change (IPCC)[3] defines technology as "a broad set of processes covering the flows of know-how, experience and equipment."[4] For the purposes of this paper, "clean technologies" is a term that integrates any type of technology, from environmental goods or services, to any form of know-how that results in the significant improvement of environmental performance, including polluting less and using resources in a more sustainable manner.

Technology can be transferred through a variety of manners and market channels, including by trade in goods and services, as well as FDI. In practice, an exporter can sell products and provide installation and maintenance services directly to the foreign client. In this situation, the clean technology transfer is limited, as it only applies to the importation of products and related services.

1 UN, *Second Committee Special Event Panel Discussion on Science, Technology and Innovation for Development* (16 November 2012), online: <www.un.org/en/ga/second/67/scitechnote.pdf>.

2 COP 21 was held in Paris, France, from November 30 to December 12, 2015. Subsequent conferences of the parties have sought to reinforce the cooperation in evidence at that gathering.

3 The IPCC, operating under the auspices of the United Nations, is the leading international body for assessing the science related to climate change.

4 IPCC, *Methodological and Technological Issues in Technology Transfer* (Geneva: IPCC, 2000).

Additional technology can be transferred if the exporter entrusts the manufacturing or installation of clean technologies to local intermediaries upon whom it exercises sufficient control. The exporter also has the option to fully transfer the manufacturing, commercialization, installation and maintenance processes of clean technologies to the importer, and invest directly in the foreign market by creating a subsidiary, joint venture or through any other suitable legal arrangement.

Moreover, while trade barriers do not exclusively affect clean technologies, they are becoming an increasingly important factor in the global market of environmentally sustainable technologies. As we have seen above, depending on the nature of the technology transfer, international trade barriers to the transfer of technology may not impact all exporters equally, in particular due to the various foreign market penetration avenues available to satisfy each exporter's needs.

This paper analyzes the main barriers that impede the large-scale transfer of clean technologies and proposes solutions that exporters could use to mitigate the impact of such barriers. Its objective is not to address all the obstacles to international trade in an exhaustive manner. Rather, the paper synthesizes the main obstacles to the international transfer of clean technologies. Specifically, it focuses on barriers to the transfer of environmental goods; environmental services; foreign investment; those specific to the transfer of clean technologies and intellectual property; and, finally, the legal and regulatory obstacles affecting the transfer of technology. While some of these categories might interrelate or act concomitantly in their concrete application, they are categorized and distinguished within this paper so as to better address their particularities.

Among the various mitigating avenues presented, this paper recommends that exporters collaborate, lobby or act with the support of their respective governments and those of the importing country. While some readers might consider these recommendations difficult to achieve in practice, or believe that such efforts to influence will either fail or be limited in scope, engaging governments is a crucial step to take in order to reduce or remove trade barriers and mitigate their impact on the transfer of clean technologies. Not only do the actions of exporters and industry at large resonate with governments, their implication is often crucial in making policy makers aware of various pressing issues at hand.

Exporters should also take note that governments are not monolithic structures. Exporters and governmental agencies might, at times, have differing interests and objectives (on trade, the environment, human rights and so forth). It would be naive to believe that governments operate with one voice. As such, it is crucial for exporters to target and identify which structures and individuals within government (such as members of Parliament, parliamentary committees, export and development agencies, trade representatives, regional economic development agencies and foreign service officials) might best represent their interests abroad. Exporters can also seek to act through their trade association, various relevant chambers of commerce and other stakeholders that may represent their interests and possess appropriate structures to lend support.

It is also important to note that, although they will not be discussed here at length, several other factors might influence the success of an international commercial transaction involving clean technologies. In particular, due diligence is crucial to identify the applicable regulatory framework, to select reliable commercial partners, and to decide which legal and commercial mechanism is best suited to transfer a particular clean technology. An international transaction might involve managing a plethora of foreign and local entities, such as manufacturers, international agents, lawyers, freight forwarders, shipping companies, banks, governments, regulatory agencies and insurance companies. The diversity of foreign cultures, languages and business customs that might interfere with an international transaction should also not be underestimated.

Barriers to the Transfer of Environmental Goods

This first section primarily addresses the export of environmental goods. This includes manufacturing equipment, which often entails more transfer of technology than the export of manufactured goods. Two major types of

barriers to trade in environmental goods — tariff and non-tariff barriers — will be analyzed.

Tariff Barriers: Customs Duties and Value-added Taxes

Customs duties or tariffs are amounts of money (often expressed in terms of the percentage of the value of the good at issue) collected by governments on goods upon their importation when transported across international borders.[5] Tariffs may affect the extent to which environmental technology can be transferred between countries, as they can make imported goods more expensive. They may vary significantly depending on the type of goods and the country of importation. While tariffs among more technologically advanced countries are relatively low (on average, it would seem that tariffs on environmental goods are lower than those on other types of goods),[6] developing countries often impose higher duties on such goods.[7] There remain non-negligible levels of tariffs globally for environmental goods. According to the European Commission, the global average bound tariff for environmental goods is almost nine percent. Yet such a figure conceals much higher tariffs in certain regions. For instance, the average bound tariffs on environmental goods reach a maximum of 20 percent in Central Asia and Eastern Europe and 41 percent in Latin America and the Caribbean.[8]

It is to be noted that substantial efforts have been made by governments at the multilateral level to reduce tariffs on environmental goods. The Doha Round of World Trade Organization (WTO) negotiations called for "the reduction or, as appropriate, elimination of tariff and non-tariff barriers to environmental goods and services."[9] While the talks were largely unsuccessful, certain WTO members decided to work toward eliminating tariffs on select environmental goods through bilateral and regional agreements. In 2012, members of the Asia-Pacific Economic Cooperation (APEC) conference agreed to reduce their tariff rates on a specified list of environmental goods, including renewable energy technologies, to five percent or less by December 31, 2015.[10] More recently, at the Meeting of APEC Ministers Responsible for Trade, held in May 2019, trade ministers strongly urged economies to "reduce tariffs under APEC's list of Environmental Goods as soon as possible."[11]

In 2014, in Davos, Switzerland, 14 WTO members, including Canada, China, the European Union and the United States, announced the launch of negotiations toward an Environmental Goods Agreement (EGA) seeking to make environmental goods tariff-free. Since then, the number of participants has grown to 18.[12] A major hurdle of these negotiations (which broke down in December 2016[13]) was precisely defining an "environmental good," and if such a notion generally includes other types of goods that would not themselves be classified as environmental goods, such as materials required to produce or assemble environmental goods, accessories or spare parts. For example, while efforts to reduce tariffs on various environmental goods used in wind or solar projects might be extremely successful, accessory goods required for such systems to function, such as static converters and batteries, might still be subject to substantially higher tariffs. While the APEC negotiators managed to draw up a list of 54 environmental goods, negotiations of the EGA are currently bogged down over which environmental goods to include

5 Tariffs or custom duties can also be imposed upon exportation, but it is not the practice in Canada. To simplify the text, tariffs and custom duties will be referred to as "tariffs" throughout.

6 Gaëlle Balineau & Jaime de Melo, "Removing barriers to trade on environmental goods: an appraisal" (2013) 12:4 World Trade Rev 693.

7 Patricia M Goff, "The Environmental Goods Agreement: A Piece of the Puzzle" CIGI, CIGI Papers No 72, 8 June 2015 at 5–6. Note that "bound" tariff levels (the maximum level of tariff for a specific product in accordance with each country's Most-Favoured Nation commitments under the World Trade Organization agreements) can vary for each product and may differ from the "applied" tariffs (the tariffs actually applied and collected by the importing countries). Applied tariffs may not exceed the importing WTO member's bound tariffs for the good in question.

8 International Trade Centre, "Trade in Environmental Goods and Services: Opportunities and Challenges" (2014), online: <www.intracen.org/publication/Trade-in-environmental-goods-and-services-Opportunities-and-challenges>; Cecilia Malmström, "The Path to an Effective Environmental Goods Agreement" (Address delivered at the EPP Group Hearing, 4 May 2016) online: <http://trade.ec.europa.eu/doclib/docs/2016/may/tradoc_154552.pdf>.

9 WTO, *Doha Ministerial Declaration,* WTO Doc WT/MIN(01)/DEC/1, online: <www.wto.org/english/thewto_e/minist_e/min01_e/mindecl_e.htm>.

10 APEC, News Release, "APEC Cuts Environmental Goods Tariffs" (28 January 2016), online: <www.apec.org/Press/News-Releases/2016/0128_EG>.

11 APEC, "APEC Ministers Responsible for Trade Meeting Joint Statement" (28 May 2019), online: <www.apec.org/Meeting-Papers/Sectoral-Ministerial-Meetings/Trade/2019_trade>.

12 WTO, "Environmental Goods Agreement", online: <www.wto.org/english/tratop_e/envir_e/ega_e.htm>.

13 Jaime De Melo & Jean-Marc Solleder, "The EGA Negotiations: why they are important, why they are stalled, and challenges ahead" (2018).

in the agreement, ranging from bicycles to light-emitting diode (LED) lights.[14] In fact, at the meeting of the EGA in 2016, the chair reorganized the list by dividing goods into two categories: those that are most likely to gather support and those for which significant differences remain.[15]

In addition to customs duties, the import of goods may also be subject to the payment of value-added taxes (VATs), similar to the VAT in Europe and in China, and to the Goods and Services Tax in Canada. Local companies in importing countries may generally claim VAT credits, but foreign companies may not usually claim VAT credits or returns, which increases the cost of imported goods.

Solutions

As regulations governing the imposition of customs duties may prove to be quite complex, exporters would first conduct proper due diligence and research to ensure that they are able to mitigate the impact of tariffs to the fullest extent possible and seek to take advantage of the various opportunities that may be available to them through regional or bilateral preferential trade agreements. Appropriate knowledge of tariffs and of rules of origin contained in free trade agreements may also allow exporters to adopt efficient strategies for export, especially when the exporting goods are comprised of various components that may be subject to different tariffs if assembled in one unit or sold individually. Rules of origin determine the product eligibility for preferential tariff treatment available under free trade agreements.

For such purposes, exporters can use a customs broker who is familiar with the customs regulations of the importing country, as well as a trade lawyer if the issue is more complex. There are also various databases, such as Canada Tariff Finder,[16] as well as publications from the Government of Canada (in particular the Canada Border Services Agency and the Canadian Trade Commissioner Service) that provide various tools to determine the applicable customs duties for goods. Export agencies and international institutions such as the WTO can also be valuable resources when researching such a matter.[17]

Exporters will also be mindful that the business landscape might change rapidly through the imposition or lifting of trade-related measures, such as safeguards, anti-dumping and countervailing duties affecting solar cells or other environmental goods. As a result, ensuring an appropriate watch on the political and economic landscape can help exporters respond to future changes and implement adequate mitigation strategies. For exporters, an efficient inventory management software can be an effective instrument to keep track of changing tariffs in the importing market, as well as their impact on profit margins and business operations.

Exporters conducting business with foreign state-owned entities (and other important companies that might hold sway with the government) can also collaborate with the latter to facilitate import formalities or have local public bodies or foreign state-owned entities that are not subject to the payment of customs duties directly import foreign goods. Structuring such arrangements with foreign state-owned entities has proven to be particularly useful in Brazil, for example, to avoid paying customs duties or to promptly be authorized to import Canadian solar panels that were purchased with the financial contribution of Brazilian public funding. Moreover, in such cases, the matter of tariff reduction could be raised directly with the foreign government at a higher level in exchange for access to specific technology and/or training services.

Regarding VATs, exporters should avoid being the importer of record and should request that the local buyer be considered the importer of record. The importing local entity will pay the VAT and will most probably be entitled to claim a VAT return, which would minimize the impact of the VAT on the price of the imported goods.

Businesses implicated in a long-term technology transfer within a particular market could also decide to set up a local plant, partner with local manufacturing companies or otherwise invest in the foreign market so as to produce

14 ICTSD, "Ministerial Talks to Clinch Environmental Goods Agreement Hit Stumbling Block" (8 December 2016) online: ICTSD <www.ictsd.org/bridges-news/bridges/news/ministerial-talks-to-clinch-environmental-goods-agreement-hit-stumbling>.

15 Canada, Global Affairs Canada, *WTO Environmental Goods Agreement* (2014), online: <www.international.gc.ca/trade-agreements-accords-commerciaux/topics-domaines/env/plurilateral.aspx?lang=eng>.

16 Canada Tariff Finder, online: <www.tariffinder.ca/>.

17 See e.g. WTO, "World Tariff Profiles 2018", online: <https://unctad.org/en/PublicationsLibrary/wto2018_en.pdf>; Canada, Global Affairs Canada, "Tariff Information by Country", online: <www.international.gc.ca/trade-commerce/tariff-tarifaire/index.aspx?lang=eng>.

or assemble the goods locally and thereby reduce the impact of any tariffs imposed.

In the medium term, exporters (directly or through chambers of commerce and trade associations) can work with importing governments to demonstrate the benefits of lower tariffs in helping to achieve efficient technology transfer and national climate goals. For example, it has been shown that green technology transfer is facilitated when tariffs are low. Research has shown that "a 10% increase in the applied MFN [Most-Favoured Nation] tariff rate on environmental goods is associated with a 3-percentage point decrease in the likelihood of technology transfer in a project."[18] It is important to note that the importing country must always impose the same tariffs on all like products coming from WTO members, under the Most-Favoured Nation treatment rule, with the exception of preferential and regional trade agreements.

Lastly, in collaboration with their own national governments, and in particular trade negotiators, exporters (directly or through chambers of commerce or trade associations) can also work toward ensuring that a specific environmental good they manufacture and/or sell be characterized as an environmental good for inclusion in the EGA (or in any other multilateral agreement attempting to reduce tariffs on environmental goods).

Non-tariff Barriers

The second major type of barrier to trade in environmental goods discussed in this paper are non-tariff barriers (NTBs). NTBs are often misunderstood and overlooked. They can wreak havoc even in a well-elaborated business plan, as they can be difficult to address, often arise unexpectedly for the inexperienced exporter, and can be exceedingly technical in nature. According to the United Nations Conference on Trade and Development (UNCTAD), environmental goods still face various and significant NTBs.[19]

NTBs are any barriers to trade that restrict either the import or export of goods through mechanisms other than tariffs. Contrary to tariffs, NTBs take many different forms and often are not subject to comprehensive reporting requirements, even if they can lead to increased trade costs. While global efforts, in particular under the WTO and bilateral trade agreements, have led to the successful reduction or elimination of trade tariffs and their increased transparency, various states, including less technologically advanced countries, use NTBs to control imports as instruments of economic protection, which often thwarts the implementation of much-needed technological advancements. While the adoption of various non-tariff measures for legitimate policy reasons is permitted under the WTO framework (such as under the Agreement on Technical Barriers to Trade[20] or the Agreement on the Application of Sanitary and Phytosanitary Measures), when applied improperly, without justification, or in a discriminatory manner, such measures are considered to be disguised restrictions or unnecessary obstacles to trade.[21]

This section will address two major NTBs: technical barriers to trade (TBTs); and local content requirements (LCRs). NTBs customarily associated with the transfer of services, of technology, of investments, and those associated with legal and regulatory impediments, will be specifically addressed in dedicated sections of this paper.[22]

Technical Barriers to Trade

Prior to export, businesses must ensure that their products comply with the technical requirements of the country of importation, if applicable, which may be in the form of mandatory technical regulations or through voluntary standards.

18 Gisèle Schmid, "Technology transfer in the CDM: the role of host-country characteristics" (2012) 12:6 Climate Policy 722.

19 UNCTAD, *Trading Into Sustainable Development: Trade, Market Access, and the Sustainable Development Goals*, UNCTAD/DITC/TAB/2015/3, online: <http://unctad.org/en/PublicationsLibrary/ditctab2015d3_en.pdf>.

20 WTO, *Agreement on Technical Barriers to Trade* [WTO, *TBT Agreement*], online: <www.wto.org/english/docs_e/legal_e/17-tbt_e.htm>.

21 See, for example, efforts at the classification of non-tariff measures (which include TBTs) conducted by the Multi-Agency Support Team established by the United Nations Conference on Trade and Development, online: <https://unctad.org/en/Pages/DITC/Trade-Analysis/Non-Tariff-Measures/MAST-Group-on-NTMs.aspx>.

22 A wide range of other crucial NTBs are not addressed in this paper. These include customs surcharges, advanced income payments, internal taxes and charges, insurance requirements, transport regulations, fees and delays related to administration and customs procedures, import licensing and sanitary measures. Implicit market barriers to entry, such as the presence of oligopolies and monopolies within a market, often make entry of competitors too costly and sometimes impossible. Partial or complete bans on exporting goods can also be in effect through the presence of economic and targeted sanctions and export controls. See OECD, *Looking Beyond Tariffs: The Role of Non-Tariff Barriers in World Trade* (2005), online: <www.oecd.org/tad/ntm/lookingbeyondtariffstheroleofnon-tariffbarriersinworldtrade.htm>.

Both define specific characteristics that an environmental good should possess, such as size, performance, process, production methods, function, labelling and so forth. Such TBTs have become a growing source of concern. As tariffs have steadily decreased, governments have increasingly introduced an array of regulatory requirements. While TBTs contribute to protecting the public and streamline the trade of goods leading to more efficient markets, they can often be extremely complex and opaque. TBTs are not always published or otherwise made publicly available by states, and exporters also find it difficult to obtain information about such measures and their particularities (such as proposed changes) from government sources. As a result, TBTs can interfere with exporters' business opportunities, leading to subpar market outcomes and increased costs.

Various international instruments seek to ensure market access to exporters and to favour the harmonization of domestic technical regulations with international norms and the application of technical regulations without discrimination. Among the most important is the WTO Agreement on Technical Barriers to Trade (TBT Agreement), which seeks to avoid unnecessary obstacles to trade, while at the same time ensuring that states are able to implement various measures needed to protect legitimate public interests (such as national security, and public policy matters, including the protection of human, plant and animal life, and the environment). Free trade agreements also often contain language on technical regulations, standards and conformity assessment procedures (the procedures used to verify that goods or services conform to technical regulations or standards).

In principle, all technical regulations are to be "based on" international standards, such as standards developed within committees of the International Standards Organization (ISO) based in Geneva. For example, manufacturers and exporters of environmental goods should be knowledgeable about the ISO standard 14034 (Environmental management — Environmental technology verification), which allows for the independent verification of claims made on the performance and reliability of clean technologies. If a domestic technical regulation complies with relevant international standards, it is presumed not to create an unnecessary obstacle to trade and, thus, considered consistent with the TBT Agreement. States are therefore encouraged to use international standards as the basis to implement their domestic technical regulations.

However, since TBTs define specific characteristics of goods or services, they may not be able to cover, or may not be suited for, newly developed goods or services, for instance, recycled paint. The process for creating TBTs is slow. Therefore, manufacturers would be well advised to try to address any safety concerns that may arise regarding their products in the period before TBTs are developed. Manufacturers should also be aware that competent authorities in different states may have different concerns or criteria regarding such goods or services, and that TBTs may also vary from state to state as they begin to be developed. Exporters can also be subject to TBTs in their own exporting jurisdiction that may differ from those of the country or countries where they intend to export their goods.

Solutions

Effective knowledge about which TBTs might be applicable to a particular product in a foreign market is crucial. Exporters must ensure that their products comply with technical requirements and standards, and with other TBTs in the foreign market, in order to sell their products. Pursuant to WTO rules and most free trade agreements, technical regulations have to be published and made available. For such purposes, each WTO country has created a Notification Authority and Enquiry Point that provides documentation and responds to enquiries. Various organizations in Canada, as well as international institutions, have created and established tools to support exporters facing TBTs. They provide information on requirements, costs, foreign governmental enquiry points and time frames involved in preparing a product for export, among others. Often such entities employ experts on TBTs who possess a vast network of contacts in various industries abroad, as well as with certification labs and standards agencies abroad.[23] Exporters can sign up with ePing to receive email alerts on new TBT

23 WTO, *TBT Agreement*, *supra* note 20. For example, an exporter may contact various organizations set up to help exporters understand TBTs in foreign markets. The Standards Council of Canada is also an important resource, as it offers a system of electronic alerts to advise of any changes in national and international standards. Online: <www.scc.ca/en/standards/standards-alert>. Help can be found through other organizations such as CRIQ in Quebec. Online: <www.criq.qc.ca>.

notifications.[24] Resources provided by industry associations on certification processes and similar TBTs could also be useful in order to identify TBTs that might interfere with export activities.

WTO members are bound to use international norms as the basis for establishing uniform domestic technical regulations, unless those norms are proven to be ineffective or inappropriate to the legitimate objectives pursued. As a result, adhering to widely disseminated international standards, such as those of the ISO, can help mitigate the risk of exported products not respecting foreign domestic technical regulations. For example, using ISO standard 14034 (as discussed above) allows exporters to confirm the actual performance of clean technologies and to prove the reliability of their performance claims, with the objective of ensuring easier market access abroad.

To meet domestic technical regulations, exporters will often have to have their goods certified according to local standards. Attempts at certifying products prior to their export, through foreign accreditation and certification bodies, can be an extremely time-consuming challenge. A potentially expedient solution that may be available to exporters is to use an accreditation/certification body in the exporter's own jurisdiction that is recognized by the foreign state, and thus avoid the time-consuming process of shipping samples of goods to the foreign jurisdiction for certification.

For the longer term, exporters can register a TBT that affects them with their own government. In Canada, Global Affairs Canada, through its Trade Commissioner Service, works closely with exporters to address trade barriers with foreign agencies.[25] Exporters (directly or through chambers of commerce or trade associations) can also seek to collaborate with foreign governments, notably with departments of industry and trade, to develop domestic technical regulations based on international standards, accept the certification made by foreign accreditation and certification bodies, and build the necessary capacity to efficiently manage TBTs (in particular within those less technologically advanced countries that lack capacity and infrastructure). If technical regulations are non-existent in a certain field, governments could be encouraged to build capacity and develop relevant legitimate technical regulations. For instance, ISO 14034 followed from a proposal submitted by the Standards Council of Canada in 2012, which thereafter worked with Environment and Climate Change Canada to support the development of the international standard.

Exporters can also seek the protection of their governments. Many governments have established programs aimed at collecting and investigating reports of NTBs (including LCRs and TBTs) identified by exporters in foreign markets. When faced with difficulties, exporters may also write directly to the embassy and trade commissioners located in the importing country. If well described, and substantiated with reliable evidence, reports of NTBs will more easily be passed through government channels and reach representatives of the importing government directly or through the appropriate WTO committee or sub-committee. If no resolution occurs and if NTBs violate WTO rules, a government may also request consultations with the government responsible for the NTBs in question and eventually file a complaint in accordance with the WTO's dispute settlement rules. While turning to the WTO dispute settlement mechanism in order to get the NTBs removed may seem to be an arduous and time-consuming process, it could be well worth the effort in the longer term. However, if deemed impossible by the exporter, as WTO dispute resolution proceedings can take a long time, exporting businesses should assess their options and decide whether the potential rewards offered by a foreign market outweigh the costs of operating with NTBs in place.

Finally, even when all TBTs have been addressed, various other NTBs can interfere with the export of environmental goods before they are even allowed to enter the foreign market. Among the most important, LCRs can often impose a disproportionate burden on the foreign operations of an exporter.

Local Content Requirements

LCRs are the result of governmental policies requiring that final goods used in a country incorporate a share of locally produced inputs, jobs or costs as a condition to operate, sell or receive a benefit in the foreign market. Other government

24 ePing was established as part of a collaboration among the United Nations Department of Economic and Social Affairs, the WTO and the International Trade Centre. Online: <www.epingalert.org/en>.

25 Canada, Global Affairs Canada, "Is a trade barrier holding back your export business?", [Canada, Global Affairs Canada], online: <www.international.gc.ca/gac-amc/campaign-campagne/trade_barriers-barrieres_commerciales/index.aspx?lang=eng>.

policies, such as discriminatory government procurement and localization requirements associated with data protection and security, can also be considered as a form of LCR.[26] Among policy objectives, LCRs in clean technologies are often implemented by governments to support nascent national industries and technological sectors, to create local employment and to encourage public support for projects. Even though they are considered an obvious barrier to the transfer of technology and to trade in general, some governments seek to support their own renewable energy industry and manufacturers by resorting to LCRs and regulations that have similar effects, which has led to renewable energy becoming an increasing target of trade disputes at the WTO level. For example, domestic content requirements were a point of contention in disputes between the US and China (DS419) regarding Chinese wind power subsidies that required domestic content, and against India (DS456) in relation to the LCR measures India had imposed as part of its Jawaharlal Nehru National Solar Mission to encourage solar developers to sell electricity to the government. A WTO panel and the Appellate Body found that India's LCR measures were inconsistent with WTO non-discrimination obligations.[27] These are among many recent trade disputes over renewable energy (from 2010 onward) involving LCRs. There were also cases against the United States for LCRs in the renewable energy sector, especially concerning the various solar programs in a number of US states, and against Canada related to the government of Ontario's renewable energy program.[28]

Moreover, not only do LCRs stifle the transfer of clean technologies, they often can have a detrimental impact on national economies that implement such measures, leading to increasing economic isolation, as well as lowering the quality of goods due to protection from competition and deterring innovation and investment.[29] According to the Organisation for Economic Co-operation and Development (OECD), "since the financial crisis of 2008, more than 140 new local content measures have been put in place by governments largely in an effort to improve domestic employment and industrial performance."[30] LCRs in solar and wind industries have been implemented by at least 21 nations, including OECD and emerging countries.[31] Even when governments drop their explicit LCRs, implicit LCRs can remain in place. Brazil, for example, was convinced to drop LCRs in a public tender involving wind energy in 2009. However, an implicit LCR remained, as the Brazilian national development bank only provided financing to projects with a certain percentage of content produced locally.[32]

Solutions

Exporters faced with LCRs will need to be aware of the wide range and scope of LCRs that may apply to their products. For example, the foreign requirements might be to transform the product in its entirety, manufacture and assemble the product with local components, or only to finalize the assembly locally.

Depending on the type of LCRs, businesses could consider establishing an operating structure abroad that is less sensitive to the impact of LCRs, such as partnering with a local business or establishing a subsidiary in the foreign market. Observing how competitors manage LCRs in their operations in a particular foreign market can also be a useful tool. With such information

26 OECD, "The economic impact of local content requirements", online: <www.oecd.org/tad/policynotes/economic-impact-local-content-requirements.pdf>.

27 See *China—Measures concerning wind power equipment* (2010), WTO Doc WT/DS419; *India—Certain Measures Relating to Solar Cells and Solar Modules* (2013), WTO Doc WT/DS456. See also Bob Carbaugh & Max St Brown, "Industrial Policy and Renewable Energy: Trade Conflicts" (2012) 5:1 J Intl & Global Economic Stud 1.

28 See *United States—Certain Measures Related to Renewable Energy* (2018), WTO Doc WT/DS563; *United States —Certain Measures Relating to the Renewable Energy Sector* (2016), WTO Doc WT/DS510. On the 2010 trade dispute between Japan and Canada related to the Government of Ontario's renewable energy program, see *Canada—Certain Measures Affecting the Renewable Energy Generation Sector* (2013), WTO Doc WT/DS412/AB/R (Appellate Body Report); *Canada—Measures Relating to the Feed-in Tariff Program* (2013), WTO Doc WT/DS426/AB/R (Appellate Body Report).

29 Sherry M Stephenson, "Addressing local content requirements: Current challenges and future opportunities" (2013) 7:3 Biores, online: International Centre for Trade and Sustainable Development (ICTSD) <www.ictsd.org/bridges-news/biores/news/addressing-local-content-requirements-current-challenges-and-future>.

30 OECD, "The economic impact of local content requirements", online: <www.oecd.org/tad/policynotes/economic-impact-local-content-requirements.pdf>.

31 Geraldine Ang & Ronald Steenblik, "Breaking Down the Barriers to Clean Trade and Energy" (2015) 9:6 Biores, online: ICTSD <www.ictsd.org/bridges-news/biores/news/breaking-down-the-barriers-to-clean-energy-trade-and-investment>.

32 Renewable Energy World, "Trade Barriers Dim Renewable Energy's Prospects", online: <www.renewableenergyworld.com/articles/print/volume-14/issue-5/solar-energy/trade-barriers-dim-renewable-energys-prospects.html>.

in hand, exporters can better evaluate the impact of LCRs on their business and manufacturing operations, and the measures they need to take.

While LCRs may violate WTO rules and other international trade agreements, they nevertheless remain present in the landscape, usually for political reasons. Exporters and their home governments can help shape and develop alternative strategies for governments of less technologically advanced countries to build capacity, such as creating a favourable business and regulatory environment, providing government financing, developing human resources and targeting innovation policy and infrastructure development. Improvements in these areas could lead to more sustainable trade outcomes over the long run than would be achieved by implementing LCRs.

To sum up, barriers to the trade in clean tech goods are numerous and have the potential to interfere with export activities. They have traditionally been the focus of much attention by national and international actors seeking to reduce and streamline impediments to international trade. However, with the diversification of the global economy, addressing barriers to the trade in goods is not sufficient. The global rise in importance of the service industry has underscored the need to address the various barriers to the transfer of environmental services. This will be dealt with in the following section.

Barriers to the Transfer of Environmental Services

Clean technology is often of a technical nature, and numerous services are required to design, install, operate and maintain environmental technologies. Wind turbines, for example, require constant optimization and must be adapted to changing wind conditions. Paradoxically, less technologically advanced countries tend to have more restrictive trade policies toward the provision of foreign services.[33]

There are several barriers to the transfer of services that prevent the effective transfer of clean technologies. They vary significantly from one state to the next. Licensing requirements, which require professionals in certain industries to be locally licensed, often complicate the hiring of foreigners. Residency requirements and restrictions on the movement of persons (via visa restrictions on business visitors, intra-company transferees, after-sales service and independent service providers, among others) limit the transfer of persons and services provided.[34] According to the OECD, not only do direct restrictions impact the trade in environmental services, but the market structure and other implicit restrictions can also act as barriers to the trade of services.[35] For example, the legal and constitutional structure of certain governments can bar foreign entities from providing services in certain sectors (sewage treatment, for example), as they are exclusively undertaken by public monopolies or by entities such as local municipalities. Substantial fiscal charges, extremely complicated tax structures, or bans on public procurement for foreign service providers can also restrict the ability of foreign service providers to operate effectively, even if they are not targeted specifically to environmental services. Removing barriers to the trade in services would reduce the costs of meeting environmental goals, as local firms could operate at greater scale, with higher earnings, increased productivity and access to technology and skills, and the ability to choose service providers at competitive prices.

Intergovernmental efforts have attempted to ease the transfer of environmental services, even though international negotiations have primarily focused on environmental goods. One of the challenges is how to address and categorize environmental services, as many services provided are much wider than their classification as an environmental service (such as construction or consulting services, which can be considered environmental services, but also be used in a

33 *Ibid* at 13.

34 The government of Indonesia, for example, places a 55 percent limit on the share of equity that can be held by foreigners in companies operating in services related to consulting, engineering and construction, among others. See Republic of Indonesia, *Presidential Regulation Number 39 of 2014 on List of Business Fields Closed to Investment and Business Fields Open, With Conditions, To Investment*.

35 Heymi Bahar, Jagoda Egeland & Ronald Steenblik, "Domestic Incentive Measures for Environmental Goods with Possible Trade Implications" (2013) OECD Trade and Environment Working Papers, online: <www.oecd-ilibrary.org/trade/domestic-incentive-measures-for-renewable-energy-with-possible-trade-implications_5k44srlksr6f-en>.

plethora of other service industries). Multilateral efforts have been made, notably under the WTO with the General Agreement on Trade in Services (GATS), in which governments make special commitments in negotiations (which vary from state to state) regarding market access for foreign service suppliers in various industries, including prohibiting of discrimination toward different trade partners. However, many governments take the position that these negotiations do not go far enough. As a result, recent negotiations have taken place to further liberalize services under an agreement called the Trade in Services Agreement (TISA) involving 23 WTO members, including Canada, the European Union and the United States. TISA, whose participants account for more than 70 percent of world trade in services, seeks to further open up markets and streamline rules in a variety of industries, such as financial services, as well as mobility of individuals to temporarily provide services. However, negotiations have been stalled since 2016, and major emerging markets such as China, Brazil or India, which are net importers of services, are not participants in TISA. Even though formally the TISA negotiations are conducted outside the WTO legal framework, a possible outcome of any successful TISA negotiation would be to build upon progress achieved under TISA and broaden participation to all WTO members.[36]

Solutions

Exporters should conduct proper due diligence and research to ensure that they are able to supply their services in the export market or to mitigate the impact of market barriers that may prevent such supply. In order to do so, exporters can consult the various market-access commitments (and associated requirements) made by foreign states under the GATS and free trade agreements. The latter are negotiated commitments that limit restrictions of access by foreign service suppliers, their operations or their participation in the domestic market. Market-access commitments are most generally made by states in international agreements such as the GATS and free trade agreements. These allow for the provision of foreign services, such as for after-sales service, services conducted under product guarantees, or sector-specific service work. Each state party to the GATS describes its market-access commitments in schedules to the GATS it updates from time to time.[37]

If exporters are unable to supply their services without restriction, they can explore the possibility of establishing a presence in the importing country and/or encourage the hiring of a highly skilled and diverse workforce legally entitled to work in various states. This strategy has the added benefit of providing services with employees who can arguably better navigate the often complex web of local business customs and languages.

Over the long term, exporters facing barriers to trade in services should register the trade barriers with their own government. Global Affairs Canada can have its Trade Commissioner Service work closely with exporters in addressing trade barriers with foreign agencies.[38] Exporters can also (directly or through other stakeholders such as trade associations and chambers of commerce) seek to collaborate with national and foreign governments to achieve meaningful changes in government practice regarding the trade in services, as well as to encourage WTO members to broaden their national "special commitments." The same could be said with efforts to tackle, streamline and/or address the wide array of domestic laws, regulations and administrative rules that directly affect trade in environmental services (such as professional, technical or workplace safety requirements). Given the dual-use challenge in which environmental services increasingly overlap with services classified within other service sectors (also present in the trade of goods), special attention should be paid to identifying and categorizing which industry sectors could be considered as environmental services. For example, "engineering services" is an overbroad classification and would need to be defined according to its different environmental dimensions.

While goods and services are the main products of international trade, attention must also be paid to the trade barriers interfering with the underlying forces sustaining the production of goods and services. The next section will therefore deal with barriers to the transfer of FDI.

36 Canada, Global Affairs Canada, *Trade in Services Agreement,* online: <www.international.gc.ca/trade-agreements-accords-commerciaux/topics-domaines/services/tisa-acs.aspx?lang=eng>.

37 Schedules of commitments of each WTO member country may be found online: <www.wto.org/English/tratop_e/serv_e/serv_commitments_e.htm>.

38 Canada, Global Affairs Canada, *supra* note 25.

Barriers to the Transfer of Foreign Investment

The effective transfer of clean technologies can be substantially encouraged by foreign private investment. FDI, such as an investment made by a foreign entity in a local company, is recognized as an important factor in the transfer of clean technologies and of know-how, even though there currently seems to be no agreed-upon definition of what constitutes FDI. There is also a lack of efficient data on how to quantitatively measure the impact of FDI on the transfer of clean technologies.[39] Nonetheless, according to UNCTAD, there is a "robust correlation between trade in environmental goods and FDI."[40] It has become evident that public financing is not sufficient to engage in the efficient transfer of clean technologies. Among other factors, developing countries are often saddled by important infrastructure gaps and chronic budget constraints, as well as by constant increases in energy demand from their population.[41] In 2016, green FDI in the field of renewable energy, recycling activities and low-carbon technology manufacturing reached US$82 billion.[42]

However, the efficient transfer of technology and know-how is often restricted by regulatory or implicit impediments related to foreign investment. Regulatory impediments include capital controls, foreign investment screening, restrictions on ownership and residency (which can also include residency restrictions for management), government-appointed board members, unfavourable tax treatment, conditioning the approval of foreign investment upon performance of technology transfer or other requirements,[43] restrictions on joint ventures, on repatriation of capital and profits, and a number of sector-specific measures, among others. As a result, foreign investment can be prohibited, difficult to achieve, or severely restricted.

Exporters may also lack guarantees and other financing mechanisms (such as investment funds or export credit) to invest in and operate in certain foreign markets, which can raise the cost for private entities seeking to transfer clean technologies. Other than financial or sovereign risk, exporters and investors may also have to manage unstable governments and banking systems, the risk of expropriation or discrimination, the lack of government transparency in services (such as in taxation and in attributing permits), the shortcomings in governmental and energy policy, and the poor credit of domestic partners.

Solutions

Investors are advised to conduct due diligence and research to identify obstacles to the transfer of FDI. The World Bank, for example, compiles various quantitative indicators on the economies of various foreign states (their laws, regulations and business practices) in order to determine the number and type of FDI barriers per state.[44] Host states usually have an agency that is responsible for attracting foreign investment and providing information on the investment regime and regulations. Contacting such agencies and developing long-term relationships can prove to be extremely useful.

There are dozens of official export credit agencies around the world, such as Export Development Canada, or investment guarantee programs, such as the Multilateral Investment Guarantee Agency, which can provide some security to investors.[45] They mostly provide guarantees to financial institutions extending credit on behalf of exporters, as well as providing insurance to exporters in case of default in payment by overseas buyers.

39 Stephen Golub, Celine Kauffmann & Philip Yeres, "Defining and Measuring Clean FDI: An Exploratory Review of Existing Work and Evidence" (2011) OECD Working Papers on International Investment at 19; Ans Kolk, "The Role of International Business in Clean Technology Transfer and Development" (2013) 15:1 Climate Policy 170.

40 UNCTAD, *Promoting poles of clean growth to foster the transition to a more sustainable economy* (2010) Trade & Environment Review at 198, online: <http://unctad.org/en/docs/ditcted20092_en.pdf>.

41 OECD, *Policy Guidance for Investment in Clean Energy Infrastructure* (2013), online: <www.oecd.org/daf/inv/investment-policy/CleanEnergyInfrastructure.pdf>.

42 UNEP, *Green foreign direct investment in developing countries* (2017), online: <http://unepinquiry.org/wp-content/uploads/2017/10/Green_Foreign_Direct_Investment_in_Developing_Countries.pdf>.

43 The European Union and other countries have engaged in consultations on these measures with China at the WTO since June 1, 2018. See *China–Certain Measures on the Transfer of Technology* (2018), WTO Doc WT/DS549.

44 World Bank, "Investing Across Borders: Indicators of Foreign Direct Investment Regulation", online: <http://iab.worldbank.org>.

45 World Bank, "Multilateral Investment Guarantee Agency", online: <www.miga.org>.

Investors can also mitigate the effect of FDI restrictions by ensuring that their project falls within the scope of bilateral investment treaties or multilateral investment treaties, such as the Energy Charter Treaty, which aim to provide a level of legal protection to foreign investors with regard to the actions of a host state, and dispute settlement mechanisms such as investor-state arbitration. These instruments can be useful to help investing entities ensure that host governments and other institutions provide transparency and openness for markets, as well as to prevent discriminatory measures and expropriation. Exporters might also take advantage of various FDI incentives established by foreign governments, which might be available to the investors on a permanent or an ad-hoc basis for specific projects. Such incentives may include tax breaks (preferential tax rates, exemption from import duties, income tax exemptions), low-interest loans and input subsidies. It is important to note, however, that many such incentives come with conditions attached, such as the obligation to use local inputs in the foreign market (LCRs such as labour or local resources).

Over the longer term, investors (directly or through chambers of commerce and trade associations) can seek to collaborate with governments and international institutions to reduce limits and restrictions on FDI, as well as to ensure that restrictions on FDI are implemented only for national security or public interest reasons. They can also seek to lobby governments to establish appropriate institutional policy frameworks for FDI in clean technologies, to ease access to guarantees and other financing mechanisms, as well as to tackle market rigidities present abroad that favour traditional fossil fuels. Governments should be encouraged to adopt flexible and responsive government transaction approvals or reviews, as well as to provide access to quantitative and qualitative data through the compilation of national databases on FDI (on the number of FDI reviews, transactions blocked, or in which conditions were imposed, for example). Efforts should also be deployed to improve international efforts to harmonize investment policies and to increase the competitiveness of clean technologies.

The trade in environmental goods and services, as well as FDI, often imply transfer of technology and corresponding use of licensing agreements, which are analyzed in the following section.

Barriers to the Transfer of Clean Technologies

Intellectual Property Rights

Operating in a foreign market, especially in an innovative industry that incorporates specialized and highly complex technology, requires the efficient protection of intellectual property rights (IPR), a proper licensing regime and efficient tax treatment.

The effective transfer of clean technologies generally involves the sale or licensing of high-value IPR through trade, technology licensing and FDI. Exporting businesses are well advised to ensure that the IPR related to their products, software or services are legally protected. Failure to do so can adversely affect their businesses. The IPR environment in a foreign market can be a determining factor in the decision to transfer clean technologies, even though it is important to mention that not all clean technologies are subject to IPR protection or are patentable. Multiple forms of IPR protection exist, among them copyrights, patents, trademarks and trade secrets. However, this paper will mainly focus on patents and trade secrets.

Technologically advanced and less technologically advanced countries often hold diverging views on the scope of clean technology IPR protection. Some states argue that weak foreign IPR protection can act as a barrier to technology diffusion, as IPR are at the core of innovation and indispensable to fostering technology transfer.[46] On the other hand, a state facing immediate challenges in accessing new technological advances may consider that having a weaker IPR regime will facilitate the acquisition of clean technologies developed in other, more technologically advanced, countries.

Patents

Businesses seeking patent protection in foreign states must file separate applications in each jurisdiction where protection is sought. They

46 Wei Zhuang, "Intellectual property rights and transfer of clean energy technologies" (2001) 1:4 Intl J Public L & Pol'y 384; Ahmed Abdel-Latif, "Intellectual property rights and the transfer of climate change technologies: issues, challenges, and way forward" (2015) 15:1 Climate Policy 103.

can also file an application under the Patent Cooperation Treaty (PCT) and designate the jurisdictions where protection is sought. The duration and the costs involved with the issuing of a patent are major concerns for exporting businesses, especially for small and medium-sized enterprises that need to protect their innovations but have limited funds. On top of the necessary due diligence, waiting for a decision from patent offices is also expensive and time-consuming, as intellectual property offices in some states might suffer from a backlog of applications. The complete patent process takes more than eight years in Brazil and three to five years in India and China. Several states have adopted measures to accelerate the process of patent granting in the field of clean technologies.[47] This acceleration is a worthwhile initiative that offers clean technology developers a viable choice for protecting their inventions. However, the unavailability of a uniform and precise definition of clean technology can be problematic in this context. Indeed, patent offices that allow accelerated procedures for clean technologies have access only to broad and imprecise definitions.

States with weak IPR protection also pose the risk that patent rights will not be fully respected or that enforcement will be subject to extensive and expensive legal disputes and delays. Each year, the Office of the United States Trade Representative (USTR) releases a report identifying countries that, in its opinion, do not adequately or effectively protect and enforce IPR or otherwise deny market access to US creators that rely on their IPR.[48]

Trade Secrets

In addition to patenting, trade secrets are another vehicle for ensuring IPR protection. Unlike patent protection, which is limited to a period of at least 20 years after filing, trade secrets are protected for an unlimited period of time without any procedural formalities. Any confidential business information, such as operation and control systems or manufacturing and composition of the products, may be considered a trade secret, provided the information is kept secret and has commercial value.

It is usual practice for technology businesses, when dealing with third parties, to use non-disclosure or confidentiality agreements to protect trade secrets or other confidential information. These confidentiality agreements forbid contracting parties from disclosing proprietary and confidential information to others, unless otherwise specified.

Under the WTO's Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS),[49] WTO member countries are obligated to ensure the protection of undisclosed information (trade secrets, for example) through appropriate legislation. TRIPS, however, is silent on the modalities of achieving this.

While the rationale that trade secrets protection incentivizes innovation is supported by some jurisdictions, the notion of public interest, such as the right to information, is viewed as a more prominent issue by others.[50] Favouring public interest over an outright protection of trade secrets may put businesses' confidential information at risk. An absence of trade secret protection increases the resources that businesses must expend on other IPR protection vehicles. Offering trade secret owners more options to protect their confidential information may be more beneficial for the transfer of clean technologies in the long run. An implicit bias against trade secret protection may exist when a state's IPR framework is weak or if there is an absence of detailed laws regulating them. The risks to trade secrets may be further aggravated when governmental regulations require full disclosure of pertinent information, which may be

47 See International Association for the Protection of Intellectual Property, Standing Committee on Intellectual Property and Green Technology, *Climate Change and Environmental Technologies–The Role of Intellectual Property, esp. Patents* (2014) ("The United Kingdom Intellectual Property Office (UKIPO) was the first office to introduce an accelerated procedure for clean technologies in May 2009 by establishing the 'Clean Channel' initiative. Several other states developed similar programs: the Korean Intellectual Property Office (KIPO), the United States Patent and Trademark Office (USPTO), the Canadian Intellectual Property Office (CIPO), the Australian Intellectual Property Office (IP Australia), the Japanese Patent Office (JPO), the Israel Patent Office, the Brazil Patent Office (INPI) and the Chinese Patent Office (SIPO)" at 10). See also Estelle Derclaye, "Not only innovation but also collaboration, funding, goodwill and commitment: Which role for patent laws in Post-Copenhagen Climate Change Action" (2010) 9:3 John Marshall Rev Intellectual Property L 161.

48 USTR, *2018 Special 301 Report*, online: <https://ustr.gov/sites/default/files/files/Press/Reports/2018%20Special%20301.pdf>.

49 *Agreement on Trade-Related Aspects of Intellectual Property Rights, Marrakesh Agreement Establishing the World Trade Organization, Annex IC*, 15 April 1994, 869 UNTS 299, 33 ILM 81, art 39.

50 Elizabeth A Rowe & Sharon K Sandeen, *Trade Secrecy and International Transactions: Law and Practice* (Cheltenham, UK: Edward Elgar, 2015).

confidential, as a prerequisite to obtaining market entry approval. The disclosure requirement can also occur as part of the investigation and prosecution before a court of a trade secret infringement litigation, as court records are usually public. The risk associated with these requirements is that submitted information will not be kept confidential.

Solutions

Exporters are well advised to develop their knowledge on the various forms of country-specific IPR protection, such as copyright, patents, trademarks and trade secrets, and to seek the most efficient measures to protect the IPR of their technology. Among such measures are patent priority under the Paris Convention for the Protection of Industrial Property, and patent filing under the PCT, which allows for a unified procedure for filing patents in PCT-contracting states.[51] Given that the norms governing IPR protection are often specific to each state, this could help avoid future challenges and headaches.

Once exporters are well versed in IPR and their rights are protected in the most important jurisdictions, they should also explore using various tools to reduce any interference that the IPR of third parties might pose to their foreign operations. Among such tools is conducting an analysis to determine the "freedom to operate" an exporter has to expand into foreign markets. This normally involves hiring a patent attorney or other IPR law expert to conduct an analysis to determine if expanding into a foreign market breaches a competitor's IPR rights (such as patent and trademark rights). If the analysis determines that the exporter's technology infringes a competitor's IPR rights, exporters may explore how they can "design around" and change the exported technology just enough so that it does not violate the competitor's registered patents in a specific state or seek to conclude with the competitor a licensing agreement for the use and exploitation of its patents. If they are able to find evidence that the competitor's invention was already publicly known or available before the effective filing of its patent (also known as prior art), they can consider attacking or threatening to attack patent validity.

Other mitigating avenues can be explored to allow different entities that might own competing IPR to operate in a particular market, often on a give-and-take basis. Entities can enter into a cross-licensing agreement, which allows corporate entities to share patent rights or other IPR with each other, thus expanding their freedom to operate. Larger patent pools can also be used, which often involve several companies pooling their IPR resources to allow use of patented technology in exchange for payment. Other technological collaborative mechanisms include patent pledges, whereby clean technology holders pledge or simplify the non-exclusive use of their patented technology, subject to certain conditions.[52]

Exporters also need to pay special attention to the protection of their trade secrets, in particular with confidential information they disclose to businesses operating in states where trade secrets are not well protected. To mitigate their risks, they are advised to draft unambiguous confidentiality and non-disclosure agreements, with penalties in case of violation and effective dispute resolution mechanisms to ensure their robust compliance and enforcement. It is also important to develop and implement company policies on the protection of IPR and to make sure measures are in place and acted upon, as many foreign legal systems will provide substantially less protection in case of infringement if exporters have not taken reasonable measures to protect their IPR beforehand.

There are a variety of other concrete actions that exporters can take to maintain control of their IPR. These options might not apply to every clean technology product exported and might need to be modified and adapted to each particular case. First, during the manufacturing process, relying on foreign manufacturers or partners can put IPR at risk. It is recommended to divide production among several foreign manufacturers to ensure that no single entity has access to the entirety of the exporting entity's IPR, especially trade secrets. Exporters can also retain final assembly under their sole control by storing and assembling critical components in a secure location, while exerting less control over non-critical components in the manufacturing process.

51 The PCT has 152 contracting states. Online: <www.wipo.int/pct/en/pct_contracting_states.html>.

52 Bassem Awad, "Global Patent Pledges: A Collaborative Mechanism for Climate Change Technology" CIGI, CIGI Papers No 81, 27 November 2015, online: <www.cigionline.org/publications/global-patent-pledges-collaborative-mechanism-climate-change-technology>; Jorge Contreras, "Patent Pledges" (2015) 47:3 Ariz St LJ 543.

Protecting IPR abroad can also be done remotely, by keeping a degree of control over the product by withholding critical spare parts or disabling critical software or hardware remotely in case of infringement. The use of cameras and other surveillance mechanisms (while being mindful of privacy concerns) could be an option to ensure that only certain authorized persons have access to critical IPR. Exporters can also develop an "export" version of a product, which could contain less advanced materials and technology than more advanced versions remaining in the home market or in the control of clients who pose less risk of IPR infringement. An alternative technique would be to export the most advanced product abroad and to constantly develop new technology and updates in the home market. The exporting entity would then exert control on the most recent technology and updates and the foreign entity would be less likely to infringe the exporting entity's IPR to secure its access to updates.

In the event of an infringement of their patent or other IPR, exporters may consider protecting their IPR by acting against the infringer in court (or at least brandish the threat of doing so). While local courts would probably have jurisdiction to hear such a case, exporters could explore the possibility of using foreign courts to hear their case and render judgment if their jurisdiction rules allow. Some national courts consider having jurisdiction over a foreign defendant if an infringement act took place in their jurisdiction, for example, if the claimant is able to purchase counterfeited goods, on the internet or otherwise, from the foreign defendant and have them delivered in the jurisdiction of the court. There are other rules that grant jurisdiction to foreign courts. Strategically, it is worthwhile exploring such avenues, as some jurisdictions are friendlier to IPR holders than others, and are more knowledgeable in IPR protection. Besides court litigation, intellectual property disputes can be resolved through mediation and arbitration, provided the disputing parties agree to it.

While the trade barriers affecting the transfer and protection of technology through the use of patents and trade secrets have been addressed herein, attention must also be paid to the mechanisms through which such technology is transferred abroad. The following section will deal with the various impediments to the efficient transfer of technology related to contractual agreements such as licensing agreements. Such agreements are the most common legal instrument used to transfer IPR from a licensor, who owns the IPR, to the licensee, who is the user in the foreign market such as a local partner or local subsidiary.

Licensing Agreements

Clean technology can be transferred through a licence or licensing agreement that allows the licensee to use and exploit clean technologies and associated IPR. An exporter can grant a local licensee the right to manufacture clean goods locally, such as solar thermal collectors, in exchange for royalty payments under a licensing agreement. Technology transfer licensing may cover patent and know-how licensing, copyright licensing, trademark or service mark licensing and so forth. Specific barriers to the licensing of clean technologies and limitations include grant-back clauses, compulsory licensing, and royalty transfer and taxation.

Grant-back Clauses

Licensing agreements often include grant-back clauses, which are provisions under which a licensee has to transfer and assign any improvement made to a licensed technology back to the original licensor of the IPR. They are common in licensing agreements concerning patented technology. Licensors who license their invention have a clear interest in ensuring control over new developments made by the licensee to their invention and may insist on a grant-back clause to avoid competing with their licensees and updated products and manufacturing processes.

In licensing agreements, assignment-backs give the original licensor all rights over the improvements made by licensees. License-backs, on the other hand, give the original licensor the right to use the improvements made by licensees, which can be shared with others.[53] Grant-back clauses can also require the licensee to grant back only the improvements relating directly to the original patents. Of course, grant-back clauses can contain combined characteristics from the above-mentioned clauses.

In most jurisdictions, freedom of contract governs grant-back clauses. In others, however, the validity of grant-back clauses is a controversial issue. For instance, grant-back clauses have been challenged

53 Richard Schmalbeck, "The Validity of Grant-Back Clauses in Patent Licensing Agreements" (1975) 42 U Chicago L Rev 733.

on the ground that they may have adverse effects on innovation and competition.[54] While this is not overly common, some governments possess a legal framework that might affect the rights of a licensor,[55] and some authorities regard such clauses as illegal, null or void in order to prevent the abuse of IPR having adverse effect on competition in their relevant markets.[56]

For example, China has focused on regulating the effects of grant-back clauses on innovation and competition (among the many measures taken to restrict the rights of IPR holders).[57] For example, article 10 of the Provisions on the Prohibition of the Abuse of Intellectual Property Rights to Eliminate or Restrict Competition, promulgated by the State Administration for Industry and Commerce, "prohibits a business operator in a dominant market position from imposing unreasonable restrictive conditions without justification. Prohibited acts include: requiring exclusive grant-backs of improved technologies."[58] Grant-back clauses may also be subject to the scrutiny of the Antimonopoly Law if abuse of IPR is found in agreements.[59] More specifically, article 29(3) of the Regulations on Technology Import and Export Administration of the People's Republic of China prohibits clauses "restricting the receiving party from improving the technology supplied by the supplying part, or restricting the receiving party from using the improved technology."[60]

In the context of clean technology transfer, licensors need to be cautious when entering into agreements with foreign partners and should take into account legislation affecting grant-back clauses, in particular under competition law provisions.

Solutions

Given the different legal regimes of various technology-deprived countries and the legal uncertainties in some jurisdictions, technology-driven businesses may face sanctions from foreign authorities or see provisions of their licensing agreements declared void. A licensor may prefer not to trade in clean technologies without the assurance that it will not lose its rights on its innovations or find itself competing with its licensees. It is fundamental to be aware of local rules and review licensing agreements thoroughly to avoid the potential risk of violating applicable laws. For such purpose, it is advisable to consult a local lawyer specialized in intellectual property.

It is also advisable to carefully prepare the licensing transaction and assess the impact of regulations applicable to grant-back clauses. A licensor may consider prohibiting the licensee to make any change to its technology to avoid drafting a grant-back clause. In a manufacturing licence agreement, the licensor may authorize the licensee to limit its improvements to the manufacturing of its products and not cover the licensed product itself. However, if it needs to authorize a change in the licensed product and seek to limit the impact of grant-back clause regulations, the licensor could draft the following clause in its licensing agreement to express the intent of the parties, with no assurance that it will function in all cases:

> Any modification, adaptation or improvement to the Technology made by Licensee alone or in collaboration with Licensor or a third party ("Improvement")

54 An obligation to grant the licensor an exclusive licence to improvements of the licensed technology or to assign such improvements to the licensor is likely to reduce the licensee's incentive to innovate since it hinders the licensee in exploiting the improvements, including by way of licensing to third parties. See EC, *Guidelines on the application of Article 101 of the Treaty on the Functioning of the European Union to technology transfer agreements* [2014] OJ, C 89/3.

55 Even technologically advanced entities such as the European Union possess rules on the matter. See e.g. EC, *Commission Regulation (EU) No 316/2014 of 21 March 2014 on the application of Article 101(3) of the Treaty on the Functioning of the European Union to categories of technology transfer agreements* [2014] OJ, L 93/17.

56 Section 40 of TRIPS provides that nothing in TRIPS shall prevent WTO members "from specifying in their legislation licensing practices or conditions that may in particular cases constitute an abuse of intellectual property rights having an adverse effect on competition in the relevant market. As provided above, a Member may adopt, consistently with the other provisions of this Agreement, appropriate measures to prevent or control such practices, which may include for example exclusive grantback conditions, conditions preventing challenges to validity and coercive package licensing, in the light of the relevant laws and regulations of that Member."

57 See *China—Certain Measures on the Transfer of Technology*, *supra* note 43 and accompanying text.

58 People's Republic of China, State Administration for Industry and Commerce, *Provisions on Prohibition of Abuse of Intellectual Property Rights to Eliminate or Restrict Competition, Promulgated by Decree No 74 on 7 April 2015*, online: <www.linklaters.com/pdfs/mkt/beijing/19848090.pdf>.

59 Susan Ning, Ting Gong & Yuanshan Li, "Risks of Grant-back Provisions in Licensing Agreements: A Warning to Patent-heavy Companies" (2016) 1 CPI Antitrust Chronicle, online: CPI <www.competitionpolicyinternational.com/wp-content/uploads/2016/02/Risks-of-Grant-back-Provisions.pdf>.

60 WIPO, *Regulations on Technology Import and Export Administration of the People's Republic of China*, online: <www.wipo.int/wipolex/en/text.jsp?file_id=182583>.

shall become the exclusive property of Licensor as of its creation. Licensee hereby irrevocably and unconditionally conveys, assigns and transfers to Licensor, without the necessity of any consideration received by Licensee other than the licensing rights granted hereto, all right, title and interest in and to such Improvement and waives and have its employees waive any claim to moral rights that it and they may have with respect to the Improvement. Licensee shall promptly make full disclosure to Licensor of all Improvements and shall, at Licensor's expense, do all acts and things (including, but not limited to, executing applications and instruments of assignment) which Licensor deems necessary or desirable from time to time in order to vest the rights in Licensor. In consideration thereof, any Improvement shall be deemed to be licensed to Licensee under the terms of this Agreement, and shall be deemed to be included within the definition of Technology during the term of this Agreement.

Should the law or regulations of any part of the licensed territory invest Licensee with any property rights to any of the intellectual property of Licensor, Licensee shall promptly, freely and co-operatively relinquish to Licensor any and all such rights upon demand or termination of this Agreement for any reason, without recourse or cost to Licensor and shall thereafter refrain from any further usage of said intellectual property.

Compulsory Licensing

Compulsory licensing is another example of a potentially problematic situation that might arise in the transfer of clean technologies, as it poses the risk of expropriation for trading businesses. This mechanism, which has typically been employed for pharmaceutical products used to fight epidemics such as AIDS,[61] enables a state to waive a patented right and allow a non-patent holder to create a generic copy of the technology without the consent of the patent owner. It would intervene in situations when a patent holder is unwilling to license its technology. It would need to comply with article 31 of TRIPS and other provisions and WTO decisions applicable to compulsory licensing.

Compulsory licensing regarding clean technologies has been discussed during international negotiations, because some states argue that it would help them access clean technologies and meet their environmental targets.[62] But challengers of compulsory licensing have responded that strong patent protection guarantees profits for patent holders and thus will likely incentivize them to further innovate in the field of clean technologies.[63] Weak patent protection may discourage exporters from deploying their latest clean technology, along with the possibility of limiting follow-on innovations.[64] Moreover, various challenges to the compulsory licensing of clean technologies are often invoked, such as the inadequate manufacturing capabilities of various less-developed countries needed to replicate the licensed technology as well as the difficulty in defining and categorizing precisely what green or clean technology is.[65]

Solutions

Even though compulsory licensing is presently limited in scope and need to comply with applicable WTO provisions, and has only been implemented in certain states, exporters will understand the potential risks of compulsory licensing abroad of clean technologies and pay attention to any changes

61 Robert Fair, "Does Climate Change Justify Compulsory Licensing of Green Technology?" (2010) 6:1 BYU Intl L & Management.

62 Tim Wilson, *Undermining mitigation technology: Compulsory licensing, patents and tariffs* (Melbourne, AU: Institute of Public Affairs, 2008), online: <https://ipa.org.au/wp-content/uploads/archive/1219192134_document_wilson_mitigationtechnology.pdf>; Charles R McManis & Jorge L Contreras, "Compulsory licensing of intellectual property: A viable policy lever for promoting access to critical technologies?" (2014) American University WCL Research Paper No 2014-16.

63 Rishi R Gupta, "Compulsory Licensing in TRIPS: Chinese and Indian Comparative Advantage in the Manufacture and Exportation of Green Technologies" (2012) 12:3 Sustainable Development L & Pol'y 21. In relation to India's National Manufacturing Policy, see Arun S, "Compulsory licensing in manufacturing may slow investments: EU", *The Hindu* (5 February 2016), online: <www.thehindu.com/business/compulsory-licensing-in-manufacturing-may-slow-investments-eu/article8194418.ece>.

64 International Centre for Trade and Sustainable Development, "Links Between Patent Rules and Access to Green Technology Come Under Scrutiny", *Bridges* (5 December 2007), online: <http://ictsd.net/i/news/biores/9153/>.

65 Nitya Nanda & Nidhi Srivastava, "Clean Technology Transfer and Intellectual Property Rights" (2009) 9:3 Sustainable Development L & Policy 42.

in foreign legislation covering compulsory licensing that might apply to them.

In the event a state is considering the implementation of a compulsory licensing scheme that might affect clean technologies, exporters (directly or through chambers of commerce, trade associations and their respective governments) may seek to influence and collaborate with foreign governments by demonstrating that compulsory licensing is contrary to their policy of attracting foreign investment and clean technologies, and that implementing a policy allowing for compulsory licensing might dissuade foreign investors and licensors from operating in the foreign market. Exporters can also collaborate and seek help from their own national governments to ensure that the latter protect their interests and formulate objections to compulsory licensing and the weakening of IPR regimes abroad. Various governments, in the United States for example, have put mechanisms in place to monitor threats to IPR and to dissuade states from compulsory licensing.[66]

As an alternative to compulsory licensing, exporters could also consider joining and advocating for voluntary licensing models for technology and IPR where patent and technology holders can choose to participate. A number of companies and non-governmental organizations have galvanized efforts to support technology transfer as well as intellectual property protection.

Having analyzed two important legal instruments that might affect the protection of IPR abroad, it is also important to note that the use of licences and licensing agreements can have important fiscal implications. This is particularly true for exporters who seek to transfer technology to less technologically advanced countries. For the inexperienced exporter, royalty payments and taxation can rapidly become significant sources of frustration if not addressed and incorporated in business plans prior to export.

Royalty Payment and Taxation

Clean technology transfer can be affected by various tax requirements, notably the rate of withholding tax levied on royalty income by the foreign government and the deductibility of royalties paid to use the technology in question. The private sector is concerned with how the variability of these rates increases the cost of transfer or reduces the rate of tax return.

Royalties are typically paid to the licensor of intellectual property for the authorized use of its IPR and other forms of intangible assets pursuant to licensing agreements. Withholding taxes are often levied on these royalties. To illustrate with examples, the payment of royalties is subject to 15 to 25 percent withholding tax in Brazil,[67] 15 percent in Colombia,[68] 12.25 to 31.5 percent in Argentina,[69] and 10 percent in Morocco,[70] unless the rate is reduced under a tax treaty. Taxation imposed by states applying such high rates erodes the after-tax earnings of technologically advanced sellers, and also goes against the goal of facilitating the diffusion of clean technologies.

The deduction of royalty expenses is another potentially problematic issue because certain laws limit the amount of royalties that can be deducted from the revenues of a licensee. The deductibility of royalty payments can be restricted by some governments because they are viewed as "thinly veiled profit distributions rather than legitimate expenses of acquiring technology."[71] That being the case, deductibility of royalties can be limited or denied, depending on governmental and/or institutional approval. If few expenses are deductible from the gross income, the tax liability can be a large amount of the net royalty income. Tax policies restricting the deductibility of royalties or levying a high withholding tax on royalty income are thus an obvious deterrent to the transfer of clean technologies. For example, in Brazil, Ordinance 436/58 controls the tax deduction for patent royalties. The deduction on payments derived from intellectual property agreements varies from one to five percent of the net or gross

66 For example, the Office of the USTR publishes annual reports that review states based on their IPR protection and enforcement. States deemed to insufficiently protect their IPR are placed on a watch list.

67 Deloitte, *International Tax Brazil Highlights 2018*.

68 Deloitte, *International Tax Colombia Highlights 2018*.

69 Deloitte, *International Tax Argentina Highlights 2018*.

70 Deloitte, *International Tax Morocco Highlights 2018*.

71 *Ibid* at 29.

revenue originating from products manufactured under the patent.[72] Royalties remitted in excess of the limit set by Ordinance 436/58 cannot be included in the expenses. Parties may also be denied a deduction on any amount resulting from royalty payments made to their partners.

Other than taxation on royalty payments, a heavy taxation burden can be levied on the import of technical services rendered by the contracting party transferring clean technologies to a less technologically advanced country. In Brazil, for example, the effective tax rate on services can reach 40 percent. Indeed, multiple tax legislation is in effect in Brazil, namely the Normative Instruction RFB No. 1786/2018, the Contribution of Intervention in the Economic Domain, the contribution to the Social Integration Program, the federal contribution tax on gross revenues of business sales and the Brazilian tax charged on the provision of services.[73]

Solutions

In order to mitigate a heavy tax burden, clean technology exporters must be rigorous and precise when preparing their financial projections and pricing, and ensure they take advantage of tax treaties. They must also prepare the pertinent documentation, and clearly distinguish revenues generated from technology licensing and from the sale of products and services. For example, providing a thorough description demonstrating which sums correspond to the remuneration for services or royalties can positively impact the payment of certain taxes.

Some licensors may request that their licensees pay for all costs related to withholding taxes in order to avoid being affected by them, or request that they be delivered proper documentation evidencing the payment and remittance of the withholding taxes to get the appropriate tax credit from its tax agencies and request that the following clauses be included in their licensing agreements:

> All payments to Licensor hereunder shall be made without any deduction of any kind. If any amount payable by Licensee is subject to any withholding tax or any other tax or levy, Licensee shall pay to Licensor an additional amount such that following such payment Licensor receives the amount it would have received had no such withholding been made.
>
> [Licensee shall provide Licensor with all required documents evidencing the payment and remittance of the withholding taxes including a tax receipt in order to allow Licensor to obtain a tax credit. In the event Licensor is able to obtain said tax credit, the above mentioned additional amount will be reduced by an amount equal to said tax credit obtained by Licensor.]

Over the longer term, exporters (directly or through the support of chambers of commerce and trade associations) and their respective governments can also seek to influence foreign governments through advocacy, by demonstrating that reduction of high tax rates could improve the inflow and transfer of clean technologies. It is important to note that states wishing to promote the importation of technology need not wait until they have negotiated tax treaties or other agreements in order to remove or reduce impediments to the transfer of clean technologies. They may therefore want to review their tax rate policies to see if more reasonable rates can be levied on non-residents and foreign technology, and if there are provisions in their laws and regulations that challenge corporations from technologically advanced countries from transferring their clean technologies.

Lastly, while the main trade barriers to the transfer of goods, services, FDI and technology have been addressed, it is important to underline that an efficient legal regime is crucial to protect the exporting entity's operations abroad. Unfortunately, the legal regimes present in less technologically advanced countries often suffer from weak institutional capacity. As a result, the last section of this paper will deal with the various challenges present in foreign markets that could affect the enforcement of rights of the exporting entity.

Legal and Institutional Barriers

In the context of institutional and legal barriers, some less technologically advanced countries suffer from weak legal regimes due to institutional and governance issues, weak regulatory and administrative capacity, corruption, chronic

72 UNCTAD, *Taxation and Technology Transfer: Key Issues* (2005), online: <http://unctad.org/en/docs/iteipc20059_en.pdf>.

73 Deloitte, "Corporate taxation: Taxes and contributions in Brazil", online: Deloitte <www2.deloitte.com/br/en/pages/doing-business-brazil/articles/corporate-taxation.html>.

delays and lack of consultation with stakeholders. Corruption, which is often encountered in less technologically advanced countries, is considered to be among the most important barriers to the efficient transfer of clean technologies. It significantly weakens the capacity and willingness of courts and regulatory agencies to render fair judgments or decisions free from external pressure, and it constitutes a serious barrier to sustainable development. Empirical analysis from UNCTAD demonstrates that corruption hinders FDI, which plays a crucial role in the transfer of technology[74] and tends to reduce its volume.[75] The United Nations Conference on Sustainable Development, Rio+20, urged the need to fight corruption, a serious barrier to sustainable development.[76]

Often, environmental regulations in certain less-developed states may be severely lacking or not efficiently enforced. This can act as an impediment to the transfer of clean technologies, as an efficient regulatory regime is a key factor in driving demand in clean technologies. Inadequate implementation and enforcement capacity may limit the capacity of states to attract technology-rich businesses.[77] For example, a shortage of appropriately qualified staff personnel in ministries or agencies causes unnecessary delays and costs in administrative proceedings, such as in granting permits.[78] This results in the loss of sale opportunities for businesses if their market entry depends on the approval of various bureaucratic institutions abroad. With the recent entry into force in 2017 of the WTO Trade Facilitation Agreement, various governments from less technologically advanced countries have ratified its provisions, which seek to reduce red tape and numerous bureaucratic hurdles impeding the movement of goods across borders. In particular, this agreement aims to facilitate trade through cooperation between customs authorities as well as technical assistance and capacity building.

Foreign exporters can also run the risk of being systematically discriminated against by states that lack judicial independence and that administer and enforce laws in an opaque or unfair manner. This increases uncertain outcomes for businesses transferring clean technologies to less-developed states and diverts potential entrepreneurs and innovators. Indeed, exporting businesses are often reluctant to enter into a contract of any kind with partners from states that fail to establish robust legal systems. Should they choose to transact with local partners from such states, such foreign businesses often increase the cost of their technology to cover the costs associated with the mitigation of risks.

Cross-border transactions often involve a large number of parties — foreign partners, suppliers, distributors, labour forces, construction companies, and so forth — which can often create complex litigation cases. Lack of transparency and access to publicly available laws, regulations and case law negatively affects investors and exporters, as they often can be kept in the dark as to how legal issues are treated at the local level. If businesses face weak or non-transparent legal systems, they might want to ensure that they be paid in advance, rely on other means to limit their risks or simply elect another jurisdiction to transfer their clean technologies.

Solutions

Exporters should be aware that various states, including Canada, have enacted legislation that seeks to discourage and punish dubious and corrupt behaviour of their own companies abroad, such as bribing and using facilitation payments abroad.[79] Exporters should be proactive and implement policies and other mitigation measures to tackle the issue and to ensure that their own behaviour does not exacerbate the already fragile situation in various foreign markets.

74 UNCTAD, *Foreign direct investment, the transfer and diffusion of technology, and sustainable development,* Note by the UNCTAD Secretariat (2011), online: <https://unctad.org/en/docs/ciiem2d2_en.pdf>.

75 OECD, *Issues Paper on Corruption and Economic Growth*, at 16, online: <www.oecd.org/g20/topics/anti-corruption/Issue-Paper-Corruption-and-Economic-Growth.pdf>.

76 The UN General Assembly, recalling its resolution *Implementation of Agenda 21, the Programme for the Further Implementation of Agenda 21 and the outcomes of the World Summit on Sustainable Development* (UNGAOR, 64th Sess, UN Doc A/Res/64/236 [2009]), in which it decided to organize the United Nations Conference on Sustainable Development at the highest possible level in 2012, as well as its resolution of the same name (UNGAOR, 66th Sess, UN Doc A/Res/66/197 [2011]). See also *The Future We Want*, UNGAOR, 66th Sess, UN Doc A/RES/66/288 (2012).

77 Volkmar Gessner, ed, *Contractual Certainty in International Trade* (Oxford, UK: Hart, 2009) at 253.

78 OECD, *Competition Law and Policy in Latin America* (2006), online: <www.oecd.org/countries/peru/37976647.pdf>.

79 In Canada, see e.g. *Corruption of Foreign Public Officials Act,* SC 1998, c 34.

Moreover, given the challenges seen above, exporters can analyze the possibility of using arbitration to resolve their disputes, instead of court litigation. Arbitration is often considered by many legal practitioners to be an appropriate alternative to court litigation in cross-border transactions, for several reasons. First of all, the 1958 Convention on the Recognition and Enforcement of Foreign Arbitral Awards (known as the New York Convention), applied by the vast majority of countries, provides that arbitral awards must be recognized and executed. Compared to court decisions, arbitral awards are much easier to be executed in a foreign state. Second, the parties have a say in the selection of the arbitrators. Finally, arbitration proceedings and awards are confidential, which appeals to businesses. Mediation can also be considered prior to arbitration or court litigation.

To mitigate litigation risks, the drafting in licence agreements of a hybrid mediation and arbitration clause can be useful. There are many well-known and highly respected international arbitration institutions, such as the International Court of Arbitration of the International Chamber of Commerce (ICC), the London Court of Arbitration, the International Center for Dispute Resolution or the Arbitration and Mediation Center of the World Intellectual Property Organization (WIPO). The ADR Institute of Canada is also worth mentioning. The suggested clause (below) can also limit the cost of a judicial dispute resolution for smaller claims and secure the recognition and enforcement of the arbitral award in the states that are parties to the New York Convention. There are other perfectly suitable arbitration institutions and rules; the ICC Mediation Rules are provided as an example. The use of one arbitrator is recommended to reduce costs and simplify proceedings. A single arbitrator might not be suitable in large-scale commercial arbitration, however.

> Any controversy or claim arising out of or relating to this Agreement will be submitted to one designated director of each party who will meet within thirty (30) days of receipt of a written request by one party to the other in order to resolve it. If the parties' designated directors are not able to amicably settle the dispute within thirty (30) days of first meeting or if the parties' designated directors do not meet within thirty (30) days of receipt of such request, the parties will refer said controversy or claim to proceedings under the ICC Mediation Rules. If the controversy or claim has not been settled pursuant to the said Rules within 60 days following the filing of a Request for Mediation or within such other period as the parties may agree in writing, such controversy or claim shall thereafter be finally settled under the Rules of Arbitration of the International Chamber of Commerce by one arbitrator appointed in accordance with the said Rules of Arbitration; provided, however, that each party may enforce its intellectual property rights in any court of competent jurisdiction. The arbitration shall be held in English. Where no party's claim in the controversy or claim exceeds US$2,000,000, exclusive of interest and arbitration costs, the controversy or claim shall be resolved by submission of documents, unless the arbitrator determines that an oral hearing is necessary. The arbitrator shall establish a fair and equitable procedure for said submission of documents.

Other provisions and mediation and arbitration rules may be used but, in all cases, great care must be given to the drafting of dispute settlement clauses, notably to ensure their application and enforcement.

Various other tools are available to exporters to reduce risk abroad, including a plethora of insurance solutions to reduce transaction and other risks, such as export credit and foreign funds insurance. These protect exporters from various events, such as non-payment, and various political risks, such as inconvertibility of currency. Insurance also allows the exporter to obtain better cash flows and advantageous terms of credit.

Finally, exporters (directly or through chambers of commerce and trade associations) may collaborate with governments and international institutions, as well as non-governmental organizations, to encourage and reinforce capacity building in the various foreign markets in which they operate, if there is a need to do so. They can collaborate with governments under the United Nations

Convention against Corruption[80] or the WTO Trade Facilitation Agreement discussed above to improve transparency and reduce the scope for corruption.

Conclusion

There are many challenges and obstacles that have the potential to interfere with the international transfer of clean technologies, especially to less technologically advanced countries. This paper categorizes the most important trade barriers facing exporters in clean technologies, and identifies the various avenues exporters can use to reduce their impact.

Well-informed exporters should be unafraid to navigate the complex world of international trade. They should feel confident that the knowledge gained in understanding the legal realities of the transfer of clean technologies is crucial to their success as well as to their ability to make effective decisions. This paper does not seek to be exhaustive; collaborating with various partners can ensure that exporters of clean technologies are able to build their business and discover new and emerging markets.

Exporters will find it useful to build effective networks with targeted institutions and individuals within governments (such as committee members, foreign trade representatives and so forth), international secretariats such as the Climate Technology Centre & Network, Global Environment Facility and Clean Development Mechanism, trade associations such as the CleanTech Alliance and the Canada Cleantech Alliance, and regional organizations including MaRS Cleantech, Ecotech Québec, the Alberta Clean Technology Industry Alliance and the British Columbia CleanTech CEO Alliance, SEforALL and its regional and thematic hubs, the World Business Council for Sustainable Development, RE100, the International Council on Clean Transport, WindEurope, the Clean Energy Business Council and many others, including local chambers of commerce, industry leaders and professionals such as lawyers, customs brokers and investment, export and technology transfer experts.

Globalization and advances in communications now provide the exporter with vast new opportunities to create partnerships, often in the absence of government support. Exporters are, and have always been, the main player for which international markets and the trading system are designed. Exporters bear the burden of business risks and are the ones who must overcome the issues and challenges placed in their way by intentional and unintentional trade barriers.

As a result, exporters should not minimize their role or their ability to manage and mitigate the many obstacles to the transfer of environmental goods, services, investments and technology. Exporters will always have a crucial role to play in raising awareness not only of the challenges but also the opportunities that come with developing a foreign market. Now more than ever, their input and participation are needed to help foster the development and transfer of clean technologies, with the objective of reducing greenhouse gas emissions in various emerging markets and ultimately lowering the costs of implementing clean technologies in those markets and worldwide.

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80 *United Nations Convention against Corruption,* 31 October 2003, UNTS 2349, UN Doc A/58/422 (entered into force 14 December 2005), online: <www.unodc.org/documents/treaties/UNCAC/Publications/Convention/08-50026_E.pdf>.

Appendix A: Summary of Barriers to the Transfer of Clean Technologies and Solutions for Exporters

Nature of the Trade	Barriers to Market Access	Solutions for Exporters
Trade in Environmental Goods	**Tariff Barriers and VATs** → High customs duties and VATs on environmental goods	→ Conduct proper due diligence on applicable tariffs using various resources, including Canada Tariff Finder and customs brokers. → Seek to mitigate the impact of customs duties and take advantage of preferential trade agreements. → Ensure an appropriate surveillance on changing tariffs and potential safeguard, anti-dumping and countervailing duties. → Where appropriate, have local governmental authorities or state-owned entities that are not subject to the payment of customs duties import the foreign goods. → Where appropriate, assemble or manufacture goods abroad to limit tariffs. → Lobby importing governments to lower tariffs in order to help achieve national climate goals. → Work in collaboration with trade negotiators to include specific environmental goods in multilateral and bilateral trade agreements.

Nature of the Trade	Barriers to Market Access	Solutions for Exporters
Trade in Environmental Goods	**NTBs** → Technical requirements and other TBTs → LCRs	→ Conduct proper due diligence on technical requirements and standards and LCRs of the importing state applicable to exporter's products. → Utilize industry associations and national governmental programs to better identify foreign NTBs, such as each country's Notification Authority and Enquiry Point, created pursuant to the WTO. → Take advantage of the fact that various governments offer reporting services in order to identify NTBs. → Sign up with ePing to receive email alerts on new TBT notifications. → Seek to identify and use accreditation/certification body in exporter's own jurisdiction to certify its products for the foreign market. → Adhere to international standards such as ISO 14034 related to the performance of clean technologies, and to various national and regional certification and technical standards. → Lobby governments and international institutions to ensure convergence in TBT technical norms to take advantage of international standards and agreements. → Work in collaboration with standards organizations to develop international standards, just as the Standards Council of Canada initiated the development by ISO of ISO standard 14034. → Report NTBs to exporting country trade ministries such as Global Affairs Canada, embassies and trade commissioners to help have the NTBs be removed. → Identify concrete solutions to address LCRs such as partnering with local entities or setting up a foreign plant to assemble or manufacture products. → Help shape and develop alternative strategies for importing countries to build a favourable business environment.

Nature of the Trade	Barriers to Market Access	Solutions for Exporters
Trade in Environmental Services	**Environmental Services** → Restrictions on foreign service suppliers: • licensing requirements • residency requirements • substantial fiscal charges • public monopolies, etc.	→ Conduct proper due diligence on regulations affecting foreign service suppliers, and consult commitments made by importing states in GATS and trade agreements. → Where applicable, establish presence in importing country and/or hire employees or service providers that meet importing country's requirements. → Report trade barriers to exporting country trade ministries such as Global Affairs Canada, embassies and trade commissioners to help have the trade barrier removed. → Lobby national and foreign governments in order to encourage the reduction of barriers to trade in environmental services. → Work in collaboration with trade negotiators to include specific environmental services in multilateral and bilateral free-trade agreements.
Transfer of Foreign Investments	**FDI** → Restrictions to FDI: • foreign investment screening, approval conditions, and restrictions on ownership and residency • sector-specific measures → Unstable governments, lack of transparency, shortcomings in government policy and risk of expropriation and discrimination, etc.	→ Conduct proper due diligence and research to identify obstacles to FDI transfer. → Take advantage of various FDI agencies and incentives established by foreign governments, and of bilateral and multilateral investment treaties such as the Energy Charter Treaty. → Encourage host-country governments and international institutions to ease restrictions of FDI in clean technologies, and to establish programs that might reduce financial transaction risks and institutional policy frameworks for FDI in clean technologies.

Nature of the Trade	Barriers to Market Access	Solutions for Exporters
Transfer of Technology	**IPR** → Weak IPR protection and enforcement: • delays for registering patents • weak trade secret protection • unenforceability of IPR	→ Develop knowledge of the various forms of country-specific IPR protection. → Conduct an analysis to determine the "freedom to operate" to ensure that exporter's goods and technology do not infringe IPR of a competitor in the importing country. → Use priority filing, expedited process and PCT uniform filing abroad for patent protection using international agreements. → Protect trade secrets by executing efficient non-disclosure agreements, adopting appropriate company policies, and taking appropriate security and technical measures: • divide production among several foreign manufacturers to ensure that no single entity has access to the entirety of the IPR; • retain final assembly or exert control on manufacturing; • develop and export a less advanced export version of a product or technology; or • export most advanced technology and keep updating it. → Take action against IPR infringers in court or through mediation and/or arbitration. → Encourage importing country governments to adopt laws and regulations and have institutions that ensure efficient IPR protection, in particular for clean technologies.
	Licensing Agreements → Restrictions on licensing agreements: • prohibition of grant-back clauses • compulsory licensing • withholding taxes on royalties • limited deductibility of royalties	→ Conduct proper due diligence on laws and regulations on technology transfer and licensing agreements, including grant-back clauses and royalty payments and taxation, and determine how they might affect the exporter. → Pay thorough attention to drafting licensing agreements, including provisions on technology and product improvements. → Make sure to distinguish various types of revenues, including those deriving from the use of patents, trade secrets, trademarks and other IPR, and the sale of products and services. → Encourage importing country governments to avoid using compulsory licensing in the field of clean technologies, and to reduce the complexity of tax regulations. → Take advantage of tax treaties, notably to benefit from reduced withholding taxes. → Where appropriate, draft clauses in licensing agreements to have the licensee pay an additional amount to cover the withholding tax or provide appropriate documents to obtain a tax credit. → Lobby governments to have them reduce high tax rates in order to improve the inflows and transfer of clean technologies.

Nature of the Trade	Barriers to Market Access	Solutions for Exporters
Legal and Regulatory Issues	**Institutional Capacity** → Corruption → Lack of transparency, of judicial independence, of robust legal system, and of regulatory regime and contract enforcement mechanisms	→ Conduct proper due diligence on the legal system and regulatory regime and assess enforcement mechanisms in the importing state. → Seek to discourage dubious and corrupt behaviour and to respect legislation regarding corruption. → Draft appropriate mediation and arbitration clauses and take advantage of the New York Convention on arbitration. → Adopt insurance solutions to reduce transaction and other risks and limit financial exposure and other risks. → Collaborate with governments and international institutions in order to help build institutional capacity.

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