ENVIRONMENTAL TECHNOLOGIES INDUSTRIES

FY2010 INDUSTRY ASSESSMENT

A. Industry Background / Definition

In general and as well as for the purpose of this report, the environmental technologies (ET) industry is defined as all goods and services that generate revenue associated with environmental protection, assessment, compliance with environmental regulations, pollution control and prevention, waste management, renewable energy, remediation of contaminated property, design and operation of environmental infrastructure, and the provision and delivery of environmental resources. According to Environmental Business International (EBI), employment for the U.S. ET industry is approximately 1.6 million for all segments, producing revenues of $290 billion. The U.S. ET industry revenue is broken down into the various industry segments as follows: services (47%), equipment (21%), and resources (32%).

Key subsectors for products and services of the ET industry include: air, water, and soil pollution control; solid and toxic waste management; recycling; renewable energy; pollution prevention and resource recovery; site remediation; environmental monitoring; and water treatment for industrial and municipal water use. This sector is extremely broad and includes a wide variety of products and services that cut across many different industry sectors. The ET industry evolved in response to concerns about the risks and costs of pollution and the enactment of pollution control legislation and regulations in the United States and around the world. It is now increasingly driven by sustainability concerns.

A key challenge to studies and analyses of the ET industry is that there is currently no North American Industry Classification System (NAICS) or any other similar system definition for this industry. The International Trade Administration's (ITA) Office of Energy and Environmental Industries (OEEI) has developed the most comprehensive and representative list of products for the ET industry, based on the Harmonized Tariff System (Attachment A). This list was developed in close consultation with industry and the U.S. International Trade Commission; it also tracks work done by the Organization for Economic Co-operation and Development. The list was used for Asia-Pacific Economic Cooperation trade negotiations and is currently used by the U.S. Trade Representative in various trade negotiations venues. OEEI has also developed a separate, comprehensive listing of ET goods categories.

B. Industry Overview and Global Competitiveness

According to EBI, the global market for the ET sector in 2008 was estimated at $782 billion (Figures 1-2). In the United States, the world's largest producer and consumer of ET goods and services, approximately 119,000 ET firms generate $300 billion in revenues and $43.8 billion in exports, supporting close to 1.7 million jobs.

While 99 percent of U.S. ET private sector companies fall under the small and medium-sized enterprises (SMEs) category, they generate only 20 percent of the total U.S. ET revenue. Large

ET companies, which represent only one percent of all private sector activity, account for 49 percent of total U.S. ET revenue. Public-sector municipalities and similar entities account the remaining 31 percent of revenue and dominate water utilities, wastewater treatment works, and solid waste management.

The ET industry continues to experience consolidation as larger ET companies typically arise through mergers and acquisitions, not internal growth. More change of ownership and structure is likely to continue.

Figure 1

U.S. Environmental Export Competitiveness 2004-2008

	2004	2005	2006	2007	2008
Global Market	638.6	671.2	711.9	757.9	782.4
US Market	245.2	256.3	271.4	289.6	299.5
Non-US Market	393.4	414.8	440.5	468.4	493.8
% Exports	11.4%	12.0%	13.1%	14.2%	14.6%
US Exports	28.7	31.8	36.9	43.1	43.8
% Growth in U.S. Env'l Exports	10%	11%	16%	17%	2%
US Share of Non-US Market	7.3%	7.7%	8.4%	9.2%	8.9%
Trade Surplus	5.9	8.2	10.7	12.8	10.9

Units:$ U.S. billion
SOURCE: Environmental Business International, San Diego, CA

Industry Subsectors

There are 14 segments or subsectors identified in the ET industry (Figure 2). Most ET goods and services are easily classified within one of these subsectors, while others (e.g. water pumps, monitoring and instrumentation equipment, water treatment membranes) may overlap different subsectors outside of the ET sector. The largest segments in the global ET market are: solid waste, water utilities, and water treatment works, renewable energy, and water equipment and chemicals. The water/wastewater treatment sector and the renewable energy sectors have the greatest opportunities in the international market; the global water market has grown rapidly over the last decade and alone accounts for over 35 percent of the total global environmental market.

Figure 2- U.S. Environmental Market by Segment ($billion)

Equipment	*US ind 2008*
Water Equipment & Chemicals	28.5
Air Pollution Control	18.0
Instruments & Info. Systems	5.9

Waste Mgmt Equipment	11.4
Process & Prevention Tech.	1.9
Services	0.0
Solid Waste Management	53.1
Hazardous Waste Mgmt	9.2
Consulting & Engineering	27.1
Remediation/Industrial Services	12.5
Analytical Services	1.9
Water Treatment Works	40.7
Resources	
Water Utilities	39.2
Resource Recovery	28.5
Clean Energy Systems & Power	21.5
Total	**299.5**

Source: Environmental Business International, Inc. (San Diego, CA)
* Data on the ET industry and markets vary significantly because of inexact definitions of the sector. Key sources of ET data are: EBJ, Environmental Business International, Inc. (EBI), (San Diego, CA). USDOC data was used for detailed trade flows based on the expanded HTS-based list of ET products. For ET services area, OEEI relies on EBI only since there are no reliable service-related codes to track trade flows.

In light of the Administration's focus on clean energy, we have separated this report in two sections: one focusing on the tradition environmental sector (air, water, waste, etc) and the other on the renewable energy sector. It should also be noted that the Energy Industry Assessment prepared by Office of Energy and Environmental Office also includes the same renewable energy section.

TRADITIONAL ENVIRONMENTAL SECTOR

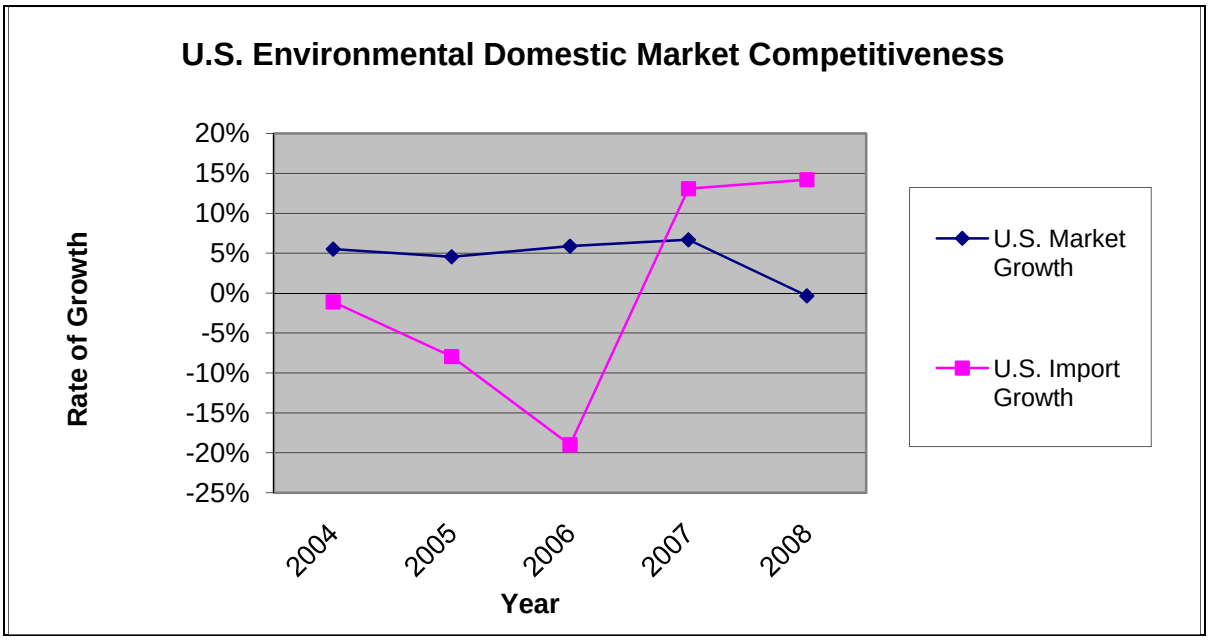
Competitiveness

The United States is regarded as a world leader in many ET categories, including: engineering, design, construction, and consulting services; pollution prevention and resource recovery; water and wastewater handling and treatment equipment; stationary and mobile source air pollution monitoring and control equipment; solid and hazardous waste management; contaminated site remediation; automation for treatment systems and monitoring equipment; and, information systems/software for environmental management and analysis.

The rate of U.S. market growth has hovered around five percent since 2004. At the same time, the rate of growth of U.S. environmental technologies imports, which had been slowing since 2004, jumped to growth rates of over ten percent in 2007 and 2008. Combined, these two trends have caused U.S.-based environmental technologies firms to lose market share in the United States.

Figure 3

Source: International Trade Administration (with ITC and EBI data)



While the American market remains the largest single market for environmental technologies and the most mature, foreign markets, particularly those of developing countries, continue to grow at a higher rate and offer the most opportunity for U.S. companies. The U.S. share of foreign ET markets has also continued to grow (from 5.7 percent in 1997 to 9.8 percent in 2007), giving the U.S. ET industry a positive trade surplus for the past decade. The rate of growth of U.S. ET exports had slowed early in the decade, but has steadily returned; some of this is also influenced by the booming demand for renewable energy technology. The U.S. ET industry's annual rate of export, as a percentage of its total production, was 14 percent in 2007 (Figure 4 below). In contrast, our key competitors (Japan, Western Europe) export over 20 percent of their domestic production.

Figure 4-

The Global Environmental Industry and Market: Estimated Global Trade Flow

By Region	2007 Market	Exports	Imports	Balance	% Exports
USA	289.6	43.1	30.3	12.8	14%
Western Europe*	209.5	48.1	35.6	12.5	23%
Japan	99.6	21.2	7.0	14.2	21%
Rest of Asia	59.0	3.1	19.5	-16.4	5%
Mexico	6.2	0.58	3.04	-2.5	9%
Rest of Latin America	22.7	0.9	9.1	-8.2	4%
Canada	19.8	2.49	3.06	-0.6	13%

Australia/NZ	13.6	3.2	1.8	1.5	24%
Central & Eastern Europe	18.2	1.0	7.1	-6.1	6%
Middle East	13.0	0.4	4.6	-4.2	3%
Africa	6.8	0.1	3.0	-3.0	1%
Total	758	124.1	124.0		

SOURCE: Environmental Business International, Inc., San Diego, Calif. units in $ billion

****Note: each country within the region, not as a block: i.e. German sale to Italy is an export and an import***

In terms of exports as a percentage of total U.S. ET production, the leading subsectors are: resource recovery (58%), instruments and information systems (46%), water equipment and chemicals (36%), waste management equipment (25%), and air pollution control (16%), as illustrated in Figure 5 below.

Figure 5 ET Subsectors Exports in 2008 ($ billion)

U.S. Environmental Exports By Sector, 2008

Equipment	*US ind*	%export
Water Equipment & Chemicals	28.5	36.2%
Air Pollution Control	18.0	16.2%
Instruments & Info. Systems	5.9	46.0%
Waste Mgmt Equipment	11.4	25.0%
Process & Prevention Tech.	1.9	8.0%
Services		
Solid Waste Management	53.1	0.3%
Hazardous Waste Mgmt	9.2	1.0%
Consulting & Engineering	27.1	12.8%
Remediation/Industrial Services	12.5	6.0%
Analytical Services	1.9	7.4%
Water Treatment Works	40.7	0.6%
Resources		
Water Utilities	39.2	0.2%
Resource Recovery	28.5	58.0%
Clean Energy Systems & Power	21.5	16.0%
Total	***299.5***	***14.6%***

Source: Environmental Business International, Inc. (San Diego, CA).
Note: U.S. Industry is equal to revenues generated by U.S. companies worldwide. U.S. market refers to revenue from U.S. customers. Exports do not include ownership of overseas companies but do include repatriated profits.

The U.S. ET industry should be able to increase its global competitiveness as it focuses greater attention on key international markets and introduces new, state-of-the art products and services (e.g., particularly technologies applicable to water reuse and recycling, desalination, and technologies with comprehensive environmental management system applications). While technological development can undoubtedly help increase U.S. industry's competitiveness, stricter laws and regulatory enforcement worldwide are essential to addressing the world's environmental issues.

The international market for ET is fueled by several important policy and market drivers of demand: greater global focus on climate change and sustainable development; liberalization of trade in environmental goods and services *via* bilateral and multilateral efforts; growing industrialization and environmental awareness in key emerging markets; and, application of cleaner production and environmental "best practices" not only by multinationals and major foreign companies, but also and increasingly by SMEs.

C. Industry's Domestic Environment

In 2008, the U.S. ET industry contracted slightly by 0.3%. The industry is expected to return to growth as economic conditions improve and industrial activity rises, increased attention and resources are paid to addressing climate change. The new Administration is strengthening and harmonizing the currently weakened and fragmented U.S. environmental regulatory framework.

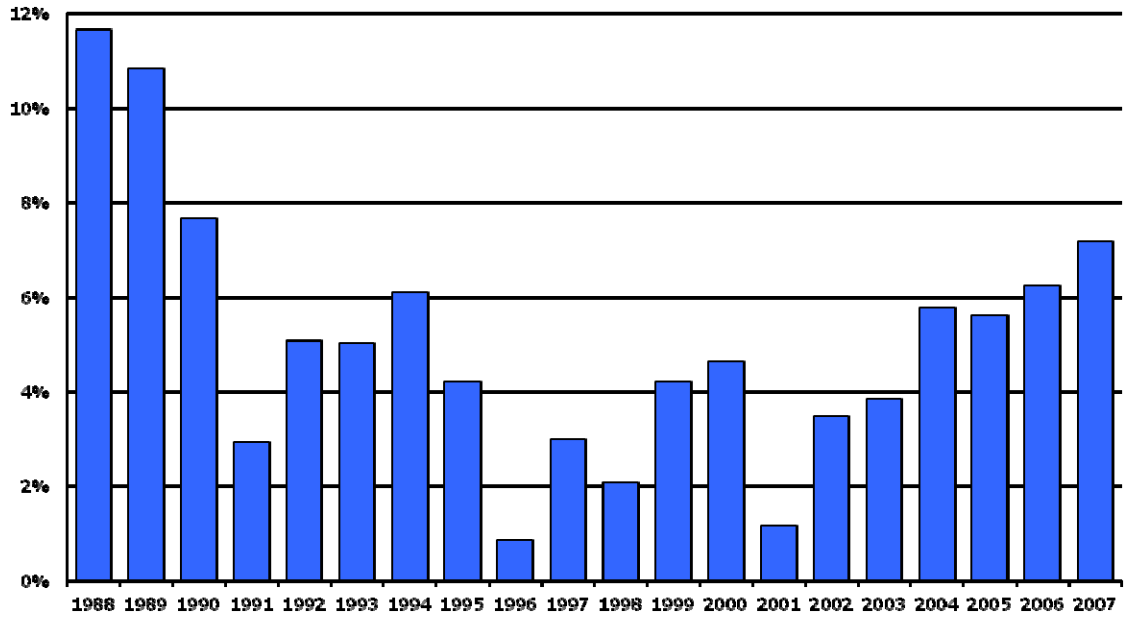


Figure 6. Environmental Industry Growth 1988-2007
(Source: Environmental Business International)

U.S. Regulatory Issues

While environmental laws and regulations are often seen as extra costs and burdens for other industry sectors, the opposite is true for the ET sector: new and stricter environmental regulations are the major drivers for increasing demand for its products. Complying with environmental regulations requires investments in goods and services that prevent, remediate, or alleviate environmental degradation, all of which encompass the ET industry. Relatively speaking, the United States has one of oldest and strongest regulatory environmental regime.

Essentially two types of environmental regulations drive demand for ET products and services: first, the so-called "end-of-pipe" regulations that address the need to regulate or treat existing pollution; and second, "pollution-prevention" regulations created in order to prevent pollution from occurring and to encourage or require clean production methods. The principal environmental laws and regulations are related to the management of environmental conditions concerning water, air or soil pollution. Domestically, these laws include, for example, the Clean Air Act, Clean Water Act, the Resource Conservation and Recovery Act (RCRA), and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund). Over the past few years, there has been some weakening of the Clean Air Act and the Clean Water Act, which has decreased demand for ET goods and services.

Developments around the Clean Air Interstate Rule and the Clean Air Mercury Rule stand to significantly affect the domestic market for air pollution control sector products and services. Together, these regulatory actions under the Clean Air Act would cap emissions of mercury, sulfur dioxide, and nitrogen oxides from electric power generators and participate in a cap and trade system. In December 2008, a lengthy legal battle resulted in EPA being ordered to revise these rules in line with court guidance. Electric power generators and air pollution control companies have been waiting to see what new regulatory requirements develop, before investing in upgraded air pollution control equipment. A final resolution of the status of these rules, expected shortly, could unleash pent-up demand for the products and services of the U.S. air pollution control industry. Similarly, in January 2010, EPA announced plans to implement stricter emissions on pollutants contributing to ground-level ozone ("smog"). When finalized, these new guidelines will likely also result in additional air pollution control investments by oil refiners and U.S. manufacturers.

ITA also worked with EPA on a revision to the Definition of Solid Waste ("DSW") rule under RCRA as part of the Department's regulatory review program mandated by the Economic Agenda and the American Competitiveness Initiative. Under the current RCRA, certain waste streams are regulated as hazardous wastes, even when they are being recycled. Working in part with ITA industry analysts, EPA clarified the definition of solid waste under RCRA so that a material destined for recycling is not subject to regulation as hazardous waste as it is not being "discarded." This rule change is expected to encourage industrial recycling of potentially hazardous materials by lowering the costs and regulatory hurdles. Some in the industry believe the new rule could cause revenue losses for the waste management industry.

Recent years have not seen significant new federal regulations regarding hazardous or solid waste. As a result, the waste management industry is undergoing a period of consolidation which is likely continue.

Climate Change Issues

Global efforts to reduce greenhouse gas (GHG) emissions and the effects of climate change will provide one of the most significant drivers in the global ET sector for the foreseeable future. The Kyoto Protocol has historically been the major global mechanism in this area, and its successor treaty will inevitably drive world demand for new ET technologies as well.

Several GHG trading schemes have emerged. The most prominent one is the *European Union Greenhouse Gas Emission Trading Scheme* which began in January 2005. In the United States, the *Chicago Climate Exchange* is a voluntary GHG emission reduction and trading program for members operating in the United States, Canada, and Mexico; its members' (state and local government entities as well as U.S. companies) commitments are legally binding . Ten mid-Atlantic states have capped GHG emissions under the *Regional Greenhouse Gas Initiative*-- a cooperative regulatory "cap-and-trade" effort. The *Western Climate Initiative*-- a collaboration to identify, evaluate, and implement collective and cooperative ways to reduce greenhouse gases in the region-- includes Arizona, California, Montana, New Mexico, Oregon, Utah, and Washington. A number of U.S. federal voluntary programs are also being developed including proposed energy tax incentives designed to spur the use of cleaner, renewable energy and more energy-efficient technologies that reduce greenhouse gas emissions. These developments complement new EPA rules such as the Clean Air Interstate Rule and the Clean Air Mercury Rule as GHG-related drivers in the air pollution control and other ET sub-sectors.

In the December 2009 United Nations climate change talks in Copenhagen, the U.S. and four other nations (South Africa, China, Brazil, and India) agreed to monitor and reduce GHG emissions while exploring ways to provide funding assistance for related mitigation efforts in developing nations. This and any subsequent agreements are likely to stimulate global market demand for environmental technologies, specifically for products and services in the air pollution control sector, such as: continuous emissions monitoring systems; gas scrubbers and filters, emissions control and assessment consulting; and, nitrous oxide control devices.

Because of increasing droughts around the world combined with a boom in population growth, water efficiency and management is bound to increase exponentially. With regard to ET services, consulting firms and developers of pollution prevention or retrofitting technologies stand the most to gain in the near future.

U.S. leadership in global solutions to climate change will benefit the U.S. environmental industry, especially if environmental regulations are uniform across countries, allowing American companies to achieve economies of scale and find new markets by expanding on their domestic business plans.

D. Industry's Trading Environment

According to DOC trade statistics, U.S. ET product exports totaled approximately $39 billion in 2007 (Attachment B). The top ten export markets for U.S. ET exports are: Canada, Mexico, Germany, China, Japan, South Korea, UK, Singapore, France, and Taiwan (Attachment B). While developed nations are the largest markets for U.S. ET, the highest growth rates and export

opportunities are in major developing markets like China, India, and other selected markets in Asia and South America.

Industry in Transition

Over the past ten years, the U.S. ET industry has undergone significant restructuring and consolidation. This change has taken place mostly through mergers and acquisitions and has been concentrated in the water sector. Despite the controversy over privatization, out-sourcing, and the role of industry in the water business, several European companies (e.g., Veolia, Suez, RWE, and Siemens) have successfully purchased many water sector assets and now hold a commanding competitive position in the United States as well as in the international market. Despite the downturn in the global economy, there has been a surge of financial interest—from all types of investors—in the water business.

Government Assistance to ET Industry

ET trade associations recognize the need to involve their members in the export arena, as demand in overseas markets is growing rapidly. More recently, several key associations have introduced their members to U.S. Government agencies' (e.g. ITA, U.S. Export-Import Bank, Trade and Development Agency, Overseas Private Investment Corporation, U.S. Agency for International Development) export programs focusing on the ET industry, and are monitoring international opportunities offered by the multilateral development banks (e.g. World Bank, Asia Development Bank, European Bank for Reconstruction and Development).

Several associations participate actively in ITA's International Buyer Program (Environmental Industries Association, American Water Works Association, Water Quality Association, and the Water Environment Federation) to attract foreign buyer participation and conduct matchmaking at their annual exhibition events. A few associations are pursuing more formal collaboration agreements with ITA (e.g., MOU signed in 2007 with ITA by the American Water Works Association. In addition to these developments, OEEI is also leading a number of efforts to bring industry closer to developing markets. Finally, several key ET associations are actively working with ITA on trade liberalization and international standards issues.

Foreign governments devote significantly more resources and provide more aggressive trade support and financing for ET than the USG. Member States of the European Union, Japan, and Australia provide significant developmental assistance and tied-aid specifically focused on the ET sector, resulting in a significant disadvantage for the American ET industry, particularly in the China market. Our competitors often subsidize home-country training, trade promotion events for their environmental companies, and feasibility studies. In addition, they embed public and private-sector officials in the decision making process of buyer nations/entities making it difficult for U.S. companies to compete, particularly the numerous SMEs that comprise the U.S. ET industry.

A concerted USG strategy, begun in 1994 through the Environmental Technologies Export Initiative, played a major role in helping the U.S. ET industry enhance its international competitiveness and increase its exports. An interagency group was created under the Trade

Promotion Coordination Committee to increase coordination and leverage of USG programs focusing on the ET industry. As underscored by the Environmental Technologies Trade Advisory Committee (ETTAC), renewed and focused USG support for this industry is still needed.

OEEI and the ETTAC have become the key advisors to the USG on environmental trade issues, including: the expanded and detailed definition of the ET industry/sector; identification of key barriers to ET trade; and strategies/policies for enhancing ET trade in general, and in China and India in particular.

The U.S.-China Joint Commission on Commerce and Trade's (JCCT) Environmental Working Group, chaired by the U.S. Department of Commerce, EPA and China's Ministry of Environmental Protection, has been actively engaged for the past ten years enhancing ET trade with China through a variety of policy and promotion projects. Through the JCCT Environmental Working Group, OEEI has helped identify, organize and support events and programs that foster environmental and commercial cooperation between the two countries. In November 2008, the first biennial U.S.-China Environmental Industries Forum (EIF) was held to foster government-private sector dialogue between the two countries and encourage the deployment of environmental technologies. The Second EIF is currently scheduled for October 2010 in New Orleans, alongside the Water Environment Federation's Annual Technical Exhibition and Conference. Past Working Group initiatives have included: technology demonstrations, training workshops, trade missions, publications, exhibitions/conferences/seminars to help provide capacity-building efforts in China create the optimal business environment for the ET industry.

Obstacles to ET Exports

The developing world is progressively embracing environmental protection and is developing new regulatory frameworks, but much work is still needed in this area. Relatively high tariffs on ET products (averaging 15-20 percent) are present in most major emerging markets. In some key markets, such as China, the Philippines, Malaysia, and Brazil, tariffs on ET products are as high as 40 percent. Weak environmental regulatory regimes and enforcement in some foreign markets also failed to increase demand for the ET sector at large- thus affecting U.S. ET exports.

Numerous non-tariff barriers (NTBs) affect worldwide trade in ET goods, including: restrictive technical standards; disproportionately onerous labeling, packaging and documentation requirements; non-transparent government procurement and contracting procedures; restrictions on professional services, investment, and ownership; and, product design/life cycle and recycling issues.

Foreign ET firms enjoy substantial government support for their overseas ventures, and U.S. ET companies find it very difficult to compete on such terms. Generally, most U.S. ET firms lack international experience. U.S. ET firms also lack the capitalization necessary to move into emerging overseas markets and provide necessary large-scale infrastructure investments.

To address these barriers, OEEI cooperates extensively with the Export-Import Bank, which has established an "environmental lending program." OEEI also works closely with the Office of the U.S. Trade Representative (USTR) to lower tariffs on environmental goods internationally and to

establish new agreements that will facilitate increased access to global markets for U.S. environmental technology firms. In 2007, USTR announced a joint proposal by the U.S. and the European Union to place priority action on technologies directly linked to addressing climate change and energy security by establishing an environmental goods and services agreement in the World Trade Organization (WTO). The agreement would include a commitment by all WTO Members to remove barriers to trade to a specific set of climate-friendly technologies—a great step for the industry and possibly a giant leap for environmental protection and citizens' health.

RENEWABLE ENERGY SECTOR

Background

The renewable energy industry includes both established and emerging technologies that generate power from sources that are naturally replenished in a short amount of time. While the term "renewable energy" often encompasses both renewable fuels and power generation, this assessment only examines renewable energy power generation equipment.
These include:

- *Solar Energy*: concentrated solar power (CSP), photovoltaic (PV) solar cells, solar hot water systems – both active or passive
- *Wind Energy*: wind turbines including the nacelle, hub, tower, blades, and down tower assembly – both onshore and offshore
- *Hydroelectric Power*: conventional hydropower dams, pump storage plants, ocean energy technologies, tidal energy, and wave energy technologies
- *Geothermal Energy*: geothermal turbines, geothermal drilling equipment, heat pumps, enhanced geothermal systems, and low-temperature cogeneration systems;
- *Biomass*: both closed and open loop biomass systems from a wide variety of feedstocks.

Investment Trends

Global investment in renewable energy reached $120 billion in 2008 including new capacity, assets, and projects. Renewable energy investment in 2008 included approximately $51.8 billion for new wind capacity, $33.5 billion in solar PV, $6 billion for small hydropower, $40-45 billion for large hydropower, and $7.2 billion each for biomass and geothermal.[1]

At time of writing (January 2010), investment and installation trends for 2009 are still incomplete. However, an initial *New Energy Finance* report indicates that for the first time Asia's new clean energy investment valued at $37.3 billion exceeded the $32 billion invested in the Americas. The wind sector accounted for the majority of clean energy investment in Asia.[2]

While the global recession reduced the amount of private sector financing in 2009, governments around the world invested an additional $180 billion in stimulus dollars to promote the industry.

[1] Renewable Energy Policy Framework for the 21st Century (REN21), "Global Status Report 2009
[2] New Energy Finance, NewsWatch, January 8, 2010.

However, helping to offset the effect of the recession on the sector, governments' research, development and demonstration and small-scale projects increased in 2009.[3]

Installation Trends

In 2008, U.S. renewable energy accounted for 119 gigawatt (GW) of energy capacity, nearly 11% of total U.S. energy capacity. The solar and wind power sectors continue to lead the renewable industry's growth, increasing 44% and 51% respectively in 2008. Yet, hydropower and biomass remain the largest sources of renewable energy production.

In 2008, renewable energy, including hydropower, accounted for 18% of all global electricity generation; without hydropower, renewable energy accounts for 2.5% of global generation.[4] As the United States becomes the global leader in wind installation, Germany continues to lead in cumulative installed capacity of solar PV. The United States is also the leader in geothermal, biomass and concentrated-solar-power installed capacity. China has the largest installment of solar hot water heating and hydropower (mainly small hydro facilities).

Globally, wind generating capacity reached 121 GW, small hydropower 85 GW and biomass power reached 52 GW in 2008; geothermal power reached 10 GW in capacity; and grid-connected solar PV now accounts for 13 GW.

In 2008, for the first time ever, the United States surpassed Germany as the global leader in wind installed capacity. However, it is anticipated that China will surpass the United States both in terms of 2009 installations, which increased by 92.3% from 2008, but also in cumulative terms. China increased its grid-connected wind capacity in 2009 by 8.97GW, accounting for 10% of the total increased power generating capacity, according to a report released by the government-owned China Electricity Council.[5]

Markets

The five largest markets for each renewable energy technologies are listed below:

Largest Markets for Renewable Energy Technologies, 2008

Rank	Wind	Solar	Biomass	Geothermal	Small Hydro
1	United States	Germany	United States	United States	China
2	Germany	Spain	Brazil	Philippines	Japan
3	Spain	Japan	Philippines	Indonesia	United States
4	China	United States	Germany	Mexico	Italy
5	India	South Korea	Sweden	Italy	Brazil

Source: U.S. Department of Energy, "Renewable Energy Data Book 2009"

[3] Ibid.
[4] REN 21, Global Status Report, 2008
[5] Ibid.

Domestic Environment

Despite the increased importance of energy security and climate change to U.S. policy-makers, the U.S. renewable energy industry continues to operate at a disadvantage to competitors in the European Union, which generally have stronger government incentives for renewable energy technologies. U.S. industry also operates at a disadvantage to Chinese competitors that benefit from strengthened domestic incentives, while producing lower quality, but lower cost renewable energy technologies. General Electric (GE) remains the only U.S. firm among the world's ten largest wind energy companies. First Solar is the only U.S. company represented in the top world's ten solar companies. The United States does dominate the geothermal sector and has produced several leading companies in the biomass sector.

According to the Solar Energy Industry Association, solar PV installations in the United States nearly doubled in 2008, bringing the industry's total capacity to around 1,000 MW.[6] U.S. wind installations also nearly doubled in 2008, bringing the wind industry's total capacity to about 27,000 MW. The United States is the largest producer of geothermal energy in the world with 2,937 MW of grid-connected capacity in 2007[7]. Stationary biomass power capacity also had a banner year in 2007, contributing 11,738 MW of power in the U.S. market.[8] Solar panel prices collapsed by nearly 50 percent in 2009; analysts predict prices could drop another 20 percent in 2010, helping the industry become cost-competitive with other energy resources but squeezing some companies out of business.

The structure of the industry differs according to specific technologies. The U.S. wind industry is dominated by a few large firms. GE Wind continues to be the leading manufacturer of wind turbines in the United States. In 2008, GE captured 43% of the global wind market (compared to 45% in 2007).[9] Foreign competitors including Vestas (Denmark), Siemens (Germany), and Suzlon (India), also had significant market share, followed by Suzlon (India), Gamesa (Spain), Mitsubishi (Japan).[10]

U.S. manufacturing in the wind sector has experienced substantial growth in recent years with foreign firms adding new manufacturing plants in Minnesota (Suzlon/India), Pennsylvania (Gamesa/Spain), and Colorado (Vestas/Denmark). GE also continues to maintain a substantial U.S. manufacturing base.

Despite this positive trend, growth prospects for 2010 have dimmed considerably as the global recession slowed project development and reduced the near-term demand for turbines. As a result, some manufacturers have delayed their plans to expand into the United States, while others have had to scale back their efforts and lay off workers. In December 2009, Vestas announced that it would idle a blade plant it had opened in Colorado in 2008, putting 500 workers on leave until orders pick up again, possibly in the second quarter of 2010.

[6] Solar Energy Industry Association
[7] U.S. Department of Energy, "EERE Renewable Energy Data Book (July 2009)
[8] Ibid.
[9] Ibid.
[10] DOE 2008 Wind Technologies Market Report.

Domestic manufacturing capacity for solar has also grown considerably, led by First Solar, SolarWorld, United Solar, BP Solar and GE Energy. First Solar has the largest market share in the United States (31%) and a growing player internationally. In 2008, China surpassed Japan and Germany to become the world's largest exporter of solar cells. China's dominance exists primarily in mono- and poly-crystalline-based solar cells. The economic downturn and falling power demand in the United States and Europe have contributed to the price collapse in solar cells. The major cost driver has been the fluctuating supply of polysilicon, the primary raw material used the majority of solar cells. Polysilicon has gone from a major shortage to massive oversupply, and analysts have projected an oversupply of polysilicon until 2012. This provides an opening for thin film solar panels, a technology in which U.S. companies are leaders.

The geothermal industry is led by U.S. firms, both domestically and internationally. Chevron is the largest producer of geothermal energy, but the industry includes a fairly definitive supply chain consisting of project developers, drilling firms, manufacturers, and plant operators. Geothermex, Power Engineers, U.S. Geothermal, Geothermal Development Associates and GE are the leading U.S. firms. Ormat (Israel), Ansaldo (Italy), Fuji Electric (Japan), and Mannvit (Iceland) are the largest international competitors.

Domestically, 13 states now have active geothermal projects under development – the most of any time in history. The Geothermal Energy Association expects that by 2012 over 25 countries to produce geothermal power. Yet the industry faces significant barriers, including a notoriously difficult financing structure (with most of the risk is up-front), long-lead times, and resource dependent siting.

The biomass industry has grown 7% annually since 2005 around the world. The industry now provides 1.1% of global nameplate capacity. Priority markets for the sector include the United States, Brazil, Philippines, Germany, and Sweden. Domestically, biomass now produces enough electricity to power 8.5 million American homes. Today, over 100 biomass power plants are connected to the nation's electricity grid; many more operate as stand-alone, off-grid cogeneration facilities, particularly in conjunction within the pulp and paper industry.

The traditional hydropower industry in the United States has withered in recent years. Only American Hydro Corporation, specializing in runners, remains as a U.S. manufacturer of hydropower equipment. They compete with Voith Siemens (Germany) and other international firms to build new plants and refurbish old facilities. Newer hydropower technologies include tidal, ocean, and wave energy systems that have emerged as a potential growth industry for the sector. Greentech Media expects investment in these new hydro sectors to reach over $500 million globally by 2015.

Policies

The renewable energy sector hailed President Obama's call to double alternative energy installations within three years and to spend $150 billion on renewable energy research over ten years. In addition, the passage of the American Recovery and Reinvestment Act provided $80 billion for the U.S. clean energy sector.

Despite these achievements, renewable energy companies across the technology continuum continue to cite the short-term nature of the production tax credit and investment tax credits and the lack of both a national renewable portfolio standard (RPS) and a pricing mechanism for carbon as reasons why the U.S. renewable industry continues to fall behind competitor nations.

RPS, which mandate percentages of power generation from renewable sources, are key drivers of the renewable energy industry in states where they exist. As of February 2009, only 29 U.S. states and the District of Columbia had a renewable portfolio standard. Without specific technology mandates or "cutouts", a general RPS tends to favor more mature renewable energy technologies, such as wind, over other emerging forms of renewable energy like solar, enhanced geothermal or tidal power.

The lack of uniform national standards and mandates makes projecting industry growth rates difficult. One good example involves varying state interconnection standards. Manufacturers often must make different products for each state since each state's utility commissions mandate differently how distributed energy sources connect to the electricity grid. A national interconnection standard, such as exists in the telephone industry, would remove this barrier and improve the economies-of-scale manufacturers seek to develop.

Parity among sectors would likely spur additional investment in these sectors. Currently, not all renewable energy technologies benefit equally from the Investment Tax Credit and Production Tax Credit, the two most important federal financial incentives. Both hydropower technologies and some biomass technologies receive only half the credit that wind and solar technologies do.

Trading Environment and Barriers to Trade

In 2007, the United States and the European Union initiated a drive to reduce or eliminate WTO tariffs on clean energy technologies. Progress on this initiative depends in part on the outcome of the Doha Round of negotiations.

Numerous nontariff barriers to trade exist within European and Asian markets that effectively restrict U.S. exports and prevent meaningful U.S. industry market penetration.

China and other countries consider the establishment of a renewable energy manufacturing base to be a national priority and can be expected to maintain a variety of non-tariff trade barriers and investment restrictions to protect their domestic producers. In numerous consultations with energy industry companies, the Office of Energy and Environmental Industries identified many barriers to U.S. companies doing business overseas. Among them are:

- Intellectual property protection,
- Preferential procurement,
- Lengthy or non-transparent project approval process,
- Central versus provincial government authority issues,
- Legal framework issues,
- Regulatory framework issues,
- Lack of financing,

- Limits on foreign equity ownership,
- Lack of adequate energy infrastructure, and
- Incompatible standards.

For additional information on this report, please contact the Office of Energy and Environmental Industries at (202) 482-5225.

Attachment A

U.S. Environmental Technologies Exports

(Domestic Exports; FAS; $)

HTS	DESCRIPTION	2004	2005	2006	2007
3926909887	ARTICLES OF PLASTICS & ARTICLES OF OTHER MATERIALS OF HEADING 3901 TO 3914, NESOI	2,300,149,698	2,395,222,324	2,541,903,741	2,505,061,17
3926909987	ART. OF PLASTIC AND OTHER MAT, HDG 3901-3914 NESOI	0	0	0	
4601200000	MATS, MATTING AND SCREENS OF VEGETABLE MATERIALS	10,714,363	8,415,917	8,662,750	
4601210000	MATS, MATTING AND SCREENS OF BAMBOO	0	0	0	1,668,07
4601220000	MATS, MATTING AND SCREENS OF RATTAN	0	0	0	292,00
4601290000	MATS, MATTING AND SCREENS OF OTHER VEG MATERIALS	0	0	0	8,182,33
5603140000	NONWOVENS, WHETHER OR NOT IMPREGNATED, COATED, COVERED OR LAMINATED: OF MANMADE FILAMENTS WEIGHING MORE THAN 150 G/M2	101,437,802	124,021,819	147,885,606	165,159,11
8404200000	CONDENSERS FOR STEAM OR OTHER VAPOR POWER UNITS	7,365,136	18,613,088	16,865,299	44,022,77
8405100000	PRODUCER GAS, WATER GAS, ACETYLENE GAS AND SIMILAR WATER PROCESS GAS GENERATORS, WITH OR WITHOUT THEIR PURIFIERS	29,205,947	55,807,938	47,029,282	58,228,33
8410110000	HYDRAULIC TURBINES AND WATER WHEELS OF A POWER NOT EXCEEDING 1,000 KW	4,432,219	2,907,356	1,679,620	3,788,74
8410120000	HYDRAULIC TURBINES AND WATER WHEELS OF A POWER EXCEEDING 1,000 KW BUT NOT EXCEEDING 10,000 KW	785,755	3,912,753	4,216,583	143,40

8410130000	HYDRAULIC TURBINES AND WATER WHEELS OF A POWER EXCEEDING 10,000 KW	883,369	1,590,953	1,431,353	2,572,87
8410900000	PARTS, INCLUDING REGULATORS, FOR HYDRAULIC TURBINES AND WATER WHEELS	14,120,617	25,279,716	34,346,661	28,636,05
8413600020	HYDRAULIC FLUID POWER PUMPS, ROTARY POSITIVE DISPLACEMENT, VANE TYPE	169,980,882	151,604,274	155,687,665	139,319,19
8413600030	HYDRAULIC FLUID POWER PUMPS, ROTARY POSITIVE DISPLACEMENT, GEAR TYPE	67,162,457	62,643,330	97,966,687	100,912,01
8413600040	HYDRAULIC FLUID POWER PUMPS, ROTARY POSITIVE DISPLACEMENT, NESOI	78,036,506	88,822,190	104,604,026	118,501,46
8413600070	ROLLER PUMPS, ROTARY POSITIVE DISPLACEMENT	5,815,435	4,930,369	4,840,991	4,361,40
8413600090	ROTARY POSITIVE DISPLACEMENT PUMPS, NESOI	108,296,892	116,481,751	128,287,946	139,777,64
8413702004	SUBMERSIBLE PUMPS, CENTRIFUGAL	145,465,889	89,092,117	123,228,311	179,726,02
8413702005	CENTRIFUGAL PUMPS FOR LIQUIDS, SINGLE-STAGE, SINGLE SUCTION, CLOSED-COUPLED, WITH DISCHARGE OUTLET UNDER 5.08 CM IN DIAMETER	16,012,623	17,427,615	28,506,465	36,985,34
8413702015	CENTRIFUGAL PUMPS FOR LIQUIDS, SINGLE-STAGE, SINGLE SUCTION, CLOSED-COUPLED, WITH DISCHARGE OUTLET 5.08 CM OR OVER IN DIAMETER	20,716,181	18,322,811	26,439,504	25,554,89
8413702022	CENTRIFUGAL PUMPS FOR LIQUIDS, SINGLE-STAGE, SINGLE-SUCTION, FRAME-MOUNTED, WITH DISCHARGE OUTLET UNDER 7.6 CM IN DIAMETER	25,027,319	30,317,255	24,824,062	40,998,85
8413702025	CENTRIFUGAL PUMPS FOR LIQUIDS, SINGLE-STAGE, SINGLE-SUCTION, FRAME-MOUNTED, WITH DISCHARGE OUTLET 7.6 CM OR OVER IN DIAMETER	33,072,022	54,270,143	66,091,982	95,321,11

8413702030	CENTRIFUGAL PUMPS FOR LIQUIDS, SINGLE-STAGE, DOUBLE-SUCTION	19,631,828	38,276,961	43,950,872	42,815,99
8413702040	CENTRIFUGAL PUMPS FOR LIQUIDS, MULTI-STAGE, SINGLE OR DOUBLE-SUCTION	67,993,979	83,302,586	75,784,165	78,738,94
8413702090	CENTRIFUGAL PUMPS FOR LIQUIDS, NESOI	170,475,582	172,772,568	186,920,682	199,510,34
8413810020	TURBINE PUMPS, NESOI	46,075,240	39,107,691	46,374,267	64,917,52
8413810030	HOUSEHOLD WATER SYSTEMS, SELF-CONTAINED; AND WINDMILL PUMPS	9,417,822	9,995,525	11,092,830	9,129,34
8413810040	PUMPS FOR LIQUIDS, NESOI	196,027,900	224,227,153	199,000,035	229,187,67
8414100000	VACUUM PUMPS	121,805,393	145,478,240	159,992,221	177,198,91
8417800000	INDUSTRIAL OR LABORATORY FURNACES AND OVENS, INCLUDING INCINERATORS, NONELECTRIC, NESOI	48,558,067	62,236,335	59,396,547	74,302,94
8417900000	PARTS OF INDUSTRIAL OR LABORATORY FURNACES AND OVENS, INCLUDING INCINERATORS, NONELECTRIC	88,108,816	117,690,654	118,894,584	159,553,25
8419190040	SOLAR WATER HEATERS	2,583,959	2,275,828	4,318,209	2,390,58
8419400040	DISTILLING OR RECTIFYING PLANT FOR FOOD AND BEVERAGES	8,025,614	7,196,624	11,295,201	7,760,00
8419400080	DISTILLING OR RECTIFYING PLANT, FOR THE TREATMENT OF MATERIALS BY A PROCESS INVOLVING A CHANGE IN TEMPERATURE, NESOI	10,773,689	55,795,104	18,657,308	44,571,77
8419500000	HEAT EXCHANGE UNITS, INDUSTRIAL TYPE	375,625,285	419,320,797	582,202,625	668,159,05
8419600000	MACHINERY FOR LIQUEFYING AIR OR OTHER GASES	86,015,212	81,242,971	133,976,056	130,726,06
8421190000	CENTRIFUGES, NESOI	114,598,947	144,224,742	153,342,548	174,718,05
8421210000	WATER FILTERING OR PURIFYING MACHINERY AND APPARATUS	598,814,009	692,850,214	775,049,172	944,274,30
8421290005	REFRIGERANT RECOVERY AND RECYCLING UNITS	7,520,898	15,192,570	13,163,610	21,775,53
8421290015	OIL-SEPARATION EQUIPMENT	40,482,199	53,817,261	74,502,406	108,156,56

8421290040	HYDRAULIC FLUID POWER FILTERS, RATED AT 1000 KPA OR GREATER	29,037,543	33,743,230	46,406,018	58,631,01
8421290065	OTHER FILTER AND PURIFYING MACHINERY FOR LIQUIDS NESOI	370,113,982	410,335,797	491,521,344	544,725,85
8421394000	CATALYTIC CONVERTERS	90,160,719	71,119,290	161,637,632	254,860,81
8421398005	DUST COLLECTION AND AIR PURIFICATION EQUIPMENT, NESOI, FOR MACHINE TOOLS OF HEADING 8465 THROUGH 8465, INCLUSIVE.	20,556,863	20,456,585	32,167,214	29,106,89
8421398015	DUST COLLECTION AND AIR PURIFICATION EQUIPMENT NESOI	146,763,692	168,997,497	208,524,731	228,541,06
8421398020	ELECTROSTATIC PRECIPITATORS, INDUSTRIAL GAS CLEANING EQUIPMENT	7,913,773	5,333,853	8,815,326	6,419,28
8421398030	INDUSTRIAL GAS CLEANING EQUIPMENT, NESOI	42,690,917	36,153,422	46,320,356	59,128,65
8421398040	GAS SEPARATION EQUIPMENT	89,022,766	106,326,490	96,543,046	198,516,04
8421398060	PNEUMATIC FLUID POWER FILTERS RATED 550 KPA OR GREATER	11,318,854	13,599,295	7,957,290	6,226,62
8421398090	FILTERING OR PURIFYING MACHINERY AND APPARATUS FOR GASES, NESOI	620,089,030	590,098,086	658,923,800	761,124,80
8421910000	PARTS OF CENTRIFUGES, INCLUDING CENTRIFUGAL DRYERS	67,197,896	63,927,362	86,143,747	97,027,41
8421990040	PARTS OF FILTERING OR PURIFYING MACHINERY AND OTHER APPARATUS FOR FILTERING OR PURIFYING WATER	435,561,470	433,235,322	501,333,545	548,048,64
8421990080	PARTS OF MACHINERY AND APPARATUS FOR FILTERING OR PURIFYING LIQUIDS AND GASES, NESOI	626,794,249	679,017,401	744,585,473	789,373,59
8462910030	HYDRAULIC PRESSES, METAL FORMING, USED OR REBUILT	6,903,572	8,566,553	23,604,023	9,222,18
8462910060	HYDRAULIC PRESSES, METAL FORMING, NUMERICALLY CONTROLLED, NEW	8,290,053	7,787,544	17,241,292	6,695,00

8462910090	HYDRAULIC PRESSES, METAL FORMING, EXCEPT NUMERICALLY CONTROLLED, NEW	16,360,619	23,466,461	24,622,457	18,575,02
8472909000	OFFICE MACHINES, NESOI	80,051,345	103,779,669	103,045,425	
8472909002	OFFICE MACHINES, NESOI	0	0	0	103,981,50
8474100010	SORTING, SCREENING, SEPARATING OR WASHING MACHINES FOR EARTH, STONE, ORES, OR OTHER MINERAL SUBSTANCES IN SOLID FORM, PORTABLE	22,237,087	36,986,169	39,620,994	85,267,79
8474100090	SORTING, SCREENING, SEPARATING OR WASHING MACHINES FOR EARTH, STONE, ORES, OR OTHER MINERAL SUBSTANCES IN SOLID FORM, STATIONARY	76,871,194	91,206,388	126,525,194	178,374,43
8479820040	MIXING, KNEADING OR STIRRING MACHINES, NESOI	53,807,346	93,761,468	84,599,698	94,819,24
8479820080	CRUSHING, GRINDING, SCREENING, SIFTING, HOMOGENIZING OR EMULSIFYING MACHINES, NESOI	65,026,307	78,497,983	104,235,055	111,822,66
8479895500	TRASH COMPACTORS	19,304,315	23,404,180	27,292,136	33,315,37
8479896500	ELECTROMECHANICAL APPLIANCES WITH SELF-CONTAINED ELECTRIC MOTORS, NESOI	53,701,765	58,966,519	62,650,062	223,750,35
8479899885	ULTRASONIC CLEANING DEVICES	10,057,542	14,188,543	25,153,463	19,677,02
8479899895	INDUSTRIAL VIBRATORS	4,916,416	4,498,085	8,918,362	13,801,43
8479899897	MACHINES AND MECHANICAL APPLIANCES HAVING INDIVIDUAL FUNCTIONS, NOT SPECIFIED OR INCLUDED ELSEWHERE IN CHAPTER 84	1,240,602,195	1,219,456,026	1,335,796,790	
8479899898	MACHINES AND MECHANICAL APPLIANCES HAVING INDIVIDUAL FUNCTIONS, NOT SPECIFIED OR INCLUDED ELSEWHERE IN CHAPTER 84	0	0	0	2,128,335,00

8479909465	PARTS OF MACHINES OR MECHANICAL APPLIANCES FOR TREATING METAL,NESOI	50,392,500	123,927,196	127,995,352	150,152,30
8479909495	OTHER PARTS OF MACHINES AND MECHANICAL APPLIANCES HAVING INDIVIDUAL FUNCTIONS, NOT SPECIFIED OR INCLUDED ELSEWHERE IN CHAPTER 84	1,585,642,219	1,752,546,783	1,928,024,011	
8479909496	OTHER PARTS OF MACH & MECHANICAL APPLIANCES	0	0	0	1,120,151,52
8479909498	OTHER PARTS OF MACH & MECHANICAL APPLIANCES	0	0	0	
8481100020	PRESSURE-REDUCING CONTROL VALVES, HYDRAULIC FLUID POWER TYPE	50,920,214	75,897,284	77,678,489	88,329,21
8481100040	PRESSURE-REDUCING VALVES, PNEUMATIC FLUID POWER TYPE, FILTER-REGULATORS AND FILTER-REGULATOR-LUBRICATORS	13,956,859	22,254,868	22,270,560	29,525,06
8481100060	PRESSURE-REDUCING VALVES, PNEUMATIC FLUID POWER TYPE, NESOI	24,752,355	23,582,439	32,545,654	33,176,94
8481100090	OTHER PRESSURE-REDUCING VALVES, NESOI	110,182,364	109,806,652	112,938,128	208,627,99
8481200010	HYDRAULIC VALVES, MANUAL TYPE, DIRECTIONAL CONTROL	44,574,598	60,744,224	50,253,937	60,172,07
8481200020	HYDRAULIC VALVES, SOLENOID TYPE, DIRECTIONAL CONTROL	37,217,374	32,660,226	58,901,477	78,045,97
8481200030	HYDRAULIC VALVES, NESOI, DIRECTIONAL CONTROL	25,287,916	34,710,907	34,676,780	56,437,92
8481200040	HYDRAULIC VALVES, FLOW CONTROL TYPE	65,764,375	55,285,245	66,704,022	104,715,52
8481200050	HYDRAULIC VALVES, NESOI	45,749,144	41,189,340	73,978,369	125,935,65
8481200060	PNEUMATIC VALVES, SOLENOID TYPE, DIRECTIONAL CONTROL	15,532,092	17,287,793	24,781,975	24,436,39
8481200070	PNEUMATIC VALVES, NESOI, DIRECTIONAL CONTROL	16,455,376	14,204,650	13,510,489	17,967,58
8481200080	OTHER PNEUMATIC VALVES, NESOI	59,153,502	109,030,596	86,096,057	126,669,19

8481301010	CHECK VALVES OF COPPER HAVING A PRESSURE RATING UNDER 850 KPA	7,632,088	7,632,780	9,853,267	13,173,98
8481301090	CHECK VALVES OF COPPER HAVING A PRESSURE RATING OF 850 KPA OR OVER	2,026,750	2,076,875	3,254,918	3,541,83
8481302010	CHECK VALVES OF IRON	13,797,692	13,556,580	23,424,738	28,529,80
8481302090	CHECK VALVES OF STEEL	56,147,912	71,053,721	60,024,290	71,259,92
8481309000	CHECK VALVES OF MATERIALS OTHER THAN COPPER, IRON OR STEEL	68,084,728	82,792,725	95,430,930	117,864,25
8481400000	SAFETY OR RELIEF VALVES	262,292,887	308,455,879	409,193,547	436,466,13
8481801010	HAND OPERATED TAPS, COCKS, VALVES AND SIMILAR APPLIANCES OF COPPER, HAVING A PRESSURE RATING UNDER 850 KPA (123 LBS PRESSURE)	43,403,634	49,185,266	61,996,733	68,195,46
8481801060	GATE TYPE TAPS, COCKS AND VALVES OF COPPER, HAND OPERATED, HAVING A PRESSURE RATING OF 850 KPA OR OVER	5,455,709	9,340,908	14,701,601	29,371,63
8481801070	GLOBE TYPE TAPS, COCKS AND VALVES OF COPPER, HAND OPERATED, HAVING A PRESSURE RATING OF 850 KPA OR OVER	2,553,885	4,347,932	7,766,375	11,552,26
8481801075	PLUG TYPE TAPS, COCKS AND VALVES OF COPPER, HAND OPERATED, HAVING A PRESSURE RATING OF 850 KPA OR OVER	2,532,110	4,417,845	5,412,120	7,563,95
8481801085	BALL TYPE TAPS, COCKS AND VALVES OF COPPER, HAND OPERATED, HAVING A PRESSURE RATING OF 850 KPA OR OVER	11,918,950	15,097,957	22,850,135	20,675,78
8481801090	BUTTERFLY TYPE TAPS, COCKS AND VALVES OF COPPER, HAND OPERATED, HAVING A PRESSURE RATING OF 850 KPA OR OVER	4,124,932	10,226,841	6,734,017	14,680,17

8481801095	TAPS, COCKS AND VALVES, NESOI, OF COPPER, HAND OPERATED, HAVING A PRESSURE RATING OF 850 KPA OR OVER	40,259,595	42,918,870	37,000,917	40,611,34
8481803010	GATE TYPE TAPS, COCKS AND VALVES OF IRON, HAND OPERATED	26,957,782	29,138,820	41,096,688	50,268,39
8481803015	GLOBE TYPE TAPS, COCKS AND VALVES OF IRON, HAND OPERATED	3,987,041	3,339,866	5,158,000	3,785,48
8481803020	PLUG TYPE TAPS, COCKS AND VALVES OF IRON, HAND OPERATED	6,029,580	5,824,491	7,680,869	10,147,45
8481803025	BALL TYPE TAPS, COCKS AND VALVES OF IRON, HAND OPERATED	22,886,573	29,622,520	39,824,205	57,611,94
8481803030	BUTTERFLY TYPE TAPS, COCKS AND VALVES OF IRON, HAND OPERATED	11,682,633	16,404,861	19,201,955	23,663,51
8481803040	TAPS, COCKS AND VALVES, NESOI, OF IRON, HAND OPERATED	18,094,754	22,551,547	30,581,576	26,998,69
8481803055	GATE TYPE TAPS, COCKS AND VALVES OF STEEL, HAND OPERATED	47,063,034	65,398,054	76,414,869	94,958,74
8481803060	GLOBE TYPE TAPS, COCKS AND VALVES OF STEEL, HAND OPERATED	43,305,260	57,636,752	58,763,090	68,299,55
8481803065	PLUG TYPE TAPS, COCKS AND VALVES OF STEEL, HAND OPERATED	36,784,121	33,802,246	45,918,837	47,929,04
8481803070	BALL TYPE TAPS, COCKS AND VALVES OF STEEL, HAND OPERATED	84,839,183	96,578,290	138,542,897	151,259,43
8481803075	BUTTERFLY TYPE TAPS, COCKS AND VALVES OF STEEL, HAND OPERATED	15,328,452	22,229,366	29,860,770	25,110,44
8481803090	TAPS, COCKS AND VALVES, NESOI, OF STEEL, HAND OPERATED	57,267,299	56,858,303	72,210,525	77,131,07

8481805090	TAPS, COCKS, VALVES AND SIMILAR APPLIANCES, NESOI, HAND OPERATED, OF MATERIALS OTHER THAN COPPER, IRON OR STEEL	102,434,407	106,267,580	128,664,269	113,424,21
8481809005	SOLENOID VALVES	191,193,768	179,829,415	193,130,740	221,371,21
8481809015	REGULATOR VALVES, SELF-OPERATING, FOR CONTROLLING VARIABLES SUCH AS TEMPERATURE, PRESSURE, FLOW AND LIQUID LEVEL	200,468,547	201,302,021	235,684,867	306,129,44
8481809020	CONTROL VALVES, ELECTRICALLY AND ELECTRO-HYDRAULICALLY ACTUATED, DESIGNED FOR PROPORTIONAL OPERATION BY A SIGNAL FROM A CONTROL DEVICE	69,230,579	73,317,092	96,186,642	111,890,60
8481809025	VALVES, NESOI, ELECTRICALLY OR ELECTRO-HYDRAULICALLY ACTUATED	34,469,372	46,942,602	46,712,192	46,362,90
8481809030	VALVES WITH HYDRAULIC ACTUATORS, NESOI	78,029,277	118,634,529	135,440,381	175,176,55
8481809035	CONTROL VALVES, PNEUMATICALLY ACTUATED BY DIAPHRAGM, PISTON OR BELLOWS TYPE, DESIGNED FOR PROPORTIONAL OPERATION BY A SIGNAL FROM A CONTROL DEVICE	114,684,736	121,550,160	163,622,064	177,693,14
8481809040	VALVES, PNEUMATICALLY ACTUATED, NESOI	51,406,499	73,055,694	67,137,736	57,649,04
8481809045	VALVES, NESOI, THERMOSTATICALLY ACTUATED	19,519,004	18,809,805	16,439,707	20,583,80
8481809050	TAPS, COCKS, VALVES AND SIMILAR APPLIANCES, NESOI	408,834,845	436,156,340	519,429,280	548,964,07
8481909090	PARTS OF TAPS, COCKS, VALVES AND SIMILAR APPLIANCES, NESOI	667,453,742	814,234,281	990,651,555	1,061,874,13
8502310000	GENERATING SETS, ELECTRIC, WIND-POWERED	4,398,305	3,626,370	83,309,704	14,157,87

8514100000	INDUSTRIAL OR LABORATORY FURNACES AND OVENS, RESISTANCE TYPE	90,395,460	112,075,010	167,404,872	302,420,36
8514200000	INDUSTRIAL OR LABORATORY FURNACES AND OVENS, INDUCTION OR DIELECTRIC TYPE	0	0	0	
8514208000	INDUSTRIAL OR LABORATORY FURNACES AND OVENS, INDUCTION OR DIELECTRIC TYPE, NESOI	27,263,895	23,121,812	31,719,726	31,624,97
8514300000	INDUSTRIAL OR LABORATORY FURNACES AND OVENS, NESOI	0	0	0	111,291,34
8514304000	INDUSTRIAL OR LABORATORY FURNACES AND OVENS, NESOI	443,245,591	392,604,015	440,904,870	
8514900000	PARTS FOR INDUSTRIAL OR LABORATORY FURNACES AND OVENS, OR OTHER INDUSTRIAL OR LABORATORY INDUCTION OR DIELECTRIC HEATING EQUIPMENT	0	0	0	
8514908000	PARTS, NESOI, FOR INDUSTRIAL OR LABORATORY FURNACES AND OVENS, OR FOR OTHER INDUSTRIAL OR LABORATORY INDUCTION OR DIELECTRIC HEATING EQUIPMENT	217,192,340	216,667,234	237,472,745	234,499,83
8541406010	UNMOUNTED CHIPS, DICE OR WAFERS FOR PHOTOSENSITIVE DIODES	65,134,527	70,293,767	65,489,263	130,863,60
8541406020	SOLAR CELLS ASSEMBLED INTO MODULES OR MADE UP INTO PANELS	177,051,158	316,720,230	374,011,275	571,776,83
8541406030	SOLAR CELLS NOT ASSEMBLED INTO MODULES OR MADE UP INTO PANELS	119,768,831	62,818,258	68,706,138	75,156,89
8541406050	PHOTOSENSITIVE DIODES, NESOI	127,362,285	161,052,329	125,072,345	157,672,21
8541407040	UNMOUNTED CHIPS, DICE AND WAFERS FOR PHOTOSENSITIVE TRANSISTORS	8,957,531	4,507,591	7,167,580	11,535,69
8541407080	PHOTOSENSITIVE TRANSISTORS	12,078,539	13,365,483	24,370,124	23,829,46
8541408000	OPTICAL COUPLED ISOLATORS (PHOTOSENSITIVE SEMICONDUCTOR DEVICES)	35,361,773	38,897,635	53,261,074	54,097,35

8541409500	PHOTOSENSITIVE SEMICONDUCTOR DEVICES, NESOI	94,213,085	87,990,047	82,989,552	69,397,93
9025112000	CLINICAL THERMOMETERS LIQUID-FILLED, FOR DIRECT READING	1,467,723	1,379,036	1,369,252	2,038,38
9025114000	THERMOMETERS LIQUID-FILLED, FOR DIRECT READING, EXCEPT CLINICAL	7,557,297	7,557,370	9,383,878	9,124,79
9025194000	PYROMETERS NOT COMBINED WITH OTHER INSTRUMENTS	10,677,773	13,946,991	19,344,341	26,210,77
9025198040	CLINICAL THERMOMETERS, NOT COMBINED WITH OTHER INSTRUMENTS, NESOI	16,212,335	20,316,919	12,508,516	14,474,57
9025198080	THERMOMETERS, NOT COMBINED WITH OTHER INSTRUMENTS, NESOI	72,690,194	75,232,574	93,620,414	103,847,82
9025801500	BAROMETERS, NOT COMBINED WITH OTHER INSTRUMENTS	1,496,934	1,953,406	2,339,202	2,717,42
9025805050	HYDROMETERS AND SIMILAR FLOATING INSTRUMENTS,HYGROMETERS AND PSYCHROMETERS, NESOI	53,981,721	52,093,312	47,863,034	63,410,77
9025900000	PARTS AND ACCESSORIES FOR HYDROMETERS AND SIMILAR FLOATING INSTRUMENTS, THEROMETERS, PYROMETERS, BAROMETERS, HYGROMETERS AND PSYCHROMETERS	29,836,555	40,549,145	42,078,777	47,912,33
9026105000	FLOW METERS FOR MEASURING OR CHECKING THE FLOW OR LEVEL OF LIQUIDS	173,361,861	188,336,673	229,418,937	294,863,62
9026107000	INSTRUMENTS AND APPARATUS FOR MEASURING OR CHECKING THE FLOW OR LEVEL OF LIQUIDS, NESOI	161,803,085	190,303,801	208,592,907	249,753,74
9026200000	INSTRUMENTS AND APPARATUS FOR MEASURING OR CHECKING PRESSURE	450,314,698	496,833,987	613,735,862	750,838,82

9026800000	INSTRUMENTS AND APPARATUS FOR MEASURING OR CHECKING OTHER VARIABLES OF LIQUIDS OR GASES, NESOI	244,990,276	272,429,429	314,750,648	373,972,08
9026900000	PARTS AND ACCESSORIES FOR INSTRUMENTS AND APPARATUS FOR MEASURING OR CHECKING THE FLOW, LEVEL, PRESSURE OR OTHER VARIABLES OF LIQUIDS OR GASES	458,440,266	492,025,592	558,843,846	550,937,10
9027100000	GAS OR SMOKE ANALYSIS APPARATUS	254,883,130	280,461,997	335,117,439	402,400,47
9027202000	GAS CHROMATOGRAPHS	117,206,209	128,081,844	138,240,424	173,977,70
9027205030	ELECTRICAL ELECTROPHORESIS INSTRUMENTS	56,896,361	55,642,798	48,683,091	48,603,41
9027206050	LIQUID CHROMATOGRAPHS	132,288,664	137,151,329	139,228,675	150,695,01
9027209000	CHROMATOGRAPHS AND ELECTROPHORESIS INSTRUMENTS, NESOI	158,648,601	133,456,484	118,780,331	136,407,42
9027304040	SPECTROPHOTOMETERS USING OPTICAL RADIATIONS (ULTRAVIOLET, VISIBLE, INFRARED), NONELECTRICAL	149,221,779	172,484,108	210,113,632	231,108,67
9027304080	ELECTRICAL SPECTROMETERS AND SPECTROGRAPHS USING OPTICAL RADIATIONS (ULTRAVIOLET, WISIBLE, INFRARED)	122,189,718	127,274,373	139,869,835	199,337,21
9027308020	SPECTROSCOPES USING OPTICAL RADIATIONS, NONELECTICAL	1,059,879	1,548,128	1,255,128	1,448,71
9027308080	SPECTROMETERS AND SPECTROGRAPHS USING OPTICAL RADIATIONS, NONELECTRICAL, NESOI	36,048,042	57,298,819	48,358,953	82,646,53
9027400000	EXPOSURE METERS	6,087,800	5,621,074	8,921,444	
9027501000	ELECTROCHEMICAL INSTRUMENTS AND APPARATUS,	0	0	0	12,612,07
9027502000	THERMAL ANALYSIS INSTRUMENTS AND APPARATUS	162,505,354	171,741,092	214,235,842	250,672,23
9027504050	PHOTOMETERS	30,462,524	35,678,620	51,425,018	66,224,52

9027505000	OTHER CHEMICAL ANALYSIS INSTRUMENTS AND APPARATUS, NESOI	299,591,956	389,660,332	517,090,696	578,759,91
9027509000	INSTRUMENT AND APPARATUS FOR PHYSICAL OR CHEMICAL ANALYSIS USING OPTICAL RADIATIONS, NESOI	305,031,944	384,037,815	378,836,433	514,082,20
9027801000	NUCLEAR MAGNETIC RESONANCES INSTRUMENTS AND APPARATUS (EXCEPT THOSE OF HEADING 9018)	68,900,457	81,874,892	76,649,658	
9027802000	MASS SPECTROMETERS	236,155,263	242,769,878	321,280,400	
9027802500	NUCLEAR MAGNETIC RESONANCES INST EXC HEADING 9018	0	0	0	19,636,08
9027802600	MASS SPECTROMETERS	0	0	0	371,289,56
9027803100	ELECTROCHEMICAL INSTRUMENTS AND APPARATUS,	148,188,718	158,592,899	141,887,254	149,037,37
9027803200	CHEMICAL ANALYSIS INSTRUMENTS AND APPARATUS, NESOI	194,999,943	180,642,726	214,756,249	262,994,29
9027803500	PHYSICAL ANALYSIS INSTRUMENTS AND APPARATUS, EXCEPT USING OPTICAL RADIATIONS, NESOI	258,918,098	307,538,931	311,068,194	341,467,10
9027808000	INSTRUMENTS AND APPARATUS FOR MEASURING/CHECKING VISCOSITY, POROSITY EXPANSION, SURFACE TENSION OR THE LIKE, NESOI	328,385,064	361,951,337	361,405,353	331,257,92
9027902000	MICROTOMES	17,307,072	23,929,256	26,334,990	19,812,98
9027905430	PARTS AND ACCESSORIES OF ARTICLES OF SCHEDULE BE NUMBERS 9027.30.4040 AND 9027.30.4080	91,579,426	143,299,479	128,617,454	130,938,81
9027905440	PARTS AND ACCESSORIES OF ARTICLES OF SCHEDULE B NUMBER 9027.40.0000	27,018,565	39,733,153	22,270,248	13,489,61
9027908950	PARTS AND ACCESSORIES OF INSTRUMENTS & APPARATUS FOR PHYSICAL OR CHEMICAL ANALYSIS, NESOI	711,930,828	763,686,514	838,807,652	988,568,54

9028100000	GAS METERS	30,686,927	35,226,662	41,712,925	48,622,48
9028200000	LIQUID METERS	68,091,813	60,863,377	78,885,608	75,444,91
9028300000	ELECTRICITY METERS	65,287,940	86,122,342	118,650,359	166,155,20
9028900040	PARTS AND ACCESSORIES OF ELECTRICITY METERS	24,671,928	22,801,554	32,524,171	34,945,05
9028900080	PARTS AND ACCESSORIES OF GAS, LIQUID OR PRODUCTION METERS, INCLUDING CALIBRATING METERS, NESOI	66,448,423	99,382,875	120,069,210	105,251,16
9030100000	INSTRUMENTS AND APPARATUS FOR MEASURING OR DETECTING IONIZING RADIATIONS	173,268,799	193,653,540	263,876,128	322,702,68
9030200000	CATHODE-RAY OSCILLOSCOPES AND CATHODE-RAY OSCILLOGRAPHS	25,107,894	30,087,373	26,406,638	
9030200500	OSCILLOSCOPES AND OSCILLOGRAPHS	0	0	0	78,783,05
9030310000	MULTIMETERS	53,337,848	56,711,484	65,853,639	51,041,52
9030330040	APPARATUS TO TEST VOLTAGE OR CURRENT OR RESISTANCE	0	0	0	128,842,30
9030330080	INST&APPTS FOR MEASURING/CHECKING POWER, NESOI	0	0	0	124,830,02
9030390040	APPARATUS TO TEST VOLTAGE OR CURRENT OR RESISTANCE	205,220,331	242,080,763	259,232,963	
9030390080	OTHER INSTRUMENTS AND APPARATUS FOR MEASURING OR CHECKING POWER, WITHOUT A RECORDING DEVICE, NESOI	244,507,891	241,663,996	246,269,480	
9030830000	INSTRUMENTS AND APPARATUS WITH A RECORDING DEVICE, NESOI	360,827,264	308,867,571	334,849,470	
9030840000	INSTRUMENTS & APPARATUS WITH RECORDNG DEVICE NESOI	0	0	0	221,564,80
9030890000	OTHER INSTRUMENTS AND APPARATUS FOR MEASURING OR CHECKING ELECTRICAL QUANTITIES, NESOI	325,829,922	310,892,136	380,043,292	
9030890100	INSTRUMENTS & APPARATUS W/O RECORDING DEVICE NESOI	0	0	0	208,688,40

9030904000	PARTS AND ACCESSORIES FOR ARTICLES OF SUBHEADING 9030.10	101,165,273	114,895,639	132,089,191	111,934,63
9030908010	PARTS AND ACCESSORIES FOR ARTICLES OF SUBHEADING 9030.20	23,727,054	28,249,955	31,095,370	44,193,00
9030908020	PARTS AND ACCESSORIES0 OF ARTICLES OF SCHEDULE B SUBHEADING 9030.31	5,041,991	4,717,384	4,269,409	7,676,84
9030908030	PARTS AND ACCESSORIES OF ARTICLES OF SCHEDULE B SUBHEADING 9030.39	25,377,565	23,353,276	29,985,758	15,023,74
9030908040	PARTS AND ACCESSORIES OF ARTICLES OF SCHEDULE B SUBHEADING 9030.40	111,169,863	77,159,344	110,338,562	70,396,85
9030908050	PARTS AND ACCESSORIES OF ARTICLES OF SCHEDULE B SUBHEADING 9030.82 OR 9030.83	712,917,800	661,515,479	799,225,101	814,560,98
9030908060	PARTS AND ACCESSORIES OF ARTICLES OF SCHEDULE B SUBHEADING 9030, NESOI	308,596,591	274,593,967	242,429,126	202,519,19
9031100000	MACHINES FOR BALANCING MECHANICAL PARTS	56,968,744	93,087,645	100,689,014	116,041,23
9031200000	TEST BENCHES	69,211,409	68,620,613	101,611,842	100,827,73
9031300000	PROFILE PROJECTORS	5,465,772	7,184,663	4,923,983	
9031491000	PROFILE PROJECTORS	0	0	0	4,535,26
9031808060	EQUIPMENT FOR TESTING ELECTRICAL CHARACTERISTICS OF INTERNAL COMBUSTION ENGINES	108,836,647	137,112,349	110,215,783	141,674,52
9031808070	EQUIPMENT FOR TESTING OTHER THAN ELECTRICAL CHARACTERISTICS OF INTERNAL COMBUSTION ENGINES	125,580,335	143,074,938	138,300,585	142,775,98
9031808080	OTHER MEASURING OR CHECKING INSTRUMENTS, APPLIANCES AND MACHINES, NESOI IN CHAPTER 90	814,915,904	938,621,921	1,043,795,140	1,152,338,50
9031900000	PARTS & ACCESSORIES OF MACHINES, NESOI IN THIS CHAPTER AND FOR PROFILE PROJECTORS	1,042,451,250	741,147,741	1,030,047,371	829,365,40

9032100000	THERMOSTATS	118,204,725	126,935,258	123,706,799	109,290,89
9032200000	MANOSTATS	25,643,149	26,607,043	24,385,681	19,929,37
9032810040	HYDRAULIC OR PNEUMATIC INDUSTRIAL PROCESS CONTROL INSTRUMENTS AND APPARATUS	41,210,138	41,544,403	43,563,809	45,574,82
9032810080	HYDRAULIC AND PNEUMATIC INSTRUMENTS AND APPARATUS EXCEPT INDUSTRIAL PROCESS CONTROL	56,387,633	51,916,556	47,286,729	63,904,70
9032893000	AUTOMATIC VOLTAGE AND VOLTAGE-CURRENT REGULATORS	69,941,869	87,240,899	103,004,003	87,565,00
9032896020	CONTROL INSTRUMENTS FOR AIR CONDITIONING, REFRIGERATION OR HEATING SYSTEMS	86,605,674	140,639,749	196,669,440	228,083,14
9032896030	PROCESS CONTROL INSTRUMENTS AND APPARATUS FOR COMPLETE SYSTEMS	186,185,330	156,997,646	177,003,878	263,567,38
9032896040	PROCESS CONTROL INSTRUMENTS AND APPARATUS FOR TEMPERATURE CONTROL	101,819,390	99,445,061	124,770,180	121,065,01
9032896050	PROCESS CONTROL INSTRUMENTS AND APPARATUS FOR PRESSURE DRAFT CONTROL	32,743,560	32,007,329	46,330,225	47,605,31
9032896060	PROCESS CONTROL INSTRUMENTS AND APPARATUS FOR FLOW AND LIQUID LEVEL CONTROL	95,988,177	53,559,547	86,813,432	103,250,91
9032896070	PROCESS CONTROL INSTRUMENTS AND APPARATUS FOR HUMIDITY CONTROL	4,372,035	4,857,561	6,243,923	6,868,31
9032896075	OTHER PROCESS CONTROL INSTRUMENTS AND APPARATUS, NESOI	484,644,861	560,574,895	629,565,157	518,662,79
9032896085	AUTOMATIC REGULATING OR CONTROLLING INSTRUMENTS NESOI	823,361,470	780,988,343	726,233,214	666,917,99
9032900000	PARTS AND ACCESSORIES OF AUTOMATIC REGULATING OR CONTROLLING INSTRUMENTS AND APPARATUS	633,238,503	584,913,079	590,182,138	589,501,45

9033000000	PARTS AND ACCESSORIES (NOT SPECIFIED OR INCLUDED ELSEWHERE IN THIS CHAPTER) FOR MACHINES, APPLIANCES, INSTRUMENTS OR APPARATUS OF CHAPTER 90	470,280,327	360,392,652	378,958,948	544,410,77
	Totals	***29,750,428,761***	***31,606,478,280***	***35,794,019,896***	***38,505,408,81***

Attachment B

U.S. Environmental Technologies Export Markets

2004-2008; FAS Value; USD

COUNTRY	2004	2005	2006	2007	2008	% Change 04-08
Canada	6,268,984,121	6,664,480,081	7,271,979,741	7,422,332,336	7,639,024,213	22%
Mexico	4,213,132,647	4,231,789,253	4,540,033,273	4,713,142,982	4,895,821,404	16%
China	1,694,064,569	1,903,301,676	2,320,997,517	2,633,059,290	3,119,086,349	84%
Germany	1,739,958,172	1,991,139,878	2,372,641,280	2,651,324,033	2,716,987,605	56%
Japan	2,252,036,789	2,192,819,095	2,680,854,504	2,315,687,873	2,047,274,983	-9%
Korea	1,051,669,025	1,116,473,837	1,256,221,142	1,746,257,602	1,498,626,625	42%
United Kingdom	1,193,513,121	1,218,719,318	1,290,678,511	1,410,954,081	1,467,667,698	23%
Singapore	930,234,294	961,458,767	1,170,927,325	1,226,134,163	1,195,918,608	29%
France	874,150,848	947,399,245	1,149,983,055	1,096,345,708	1,086,273,874	24%
Brazil	342,419,523	396,679,075	492,495,904	637,449,908	881,123,829	157%
Netherlands	727,973,707	818,911,989	815,491,067	778,054,963	807,449,354	11%
Taiwan	1,428,829,897	1,328,369,166	1,339,631,411	1,095,831,898	778,812,011	-45%
Australia	462,257,428	495,240,242	547,967,273	617,922,692	754,579,447	63%
Italy	432,353,278	496,521,667	566,419,390	613,943,780	692,694,674	60%
Belgium	421,366,565	411,061,682	472,147,330	598,349,769	688,891,690	63%
India	256,903,706	350,043,658	403,779,253	597,174,845	631,085,301	146%
Hong Kong	564,023,555	536,026,871	545,086,196	561,081,453	554,423,517	-2%
Saudi Arabia	188,138,722	219,401,019	367,210,970	493,188,565	554,256,150	195%
United Arab Em	176,819,403	188,804,599	257,978,690	376,452,111	484,650,286	174%
Spain	197,754,947	233,241,163	281,731,965	355,707,589	479,746,275	143%
Malaysia	415,248,257	407,747,895	499,214,004	451,875,888	455,015,977	10%
Venezuela	122,461,602	198,595,050	246,770,796	290,556,597	387,243,309	216%
Thailand	267,349,723	313,955,260	312,229,188	326,693,421	363,550,961	36%
Russia	197,862,024	151,366,376	206,859,580	290,911,172	286,003,025	45%
Israel	200,970,623	218,665,459	252,907,047	259,944,780	251,556,376	25%
Colombia	82,399,292	111,853,249	122,230,616	196,613,179	238,643,810	190%
Philippines	258,117,247	232,113,961	253,988,570	279,963,974	237,668,532	-8%
Switzerland	180,306,478	194,804,734	245,738,217	207,088,289	234,122,431	30%
Sweden	183,817,730	190,760,943	197,729,568	216,555,716	234,005,659	27%
Qatar	23,618,985	75,257,796	95,579,419	288,724,953	228,156,803	866%
Chile	92,886,835	127,269,855	143,059,365	168,648,567	225,338,335	143%
Ireland	237,814,085	268,289,363	272,696,625	249,311,838	221,970,374	-7%
South Africa	103,841,078	123,164,325	151,260,938	163,207,945	212,065,757	104%
Argentina	86,146,878	112,002,472	114,850,973	156,855,924	172,944,757	101%

Turkey	75,024,745	105,188,280	106,060,150	122,440,767	172,202,245	130%
Norway	63,888,771	91,677,390	112,808,774	137,740,268	165,373,562	159%
Peru	35,574,498	55,662,711	102,608,452	119,936,013	144,660,091	307%
Nigeria	95,268,436	38,452,629	84,842,456	81,668,801	136,358,460	43%
Trin & Tobago	55,218,413	77,053,483	65,074,028	90,052,041	126,157,371	128%
Egypt	84,711,865	78,580,973	90,795,093	106,162,381	120,143,268	42%
Poland	47,618,093	58,089,857	84,860,437	89,417,865	116,451,577	145%
Indonesia	48,554,333	61,611,657	65,684,989	85,287,612	112,879,912	132%
Costa Rica	119,654,376	123,506,309	118,129,304	99,415,025	111,004,782	-7%
Denmark	80,437,086	89,580,387	91,465,614	126,653,781	109,788,936	36%
Kuwait	46,359,411	59,303,841	97,069,431	109,236,264	105,475,676	128%
Finland	54,656,084	75,694,096	69,218,657	88,222,998	89,105,946	63%
Hungary	34,300,912	38,535,383	43,799,833	65,327,823	88,591,348	158%
Dominican Rep	73,546,299	81,637,100	100,362,231	98,556,266	83,850,842	14%
Austria	102,538,232	102,070,839	100,285,208	102,711,630	83,799,440	-18%
Angola	8,801,452	14,773,176	29,121,663	66,420,902	80,311,097	812%
New Zealand	52,763,097	54,253,267	54,408,795	60,190,302	74,054,853	40%
Iraq	45,624,133	41,860,104	55,869,526	52,420,528	69,301,658	52%
Pakistan	40,141,002	39,164,666	56,781,670	49,096,286	64,493,062	61%
Ecuador	22,741,064	26,776,129	40,247,060	46,460,389	64,437,660	183%
Algeria	19,024,937	33,938,320	45,189,039	73,556,771	63,916,654	236%
Oman	46,944,720	18,627,774	30,518,573	42,520,334	63,327,707	35%
Czech Republic	52,559,390	52,729,128	57,715,671	66,807,420	58,267,825	11%
Vietnam	18,153,453	25,164,924	34,101,480	65,989,643	58,041,892	220%
Kazakhstan	23,827,444	36,083,060	26,589,281	35,714,322	53,932,759	126%
Romania	20,694,652	30,777,078	25,531,087	31,222,620	50,174,093	142%
Ukraine	16,630,467	25,302,585	21,166,060	34,397,023	45,443,485	173%
Greece	34,322,308	33,612,362	34,553,157	49,304,606	39,224,686	14%
Guatemala	28,009,988	30,496,378	35,853,479	46,413,208	39,069,072	39%
Panama	20,033,853	23,394,192	16,738,362	24,150,017	38,319,061	91%
Portugal	18,610,625	23,783,377	29,199,269	34,298,331	35,297,930	90%
Honduras	34,354,560	50,597,743	48,327,959	34,818,562	34,832,908	1%
Jamaica	17,900,778	22,899,871	24,674,136	27,090,956	29,462,292	65%
Jordan	24,421,292	58,794,700	19,989,601	19,356,338	28,172,020	15%
Azerbaijan	8,725,729	13,411,284	16,835,352	31,183,185	26,348,916	202%
Libya	704,549	3,586,482	11,391,959	17,536,822	24,398,595	3363%
Bahrain	11,584,761	17,432,641	19,562,956	23,264,005	23,389,633	102%
Nicaragua	8,128,819	7,141,984	9,132,250	10,470,798	21,630,481	166%
Bahamas	18,219,989	17,415,067	29,723,660	19,399,683	21,529,713	18%
Eq Guinea	23,240,514	17,049,981	28,192,484	24,923,362	20,928,118	-10%
El Salvador	9,423,935	13,378,781	16,894,594	19,350,229	18,952,412	101%

Congo (ROC)	1,103,436	3,648,896	7,452,114	5,303,347	17,995,545	1531%
Netherlands Ant	6,392,985	4,326,844	6,953,842	8,322,019	17,698,609	177%
Kenya	6,420,677	5,389,804	6,998,482	8,448,111	16,819,435	162%
Tunisia	2,709,481	4,354,174	6,768,266	15,695,991	16,211,651	498%
Morocco	5,928,709	5,629,734	9,369,812	11,501,834	16,077,290	171%
Bulgaria	6,374,614	7,186,359	10,168,014	8,631,971	16,039,155	152%
Slovak Republic	10,126,192	9,178,554	11,887,717	19,305,926	15,884,880	57%
Afghanistan	5,683,665	11,209,531	8,342,711	14,876,628	15,648,611	175%
Slovenia	7,151,814	6,127,325	8,695,063	11,075,891	14,798,784	107%
Georgia	3,392,854	3,504,263	3,545,256	5,209,226	14,638,754	331%
Aruba	2,537,051	13,568,489	13,629,635	17,297,019	14,562,231	474%
Uruguay	4,982,733	5,839,541	11,203,603	10,203,759	14,145,177	184%
Bolivia	7,464,748	9,664,246	7,088,214	8,918,821	14,091,380	89%
Croatia	5,479,139	3,359,542	5,418,070	6,940,968	13,442,026	145%
Luxembourg	5,297,414	7,924,961	4,923,846	9,554,036	13,423,398	153%
Lithuania	4,848,432	10,451,759	13,776,600	15,730,690	13,273,200	174%
Madagascar	136,491	257,522	151,527	323,454	13,262,050	9616%
Uzbekistan	2,213,117	5,417,234	3,556,926	4,684,013	12,542,512	467%
Yemen	5,852,303	3,774,219	4,540,052	12,215,559	11,110,911	90%
Latvia	2,064,353	4,142,019	8,679,238	8,816,143	9,900,833	380%
Gabon	1,229,964	2,316,831	3,700,179	8,265,897	9,646,869	684%
Liberia	3,769,676	5,616,650	7,227,285	14,517,332	8,738,381	132%
Sri Lanka	6,007,810	7,465,238	6,343,479	6,525,479	8,717,706	45%
Ghana	3,076,556	3,438,416	5,904,325	11,086,227	8,604,916	180%
Bangladesh	9,933,899	13,628,435	16,836,097	9,376,595	8,594,222	-13%
Belize	1,333,398	2,476,417	3,909,033	5,674,410	8,521,842	539%
Cyprus	3,377,560	2,620,866	4,918,033	4,429,548	7,796,418	131%
Suriname	5,043,621	4,588,673	7,782,757	6,627,302	7,723,614	53%
Bermuda	5,659,548	4,813,279	7,091,474	7,040,832	7,683,922	36%
Lebanon	5,172,658	7,067,448	4,025,350	6,708,004	7,491,030	45%
Estonia	4,730,553	6,264,703	8,718,062	8,215,358	7,338,044	55%
Serbia	0	0	0	14,178,094	7,314,297	
Iceland	3,750,458	6,417,608	7,784,598	10,320,095	7,297,070	95%
Barbados	5,311,752	4,619,945	5,858,080	7,404,305	7,063,416	33%
Tanzania	1,365,896	4,453,574	15,103,372	3,325,645	6,795,520	398%
Brunei	1,387,190	1,974,607	3,115,226	5,651,790	6,165,353	344%
Congo (DROC)	1,102,539	501,165	1,162,866	1,502,266	6,133,749	456%
Turks & Caic Is	4,090,318	2,410,945	3,919,962	5,233,149	5,877,378	44%
Belarus	1,643,059	2,448,942	6,065,926	5,500,273	5,355,954	226%
Senegal	2,353,351	2,725,423	1,780,599	4,988,162	4,894,638	108%
Malta	7,311,400	7,126,759	7,863,521	6,080,505	4,845,651	-34%

Cayman Is	2,230,541	5,325,945	6,116,361	4,435,552	4,716,532	111%
Laos	368,800	1,374,685	1,326,668	711,828	4,261,054	1055%
Zambia	773,929	1,032,679	1,613,310	2,844,333	4,185,470	441%
Paraguay	5,013,515	11,151,723	3,566,553	5,099,284	4,141,141	-17%
Br Virgin Is	963,279	1,394,399	2,380,118	2,542,330	3,890,483	304%
Haiti	2,110,799	5,058,718	3,061,900	2,333,558	3,674,755	74%
Mongolia	813,010	1,056,377	1,342,169	691,122	3,636,781	347%
Macao	614,532	1,881,331	2,115,164	2,417,528	3,420,299	457%
Guyana	1,742,813	3,927,617	2,547,957	2,092,925	3,396,258	95%
Benin	377,121	107,335	693,440	8,123,476	3,233,552	757%
Cote d`Ivoire	1,668,847	2,150,163	3,262,843	2,937,394	3,196,944	92%
Tokelau Is	1,324,204	1,316,194	1,614,436	3,179,037	3,192,629	141%
Turkmenistan	1,632,598	5,491,611	639,124	2,450,115	3,170,662	94%
New Caledonia	1,035,830	773,313	3,080,496	12,323,872	3,095,225	199%
Namibia	513,799	582,374	400,443	1,244,432	3,041,186	492%
Ethiopia	723,996	2,194,547	1,518,549	2,064,202	2,983,214	312%
Albania	539,747	782,411	3,059,137	556,006	2,934,203	444%
Papua New Guin	1,725,656	1,517,129	2,770,999	1,300,842	2,625,565	52%
Antigua Barbuda	1,110,895	1,757,545	3,434,971	4,147,466	2,461,638	122%
St Lucia Is	769,943	1,864,842	8,003,942	2,633,647	2,196,780	185%
Cameroon	789,848	945,037	1,217,351	854,084	1,988,128	152%
French Guiana	2,095,546	3,431,979	1,271,861	2,259,690	1,914,737	-9%
Sierra Leone	594,845	212,700	581,995	1,328,350	1,879,737	216%
Marshall Is	620,827	773,104	353,783	1,119,301	1,722,600	177%
Uganda	1,292,191	1,585,514	774,058	1,613,837	1,657,781	28%
Anguilla	894,472	900,642	1,034,746	15,521,648	1,586,188	77%
Martinique	664,958	1,386,466	1,165,817	1,013,397	1,549,014	133%
Liechtenstein	245,076	1,114,435	1,217,115	1,665,315	1,526,855	523%
Guinea	814,999	2,597,159	683,121	1,390,528	1,412,739	73%
Fiji	1,166,520	318,981	313,412	1,133,458	1,333,679	14%
St Vinc & Gren	642,251	420,115	652,025	1,543,642	1,232,580	92%
St Kitts-Nevis	1,182,890	1,087,421	1,201,254	2,017,407	1,222,358	3%
Maldive Is	1,260,921	813,383	1,723,916	1,567,033	1,191,713	-5%
Kyrgystan	692,013	752,620	501,031	690,825	1,185,617	71%
Mozambique	149,206	371,000	1,511,852	3,338,748	1,089,748	630%
Djibouti	351,962	239,075	1,841,826	707,148	1,079,066	207%
Mauritius	1,876,025	621,254	817,496	599,914	1,054,678	-44%
Seychelles	57,601	704,180	102,620	761,226	1,050,556	1724%
Armenia	570,063	453,134	778,338	443,447	1,041,031	83%
Cambodia	326,349	477,120	342,271	3,228,101	1,024,839	214%
Macedonia	444,163	221,779	1,834,422	528,591	995,408	124%

Niger	727,419	68,363	319,034	2,005,435	946,295	30%
Dominica Is	399,225	823,529	403,795	3,201,556	912,399	129%
Moldova	380,316	470,382	399,456	537,839	880,147	131%
Grenada Is	1,733,080	1,378,231	1,017,223	1,419,063	879,099	-49%
Nepal	536,258	435,775	404,154	636,494	863,946	61%
Fr Polynesia	467,597	733,228	1,391,349	686,018	842,370	80%
Rwanda	306,024	153,920	80,622	258,697	789,667	158%
Zimbabwe	346,286	185,216	408,631	530,864	724,167	109%
Guadeloupe	626,681	2,690,770	1,178,141	569,481	701,209	12%
Iran	1,325,955	438,404	582,422	590,081	693,854	-48%
Sudan	59,109	0	169,034	29,320	665,690	1026%
Botswana	382,170	520,830	228,314	1,306,493	661,240	73%
Burkina Faso	49,343	123,999	82,110	832,077	625,528	1168%
Bosnia-Hercegov	566,333	459,227	891,650	719,907	566,593	0%
Mali	1,335,637	1,051,706	745,135	1,066,808	564,666	-58%
East Timor	348,686	84,643	124,837	306,574	553,993	59%
Montenegro	0	0	0	1,192,808	457,749	
Chad	100,260	65,236	3,187,861	3,318,367	404,571	304%
Malawi	250,580	601,886	113,848	290,869	394,298	57%
Swaziland	208,283	274,683	539,715	122,939	362,144	74%
Monaco	154,638	347,368	107,955	261,846	352,272	128%
Syria	1,519,606	62,718	252,938	115,326	328,683	-78%
F St Micronesia	175,810	33,605	57,525	386,692	325,966	85%
Samoa	44,838	94,965	46,491	60,893	322,831	620%
Gambia	355,293	362,144	409,049	309,511	299,947	-16%
Gibraltar	99,967	41,854	6,685	143,244	272,814	173%
Togo	106,886	90,918	1,023,324	820,506	260,108	143%
St Helena	14,669	0	48,095	395,200	245,015	1570%
Mauritania	508,578	643,409	1,062,379	182,083	216,187	-57%
Andorra	345,104	1,304,016	14,290	30,671	199,540	-42%
Solomon Is	0	13,130	34,068	57,908	192,301	
Burma (Myanmar)	214,152	267,907	834,052	216,811	192,175	-10%
Faroe Islands	0	8,510	14,322	75,345	178,537	
Christmas Is	99,469	5,978	72,230	127,159	178,202	79%
Tajikistan	644,131	557,386	261,344	440,513	156,530	-76%
Reunion	133,629	35,791	448,565	325,162	132,576	-1%
Cen African Rep	198,229	85,567	108,802	137,054	124,797	-37%
Cook Is	5,225	3,600	16,945	15,927	119,069	2179%
Vanuatu	36,660	10,882	170,550	74,416	111,898	205%
Montserrat Is	69,296	57,213	69,772	94,710	103,968	50%

Cape Verde	66,393	246,961	114,226	175,251	93,510	41%
Kiribati	26,153	33,230	22,260	89,402	82,473	215%
Nauru	3,050	24,598	93,103	25,106	81,054	2558%
Greenland	12,132	79,028	46,795	71,896	77,970	543%
Guinea-Bissau	76,058	33,027	9,470	11,045	69,762	-8%
Eritrea	70,503	60,977	87,845	89,780	64,900	-8%
Somalia	52,256	75,415	228,569	29,132	62,771	20%
Tonga	6,956	267,470	0	453,805	60,162	765%
Falkland Is	6,464	124,083	194,262	46,131	59,600	822%
Br Indian O Ter	4,305	17,728	6,609	24,139	51,000	1085%
Bhutan	32,020	28,825	223,471	42,130	49,450	54%
Palau	297,328	204,769	157,315	113,237	46,527	-84%
West Bank	7,916	26,919	0	19,984	44,346	460%
Cuba	0	181,598	203,283	98,641	31,720	
San Marino	199,205	19,267	169,217	22,144	29,672	-85%
Tuvalu	0	0	0	0	29,567	
Lesotho	5,160	44,056	864,336	144,913	21,615	319%
Burundi	107,096	24,459	41,373	2,997	18,612	-83%
Sao Tome & Prin	0	4,918	8,720	38,349	14,400	
Pitcairn Is	20,809	44,873	9,527	15,824	13,779	-34%
Niue	0	0	0	0	11,200	
Cocos Is	53,436	16,340	263,951	85,510	6,368	-88%
Vatican City	113,862	19,673	75,365	9,000	4,366	-96%
Comoros	0	4,363	22,118	0	0	
Western Sahara	22,234	16,039	0	0	0	
Svalbard,May Is	0	0	116,325	59,081	0	
St Pierre & Miq	0	0	0	0	0	
Serbia/Monteneg	5,319,241	5,331,424	8,258,498	0	0	
Norfolk Is	0	43,267	0	15,120	0	
North Korea	0	0	0	0	0	
Mayotte	0	0	3,961	0	0	
Internat Org	0	0	0	0	0	
Heard & McDn Is	88,549	0	0	0	0	
Fr S & Ant land	0	0	0	138,155	0	
Gaza Strip	0	0	0	0	0	
Totals	***29,750,428,761***	***31,606,478,280***	***35,794,019,896***	***38,505,408,813***	***40,194,969,747***	***35%***

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