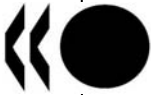


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**BUSINESS PERCEPTIONS OF NON-TARIFF BARRIERS (NTBS) FACING TRADE IN SELECTED
ENVIRONMENTAL GOODS AND ASSOCIATED SERVICES: SURVEY RESULTS**

OECD Trade and Environment Working Paper 2007-02 Part I

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ABSTRACT

Surveying 136 exporting firms from ten OECD and non-OECD countries, this study documents the incidence, and impact of, non-tariff measures that are perceived to act as barriers to trade in seven sectors of environmental goods and associated services. Although the DDA has a mandate to address *inter alia* such trade barriers, information shedding light on the specific problems that firms encounter in their export activities has been scarce.

Accounts by exporting firms in Austria, Brazil, Canada, Chile, France, Germany, India, Japan, Korea and the United States suggest that environmental goods indeed face a variety of obstacles when traded abroad. Firms participating in the survey mentioned relatively often problems associated with product testing and certification requirements, customs procedures, regulations on payment, problems with intellectual property protection, government procurement procedures and technical regulations and standards. Certain types of reported barriers appear to be more prevalent in certain markets. For example, customs procedures reportedly pose a problem predominantly in developing and transition economies and problems with intellectual property rights are associated especially with China. The non-tariff barriers reported by the firms appear to be generic and not specific to the environmental sector. The study shows that in many countries the environmental industry consists mostly of SMEs, for whom cost-raising barriers pose disproportionately greater problems due to their limited resources.

The survey helps to better understand the effects that NTBs have at the firm level, and what firms do when they encounter barriers of various types. It appears that the firms participating in this study mostly seek to devise ways of coping with the difficulties that they encounter, rather than seeking help from governments. Since these measures are ad hoc and do not address problems at their source, they cannot substitute for governments taking action. The study points out that many of the concerns voiced by firms in the environment sector can be addressed at the WTO but that more can be done also at the bilateral and regional levels.

Keywords: environmental goods and services, environmental technologies, environmental industries, trade liberalization, trade and environment, non-tariff barriers, WTO, DDA, Austria, Brazil, Canada, Chile, France, Germany, India, Japan, Korea, United States.

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the OECD Trade and Agriculture Directorate under the direction of Dale Andrew (TPLS). It was discussed in the OECD JWPTE as well as the Trade Committee Working Party (TCWP), which have agreed to make these findings more widely available through declassification on its responsibility.

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EXECUTIVE SUMMARY

Despite the importance of non-tariff barriers (NTBs) documented by business surveys and other source for trade in non-agricultural products, there is very limited understanding of the incidence and impact of NTBs on trade in environmental goods and associated services. This paper investigates the types of NTBs that exporters of certain environmental goods and associated services report having encountered in foreign markets. The overall project consists of 10 case studies covering both OECD and non-OECD countries (Austria, Brazil, Canada, Chile, France, Germany, India, Japan, Korea and the United States). In each case study, data were collected through a survey followed by in-depth interviews of company officials. Following up the first instalment of the project reporting on NTBs identified by companies in five countries (Brazil, Canada, France, Japan and the United States) [COM/ENV/TD(2006)48], this paper presents and analyses survey findings on NTBs reported by a total of 136 firms operating in seven environmental sectors in all ten countries. It should be noted that the concerns documented by this study reflect the perceptions of businesses, not that of governments, and the accuracy of the claims have not been verified.

Accounts provided by exporting firms in the countries surveyed suggest that environmental goods and associated services face various non-tariff barriers in foreign markets which firms at times perceive to be very significant. Barriers relatively often mentioned relate to regulations on product testing and certification, customs procedures, regulations of payments, inadequate protection of intellectual property rights (IPR), government procurement procedures and product standards and technical specifications. Overall, the prominence of these six areas among the concerns that companies voiced holds across a broad range of both developed and developing exporting countries. Even in the already highly integrated regional market such as the EU, responses of firms with strong commercial ties to EU member countries suggest that more can be done to facilitate intra-regional trade in such areas as technical barriers to trade and public procurement.

The analysis of leading NTBs identified by the business survey also reveals that particular types of NTBs were perceived as significant export barriers in certain export markets. For instance, customs procedures were mentioned predominantly in developing or transition economies. Moreover, the kinds of customs procedures problems tended to be different for developed and for developing-country export markets: strict and inflexible application of paperwork required for customs clearance appears to be a problem that firms are encountering in developed country export markets, whereas perceived arbitrary behaviour of customs officials appears to pose burdens for firms exporting to developing countries or economies in transition. Negative experiences with government procurement procedures were reported notably for developing countries in Asia.

The NTBs identified by this study appear to be generic and not specific to the environmental sector. Past studies reviewing business surveys undertaken in other economic sectors find a similar pattern where measures and practices relating to technical barriers to trade and customs procedures lead private-sector concerns about trade barriers. Similarly, government procurement procedures and inadequate protection of IPR have also been pointed to by producers of other goods.

The study also provides data illustrating the additional costs and other effects of NTBs that companies in the environmental industry must reckon with. In their most extreme incarnations, respondents

reported that NTBs make it prohibitively expensive or difficult for exporters to sell their goods into some foreign markets. NTBs also have forced some environmental goods exporters to abandon markets altogether or restrict the types of goods exported to such markets. However, in dealing with the identified significant barriers it appears that in many cases exporters tend to devise ways of coping with them rather than resorting to interventions by their home governments. Interviews revealed that exporters at times hire local partners to handle complex problems or raise the issue with the relevant authorities in the export market. Making requested or expected (informal) payments provides a way out for exporters to overcome obstacles to conducting business abroad; this option usually is more readily available to larger firms that do not face resource constraints. Another finding is that firms seek to cope with these barriers themselves, on an ad hoc basis. Because this is unlikely to solve the actual problem it is somewhat surprising that in only a few instances have firms interviewed indicated that they have approached governments for help.

The leading NTBs that firms identified in this study have broad implications in the context of the overall WTO negotiations. By shedding light on these barriers to exports of environmental goods and associated services, the study can contribute to on-going efforts to liberalise trade in this area. Survey responses also indicate that greater benefits will accrue from a simultaneous liberalisation of trade in environmental goods and services because products, technology and services are often supplied on an integrated basis. The relatively frequently mentioned problems with customs procedures underline the timeliness of the negotiations on trade facilitation included on the agenda of the Doha Development Agenda (DDA).

The dissatisfaction expressed by respondents about government procurement practices draws attention to weaknesses, in terms of both the level of participation by countries and substantive issues, of the existing plurilateral disciplines in this area. Based on the findings of this survey, the concerns expressed by environmental technology firms go beyond the transparency issues under discussion under the Doha agenda mandate. For example, to support effective participation of smaller firms in this market, the tender process may need to be simplified in major ways.

The concerns so often voiced by participants in respect to product testing and certification suggests that this industry and trade in this sector would benefit greatly from initiatives which governments individually or jointly could take to eliminate redundancy of procedures and reduce the costs of conformity assessment. Also, it would be for consideration whether issues of Technical Barriers to Trade (TBT) raised by the environmental industry might be taken up in the discussions of the WTO Committee on Technical Barriers to Trade. With regard to the protection of intellectual property, despite progress being made in this area, the experiences which firms describe indicate that there is still much room for seeking more effective implementation of international commitments and stronger enforcement mechanisms, at bilateral, regional and multilateral levels, .

The strong regional export orientation of firms in several country studies points to the importance of regional markets for expanding trade in this sector and serving as a stepping stone for SME internationalisation. This reality could be more explicitly recognised if governments took advantage of the action agendas of existing or prospective regional or bilateral trade agreements to address the concerns highlighted by this study. Responses of firms from EU member states suggest that more can be done to facilitate cross-border business even in the already highly integrated EU market.

BUSINESS PERCEPTIONS OF NON-TARIFF BARRIERS (NTBS) FACING TRADE IN SELECTED ENVIRONMENTAL GOODS AND ASSOCIATED SERVICES¹: SURVEY RESULTS

I. Introduction

1. Barriers to trade in non-agricultural products, including non-tariff measures (NTMs) affecting these products have been at the centre of trade policy discussions and will receive continued attention in the course of coming years. Although some of these measures serve legitimate policy purposes ranging from the protection of public health or security to the preservation of natural resources and the protection of the environment, there is a growing consensus among economists that NTMs are often more trade-restrictive and distorting than tariffs. The importance of NTMs is also underlined by the growing number of NTM-related disputes brought to the Dispute Settlement Body of the WTO.

2. Despite the growing importance of non-tariff barriers (NTBs), there is still limited understanding of their prevalence and impact on trade in environmental goods and associated services. This is partially due to the complex nature of the measures and practices involved and the difficulties of collecting and analysing relevant data. Unlike tariffs, NTBs are not subject to comprehensive reporting requirements in the WTO. Also, the effects of NTBs on trade and economic welfare are complex and not readily measurable: NTBs can take many forms and can quickly change, which renders NTB analysis all the more difficult. NTM data are mostly collected using a pragmatic, bottom-up approach of surveying exporting firms. Any list of NTMs is bound to be long. While several initiatives have been taken to construct a typology or classification system, broad consensus is lacking among scholars, countries and international organisations on this matter.²

3. This paper reports the findings from surveys conducted with firms from ten countries. Overall, the purpose of this project is to identify and document, on the basis of reported company experiences:

- NTMs³ perceived by exporters of certain types of environmental goods⁴ to represent major barriers to their exports;

¹ This study covers environmental services to the limited extent, and the analysis of non-tariff barriers (NTBs) facing some environmental services is less systematic than that of NTBs facing environmental goods.

² *Looking Beyond Tariffs; the role of non-tariff barriers in world trade* (2005), Paris: OECD.

³ A distinction is made between non-tariff measures (NTMs) and non-tariff barriers (NTBs). NTMs refer to government measures of a regulatory nature that may or may not have trade effects (and if they do, these effects may or may not be intentional or necessary for achieving the measure's principal objectives). The term is intended to be neutral by recognising that governments are free to set regulatory policies, e.g., to serve legitimate social, environmental and other regulatory goals. On the other hand, "NTBs" refer to specific NTMs that have or are perceived to have trade-restrictive effects. In the survey, the pre-screening questionnaire asked firms initially to indicate whether, and to what degree, any of 19 listed areas or categories of NTMs posed obstacles to their exports (i.e. could be considered to be NTBs). Such NTBs are thus specific measure, policy, conduct or procedural aspect thereof, identified by the firms themselves during interviews as a barrier to their exports.

- NTMs perceived as prevalent in specific environmental sectors, in specific export markets, and for small and medium enterprises (SMEs);
- Perceived effects of NTBs identified on firms' export activities in seven environmental sectors;
- Responses to or strategies for overcoming the reported obstacles, at company and government levels.

II. Methodology and Scope

4. Separate surveys of exporting firms were conducted in ten OECD and non-OECD countries (Austria, Brazil, Canada, Chile, France, Germany, India, Japan, Korea, United States). This overview report discusses key findings resulting from this research. Detailed country findings can be found in COM/ENV/TD(2006)48/ANN/REV1.

5. The studies used a pragmatic, bottom-up approach of surveying and interviewing companies who are exporting environmental products (see Annex I) in seven environmental sectors to identify major problems as perceived by these companies (see Table 1).⁵ In each country, exporting firms identified with the help of associations and other contacts in the field were asked in a pre-screening phase to identify and rate the importance of barriers to selling abroad. Respondents could choose from a list of 19 categories of NTMs (see Annex II). The pre-screening survey linked, where possible, identified impediments to market access with specific categories of environmental products. This phase was followed by in-depth interviews with companies that had identified at least one NTM category as causing major difficulties for their export activity; the aim here was to identify at a level of greater specificity the issue(s) of concern to the exporting firm. In order to screen out any barriers to exports that are internal to the firm (such as limited financial or organisation resources, difficulties contacting overseas customers, untrained personnel), companies reporting satisfactory business performance were the prime target for these interviews.⁶ Each firm was asked to describe at least one real-life experience illustrating in some depth the operation of a specific NTB reported.

⁴ See Annex I for environmental products and associated services covered by this study.

⁵ The initial scope of these case studies proposed in the scoping paper [COM/ENV/TD(2006)31/REV1] was 11 sectors including: Environmentally Preferable Products Based on End-Use or Disposal Characteristics; Noise and Vibration Abatement; and Heat and Energy Management. The scope has been narrowed down to 7 sectors in the process of identifying exporting companies.

⁶ Barriers to exports stemming from the home country of the firm (unfavourable home rules or regulations, such as export controls) were not investigated.

It should be noted that the concerns documented by this study reflect the perceptions of businesses, not that of governments. The accuracy of the claims has not been verified and no judgement is made that these are barriers to trade for which governments are responsible. The reported barriers are discussed without prejudice to the views of the governments concerned and do not constitute official notifications.

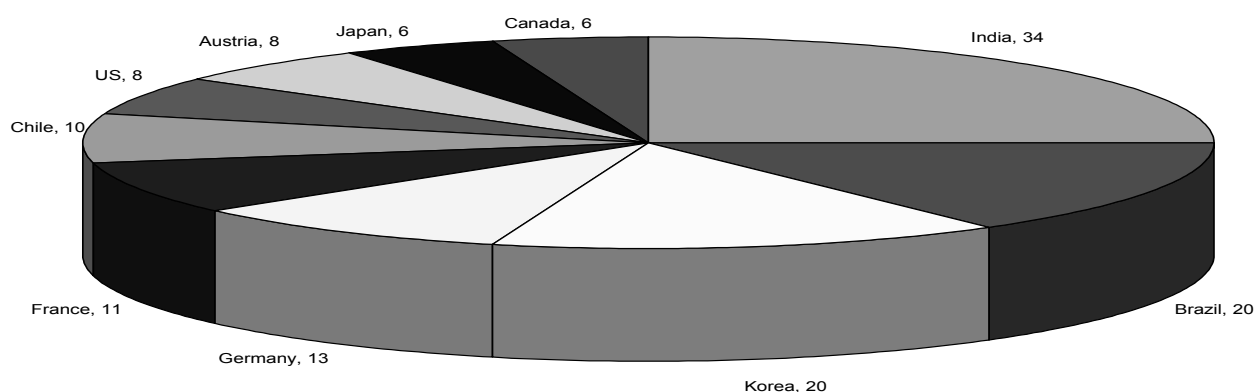
Table 1. Sectors represented by survey respondents

Environmental sectors		Exporting countries									
		US	Canada	France	Japan	Germany	Austria	Korea	Brazil	Chile	India
I	Environmental monitoring, analysis and assessment equipment	+	+	+	+	+	+	+	+		+
II	Remediation and clean-up of soil and water		+								
III	Recycling systems			+	+	+		+	+		+
IV	Renewable energy			+	+	+	+				+
V	Air pollution control	+		+	+	+	+	+	+	+	+
VI	Waste water management	+	+	+	+	+	+	+	+	+	+
VII	Solid and hazardous waste management	+		+	+		+	+	+		+

III. Characteristics of Surveyed Exporters

6. Responses to the survey were received from a total of 136 companies spanning 10 countries, of which 99 companies (72%) were small and medium sized companies (SMEs)⁷, of which 63 (or 46.%) have less than 50 employees (see Figure 1).

Figure 1. Number of Respondents from Each Exporting Country



7. The majority of companies reported that their overall export performance over the last three years had been good or satisfactory, thus minimising the likelihood that difficulties reported by companies in their export markets stem from the un-competitiveness of the firms' products and services or poor internal management (see Table 2).⁸

Table 2. Business Performance of Exporters

Not So good	OK	Good	Excellent
21	44	50	20

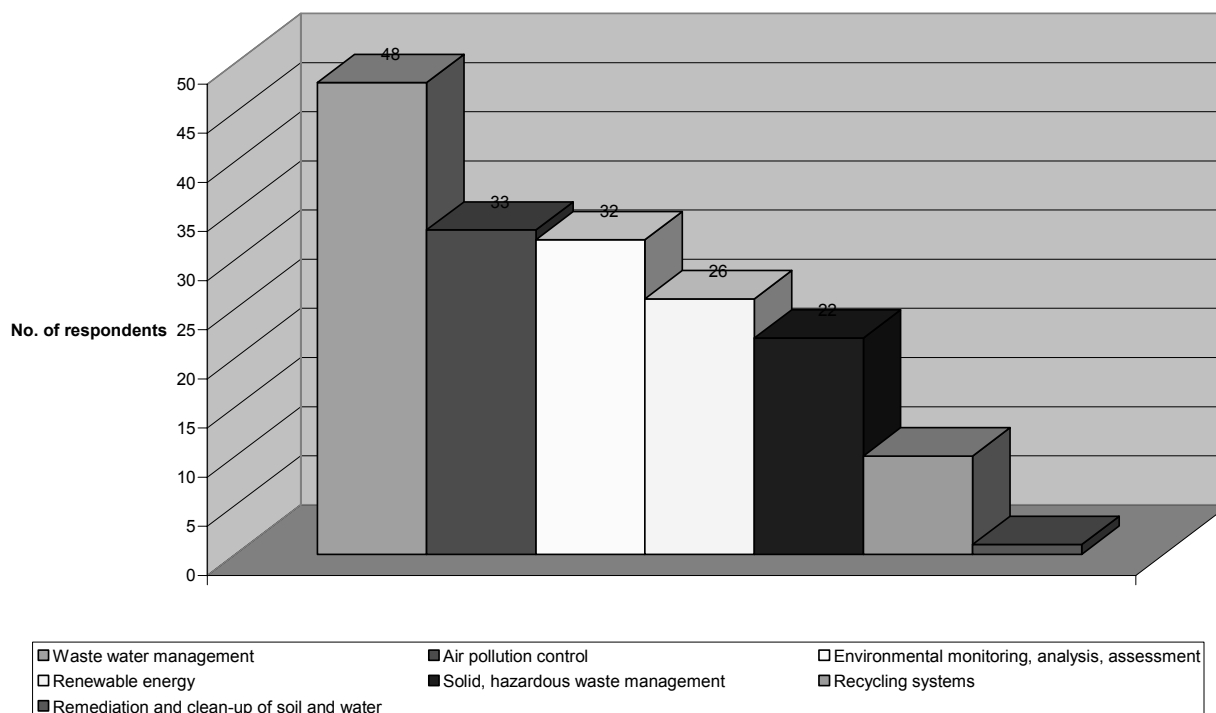
8. Of 136 surveyed exporters, 48 exporters are operating in the waste water management sector followed by 33 in the air pollution sector; 32 in the environmental monitoring analysis and assessment; 26

⁷ In this study, small and medium-sized enterprises (SMEs) are defined as firms with less than 250 employees.

⁸ Where respondents indicated less than satisfactory business performance, this was investigated further. It appeared that less than satisfactory business performance could be attributed mostly to external factors (e.g. strong domestic currency or the change of domestic policy concerning their domestic market share), not to problems that are internal to the firm. Those with unsatisfactory business performance that are attributable to internal problems were not interviewed.

in the renewable energy sector; and 22 in the solid and hazardous waste management sectors respectively. Less than 5 exporters are operating in recycling systems and remediation and clean-up of soil and water sectors (see Figure 2).

Figure 2. Number of respondents operating in each sector



9. In response to a survey question concerning major export markets, 62 (or 45%) of the 136 respondents mentioned countries in Asia; while 50 respondents (37 %) mentioned those in Europe. 38 and 36 respondents (28% and 26%, respectively) mentioned countries in Latin America and Middle East as their major export market respectively (Figure 1).

Table 3. Reported Major Export Markets, by Region

Africa	Asia	Europe	Latin America	Middle East	Northern America	Oceania
26	62	50	38	36	22	6

Note: Respondents could give multiple responses. Europe includes Western, Central and Eastern Europe as well as the former republics of the Soviet Union.

10. Data provided by survey respondents about their major export markets show that a primary focus of firms in some of the countries surveyed (Germany, Austria, Chile, Brazil) is the regional market whereas some of the other countries (India, France) reported that their major export markets are more dispersed globally. To a lesser extent this holds true also for the US, Japan and Canada, with a stronger focus on Asia than other regions. Table 4 shows that more than 70% of the major export markets listed by survey respondents in Korea and Brazil are located in Asia and Latin America respectively, while of the

major markets mentioned by German and Austrian firms, 48% and 60% respectively are European. Latin America alone accounts for 33% of the major export markets named by survey respondents in Chile.

Table 4. Break-Down of Reported Major Export Markets, by Region (in %)

Exporting country	No. of companies	Africa	Asia	Europe	Latin America	Middle East	Northern America	Oceania
France	11	23	23	20	13	17	3	0
Japan	6	0	45	27	0	0	27	0
US	8	0	35	18	18	18	12	0
Canada	6	8	42	17	8	8	17	0
Germany	13	7	21	48	3	3	10	7
Austria	8	0	20	60	0	0	13	7
Chile	10	11	6	17	33	6	11	17
Brazil	20	15	0	8	77	0	0	0
India	34	17	20	16	5	33	9	0
Korea	20	0	73	4	4	15	4	0

Note: For definitions of regions see Note for Table 3. Respondents could name more than one major export market.

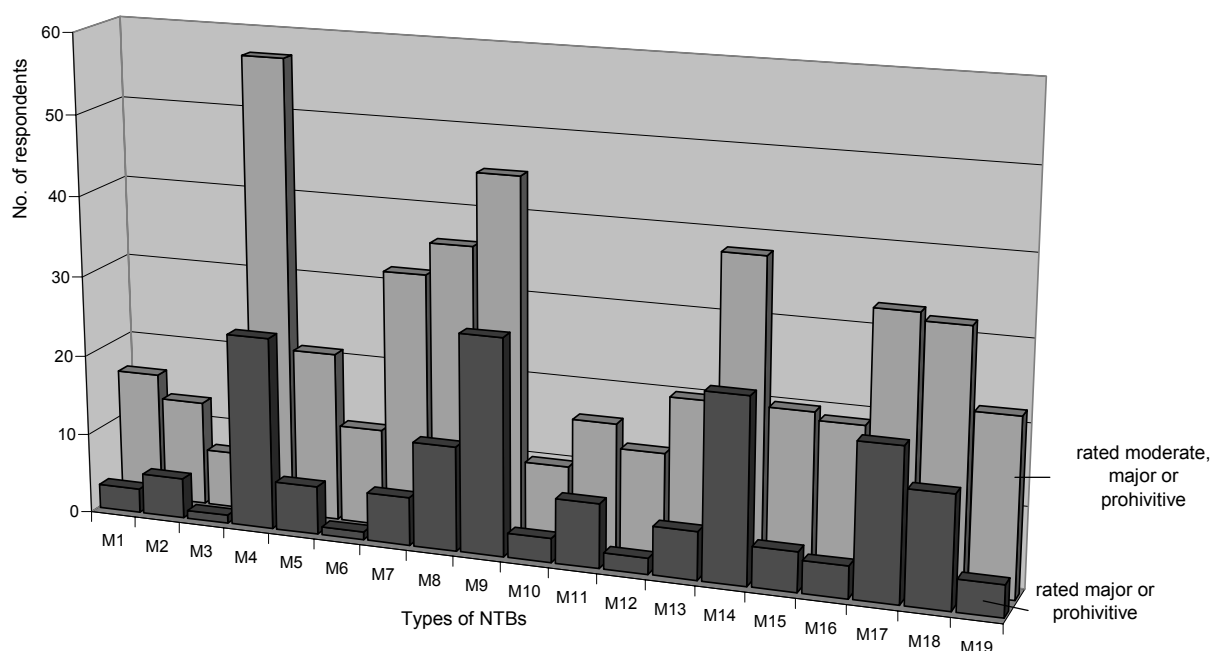
IV. Analysis of Non-tariff barriers to trade in environmental goods and services: Survey findings

11. When responses by 77 companies across all 10 countries confirming the presence of significant barriers (i.e. rated “major” or “prohibitive”) are analysed using the simple criteria of frequency of response, the following five items lead the list of 19 categories of NTMs covered by the survey (see Figure 3):

- M9: Testing and certification (27 firms)
- M4: Customs procedures (24)
- M14: Regulations on payments (23)
- M17: Adequacy of intellectual property protection (19)
- M18: Government procurement procedures (14)
- M8: Product standards and technical regulations (13)

12. Figure 3 also shows that when NTM categories that respondents rated as causing “moderate” obstacles to exporting are included, a simple count of frequency of responses produces the same cluster of most frequently mentioned items, with the addition of the item “cargo handling and port procedures”.

13. SMEs represent the majority of firms participating in the survey (98 of 136 firms, or 72%), and 51% of SMEs (50 firms) rated at least one NTM area as posing a major or prohibitive barrier to trade. Examination of SME responses reveals a cluster of leading NTM areas very similar to that for the group of all participating firms. Customs procedures is the leading area identified by SMEs as posing major or prohibitive obstacles to trade (mentioned by 31% of SME respondents), followed by testing and certification (27%), regulations on payments (25%) and adequacy of protection of intellectual property (18%).

Figure 3. Number of respondents by NTM categories

Source: Note: M1 - M19 refer to the categories of NTMs listed in Annex II. Respondents could describe also "other barriers", a category not shown in this Figure.

14. For NTM areas reported to pose major or prohibitive barriers to trade, a sector analysis was undertaken covering the 10 countries. Table 5 tracks which sectors are associated with which categories of NTMs. Five of the six leading NTM areas cut across all or most of the seven sectors, except for customs procedures, whereas areas such as import quota prohibitions, state-trading monopoly or price controls are much less dispersed. It is difficult to say however whether there are real sector-specific NTBs because the number of respondents per sector varies.

Table 5. Incidence of reported major and prohibitive barriers by sector

	Categories of NTMs	Environmental Sectors*						
		I (31)	II (1)	III (12)	IV (29)	V (35)	VI (50)	VII (24)
1	Pre-shipment control	+				+		+
2	Import licensing	+		+		+	+	+
3	Import quota or prohibitions					+		
4	Customs procedures	+			+	++	++	+
5	Import surcharges or border taxes	+				+	+	+
6	State-trading monopoly or state monopoly control of imports							+
7	Cargo handling and port procedures or requirements	+		+			+	+
8	Technical standards and regulations	+		+	+	+	+	+

9	Testing and certification	++	+	+	++	+	+	++
10	Restrictions on investment	+		+			+	+
11	Restrictions on after-sales services	+		+	+	+		+
12	Price controls or administered pricing	+				+		+
13	Foreign exchange restrictions	+		+	+	+	+	+
14	Regulations on payment	++		++	++	+	++	++
15	High or discriminatory taxes or charges			+	+	+	+	
16	Subsidies or tax benefits given to competing domestic firms					+	+	+
17	Adequacy of intellectual property protection	+	+	++	+	++	+	+
18	Government procurement procedures	+	+	+	+	+	+	+
19	Informal "additional payments" required to effect import			+	+	+	+	++

Notes: I. Environmental monitoring, analysis and assessment equipment; II. Remediation and Clean-Up of Soil and Water; III. Recycling systems; IV. Renewable energy; V. Air pollution control; VI. Waste water management; VII. Solid and hazardous waste management.

* Figures in brackets at the top of each column indicate the numbers of firms representing each environmental sector.

+ = incidence of reported major and prohibitive barriers for a specific sector

++ = leading NTM area (by count of firms) relative to other NTM areas, for a specific sector. Sometimes two or three NTM areas show similar high counts.

15. To what extent are NTM areas identified as causing significant barriers to specific sectors of environmental goods for their export? The survey shows that:

- 34% of exporters of renewable energy products and associated services reporting having encountered at least one major or prohibitive obstacle mention testing and certification.
- Along with regulations on payment, testing and certification is mentioned by 24% of the firms operating in the solid and hazardous waste management sector.
- 23% of the 31 exporters of monitoring, analysis and assessment equipment and associated services identify regulations of payment as representing a significant problem.
- Regulations on payment and customs procedures are reported to represent barriers by 20% and 18% of exporters operating in the waste water management, respectively.
- For 17% of the 35 firms in the air pollution control sector barriers to trade arise from IPR issues.

16. Not included in the cluster of six leading NTM areas are foreign exchange restrictions which also are mentioned relatively often by firms operating in the solid and hazardous waste management sector (17%). A few firms mentioned major or prohibitive barriers not covered by the categories of NTMs specifically mentioned in the questionnaire. One firm operating in Sectors I, V and VII mentioned certificates of origin. Two firms, one operating in Sector IV and the other in Sector V, took issue with perceived unfair competition by other foreign firms in their export market. Two firms operating in Sector IV identified restrictions of the movement of personnel as significant obstacles, and one firm in Sector IV mentioned unusual charges imposed on the export side on specific goods that the firm imports for use in production.

17. In terms of the most frequently mentioned export market where exporters reported significant barriers in association with the leading six categories of NTMs, China stands out as being named by the

largest number of exporters for four of the six most frequently mentioned categories of NTMs. For testing and certification, other countries/regions mentioned several times were Europe and France, whereas the United States was most often mentioned in connection with perceived barriers having to do with technical regulations and standards. Other countries were mentioned only occasionally. (Table 6).

Table 6. Most frequently mentioned export market for the leading categories of NTMs

NTM Category	Most frequently mentioned export market
Regulations on payment	China (7), India (3)
Testing and certification	Europe (5), China (4), France (4); Russia (3), Spain (3), United States (3)
Customs procedures	China (3), Chile (2), Europe (2)
Adequacy of intellectual property protection	China (12), Chinese Taipei (2), Germany (2), Korea (2)
Government procurement	China (3), Chinese Taipei (2)
Technical regulations and standards	United States (4), Russia (3)

V. Specific problems that firms report to have encountered

18. This section provides further details about the concerns that participants in the survey have raised in the aforementioned five areas and the costs and other consequences for business associated with the barriers described. For each country case, a comprehensive description of company experiences recorded during the interviews is provided in the separate Annex to the paper [COM/ENV/TD(2006)48/ANN/REV1].

Product standards and technical regulations /testing and certification

19. Product standards and regulations, and associated requirements for demonstrating that products and services conform to given standards and regulations, are key factors shaping environmental technology markets. In the questionnaire, these two NTM areas were listed separately, but they are closely linked and some of the obstacles reported by firms related to both areas. Therefore they will be analysed jointly in this section.

20. Concerns in respect to major or prohibitive barriers arising from testing and certification requirements applicable in various export markets were voiced by a relatively large number of firms from Austria (6 firms) and Germany (6 firms). Issues related to conformity assessment were mentioned also by certain respondents in almost every non-OECD market surveyed. 4 German respondents, 3 Austrian firms, 3 Indian firms and 1 Japanese and Korean firm, respectively, reported specific problems with technical product regulations and standards, often described to differ across export markets. A relative large number of Korean firms (20 firms) rated issues belonging in either of the two NTM areas as posing moderate problems for exporting.⁹

21. Specific problems reported are:

- Multiple technical regulations and conformity requirements in different export markets (EU, US, Russia, Canada)

⁹ That few of the participating French companies mentioned any standard issues likely reflects the fact that many of these companies are service providers.

- Technical requirements favouring local suppliers/competitors (e.g. through design requirements) (China, France)
- Arbitrary technical regulations (China)
- Cumbersome and costly process of certification and compliance (Kazakhstan, Russia, Slovenia)
- Difficulties finding a local certification company for testing performance of a unique product (South Africa)
- Certification practices of questionable integrity (Russia, Ukraine, China)
- Lack of advance notice of changes in product standard (Japan)
- Lack of transparency (information) concerning certification requirements that a foreign firm must meet (Russia)
- Non-recognition of home-country certification in export market (Japan) or in another EU member (France, Poland, Spain), or requirement for additional certification not part of EU rules (Italy)

Illustrations:

(1) According to a French firm, some *Middle East* contracts require products to be certified according to US Environmental Protection Agency (EPA) standard, which is costly because products have to be shipped to the United States in order to be tested. This provides a guarantee to the client but introduces a market bias unfavourable to European exporters.

(2) A French exporter described his experience in obtaining pattern approvals in *China* for equipment, which costs between \$1,200 and \$3,000 for each model. He believes the requirements are legitimately designed to ensure product performance but reported that Chinese producers go through a less costly process with regional authorities whereas importers must have their products reviewed by the central government.

(3) A US company reported that two of its machines have completed German TÜV (Technischer Überwachungs-Verein) certification at a cost of \$40,000 each, but that this certification has not been honoured in *France*. According to this respondent, French standards give preference to French manufacturers because they require specific design prescriptions that are used only in French-made equipment. When presented with data showing his company's equipment performed better than equipment meeting French design standards, he learned that an EU directive mandating revisions to technical standards would be considered only after five years. Additionally, meeting French certification would require sponsoring annual visits to the U.S. factory. All this has led the company to abandon efforts to export to France.

(4) A Canadian firm reported that it was required to obtain UL certification to export to the *United States* even though the Canadian Standard Association (CSA) standards it had already met were virtually the same. It also must pay yearly maintenance fees for U.S. and Canadian certification. A German exporter of photovoltaic inverters also having to obtain UL certification considered the process as taking too long and the requirements very costly and excessive. For example, each component of the product must be certified separately.

(5) While an Austrian's firm's products are certified to meet international norms, the recognition of this certification is reported to be very limited, especially in *the South of Europe*. When the firm wishes to export to *Spain*, it has to submit its solar thermal systems for another round of testing and certification in that country that the firm considers redundant. The problem appears to be that applicable EU directives simplifying the process by mandating recognition have not been incorporated into national law. Certification includes testing materials (e.g. rubber) for durability and resistance to bathing and drinking water. Having to undergo the same process all over again in different markets is considered very burdensome as well as unnecessarily costly. Moreover, if foreign producers do not undergo certification in the country, their solar energy equipment will not benefit from subsidies from local authorities available for such installations in Spain.

(6) A producer in Chile exporting equipment for the control of gas escapes was asked by his clients *in South Africa* to have compression tests done. As the product was unique, the exporter had great difficulties finding a suitable certification company.

Box 1. The costs of multiple certifications

A Canadian exporter of monitoring and analysis instruments reported that his products must pass multiple certifications to be imported into Europe, including the ATEX directive for use in hazardous environments. The respondent believes that his company's products should be exempt under ATEX requirements because, among other reasons, they do not have ignition sources. Nonetheless, large potential customers in Europe require ATEX. He estimated initial costs would be \$25,000 plus yearly costs of \$20,000 for three years, declining to \$5,000 annually thereafter. Cost for complying with the Waste Electrical and Electronic Equipment directive would be \$7,000 to \$10,000 per product plus yearly maintenance costs. The respondent reported that his company's European representatives estimate the annual sales potential of its products in Europe at \$100,000, and that his company is weighing whether these certifications are worth the costs.

In the case of an Austrian firm exporting heating boilers to Russia and Ukraine, certifiers come from Russia or Ukraine to the firm in order to certify products that already meet strict standards for low emission of pollutants, energy efficiency in the EU and Switzerland. The firm has to pay for the travel and other expenses for several days. According to the firm, the certifiers are not knowledgeable about certification, but it pays and gets the certificate. Getting a certificate for a product series costs 20,000-30,000 EUR and is valid for two years. At times, this firm does not even receive an invoice, or it receives an invoice for only a partial amount that it has paid.

Photovoltaic (PV) modules for sale in Italy are required to undergo certification for the standard IEC 61215 for PV modules. According to an Austrian producer, this is a requirement only in Italy, not in the other EU markets. Certification costs 50,000 EUR and takes 6 months. When the Austrian firm brings new models on the market, it has to wait 6 months before it can sell the model in Italy. The producer considers this to be a very high barrier.

22. How do standards, technical requirements and associated compliance procedures impact on companies' ability to do business abroad? Survey responses indicated that coexistence of different national and regional certification schemes, for example within the EU for certain products, create major delays and costs in introducing new products and upgrading existing ones. The case presented in Box 2 illustrates the regulatory compliance costs that exporters may have to consider and which can discourage especially smaller companies from internationalising. As one US exporter put it, multiple standards in different European markets constitute a competitive advantage for larger exporters (such as his company) and a barrier to SMEs. The exporter estimated that certification costs add as much as 30% to the cost of developing a new instrument in his company's class of equipment.

23. Faced with the need to meet Chinese regulations for importing pressure vessels, another US exporter explained that when the process of complying with the regulations becomes very difficult, the firm chooses to procure components of lesser quality locally. Often small firms exporting plant systems procure certain parts from a local market for their price competitiveness. A few Korean exporters pointed

out that a lack of adequate certification facilities or failure of local products to meet the standards in the export market represented barriers to their export activities.

24. Also, the process of becoming certified for technical standards in Russia was judged by one of the respondents to be so costly that it gave up exporting to this country. Similarly, one Brazilian company producing equipment for recycling refrigerant gases that contribute to the greenhouse effect (HFCs) had the opportunity to export to the USA, but the high costs of testing and licensing the equipment (over 20,000 US dollars for two years) were prohibitive, given the scale of its exports. The company gave up exporting to the US market.

25. Concerns about standards and/or conformance requirements relate to various export markets or regions, both in the developed and developing world. The *EU including certain members, the United States, China* and *Russia* were mentioned by exporters from at least three exporting countries (see Table 4).

Table 7. Where are “technical barriers to trade” causing problems?

Export markets	Exporting countries									
	US	Canada	Austria	France	Germany	Japan	Korea	Brazil	Chile	India
Europe							+			
EU	+	+				+				
France					+					
Italy			+							
Poland					+					+
Slovenia			+							
Spain			+		+					
US		+	+		+	+				+
Canada					+					
Chile								+		
Uruguay								+		
Japan		+					+			
Korea			+							
Thailand				+						
China	+		+	+			+			
Pakistan										+
Russia	+		+		+					
Ukraine			+							
Kenya										+
South Africa									+	+
Middle East				+						
Iran										+
Dubai										+

Customs procedures

26. Customs procedures were mentioned by a relatively large number of respondents surveyed. If pre-shipment inspection is included, 6 US firms, 4 Brazilian firms and 4 German firms as well as 2 firms each from Austria, Canada, Chile, France and India reported difficulties with customs procedures which they considered “major” or “prohibitive” for doing business abroad. Also, relatively many Indian respondents to the questionnaire described customs procedures as either “major” barriers (5 firms) or “moderate” barriers (12 firms).

27. Typically, the problems mentioned cause delays in cross-border transactions or increase the cost of exporting to the foreign market. Overall, they create a less predictable business environment.

28. Specific problems mentioned are:

- Data or document requirements that are difficult to comply with (e.g. disclosure of information considered to be confidential) (US)
- Heavy penalties for minor errors (US)
- Slow customs clearance (Peru, Kenya) and extremely cumbersome procedures (Russia)
- Customs officials perceived to be finicky (Bosnia Herzegovina, Croatia, Serbia, Switzerland) or border officers perceived of engaging in improper conduct (Russia)
- Arbitrary application of rules by customs officials (Eastern Europe, Central Asia, Asia) and (arbitrary) product classification leading e.g. to higher import taxes (Brazil, Venezuela, China)
- Inconsistent and frequently changing customs procedures (Mexico, Rwanda)
- Difficulties for exporters to identify Harmonised Systems (HS) or other product classification codes for their equipment (South American region)
- Dissatisfaction with the treatment for customs purposes of free samples destined for potential customers (Bosnia Herzegovina, Croatia, Serbia, Argentina)

Illustrations:

(1) A Canadian exporter of wastewater treatment equipment reported that burdensome delays and costs are common when exporting equipment for sewage plants to *Rwanda*. Rules and regulations are not available and change frequently. All goods must pass through the Magerwa facility in Kigali, where importers must unload, reload and pay a 4.5% surcharge. There is a low level of automation, but the real problem, in this exporter's view, is a lack of experience and expertise in managing the customs process.

(2) In another instance French equipment was delayed at customs because a tag on the equipment said this was a radioactive source. This problem reportedly is encountered about once every five or six deliveries destined for *Mexico, Egypt* and *Algeria*.

(3) Two German firms, one operating in the air pollution control sector and the other in the waste water treatment sector, reported that *Swiss* customs officials have no tolerance for even small mistakes in customs declarations. One firm reported that if the paperwork is not flawless, a shipment can be delayed for eight days even if it is urgent. Giving the example of a recent experience where it took two hours of back and forth to prepare what is supposed to be a simplified export declaration, the other firm also complained that there is absolutely no room for small mistakes or omissions, otherwise you will not get the necessary stamp.

(4) An Indian producer of measuring instruments reported having encountered problems with classification codes in some African countries, such as *Kenya*. These do not match the codes used by India, which has resulted in the rejection of the products. Also, customs clearance in these countries takes very long.

29. From the interview results, it appears that strict and inflexible application of paperwork is perceived to pose burdens for firms exporting to developed-country export markets, whereas perceived arbitrary behaviour of customs officials appears to be a problem primarily when exporting to developing countries or economies in transition. A particular issue raised was the treatment by customs of samples sent to potential customers.

30. Several respondents explained that they hire agents to do the paperwork and handle procedures. In other cases, exporters have reacted to difficulties encountered by contractually requiring that their customers in the market concerned take themselves care of all required customs formalities and procedures.¹⁰

Box 2. The costs of customs procedures

A US exporter of air pollution control equipment recently sought to begin assembling finished machines in China. But its imported component parts were not considered to represent environmental goods benefiting from preferential tariff rates, and hence the company was charged a 25% tariff. Resolving the difficulty required hiring special consultants. Adding up the cost of solving this dispute, lost business and penalties levied by clients because equipment delivery was delayed, this NTB has cost the company more than \$200,000 to date.

An Austrian producer of equipment for the handling of biogas reported that Russian customs involve extremely cumbersome processes and procedures. One time, officials requested separate registration of each of thousands of cables included in a switch cabinet that the firm shipped. Officials also request to see production drawings. Moreover, when customs officials do not like some aspect of the customs documents, they confiscate the shipment at the border and if the problem is not fixed quickly will simply auction off the shipment.

31. As the case described in Box 3 underlines, problems with customs procedures can be extremely costly for exporters. In another case, equipment was blocked for 6 months at the border of *Iran*, which created a problem in terms of contractual warranty because the client lost these 6 months on the warranty period. As a consequence, warranty had to be re-negotiated with the client. Storage conditions at the border were also detrimental to product quality. Finally, on a customs-related issue, one French company reported problems with pre-shipment controls when seeking to access the *Saudi Arabian* market: In order to enter this market, equipments have to be certified prior to leaving the exporting country. Such certification is provided by specialised companies at a very high cost (3 000 to 4 000 € for an individual sale which may amount to 100 000 €). A Swedish auditing company has to travel to France to certify the equipment.

32. While the range of countries where respondents reported having experienced difficulties with customs procedures is wide, as can be seen in Table 5, the countries mentioned are predominantly developing or transition economies. *Europe/EU, China and Mexico* were mentioned by respondents from more than one export country. Some companies reported having had much greater difficulties with the customs procedures of several Eastern European countries in the past and that there had been notable improvements over time, especially following the accession of *Poland* and others to *the European Union*. Two of the interviewed German exporters voiced independently similar concerns about *Swiss* customs. None of the Korean firms and only one Japanese firm reported that customs procedures posed a major obstacle to exporting.

¹⁰ This may also affect responses to this item in this survey since a few of the firms using agents did not know whether or not their shipments experienced customs-related difficulties. For the set of respondents of this survey, barriers to trade related to customs procedures may therefore be somewhat underreported.

Table 8. Where are “customs procedures” causing problems?

Export market		Exporting countries									
Region	Country	US	Canada	Austria	France	German	Japan	Korea	Brazil	Chile	India
Middle East	Iran				+						
	Saudi Arabia				+*						
	Qatar	+									
	Egypt				+						
	Oman										+
Africa	Algeria				+						
	Rwanda		+								
	Mauritius										+
Europe/ Central Asia	Europe					+					
	EU					+			+*		
	Germany										
	Switzerland					+					
	Croatia			+							
	Bosnia and Herzegovina			+							
	Serbia			+							
	Russia		+								
Kazakhstan		+									
Asia	Asia										
	China	+				+					
	Thailand				+						
	India	+									
North America	US						+				
	Mexico	+			+						
Latin America	South America										+
	Argentina								+*		
	Brazil	+									
	Chile								+**		
	Colombia								+		
	Paraguay								+*		
	Venezuela	+							+		
	Peru									+	
	Bolivia									+	
Ecuador									+		

*This item refers to pre-shipment control; +** this item refers to customs procedures and to pre-shipment control.

Regulations on payment

33. Regulations on payment was one of the broad categories of NTMs most frequently reported as giving rise to “major” or “prohibitive” trade barriers by the overall group of respondents representing the 10 exporting countries, and particularly by a large number of French and Canadian respondents (9 and 3 firms, respectively). Issues falling in this area, including foreign exchange controls, were rated to be important occasionally by respondents from other surveyed exporting countries as well. Moreover, a relatively large number of Korean firms (12 firms) also mentioned issues falling into this category as a “moderate” or “major” barrier to exporting.

34. Specific problems mentioned are:

- Foreign exchange control or restrictions (Bangladesh, China and Venezuela)
- Request for pre-payment (China and India)

- Request for payment through letters of credit (India, Eastern Europe and Middle East)
- Requirement of a written clearing notification of local tax authorities prior to making a payment (India, Eastern Europe and Middle East)
- Payment for product certification required to be made by mother company abroad, not by subsidiary in export market (China)

Illustrations:

(1) A Canadian exporter of monitoring and analysis instruments reported that *India* and countries in the *Middle East* and *Eastern Europe* often require that imports be paid for through letters of credit. The informant believes that this requirement is triggered when governments are the purchasers or when importing firms are supplying the government. The time and cost associated with setting up letters of credit between banks has caused this exporter to forego potential sales in these markets, India most often (India, Eastern Europe and Middle East).

(2) A French company reported that a classical problem associated with payment in *China* and *India* is linked to pre-payment of goods. The contract stipulates pre-payment of goods. Delivery is made only after payment is received by the exporting company. Quite often, in *China* and *India* payment is made long after the contract is signed. As a consequence, the exporting company must store the equipment while waiting for the payment and bear the cost of this storage. Other problems occur when the exporting company uses a local agent. The client often demands a security deposit from the local agent. Most of the time, banks do not want to provide insurance for these payments because local agents are small. As a consequence, the exporting company must directly provide this insurance because any other solution is too complex to implement (*China* and *India*).

(3) In *Bangladesh*, the customer of a German exporter has to secure a bank guarantee even for small orders, presumably because the government wishes to control foreign exchange. This is costly, especially for small orders.

Box 3. The costs of foreign exchange restrictions

A US exporter of monitoring and analysis instruments reported that foreign exchange restrictions constitute a major obstacle to trade with *Venezuela*. Monitoring and analysis instruments to be used for university-sponsored research related to offshore oil exploration were delayed and the entire project was cancelled due to these restrictions, resulting in loss of a \$60,000 sale and \$5,000 in staff time.

35. As the case described in Box 1 and other examples cited by respondents suggest, various regulations on payment, including foreign exchange control or restrictions, often cause payment to be delayed and may even result in cancellation of contracts and hence potentially substantial losses of sales or investment opportunities in the market. According to one respondent, a possible solution to these problems could be "factoring", which enables a bank to buy the invoice and pay the company without any delay. This solution however would only work when the final client is a large company because banks do not want to take risks with small clients. Another solution mentioned is for the exporter to include a payment deadline in the contract.

36. As shown in Table 3, *China*, *India* and *Venezuela* were identified by respondents from more than one exporting country as the markets where difficulties with respect to payment represented major or prohibitive barriers to their business abroad.

Table 9. Where are “regulations on payment” causing problems?

Export market		Exporting countries									
Region	Country	US	Canada	Austria	France	Germany	Japan	Korea	Brazil	Chile	India
Asia	China	+		+	+	+		+			
	India		+		+			+			
South America	Peru									+	
	Brazil				+						
	Venezuela	+	+		+						
Africa	Rwanda		+								
Middle East			+								
	Iran					+					
	Lebanon				+						
Eastern Europe			+								

Government procurement procedures

37. Government procurement is another area where a large number of respondents in France (7 firms), followed by Austria (2 firms) and United States (2 firms) reported problems that they considered “major” or “prohibitive”. No significant problems in this area were reported by Chile and Brazil. Several Korean firms reported that procurement practices posed “moderate” barriers, as did several German firms.

38. Some of the German (and Austrian) firms interviewed mentioned that they did not supply and were not interested in this market. Reasons given were the significant paperwork involved in bidding for public procurement contracts, the presence of other competing firms, the price pressure brought on the firm and that these contracts were not profitable for the firm.

39. A typical complaint was that central or sub-central authorities were manipulating the procurement process in ways that gave preference to domestic over foreign firms. Among the specific problems mentioned are:

- Non-transparent decisions making process or arbitrary enforcement of requirements (Middle East)
- Timeliness of information about tender requirements (China)
- Request for informal “additional payments” (China)
- Preferential treatment of domestic producers (China, Italy)
- Frequent change of local contents provisions (use of local labour, inputs, R&D required) that result in unexpected costs for foreign providers (China)
- Lack of independent appeals procedures (Middle East, China and India)
- Non-compliance of decisions made by the arbitration authority (Chinese Taipei)

Illustrations:

- (1) A US exporter of monitoring and analysis instruments reported that government bid procedures have overly burdensome terms and conditions and a lack of clarity. The countries cited are *India, Pakistan, Bangladesh and Sri Lanka*. Bid submissions can be as long as 3,000 pages. This informant also reported that tender notices from these governments are often received close to the deadline—within a week, on one occasion—which favours domestic companies. Additionally, earnest money deposits that must accompany bids have not been returned in approximately half of the instances where this company bid and lost, according to the informant.
- (2) A Japanese exporter of water treatment/solid waste treatment plants was requested by its *Malaysia* partner to raise local contents from the initially agreed 20% to 60%. This request was made in the middle of the project implementation and the exporter was told by their Malaysian partner that if the local contents were not raised to 60%, they would cancel the contract. In order not to lose the contact, the Japanese firm decided to comply.
- (3) A French firm reported that there is a lack of independent appeals procedures in *the Middle East*. The respondent pointed out that it is not possible to include in a contract a clause requiring international arbitration. Only local courts can be mentioned. Most of the time, it is hopeless to try to sue a client or a local partner in a local court.
- (4) A French firm pointed out that a contract proposed by the client included a clause which made it possible for the client to terminate the contract at his own convenience. This was unacceptable and the company refused to sign, but they find that this is a common practice in certain *Middle East* countries.
- (5) According to an Austrian firm, local utilities in *Italy* which are business partners of this firm and other producers of photovoltaic modules are themselves trading similar products on the side, for example by way of subsidiaries. These products receive preferential treatment in local public procurement.

Box 4. Non-compliance with decisions made by the local arbitration authority

A Japanese exporter signed a contract with a Chinese Taipei partner to build an incinerator. No “inflation clause” was included in the contract, but because of price increases for materials such as steel and cement etc., the exporter asked that their supply price be raised by 20-30%, which the Chinese Taipei government refused. The contractor brought the case to the “public industrial commission”, an arbitration procedure in Chinese Taipei and won the case. However, the Chinese Taipei partner has not complied and the exporter is considering a law suit.

40. As can be seen from Table 6, government procurement procedures are perceived to act as significant export barriers in many countries, and notably in developing countries in Asia.

41. The issue of informal “additional payments” was also mentioned by several respondents to the survey, especially in the context of public procurement. Many of the countries cited are in Asia and not a party to the plurilateral agreement on government procurement administered under WTO auspices, which sets rules and obligations for open and non-discriminatory tendering procedures.¹¹

¹¹ The following countries cited by respondents in the survey are at the present not party to the plurilateral agreement on government procurement: Bangladesh, China, Chinese Taipei, India, Malaysia, Pakistan and Sri Lanka.

Table 10. Where are “government procurement procedures” causing problems?

Export market		Exporting countries									
Region	Country	US	Canada	Austria	France	Germany	Japan	Korea	Brazil	Chile	India
Asia	China	+			+			+			
	Chinese Taipei	+					+				
	India	+			+						
	Pakistan	+									
	Bangladesh	+									
	Sri Lanka	+									
	Malaysia						+				
Middle East				+							
North Africa				+							
	Kenya										+
North America	Canada	+									
Europe	Italy			+							
	Eastern Europe		+								
Global		+		+							

Adequacy of protection of intellectual property

42. A comparatively large number of respondents mostly in OECD countries (4 French, 3 Austrian and 3 US firms as well as 2 firms each from Canada, Germany, Japan and Korea) reported having experienced export difficulties due to difficulties in securing the protection of intellectual property or infringements of established rights. China was singled out as the most frequently mentioned export market concerned.

43. Specific problems mentioned are:

- Illegal copying (Peru, Canada, Germany)
- Proprietary equipment was copied by local partners who became significant competitors (China and Chinese Taipei)
- Intellectual property such as “construction design ideas” was stolen and software was pirated (China and Chinese Taipei)
- Trademarks were counterfeited and trade secrets were not protected (China)
- Excessively long and costly procedures for obtaining patent (China)
- Absence of legal protection of know-how contained in technical drawings accompanying tenders for public procurement contracts (Germany, Austria)
- Need to repeat lengthy and costly patent registration procedures for different export markets (EU)

Illustrations:

(1) A US exporter of air pollution control equipment reported that local partners in *China* and *Chinese Taipei* copied proprietary equipment and became significant competitors. The respondent said that attorneys advised the company that attempting legal action to protect its intellectual property would not succeed. The company has largely given up exporting to these markets.

(2) A Canadian exporter of remediation and cleanup equipment reported that it believes its trading partners in *Chinese Taipei* stole intellectual property associated with one of its most important products. While it is still bidding on projects in Chinese Taipei, the exporter fears that cheaper imitations of its products will soon appear and compete unfairly for a potentially large market.

(3) A US exporter of monitoring and analysis instruments reported that intellectual property protection has improved in *China* but continues in forms more subtle than outright copying, such as distributors releasing similar competitive products.

(4) An Austrian builder of photovoltaic modules explained that when his firm participates in bids for public procurement, it runs the risk that the technical drawings that it submits in its tender offer will be copied. Specific countries mentioned were *Germany* as well as the *producer's home country*. The drawings reveal customs-made technical solutions, hence know-how, but do not enjoy protection from being copied. This means that any other firm having access to these drawings can carry out the contract based on these technical designs.

Box 5. Inadequate protection of trade secrets

A Japanese exporter of water treatment and solid waste management treatment systems reports that they are experiencing difficulties in protecting their business secrets and know-how. In constructing water treatment and solid waste management plants in China, they were requested to provide various documents which show the use of technology being transferred through the project. This includes documents such as “construction drawing” of other projects that the Japanese company had carried out with other business partners. While the Chinese partner argued that the request is consistent with the “process license” provision of the contract and a common business practice in China, the Japanese company thought that such information was of a confidential nature since it was not being disclosed by the other partners. In addition, such information entails detailed know-how of the company.

44. Inadequate protection of intellectual property especially in *China* is a concern shared by respondents from many of the exporting countries covered in this study, putting the marker on a problem area that is extremely disconcerting for foreign firms wishing to do business there. Several firms participating in the survey reported that, because of the problem of intellectual property theft, they have either left the Chinese market or thus far declined to export to China. Some French firms expressed the hope that newly developed protection devices, such as “self destruction systems” on software, will provide better protection in the future. The perception of major IPR problems in China was shared by respondents from seven of the ten exporting countries, as shown in Table 7.¹² Also interesting is that one Austrian firm and one German firm described similar experiences with Chinese visitors of their manufacturing plants taking an unusual interest in the firms’ manufacturing know-how, which made staff suspicious of the motive for the visit.

¹² This strong consensus view may not fully reflect the pervasiveness of IPR-related difficulties given the insignificant role of China as an export market in the case of the sample of exporters from Brazil and Chile.

Table 11. Where is “adequacy of IPR protection” causing problems?

Export market		Exporting countries									
Region	Country	US	Canada	Austria	France	Germany	Japan	Korea	Brazil	Chile	India
Asia	China	+	+	+	+	+	+	+			
	Chinese Taipei	+	+								
	Vietnam				+						
	Thailand						+				
	Malaysia						+				
	The Philippines						+				
	Singapore						+				
	Korea	+			+						
Europe	Czech Republic				+						
	Spain				+						
	Germany			+							
North America	Canada			+							
Latin America	Peru								+		

VI. Reported effects of NTBs on export activities of companies

45. The evidence supplied by the survey and interview data consists not only of what participants in the survey report and then describe in more detail are major or prohibitive obstacles for them. Respondents also were asked to provide information about the costs and other consequences resulting from the barriers that they identified. In analysing the business impact of the reported barriers, caution should be applied in generalising the findings on business impact. Because of the methodology used for selecting the companies and the relatively small number of respondents per surveyed country, we cannot be sure how representative the set of respondents are of the larger population of exporting firms in their respective countries. Nonetheless, some barriers are reported by respondents of several exporting countries, suggesting that these are indeed areas of concern that merit policymakers' attention at the international level.

46. Several instances were reported where different NTBs (e.g. relating to regulations on payment, government procurement procedures, standards and technical regulations or conformity assessment requirements) impose significant additional costs on responding companies. For example, exporters reported additional costs where they are confronted with having to:

- deal with red tape
- subject their products to testing and re-testing for the same standard,
- engage in costly and time-consuming disputes with public sector clients,
- destroy their merchandise that cannot enter a country and also cannot be re-imported into the home market;
- forego buying parts and inputs from low-cost suppliers.

47. Some of the barriers incurred opportunity costs for exporters. Sometimes relatively large firms have subsidiaries or local offices in the export markets. Nevertheless, they are constrained to contract local firms since regulations in the export market treat domestic firms preferentially or require a contract with local firms. Another reported factor outside exporters' control that artificially raises the costs of doing business in certain foreign markets is demands for informal "additional payments". According to figures supplied by some respondents these payments amount to 5-10 % of the transaction value. Although such payments were seldom perceived to represent a significant barrier to exporting, the conversations with firms' staff during interviews suggest that this is a common practice across export markets and affecting various policy domains, such as customs procedures and product certification.¹³ Payments are not necessarily made by the producer himself but often are handled by middlemen involved in the business transaction, or the client.

48. In their most extreme incarnations, the trade barriers reported by participants in this survey make it prohibitively expensive or difficult for exporters to export their goods into some foreign markets. They have forced some environmental goods exporters to abandon markets altogether or restrict the types of goods exported to such markets. Based on the survey data collected, companies are extremely wary about and may even forego opportunities to enter a market with unfavourable trade or regulatory policies or practices. The Chinese export market and China's IPR policy is a case in point.

49. The impacts of NTBs on a company's export business depend on many variables. Although respondents' evaluations of NTM categories through the pre-screening questionnaire do not provide evidence that certain NTM areas are of specific concern to SMEs, the interviews suggest that product standards and technical regulations restrict market access for SMEs which often cannot afford the costs of obtaining required certifications. Resource limitations also render it more difficult for smaller firms to obtain information about applicable testing and certification requirements. It was pointed out that multiple standards in different European markets constitute a competitive advantage for larger importers, therefore negatively affecting the export activities of SMEs.

50. Smaller firms exporting plant systems often try to procure certain parts of it in the foreign local market because of their price competitiveness. Hence such SMEs may be particularly affected also by the lack of certification infrastructure or by difficulties that local products may have in meeting the standards of the export market. Several SMEs told interviewers that one of the biggest challenges to exporting plants to developing country markets was to secure payment. Where an SME works under loan contracts in order to minimise the risk of not getting paid, special requirements may be attached to the arrangement, for example that 60% of content originates in the market of the loan provider, which requires larger scale financing on the part of the SME because it is not be able to take advantage of the price competitiveness of local market products.

51. Another concern raised by some of the SMEs interviewed was that in many developing countries environmental industries, particularly the waste water management and waste management sectors, are in the public domain and foreign exporters are often expected to bring in financial investment. This is particularly difficult for smaller firms.

52. Larger companies are more able to develop expertise in handling barriers to trade and manage the associated costs. However, the larger and more extensive a company's export sales, the greater the

¹³ While only 4 firms reported and judged as representing a major obstacle to exporting the need to effect informal additional payments, when responses describing this as a moderate obstacle are taken into account, a much higher number of respondents (22 firms) report facing this issue, and a total of 34 firms completing the questionnaire (25.% of all respondents) identified this issue as posing an obstacle of some degree (modest through major).

aggregate effects of trade barriers on its business. The magnitude of its experienced effect is likely to influence how important the trade barrier is for the firm. One large-volume exporter interviewed reported that the requirements to meet redundant technical standards in European markets have resulted in lost business and costs totalling several million dollars in the past two years. An exporter of renewable energy equipment estimated that his company has lost \$30 million in export sales because of preferential treatment given to its competitors.

53. Where domestic firms are producing comparable goods, NTBs confer direct advantages such as subsidies or bid preferences and indirect advantages such as lower costs of sales. Government policies that support domestic producers may have national economic benefits, but to the extent that NTBs distort trade in environmental goods, there is likely to be downstream sacrifice in the achievement of environmental and even economic development goals. In the interviews conducted, several instances were reported where projects in an importing country had been delayed or even cancelled because NTBs made it too difficult or expensive to effect imports of needed equipment. This can be a particularly serious consequence for certain types of critical environmental equipment, for which there are no domestic producers and very few suppliers worldwide.

VII. Other observations

54. The survey brings to light some less well known problem areas and ways in which regulation in the export market can negatively impact on a foreign firm's sales in that market.

55. As far as procurement policies are concerned, it was pointed out by several respondents that the *bidding processes for projects funded by international organisations or multinational funding agencies* often are not transparent. A US exporter of monitoring and analysis instruments reported that sometimes end-user representatives and consultants appointed to evaluate bids receive informal "additional payments" from bidders in exchange for their influence. According to a Canadian exporter of remediation and cleanup equipment, the conditions for participation in a United Nations-sponsored project to identify non-combustion cleanup technologies for use in Eastern Europe were so onerous (e.g., complex bureaucratic requirements) that it was difficult for an SME to participate. The respondents argued that these organisations should adopt better practices and more transparency in appointing bid review committees.

56. The handling of certification issues can be of strategic importance for firms doing business in markets where the government provides financial incentives (subsidies) to promote the installation of certain environmental equipment but ties these to fulfilment of requirements that are more costly for foreign producers than domestic firms. As one respondent explained, his equipment would not be eligible for such subsidies if his firm did not submit to certification in the export market.

57. In two instances, suppliers of renewable energy production equipment voiced frustration about difficulties with deploying their own personnel to install or supervise the installation of the equipment for clients located abroad, and a third firm reported being marred in complex paperwork when sending its technicians to service installed equipment in one of its foreign markets. Unless technical personal can move flexibly to provide services that are fundamental to the operability of the equipment/project, this can determine the sales prospects of the firm. These examples support one of the key conclusions drawn from other OECD work, namely that environmental products, technologies and services are increasingly provided commercially on an integrated basis and greater benefits will accrue from liberalising trade in environmental services and in environmental goods simultaneously.¹⁴

¹⁴ Steenblik et al (2005), *Synergies between Trade in Environmental Services and Trade in Environmental Goods*, OECD Trade and Environment Working Paper 2005-1, OECD, Paris.

58. Besides giving concrete examples concerning the impact of specific difficulties encountered on companies' business performance, the survey responses draw attention to *factors other than NTBs* as a key obstacle to their exports in environmental goods and services sector. Apart from the reported financial and other burdens resulting from having to meet specific national requirements in the field of standardisation, some respondents from a high-standard country like France point to the *lack of adequate standards in importing countries* as a key obstacle to development of technology and service exports, whereas the *high standards* in place in OECD markets are perceived by some firms in Brazil as creating a technology barrier that they feel they cannot overcome with their more limited know-how. Again, it should be borne in mind that these findings are limited to a small sample of firms included in this study and cannot be considered as necessarily representative of overall industry experience in the countries covered.

VIII. What are firms or governments doing about the barriers reported?

59. Interview responses suggest that firms try to deal on their own with barriers that they encounter in some way.

60. Several exporters reported having passed the task of handling difficult customs procedures on to their shipping agents or to their clients. For example, two Austrian firms explained that to avoid having to face such problems they were asking their clients or a local partner to take care of customs formalities. Another firm selling biogas plants and handling equipment reported that it stipulates in its contract with the client that the client covers the costs of product certification. Another producer facing problems with certification argued that without having passed the required certification process the firm would not be able to put its products on offer, or even advertise.

61. A few firms reported dealing with IPR problems by direct contacts with the infringing party and hiring lawyers, but if the firm is small it can feel powerless to defend its patents or copyrights. Responses during interviews also suggest that the extent to which environmental goods are vulnerable to IPR infringement and consequently the desire of producers to seek remedial action, depends *inter alia* on the kind of the product. For example, one firm indicated that while it has experienced occasional IP infringements, the products that it manufactures are very specialised and, if illegally copied, would be recognised immediately by the price and quality differences. Another firm that reported having encountered some patent infringement problems in the past noted that it was not worthwhile to launch legal proceedings because its equipment was custom-built and not series production. For another firm, IPR was not (yet) a concern because the volume of the firm's sales was too small in the countries where IPR could be a problem.

62. A few firms made reference to recent or ongoing government initiatives seeking to address specific barriers. Inadequate protection of IPR in China is an example where consultations are reported to take place at the government level. Where the absence of environmental standards in export markets constitutes a barrier to entering a market, one respondent explained that the government of the exporting country is investing in research and development underpinning the establishment of standards in a potential export market. In another case, involving certain public procurement practices, a respondent reported having taken the initiative to raise the issue with the government agency in the export market concerned. A respondent from Korea referring to a sudden upgrading of product standards due to a strengthened air pollution control regulations in the export market, also reported that they are enquiring to relevant government bodies in the export market about timely announcement of standards upgrading for the future export.

63. Very seldom did firms report having brought any of the problems in export markets described to the attention of their own governments. It was only in Brazil where exporting companies reported to have turned to their own government for action aimed at reducing barriers; however, at issue were barriers (such

as bureaucracy, port procedures) in the home country that made it difficult to import parts needed for production. Mention was also made of recent or ongoing policy reforms, such as the easing of foreign exchange controls by Brazilian authorities and work and discussions going on in Mercosul aimed at reducing technical barriers to intra-regional trade

64. Survey results also suggest that coping with certain barriers may take the form of making requested or expected (informal) payments. For instance, some respondents in India alluded to the important role of so-called “speed money” as a trade-facilitating mechanism; in the words of one respondent, it was cheaper to give speed money to customs officials than provide all the documents requested.

IX. Concluding observations

65. By adding an interview phase, the survey methodology adopted here gathers more detailed information about specific instances of companies’ actual experiences with policies, procedures or practices claimed to obstruct market access. Business complaints can be better understood and their credibility better judged. Concerns would seem even more credible where different companies describe experiences that are similar. If these criteria are applied to the reporting of barriers in this survey, certain problems relating to customs procedures, national certification requirements and protection of patents and manufacturing know-how stand out.

66. At the broadest level, firms operating in the seven sectors of the environmental industry report a variety of obstacles to exporting associated most prominently with six of 19 categories of NTMs . The six categories are testing and certification, customs procedures, regulations on payments, adequacy of intellectual property protection, government procurement procedures, and product standards and technical regulations. The prominence of these areas documented by the concerns which respondents voiced applies broadly across the set of developed and developing exporting countries. By comparison, for certain other NTM areas (import quotas or prohibitions, state-trading monopoly or state monopoly control of imports, price controls or administered pricing in destination market and restrictions on investment), the reporting rate was low.

67. Research reviewing business surveys undertaken in other economic sectors or economy-wide finds that exporters view measures and practices relating to technical barriers to trade (standards and technical specifications, and related conformity assessment procedures) and customs procedures as critical trade barriers, and this perception among exporting firms is widely shared across different regions of the globe. Government procurement procedures and inadequate protection of IPR have also been mentioned by producers of other goods participating in other surveys on trade barriers. The issue of regulations on payment usually has not received much attention, but these regulations are not industry specific.¹⁵ Overall, from the findings of these surveys and the barriers documented in our survey covering several sectors of the environmental industry it seems that the barriers faced by producers of environmental goods and services apply also to other industries.

68. The study also points to the existence of factors other than NTBs that discourage firms from exporting to certain markets. For example, some of the problems that firms surveyed associated with regulations of payment appear to touch more on payment practices in the private sector than government policies. Also, as some exporters from OECD economies pointed out, weak environmental standards in foreign markets act as disincentive or obstacle for the development of technology and services exports, whereas for other (Brazilian) firms interviewed the high environmental standards of OECD markets

¹⁵ See Chapter 1 “Overview of Non-tariff Barriers: Findings from Existing Business Surveys” in *Looking Beyond Tariffs: The Role of Non-Tariff Barriers in World Trade* (2005), OECD, Paris.

constituted a technological barrier preventing them from selling in these markets. Since export opportunities for environmental goods and services are driven by demand, it will take more than initiatives that reduce or remove NTBs (for example streamlining customs procedures, reforming public procurement practices or other domestic regulations) to spur international trade in this sector.

69. The interviews also help to better understand the effects that NTBs have at the firm level, and what firms do when they encounter barriers of various types. Some exporters mentioned having exited from markets. Others have developed coping strategies. Mostly, exporters try to overcome reported barriers on their own, without government involvement. Some deflect the burden of handling situations to other business partners, including by hiring local partners in export markets. Cases where respondents interviewed reported having raised an issue directly with the relevant government authorities in their export market, or with the home government, were rare. At times, payments that are either requested or expected provide an easy option for exporters to deal with difficult barriers. However, measures taken by individual firms to overcome market access barriers typically are ad hoc, often patchy and do not address problems at their source. In short, they cannot substitute for governments taking action.

70. The leading NTBs that firms identified have broad implications in the context of the overall Doha negotiations. By shedding light on these barriers to exports of environmental goods and services, the study can contribute to on-going efforts to liberalise trade in this area. Survey responses also indicate that greater benefits will accrue from a simultaneous liberalisation of trade in environmental goods and services because products, technology and services are often supplied on an integrated basis.

The relatively frequently mentioned problems with customs procedures underline the timeliness of the negotiations on trade facilitation included on the agenda of the DDA.

71. The dissatisfaction expressed by respondents about government procurement practices draws attention to weaknesses, in terms of both the level of participation by countries and substantive issues, of the existing plurilateral disciplines in this area. Based on the findings of this survey, the concerns expressed by environmental technology firms go beyond the transparency issues under discussion under the Doha agenda mandate. For example, to support effective participation of smaller firms in this market, the tender process may need to be simplified in major ways.

72. The concerns so often voiced by participants in respect to product testing and certification suggests that this industry and trade in this sector would benefit greatly from initiatives which governments individually or jointly could take to eliminate redundancy of procedures and reduce the costs of conformity assessment. Also, TBT issues relevant to the environmental industry can be taken up in the regular discussions of the WTO Committee on Technical Barriers to Trade. With regard to the protection of intellectual property, despite progress being made in this area, the experiences which firms describe indicate that there is still much room for seeking more effective implementation of international commitments and stronger enforcement mechanisms, at bilateral, regional and multilateral levels.

73. The strong regional export orientation of firms in several country studies points to the importance of regional markets for expanding trade in this sector and serving as a stepping stone for SME internationalisation. This reality could be more explicitly recognised if governments took advantage of the action agendas of existing or prospective regional or bilateral trade agreements to address the concerns highlighted by this study. Responses of firms from EU member states suggest that more can be done to facilitate cross-border business even in the already highly integrated EU market.

**ANNEX I. SCOPE OF ENVIRONMENTAL PRODUCTS AND ASSOCIATED SERVICES
COVERED BY THE STUDY**

	Environmental Sectors	HS Code	Exporting Products	Relevant Services
1	Environmental monitoring, analysis and assessment equipment	690320	Ceramics	Ambient air quality monitoring and continuous emissions monitoring.
		7017.10; 7017.30	Laboratory glassware	Training for monitoring equipment
		701720	Building materials and equipments	Services related to warning stations (mobile unit)
		701790	Laboratory equipment	Laboratory analysis of environmental samples.
		842119	Centrifuges, including centrifugal dryers; air filters; air conditioners	Monitoring equipment after-sales services;
		842129	Floating structures for controlling oil spills; filtering machine	
		901580	Meteorological equipments	
		902290	Lab system	
		902519	Digital thermometers; industrial control components	
		902590	Parts of hydrometers & barometers	
		902610	Meters of water level; manometers; pressure transmitters	
		902680	measuring instruments for emissions control; spring balances; measuring cylinder	
		902710	Gas analysis apparatus (particulate, CO, SO ² , NO _x); Multi-parameter water quality monitoring instruments	
		902720	Chromatographs and electrophoresis instruments	
		902730	Monitoring equipment (902730.2000); photo colorimeter; spectrophotometer	
		902750	Fused cast aluminium refractories	
		902780	PM meter (9027802010); Measuring instruments and transmitters; Vacuum systems; scientific instruments; process control instruments	
		902790	PM sensor (902790.2999); Electronic parts;	

	Environmental Sectors	HS Code	Exporting Products	Relevant Services
		903180	Data recording and transmission machine	
		903149	Optical instruments	
		903289	PM alarm system; semi-conductor; electrical controller	
2	Remediation and Clean-Up of Soil and Water	851629	Apparatus for treating contaminated soil	Treating contaminated sites
3	Recycling systems	8414599000	Blower	Consulting in environmental legislation and regulations (legal and contractual services)
		841940	Distilling plant	Design of sustainable buildings: residential, commercial (for recycling water system in the building)
		842833.2000	Belt conveyor	Design and engineering of industrial water treatment plant for recycling
		847982	Machinery for crushing and grinding; Granulator (847982.2000); engineering products; chemical processing refineries; engineering chemicals, papers, galvanised steel	
		847989	Machines and mechanical appliances having individual functions, not specified or included elsewhere in chapter 84.	
		847990.9090	Cyclone; air rock; wet type sorter; sieve type vibrator	
4	Renewable energy*	841011	Hydraulic turbines	Engineering services related to clean energy
		841090	(No specific product was identified)	Engineering services related to geothermal energy
		854140	Photovoltaic converters; photovoltaic inverters; solar panel cell/module; CPC tube solar energy collector	Design of sustainable buildings: residential, commercial (for renewable energy system)
				Consulting in environmental legislation and regulations (legal and contractual services)
5	Air pollution control	840410	Vacuum pumps; blowers; heating system (boiler and equipment to treat water)	Consulting in environmental legislation and

* Some of product types in this category were withheld to preserve informant confidentiality.

	Environmental Sectors	HS Code	Exporting Products	Relevant Services
				regulations (legal and contractual services)
		841410	Recovering and recycling equipment for refrigerant gases;	Ambient air quality monitoring and continuous emissions monitoring
		841459	Pollution control equipment	Engineering services for air pollution prevention and treatment
		841480	Air conditioning equipment	Engineering services for pollution prevention and treatment
		851420	Induction melting furnace	Design of sustainable buildings (residential, commercial)
		851490	Furnaces and articles thereof; System of evacuation and gas cleaning (841490.9000); rotating unit for pumps; air precision instrument (API) products	
		854140	Modules/solar cells for photovoltaic energy; aviation lights	
		841989	Fishmeal processing equipment (841989.9000); cooling towers;	
		842139	Acid fog control and abatement system (842139.90000); Filter assemblies; exhausters, bag-houses; electrostatic precipitators; filtering or purifying machinery and apparatus, for liquids or gases; Auto-catalyst; Reactors and air filters;	
		842199	parts for filtering or purifying machinery and apparatus, for liquids or gases;	
		N/A	Operational software	
		N/A	Glass fibre mats for exhaust/extraction ducts/pipes	
		N/A	Sample parts of exhaust/extraction pipes, storage and systems	
6	Waste water management	392690	Other articles of plastics; thermo couplings; rubber moulded goods; plastic modules	Engineering services for water pollution prevention and treatment
		560314	Fabric	Industrial water management outsourcing services
		730900	Metallic tanks (730900.1000)	Engineering services for water pollution prevention and treatment

	Environmental Sectors	HS Code	Exporting Products	Relevant Services
		731010	Still drums (731010.1000)	Mineral resources and groundwater mapping
		841320	Grinding machines and hand pumps; different types of pumps	Design of sustainable buildings (residential, commercial)
		841360	(No specific product was identified)	Consulting in environmental legislation and regulations (legal and contractual services)
		841370	Pumps for liquids (841370.7000);	Design and engineering of industrial water treatment plans
		842121	Water well screen (842121.9900); waste water treatment plants (842121.9900); water demineralisation plant; industrial effluent treatment systems; fixed or removable diffusion aeration systems; blower systems;	
		842129	Filters (air) mode of mettle; membrane; submerged mixer	
		842199	Lxtus filter for liquid (842199.9090); water drainage system (842199.0000) Filtering or purifying machinery and apparatus for liquids or gases	
		842833	(No specific product was identified)	
		854389	Engineering, locomotive parts	
		847982	(No specific product was identified)	
		847989	Vertical hydraulic press	
		848180	Tubes and components	
		N/A	Software for operating waste water treatment plants	
		N/A	Waste water management plant; Drinking water management plant	
7	Solid and hazardous waste management	841780	Incinerator	Consulting in environmental legislation and regulations (legal and contractual services)
		847410	Machinery for crushing and grinding;	Engineering of toxic waste treatment and polluted sites remediation
		847982	Engineering waste products	Design of sustainable buildings: (residential, commercial)
		847989	Biowaste treatment (bio filter; crushing device; automatic	

	Environmental Sectors	HS Code	Exporting Products	Relevant Services
			introducing device; bio regulator; automatic aerator); biogas handling equipment; biogas production equipment	
		847990	Gas scrubbers systems;	
		901320	Container for the chemical industry	
		960350	Machinery for the collection of waste material;	
		N/A	Ceramic membrane filtration system; Submerged membrane unit and cartridges	
		N/A	Solid and hazardous waste management plant	
		N/A	Software for operating solid waste treatment plants	

ANNEX II. SCOPE OF NON-TARIFF MEASURES (NTMS) COVERED FOR THE BUSINESS SURVEYS AND INTERVIEWS

M1	Pre-shipment control of quality, quantify or prices of goods
M2	Import licensing
M3	Import quota or prohibitions
M4	Customs procedures
M5	Import surcharges or border taxes
M6	State-trading monopoly or state monopoly control of imports
M7	Cargo handling and port procedures or requirements
M8	Product standards and technical regulations of destination country
M9	Testing and certification in destination country
M10	Restrictions on investment
M11	Restrictions on after-sales services
M12	Price controls or administered pricing in destination market
M13	Restrictive foreign exchange allocations to importers
M14	Regulations on payment
M15	High or discriminatory taxes or charges in destination market
M16	Subsidies or tax benefits given to competing domestic firms in destination country
M17	Adequacy of intellectual property protection
M18	Government procurement procedures in destination market
M19	Informal “additional payments” required to effect import of your product