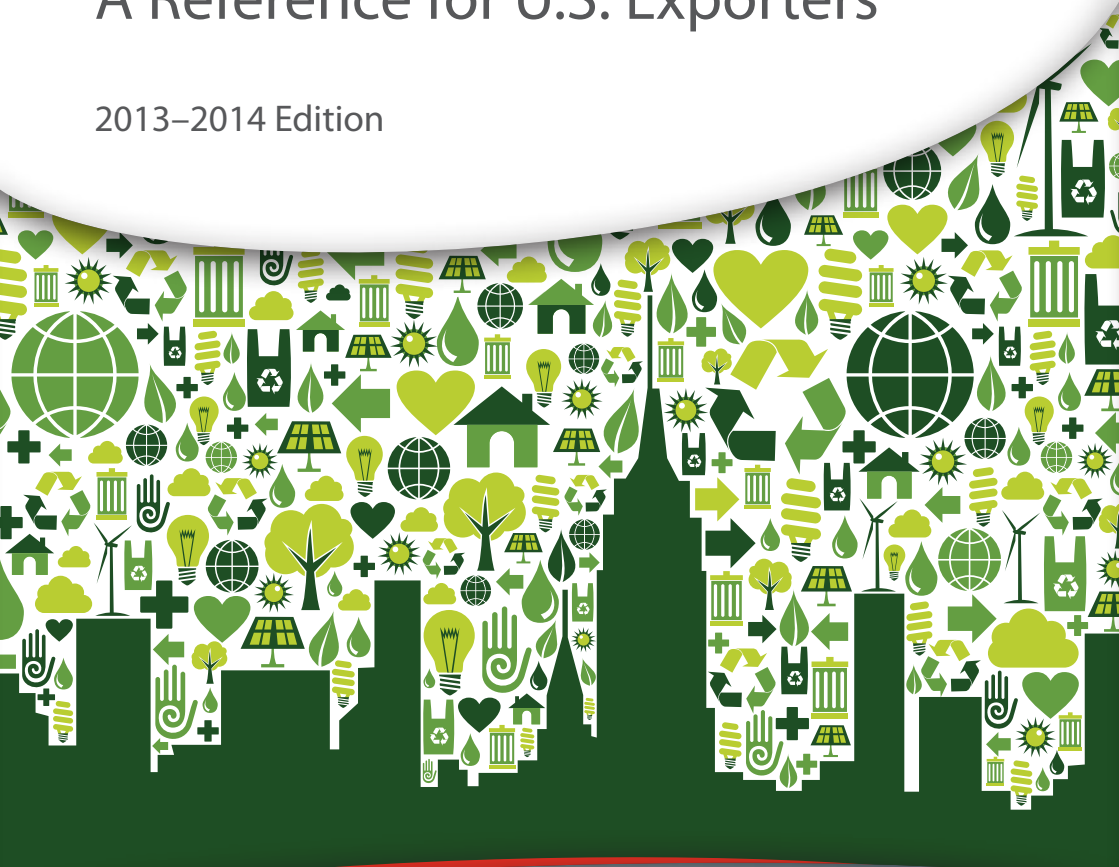
U.S. COMMERCIAL SERVICE
United States of America
Department of Commerce

Environmental Technologies Resource Guide

A Reference for U.S. Exporters

2013–2014 Edition



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Environmental Technologies Resource Guide

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Acknowledgements

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and the Worldwide CS Environmental Team

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Introduction

What Can the U.S. Commercial Service Do for You?

The U.S. Commercial Service (CS) is the export promotion arm of the U.S. Department of Commerce's International Trade Administration. Our global network of more than 1400 trade professionals is located throughout the United States and in U.S. Embassies and Consulates in more than 70 countries. Whether you are looking to make your first international sale or expand to additional markets, we offer the expertise you need to connect with lucrative opportunities to increase your bottom line.

Our Services

The CS Environmental Technologies Team works directly with the industry to provide you with the information you need to grow your business by identifying and evaluate key business prospects concerning the areas of water, waste, and air technology. We have created this Environmental Technologies Resource Guide to provide valuable market intelligence relevant to your company and its export goals, through a balanced, realistic view of each country's market. To learn more about how we can help you, please visit ***export.gov/industry/environment***. You can also follow us on Twitter, ***@EnviroTeam***.

For more information on how CS can help your business increase its international sales, please contact your local CS office. A list of offices appears at the back of this guide and at ***export.gov/usoffices***.

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Market Intelligence

- Analyze market potential and foreign competitors
- Obtain useful information on best prospects, financing, laws, and cultural issues
- Conduct background checks on potential buyers and distributors

Business Matchmaking

- Connect with pre-screened potential partners
- Promote your product or service to prospective buyers at trade events worldwide
- Meet with international industry and government decision makers in your target market(s)

Trade Counseling

- Develop effective market entry and sales strategies
- Understand export documentation requirements and import regulations of foreign markets
- Navigate U.S. government export controls, compliance, and trade financing options

Commercial Diplomacy

- Overcome trade obstacles to successfully enter international markets
- Benefit from coordinated U.S. government engagement with foreign governments to protect U.S. business interests
- Access U.S. government trade advocacy for your foreign government procurement bids

Austria

Overview

Austria has a long history of environmental activity, and one that is distinct from the environmentalism of the United States. Whereas U.S. environmentalism has its roots in the Audubon movement, with a focus on preserving the beauty of nature, Austrian environmentalism tends to focus on the protection of its cultural heritage and maintaining natural resources for safe (human) consumption.

In 2010, Austria spent USD 15 billion on environmental measures. More than half of total spending went toward waste management programs (34 percent) and surface water preservation efforts (20 percent). Soil remediation and groundwater protection accounted for 11.5 percent of the total, and efforts to reduce air pollution and support climate change goals made up 8.7 percent. Other significant segments include bio-diversity and landscape preservation measures (7.7 percent). Noise abatement made up 1.7 percent, and notably, research and development came in at a meager 1.5 percent. Most environmental spending came from businesses (63 percent), followed by private households (25 percent) and public sources (9.3 percent). (source: Statistik Austria, access 2013)

Austria is also a strong player in several "green tech" industry sectors, especially renewable energy, waste management, and energy efficiency technologies, with 2010 turnover of USD 45 billion. A recent study takes a closer look at environmental technology (excluding services) and identifies 390 Austrian companies that together charted sales of USD 11 billion in 2011, of which 73 percent were export sales. (Sources: Statistik Austria, 2013, and Wifo, 2013)

Market Opportunities

Waste Management and Recycling

The two most notable facts about waste management in Austria are the high rate of recycling (approximately 63 percent) and the landfill moratorium that came into force in 2009, which restricts landfill deposits to waste that has already been

Statistics

Capital:	Vienna
Population:	8.2 million
GDP:	USD 357.8 bn (est 2012)
Currency:	Euro (€)
Language:	German

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treated and mineral-based excavation materials. In 2009, 51.72 million tons of "primary" waste was collected. This includes excavation materials but not secondary waste such as the by-products of incineration. The largest category of waste was excavated materials (43 percent). Household waste made up only 7.2 percent of the total.

Waste products that are not recycled are either treated thermally (14 percent) or otherwise (23 percent), including physico-chemical processing, aerobic and anaerobic treatment, shredders, sorters, and special processing for various materials including fats, oils, asbestos, etc. There are currently around three million containers of various sizes and colors for the collection of glass, metal, paper, organic, plastic, and miscellaneous trash, all standardized for use with trash collection vehicles. Approximately 2,000 vehicles collect trash, and 2,200 treatment plants receive it. Annual turnover for the waste management branch is around USD 3.8 billion. (Sources: Bundesabfallwirtschaftsplan 2011, Statistic Austria, both accessed 2013)

Maintaining Surface Water Resources

Surface Water

Austria's surface water resources are plentiful and constitute an important part of the Austrian identity. From the economically and historically significant Danube river to the sparkling blue alpine lakes in Salzburg, clean and safe surface water is a major concern in Austria.

Flowing Water

There are around 100,000 kilometers of rivers and streams flowing through Austria, monitored by a network of 290 permanent measurement stations plus a smaller number of temporary stations. According to 2010 data, a 82 percent of the river stations reported a fair to poor rating for biological conditions (fish, macrozoobenthos and phytobenthos). General physical/chemical parameters, on the other hand, were exceeded only in 20 percent of the stations; the most common pollutants were dissolved organic carbons, orthophosphates, and nitrates. (Sources: Wassergüte in Österreich, Jahresbericht 2011 and interview with Umweltbundesamt Gerald Hochedlinger, March 28, 2013)

Stationary Water

There are over 2,143 bodies of water in Austria with an area of at least 1 hectare. 38 percent are natural and 62 percent man-made. Water quality is measured with 33 monitoring stations at the 28 largest lakes. Here a very different picture emerges, with the biological and physical/chemical parameters in 27 of the 28 bodies of water scoring a good or very good rating. Even the 28th monitored lake was only slightly below the "good" mark. That having been said, with a test sample of 33, a blanket statement about the water quality of over 2,000 bodies of water seems questionable. (Source: Wassergüte in Österreich, Jahresbericht 2011)

Wastewater

Austria's scores in removing pollutants from wastewater are among the best in Europe. According to the latest figures, there are currently 1,841 sewage treatment plants in Austria with capacities over 50 PE (population equivalents) serving 94 percent of the population. Austria's level of canalization is considered to be close to its full potential with only 6 percent using a septic tank or individual treatment solution. In fact, 88 percent of households are connected to a plant with over 15,000 PE. Of these larger plants, most run a three-stage process that removes carbons, phosphates, and nitrogen. Some plants also run anaerobic digesters that produce biogas from the sludge, which is in turn used to power parts of the facility, sold into the gas or electricity grid, or in the case of the city of Linz, used to power the city bus fleet. (Source: Kommunal-Abwasserrichtlinie 91/271, Österreichische Bericht 2012)

Soil Remediation and Groundwater Protection

Soil Remediation

The full extent of soil contamination in Austria is unknown, but experts from the Austrian Environment Agency (Umweltbundesamt) estimate that there are approximately 70,000 former industrial or commercial sites plus around 10,000 former garbage dumps that should be tested. Of these, the agency estimates that between 1,000 and 2,000 sites will require remediation. The most common sources of contamination are petroleum products and by-products, metals, and various industrial and commercial chemicals. Tackling these sites is a slow process because there is no incentive for a property owner to test or clean up a site. Triggers for an assessment include: obtaining permitting for a new building, selling the property, or if the site is identified as a probable source of groundwater contamination. Furthermore, because of regulations limiting in situ clean-ups, soil remediation can be an extremely expensive process involving the removal/replacement of huge quantities of earth. Proposed changes to those regulations currently under consideration could improve the situation, opening the door for less expensive in situ clean-ups.

Drinking water

All tap water in Austria is potable. The average per capita water use is approximately 130 liters per day, and a 4-person household uses an average of around 200 m^3 of drinking water per year. The cost of drinking water is 1.09 Euros per cubic meter. According to the latest available figures, 90 percent of all Austrians purchase water from a provider. Considering the topography of Western Austria, this is considered to be very close to full water network expansion. The water delivery network is 59,000 km long, and includes 2,900 tanks with 4.2 million cubic meters of capacity. There are over 1.1 million building connections, and 2,630 spring taps. Water is not treated before consumption, but disinfection systems using chlorine, chlorine gas and UV as well as monitoring systems are installed in larger population centers. Most drinking water is sourced from groundwater, which is monitored by a network of 1,976 measuring stations throughout Austria. Water quality is determined according to how many stations report a value higher than determined safe for 140 chemical parameters. The pollutants

that regularly cause problems are nitrates (10–16 percent of the measuring stations report higher than allowed values), as well as the pesticide Atrazin and its derivative desethylatrazin, ammonia, and orthophosphates, whereby these are reported in less than 2 percent of the measurement stations. (Sources: Wassergüte in Österreich, Jahresbericht 2011, and Austrian Association for Gas and Water, accessed 2013)

Air Pollution and Climate Change

The Austrian Ambient Air Quality Act and the Ozone Act define the scope of air pollution monitoring. These and related ordinances stipulate the limit and target values for SO_2, NO_2, NO_X, PM_{10}, $PM_{2.5}$, CO, Benzene, and Lead. The most problematic values are for PM_{10}, NO_2, and ozone, all associated with exhaust from automobile traffic. Especially the elevated PM_{10} values can be traced to Austria's love of the diesel engine, which powers more than half the vehicles on the road here. The last year for which figures are available is 2011, when 80 of 140 monitoring stations reported significant PM_{10} violations, amounting to more than 35 days above the 50µg/m^3 limit. (Source: Umweltbundesamt, *Jahresbericht Luftgütemessungen in Österreich 2011*, accessed March 2013)

The Austrian portion of the European Union's climate goals for 20-20-20 include a 16 percent reduction (basis year: 2005) in GHGs above and beyond the EU emissions trading scheme. In addition to programs designed to incentivize building insulation and investment in renewable energy, transportation is seen to hold significant potential. In particular the problem of "gas station tourism" could be reduced if the price of fuel were similar in Austria's border regions and the bordering countries (Austria shares borders with 8 EU nations). Other ideas include lower speed limits, distance-based user fees for expressways, and making public transportation even more attractive.

Best Prospects

- Waste management: Innovative waste collection/separation/processing technologies that could reduce cost or increase efficiency, waste-to-energy solutions
- Surface water resource management: Innovative technologies for water treatment facilities, including treatment options, waste to energy and monitoring equipment
- Soil remediation and groundwater/drinking water: in situ solutions to remediating contaminated soil are likely to be approved soon. Innovative no-dig solutions for monitoring and maintaining the water delivery network. Non-toxic disinfection solutions for city water distribution systems in growing cities.
- Austrian "green tech" companies report a turnover of USD 11 billion in 2011 just for products and services which could be identified as exclusively dedicated to renewable energy or environmental protection. Of that figure, 73 percent were export sales. Entering the supply chain for these firms is another significant business opportunity for U.S. companies.

Trade Events

Due to the geographic proximity and shared language, Austrians tend to visit the large German shows in these sectors. U.S. companies looking to find Austrian distribution or joint venture partners are likely to meet them when exhibiting in Germany. The following are the most important Austrian shows and events in this sector:

World Sustainable Energy Days

oec.at/en

Annual conference in Wels, focused on energy efficiency. Organized by OEC Oberoesterreich and co-located with the EnergieSpar Messe.

EnergieSpar Messe

energiesparmesse.at

Annual trade show in Wels, with a focus on energy efficiency in building. Organized by Messe Wels GmbH.

Bauen und Energie Wien

messe.at/en

Annual conference in Wels, focus on energy efficiency, organized by OEC Oberoesterreich and co-located with the EnergieSpar Messe

Resources

- Umweltbundesamt (Austrian Environmental Protection Agency): ***umweltbundesamt.at/en***
- Federal Ministry for Transport, Innovation, and Technology—Department of Technologies for Sustainable Development: ***www.bmvit.gv.at/en***
- Federal Ministry for Environmental Affairs—Federal Ministry of Agriculture, Forestry, Environment and Water Management: ***lebensministerium.at/en***
- Statistik Austria: ***www.statistik.at/web_en***
- WIFO Österreichisches Institut für Wirtschaftsforschun
- Federal Agency for Water Management: ***www.baw.at/index.php?lang=en***
- Austrian Association for Gas and Water (Oesterreichische Vereinigung für Gas und Wasserfach): ***www.ovgw.at/en***
- Advantage Austria—Federal Economic Chamber (WKÖ): ***advantageaustria.org***
- Bundesabfallwirtschaftsplan (Federal Waste Management Plan): ***bundesabfallwirtschaftsplan.at***
- E-Control: ***e-control.at/en/home_en***

Belgium

Overview

The Belgian environmental market (public and private sectors) is estimated at approximately USD 5 billion divided among wastewater treatment, waste management, soil remediation, air pollution control and environmental consultancy. The market has not grown significantly since the last market report for this sector was published in 2008. The ecological footprint of the average Belgian is 4.9 global hectares, 2.7 times the available space per person (1.8 ha). Of this amount, 0.95 ha comes from food production, 1.25 ha comes from accommodation, 0.95 ha comes from transportation and 1.75 ha comes from various waste streams—for example, goods and services, health care, and consumer consumption.

Market Opportunities

The leading Belgian sectors for U.S. export and investment are: biotechnology, chemicals, energy and renewable energy, environmental technologies, green building, medical devices, safety and security, automotive, and travel and tourism. As the host of NATO and EU headquarters, and hundreds of other international organizations, Belgium also offers opportunities for specific projects. Belgium's central location in the wealthy region of Europe makes of the country an ideal gateway for exports to Europe. Within a radius of 300 miles, 140 million EU consumers can be reached representing 60 percent of Europe's purchasing power. Belgium is also seen as a test market. Indeed, Belgium contains a few distinctly separate socio-demographic groups such as the Germanic Flemings and the Latin Walloons, governed by the same legal system. The Belgian economy largely reflects the overall European economy and consumer, a mini-Europe that is easier to enter than starting with larger European markets.

Moreover, Belgian productivity levels are the result of high investment in the quality of its labor force. Because of its location and history, the educational system in Belgium is highly oriented towards the instruction of foreign languages.

Statistics

Capital:	Brussels
Population:	11 million
GDP:	USD 413.281 billion
Currency:	Euro (€)
Language:	French, Dutch, German

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U.S. companies contemplating the Belgian market will be encouraged by the large number of English speakers. The Notional Interest Deduction (NID) of 2005 introduced an annual deduction on taxable income and is very attractive for foreign businesses as it reduces the taxable base. The American Chamber of Commerce (AmCham Belgium) has tracked the impact of NID on U.S. companies operating in Belgium. Changes to the NID are being debated by the di Rupo government.

Best Prospects

U.S. exports of environmental goods increased by 23 percent only in 2010, keeping pace with the overall growth of the global market. Exports to Belgium have likewise kept pace with this global growth rate. By the end of 2010, U.S. water-related exports to Belgium stood at around USD 6 billion, which account for 5 percent of the U.S. exports of water products worldwide. These exports included products, chemicals, and supplies. Opportunities were also realized with services, primarily consulting and engineering. Predominant product exports to Belgium from the U.S. in the water sector fall into HST numbers 8413 (pumps, submersible pumps, centrifugal pumps), 8421 (water filtering apparatus and parts), and 8481 (all types of taps, cocks and values). Filtering and purification devices are among best prospects for U.S. exports to Belgium.

Water and Wastewater

The Belgian water treatment market is comprised of industrial and residential wastewater and drinking water treatment, and includes both equipment and services. Currently, the three regions of Belgium—Flanders, Wallonia, and Brussels—are applying new technologies to areas in wastewater treatment and recycling the use of water. The best prospects for American companies are in equipment and supplies. It is recommended to approach the Belgian market through partnerships, strategic alliances, and joint ventures with local firms.

Waste and Recycling

The ecological footprint of the average Belgian is 4.9 global hectares, 2.7 times the available space per person (1.8 ha). Of this amount, 0.95 ha comes from food production, 1.25 ha comes from accommodation, 0.95 ha comes from transportation and 1.75 ha comes from various waste streams—e.g., goods and services, health care, consumer consumption.

The Belgium environmental market is primarily engineering and service-oriented. Most companies provide environmental services in waste integrated management, wastewater treatment and soil remediation. The Belgian environmental market is undergoing much change currently, with the reorganization of the public waste sector, newcomers from Asia, and industrial operators restructuring their operations. Household waste is managed by the public sector through regional and municipal authorities. The industrial waste market is managed by the private sector. However, pressures are now in play to privatize the household waste sector.

Soil Remediation

Soil may become polluted from a number of sources: industrial activity, agriculture, leaking fuel storage tanks, transport accidents, and more. All three regions undertake similar approaches to remediating soil issues and maintain registries of contaminated sites. The first step is a thorough investigation which can then be used to next determine if remediation is necessary and to what extent. The final stage is actual remediation activities. Property transfer laws have a significant impact on remediation. Soil investigations are mandatory upon property transfer. In the case where the private parties cannot agree to undertake remediation, local authorities reserve the right to step in to perform the necessary work.

The three regions and the federal government have in fact joined together to form a financing and soil remediation needs of petrol stations. In Flanders alone, OVAM estimates that there may be as many as 3,000 cases that need to be effectively and efficiently dealt with. In March 2004, a fund called BOFAS npo was created to handle the financing for petrol station clean up.

Indoor and Outdoor Air Pollution—Particulates

As noted, the largest improvement with this category will come from attacking the largest source—diesel automobile engines. Technologies that can burn diesel more thoroughly, efficiently and effectively should see improving market opportunities in Belgium with the passage of the new EU Ambient Air Quality Directive. As the EU is heavily committed to biodiesel and biofuels, they have begun to address this issue. However, these alternate fuels are not without their own set of unique implications, such as increased NOX emissions from corn and rapeseed derived biofuels.

Indoor and Outdoor Air Pollution—Indoor Air Quality

To date, the EU has not developed any specific directives for indoor air quality, but issues related to indoor health are now receiving much attention. Like most Europeans, Belgium citizens spend a significant amount of time indoors. Safety from typical indoor pollutants—benzene, radon, formaldehyde, household cleaning solvents, etc—will need attention. As the U.S. has been a leader in indoor air quality, U.S. product should see an advantage in serving this segment. Sensing devices, monitoring devices, and ventilation and filter systems should see opportunity in the area of indoor air quality. This is true for all indoor activity—from the home to workplace.

Brazil

Market Opportunities

In 2010, the Government of Brazil passed the National Solid Waste Policy (Law 12,305) to stimulate recycling and manage waste with high contamination potential. The law determines that households in municipalities that offer "selective collection services," sort their domestic waste. In order to receive any government funding for urban cleaning and waste management activities, the municipalities will need to have a waste management plan in place.

The law still requires implementation legislation and the companies will need time to adapt to the new requirements and determine the appropriate treatment for each type of material.

Major elements of the National Solid Waste Policy:

- New garbage dumps cannot be created;
- All municipalities have to build sanitary landfills that will only allow products that are not appropriate for reuse or composting;
- Imports of waste are prohibited;
- Using "reverse logistics" manufacturers, distributors and retailers are obliged to collect certain used products, including agricultural chemicals, batteries, tires, lubricant oils, all types of lamps and electronic products such a cell phone and computers;
- Should manufacturers, importers, distributors and retailers not fulfill their reverse logistics responsibility under the law, the government will fulfill them or contract to have them fulfilled and charge companies accordingly;
- Recycling industries will have priority in government financing;
- Encouraged activities are non-generation, reduction, reuse, recycling, treatment and adequate final disposal;

Statistics

Capital:	Brasília
Population:	190 million
GDP:	USD 2.47 trillion
Currency:	Real
Language:	Portuguese (Brazil)

Contact

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- Non-recycled waste must be used for energy generation, once technical and environmental feasibility studies indicate the appropriateness. The emission of toxic gases have to be monitored;
- Companies that manage, transport, store or process hazardous waste must register in the "National Registry of Hazardous Waste Operators" and prove their technical capability.

Water/Wastewater Sector:

The Brazilian government's goal is to provide sanitation coverage to all Brazilian population. The amount of investments required to reach this objective is USD 100.5 billion. Investments needed by geographic region include:

- North—USD 9.15 billion
- Northeast—USD 21.01 billion
- Southeast—USd 41.92 billion
- South—USD 18.64 billion
- Center-West—USD 9.83 billion
- Total Brazil—USD 100 billion

About 30 percent of the above total represents replacement of equipment, pumps, asbestos, and cement pipes. The sector's major challenge is the expansion of sewage collection and treatment, which is expected to attract most of the investments.

Private Sector Investments

As a result of the Public Consortium Law of 2007 (Law 11455, which creates Public-Private Partnerships (PPP) as part of the "Sanitation for All" program), the private sector is increasing its direct participation in the sanitation business by operating water and wastewater utilities, which in turn is increasing the demand for higher technology equipment used by the water and wastewater utilities. According to industry specialists, Law 866, which regulates procurement of public sector companies in Brazil, stipulates that procurements favor the lowest bidder. This legislation discourages local water and wastewater product manufacturers and exporters from offering sophisticated technologies.

In 2008, Sabesp, the state of Sao Paulo's water utility, established its first PPP with CAB-Galvao Consortium. They are now considering five additional PPPs which are currently being analyzed. In 2007, the municipality of Rio Claro, state of Sao Paulo, established a PPP with the Odebrecht Group, to operate and expand sewage treatment. This was the first municipal PPP in Brazil.

Estimates by the Brazilian Association of Water and Sewage Public Services Concessionaires (ABCON) indicate the private sector will invest about USD 8.3 billion in basic sanitation works by 2017 and will manage concessions that will cover 30 percent of the Brazilian population, compared to the current level of 9.6 percent.

The Odebrecht group has recently created its own sanitation company, Odebrecht Engenharia Ambiental (OEA), which already has seven concession contracts in the sector. According to the company's source, OEA has about USD 690 million to invest in new concessions in the next three years.

The Spanish-owned OHL Meio Ambiente Brasil, which currently has two sewage treatment contracts with municipalities in the state of Sao Paulo (Ribeirao Preto and Moji Mirim), foresees investments of USD 16 million by 2010, for treating half of the sewage of Mogi Mirim (84,000 inhabitants). OHL has investment plans of USD 276 million and plans to bid on five new concessions in the midterm.

The municipal water utility in Campinas, Sanasa, will build two sewage treatment plants using Membrane Bioreactor technology (MBR), a technology first promoted in Brazil by USTA which took state water treatment personnel to the U.S. to see the equipment being used.

Air Quality Monitoring Engagement

In 2012, the U.S. EPA and Brazil Ministry of Environment entered into a Memorandum of Understanding that included technical exchanges to improve air quality monitoring capacities as possible areas for cooperation. Efforts to facilitate Brazilian access to U.S. approaches to air quality measurement and assessment can also be achieved by better integrating U.S. environmental monitoring companies follow up projects of the U.S.-Brazil Joint Initiative on Urban Sustainability (JIUS), which was a bilateral program that focused on addressing urban issues, including air quality. Additionally, exchange of air quality and other relevant standards will be better integrated into the U.S.-Brazil Commercial Dialogue to facilitate access to relevant technologies. These efforts support the March 2011 agreement between President Obama and President Rousseff to enhance cooperation in trade and environmental protection and cooperation. For more information on EPA activities in Brazil, please visit ***go.usa.gov/bF2j***.

Best Prospects

Currently in Brazil, there is increasing demand for effluent treatment and energy/water saving technologies, as well as for specialized consulting services. Such technologies include advanced water treatment (filtration), water loss prevention solutions, "intelligent valves," efficient water distribution and reuse projects, water saving devices, and rain water systems, among others. Membrane filtration is a technology that has become more common in Brazil as a consequence of cost reduction. Membranes used in ultra, micro, nano filtration and reverse osmosis are imported into Brazil. Suppliers of water treatment stations incorporate specific imported equipment; laboratory and analytical equipment are also usually imported, and in an increasing demand.

Opportunities include solutions related to water distribution systems, including services and equipment, since the water loss rate in Brazil corresponds to about 40 percent of the potable water produced in the urban areas. Additionally, water reuse is becoming increasingly important in Brazil, especially in the large centers where water scarcity represents high operational costs for water impounding and adduction. Existing legislation imposing charges for collecting and disposing effluents in water bodies increases the demand for specialized consulting services and effluent treatment technologies.

Investments in solid waste treatment technologies and waste to energy projects in sanitary and hazardous landfills are expanding significantly. The Brazilian government plans to invest USD 870 million in solid waste treatment projects, replacement of garbage dumps, and introduction of selective waste collection services and financing of cooperatives of waste collectors. The Brazilian government expects that recycling activities income increases from current USD 1.1 billion to USD 4.5 billion.

The demand for air pollution control products is also rising in Brazil. In addition to the industrial demand, the increased number of Clean Development Mechanism CDM projects in sanitary landfills and the vehicle emission inspection program, mandatory in some of Brazil's largest municipalities generate a demand for gas emission monitoring technologies and gas analyzers, as well as the demand for industrial filters.

Bulgaria

Overview

Bulgaria's accession to the EU was a major impetus for large-scale environmental remediation and implementation of new environmental standards in Bulgaria. Bulgaria will have to invest major funds to meet EU environmental requirements, some of the funding coming from EU funds for environmental water and waste infrastructure projects. Bulgaria will need to import almost all of the technology for these requirements, and U.S. companies that possess world-class technology, equipment, services and systems at competitive prices will be best poised to benefit from these opportunities. There are no restrictions for U.S. firms to take advantage of EU funding for environmental projects.

Ministry of Environment and Water (MOEW), together with other state institutions, representatives of NGOs and other partners are developing the new operational programme "Environment" (OPE) 2014–2020. The EU will provide substantial funding for water, wastewater and biodiversity projects. The aim is to build a more competitive low carbon economy in which resources are used in an efficient and sustainable manner.

Market Opportunities

Bulgaria boasts a talented labor force, one of the lowest wage rates in EU, and a convenient geographical location. EU membership offers additional opportunities as Structural and Cohesion funds are funding major infrastructure projects. For more information, please visit ***go.usa.gov/bFTP***.

Water and Wastewater

Most industries in Bulgaria need to construct or upgrade their wastewater treatment facilities in the next 3–4 years in order to meet the new EU requirement. Urban wastewater treatment plants are planned for hundreds of cities and towns with population equivalent of above 2,000 through 2015. There are EU funds for the construction of wastewater treatment plants and water supply/sewage

Statistics

Capital:	Sofia
Population:	7.4 million
GDP:	USD 103.8 billion
Currency:	Lev (BGN)
Language:	Bulgarian

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networks at many municipalities. The Bulgarian municipalities will tender these projects as design and build projects. Price is a leading factor in winning these tenders.

Solid Waste

Currently, Bulgaria utilizes landfills for the disposal of municipal waste. The EU requires Bulgaria to decrease the number of landfills and build regional landfills for a group of municipalities. There is a critical need to find more environmentally-friendly ways to handle hazardous, solid, and industrial waste, such as waste-to-energy projects, recycling, and waste minimization. Some solid waste treatment plant construction projects are indevelopment, but the projects have not yet been finalized.

The market is not very receptive of composting projects.

Wind Energy

A series of regulatory measures over the last two years has worsened prospects for the Bulgarian wind industry, including a major cut in the feed-in tariff (FIT) and a grid access fee slapped on operational renewable energy plants last year, equivalent to 10 percent of their FIT in the case of wind.

Air

The air pollution control sector will provide opportunities for construction of air pollution control installations at various industrial facilities.

At the end of January 2013, 17 EU member states, including Bulgaria, received letters of advice, informing them about their failure to meet the requirements of the current European directive regarding air purity.

Canada

Overview

Canada's Environmental Technology market is large and growing, with over USD 18.4 billion in revenues. In 2010, export revenues were USD 1.4 billion, and sales of environmental goods accounted for 55 percent of industry revenues. Canada's ET market comprises of several firms that develop similar technologies and products, which support the environmental market. Canada's waste management and remediation services, for one is the largest single part of the Canadian environment industry. This sector represents nearly one quarter of total environmental industry revenues. Another large segment of the Canadian environment industry includes water and wastewater technologies. In 2012, the estimated upgrade costs for wastewater treatment facilities were estimated at USD 1.4 billion.

Other environmental technology strengths that Canada fosters include wind energy technology. Canada is currently the 9th largest producer of wind energy in the world, with the Canadian Federal government committed to seeing 90 percent of Canada's electricity generated by non-emitting sources by 2020. Similarly, Canada's clean technology market is estimated to be USD 10.6 billion and projected to exceed USD 26 billion in the next five years.

Statistics

Capital:	Ottawa
Population:	34 million
GDP:	USD 1.74 trillion
Currency:	Canadian Dollar
Language:	English, French

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Market Opportunities

Wastewater Treatment

- Wastewater treatment facilities in Newfoundland Labrador, Quebec, Nova Scotia, British Columbia, Ontario, Alberta, Saskatchewan, the Yukon, and an additional 150 federally owned plants throughout Canada by 2020.
- First Nation Communities: 18 water projects, USD 165 million in federal funding allocated
- Capital Region District Wastewater treatment plant (USD 782.7 million) Victoria, BC

In addition, the Core Area Wastewater Treatment Program has three main projects:

1. McLoughlin Wastewater Treatment Plant: a 0.8 kilometer harbor crossing and 1.6 kilometer marine outfall pipeline.
2. Biosolids Energy Centre: design and construction of a sludge dewatering and stabilization facility, biosolids storage and truck loading facility, pumping stations, 18 kilometer pipeline to transfer waste from McLoughlin Wastewater Treatment Plant to the Biosolids Energy Centre.
3. Conveyance System Upgrades: Macaulay Point-McLoughlin Conveyance (USD 13 million), Clover Point-Ogden Point Conveyance (USD 20 million), Currie Pump Station upgrade/ pipelines, consisting of an extension of the Trent Pump Station siphon (USD 12.8 million), Craigflower Pump Station replacement (USD 10 million), Arbutus Road Attenuation Tank (USD 9.5 million).

Wind Energy

Experts predict that between now and 2025, 15 percent of Canada's energy mix will be phased out and will need replacement. Investment of approximately USD 185 billion dollars will be required for procurement needs (under prospects)—USD 95 billion in generating capacity, USD 27 billion in transmission and USD 63 billion in distribution.

There are strong political incentives offered by the Canadian federal and provincial governments, and a true commitment to wind energy.

Clean Tech

There are several opportunities to be found within different sectors under clean tech. Within oil and gas opportunities include carbon capture and storage, tailing and tailing pond, oil shipment and storage, and leak detection services. In environmental services and green building opportunities such as reclamation and remediation of groundwater and soil, solar energy, eco-certified lumber, double glaze windows, and low volatile organic compound paints are included.

Best Prospects

Wastewater Treatment

- Pipeline construction for the Biosolids Energy Centre and conveyance facilities.
- Advisors needed for legal, finance, risk/insurance, fairness, and conflict of interest adjudication.
- Proposals sought for planning, surveying, and drilling.
- Macaulay Point and Clover Point Conveyance system—Project scope includes grit removal, partition pump station to pump to McLoughlin, maintain screening and overflow pumping.
- McLoughlin Facilities—Request for proposals will occur during the second quarter of 2013, contract will be awarded by December 2013, and construction will start in 2014.
- Biosolids Energy Centre—Request for proposals will occur during the first quarter of 2014, contract will be awarded by September 2014, and construction will start in October 2014.

Wind Energy

- Wind turbines, tower sections, rotor blades, casting and forgings and transformers.
- Gears and generators.
- Hydro energy turbines and equipment
- Engineering, construction and logistics services.
- Smart Grid.

Chile

Overview

(in USD thousands)	2010	2011	2012 (est.)	2013 (est.)
Total Market Size	1,500	2,500	4,000	5,000
Total Local Production	300	500	800	1,000
Total Exports	N/A	N/A	N/A	N/A
Total Imports	1,200	2,000	3,200	4,000
Imports from the U.S.	360	600	960	1,200

Data Sources: Unofficial estimates based on information from industry sources from the public and private sector.

Market Opportunities

The depletion of the underground water reserves that have supplied the cities and mining operations in northern Chile will continue over the next few years, forcing consumers to look elsewhere for their water supply. While still expensive, the cost of desalinizing sea water has decreased to a fifth of what it was 30 years ago and requires six times less energy. Desalinization is a viable option despite the distances that water must be pumped to reach the mining operations located 300+ kilometers inland. The threat of less rainfall and the deterioration of glaciers clearly indicate that one of the main challenges is and will continue to be lack of water. Chile already has plants in operation and Arica-Parinacota, Chile's northernmost city, expects to meet 100 percent of the demand by 2014.

According to the "Dirección General de Aguas" (DGA, ***www.dga.cl***), the private sector has plans to invest between USD 4–5 billion in northern Chile's desalination business through 2014. It is expected that this figure will be complemented by additional investment as a result of government incentives. Between 2012 and 2014, there have been investments announced that will exceed USD 20 billion. The strongest growth in demand for water is expected in mining and industrial

Statistics

Capital: Santiago
Population: 17,216,945 (est. 2013)
GDP: USD 325.8 bn (est. 2012)
Currency: Chilean peso (CLP)
Language: Spanish (official), German, English, Mapudungun

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operations as these industries expand. More moderate growth in demand will be seen in agricultural and potable water as the infrastructure is largely in place in these areas.

Best Prospects

According to industry experts, the greater potential in environmental technologies will be oriented to the water sector during the next years. Sectors anticipating growth include:

- Project design and construction of desalinization plants.
- Water and wastewater treatment equipment and technologies
- Project design and construction of water treatment plants.
- Preventive maintenance techniques in water treatment plants, such as vibration, laser alignment, oil dialysis, and more.
- Reutilization of wastewater for agricultural irrigation.
- Biological biosolid evaporation processes and latest generation biosolid evaporation systems.

Participating in trade shows offers a unique opportunity for U. S. suppliers to introduce their products and services in the Chilean market:

- Expo Agua, the water show takes place in Chile every two years. The next version of the event will take place in October 2013.
- Expomin is a CS Certified Trade Show and it gathers over 2,500 exhibitors. The U.S. Pavilion has approximately 200 exhibitors. Expomin 2012 will take place in April 2012 in the city of Santiago. ***expomin.cl/index.php?idi=11***

China

Overview

The 12th Five-Year Plan outlines rigorous environmental goals including reducing major pollutant emissions, safety of urban and rural drinking water resources, and the reversal of ecological deterioration. The increasing interest in environmental awareness across China presents an opportunity for U.S. companies to provide expertise and new technologies in key areas such as wastewater treatment, solutions to air and water pollution, and soil remediation. China relies heavily on its coal resources and imported oil. The methods used to extract and create energy from these resources involve high emissions of carbon and air and water pollutants. The government has highlighted alternative forms of energy as key to reduce pollution from these substances. Increased public awareness of major pollution incidents has influenced the government to put environmental protection efforts at the forefront of China's future. There are many opportunities for U.S. companies to enter the Chinese market in these industries, however most of the industry is dominated by an invisible monopoly of State owned enterprises. Market entry for U.S. companies may require significant time investments, a need for local personnel, or the creation of appropriate partnerships. Chinese companies embrace the knowledge and expertise that experienced U.S. companies have to offer in the environmental protection industries and desire to learn systems and knowledge from other nations and adapt them to fit the needs of China.

Market Opportunities

Water Treatment

China's per capita water supply is 2,100 m^3 per year, or 25 percent of the world average. Water resources tend to be scarce, unevenly distributed, and often heavily polluted. China's rapid industrial changes have created a need for environmental saving and protection solutions. The 12th Five-Year Plan highlights a 30 percent reduction in water use per unit of industrial production from 2011–2015. A future projection indicates the government will strive to continue to reduce the rate of

Statistics

Capital:	Beijing
Population:	1.33 billion
GDP:	USD 8,223 trillion
Currency:	Yuan (¥)
Language:	Mandarin Chinese

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water used per unit through 20201. These reductions are designed to reduce pollutants added to water. This industry has grown and accounted for nearly RMB 2 trillion in 2010. China's close proximity to sea water has spurred the market for desalination. According to market estimation, during the 12th FYP, the compound growth rate of desalination industry could reach around 20 percent. By the end of 2015, the desalination projects and related investment could reach RMB 10 billion in China.

The government also plans to reduce chemical oxygen demand by 8 percent, a 10 percent reduction in ammonia nitrate, and a 15 percent reduction in other heavy metals.1 Urban and rural regions face very different water-related issues. Rural regions are highly affected by seasonal changes and frequently experience devastating droughts or floods. The people of these regions have limited access to safe, drinkable water. The urban population lacks the proper infrastructure for efficient water usage and water irrigation systems. The opportunities for companies looking to share knowledge and expertise in water treatment are both broad and comprehensive.

Opportunities include:

- Quality monitoring and pollution rating systems
- Water efficiency
- Water-saving irrigation technologies
- Flood and Drought prevention systems

Wastewater Treatment

The severe water pollution and water shortage problems that are currently plaguing China provides an ample opportunity in the wastewater treatment industry. Sewage discharge has an annual increase of approximately 2.03 billion tons on average and accounted for 65.21 billion tons in 2011. The government has identified the lack of clean water as an issue and is working to improve China's wastewater treatment facilities. In the 12th Five-Year Plan, the State Council introduced a National Urban Wastewater Treatment and Recycling Facilities Construction Program which is striving to build and advance the wastewater treatment plants by 2015. In 2010, the market was estimated to be about USD 6 billion. According to the government's plan, they will allocate about RMB 430 billion (USD 63 billion) toward improving the urban sewage rate to 85 percent in urban areas, 70 percent in county-level cities, and 30 percent in towns by 2015.2 China has a rapidly increasing wastewater volume and recognizes the potential to use waste resources for energy generation. Sludge treatment and disposal represent another large market opportunity.

Thus far, due to lack of government incentives, the industry continues to build low-cost solutions and practice unsafe disposal through landfills despite the availability of more advanced technology solutions. U.S. companies looking to enter this market do face a number of entry barriers that can hinder growth including rapidly increasing sludge, water pricing mechanisms, intellectual property issues, waste collection constraints and increase electricity consumption in wastewater treatment plants. According to China Greentech Initiative

wastewater treatment, water usage efficiency solutions, and water recycling technologies will be a significant potential market if stricter government enforcement is instated and intellectual property issues are solved.

Opportunities include:

- Industrial wastewater treatment and reuse
- Municipal wastewater treatment and reuse
- Gray water recycling
- Sludge treatment and solutions
- Infrastructure operations and financing
- Industrial wastewater treatment and reuse

Air Pollution

Air pollution within China tends to be a both a national and regional issue. Air quality is becoming increasingly worse with the growing popularity of urbanization. Public awareness and international recognition of record-setting pollution levels, including the unhealthy level in Beijing in January 2013, have influenced the government's acknowledgment of a need to place tighter restrictions on emissions and implement air pollution solutions. The market for clean air solutions such as indoor air quality and vehicle emission monitoring are open to all market players. China has made a strong commitment to monitor and reduce key pollutants nationwide. The government has highlighted a number of key substances to be reduced in the upcoming plan in addition to developing stricter rules on transportation air emissions and tightening standards on carbon monoxide, oxides of nitrogen, volatile organic compounds, and other particulates. Recent measures include the 2012 adoption of a new, more stringent national standard for fine particles (WHO level 1) as well as a comprehensive and transparent national air quality monitoring network.

Opportunities include:

- Portable Monitoring systems
- Tighter restrictions on emissions
- Industrial Process Solutions
- Air quality control devices

Soil Remediation

Rapid urbanization in China has created a need for solutions to contaminated soil regions. According to the Nanjing Soil Research Institute's report, China has more than 1,000 farm chemical and pesticide production bases; together, 80 of these locations account for nearly six million tons of metal slag that lack the appropriate protection methods for rain or soil permeation.

The China Securities Journal predicts that the market value of soil remediation will be around RMB 40 billion (USD 6.36 billion) by 2015 and will account for nearly 15 percent of the total world market that year. On January 28, 2013, the State Council announced plans to improve China's soil environment situation. This plan established efforts to develop a stringent

protection system for arable lands and concentrated lands used for drinking water resources through the preliminarily goal to decrease the growing rate of soil pollution by 2015. The State Council's plans signified the first time a document of this kind was created to address and classify the polluted lands into categories based on pollution levels.

These standards present a new challenge for companies when identifying and reducing a soil's pollution rate prior to the start of a project as failure to meet the requirements of the assessment or soil quality standards could result in loss of the land in question along with the government refusing to issue a construction permit. Although there is no unified policy across China regarding soil remediation or polluted land, government officials predict it will take a more prominent role in the 13th Five-Year Plan period (2016–2020).

Opportunities include:

- Assessment and remediation standards
- Equipment for remediation construction
- Specific reagent for remediation
- Underground water treatment

Cement Plant Pollution Reduction

EPA worked with the U.S. Department of Energy Lawrence Berkeley National Laboratory's China Energy Analysis Group to produce a benchmarking tool that recommends best practices to improve cement kiln combustion efficiency, which concomitantly reduces many conventional air pollutants, as well as greenhouse gases, and hazardous air pollutants such as dioxins/furans. The Benchmarking Energy Efficiency Standards Tool ("BEST") is available at ***go.usa.gov/bFUA***.

Alternative Fuels

With support from EPA, DOE/LBL has also produced guidelines for the use of alternative fuels (also called "co-processing") such as sewage sludge and municipal solid waste. This practice is being heavily promoted in China to address the growing solid waste problem. The guide is available at ***go.usa.gov/bFPe***.

For more information on EPA activities in China, please visit ***go.usa.gov/bFEx***.

Colombia

Market Opportunities

The pollution control equipment market continues to represent a sizeable opportunity for U.S. exporters. Estimates by the Ministry of Environment, Housing, and Territorial Development (MMA) show that close to 80 percent of Colombia's municipal entities dispose of untreated wastewater into rivers or lakes. The country's coverage of potable water infrastructure reached 97.4 percent of the urban population providing 90.2 percent of the population with access to sewer system. In the country's rural areas the situation is markedly different; aqueduct service coverage reaches only 66 percent and sewer system access reaches only 57.9 percent of the inhabitants.

Given the large negative health impact of pollution in general in Colombia, the government has enacted stricter regulatory limits for air pollution emission levels for mobile and fixed emission sources, and MMA faces major challenges to improve environmental regulations, policy, environmental regulations enforcement, and capacity building for the different government agencies. Key focus areas include integrated water resource management and monitoring systems, water and wastewater treatment and sewerage systems, underground water supply, air pollution control, and toxic and hazardous waste collection and disposal.

Colombia is a regional leader in the development and implementation of a wastewater pollution "tax" (tasa retributiva). However, only a few environmental agencies have established regional funds to finance wastewater treatment facilities. Cities such as Bogotá and Medellín own wastewater treatment plants, and Cartagena is developing an underwater outfall system with World Bank funding. Nevertheless, funding remains a central concern with the exception of Medellín new wastewater treatment plant with IDB funding in the amount of USD 450 million.

Statistics

Capital:	Bogotá
Population:	46 million
GDP:	380.5 billion
Currency:	Peso
Language:	Spanish

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Since May 15, 2012, with the implementation of the U.S. Colombia Trade Promotion Agreement (CTPA), 79 percent of U.S. environmental goods and equipment has duty-free treatment immediately, improving its competitive advantage compared to vendors from other countries. The remaining equipment tariffs will be eliminated in a period of between five to 11 years.

Best Prospects

Best prospects include water and wastewater treatment plants, water pollution monitoring and control equipment, pumps, valves, solid waste hauling and disposal equipment, air pollution monitoring and control equipment, and environmental services (consulting). The operation and management of municipal services such as providing potable water and collection, hauling and disposal of solid waste also provide good market opportunities for U.S. firms.

Empresas Públicas de Medellín (EPM) is currently developing a USD 450 million loan from the Inter Development Bank (IDB) to develop a five cubic meters per second Bello wastewater treatment plant (activated sludge treatment system) on the Medellín River. In 1999, EPM's put in service the San Fernando wastewater treatment plant as part of the sanitation plan for the Medellín River, which includes wastewater pipeline, expansion and upgrade of Medellin's sewage network. Bogota's water and sewer company (EAAB is planning a 14 cubic meters per second Canoas wastewater treatment plant that could reach USD 1 billion (when all phases are implemented by 2025).

Czech Republic

Market Opportunities

Water and Wastewater

The water sector was privatized in the mid-1990s and the municipalities and their unions became the new owners. 93.4 percent of Czech population was connected to drinking water pipelines in 2012. Current length of drinking water pipelines is 74,141 km. 623.1 billion m^3 of drinking water was manufactured, out of which 486 billion m^3 were paid for. Drinking water losses represent 11.2 billion m^3—18.5 percent. 83 percent of Czechs are connected to sewerage systems. Total length of sewerage pipes is 41,911 km. Almost 96 percent of wastewater was treated in as many as 2,201 wastewater treatment plants (WWTP). Market demand for advanced technologies is mostly satisfied by imports. Most of the imports come from Europe. The quality of tap drinking water is high. Economic crises and better information on tap water quality leads to slow decrease in sales of bottled water. Current polls show that 88 percent of population drinks tap water at least time from time. The use of home filtration systems is also growing slowly. Increasing pricing of water leads to larger use of water saving water batteries or water saving washing machines and similar technologies. Trenchless technologies/CIPP are slowly gaining foothold in the Czech market.

Waste and Recycling

Landfills

Currently, 148 landfills for non-hazardous waste (62 owned by municipalities), 26 for hazardous waste/combined (mostly private company owned) as well as 31 for inert waste exist. The number of landfills has been decreasing since 1991 but landfilling of waste still remains the most frequent manner of waste disposal. Capacity for landfilling is sufficient until 2050. There is a plan to increase landfill tax and extend restrictions for biodegradable waste to disposed in landfills.

Statistics

Capital:	Prague
Population:	10.46 million
GDP:	229.8 billion
Currency:	Czech crown
Language:	Czech

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Incinerators with Energy Recovery

Three three incinerators of municipal waste are operated in the CR at estimated capacity of 654kt/year. The incinerators are located in Prague (Malešice, Praha, municipal owned), Liberec (Termizo Liberec, private (MVV Energie AS) and Brno (SAK, private). The incineration capacity is insufficient; Czech republic needs additional capacity for treatment of mixed waste. A study from the University of Brno calculates that the total capacity needed for CR is 1,500 kt/year to meet the EU requirements. In addition, five co-incinerators (cement kilns) with a capacity of 178 t/year are in operation (not for treatment of household waste) and 28 incinerators for the treatment of hazardous waste are in place. There is a plan to build at least one new incinerator (depending on EU funding).

Bio-Waste Recycling

The treatment of bio-waste is one of the major future issues for CR. In 2012, 239 composting plants, 52 community composting facilities, 326 biogas power plant stations as well as 10 biogas waste stations existed. However, this capacity is not sufficient. There is a plan for legal obligation to municipalities to separately collect bio-waste and for national strategy amendment to reduce biodegradable waste in terms of support for sorting of biodegradable and support for sales of the product of biodegradable waste treatment facilities.

Packaging Waste Recycling

Most of the sorted municipal waste is being recycled with paper (93 percent), followed by glass (71 percent), metals (52 percent) and plastics (52 percent). three glass treatment units, two glassworks which accept waste, 20 paper mills accepting paper and cardboard waste, five facilities for mixed plastic waste and two for the treatment of tetrapack existed in 2012. Despite an encouraging increase in recycling/composting rates, it is unlikely to meet the recycling target of 50 percent by 2020 without substantial investment.

Brownfields and Remediation

The number of available greenfields in the Czech Republic has been shrinking. Brownfields are thus becoming more attractive for investors. Number of brownfield sites is estimated to be 2,355 covering 11,000 ha. From 1991 through 2008, the Czech Republic cleaned up only a fourth of the environmental damage the state had pledged to remove after the fall of communism in 1989. Clean-up projects include the revitalization of the legacy ecological burdens—sites polluted under the communist regime where the polluter is unknown. In an effort to speed up the process, the Czech government decided to open a 'mammoth' tender worth USD 575 million (CZK 115 billion) for the removal of all leftover environmental damage. The tender was canceled recently. The government is obligated to finish all remediation/clean up by 2015.

Environmental consultancy services are generally offered through a competitive bidding system on projects in the government as well as in the private sector. Although the Czech market is extremely price sensitive, clients are willing to pay a substantial premium for the quality and suitability of services offered. U. S. companies will face strong competition from local environmental consulting companies. They can be successful in leveraging their experience and the latest technologies to offer assistance with financial solutions.

Air Pollution

The volume of greenhouse gas emissions produced by Czech power and metallurgical plants has not been declining recently. Carbon dioxide pollutes the air on a massive scale. It was reported to be emitted by 80 plants, mostly power plants, reaching a total of 86.3 million tones. Moravia-Silesia and north Bohemia regions are still the most burdened by pollution. Coal-fuelled power plants make up 14 of the country's 20 largest producers of carbon dioxides. The other heaviest polluters are iron works, chemical plants, heat, and paper producers.

Denmark

Overview

The nation of Denmark has consistently been a leader in renewable and environmental technologies sectors. Denmark's environmental technology future is centered about the recently adopted "Energy Agreement," which is arguably the world's most ambitious renewable energy plan. The keystone of the plan is for the country to be totally fossil fuel independent by 2050, setting benchmarks along the way, including a 33 percent reduction in fossil fuel use by 2020. This drive toward renewable energy independence has fostered an industry that is poised to grow considerably in the coming decades. Predictions for the growth of non-hydropower renewable energy in 2013 are 7.1 percent, with an average growth rate in the sector of 5.8 percent until 2022.

In addition to leading the shift to a fossil fuel free future, Denmark has often opted for more stringent environmental standards in areas not affected by energy. With no point of the country further than 52 km from the sea, the nation has close ties to oceans and coastlines which it has strove to protect.

The Danish Ministry of the Environment and its subgroup the Danish Environmental Protection Agency are the two groups responsible for research and protection of the environment.

Market Opportunities

Wind Energy

The Energy Agreement mandates that by 2020, 50 percent of Denmark's electricity will come from wind power. In December of 2012, the amount of energy which was derived from wind sources was 30 percent, up 2 percent from the previous year. In order to meet the goal of 50 percent wind energy by 2050 it will be required that Denmark adds 2000 MW of wind power. As of 2013, 1500 MW worth of offshore turbines had been approved at Krieger Flak, Horns Rev 3, and various near shore turbine locations.

Statistics

Capital:	Paris
Population:	65 million
GDP:	USD 2.53 billion
Currency:	Euro (€)
Language:	French

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Despite the increase in the market share of wind energy, revenues in the sector have remained relatively constant for three years after a sharp decline attributable to the global economic recession. In 2012, industry-wide revenues were valued at just under USD 14.2 billion.

Matters pertaining to energy supply and consumption are handled by the Danish Energy Agency.

Solid Waste Management

In 2009, Denmark managed to recycle nearly 50 percent of its solid waste. However, since this year the recycling rate of solid waste has slightly dropped, despite numbers that can be interpreted and pointing to a decrease in per capita solid waste. Much of Denmark's solid waste is incinerated; in fact, at 54 percent, Denmark has the highest rate of incineration in the EU-27. Much of this incineration occurs in one of the 29 waste-to-energy plants that produce power from non-recyclable solid waste. Due to these incinerators and relatively high levels of recycling, Denmark puts only 3 percent of its waste in landfills. However, landfill and incineration taxes create incentives for even cleaner manners of waste disposal.

Water and Wastewater Management

The hallmark of the Danish water sector is groundwater that requires little processing after extraction. Around 99 percent of the 660 million cubic meters that are extracted annually are sourced from these waters. This amount of consumption translates to 180 liters per capita daily when commercial, industrial, and household use is combined with water loss. Per capita household use equals approximately 108 liters per capita daily. This level of consumption has dropped as a result of environmental consciousness on the part of the Danes. In 2010, the average household individual consumed 122 liters daily, a number which itself had dropped from 174 liters per day in 1989. Nearly 100 percent of households have water connections and 89 percent enjoy connection to sewage.

The water industry in Denmark is characterized by cooperation between private and public sectors and a no-profit, break-even model of business. Of approximately 2700 water suppliers nearly 2550 are privately owned. However, the remaining 150 municipally-owned entities extract 24 times that of the average privately-owned entity. Converse to the highly decentralized waterworks sector, the wastewater treatment industry is highly consolidated, with just 216 plants processing over 90 percent of the wastewater.

Most every aspect of extracting, filtering, and disposing of water is managed by the Water and Wastewater Agency.

Air Pollution

Air pollution regulations in Denmark are based on EU standards. Denmark consistently meets these standards except for those pertaining to fine particulate and nitrous oxides. The present levels of pollution are attributable to 3,400 deaths annually. Much of the air pollution in the

country arises from shipping emanations, automobile traffic, and industry emissions, including trash to energy plants. Efforts to reduce emissions have taken the form of municipal idling restrictions, emission filter requirements for automobiles, and a compliance collaboration among the major participants in the shipping and shipbuilding industry.

Soil Remediation

Denmark's environmental guidelines extend to soil pollution and reclamation. In 2012, it is estimated that there were 28,000 sites identified as possible soil pollution sites (V1 sites); of these sites, 14,000 were identified as affirmatively polluted (V2 sites). Additionally, 7,000 of these sites were labeled as "sites of priority," and 2,000 were cleared as in need of remediation.

The cost of remediation in 2012 was estimated to have been USD 170 million. The Soil Contamination Act, approved in 2000, creates the principle that "the polluter pays" in regard to remediation new soil pollution; however, there are still circumstances surrounding old pollution that insurance or public funds could pay for remediation. In 2012, it was estimated that remediation costs were paid from the following sources: 47 percent from the regions, 11 percent from the municipalities, 10 percent from the oil industry, 7 percent from insurance, and 25 percent from private sources. Until 2010, the oil industry collectively paid for industry-based damage from the Environmental Pool of the Oil Industry. However, they are currently held individually liable for pollution. The end result from the changes in the last decade is that end-users for soil remediation could be both the government or private parties. It should be noted that government entities are required to go through tender bidding processes when awarding contracts.

Best Prospects

Wind Energy

Denmark is home to Vestas, the world's largest manufacturer, installer, and servicer of wind turbines. Vestas controls a large portion of the Danish production of wind turbines; however, there are many opportunities to get within the value-chain of the production. Prospects for companies within the wind energy production process include operation, maintenance, consulting, IT, and sub-suppliers for the 8,000 parts comprising a single wind turbine.

Solid Waste Management

Incineration remains a popular method of solid waste disposal, with over half of all solid waste being incinerated for energy. Currently, development plans for additional incinerators are being proposed. The technology remains popular and incineration taxes are exponentially offset by the energy produced. Cleaner methods of solid waste incineration are among the best prospects. Incineration and carbon capture technologies must develop in reaction more stringent regulations in the future as Denmark advances to a carbon-neutral future.

Water and Wastewater Management

The driving force behind investment in water and wastewater management is Denmark's environmental safeguards. The industry operates at a microbial and chemical failure rate of near zero; however, the system does suffer nearly 9 percent loss in delivery. The Danish government taxes both water loss and wastewater output. Thus, best prospects include advanced loss reduction and water reclamation technologies. Additionally, waterworks infrastructure system in Denmark has to be replaced an average of once every 35 years and runoff sewage systems are likely insufficient to handle changing weather patterns. Therefore, infrastructure replacements that can deliver reductions in loss are in constant demand.

Air Pollution

Advanced filtration technologies for mobile and fixed pollution sources provide opportunities for U.S. firms to enter the Danish market. As Denmark moves toward a carbon-neutral future and strives to meet EU standards, more innovative technologies will be demanded.

Soil Remediation

The soil remediation sector is currently dominated by a number of Danish companies; however, highly skilled and specialized U.S. companies utilizing advanced technologies have opportunities within the market. Perhaps the best situated U.S. companies are small and medium-sized enterprises that possess this special kind of knowledge. Among the skill sets that can set a U.S. entity apart is experience with remediation of pollutants containing chlorinated compounds. With 58 percent of the estimated funding in 2012 coming from public sources (chiefly the regions), these enterprises can penetrate the soil remediation market through public tenders. However, with the recent "polluter pays" initiative and the abolition of the pooled resource for oil companies, much of the soil remediation market may be moving toward private responsibility.

Resources

- Ministry of the Environment: ***mim.dk/eng***
- Danish Environmental Protection Board: ***mst.dk/english***
- Water and Wastewater Agency: ***danva.dk***
- Energy Board: ***ens.dk/en***

France

Market Opportunities

France was the world's fifth-largest economy (2011). It has substantial agricultural resources, a large industrial base, and a highly skilled workforce. Trade and investment between the U.S. and France are strong. The U.S. is France's sixth-ranked supplier and its sixth-largest customer. Although trade in goods and services receive most of the attention in terms of the commercial relationship, foreign direct investment and the activities of foreign affiliates can be viewed as the backbone of the commercial relationship. The scale of sales of U.S.-owned companies operating in France and French-owned companies operating in the United States outweighs trade transactions by a factor of almost five. In 2011, France was the fourteenth largest host country for U.S. foreign direct investment abroad and the United States with investments valued at USD 87.2 billion was the major foreign investor in France with Germany.

The French market for environmental technologies for water and wastewater, solid waste, and air purification is mature, highly competitive, and sophisticated. French and non-French world leaders are active in the local market. However, market opportunities exist in all segments, especially for cutting-edge technologies which bring significant improvements. A stable economy and financial institutions, stronger European Union (EU) regulations, greater public awareness and the increasing costs associated with polluting have played a major role in an expanding market for water, wastewater, solid waste and air purification treatment equipment and services. In addition, greater interest in complying with environmental regulations by national and local government officials has stimulated this market despite the current financial and economic challenges.

Water and Wastewater

Total French market for water treatment equipment and related services is estimated to be worth USD 25 billion. Over 15,000 water treatment and 17,000 wastewater treatment plants producing one million tons of sludge are in operation in France. The sewer network is about eight hundred thousand kilometers.

Statistics

Capital:	Paris
Population:	65 million
GDP:	USD 2.53 billion
Currency:	Euro (€)
Language:	French

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There are about 16,700 municipalities and municipal associations involved in the sanitation and 12,400 in the water sector. Municipal associations known as « établissements public de coopération intercommunale EPCI » play a major role in water and sanitation service provision in France. Private sector also plays an important role with the three largest French private sector water suppliers, Veolia Environnement, Suez Environment and Saur.

Solid Waste

In 2011, France generated close to 500 million tons of waste covering all sectors of production: Mineral waste mostly from the building construction and public works, accounting for about 75 percent of the total, and out of which two thirds were recycled. Non-mineral, non-hazardous waste accounting for about 20 percent of the total was generated from all sectors, from industry (45 percent) to household waste (55 percent), out of which half was recycled. Hazardous waste, accounting for about two percent of the total generated by the industry and requiring specific processing operations with human health and environmental risks associated. Half was recycled or incinerated with energy recovery.

Air

Overall, air quality in France's towns and cities is improving. France has a sophisticated air quality monitoring network, developed since the introduction of the law on air and rational use of energy passed in the mid 90's. Over the last 20 years, emissions of air pollution by particulates fell by over a third. The heaviest emitters are agriculture and forestry [35 percent]; manufacturing [30 percent], residential-tertiary sector [22 percent] and road transport [11 percent]. France has set up an indoor air quality observatory to gain a better understanding of indoor pollution with a view to producing recommendations on improving indoor air quality. Over the last two decades, acid emissions fell by over a third. Ammonia is the main source of acidification in France, with half of all emissions. As far as nitrogen oxides, it is mostly produced by the agriculture, while road transport accounts for a third of the pollution. Air emissions of sulfur dioxide, produced mainly by burning of fossil fuels containing sulfur (coal, fuel oil, diesel oil) and in some industrial processes, amounted to 358 000 tons, compared with 3.2 million tons thirty years ago. Emissions of nitrogen oxides have fallen in all sectors apart from the residential/tertiary sectors. Emissions of non-methane volatile organic compounds in France are estimated at about one million tons per year, down by 60 percent over the last 20 years, thanks to progress made in the storage and distribution of hydrocarbons, the introduction of the catalytic converter and the increasing proportion of diesel vehicles. Almost 10 percent of ecosystems in France suffer acid deposition in excess of the critical loads. Acid deposits are higher in the north of the country.

Best Prospects

Opportunities exist in all segments as long as technologies proposed are cutting-edge and bring significant improvement to currently used state of the art technologies.

Germany

Overview

The market for environmental technologies in Germany has been growing for some time. A strict environmental policy and legal framework with high standards has helped establish Germany as a leading player in many green markets worldwide. By 2020, the German environmental sector is expected to reach a higher sales volume than automotive or mechanical engineering.

Market Volume (2011):

- Sustainable Water Technologies: EUR 46 billion
- Recycling: EUR 16 billion
- Raw Material and Material Efficiency: EUR 21 billion

Germany is host to some of the biggest environmental technology trade shows in the world such as IFAT ENTSORGA in Munich, ACHEMA in Frankfurt, TerraTec in Leipzig or Wasser Berlin International.

Market Opportunities

For U.S. suppliers of high-tech, leading-edge solutions, the German market for environmental technologies—the largest in the EU—continues to be attractive in numerous sectors and remains an important element of any comprehensive export strategy to Europe. While U.S. companies may face relatively higher costs of doing business in Germany, they can count on high levels of productivity, a highly skilled labor force, quality engineering, a first-class infrastructure, and a location in the heart of Europe.

Water and Wastewater

Characteristics of the German water sector are long-term safety of supply and disposal, high drinking water quality, high wastewater disposal standards and sustainable utilization of water resources. German water technology is highly

Statistics

Capital:	Berlin
Population:	81.7 million
GDP:	USD 3.601 billion
Currency:	Euro (€)
Language:	German

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recognized throughout the world. Current industry challenges and opportunities for non-German suppliers include the control of antibiotic-resistant bacteria (micro pollutants) and the excessive consumption of fresh water by industrial, agricultural, and food production facilities.

Solid Waste

Germany's waste management focuses on the principles: avoidance, recovery, and disposal. The goal is to achieve almost complete high-quality recovery, at least of municipal waste, by 2020. As a result of this strategy, the need for landfill wastes could be abolished, which has adverse effects on the climate.

Over the next years, resource and climate protection will be incorporated into waste management to a greater extent at European and international level, for example by minimizing methane and CO_2 emissions or substituting fossil fuels. Germany contributes knowledge and innovative technology to reach this target and promotes further development of waste management at European and international level.

Air

Germany is well on the way to meet EU air pollution standards. For sulfur dioxide and volatile organic compounds, it is sufficient to apply the measures already adopted and implemented in the past. Additional reductions are required for nitrogen oxides and ammonia, which seems to open opportunities for non-German suppliers in this segment. The necessary reductions in nitrogen oxide emissions can be achieved in the transportation sector.

Hong Kong Special Administrative Region

Overview

According to the Hong Kong Government's latest figures, the value added of Hong Kong's environmental protection industry grew more than 16 percent year-on-year to USD 838 million in 2011. The industry consists of about 300 business establishments, the majority of which are small- and medium-sized enterprises (SMEs). The industry employs more than 38,000 people.

Hong Kong relies heavily on imports to satisfy its environmental needs. Total environmental technology imports in 2012 amounted to USD 4.5 billion. U.S. suppliers are active in the high-end segment, capturing about 14.2 percent of the total import market in 2012. Imports from the United States increased from USD 597 million in 2011 to USD 639 million in 2012, representing a growth rate of more than 7 percent.

Hong Kong is also a sourcing agent for environmental products for mainland China, where heavy green tech investments and tightening environmental regulations have emerged as major drivers of the industry regionally, if not globally. In 2012, re-export of environmental technologies to China through Hong Kong amounted to USD 3.38 billion; accounting for approximately 62 percent of Hong Kong's total environmental technologies re-exports.

The Hong Kong Government has been allocating significant resources toward tackling waste treatment, air pollution, and water pollution problems. Opportunities exist in the thermal and biological treatment of municipal solid waste, water and wastewater treatment, energy efficiency, green building, and electric vehicles.

With vigorous IPR protection, and the proximity to and experience in trading with mainland China, Hong Kong is an ideal entry point for U.S. environmental companies (especially small and medium-sized firms) interested in the China market.

Statistics

Population:	7.17 million
GDP:	USD 263,476 million
Currency:	Hong King Dollar (HKD)
Language:	Cantonese, English, Mandarin Chinese

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Market Opportunities

Waste Management

Hong Kong disposes of more than 9,000 tons of municipal solid waste per day. The per-capita municipal solid waste disposal rate per day was 1.27kg in 2011. Owing to landfill shortages, the Hong Kong government has set ambitious targets of reducing this number to 1 kg by 2017 and 0.8 kg by 2022, and will further encourage waste recovery and recycling of resource materials. USD 65 million has been allocated for setting up waste electrical and electronic equipment processing facilities and five community green stations to encourage public participation in waste reduction and recycling. The Hong Kong government is also planning to build two Organic Waste Treatment Facilities (OWTFs) to deal with food waste and an Integrated Waste Management Facility (IWMF) to treat municipal waste. The proposed OWTFs will be able to handle 200 and 300 tons food waste whereas the waste-to-energy IWMF will have a capacity of 3,000 tons per day.

Air Pollution

Hong Kong has set a target of achieving new air quality objectives by 2020. To achieve this goal, Hong Kong has set emission reduction targets with neighboring Guangdong Province of China and will enact legislation to further tighten the emission caps for power plants for the coming years.

Electric Vehicles

The Hong Kong government has set aside funding for franchised bus companies to experiment with electric buses and is subsidizing the testing of electric taxis, coaches, and goods vehicles. The government will continue to deploy more electric vehicles and solicit support from public bodies and leading enterprises.

Water Treatment

Hong Kong obtains the majority of its fresh water supply from mainland China. To ensure a sustainable water supply, Hong Kong is contemplating the construction of a desalination plant, with a capacity of about 50 million cubic meters per annum.

Green Building

To develop Hong Kong as a low-carbon city, the Secretary for the Environment is leading an interdepartmental steering committee to promote green building. Since buildings account for 90 percent of Hong Kong's total electricity consumption, the Hong Kong government enacted the Buildings Energy Efficiency Ordinance, which came into effect on September 21, 2012, to promote building energy efficiency. Under this legislation, the air-conditioning, lighting, electrical, and elevator and escalator installations of all new buildings need to comply with the design standards of Hong Kong's Building Energy Code. Furthermore, energy audits for the above mentioned installations are now mandatory for all commercial buildings.

India

Overview

It is estimated that 30–40 percent of India's industrial units produce sizeable quantities of pollutants. The Government of India has classified 17 industrial sectors as strong pollutants. India is one of the largest and one of the fastest growing producers of greenhouse gases. India's pollution control equipment industry is growing at 10–12 percent annually. Local production is mainly into standard, relatively low-tech equipment. Over thirty percent of market demand is met by imports. Most of the leading international companies operate in India now.

Until recently, the environmental goods and services sector used to refer to solutions for air, noise, and marine pollution, land and water contamination, environmental analysis and consultancy, waste management and recycling. Now it also includes renewable energy technologies such as hydro, wave and tidal power, geothermal, wind and biomass, and emerging low-carbon activities like reduced emissions from the transport and construction sector, nuclear energy, energy management, carbon capture and storage and carbon finance. Some important environment sectors include:

- Water supply and wastewater treatment
- Solid waste management
- Air and noise pollution
- Environmental goods and services
- Renewable energy
- Clean development mechanism and carbon abatement technologies

Market Opportunities

The total market size is estimated to be over USD 8 billion, with Renewable and Energy Efficiency Sectors capturing over 50 percent of the market share.

Statistics

Capital:	New Delhi
Population:	1.2 billion
GDP:	USD 1.779 trillion
Currency:	Indian Rupee (INR)
Language:	Hindi, English, others

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(in USD millions)	2011	2012	2013 (est.)	2014 (proj.)
Total Market Size	6720	7390	8100	8500
Total Local Production	4700	5170	5900	6300
Total Exports	680	780	1300	1600
Total Imports	2700	3000	3500	3800
Imports from the U.S.	810	1270	1100	1150

Indian pollution control equipment industry is unorganized and dominated by small-scale industrial firms lacking the resources to invest in research and development. There are some medium and large Indian engineering companies offering services and equipment as part of turnkey consulting services. The Ministry of Environment and Forest governs this sub sector and it has allocated a budget of over USD 300 million for pollution abatement.

The market is not restricted to the government sector. The private sector has been investing substantially in environmentally friendly production processes and accounts for nearly half of the demand in this segment. Poor enforcement of environmental laws is a key reason for the low market potential compared to developed countries. Imports constitute nearly 40 percent of the total market share due to two main factors: Unlike other sectors, multilateral and bilateral agreements on ecology and the environment play a major role in this sector. This results in an increased demand for imported pollution control equipment, because donor-led investments normally require international quality equipment that is not manufactured in India. Multinational corporations with manufacturing facilities in India insist on the replication of technology for pollution control. This almost always requires imports.

The market has undergone a lot of change in the last few years. The market knowledge, skill and availability of equipment have been growing in recent times. In the water sector today, there are 12 medium-sized companies who have rapidly increased their operations and won a number of projects. Also hundreds of small system integrators have come up all over the country, addressing local requirements. There has also been a geographical decentralization that has taken place. In the last few years, many international majors have also entered the market. Indigenous development of various treatment vessels like resins, RO membranes and vessels have reduced costs and made various technologies easily available on a mass-scale. Water is the most promising subsector. India's water and wastewater market has grown at a compounded annual growth rate of 14 percent from 2000–10. The business is almost equally split between the government and the private sector, but the industrial sector is growing at a higher rate than that of the municipal sector. The research indicated that the power, food and beverage, pharmaceuticals, refineries and textiles are generating immense opportunities in the water and wastewater treatment equipment market. These industries prefer advanced treatment technological systems such as reverse osmosis (RO) membranes for treating their wastewater and their growth is expected to drive equipment sales. The municipal water and

wastewater treatment is gaining importance, as the usage of disinfection systems such as ultraviolet, ozone, and electro chlorination is minimal in municipal water treatment plants at present. For example, the water treatment market is gradually shifting from chemical treatment and DM plants to membrane technology. The concept of wastewater recycling and zero discharge systems is growing in a big way in recent times.

The United States has traditionally enjoyed a dominant position in the market, with over 30 percent of the import market share. In some segments such as air pollution control equipment, imports from the United States constitute almost 40 percent of total imports. European companies are the biggest competitors. China and Taiwan are emerging as strong competitors. Industry sources believe that the import market will continue to increase and the domestic market share will decline due to increasing demand for improved and innovative technologies that cannot be met by domestic suppliers.

For additional information, please refer to:

- Ministry of Environment and Forests: ***envfor.nic.in***
- Central Pollution Control Board: ***cpcb.nic.in***
- The Energy and Resources Institute (TERI): ***teriin.org***
- Environmental Information System (ENVIS) India: ***envis.nic.in***

Best Prospects

Most promising subsectors in pollution control equipment (percent, projected, next 3–5 years)

Subsector	Market Size (est.)	Growth (proj.)
Energy Efficiency and Renewable Energy	51	12
Water and Wastewater Management	26	14
Air pollution control	20	8

The business opportunity in air pollution control lies with the red category polluting companies such as cement, steel, iron and power industries. Ambient air quality monitoring for cities is also an area of major opportunity.

In the water sector, the government sector is primarily involved in the raw water treatment and the sewage treatment operations. On the other hand, the private industrial sector includes equipment for clarification, sludge treatment, aeration, disinfection and filtration. Conventionally, the market has used demineralisers for treatment. However, over the last few years, Reverse Osmosis technology has grown in the market and gradually replaced DM. Newer technologies like Ultrafiltration and Electrodialysis are also entering the market now.

U.S.-India Cooperation in Environment

The EPA has engaged with India's Ministry of Environment and Forests (MoEF) to cooperate on building strong environmental institutional structures. Through the Global Methane Initiative, EPA has provided 11 grants for work in methane reduction activities in India and has worked closely with nodal Indian ministries to help facilitate new methane projects in all sectors in India. The EPA has engaged with India to support science-based air pollution control strategies in Indian cities. With the cooperation of MoEF, the State of Maharashtra, the Municipality of Pune, and several other partners, EPA has helped demonstrate technologies which can assist decision makers in developing policies aimed at reducing air pollution. EPA has engaged with India to improve drinking water quality monitoring. EPA has also partnered with the Indian government to demonstrate risk assessment and management tools to make drinking water safer for human consumption. The Government of India and EPA are evaluating new ways to partner on governance issues and addressing the trans-boundary movement of e-waste into India. For more information on EPA activities in India, please visit ***go.usa.gov/bemY***.

Indonesia

Overview

With a population of over 240 million and a fast-growing and dynamic new middle class, Indonesia represents the largest consumer market and one of the strongest economic growth stories in ASEAN. Indonesia has experienced growth rates of 6.5 percent and 6.2 percent in 2011 and 2012 respectively, and provides good market opportunities for those wishing to do business. Indonesia's sustained economic growth in the past decade, and recent membership in the G-20, has put additional focus on the environmental industry that is mainly dependent on advanced country technologies.

Market Opportunities

To accelerate the country's economic growth, the Indonesian government launched the 2011–2025 Master Plan for the Acceleration and Expansion of Indonesia Economic Development (MP3EI). MP3EI consists of 367 infrastructure projects with an investment value of USD 440 billion.

Water and Wastewater

Only 55 percent of people have access to clean water, which is 13 percent less than the Millennium Development Goals (MDGs) target of 68.87 percent access in 2015. As a means to increasing the number of people with access to clean water, Indonesia announced in November 2012 that it is prepared to offer 14 infrastructure projects with a combined USD 6.1 billion that will include water and wastewater. U.S products and engineering service have a good reputation for their quality and advanced technology in the field of water and wastewater treatment. Although the market is price sensitive, U.S. products are strong competitors in water filtration, water purification equipment and control systems, water treatment chemicals, positive displacement pumps, valves and meters.

Statistics

Capital:	Jakarta
Population:	248 million
GDP:	USD 1.12 trillion
Currency:	Indonesian Rupiah (IDR)
Language:	Bahasa Indonesia English, others

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Solid Waste

As the fourth most populous country in the world, with large consumption of consumer goods and with many industries growing rapidly, Indonesia has major issues with solid waste. To accommodate these concerns, Indonesia currently has two major projects in the solid waste industry. The first is a USD 100 million solid waste project on the island of Batam, located one hour from Singapore. The other is a USD 180 million solid waste incinerator project for to generate power/electricity at Bantar Gebang. This project is being completed in cooperation with Pertamina, state-owned oil and gas company. This project is located near as one of Indonesia's largest industry areas and also nation's largest landfill.

Air

With an increasing population, a rise in the production of manufacturing plants and the nationwide burning of waste as a means of disposal, air pollution is becoming a major issue for Indonesia, especially in the major cities of Jakarta, Medan, and Surabaya. Air pollution control technology is needed to handle both governmental air pollution through the burning of coal for power by PLN the state electric utility, as well as the private sector for its industrial and manufacturing plants, and vehicle systems in the automotive industry.

Best Prospects

U.S. EPA works closely with the Jakarta Provincial Government and other partners under the "Breathe Easy, Jakarta" program to promote approaches to improve the air quality and protect human health in the Jakarta metropolitan area. The project seeks to identify and quantify key sources of air pollution and, using that information, develop appropriate air pollution control strategies. During implementation of this program, there may be opportunities for U.S. government agencies and their partners to introduce U.S. goods and services that meet environmental needs in Indonesia (e.g. air quality monitors, air pollution control technologies for power plants or industrial facilities, vehicle emissions related technology). For more information on EPA activities in Indonesia, please visit ***go.usa.gov/bemQ***.

Japan

Market Opportunities

The Japanese water industry routinely treats and recycles water, and as a result Japan's recycle ratio of industrial water is high, approximately 80 percent. Also, because Japan's population is decreasing, the demand for water is on the decline as well.

Compared to other Asian neighbors, costs for purchase and disposal are high. Generally speaking, while there is some demand, particularly for maintenance and retrofitting of aging water facilities, the Japanese domestic market is not expected to grow.

Japanese municipalities and engineering companies specializing in water technology are increasingly looking towards overseas markets.

Best Prospects

The Japanese water industry is proud of its water control technology, but is also open to quality, innovative U.S.-made goods and services that complement their own offerings.

If a U.S. manufacturer offers products with unique features or advantages over currently available products, the firm may be able to find a Japanese partner that can service projects not only in Japan, but also in third-party countries.

Statistics

Capital:	Tokyo
Population:	127,368,088 (est. 2012)
GDP:	USD 5,984 trillion (est.)
Currency:	Yen
Language:	Japanese

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Republic of Korea

Overview

(in USD millions)	2010	2011 (est.)	2012 (est.)	2013 (proj.)
Total Market Size	6,979	8,032	8,534	9,338
Total Local Production	7,858	9,018	9,759	10,795
Total Exports	1,621	1,787	2,088	2,388
Total Imports	742	800	863	931
Imports from the U.S.	223	240	259	279

Data Sources: Unofficial estimates based on information published by the Ministry of Environment.

Since Korea's implementation of its Low Carbon, Green Growth Strategy in 2009, the country continues to demonstrate a strong commitment to environmental improvement. The pollution control equipment industry continues to grow in various industries, such as water treatment, power plants and steel mills, with support from the government. Korea established a national-level industry technology road map called "Eco-TRM 2022" in 2012 and began to embrace the development and dissemination of environmental technologies under the Support for Environmental Technology and Environment Industry Act of 2011.

CS Korea estimates the size of the pollution control equipment industry at USD 8.5 billion in 2012. According to industry experts, imports account for about 10 percent of the total market. Japan has been the principal foreign suppler with about a 50 percent local market share, followed by the U.S. with about 30 percent market share, Germany and France.

Local environmental equipment manufacturers in Korea have supplied a major portion of environmental projects with medium-level technology and medium-cost products. While they have significantly improved their technical levels, mostly through technology transfer and mergers with non-Korean suppliers, they still lack

Statistics

Capital: Seoul
Population: 49 million
GDP: USD 1.234 trillion
Currency: Korean won
Language: Korean

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the core technologies to supply the products that meet the government's stringent regulatory requirements. They are therefore seeking more advanced imported products and technologies. Because most competing Korean manufacturers target larger volumes and export markets, highly customized solutions for specific applications like in-house recycling and ultra-pure water treatment offer potential for U.S. exporters.

Market Opportunities

The Korean government plays a key role in the pollution control equipment industry, as both the regulator and also the biggest end-user in this category. The 2013 national expenditure for environmental protection increased approximately 5.3 percent from the previous year and is set at USD 5.49 billion.

Korean government project tenders are announced on the Korean government procurement website (***pps.go.kr/english***), including detailed project scope and contact information.

To enter the pollution control equipment market, we recommend that U.S. suppliers partner with qualified and capable Korean companies who maintain existing sales networks to serve end-users and who are fully aware of the regulatory changes that drive the market. Exhibiting at local environmental trade shows can be a good platform to explore the market, as well as gain exposure to end-users.

Best Prospects

- Carbon capture and storage technologies and equipment
- Volatile organic compounds (VOCs) control in oil refineries and petrochemical plants
- Dioxin abatement in municipal and industrial incinerators
- Advanced sulfur oxides/nitrogen oxides abatement in power plants and steel mills
- Energy saving and waste-to-energy in steel mills and municipal landfills
- Pollution-free and low-emission vehicles in engineering technology, engine components and parts for CNG; pollution abatement technologies for automobile, oil refinery industries
- Advanced water pollution control technology
- Environmentally friendly construction materials

Resources

- Ministry of Environment: ***eng.me.go.kr***
- Korea National Cleaner Production Center: ***www.kncpc.or.kr/en***
- Public Procurement Service (PPS): ***pps.go.kr/english***

Mexico

Overview

(in USD millions)	2010	2011 (est.)	2012 (est.)	2013 (proj.)
Total Market Size	3,820.0	3,915.3	4,065.1	4,188.5
Total Local Production	1,225.0	1,255.6	1,286.9	1,319.0
Total Exports	765.0	787.9	803.7	819.8
Total Imports	3,360.0	3,477.6	3,581.9	3,689.3
Imports from the U.S.	2,010.0	2,086.6	2,149.1	2,213.6

Data Sources: BANCOMEXT, Mexican Import/Export Bank statistics, Secretary of Economy Statistics; statistics from the Secretariat for the Environment and Natural Resources—SEMARNAT; Census Bureau, U.S. Department of Commerce or Global Trade Atlas State Exports, November 2011; Border Environmental Cooperation Commission (BECC); CONAGUA National Water Commission (CONAGUA); National Council of Environmental Executives—CONIECO and interviews with importers, distributors and end-users of water and wastewater equipment and services.

The total market for the water and wastewater subsectors is estimated to grow by 3.8 percent from 2011 to 2012 and U.S. exports to Mexico are expected to increase by 2.9 percent during the same period.

The 2012 total budget from the Federal government to CONAGUA (National Water Commission) will reach over USD 2.1 billion for new investment in water supply and wastewater treatment for the municipal and industrial sector. As a result of the new public and Private Partnership Law approved by the Mexican Congress, investment from private sector contractors in CONAGUA concessions is estimated to reach USD 700 million in 2012.

Market Opportunity

Water Purification Plants

CONAGUA will invite companies to bid in the upgrading of 100 of the existing 631 plants. The estimated budget is USD 35.5 million for plants in the states of Guerrero, Coahuila, Sinaloa, Tamaulipas, Zacatecas and Veracruz. CONAGUA plans

Statistics

Capital: Mexico, D.F.
Population: 112.3 million
GDP: USD 1.657 trillion
Currency: Mexican peso (MXN)
Language: Spanish

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to increase public access to water sanitations services from 49 percent coverage to 60 percent in 2012.

Desalination Plants

CONAGUA is planning to invite private companies to bid on desalination plants for the cities of Hermosillo and Puerto Penasco in the State of Sonora as well as Los Mochis and Mazatlan in the State of Sinaloa. CONAGUA has indicated that the new desalination plants will be built using the new Public and Private Partnership Law as a framework.

Wastewater Treatment

CONAGUA will invite companies to bid on the upgrading of 140, of the existing 2,029, municipal wastewater treatment plants mainly in the states of Aguascalientes, Chihuahua, Guanajuato, Jalisco, Nuevo Leon, Oaxaca, and Puebla, among others. The estimated budget is USD 70 million. New plants will be built in the states of Puebla, Colima, Yucatan, Quintana Roo, State of Mexico, Nayarit, Guerrero, Colima, and others. CONAGUA has a budget of USD 200 million for new plant construction. In particular, CONAGUA plans to build an Atotonilco wastewater treatment plant in the State of Hidalgo. The private sector will finance 54 percent of the USD 771 million price tag for what would be the largest wastewater treatment plant in Latin America.

Private companies in the cities of Tijuana, Mexicali, Cd. Juarez, Reynosa, Matamoros, Villahermosa, Leon, Irapuato, Queretaro, Toluca, Morelia, and Jalapa, among others, will invest USD 80 million in upgrading their wastewater treatment plants to meet the wastewater discharge environmental standard. This will increase public access to water sanitation services from 49 percent in 2011 to 60 percent in 2012.

Waste Management

Approximately 40 million tons of solid waste is generated every year in Mexico, from which approximately 88 percent corresponds to urban solid waste, and 12 percent corresponds to hazardous waste. In 2011, the federal government supported the construction of 113 landfills. Municipal, state, and federal authorities, with the support of the private sector, will continue to invest in solid waste management, particularly in projects to increase the capacity of sanitary fields and to construct new sanitary fields, to increase the capacity of recycling, to increase the use of organic waste, to transform PET, to recover construction materials, and more.

The Netherlands

Overview

The Netherlands has developed one of the world's most innovative and advanced environmental technologies with a specialization in waste processing, water purification, soil remediation, and environmental management and consultancy. The country's progressive environmental policies and strong institutional management practices drive innovation in the field. Waste processing is highly advanced in the Netherlands, with extensive IT-based recycling programs, sustainable incineration instead of land-filling and pioneering electricity generation from waste materials. The Dutch environmental sector has also developed cost-effective soil remediation technology that allows for onsite treatment rather than costly soil removal. Dutch companies are highly proficient in treating sewage and wastewater, developing new technologies, and providing consultancy services worldwide. In the area of air purification, Dutch companies focus on issues such as measurement and modeling, climate change and foul odors, and aerosols. In the area of noise management, Dutch companies develop noise abatement facilities (such as special floors, walls and cabinets) and noise measurement technologies.

Generation of electricity in the Netherlands is in the hands of six large and medium-sized electricity production companies. The purchase, transmission (in part), distribution and supply of electricity, as well as its decentralized generation, are managed by energy distribution companies. The main supplier of the decentralized electricity is the chemical industry, followed by the greenhouse sector, the food processing industry, oil refining and paper industry. Besides electricity, energy distribution companies also manage the supply of other utilities such as gas, heat, and water. Both the production and distribution companies are the main investors in renewable energy equipment in the Netherlands. Other sectors are the agricultural industry and large-scale house owners. EnergieNed,

Statistics

Capital:	Amsterdam
Population:	16.73 million
GDP:	USD 701.4 billion
Currency:	Euro
Language:	Dutch

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which is the Dutch association of companies' active in the production, transport, distribution and trade of electricity, gas and/or heat, is a major player in the decision making process in the Dutch renewable energy sector.

Total abstraction of groundwater by the Dutch economy in 2010 amounted to 1,014 million m^3, which is a reduction of one percent compared to 2009. Although abstraction by agriculture increased slightly as a result of a dry spring and summer so that additional irrigation was required, this was more than offset by a reduction in use and abstraction of groundwater in the manufacturing industry. Abstraction from surface water amounted to 13.9 billion m^3 in 2010, down two percent on 2009. This is mainly explained by reduced demand from chemical manufacturing. The water supply companies also abstracted four percent less surface water. Due to the Netherlands' geographical position, its soil and groundwater are polluted. Rivers flow through the country and leave hazardous materials behind, which compelled the Dutch to improve the purification efficiency during the last decades, especially for nutrients. According to European legislation it is compulsory to remove at least 75 percent of all nutrients at urban wastewater treatment plants. The Netherlands fulfills this percentage and therefore complies with this European legislation. There is no European legislation for heavy metals, but the national guideline is a removal of 70 to 90 percent. In this context, heavy metals are generally removed sufficiently, although there are differences between the underlying metals.

Market Opportunity

The Netherlands offer an open and accessible import market in which American technology firms are highly regarded and well-accepted. U.S. suppliers of renewable energy equipment and systems will find a receptive market in the Netherlands. They have an excellent reputation for their quality and innovative implementation of new technologies.

The Dutch market for renewable energy equipment is dominated by domestic suppliers and manufacturing subsidiaries of foreign companies. U.S. manufacturers of renewable energy equipment interested in penetrating the Dutch market generally have proven most successful by either appointing a qualified Dutch agent/distributor, using the Value Added Reseller (VAR) channel, or by opening their own subsidiary in the Netherlands. More than 7,000 U.S. companies have appointed Dutch agents and distributors in the Netherlands and approximately 1,600 American companies or affiliates have operations here.

Publications

- Vewin, the association of drinking water companies in the Netherlands: ***vewin.nl/english***
- An extensive report about Dutch drinking water statistics: ***bit.ly/137NVN5***
- CBS, Statistics Netherlands, responsible for collecting and processing data about all Dutch sectors, including more information about the environmental sector: ***cbs.nl/en-GB***
- Environmental accounts of the Netherlands (2011): ***bit.ly/1afLcnG***
- VLM, Association of Suppliers of Environmental Technology: ***vlm.fme.nl***
- CleanTech Holland—Dutch export platform for products, concepts, and innovations based on sustainable technology: ***cleantechholland.nl/en***

Trade Shows

- Aquatech Amsterdam—Focused on water treatment, transport and storage, process control technology, and process automation: ***aquatechtrade.com***
- Energy 2013—Mid-sized, energy-focused: ***energievakbeurs.nl/en***

Nigeria

Overview

Ranking among Africa's largest consumer markets, third after Egypt and South Africa, Nigeria is the continent's most populous country, accounting for approximately one sixth of its people. It is arguably one of the most culturally diverse societies in the world, with about 250 ethnic groups among its 150 million people. Nigeria aspires to be one of the largest 20 economies by the year 2020. Toward this end, the country is liberalizing its economy, promoting public-private partnership and encouraging strategic alliances with foreign firms. As a gateway to fifteen smaller West African countries and a net importer, Nigeria can be a very rewarding market for U.S. companies that take the time and effort to understand its market conditions and opportunities, find the right partners and clients, and take a long-term approach to market development. With strong growth prospects in many industry and service sectors, underserved market segments, a growing and increasingly sophisticated consumer base, coupled with a strong affinity for U.S. products and American culture, opportunities are impressive.

Nigeria is one of the world's top 10 oil producers and Africa's leading producer, with proven oil reserves of about 36.24 billion barrels (including four billion barrels of condensates), while its gas reserves are estimated at 187 trillion standard cubic feet. Natural gas that traditionally was flared at oil extraction sites for years has increasingly been recognized as an enormous income-generating resource for Nigeria and is now being captured for processing and sale both regionally and overseas. Its economy is largely dependent on its oil sector, which accounts for more than 50 percent of gross domestic product (GDP) and 95 percent of the country's foreign exchange earnings. Although the agricultural and manufacturing sectors have seen some growth over the last few years, the country remains largely an importing country of bulk commodities and food (USD 3 billion).

The two major environmental issues in Nigeria are management of solid and liquid wastes—specifically, as they relate to commercial, industrial, domestic, and medical waste management. One major environmental challenge is the

Statistics

Capital:	Abuja
Population:	174,507,539 (est. 2013)
GDP:	USD 455.5 bn (est. 2012)
Currency:	Nigerian naira
Language:	English (official), Yoruba, Hausa, Igbo, Fulani, others

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environmental degradation from oil spills, gas flares, and deforestation, as consequences of oil and gas industry activities in the country. The exploration and production of oil in Nigeria's Niger Delta region has caused severe environmental pollution, especially soil degradation resulting from oil spills, non-implementation of environmental regulations, and government complicity, especially during the military era. Under the current democratic government, there has been marked improvement, which allows for increased stringent environmental regulations for the oil industry.

Nonetheless, soil, air and marine life pollution resulting from gas flares remain critical issues even as gas provides huge opportunities for investment in harnessing it for commercial purposes. Several investment opportunities abound in environmental management and include technology, equipment, services associated with soil remediation, oil spill cleanup, and environmental training services. With Nigeria's population continuing to increase, the pressure on the country's environment appears likely to increase as well, even with the added focus on cleaning up the Niger Delta and tightening environmental laws and regulations. Nigeria also experiences various environmental problems arising from non-oil activities, most of which are related to massive generation of solid and liquid wastes and the absence of any program for managing these municipal solid and liquid wastes (MSW) including wastewater.

Nigeria has no anti-littering law or any specific policy on plastic waste management, and although some municipality bylaws prohibit littering, these are not enforced and appropriate disposal infrastructures are deficient. As a result of health, economic and social issues consequent on the indiscriminate dumping and inadequate management of MSW, the government of Nigeria, through its agencies and parastatals, is focusing on ways to efficiently manage and recycle MSW. Several States have initiated various waste management and waste to wealth projects to dispose the huge mounds of MSW generated in their States. Some of these projects, though in their rudimentary stages are constrained by lack of technical expertise in waste management, equipment/machinery and the capital to execute them.

For instance, with adequate funding support, investors can design, construct, install and manage a Floating Resource Recovery Plant that will convert approximately 1, 000 tons/day of MSW to produce 25 megawatts of electricity per hour, and 1, 350, 000 gallons of potable water per day. This type of project is very attractive to State governments, especially when executed on an equity participation model of 10–20 year Build-Own-Operate-Transfer (BOOT) basis. Industry observers have identified huge investment opportunities accruing from waste management in Nigeria, especially given the huge volumes of plastics and other recyclable materials which enter the MSW chain and which are key components for recycling plants. Food and animal wastes are also huge sources of fertilizer.

Market Opportunities

Some proposed and ongoing waste to wealth projects are in the pipeline and offer huge investment opportunities, including:

- Conversion of animal and food waste to fertilizers for agriculture.
- Conversion of domestic MSW into bricks or panels used for construction.
- Conversion of plastic materials to green diesel (fuel) for motor vehicles and machinery.
- Conversion of oil for energy or industry as other byproducts which are expected to produce water and energy.
- Conversion of other recyclable materials such as glass, metals.
- Conversion of wetlands, land replenishment, and construction of engineered landfill sites and incinerators (both mobile and fixed) for medical waste disposal.
- Construction of biogas and waste oil management and gas recovery/carbon credit plant to generate energy and gas.
- Construction of wastewater, common effluence treatment, and sewage plants.
- Supply of compactor trucks, tippers and pay loaders, monitoring equipment and other ancillary equipment.

U.S. waste management companies can also explore other investment opportunities and areas of partnership offered by providing technical assistance to manage the full spectrum of waste management and recycling activities. Technology is needed in areas including:

- Provision and rehabilitation of sewage/drainage infrastructure, procurement of requisite equipment for collection and disposal of waste, monitoring, and enforcement, training and manpower disposal.
- Technical assistance relating to advisory/consultative knowledge on waste management.
- Support for public sector participation/involvement, for instance landscape/beautification programs, waste management, collaboration with Federal, State, and Local government, as well as NGOs, CBOs, CDAs and multi donor agencies.
- Technical support to establish a framework for implementation of drainage, monitoring/control of outdoor advertising, enforcement of environmental laws and regulations, appropriate public enlightenment and environmental education.
- Construction of high-temperature incinerators, recycling plants, and central sewage treatment facilities.

Nigeria increasingly recognizes the importance of participating fully in the global economy, and enacts policies to attract foreign investment for economic growth, creating more opportunities for American products and services in key sectors. We recommend that U.S. manufacturers and suppliers combine the benefits of the CS network's services and programs with the expert knowledge, industry contacts, and services of local commercial officers in CS Lagos (***export.gov/nigeria***).

Oman

Market Opportunities

Development and rapid population growth have impacted Oman's water resources with 8 percent annual growth in consumption, and there is substantial demand for water conservation technology and desalination projects. The salinity of groundwater is a growing problem in coastal agricultural areas, with water tables falling throughout the country. Companies that can provide equipment for small-scale irrigation should find a ready market among the large number of small farms in the country. Firms with expertise in desalination, sewage, and wastewater treatment may also find opportunities, particularly with the upcoming tenders for construction of a USD 1 billion wastewater treatment system for the Muscat area. Oman's economy is still heavily dependent on petroleum, and the Enhanced Oil Recovery techniques used to extract its heavy oil requires substantial water treatment. For example, Oxy continuously treats and circulates 500,000 bpd of water to produce steam necessary to heat and extract the heavy, viscous oil found at its Mukhaizna concession site.

The Million Date Palm project was announced during the summer of 2011 with the goal of planting one million dates over 60 years. As an initiative of the Sultan, administered by the Royal Office (RO), this is a high profile project, designed to benefit low-income rural Omanis. The target regions have good sources of well water, though highly saline. The RO is looking for economical solutions to treat the water to bring it to agricultural levels.

Haya Water, the parastatal responsible for connecting 80 percent of Muscat municipality's six districts to water treatment facilities by 2018 (2100 km of pipelines), will spend an estimated USD 4.3 billion on networks and treatment plants. Haya expects almost 80 percent of homes to be connected to its treatment system by 2018. Haya has registered with the UN for Carbon Credits. It has appealed for assistance and expertise for the process of registering its sewage treatment networks, increasing local awareness and acceptance of recycled water,

Statistics

Capital:	Muscat
Population:	3.15 million
GDP:	USD 80 billion
Currency:	Omani Riyal
Language:	Arabic

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and finding other uses for the treated water. (Only 60–70 percent of the recycled water is currently used, mostly for irrigation, gardening, and golf courses. The rest is discarded into the sea or used to supply a nature lagoon which is being developed as a bird breeding sanctuary.) Haya would also like to look at ways to recover methane as a source of energy and further develop its effluent fertilizer product. Finally Haya is urgently seeking solutions for odor management around its treatment plants.

Oman's Environmental Services Holding Company, a GoO agency restructuring and privatizing the solid waste sector, has plans to close nearly 350 dump yards, and seeks expertise on waste management, dump site rehabilitation, waste-to-energy options, and recycling. (Currently there is no local recycling; paper, plastic and cans must be sent to Dubai to be recycled, which is uneconomical.) U.S. expertise on "green" waste management and public awareness-raising would be welcomed in this nascent industry, and could lead to attractive opportunities for U.S. investors, with many upcoming projects for 16 landfills, 65 transfer stations), and four treatment plants resulting from current research.

Best Prospects

Water recycling and wastewater equipment, desalination equipment, waste management, weather monitors, advanced irrigation equipment, water quality monitoring systems, and oil drilling wastewater recycling systems.

The Philippines

Overview

The Philippine market for water resource equipment and services is expected to grow by at least 10 percent yearly, as a result of current and upcoming projects that address increasing water scarcity, as well as sanitation and wastewater-related problems.

The country's water supply requirement is escalating. The Philippines has a population of over 90 million, growing at an average annual rate of 2 percent, with approximately 20–50 percent of the population without access to safe drinking water. Sixteen national rivers and lakes are biologically dead and only 33 percent of river systems are suitable as water supply sources. Depletion of groundwater resources has been an increasing problem in some areas of the country.

Wastewater management is also a major concern as indiscriminate discharging of untreated wastewater over the years, particularly from domestic sources, has caused major pollution problems.

Market Opportunities

In 2012, the World Bank provided USD 275 million financing to the Metro Manila Wastewater Management Project to help support the investments of two water concessionaires in the Philippines—Manila Water Company, Inc. and Maynilad Water Services, Inc.—to increase collection and treatment of domestic wastewater. Manila Water is using the proceeds of the loan for the construction of two sewerage systems while Maynilad, for the rehabilitation of one sewage treatment plant (STP) and construction of three STPs. Aside from the World Bank-funded project, Manila Water has at least three major STP projects and Maynilad has seven that will be implemented within the next three to five years.

Statistics

Capital:	Manila
Population:	90+ million
GDP:	USD 389.8 billion
Currency:	Philippine Peso (PHP)
Language:	Filipino, English, others

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There are three water-related projects in the 2013–2015 lending pipeline of the Asian Development Bank. The Urban Water Supply and Sanitation (WSS) Project and the Water District (WD) Development Sector aim to increase access to water supply and sanitation services. The Angat Water Transmission Improvement Project will involve the retrofitting, rehabilitating and/or reconstruction of the aqueducts of the Angat Transmission Line that are currently leaking resulting to about 20 percent loss of the total potential capacity of raw water.

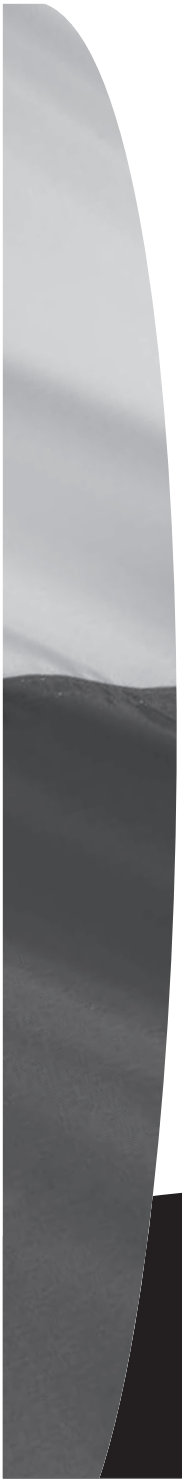
The Philippine Water Revolving Fund (PWRF), the only water revolving fund outside the United States and Europe, leverages overseas development assistance with local private funds using a cofinancing arrangement between the Philippine government and private banks. Approximately USD 93 million (PhP4 billion) of loans for water supply and sanitation projects has been mobilized to provide two million people with new or improved access to piped water. PWRF water supply projects are in the area of pipe replacements or rehabilitation. There are two new water source development and two septage projects that are in the PWRF pipeline. More WDs are expected to implement septage management programs as PWRF has helped more than 15 WDs prepare feasibility studies.

In May 2012, the National Economic and Development Authority (NEDA) Board approved National Sewerage and Septage Management Program (NSSMP) for Public-Private Partnership. The NSSMP aims to increase the number of sewerage and septage management systems by 2020. The Philippines is highly dependent on imported water and wastewater treatment products and services.

Japan, U.S., and Singapore are the major sources of water and wastewater treatment products and equipment of the Philippines.

Best Prospects

- Drinking/Potable water treatment equipment/processes
- Products/equipment for the construction and development of additional water resources and water supply systems
- Water supply rehabilitation products/equipment
- Products/equipment/accessories for sewerage and septage management
- Packaged or modular wastewater treatment equipment
- Industrial wastewater treatment
- Water Recycling products/equipment
- Wastewater treatment technologies that will result in smaller footprints (due to land constraints)



Poland

Overview

Poland's accession to the European Union has caused dynamic changes in environmental remediation and implementation of new environmental standards. In accordance to the EU directives the Polish government prepared national plans for water and wastewater management and waste management. It also stood up to the reduction of emission of CO2 and Nox/SOx as the EU required the new member states. Although tremendous money was invested and significant work has been done so far Poland still needs to improve the environment to comply with the Western European standards.

Market Opportunities

Poland has emerged as an important and dynamic market since the country began its transition to democracy and a market driven economy in 1989. With 38 million people, Poland is the largest market among the former Eastern European countries and shares borders with both "new" EU and "old" EU-15 countries. Poland became a member of the European Union (EU) in 2004 and held the presidency of the EU for the last six months of 2011. Poland's adoption of EU legislation has led to wide ranging reforms in economic regulation, and reduced government intervention in the private sector. Reforms in areas such as financial markets, company and competition law, accounting, and intellectual property rights have improved the environment for private business and boosted economic growth. Also EU membership has driven Poland towards better environment and stringent environmental regulations and requirements. During the last eight years as full member of the EU and thanks to the EU financing programs Poland built over 1000 new wastewater treatment plants together with thousands of miles of new piping systems, reduced emission of CO2 more than 30 percent, built hundreds of new municipal and hazardous waste management facilities, developed long-term programs to protect hundreds of endangered plant and animal species, etc. During 2007–2012 Poland benefited by 60 billion Euros from the various EU funds. The

Statistics

Capital:	Warsaw
Population:	38.3 million
GDP:	USD 510 billion
Currency:	Polish Zloty (PLN)
Language:	Polish

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next financial perspective of 2013–2020 will give Poland another injection of capital in amount of over 70 billion Euros.

For more information, please visit ***go.usa.gov/berw***.

Best Prospects

Waste and Wastewater

Municipal wastewater treatment plants are slated for construction, extension and modernization. Currently around 200 new wastewater treatment plants are under construction or modernization. Most in demand are wastewater treatment facilities for regions inhabited by less than 15 thousand citizens.

The market for water/wastewater equipment has grown steadily over the last few years and is expected to increase rapidly. U.S. exports of water/wastewater equipment to Poland have grown significantly over the past few years. While U.S. products are considered to be of the best quality, they face strong competition from European suppliers, especially from Germany, Sweden and France. The competitiveness of products offered by European producers is based on lower shipping costs and lower tariff rates for EU suppliers. The best investment prospects in Poland for the next few years exist for companies offering the latest technology and equipment for chemical and biological treatment of wastewater, technology for safe sludge disposal, for desalination and disposal of residuals (including marketing of salts), water recycling in industry, etc. Poland is particularly intent on reaching European Union standards for effluents and drinking water quality. Imported equipment must meet quality standards required by the Polish certification law.

Solid Waste—Municipal

Waste thermal utilization facilities are of a significant potential for production of energy and heat. As of June 2010 the ordinance regarding qualifying 42 percent of the energy recovered from waste as a renewable energy is in effect. Thus, when the waste-to-energy facilities become operational they will have a significant contribution towards Poland's compliance with the EU requirements in terms of the amount of energy produced from renewable energy source (RES). Also the new renewable energy law that is currently at public consultations foresees municipal waste as RES.

Poland's plans for increasing the number of waste-to-energy facilities open significant opportunities for the newest technology suppliers. Within 2016 and 2020 there are another 10 projects to be accomplished with public-private partnership, (PPP), financing model possible. These projected facilities are to process approximately two million tons of waste. Among these projects the most urgent is the extension of the Warsaw facility that is planned for 350K tons/year of capacity. The city of Warsaw looks for an international PPP partner. The bid should be announced in 2012.

Experts estimate that Poland needs waste-to-energy facilities of 3 million tons/year capacity in order to comply with the European Union requirements and standards. For the years 2016–2020, waste-to-energy facilities are projected for the cities of Lodz, Koszalin, Gdansk, Katowice, Chrzanow, Tarnow, Oswiecim, Gorlice, Plock, Radom, and Kalisz.

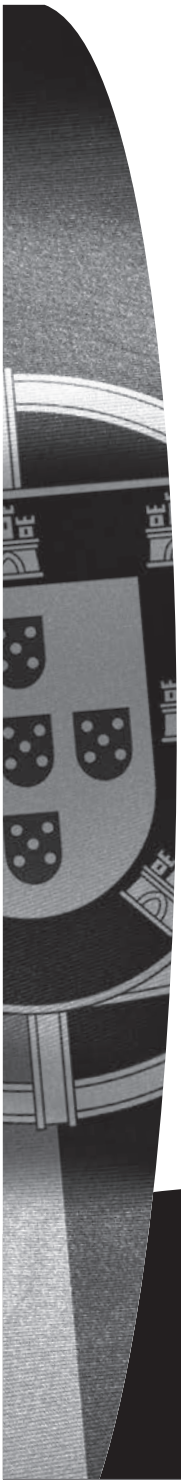
Solid Waste—Sludge

Poland produces over 600K tons of sludge per year. The EU Commission imposed an obligation in accordance to which Poland will not be permitted to landfill sludge starting from January 1st 2013. Also, according to the National Plan for Waste Management by 2018, 60 percent of sludge is to be utilized with thermal methods. The current amount being processed this way reaches only 12 percent. Cities of Warsaw, Lodz, Krakow, Gdansk, Poznan, and Szczecin have limited capacities to dry and incinerate sludge. Over 58 percent of forecasted amount of sludge by the year 2015 will originate from 76 agglomerations over 100K of citizens. Poland has practically no experience in using drying and incineration methods. High-tech sludge processing technologies are to be of high demand in the nearest future. The currently operational capacity does not allow Poland to comply with the requirement. It is important that the Polish regulations qualify dried sludge as RES.

Air

The air pollution control sector will provide opportunities for construction of air pollution control installations at various industrial facilities. Poland will have to comply with the Industrial Emissions Directive 2010/75/EU that requires significant reduction of emissions of Nox and SOx by 2016–2020. A great majority of Polish power plants were built before Poland became the EU member, so all of them will have to address to this problem.

Also Directive 2009/28/EC of April 2009 on the promotion of the use of energy from renewable sources is a driver for cleaner energy and opens the market for innovative RE technologies. Poland is one of the European Union countries that committed to a 20 percent reduction of CO2 emission, a 20 percent goal of renewable energy in the total energy balance, and a 20 percent increase in the effective use of energy, all by the year 2020.



Portugal

Overview

Although Portugal is still trailing behind in addressing some of its environmental issues when compared with other E.U member states, recent initiatives have made complying with E.U standards a priority with the help of financing from EU Cohesion and structural funds. The Portuguese economy was badly hit by the economic and financial crisis. As a response, in 2009 Portugal adopted fiscal measures to stimulate the economy and some 18 percent of the resulting stimulus package was environmentally related. Further deterioration of the country's finances has slowed the government's funding of these environmental initiatives, making investments from private businesses increasingly important. While government assistance has stalled, sales in the environmental sector have been increasing with the total output of environmental goods and services reaching € 5.4 billion in 2011, a 4 percent increase over the total in 2010.

Market Opportunities

Opportunities exist within the waste management and water sectors as well as for technologies for soil remediation. In 2011, waste management accounted for 72 percent of total service sales in the pollution control sector. Treatment of heavy metals represented the service that grew most in the environmental sector, with an increase of 16 percent. The total amounts allotted by QREN for investment support in the water and waste management sectors add up to €1.95 billion. The amount of funding still to be distributed is over €1.2 billion and main financing priorities are for water management and distribution, and wastewater treatment. As the sector is highly state-controlled and dependent on EU funding, it is preferable to have access to the proper officials to be successful in this business. In addition, in order to take advantage of existing and future business opportunities and successfully enter or expand into the Portuguese market, foreign firms usually align themselves with Portuguese companies in joint ventures, consortiums and cooperation agreements.

Statistics

Capital:	Lisbon
Population:	10.8 million
GDP:	USD 237.5 billion
Currency:	Euro
Language:	Portuguese

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Best Prospects

- Recycling technologies
- Filtering and purifying machinery
- Technologies for treatment and disposal of hazardous waste
- Composting equipment
- Water treatment technologies
- Wastewater treatment aeration and purification systems
- Air and sea pollution products
- New technologies to create valuable end-products from any form of waste
- Consulting and engineering services for the development and operation of waste management and recycling facilities.

Waste Management

Portugal's urban waste management sector has developed substantially over the past decade, as a response to the necessity to plan and implement effective strategies which address obligations for environmental stewardship under EU legislation. Particularly pressing concerns are closing waste tips and constructing landfills, along with other waste recovery infrastructure. The Portuguese government's creation of a regulatory agency for the urban waste sector, the Institute for the Regulation of Water and Waste (ERSAR), has fostered the improvement and innovation in this sector.

In 2011, the government spent 548 million euros on waste management, and total exports of waste for disposal and recovery operations reached 62 thousand tons, an increase of 13 percent over the last year. (Estatisticas do Ambiente 2011). Recent regulations reforms help facilitate the growth of the waste sector by inducing more incentives to make waste services more efficient, affordable, and sustainable. Opportunities are forecasted for a variety of waste handling and treatment technologies.

- Recycling technologies
- Technologies for treatment and disposal of hazardous waste
- Composting equipment
- Heavy metal collection equipment
- Sensors and analyzers
- New technologies to create valuable end-products from any form of waste
- Consulting and engineering services for the development and operation of waste management and recycling facilities.

Major Programs in the Waste Management Sector

Several government-approved programs are currently in progress:

- Plano Estratégico para os Resíduos Sólidos Urbanos (PERSU II, National Strategic Plan for Urban Solid Waste) 2007/2016—with an investment of USD 2.74 billion focusing in areas such as valorization of organic waste and improvement of the selective collection systems. PERSU II namely works to ensure compliance of EU objectives for separating biodegradable waste from landfill and recycling and recovering packaging waste.
- Plano Estratégico de Resíduos Hospitalares (PERH, Strategic Hospital Waste Plan) promotes the participation of public and private partners and evaluates new treatment technologies
- Plano Estratégico de Gestão dos Resíduos Industrias (PESGRI, Strategic Industrial Waste Management Plan)
- Plano Nacional de Prevenção de Resíduos Industrias (PNAPRI, National Industrial Waste Prevention Plan

Other programs are currently being developed and are expected to be approved soon. As these efforts continue, the Portuguese water and waste services markets will have growth potential over the next several years.

Romania

Market Opportunities

As a member of the European Union, Romania is required to implement EU environmental protection standards by 2018, at which time all transitional periods negotiated with the European Commission will expire. The highest costs will fall under the "heavy environment investments" related to water and wastewater, solid and hazardous waste management, and large combustion plant air quality control. The main environmental sectors that benefit the most from investments are water/wastewater and waste management, followed by integrated pollution control and risk assessment.

Water and Wastewater

The water and wastewater services in Romania have been under a reengineering process, aiming to establish efficient regional water and wastewater operators. Regionalization is considered a key element in improving the quality and cost efficiency of local water infrastructure and services in order to fulfill the country's environmental targets, but also to assure the sustainability of investments.

Opportunities in the sector include technical assistance contracts (project management, site supervision, works contracts, both Yellow FIDIC and Red FIDIC, aiming to rehabilitate and extend the water and wastewater systems (sewerage networks, water/wastewater treatment plants), supply contracts for SCADA systems, meters, operational vehicles, laboratory equipment, etc.

Waste Management

In urban areas, municipal waste management is carried out through specialized services, covering about 90 percent of the population, while none are existent in rural areas. There are 252 municipal landfills, out of which the majority is not compliant with environmental standards; there is a critical need to find more environmentally friendly ways to handle hazardous, solid, and industrial waste, such as waste-to-energy projects, recycling, and waste minimization.

Statistics

Capital:	Bucharest
Population:	21.4 million
GDP:	USD 267.2 billion
Currency:	Lei
Language:	Romanian

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Air Quality Control

Particulate matter is the main pollutant in Romania, and it currently greatly exceeds the maximum admissible concentration level. The main sources of particulate pollution are thermal power plants using solid fuels, metallurgic and steel industries, cement factories, road transport, waste dumps, and waste storage. The Large Combustion Plants (LCP), which produce power and heat represent the main source of air pollution in many municipalities. In 26 of the largest municipalities in Romania, LCPs are the most important source of thermal energy and household hot water. The main pollution source from the LCP's are the fossil fuels (coal, fuel oil) used by these installations. They emit high concentration of particulates, nitrogen and sulphur oxides, which cause acid rain and pose a significant health risk.

Russia

Overview

The share of domestic manufacturers in the Russian environmental technologies market is about 40 percent, which opens broad avenues for foreign imports, including U.S. made technologies and products. The key environmental technologies market segments include solid waste management, water treatment, air purification, protection and rational use of lands. Russia is investing in efforts to maintain a clean water supply, creating demand for commercial and household water filtration equipment. Russia has 20 percent of the world's fresh water, making it second only to Brazil in the size of its fresh water resources. The Russian government is planning to spend more than USD 20 billion on management and infrastructure projects for these water resources by 2020. Russia has a total of 8,801 water supply systems, with centralized water supply used by 106,500,000 people resident in 1,092 towns and 1,872 urban-type settlements. The capacity of water supply systems is estimated at 90,000,000 cubic meters per day, with towns accounting for about 71,000,000 cubic meters per day (79 percent). The majority (95 percent) of municipalities own both the water supply and sanitation properties and manage them as municipal unitary enterprises, or "vodokanals." The federal government owns the water supply and sanitation systems in a few cities (including Moscow and St. Petersburg), but it has limited capacity and is seeking U.S. technologies and partnerships. A recent trend is the privatization of water facilities, which is generating new opportunities for the private sector. Private sector ownership is expected to grow from the current 10 percent of the urban population to 16 percent in the near future.

In 2009, the Russian government implemented a new climate change policy. With the primary goal of lowering greenhouse gas emissions, the policy acknowledged the mitigation of climate change as one of the major long-term elements of security of the Russian Federation and placed global climate change, both in its national and international dimensions, among the Russian Federation's policy priorities. Per the new policy, all regional and municipal programs must increase

Statistics

Capital:	Moscow
Population:	140 million
GDP:	USD 1857.77 billion
Currency:	Russian ruble (RUB)
Language:	Russian

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the use of energy-efficient technologies and secondary energy sources and/or renewable energy sources; specific energy-saving targets must be met within the next 15 years.

Market Opportunities

Russia presents lucrative opportunities for U.S. environmental companies providing environmental technologies including biofuels, biomass, water, waste treatment and energy efficiency. In January 2010, the Russian government announced plans to recycle 20 percent of solid waste by 2016. The program is focused on the elimination of the ecological damage, construction and reconstruction of treatment plants, implementation of energy efficient technologies, waste disposal and modernization of hazardous facilities. Existing opportunities for U.S. companies in the Russian water market include BOT (build operate transfer) and BOOT (build own operate transfer projects), Public Private Partnerships, engineering/consultancy opportunities, pipeline rehabilitation and wastewater treatment technologies.

As of today, energy efficiency and energy saving are occupying the leading position within the five priorities of the Committee on modernization and technological development of economics under the aegis of the President of the Russian Federation created in 2009. The activity of the Committee in cooperation with leading Russian and foreign scientific and commercial organizations is, among others, aimed at complex implementation of six energy efficiency and energy saving projects: «Count, save and pay," «New light," «Energy efficient block," «Small complex hydro power," «Innovative energy» and the project of introduction of energy efficient technologies at state establishments.

Opportunities for green construction in Russia are dependent upon overall construction nationwide. Construction is expected to see growth in 2013; as the economy improves after three years of contraction, the country prepares for the 2014 Olympic Games in Sochi, the 2018 FIFA World Cup, and the Skolkovo technology park project. Among future projects, the technology park at Skolkovo in particular should prove to be fertile ground for green building and technology, as it will be an opportunity for Russia to showcase its modernization efforts. Sochi Olympic Games construction is another opportunity for American suppliers of green building materials and services to showcase their products. Specifically, the International Olympic Committee has mandated that certain standards be met. 10 of the 202 planned Olympic buildings will be either LEED or BREEM certified, and 150 objects will be certified by Olympstroy corporate standards for energy efficiency.

In December 2010, Russia won its bid with FIFA to host the 2018 World Cup tournament and is planning the construction of 16 state-of-the-art stadiums in 13 cities, mostly in Western Russia. Each stadium will have a pricetag between USD 70–300 million.

Trade Events

Wasma

October 29–31, 2013 • Moscow, Russia • ***wasma.ru/en-GB***
International exhibition of environmental technologies and innovations.

Ecwatech

June 3–6, 2014 • Moscow, Russia • ***ecwatech.com***
International water forum.

Saudi Arabia

Overview

Saudi Arabia produces 13 million tons of garbage per year, with a population base of about 28 million at a rate of 1.4 kg per person each day. The market expresses an overwhelming need for recycling and waste management solutions. Studies indicate that over 85 percent of all garbage in Saudi Arabia could be recycled. The rising population levels coupled with Saudi Arabia's rapid industrialization, construction and urbanization, have increased levels of pollution and waste. The Saudi government recognizes the critical demand for waste management solutions, and is taking concrete steps to address these issues with streamlined regulation and legislation. As per a World Bank report, the Kingdom is rated as the 13th most economically competitive country in the world; leading analysts to believe that the country's strong GDP will strengthen consumer spending; thereby creating increased levels of waste.

Market Opportunities

The market for waste management and environmental technologies products continues to grow rapidly with the Saudi Arabian government taking a deep interest in developing this sector. Industry sources estimate the market for waste management/environmental technologies to be more than USD 65 million in 2009. As per projections, U.S. exports in this sector are expected to increase around 7–8 percent each year. Among the main reasons for the demand and growth in this area is Saudi Arabia's rapid industrialization and urban growth that have increased pollution levels and ever increasing waste levels. The largest form of waste; by far, comes from the large industrial sector with municipal waste coming in second. Saudi Arabia is also known to produce more than 60 million tons of industrial toxic waste per year, prompting calls for effective management of waste and attracting attention from both the government and the corporate sector. As per a recent industry report, construction debris in the capital city of Riyadh alone was about 2.1 million tons in 2009 and commercial and domestic waste amounted

Statistics

Capital:	Riyadh
Population:	26,939,583 (est. 2013)
GDP:	USD 740.5 billion
Currency:	Saudi Riyal
Language:	Arabic

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to 1.4 million tons. Furthermore, both large-scale and small-scale industries are key drivers of this effluent and waste and the major challenges the industry faces is the transportation and monitoring of these wastes. Small-scale industries tend to neglect environmental issues and enforcement remains one of the key challenges. As per World Bank estimates, over USD 100 billion are to be spent in the waste management and environmental sectors in the Middle East region over the next 10 years, with Saudi Arabia leading the share.

Recycling as a means of waste management has also gained momentum; as a form of embracing environmentally friendly technologies. Apart from reducing the need for expensive alternatives such as land filling and incineration, recycling puts waste materials to better use, making them valuable resources. Recycling of certain materials such as paper, plastic soft drink bottles, aluminum soft drink cans and steel packaging continues to grow. Most of the municipal solid waste is degradable and recyclable; however waste disposal into landfills remains the most common practice in the Kingdom. The market needs greater diversification in the areas of composting, recycling and incineration of waste.

Saudi Aramco, the national oil company, follows some of the best waste management practices in the Kingdom. Saudi Aramco's Industrial Waste Management Plan; one of the best in the world, ensures that waste from each of the company's operating plants are adequately handled to protect the environment. It uses sanitary landfills for the disposal of municipal solid waste, whereas industrial wastes are segregated and handled as per standard industry practices. Saudi Aramco also utilizes several industrial waste treatment plants which include separators to treat oily water, land farms to treat oily sludge, dedicated asbestos disposal areas and on-site oxidation of pyrophoric waste. Recycling has also been of utmost priority to the company through its Waste Minimization Program that reduces waste generation and lowers associated costs. The company has recycled hundreds of tons of paper, aluminum and glass. A recent report from Saudi Aramco stated that their sanitary and wastewater reuse was currently 73 percent and said to reach 84 percent in two years and 94 percent by 2020. On the contrary, the national average for sanitary and wastewater reuse is said to be only 16 percent with some areas as low as 6 percent.

Saudi Basic Industries Corporation (SABIC) is another leading Saudi company known for its excellent waste management practices to handle industrial waste. The company strictly adheres to regulations to prevent pollution, reduce waste and conserve resources. It follows what is called as the 4R strategy—Reduce, Reuse, Recycle and Recover. The end result of the 4R program is a reduction in environmental impact, better resource conservation and lower costs.

Per 2009 sources, the national budget allocated SAR 17 billion (USD 4.5 billion) for the municipal services sector, which includes water drainage and waste disposal and SAR 28.5 billion (USD 7.5 billion) for the water, agriculture and infrastructure sector, which includes sanitation services and desalination plants. The Kingdom's current infrastructure and public sector building five-year plan is valued at over SAR 200 billion (USD 53 billion). Six mega cities are under construction, and hundreds of thousands of housing units are to be constructed.

The projects will produce large amount of waste requiring the latest in recycling and waste management technologies. Though this multi-billion-dollar sector continues to be underdeveloped; it holds substantial business opportunities for serious investors.

Furthermore, there are significant opportunities for waste disposal and treatment for industrial and toxic waste at the various industrial facilities including oil rigs in Saudi Arabia. The Presidency of Meteorology and Environment (PME), an offshoot of the Ministry of Defense and Aviation, is the supervising Saudi authority in charge of controlling and enforcing environmental regulations in Saudi Arabia. In October 2001, the Saudi government issued the first draft of Saudi regulations pertaining to air, water, waste, hazardous materials, and noise pollution control. The Saudi government's various diversification plans for industrial, oil and gas, petrochemical, power generation, etc will entail significant opportunities for waste management and environmental technologies.

There is also significant demand from the burgeoning healthcare sector, with Saudi Arabia known to generate more that 50,000 tons of healthcare waste per year. The Kingdom has 1,850 health centers now, with 79 hospitals under construction, and new projects including over 250 primary care centers and eight new hospitals. These facilities demand advanced medical waste disposal methods incorporating the latest technologies.

Best Prospects

The Saudi Arabian government has stepped up participation in international and regional forums with regard to environmental issues and has taken measures to sustain economic development without damaging the environment. The Saudi market is very receptive to American made machinery and equipment which are generally regarded as superior quality products. The U.S. holds a good percentage of market share, European companies are the major competitors. The local currency is pegged to the dollar and the current strength of the Euro is a positive factor for U.S. equipment sales.

Prime users of U.S. equipment include government and major industry. There are plenty of opportunities for companies in a wide range of environmental projects including treatment and recycling of industrial waste, water and sewage. Leading banks and financial institutions in the Kingdom along with the Saudi Arabian government will be playing an integral role in attracting more interest in these ventures. In addition to this, keen participation by both semi-government agencies and the private sector will ensure growth in this sector. Saudi Arabia needs to study and adopt the latest trends and technologies and industrial waste management practices in the U.S. and other developed markets, in order to combat problems of waste disposal and recycling.

Opportunities exist in several areas:

- Hazardous waste transportation
- Waste sampling, characterization and analysis
- Waste minimization
- Hazardous waste removal and tank cleaning
- Contaminated land site assessment and remediation
- Asbestos management
- Industrial and hazardous waste treatment and disposal, recovery, reuse, and recycling
- Air pollution control equipment and monitoring devices
- Solid waste management systems
- Technologies for the treatment of wastewater/sewage

U.S. companies have opportunities for sales of many types of waste management equipment and machinery in Saudi Arabia, including:

- Baling presses
- Compactors
- Banks
- Bins
- Containers
- Composters
- Conveyors
- Crushers
- Cranes
- Roll-on roll-off trucks
- Skip trucks
- Tankers
- Trailer tankers
- Vacuum tankers
- Sorting systems
- Odor control
- Recycling containers
- Shredders
- Stationary scales
- Trammels
- Wheel loaders
- Tub grinders
- Wood chippers
- Carts
- Drive trains
- Dumpers
- Hoists and lifters
- Fleet maintenance and washing equipment
- Computer software
- High capacity dewatering pumps
- Incinerators
- Auxiliary equipment
- And more

Prospective Buyers

Saudi Arabia's planned and current expansion projects represent great potential for U.S. manufacturers/exporters of waste management and technologies, products and services. Prospective local buyers prefer to deal with approved vendors acting on behalf of foreign principals. Prime users of waste management machinery are the government entities and major waste management contractors in the Kingdom. Manufacturers of equipment, machinery, and parts related to the waste management sector are advised to do business in Saudi Arabia through appointed local agents/distributors and representatives to offer and sell their products to end-users. Sales calls and follow up are critical to establish rapport and maintain a lead in tackling new opportunities. Having a local agent/distributor with a sophisticated after-sales service and a well-trained staff capable of providing technical support is indispensable and can sway purchasing decisions in favor of a manufacturer/supplier of a machinery and equipment.

Singapore

Overview

(in USD millions)	2011	2012	2013 (proj.)	2014 (proj.)
Total Market Size	13,380	16,799	17,637	18,519
Total Local Production	16,998	17,377	18,245	19,157
Total Exports	37,462	37,756	39,644	41,626
Total Imports	33,844	37,178	39,036	40,988
Imports from the U.S.	7,162	7,522	7,898	8,293

Data Sources: Unofficial estimates

From transportation and public housing, to energy management and water treatment, Singapore has developed and adapted some of the world's most advanced sustainable solutions. Backed by a progressive leadership and firm commitment to sustainable development, Singapore has managed to turn challenges into rewarding opportunities.

Singapore is one of the few countries in the world to have mandated green designs for all new buildings since early 2008. The Building and Construction Authority (BCA) Green Mark program encourages green awareness in the sectors of construction and real estates. Under the BCA Green Mark program, buildings are assessed for energy and water efficiency, indoor environmental quality and environmental protection. Leveraging the growing regional recognition of the program, Singapore is well-positioned to capture the growth in this sector through the increased incorporation of cutting-edge clean energy technologies in new and existing building developments.

The need for sustainable fresh water supply is clearly an increasingly important global concern today, with many countries actively seeking solutions for their water and environmental management needs. There is no doubt that in the years

Statistics

Capital: Singapore
Population: 5.18 million
Currency: Singapore Dollar (SGD)
Language: English (official); Mandarin, Malay, Tamil

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ahead, the water industry will continue to enjoy robust growth and Singapore, as a recognized Global HydroHub, will be there to ride the wave of this economic growth sector. By 2015, the Environment and Water sector is expected to contribute USD 1.7 billion to Singapore's gross domestic product.

Market Opportunities

The water industry in Singapore is becoming more liberalized. The national water agency, the Public Utilities Board (PUB), has opened its doors to private companies that want to test-bed projects using its infrastructure. PUB also tenders contracts to private companies to design, build and operate water plants. U.S. companies are encouraged to participate in future contracts offered by the PUB. American equipment manufacturers could also supply their equipment to successful prime contractors of PUB projects. Areas of particular interest include filtering and purifying machinery and apparatus, technologies involving wastewater recycling and treatment, and advanced desalination systems.

Best Prospects

Singapore's Green Plan 2012 (SGP 2012) incorporates programs for reduction of waste volumes through waste minimization and recycling; reduction of the amount of land for sewage treatment; stricter emission standards, and tougher vehicular emission controls. The Singapore government has announced it will upgrade and build environmental infrastructure projects over the next 10 years. Related products from the U.S. will have good market prospects, given that imports of environmental products from the U.S. account for over 20 percent of the total imports.

Other areas of interest include water filtering and purifying machinery and apparatus, technologies involving wastewater recycling and treatment, and energy efficient desalination systems.

Trade Events

Singapore International Water Week
June 1–5, 2014 • Singapore • ***siww.com.sg***

WasteMET Asia
June 2–4, 2014 • Singapore • ***wastemetasia.sg***

Resources

- Ministry of the Environment and Water Resources: ***mewr.gov.sg***
- National Environment Agency: ***nea.gov.sg***
- Public Utilities Board: ***www.pub.gov.sg***

South Africa

Market Opportunities

Air Pollution Control and Monitoring

- The Air Quality Act mandates large, South African industrial groups to implement emission management and monitoring equipment. There is a definite opportunity for extensive implementation of emission filters and cleaner production technology to assist the large air polluting industries in South Africa to reach their emission limitation targets as set by the South African government.
- There is demand for monitoring technology to measure emission levels in different industrial zones, as well as technologies and equipment to control and reduce emissions.

Hazardous Waste Management

- Opportunities for U.S. companies exists in treatment of hazardous waste sites, containing chemical and hydrocarbon spills and cleaning and rehabilitating asbestos and gold mine dumping sites.
- The South African government has proposed far-reaching legislation on the banning of asbestos products and byproducts. Active consultations are currently being held on the rehabilitation of asbestos and other hazardous waste dumping sites.
- Assessment, management and remediation of contaminated land will also play an important role as a result of new waste legislation that is being considered.
- The government is also looking at a road freight management system that will monitor hazardous material shipments and end-use compliance.

Statistics

Capital:	Pretoria
Population:	52 million
GDP:	USD 578.6 billion (est.)
Currency:	South African Rand
Language:	English, others

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Solid Waste Management

- The implementation of so-called integrated waste management plans and policies by municipalities will create opportunities for U.S. suppliers of relevant products and services.
- In the short and medium term, areas of opportunity exist in the provision of residential solid waste technologies and rehabilitation equipment to assist local municipalities to manage their solid residential waste, including transformation into reusable by products, such as fertilizer.

Water Management

- Water treatment facilities are a main priority at the moment for South Africa, and all mines and power stations are building state will need to focus on building these facilities.
- Mine acid drainage is possibly the most pressing industrial remedial water management issue facing South Africa. Because of the peculiarities of the problem, many home-grown solutions are on offer, but a lack of effective regulatory pressure seems to be militating against an immediate solution.
- With regards to potable retail water management, the biggest issue facing the big urban centers is the underground loss of bulk water due to failing infrastructure (25 percent of all water supplied). In most cases the reported drop in quality of potable water is due to lack of technical capacity of the local water authorities to budget and operate water purification systems.

Best Prospects

Subsectors offering the most opportunities for U.S. companies include:

- Air pollution control and monitoring,
- Wastewater recycling and treatment plants,
- Solid waste management technology.

Thailand

Overview

Thailand, one of the fast industrial growing countries in South East Asia, has faced increasingly serious environmental degradation. Thailand total market size for environmental technologies was estimated at USD 2 billion per year. The construction and engineering services cost are about 85 percent of the market size. The average market size of environment equipment is about USD 400–500 million per year and the growth rate is about 5–10 percent per year. There are no restrictions on the importation of environmental equipment. Tariff rates imposed on equipment range from 0–5 percent.

Market Opportunities

Thailand is Southeast Asia's second largest economy (behind Indonesia), and 4th richest nation, according to per capita GDP, after Singapore, Brunei and Malaysia. Due to its strategic location in the heart of ASEAN countries, the country also functions as an anchor economy for the neighboring developing countries like Laos, Myanmar, and Cambodia. Good prospects for exports to Thailand are listed below (in alphabetical order).

Best Prospects

Water and Wastewater

The water treatment and water resources equipment shared over half of the market. In the water and wastewater treatment equipment markets, best prospects for U.S. products are microfiltration, ultra-filtration, pumps (submersible, centrifugal, aerator/mixer, dosing and vacuum), valves (sleeve valve, solenoid valve), scrapers, sludge dewatering equipment (filter presses, belt press, small dewatering systems) and screening machines (bar screens, shredding screens), magnetic flow meters, large chlorinators for water/wastewater systems, water recycling technologies and zero-discharge system.

Statistics

Capital:	Bangkok
Population:	66 Million
GDP:	USD 345.6 billion
Currency:	Thai Baht
Language:	Thai

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Solid Waste

Currently, Thailand utilizes landfills for the disposal of municipal waste. There is a need for waste handling equipment, recycle technologies (including biomass), sorting equipment, incinerators, integrated environmental software and solutions for industrial estates and manufacturing facilities.

Air

Demand for air pollution control equipment exists in the area of air monitoring equipment, industrial emission monitoring equipment, indoor air pollution control equipment and vehicle emission monitoring system.

U.S. manufacturers and suppliers should concentrate their marketing efforts on the upper market segments, especially in the applications where quality, safety and advanced technology are critical. The types of environmental products marketed in Thailand should be relatively easy to install and maintain and require minimal after-sales service or technical support.

Turkey

Overview

Turkey's accession process to the EU has been a major impetus for large-scale environmental remediation and implementation of new environmental standards. Both the government and private sectors will have to invest in environmental technologies. EU has been funding some portion of this investment. Bank of Provinces of Turkey (Iller Bankasi) is a state owned bank that specializes for financing infrastructure projects.

Largest percentage of investment to upgrade Turkey's environmental infrastructure to EU level is for wastewater and drinking water facilities. Municipal water/wastewater treatment is the leading opportunity for foreign companies. Discharge of wastewater into surface water without treatment by industrial facilities remains to be a problem although the situation is improving. Some products that have potential in the Turkish market include water pumps, filters, pollution control equipment, design and operation of water/wastewater plants, leakage detection systems, membrane technology, and industrial wastewater remediation systems.

Market Opportunities

Turkey has a 75 million young population and the country is a hub thanks to being located at a strategic location, therefore offering many opportunities for U.S. companies that seek international expansion. Although not a full member of the European Union (EU), candidacy of the country requires harmonization of environmental regulations with EU standards. Alignment with EU standards creates an environmental infrastructure and technologies market that will ultimately be worth USD 92 billion and the alignment is planned to be completed by 2024.

Statistics

Capital:	Ankara
Population:	80 Million
GDP:	USD 783 billion
Currency:	Turkish lira (TRY)
Language:	Turkish

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Increasing industrial output and rapid urbanization have made environmental protection a priority for the Turkish government and the need for investment is continuously increasing especially in the waste management, water supply and management and air pollution control sub sectors. Local municipalities play an important role in recycling, water purification, wastewater treatment, environmental remediation and solid waste management. The lack of expertise of local companies to handle large scale environmental projects offers American companies a good opportunity in the sector.

Key Suppliers

EU countries have a strong position in the sector due to geographical proximity that brings down the costs associated with importing a product. Customs Union agreement between Turkey and the EU resulted in no import taxes for industrial goods originating from EU. European companies prefer to open offices or to assign agents to monitor developments and local tender announcements.

Prospective Buyers

The Ministry of Environment and Urbanization implements the macro environmental plan and is the buyer of services and equipment for projects on a national level. Local municipalities are responsible for the construction and management of drinking water and sewage networks and water/wastewater treatment plants. Private sector companies and organized industrial zones are also among potential buyers.

Vietnam

Overview

in USD millions)	2011	2012	2012 (est.)
Total Market Size	790	825	860
Total Local Production	435	455	475
Total Exports	0	0	0
Total Imports	355	370	385
Imports from the U.S.	29.5	31	32.5

Data Sources: Unofficial estimates based on total ODA funding of environmental projects underway and anticipated to begin, as well as projects undertaken by urban and industrial entities including water resources fund.

Vietnam is facing an increasing number of environmental pollution challenges including air, water, and solid waste pollution. Major factors contributing to these problems include high population growth rate, rapid urbanization, accelerating industrialization, and weak enforcement of the Law on Environmental Protection and Development.

Market Opportunities

Water Supply

The lack of clean water is one of Vietnam's most pressing environmental concerns. At present, it is estimated that only about 70 percent of the Vietnamese population has access to potable water. A high rate of water loss, averaging 32 percent, further aggravates the problem. In order to improve upon this situation, the Prime Minister recently issued Decision 1929/QD-TTg on approval of the "Orientation for Development of Water Supply in Vietnam's Urban Centers and Industrial Parks Leading to 2025, and Vision for 2050." The Decision sets a target of supplying clean

Statistics

Capital: Hanoi
Population: 90 million (2012)
GDP: USD 138 billion (2012)
Currency: Dong
Language: Vietnamese

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water to all urban cities, towns, and limiting the rate of water loss in these cities to less than 15 percent by 2025. By 2050, all urban cities, towns, and industrial parks will be supplied in a stable manner with high quality of services.

To this end, the Vietnamese government is using Official Development Assistance (ODA) funding to develop water distribution networks. The ODA funds are used for three major water supply programs: World Bank water supply projects for small and medium cities, Finnish water supply projects for the northern mountainous areas, and Agence Francaise de Development (AFD) water supply projects for Mekong Delta provinces. However, it is estimated that ODA will be gradually reduced, as GDP per capita surpassed the USD 1,000 threshold as of the end 2010. In that context and in view of the enormous demand, the Vietnamese government strongly encourages private participation in the development of water supply facilities and has created policies to encourage investments including Decree No. 117 on Water Supply and Environmental Sanitation; Decree No. 88 on Drainage System Management; and Decree No. 59 on Solid Waste Management.

Currently the 240 water treatment plants in Vietnam, produce over 4.7 million cubic meters per day for urban consumption, but only meet about 70 percent of demand.

Wastewater

In addition to water supply, one of the most pressing environmental concerns and a top government priority is drainage and sewage. Due to rapid and ongoing urbanization and industrialization, improved municipal and industrial wastewater treatment has emerged as a critical need. The total investment required to meet sewage and drainage system needs throughout the country is estimated to be two to three times the total investment for water supply projects.

Most of the cities and provinces have no centralized wastewater treatment plants. Both storm water and household wastewater are commonly discharged through combined outdated drainage systems into canals and rivers without treatment. The development of wastewater treatment facilities in industrial parks has also become a pressing need. Currently, only about 10 percent of industrial parks have centralized wastewater treatment plants.

In November 2009, the Prime Minister approved the "Orientation for Development of Water Sewage and Drainage Systems in Vietnam's Urban Centers and Industrial Parks Leading to 2025, and Vision for 2050." According to the directive, by 2025 all urban cities class IV and above will have centralized municipal wastewater treatment and collection systems; 70–80 percent of municipal wastewater will be collected and treated properly. All traditional handicraft villages will have centralized or decentralized wastewater treatment facilities. By 2050, all urban cities class IV and above will have storm water discharging systems as well as wastewater treatment systems. The government will give priority in using ODA funds to developing urban water drainage systems, especially in major cities and in areas that are prone to natural calamity. The government also encourages funding from both domestic and foreign individuals and institutions in developing water drainage and wastewater treatment systems.

Municipal Wastewater

According to the Hanoi Drainage Company, the city discharges 450,000 to 510,000 cubic meters of wastewater per day into lakes and rivers. Over 90 percent of the city's wastewater is discharged directly into lakes and rivers without treatment, making these watercourses seriously polluted. Currently, Hanoi has only one wastewater treatment plant (Bac Thang Long—Van Tri) and two small wastewater treatment units (Kim Lien and Truc Bach).

Ho Chi Minh City discharges 1.2 million cubic meter of wastewater per day. Similar to Hanoi, the City's wastewater is mainly discharged into rivers. Ho Chi Minh City authority is launching the three big projects in order to solve the wastewater problem of the city under the management of Steering Center of the Urban Flood Control Program of Ho Chi Minh City:

- The interception and Cat Lai Centralized Wastewater Treatment plan. This plant is used to treat the whole city. The estimated investment value is USD 450–500 million. Design and EPC contractor shall be selected via a public bidding process which is planned to start in 2012. The HCMC Steering Center for Urban Flood Control is working on the bidding document for the design of this project. Since this is a World Bank project, the Invitation for Bid (IFB) will be announced publicly sometime within 2012. The construction is to start in 2013.
- The collection system and the wastewater treatment plant for Western area of the city and Binh Tan District. The investment value is USD 700–800 million. This project is looking to start a feasibility study and for financial support.
- The interception and Tan Hoa Lo Gom wastewater treatment plant. Total estimated value is USD 350–400 million.

According to HCMC's 2020 master plan for wastewater drainage, which was approved by the Prime Minister, the City will need an additional eight wastewater treatment plants of similar size with a total investment of up to USD 4 billion to resolve its wastewater drainage problem. These projects are under the management of the HCMC Steering Center for Urban Flood Control (***bit.ly/19z5itt***).

In the Prime Minister's Decision No. 1336 on the development of the drainage system and wastewater treatment for economic development zones, total investment requirement for implementation, excluding resettlement cost, was estimated at USD 3.4 billion. In the decision, the Prime Minister made it mandatory for new urban residential areas and industrial parks to plan and construct separate drainage systems for storm water and wastewater. Municipal and industrial wastewaters are further required to be pre-treated to ensure compliance with environmental standards before being discharged into the city's drainage systems. As a result, the government encourages cost-effective and environmental friendly wastewater treatment technologies.

Industrial Wastewater

Industrial manufacturers' pollution violations have recently drawn much media, government, and public attention. Public interest groups have begun to highlight the impact of polluting manufacturers on the environment and economy. Violating manufacturers are beginning to feel negative impacts from boycotts by their associates and customers. Polluting companies have also had some difficulty in accessing bank funds, as more banks are adjusting their policies to avoid lending to clients on the environment black list. Highly visible cases have been discussed at National Assembly meetings since Q4 2008. These recent developments have triggered an intensification of environmental pollution monitoring and inspection.

Industrial parks (IPs) represent an attractive market for wastewater treatment plants since the government is pushing industries harder on environmental compliance. There are many centralized wastewater treatment facilities under construction or were put into operation in industrial parks including the Vinh Loc IP, Tan Binh IP, and High-Tech Park in the south, and the Pho Noi IP in the north. For instance, a wastewater treatment plant with a capacity of 5,000 cubic meters per day in High-Tech Park was put into operation on September 10, 2009; another wastewater treatment plant with a capacity of 10,000 cubic meters per day is under construction in Long Giang IP in Long An province.

Solid Waste

According to the Ministry of Construction, Vietnam's waste amounted to over 30 million metric tons in 2011, with municipal waste from households, restaurants, markets, and businesses sources accounting for over 80 percent of the total. Given a growing population, rapid urbanization and increased consumption, municipal waste is expanding considerably. With this growth, it is anticipated that waste generation will increase to 36 million metric tons by 2015, 47 million metric tons by 2020, and 54 million metric tons by 2025, and that the types of waste produced will continue to undergo a change from more degradable to less degradable and more hazardous.

For the most part, municipal waste is concentrated in urban areas, while industrial waste is concentrated in economic zones, industrial parks, and urban areas. Growth in hazardous waste-intensive industries such as chemical products and electronic products is expected to increase the proportion of hazardous waste in Vietnam. There is an urgent need to establish industrial hazardous waste management systems, including factory-based handling, treatment, and disposal systems, and centralized hazardous waste treatment facilities. Hazardous waste from industries and hazardous healthcare waste from hospitals, while much smaller in terms of quantities, are also burning issues because they pose high health and environmental risks if not properly handled and disposed.

Hazardous healthcare waste is increasing more rapidly as a result of the adoption of new medical techniques, greater use of disposable medical equipment such as plastic syringes, and an increase in tests, therapies, and operations.

Waste handling in Vietnam, including collection, treatment and disposal is mainly carried out by Public Urban Environment Companies (URENCOs), which are responsible for the collection and disposal of municipal waste, including domestic, institutional, and in most cases also industrial and healthcare waste. Although there have been significant improvements by URENCOs in handling waste, most of the municipal waste in Vietnam is not safely disposed of. The dominant form of disposal of municipal waste remains open dumping. In many areas, self-disposal methods—such as burning or burying waste, or dumping in rivers, canals, and open fields—is common. Out of the 91 disposal sites in the country, only 17 are sanitary landfills.

Hazardous waste handling remains weak. Industrial hazardous waste treatment systems are largely inadequate. Given the lack of treatment facilities and limited incentives for safe disposal, many industries use a variety of unsafe methods of treatment and disposal, including allowing URENCOs to collect and dispose the hazardous waste with municipal waste, storing hazardous waste onsite, selling to recyclers, or even dumping indiscriminately.

Hazardous healthcare waste treatment capacity is expanding but is hindered by poor technical capacity. Vietnam has built 43 modern medical waste incinerators since 1997, bringing its total capacity for incineration of hazardous healthcare waste up by roughly 50 percent.

The composition of Vietnamese waste makes composting potentially attractive. The high proportion of organic matter in municipal waste provides great potential for composting, which can reduce disposal costs while producing a marketable soil conditioner for agricultural and public uses. Given the strong market for composting fertilizers once source separation becomes successful, the effectiveness of centralized composting facilities could increase considerably.

The government strongly encourages private sector participation in solid waste collection, separation, transportation and treatment. Polluters Pay is compulsory by regulation. Entities generating solid waste are responsible for waste collection, transportation and treatment fees. Regulation also requires that waste be separated at the sources of generation. In order to minimize burying waste, the government recommends new technologies to treat less degradable waste.

Over the past decade, commendable efforts have been made to develop a policy and legal framework for environmental protection, particularly for the management and disposal of waste streams, specifically the Strategy for the Management of Solid Waste (SWM) in Vietnam Cities and Industrial Parks (1999), the National Strategy for Environmental Protection (2003), the government's Decree 59/2007/ND-CP on Solid Waste Management (2007), and the recently-approved "National Strategy for solid waste management until 2025, with a vision toward 2050." The Prime Minister also endorsed the list of 10 specific programs to implement this National Strategy.

Resources

U.S. Department of Commerce Environmental Technology Offices

The U.S. Commercial Service Environmental Technologies (EnviroTech) Team

export.gov/industry/environment

The CS EnviroTech Team covers water (treatment, supply, distribution), wastewater treatment, solid waste (handling, transport, transfer, disposal), recycling (all types from paper/cardboard to e-waste), soil cleanup and remediation, and air pollution (control, clean up, monitoring).

While the CS Energy Team handles matters related to generation, transmission, services, and related greenhouse gas emission, the EnviroTech team works in tandem, focused on energy efficiency and effective resource use, reuse, and recycling. We work together to provide a wide breadth of services.

The EnviroTech team includes trade professionals located around the world, and includes members of ITA and its working groups, numerous TPCC agencies, and related external partner organizations. Currently, over 150 individuals are part of our team, working together to promote of U.S. technology, products, and services worldwide.

Office of Energy and Environmental Issues (OEEI)

environment.ita.doc.gov

Part of the International Trade Administration's Manufacturing and Services operating unit, its primary mission is to help analyze and improve the global trade and economic competitiveness of U.S. energy and environmental technologies firms.

By providing support and guidance to U.S. environmental product and service exporters, the office increases the competitiveness of U.S. companies.

We are the primary resource and a key DOC contact point for U.S. environmental technology companies. Our goal is to boost U.S. competitiveness and facilitate U.S. exports of environmental goods and services through support and guidance to U.S. exporters.

Trade Promotion Coordinating Committee (TPCC)

export.gov/advocacy/eg_main_022762.asp

The TPCC is an interagency committee chaired by the Secretary of Commerce. It was established under the Export Enhancement Act of 1992 to provide a unifying framework to coordinate the export promotion and export financing activities of the U.S. government, and to develop a government-wide strategic plan for carrying out such programs. The TPCC's

Environmental Trade Working Group (ETWG) was created by the Export Enhancement Act of 1992 as a mechanism to coordinate federal government trade promotion activities in environmental technologies.

In addition to the Department of Commerce and the Environmental Protection Agency, several other U.S. government agencies participate in the ETWG:

U.S. Trade and Development Agency (USTDA) • *ustda.gov*

USTDA promotes U.S. job growth by helping create export opportunities for U.S. companies for priority development projects in emerging economies. USTDA links U.S. businesses to export opportunities by funding project planning activities, pilot projects, and reverse trade missions while creating sustainable infrastructure and economic growth in partner countries. Many priority development projects require environmental technologies, such as water quality improvement.

U.S. Small Business Administration (SBA) • *sba.gov*

SBA provides guidance, loans, and advocacy to small businesses in the U.S. to promote job growth. With offices in every state and territory, SBA will be critical to assisting small and medium enterprises (SMEs) grow their green businesses.

U.S. Department of State • *state.gov*

The U.S. Department of State advances U.S. objectives and interests in the world by developing and implementing the President's foreign policy agenda. It is the lead U.S. agency in implementing the international components of policies to address climate change and to foster sustainable development. The Department of State undertakes technical assistance delineated in the environmental chapters of U.S. multilateral and bilateral trade agreements.

Office of the U.S. Trade Representative (USTR) • *ustr.gov*

The U.S. Trade Representative is a Cabinet member who serves as the President's principal trade advisor, negotiator, and spokesperson on trade issues. USTR coordinates trade policy, resolves disagreements, and frames issues for presidential decision. The office also negotiates Free Trade Agreements and Trade and Investment Framework Agreements that help open foreign markets to U.S. exports. USTR's Office of Environment and Natural Resources has broad responsibilities to leverage trade negotiations and relationships, in pursuit of environmental goals including the reduction of trade barriers facing the environmental technology industries.

U.S. Agency for International Development (USAID) • *usaid.gov*

USAID is an independent federal government agency that receives overall foreign policy guidance from the Secretary of State. Our work supports long-term and equitable economic growth and advances U.S. foreign policy objectives by supporting economic growth, agriculture and trade; global health; and, democracy, conflict prevention and humanitarian assistance. USAID sponsors environmental and climate change projects the world over.

Export-Import Bank of the United States (Ex-Im Bank) • *exim.gov*
Ex–Im Bank is the official export credit agency of the United States. Ex–Im Bank assists in financing the export of U.S. goods and services to international markets by providing export financing products that fill gaps in trade financing and assuming credit and country risks that the private sector is unable or unwilling to accept. Ex–Im Bank has special provisions aimed at leveling the playing field for U.S. exporters by matching the financing that other governments provide to their exporters. Ex–Im Bank provides working capital guarantees, export credit insurance, loan guarantees, direct loans, and project and structured finance.

Overseas Private Investment Corporation (OPIC) • *opic.gov*
OPIC helps U.S. businesses invest overseas, fosters economic development in new and emerging markets, complements the private sector in managing risks associated with foreign direct investment, and supports U.S. foreign policy. OPIC financing provides medium- to long-term funding through direct loans and loan guarantees to eligible investment projects in developing countries and emerging markets. By complementing the private sector, OPIC can provide financing in countries where conventional financial institutions often are reluctant or unable to lend on such a basis.

U.S. Department of Energy • *energy.gov*
The U.S. Department of Energy seeks to advance the national, economic, and energy security of the United States; to develop technologies to mitigate the effects of climate change and to enable adaptation; to promote scientific and technological innovation in support of that mission; and to ensure the environmental cleanup of the national nuclear weapons complex.

U.S. Department of Treasury • *treasury.gov*
The U.S. Department of Treasury's mission is to maintain a strong economy and create economic and job opportunities by promoting the conditions that enable economic growth and stability at home and abroad, strengthen national security by combating threats and protecting the integrity of the financial system, and manage the U.S. government's finances and resources effectively. The department supports the Environmental Export Initiative by serving as an advisor to the Environmental Trade Working Group of the Trade Promotion Coordinating Committee.

The U.S. Environmental Protection Agency as a TPCC Partner

EPA's work to improve air quality, expand access to clean water, and protect vulnerable communities from toxic pollution extends from across North America to nearly 180 nations worldwide. Through collaborative efforts such as international trade engagements (***go.usa.gov/j5dJ***) with partners from around the world, EPA is working to facilitate commerce, promote sustainable development, protect vulnerable populations, and engage diplomatically around the world.

Both domestically and globally, protecting human health and the environment is essential to sustainable economic growth and development. EPA supports these goals by:

- Working with domestic and international partners,
- Providing technical analysis and capacity building assistance through knowledge-sharing and best practices, and
- Supporting the dissemination and use of environment-friendly technologies and environmentally-supportive investments and financial instruments. (For example, *Venture Capital 101: A Resource Guide for Commercializing Environmental Technology*, ***bit.ly/13axGOi***)

For more information on EPA activities relevant to environmental technologies exports, please visit these EPA program pages:

- Air and Radiation: ***epa.gov/air***
- Chemical Safety and Pollution Prevention: ***epa.gov/oppt/international***
- International and Tribal Affairs: ***go.usa.gov/j5vw***
- Research and Development: ***epa.gov/research***
- Solid Waste and Emergency Response: ***go.usa.gov/j5vQ***
- Water: ***water.epa.gov***

Or, you may contact Marc Lemmond of the Office of International and Tribal Affairs, ***lemmond.marc@epa.gov*** or (202) 564-5998.

U.S. Environmental Technologies Export Initiative

DOC and EPA are working together to lead a U.S. government Environmental Technologies Export Initiative (EXI). This interagency effort promotes the worldwide deployment of U.S. environmental solutions by developing demand through international environmental technical cooperation and providing tailored services to U.S. environmental exporters.

According to Environmental Business International, in 2010 the U.S. environmental technologies industry had USD 312 billion in revenue, employed 1.7 million Americans, included 61,000 small businesses, and enjoyed an estimated international trade surplus. This industry offers great potential gains in environmental quality and human health throughout the world, particularly in countries whose economies are developing or in transition. Environmental goods and service export also translates into more U.S. jobs and economic activity.

DOC's International Trade Administration (ITA) leads the industry and commercial aspects of the EXI and coordinates interagency activities through the TPCC's Environmental Trade Working Group. ITA leads several commercial dialogues in pivotal developing markets; through the U.S. Commercial Service's 109 domestic and 128 international offices, U.S. businesses can receive a wide variety of export development and trade promotion services.

EPA co-launched and helps to lead the EXI in conjunction with ITA. EPA's work to improve air quality, expand access to clean water, and protect vulnerable communities from toxic pollution extends from across North America to nearly 180 nations worldwide. In May, EPA launched its Export Promotion Strategy to weave its analyses of critical environmental issues into U.S. export promotion infrastructure by working with federal agencies, environmental technologies trade associations, and other global stakeholders.

One early product of EPA's export promotion strategy is the new Environmental Solutions Exporter Portal (***export.gov/envirotech***). Developed in cooperation with the U.S. Department of Commerce and with the support of other federal agency partners, the portal features information about government efforts to support the export of U.S. environmental solutions, and highlights U.S. companies offering environmental solutions identified by EPA analyses. The portal also links to the U.S. Environmental Solutions Toolkit (***go.usa.gov/j5wx***), a joint venture between the U.S. Department of Commerce's International Trade Administration (ITA) and the EPA, which offers users an all-encompassing approach to solving specific environmental issues.

Associations Focused on Environmental Technologies

- Air and Waste Management Association
- American Academy of Environmental Engineers
- American Council of Engineering Companies (ACEC)
- American Membrane Technology Association
- American Water Works Association
- Association of Metropolitan Sewerage Agencies
- Association of Metropolitan Water Agencies
- Business Council for Sustainable Energy
- Coalition for Responsible Waste Incineration (CRWI)
- Environmental Industry Association (EIA)
- Environmental Technology Council
- Export Council for Enegy Efficiency
- Institute of Clean Air Companies
- Institute of Scrap Recycling Industries
- Integrated Waste Services Association
- International Desalination Association
- International Private Water Association
- Irrigation Association
- Manufacturers of Emission Controls Association
- National Council on Radiation Protection and Measurements
- National Ground Water/National Well Water Association
- National Pollution Prevention Roundtable
- Solid Waste Association of North America (SWANA)
- Submersible Wastewater Pump Association (SWPA)
- Waste Equipment Technology Association
- Water and Wastewater Equipment Manufacturers Association
- Water Environment Federation
- Water Quality Association

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