



## 2016 Top Markets Report **Environmental Technologies** Country Case Study

### China

China is the largest and fastest growing emerging market for environmental technologies. The overall environmental technologies market in China (including goods and services) is valued at USD 60.7 billion (2016). China ranks first overall on the 2015 Top Markets Study (TMS) with a Composite Environmental Technologies Score of 100. China also ranks first across all three media categories, with scores of 47.4, 44.9, and 7.7 for the air pollution control, water, and waste and recycling markets (see Appendix 1 for global rankings).



The scope, size and expected growth of China’s market for environmental technologies is unmatched, but market barriers, particularly those related to protection of intellectual property, continue to make China a challenging market in which to operate.

#### State of the Environmental Regime

China’s environmental regime has improved in recent years with the development of a national legal framework that supports the mitigation of pollution across all three environmental media. Enforcement, however, remains weak to non-existent, since it is delegated to municipal and regional governments whose focus centers on economic development. In 2014, China fundamentally restructured its approach to environmental regulatory enforcement with the introduction of the amended Environmental Protection Law (EPL). The revised EPL took effect on January 1, 2015 and serves as an enabling statute

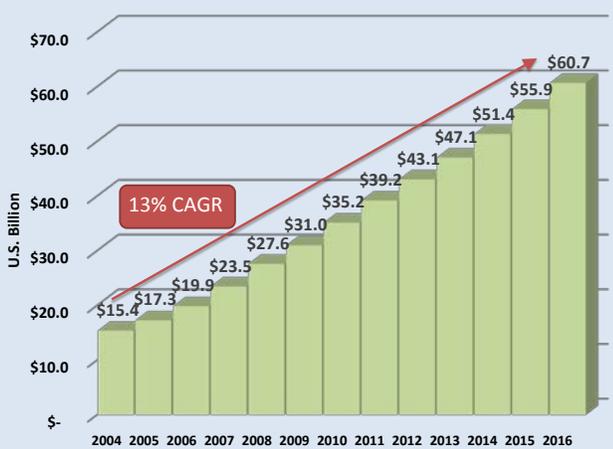
that could yield stronger adherence to environmental rules, if incentives and penalties

therein ultimately prove to be greater than the cost of non-compliance.

The Environmental Business Journal-OECD Environmental Stringency Survey, which ranks environmental regimes on a scale from 1 to 7 (with 1 being lax and 7 being among the most stringent in the world), substantiates the business perception of improved environmental rules in China. China scored a 3.6 in 2012, a 1.8 point improvement from its 2005 score of just 1.8. Similarly, China scored a 4.11 on the World Economic Forum’s 2011 Index for Regulatory Stringency (on a similar scale to that of EBJ-OECD) while China’s score in the same survey for enforcement was just above the median at 3.82.

Though the EPL came into effect more than a year ago, many local authorities still have yet to implement or enforce its provisions, and efforts to encourage public interest environmental law suits from non-governmental organizations under the revised law have so far resulted in only 36 court cases across 13 provinces.<sup>1</sup> Although the longer-term effectiveness of the EPL remains to be seen, the legal text highlights improved efforts at

**Figure 1: China Environmental Technologies Market**



Source: *Environmental Business International, 2016.*

monitoring, a path toward legal recourse to address public harm imposed by polluters, authority to halt projects that exceed pollution limits, requirements for key point sources to publicly disclose their primary pollutants, accountability of local officials to higher-level officials and daily fines towards polluters that exceed the cost of compliance.

### Market Barriers

Market barriers in China are persistent and prohibitive in many cases. In its most recent charter, the U.S. Department of Commerce's Environmental Technologies Trade Advisory Committee (ETTAC), along with industry experts in the Office of Energy and Environmental Industries (OEEI), identified the following barriers as most problematic for environmental technologies companies attempting to export to, or work in, China:

- 1. Complex intellectual property environment**  
Intellectual property rights infringement continues to affect U.S. businesses working in China and complicates operations in the country.
- 2. Technical barriers to utilization of advanced environmental technologies.**  
Chinese authorities use a series of reference technologies to identify which environmental solutions should be applied in a given process. The introduction of new or novel technologies and processes often requires the development of a demonstration project at the expense of the company to prove the efficacy of the technology. Since environmental rules are

enforced on the municipal and provincial level, it is often necessary to repeat this process in several provinces.

- 3. "Strategic Emerging Industries", State Owned Enterprises, and preferential procurement.**  
Exporters to China may also face headwinds from State-Owned Enterprises seeking to crowd out competitor technologies and establish a state-sponsored monopoly. This effect should only increase in the future since environmental technologies have been designated as one of the government's seven strategic industries intended to generate growth based on domestic consumption (as opposed to China's export-led policies of the last 30 years.) Furthermore, government tenders often exhibit open or explicit preference for domestic bidders over foreign tenders.
- 4. Local certifications and safety approvals not recognized as exporting market equivalents.**  
The ETTAC reports that many certifications, such as the CMC certificate, are available only for locally produced products. Furthermore, government tenders sometimes demand special certifications, which are only granted to local products.
- 5. Political disincentives to enforce environmental rules.**  
Enforcement of environmental rules occurs at the city and provincial levels through local Environmental Protection Bureaus (EPBs). The EPBs answer to the mayor or provincial governor, whose promotion potential as a party official is based primarily on demonstrating economic growth. This dynamic assures that environmental goals are almost always subordinated to economic development goals. The revised Environmental Protection Law (EPL), if fully enforced, may serve as a remedy to systemic weaknesses in enforcement by incentivizing environmental protection in bureaucratic performance measures and penalizing those who fail to enforce the law with demotion, dismissal and potential criminal prosecution.

## Market Opportunities

### Air Pollution Control

#### *Ambient Air Monitoring*

In late 2013, the State Council issued the Airborne Pollution Prevention and Control Action Plan. The state air plan stipulates a 25 percent reduction in particulate matter for the Beijing-Tianjin-Hebei region, a 20 percent reduction for Shanxi and Shandong, and a 10 percent reduction for Inner Mongolia. In 2015, China also amended its national Air Pollution Prevention and Control Law. The revised law took effect on January 1, 2016 and places the onus directly on city and municipal governments to improve local air quality, as they will be subject to oversight by a national-level coordinating body accountable to the State Council. In addition, major emitters are now required to install automated monitoring equipment and to publish their emissions data.<sup>2</sup> With the exception of Beijing, no other cities have sufficient monitoring networks to establish the baseline for reductions or to monitor progress.<sup>3</sup> Implementation of the state plan and amended Air Pollution Law will thus require the development of a series of ambient air monitoring networks and should yield opportunities for U.S. air pollution monitoring and instrumentation companies.

#### Technologies and Services in Demand:

- Continuous emissions monitoring systems
- Ambient air quality monitoring equipment
- Source emissions measurement technologies
- Analytical and laboratory testing goods and services
- Air pollution control equipment
- Fuel vapor control systems

#### *Industrial Air Pollution Reduction*

In its Nationally Determined Contribution (NDC) for the December 2015 Paris Climate Agreement, China committed to reach peak carbon emissions by 2030 or earlier. China's NDC also calls explicitly for the control of emissions from key industries, specifically iron and steel, nonferrous metals, building materials and chemicals. The recently-amended Air Pollution Law follows on China's NDC commitments by expanding the list of centrally-controlled pollutants beyond solely NOx and SOx to include particulate

matter, Volatile Organic Compounds (VOCs) and greenhouse gases.<sup>4</sup> If enforced, this emissions reduction effort will require the immediate implementation of control technologies at industrial sites. Industries that will be of the highest interest for the application of control technologies include iron, cement and steel plants; oil refineries; non-ferrous metallurgical plants; coal boilers; and petrochemical plants.

#### Key Technologies in Demand:

- Wet/dry scrubbers (particularly systems that remove multiple pollutants)
- Carbon injection systems (for reduction in mercury and organics)
- Particulate matter control systems (particularly new bagging systems)
- NOx, mercury, CO2 and particulate matter monitoring and continuous monitoring systems
- Selective catalytic and non-catalytic reduction controls
- Oxygen enrichment, fuel injection and other efficient combustion technologies
- Innovative specialty cements
- Mixing technologies
- Pumping and fluid handling equipment
- Engineering and plant design
- Leak detection equipment
- Alternative fuel technologies used to fire cement kilns

#### *Power Plant Emissions Reduction*

The Chinese power generation sector is heavily reliant on coal. China currently accounts for 45 percent of global installed coal-fired capacity and, in the past, has applied few, if any, central measures to reduce particulates and other criteria pollutants, such as sulfur oxides (SOx), nitrogen oxides (NOx) and mercury. Coal-fired power plants generated 67.5 percent of China's energy in 2013,<sup>5</sup> significantly contributing to air quality issues in the region. Despite China's commitments under the Paris Climate Agreement to increase the share of non-fossil fuels in primary energy consumption to 20 percent by 2030, coal is expected to remain the dominant fuel in the power sector in coming years.<sup>6</sup> Thus, reducing coal-fired based emissions is a key pillar of China's recent series of air pollution related reforms.

Though China has prohibited the building of new coal-fired power plants around three major cities—Beijing, Shanghai and Guangzhou—coal-fired capacity is increasing closer to the inland coal-producing centers to alleviate air pollution affecting major urban areas along the east coast. In 2015 alone, at least 155 planned coal-fired projects received permits.<sup>7</sup> The government is tightening regulations on both new and existing coal-fired power plants, including reducing allowed levels of particulate matter (PM) in certain areas to 5 mg/Nm<sup>3</sup>.<sup>8</sup> The newly amended Air Pollution Law also requires all older coal-fired plants to be retrofitted to meet environmental standards. The Hebei region in particular relies heavily on coal-fired power to fuel the nation's steel industry but has committed nonetheless to a reduction in coal consumption of 40 million tons. Maintaining production while reducing coal consumption will require switching to cleaner burning fuels and administering control technologies. Similarly, the Beijing Air Pollution Control Action Plan stipulates an approach to power generation that includes fuel switching to natural gas.

The Chinese government has also ratified the Minamata Convention on Mercury. The convention is an international and legally binding instrument to reduce mercury use and emissions. The text of the Minamata Convention was adopted by over 150 countries, including China, in January 2013. Given that coal-fired power plants represent a major source of airborne mercury (and other toxins), the implementation of this instrument will further foster Chinese interest in air pollution control emission control technologies.

#### Key Technologies in Demand:

- Continuous emissions monitoring systems
- Dry sorbent injection technologies
- Flue gas desulfurization equipment
- Activated carbon injection technologies
- Inspection, adjustment, maintenance and repair services
- Selective catalytic reduction technologies
- Electrostatic precipitators (wet and dry)
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#### *Mobile Source Emissions Control*

China's amended Air Law also includes provisions covering emissions from motor vehicles and non-road machinery. Enforcement and compliance with

regulations in this area traditionally have been lacking. The amended Air Law shifts responsibility for regulation of air pollutants to local officials, who must be incentivized to push for compliance. If the proper incentives are put into place, the government is now empowered to recall vehicles in violation of regulations and can issue substantial fines to violators.<sup>9</sup>

In Beijing, on-road vehicles currently account for a significant percentage of pollutant emissions, including 86 percent of carbon monoxide, 57 percent of nitrogen oxide and 31 percent of PM<sub>2.5</sub>, according to the International Council on Clean Transportation. As part of its progressive program to continue to reduce vehicle emissions, Beijing, in late 2015, proposed more stringent vehicle emission standards (Beijing 6/VI) for light-duty vehicles that are based on California's emissions standards. The new standards are likely to be implemented by early 2017 and should create an important opportunity for U.S. emission technologies on new gasoline vehicles sold in Beijing and, potentially, the surrounding Jing-Jin-Ji capital region.<sup>10</sup>

#### Key Technologies in Demand:

- Emissions control technologies for motor vehicles and non-road (diesel) vehicles and machinery

#### Waste Management and Recycling

##### *Solid Waste and Recycling*

Over the next decade, China's municipal solid waste (MSW) generation is expected to increase on pace with its rapidly growing and urbanizing population and is likely to reach 1.39 million tons per day by 2025.<sup>11</sup> Of the MSW that currently is being collected and recorded by municipalities, approximately 82 percent is landfilled, 15 percent is incinerated and 3 percent is composted.<sup>12</sup> China outlined its goals for recycling and solid waste in its 12<sup>th</sup> Five-Year Plan (2011 – 2015), which included comprehensive resource recovery from bulk solid waste such as public associated mineral resources, coal powder, coal gangue, industrial by-product gypsum, refining and chemical waste, tailings, construction waste, as well as straw, livestock wastes and waste wood. The Government of China aimed to achieve a comprehensive utilization rate of 72 percent by the end of the Five-Year Plan period.

#### Key Technologies in Demand:

- Waste pile design and sampling
- Composting equipment
- Sorting machines
- Crushing and grinding machines
- Materials handling equipment
- Collection services, containers and vehicles
- Recycling process expertise

#### *Recycling of Discarded Electronics*

In 2011, the Chinese government implemented a series of regulations to guide the domestic processing of discarded electronics and electrical appliances called the *Rules on the Administration of the Recovery and Disposal of Discarded Electronic and Electrical Products (or China WEEE)*. According to the Global E-Waste Monitor report, China generated about 6 million tons of e-waste, or about 37.5 percent of the total generated in Asia in 2014.<sup>13</sup> China's current electronic scrap recycling infrastructure is dominated by small-scale collection operations, informal recycling facilities and outdoor recycling markets.

Guided by the Ministry of Environmental Protection and funded by a levy on electronics sold throughout the country, the current recycling infrastructure will be replaced by a large network of sophisticated electronics recycling facilities. In 2011, the Institute for Scrap Recycling Industries (ISRI) estimated that 6 percent of U.S. export sales of scrap equipment were destined for China.

The relatively sudden explosion in Chinese demand for equipment and recycling services presents opportunities to U.S. companies with experience in providing equipment or services used in the safe and efficient recovery of valuable materials from discarded electronics.

#### Key Technologies in Demand:

- Sorting machines
- Crushing and grinding machines
- Materials handling equipment
- Collection services, containers and vehicles
- Recycling process expertise

#### *Hazardous Waste Management*

In November 2012, the Chinese government adopted an action plan to address mounting environmental and health issues related to improperly managed hazardous waste (medical, chemical and heavy metal). The Chinese Ministry of Environmental Protection estimates 60 million tons of hazardous waste are generated annually as of 2015. With current disposal capacity at approximately one-third of that amount, there is an urgent need to develop disposal capacity commensurate to the scope and size of waste production. Four billion dollars have been set aside to construct 300 hazardous waste disposal facilities and initiate brown field remediation projects throughout China.

#### Key Technologies in Demand:

- Waste handling equipment
- Waste treatment technologies
- Brownfield site remediation design and equipment
- Soil contamination testing and monitoring equipment

#### Water and Wastewater Treatment

The State Council issued its highly anticipated Clean Water Action Plan in April 2015.<sup>14</sup> The plan sets a series of ambitious targets for 2030, including achieving excellent water quality in seven major water sheds, elimination of "black and odorous" water, and achieving an overall water quality of level-3 or better for 95 percent of point sources in urban areas.<sup>15</sup> The action plan delineates 26 detailed requirements and 238 measures<sup>16</sup> to achieve improved water quality and promote water stewardship. Key themes are improved industrial effluent management, municipal of the plan include wastewater treatment, water reuse, enhanced monitoring and new enforcement mechanisms. The Ministry of Environmental Protection estimates that plan implementation is valued at USD 920 billion over the next five to seven years.<sup>17</sup>

#### *Municipal Water and Wastewater Treatment and Plant Development*

Aggressive construction of water treatment plants continues as China works to improve water quality

and enhance access to drinking water and sanitation services. The Ministry of Environmental Protection (MEP) announced in 2014 that it would invest USD 329 billion in addressing water pollution, which will include treating municipal and industrial wastewater.<sup>18</sup> In the coming years, China hopes to protect the drinking water sources and improve the water quality in centralized drinking sources. The government hopes to expand and promote the protection and management of important water resources.

In the 2016 to 2017 tender period, the total value of drinking water, wastewater and desalination projects expected to be tendered is USD 543.5 million across 18 projects.<sup>19</sup> The marquee opportunity is Guangdong province's Jieyang Waste Water Treatment Package project, which strings together nine waste water treatment plant projects in a single tender worth an estimated USD 33.3 million.<sup>20</sup> Furthermore, the South-to-North Water Diversion Project mandates the construction of 426 wastewater treatment plants along the eastern route to treat heavily polluted surface waters.<sup>21</sup> Tightening of national regulations will provide retrofit opportunities for existing plants to move beyond mechanical treatment alone and introduce improved chemical and biological methods.

#### Key Technologies in Demand:

- Waste handling equipment
- Engineering, procurement and construction services
- Advanced filtration
- Membrane filtration
- Waste to energy technology
- Anaerobic digestion
- Nitrification
- Biological denitrification
- Monitoring equipment
- Testing equipment

#### *Water Transmission and Storm Systems*

The Clean Water Action Plan outlines several major initiatives to reduce non-revenue water, expand wastewater collection capacity and manage storm water. The plan calls for remediation or replacement of all transmission pipelines in service for more than 50 years with a goal to reduce non-revenue water to 12 percent by 2017 and 10 percent by 2020. Another ambitious goal is to provide universal wastewater collection and treatment capacity. By 2020, the plan

calls for collection and treatment levels to reach 85 percent in semi-rural and suburban areas and 95 percent in urban areas. An accelerated goal has been outlined for the Beijing-Tianjin-Hebei region, the Pearl River Delta and the Yangtze River Delta, which are set to achieve 95 percent collection and treatment levels by 2019. Furthermore, cities and provincial capitals with independent planning status must achieve universal collection and treatment by 2017. The plan also requires the elimination of combined sewers and the introduction of distinct storm water systems that include storage and reuse capabilities where feasible as well as the design of storm water drainage systems that contribute to groundwater recharge.

#### Key Technologies in Demand:

- Engineering, procurement and construction services
- Pumps, pipes and valves
- Storage technologies
- SCADA systems
- In-line monitoring systems
- Leak detection equipment
- Trenchless technologies
- Catchment design and construction
- Pipe rehabilitation technologies

#### *Sludge Treatment*

China discharges approximately 22 to 30 million tons of untreated sludge annually,<sup>22</sup> a growing and persistent environmental challenge. Recent government action has led to the development of technology standards for sludge treatment, a requirement that municipalities install sludge treatment systems and a central government capital development investment of RMB 60 billion (USD 9.6 billion) for sludge treatment facilities. The Clean Water Action Plan calls for enhanced processing of 90 percent of sludge from cities and prefectures, including sludge stabilization, disinfection and resource recovery. Nonetheless, lack of domestic operational expertise and technology for sludge treatment remains a challenge for China that could provide sludge treatment opportunities for U.S. firms.

#### Key Technologies in Demand:

- Engineering and design
- Sludge disinfection systems
- Sludge dewatering and drying systems
- Anaerobic digestion

- Bio-gas/natural gas recovery
- Nitrogen and phosphorus recovery technologies

#### *Groundwater Monitoring, Pollution Prevention and Remediation*

Much of China's groundwater resources have been degraded by pollution, limiting their use as a reliable source for drinking water. The Ministry of Land Resources reports that 57 percent of ground water ranks 'bad' or 'very bad' in quality estimates.<sup>23</sup> The *National Groundwater Contamination Prevention and Remediation Plan* calls for an RMB 34.7 billion (USD 6.2 billion) investment through 2020. Groundwater protection efforts are focused on monitoring, source control and remediation.

The 12<sup>th</sup> Five-Year Plan delineates the study of pollution assessment, monitoring and simulation in order to establish a national monitoring system and quality standards. Source control research focuses on hazardous waste storage, landfill contamination, oil and gas extraction, mining, agriculture, and underground piping and disposal systems to establish control techniques and rules. China seeks to address contaminated groundwater by conducting a groundwater pollution remediation pilot study that will inform national approaches to groundwater remediation and lead to subsequent large-scale remediation projects. U.S. Superfund experience in environmental remediation creates a competitive advantage for U.S. companies.

#### Key Technologies in Demand:

- Monitoring equipment
- Source pollution control technologies
- Sparging
- Bioremediation
- Chemical treatment
- Flushing
- In-situ air stripping
- Multiphase extraction
- Permeable reactive barrier
- Phytoremediation
- Pump and treat

#### *Water efficiency and reuse*

China's scarce fresh water resources have made water efficiency and reuse a national priority designed to limit further economic disruptions due to water shortages. The Clean Water Action Plan sets a reuse goal of 20 percent or more in water scarce

areas by 2020. The seriousness of the economic impact of water scarcity led the State Council to note in the plan that water conservation is now a performance metric for municipal and provincial governments. The plan explicitly calls for water reuse in coal-mining, metal production, textiles, tannery, pulp and paper, chemical, and petroleum industries.

These priorities will be a boon to membrane, non-revenue water management and industrial water efficiency technologies. It is estimated that water reuse will lead to 30 percent annual growth over the next five years in the membrane technology market.<sup>24</sup> Beijing is following through with plans to emphasize water reuse, with the Miyun Yunxi Zutuan and Changping water reuse projects that are worth an estimated USD 25.9 million and USD 64.8 million, respectively.<sup>25</sup> Both projects are expected to be tendered during 2016.<sup>26</sup>

#### Key Technologies in Demand:

- Engineering and design
- Monitoring equipment
- Non-revenue water control software
- Membranes
- Advanced filtration
- Low-loss distribution equipment
- Storage equipment

#### *Process and Produced Water*

The aggressive stance of the Clean Water Action Plan on industrial water treatment and reuse combined with new effluent standards and better enforcement thereof are driving growth in process and produced water treatment. The plan calls for strengthened pollution control, effluent treatment and reuse in many of its water-intensive industries, particularly in petroleum refining, chemical production, pharmaceuticals, chemical fiber manufacturing, non-ferrous metallurgy, textiles, pulp and paper, coking, fertilizer production, food and beverage, tanneries, pesticide production, and electroplating.

The plan also calls for a systematic approach toward ports, industrial clusters and special economic zones, including export processing zones. Those areas will be serviced by central wastewater and solid waste processing facilities with continuous monitoring capabilities, and manufacturers therein will be subject to pre-treatment requirements for industrial

effluent. The plan requires the implementation of treatment and monitoring capabilities by the end of 2017, indicating that there may be ambitious efforts on the part of Chinese manufactures to acquire and implement improved monitoring and treatment technologies.

Key Technologies in Demand:

- Engineering, design and construction services
- Pumps, pipes and valves
- Storage technologies
- SCADA systems
- In-line monitoring systems
- Anaerobic digestion
- Advanced chemical treatment and rectification
- Membrane technology
- Advanced filtration

*Soil Remediation*

Weak or non-existent waste management strategies, including the failure to develop sanitary landfills, has led to prevalent soil pollution in China. The Ministry of Environmental Protection and the Ministry of Land Resources report that 16.1 percent of China's soil is polluted<sup>27</sup> and that of this total, 19.4 percent of arable land is polluted. Much of this contamination is non-organic with the most prevalent pollutants being cadmium, nickel and arsenic. Soil pollution threatens the safety of agricultural products and contributes to groundwater pollution through leaching.

In 2014 and 2015, the central government allocated RMB 130 million (about USD 19.8 million) to support six national pilot projects in the Hunan, Shandong, Hubei, Guizhou, Zhejiang and Guangdong provinces and RMB 2.8 billion (about USD 425.7 million) to support 30 regional pilots focused on remediation of heavy metals in soil. China is expected to release its National Soil Pollution Prevention and Treatment Action Plan in 2016. The expected accompanying budget allocations for remediation also are likely to be supported by the 13<sup>th</sup> Five Year Plan (2016-2020). In the coming years, a substantial remediation effort should yield opportunities for U.S. providers of remediation technology and services.

Key Technologies in Demand:

- Engineering and design
- Monitoring equipment

Environmental Consulting and Engineering

The new Environmental Protection Law stipulates that all new construction projects must undergo an Environmental Impact Assessment (EIA) before construction permits can be issued.<sup>28</sup> Similar to the U.S. National Environmental Policy Act (NEPA) if fully implemented, EPL will develop a massive industry for EIAs, an area where U.S. environmental engineering and consulting firms have substantial expertise.

Key Technologies in Demand:

- Environmental impact assessment

**ETWG Agency Initiatives and Programs**

U.S. – China Environmental Industries Forum (EIF)

The EIF engages U.S. and Chinese officials and businesses in a series of technical and policy-oriented discussions designed to enhance the U.S.-China commercial and environmental partnership. The goal of the EIF is to facilitate the development of a robust environmental protection regime and corresponding environmental technology markets. Themes and topics of focus for 2016 and future EIF events may include air, water, chemicals, soil and waste.

U.S. Environmental Solutions Toolkit

The Toolkit compiles the U.S. Environmental Protection Agency's environmental regulations, related underlying research and a directory of U.S. companies that provide technologies necessary to implement similar environmental regulatory actions abroad. A Mandarin language version of the Toolkit was recently introduced.

The Toolkit is used by U.S. EPA officials and environmental consultants as a reference tool within bilateral activities that focus on addressing environmental concerns and in fostering U.S.-Chinese partnerships. This includes the U.S.-China Joint Commission on Commerce and Trade, the Air Action Plan of the U.S.-China Strategic and Economic Dialogue's Ten Year Framework on Energy and Environment, the U.S.-China Joint Committee on Environmental Cooperation, and others.

### Power-Gen International Buyer Program

Power-Gen, one of the leading U.S. power generation equipment and services trade shows, has partnered with the U.S. Department of Commerce's International Buyer Program to encourage foreign participation in the show. This platform is leveraged to discuss policies and exchange technical information regarding power plant emissions control with Chinese participants and to foster business relationships between Chinese end-users and U.S. emissions control providers.

### WasteExpo International Buyer Program

WasteExpo, one of the leading U.S. waste management trade shows, has partnered with the U.S. Department of Commerce's International Buyer Program to encourage foreign participation in the show. This platform was leveraged to exchange relevant technical information with Chinese participants and to introduce Chinese buyers to U.S. waste management technology providers.

### Water Environment Federation Technical Exhibition and Conference (WEFTEC) International Buyer Program

The U.S. Department of Commerce, through its International Buyer Program, leads a delegation of Chinese officials and business representatives to WEFTEC to explore relevant U.S. technologies and work with U.S. exporters on approaches to water resource management.

### Green Cement Best Practices Guide

The stated goal of the Chinese Ministry of Environmental Protection is to create a *Green Cement Best Practices Guide*. For years, the U.S. government has worked to support green cement efforts in China, including funding the development of the "BEST" tool (Benchmarking Energy Efficiency Standards Tool), which recommends best practices to improve cement kiln combustion efficiency and limit air pollutants. These activities are being leveraged to support the completion of a Chinese Best Practices Guide and are utilized in various bilateral forums to introduce Chinese end users to relevant environmental solutions providers.

### Mercury Reduction Engagement

The United States and China are exchanging experiences in tackling various environmental concerns caused by mercury, highlighting existing approaches and required technologies. Improperly handled solid state mercury can contaminate the environment, as can airborne mercury falling back to earth. This engagement is advancing goals related to commitments made during recent international mercury reduction negotiations and supports the Chinese efforts to improve hazardous waste management and remediation practices.

### CIEPEC U.S. Pavilion

The China International Environmental Protection Exhibition and Conference (CIEPEC) is the Ministry of Environmental Protection's biennial sponsored trade show and conference. CIEPEC draws officials from all regional Environmental Protection Bureaus (EPBs) and municipalities, providing access to the tendering organizations that are developing water and wastewater treatment plant projects. A U.S. pavilion during CIEPEC provided U.S. companies with an opportunity to promote their participation in specific projects.

### **Market Contacts and Program References**

Ministry of Environmental Protection  
<http://www.mep.gov.cn/>

China National Environmental Monitoring Center  
<http://www.cnemc.cn/>

China Environmental News  
<http://www.cenews.com.cn/>

China Solid Waste  
<http://www.solidwaste.com.cn/>

Water China  
<http://www.h2o-china.com/>

China City Water  
<http://www.chinacitywater.org/>

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- 
- <sup>1</sup> Cui, Zheng and Kong Lingyu. "Progress for NGOs Battling Polluters in Court". *Caixin Online*. December 3, 2015. Accessed 1/29/16
- <sup>2</sup> Zhao, Lijian; Tonny Xie; Jenny Tang. "How China's New Air Law Aims to Curb Pollution". December 30, 2015. *Chinadialogue.net*. <https://www.chinadialogue.net/article/show/single/en/8512-How-China-s-new-air-law-aims-to-curb-pollution>. Accessed 1/28/16.
- <sup>3</sup> Gatins, Philip. U.S. Embassy Beijing, 2014.
- <sup>4</sup> Cai, Jingjing and Joyce Tang. "Will China's New Air Law Solve its Pollution Crisis?". *NewSecurityBeat*. China Environment Forum. November 25, 2015. <http://www.newsecuritybeat.org/2015/11/chinas-air-law-solve-pollution-crisis/>. Accessed 1/28/16.
- <sup>5</sup> Economic Daily, July 27, 2014.
- <sup>6</sup> U.S. Energy Information Agency. China Report. May 2015.
- <sup>7</sup> Wong, Edward. "Glut of Coal-Fired Plants Casts Doubts on China's Energy Priorities". *The New York Times*. November 11, 2015.
- <sup>8</sup> GoldDust Newsletter, December 2015, Mcllvaine Company
- <sup>9</sup> PRC Law on Air Pollution Prevention and Control, NPC Version (Aug 2015)
- <sup>10</sup> U.S. Environmental Technology Trade Advisory Committee (ETTAC) member input, January 2016
- <sup>11</sup> Hoorweg, Daniel and Perinaz Bhada-Tata. "What A Waste: A Global Review of Solid Waste Management". World Bank. March 2012.
- <sup>12</sup> Dorn, Thomas, Michael Nelles and Sabine Flamme. "Circular Economy in China". International Solid Waste Association. 2010
- <sup>13</sup> Chinese Ministry of Environmental Protection, 2010.
- <sup>14</sup> MarketWatch.com. "Inside China's Grand Plan to Fight Water Pollution". Accessed 1/13/2016.
- <sup>15</sup> The State Council of the People's Republic of China. *Action Plan for Water Pollution Prevention*. April 2, 2015.
- <sup>16</sup> MarketWatch.com. "Inside China's Grand Plan to Fight Water Pollution". Accessed 1/13/2016.
- <sup>17</sup> Stormwater Report. "China Releases Water Action Plan". Water Environment Federation. May 29, 2015
- <sup>18</sup> Business Monitor International, Water Industry Forecast, 2015.
- <sup>19</sup> Global Water Intelligence Project Tracker with OEEI estimates.
- <sup>20</sup> Global Water Intelligence Project Tracker with OEEI estimates.
- <sup>21</sup> CGTI. *The China Greentech Report 2012*. Page 152. Beijing: The China Greentech Initiative, 2012.
- <sup>22</sup> CGTI. *The China Greentech Report 2012*. Page 152. Beijing: The China Greentech Initiative, 2012.
- <sup>23</sup> CGTI. *The China Greentech Report 2012*. Page 147. Beijing: The China Greentech Initiative, 2012.
- <sup>24</sup> CGTI. *The China Greentech Report 2012*. Page 152. Beijing: The China Greentech Initiative, 2012.
- <sup>25</sup> Global Water Intelligence Project Tracker with OEEI estimates.
- <sup>26</sup> Global Water Intelligence Water Project Tracker.
- <sup>27</sup> Country Commercial Guide 2014.
- <sup>28</sup> Beverage & Diamond. Analysis of the Environmental Protection Law. 2015.