



# 2016 Top Markets Report **Environmental Technologies** Regional Supplement

## Gulf States

**Common challenges that the Gulf States face regarding environmentally sustainable development include the lack of urban development frameworks and regional precedents in energy and water conservation and scarce water and land resources. In order to address environmental issues resulting from the region’s rapid growth and urbanization, most Gulf States have taken measures to develop national sustainability initiatives that are serving to facilitate implementation of new environmental policies and regulations. Together with resource scarcity, this helps drive demand for environmental technologies and should offer robust opportunities for U.S. solution providers, particularly in the water and waste sectors. Indeed, if it had been scored as a single country, the Gulf States region – specifically Saudi Arabia, the United Arab Emirates (UAE), Qatar, Bahrain and Oman – would have ranked among the top three markets in this report.**

### Regional Market Overview

In recent decades, the Gulf Cooperation Council (GCC) states of the Arabian Peninsula have experienced rapid, sustained population growth and urbanization. Today, over 90 percent of people living in the GCC live in urban areas. As incomes have risen with economic development, so too has consumption, which has placed increasing pressure on scarce land and water resources. Production of fossil fuels and petrochemicals, far and away the top source of income for the GCC countries, has created additional stresses on the environment, especially through inefficiencies in oil and gas generation, distribution and end use. Much of the region’s coast is highly vulnerable to the effects of climate change, as well. Fresh water availability is projected to decline, while anticipated rising sea levels are likely to result in inundation and saltwater intrusion in many areas.<sup>1</sup>

New initiatives are being implemented across the region to help address some of these challenges. A number of GCC states have incorporated sustainable growth and environmental protection as integral features of their latest national development plans, as

in the UAE’s Vision 2021 National Agenda and Green Growth Strategy, Qatar’s National Vision 2030 and Saudi Arabia’s 10<sup>th</sup> Development Plan (2015-2019), prompting upgrades to environmental policies and regulations in order to meet their stated targets. For example, in the last few years, several GCC states have introduced new solid waste management (SWM) frameworks. The UAE and Oman in particular are seeking to rapidly upgrade the majority of their SWM infrastructure, from collections systems to sanitary landfill design and construction and waste-to-energy plants. Also, investment in desalination facilities and water reuse technologies remain extremely strong, as demand continues to significantly outpace supply of renewable water resources in this arid region.

Environmental institutions in the GCC typically are accorded high priority and status, and a range of institutions has been established to implement policies, enforce laws and set standards and norms.<sup>2</sup> National budgets, however, have been hit hard by low oil prices, and a number of governments intend to cut public investment as a result. It remains unclear how this period of reduced revenues and budget cuts might impact implementation of environmental initiatives

and projects in the region. Saudi Arabia has responded with plans to reduce expenditures by 14 percent this year, and the UAE and Qatar have eliminated their fuel subsidies. The GCC countries are making efforts to mitigate the adverse effects on their economies, including through energy price reform, plans to collectively introduce a value-added tax (VAT) and economic diversification, all of which should help to increase their non-oil sources of revenue in the medium and long-term.<sup>3</sup>

### Market Barriers

Commerce's Office of Energy and Environmental Industries has identified the following barriers as the most potentially problematic for environmental technologies companies attempting to do business in the Gulf region:

#### 1. Import License Requirements

Qatar requires a license for the importation of most products, and only Qatari nationals may obtain an import license. In the UAE, only firms with 51 percent UAE ownership can obtain a license and import products.

#### 2. Government Procurement Price Preferences

Oman, Qatar, Saudi Arabia and the UAE all apply a 10 percent price preference to tenders that contain local content or content from other GCC member countries, but Oman may not apply such price preferences in procurements covered by the U.S.-Oman Free Trade Agreement.

## Oman

### Air Pollution Control

Oman's Regulation on Controlling Air Pollutants (MD 118/2004) is the principal regulation regarding air quality. It specifies minimum stack heights, depending on the emitter, and that facility owners must "use scientific means to prevent direct or indirect emissions of toxic and hazardous gases and particulates from site, and treat such gases and particulates appropriately to render them harmless and to comply with the ministry's standards." Primary emitters are oil production and refining, natural gas production, thermal power generation, construction, cement, copper, steel, chemicals and fiber optics manufacturing.<sup>4</sup>

### 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)
- Continuous emissions monitoring systems
- Selective catalytic and non-catalytic reduction controls
- Oxygen enrichment, fuel injection, and other efficient combustion technologies
- Alternative fuel technologies used to fire cement kilns
- Flue gas desulfurization equipment
- Activated carbon injection technologies
- Electrostatic precipitators (wet and dry)

### Waste Management and Recycling

The former Ministry of National Economy's Draft National Solid Waste Management Strategy Report provides the broad framework under which Oman's solid waste management program is being implemented. Ministerial Decisions No. 17/93 and 18/93, together with the Law Regulating the Circulation and Use of Chemicals (Royal Decree No. 46/95), provide the legal framework for managing solid and hazardous waste.

Royal Decree (46/2009) delegates full responsibility for the country's waste management on the Oman Environmental Services Holding Company (OESHCO), or Be'ah. Be'ah aims to close all 317 of Oman's unregulated dumpsites by 2016 and replace them with 13 engineered landfills and approximately 25 to 34 transfer stations.<sup>5</sup> Also, under its Integrated Hazardous Waste Management System, Be'ah plans to establish a thermal treatment plant, physical and chemical treatment plant, a solidification plant and disposal facilities. The plant will be located in Liwa, near Sohar city, which generates the majority (90 percent) of the country's industrial and hazardous waste, and will be fully operational by 2019.<sup>6</sup> Be'ah has invited tenders for engineered landfills, material recovery facilities, transfer stations and waste management services in the upcoming Special Economic Zone at Duqum (SEZAD), among others.<sup>7</sup>

### Key Technologies in Demand:

- Waste handling equipment
- Waste treatment technologies

- Sorting machines
- Crushing and grinding machines
- Materials handling equipment
- Collection services, containers and vehicles
- Landfill design and engineering

## **Water and Wastewater Treatment**

### Municipal Water and Wastewater

Demand for water in Oman is growing at an aggressive pace at an average of 6 percent annually.<sup>8</sup> Oman faces substantial water supply problems, including saline water intrusion, aquifer depletion and overall scarcity in the agricultural northern region.<sup>9</sup> A recently introduced wastewater management scheme aims to reduce water stress by reusing treated wastewater in agriculture and aquifer recharge.<sup>10</sup> Within this effort, a national water monitoring program will provide vast opportunities for monitoring technology providers.

As with most gulf nations, Oman will continue to rely upon desalinated water for its freshwater needs. Desalination projects in Oman are the purview of the Oman Power and Water Procurement Company (OPWP), a government owned corporation that is the sole producer and seller of desalinated water.<sup>11</sup> OPWP announced plans in 2015 to double the number of desalination projects in the pipeline.<sup>12</sup> This effort will focus on the northern region.

Oman has also had success developing Independent Water and Power Plants (IWPP), which undertake thermal desalination utilizing the waste heat from thermal power plants. Between now and 2020, OPWP plans to build six new IWPP facilities and expand three existing plants. The cumulative capacity of the new facilities will reach 900,000 m<sup>3</sup>/D.<sup>13</sup>

Managing wastewater also is a growing segment in Oman. The parastatal Haya Water is undertaking a USD 1 billion program to improve wastewater treatment and transmission in the Muscat area. The project will connect Muscat's six municipal districts to state-of-the-art wastewater treatment facilities by 2020. The overall program is valued at USD 4.3 billion.<sup>14</sup>

#### Key Technologies in Demand:

- Engineering, procurement and construction services
- Filtration
- Advanced filtration

- Chemical disinfection
- UV disinfection
- Ozone disinfection
- Pumps, pipes and valves
- Storage technologies
- SCADA systems
- In-line monitoring systems
- Trenchless technologies
- Combined power and thermal desalination
- Anaerobic digestion
- Nitrification
- Biological denitrification

### **Market Links and Contacts**

Oman Power and Water Procurement Company  
<http://www.omanpwp.co.om>

Ministry of Environment and Climate Affairs  
<http://www.meca.gov.om>

Oman Wastewater Services Company S.A.O.G  
<http://www.owsc.com.om/>

Oman Environmental Services Holding Company  
<http://www.oeshc.co.om> ; <http://www.beah.om/>

Haya Water Treatment & Distribution  
<http://www.haya.com.om>

Public Authority for Electricity & Water  
<http://www.paew.gov.om>

Ministry of Regional Municipality and Water Resources  
<http://www.mrmwr.gov.om/en/>

Middle East Desalination Research Center (MEDRC)  
<http://www.medrc.org/>

U.S. Commercial Service Oman  
<http://www.export.gov/oman/omanhome/index.asp>

## Qatar

### Air Pollution Control

Measured on a per capita basis, this small country is the world's biggest emitter of greenhouse gases. It also has been the world's largest exporter of liquefied natural gas since 2006.<sup>15</sup> According to the Ministry of Municipality and Environment, fuel combusted during energy production accounted for 67 percent of Qatar's carbon dioxide emissions in 2011 (37 percent from energy expended in basic oil and gas production, 12 percent from gas flaring, and 18 percent from petrochemicals and industrial cogeneration). Households and commercial users account for the remaining 33 percent of the country's total emissions.<sup>16</sup> Industrial emissions, particularly from fossil fuel production, are also a main source of criteria pollutants, such as sulfur dioxide.

Over the past decade, Qatar's population and economy have averaged breakneck growth rates, topping 16 percent per year multiple times, and the country's demand for energy and transportation has increased on-pace. Air pollution accordingly also has worsened. According to a 2011 Sustainable Development Indicators report by the Qatari Statistics Administration, particle pollutants in Qatar's capital city, Doha, multiplied at a yearly rate of 5.4 percent between 2007 and 2010.<sup>17</sup> Manufacturing and construction, as well as dust from land clearing, diesel engines, demolition, burning, concrete mixing and wood cutting, are the primary contributors to the airborne particulate matter.<sup>18</sup> As in other desert Gulf states, sand and dust are also significant non-anthropogenic sources of particulates. In its National Development Strategy 2011-2016, the Qatari government recognizes the need to upgrade infrastructure and institutions in order to meet Qatar National Vision 2030 environmental goals. The Strategy indicates specific air quality targets, including maintaining ground-level ozone below international standard levels at all times. Additionally, according to the Strategy, air quality monitoring stations will need to be integrated and unified to support an online database with real-time readings, and new rules on emissions, including regulation of volatile organic compounds (VOCs), will need to be established and violators penalized. If implemented, these goals should lead to opportunities for U.S. technologies.

#### Key Technologies in Demand:

- Fenceline monitoring equipment
- Continuous emissions monitoring equipment
- Ambient air quality monitoring equipment
- Source emission measurement technologies
- Air pollution control equipment
- Particulate matter control systems (particularly new bagging systems)
- Engineering and plant design
- Inspection, adjustment, maintenance and repair services
- Selective catalytic and non-catalytic reduction technologies

### Waste Management and Recycling

According to the country's National Development Strategy 2011-2016, Qatar generates over 7,000 tons of solid waste each day, 70 percent of which is from construction & demolition (C&D), commercial facilities and industrial sites. The underdeveloped recycling industry handles only 8 percent of the total solid waste generated, and the sorting that does take place is carried out at landfills, rather than at the source. There currently are three landfills in Qatar, all of which are running out of space.

Qatar's ambitious waste management targets include a recycling rate of 38 percent by 2016 (up from 8 percent five years ago) and a final disposal rate reduced to 53 percent. A state-of-the-art Domestic Solid Waste Management Center (DSWMC) opened in 2011 near Mesaieed. Of the 2,300 tons/day of the mixed domestic solid waste processed at the DSWMC, 95 percent is recycled, composted or converted. The DSWMC's full capacity, however, already has proven inadequate for the rising volumes of waste generated by the country's growing, affluent population, and 400 tons/day of surplus are now being landfilled.<sup>19</sup> The Qatari Ministry of Municipality and Environment has introduced plans to address the problem by expanding the capacity of the DSWMC by over 130 percent to 5,300 tons/day by 2022. Additionally, a new solid waste treatment center with a capacity of 3,000 tons/day is to be built in the northern part of the country.<sup>20</sup>

#### Key Technologies in Demand:

- Waste handling equipment
- Waste treatment technologies
- Composting equipment
- Sorting machines

- Crushing and grinding machines
- Materials handling equipment
- Collection services, containers, and vehicles
- Recycling process expertise
- Waste-to-Energy (WtE) and other conversion technologies

## Water and Wastewater Treatment

### Municipal Water and Wastewater

Qatar faces a variety of water challenges that derive from its unusually high consumption rates despite being a desert nation. Water consumption per capita is among the highest in the world, but the country has just 48 hours of emergency supply.<sup>21</sup> Water is regulated by the Qatar General Electricity & Water Corporation, the so called "Kahramaa." Individual projects, however, are tendered and managed by the Public Works Authority, which is known as "Ashghal" locally. Ashghal also coordinates large-scale funding of major projects. The third major player in the Qatari water market is the Qatar Electricity and Water Company (QEWC), the semi-private water corporation which operates 70 percent of the country's desalination capacity.<sup>22</sup>

Desalination remains the priority for Qatar water authorities, though developing and expanding the wastewater collection and treatment network is becoming a close second.<sup>23</sup> Desalination projects are expected to reach their peak around 2015 or 2016 and decline starting around 2018.<sup>24</sup> The Kahramaa recently awarded a contract for Qatar's first largescale saline water reverse osmosis plan at Ras Abu Fontas. Expanding Qatar's desalination capacity beyond thermal desalination and toward reverse osmosis technologies will provide growing opportunities for U.S. water treatment companies.

Wastewater collection and treatment is a growing market in Qatar as the country grapples with increasing output and demand for reuse strategies. The issue is being addressed through the Doha Resewerage Implementation Strategy (IDRIS), which is developing a series of wastewater treatment plants and conveyance networks in and around the capital of Doha under five major procurement packages. The

most notable forthcoming opportunity under the scope of IDRIS is the Doha South wastewater treatment plant project, which will have a daily capacity of 500,000 m<sup>3</sup> and aims to reuse the balance of the treated effluent. Qatar has estimated the IDRIS effort in its entirety to be worth some USD 3.3 billion.<sup>25</sup>

### Key Technologies in Demand:

- Engineering, procurement and construction services
- Filtration
- Advanced filtration
- Chemical disinfection
- UV disinfection
- Ozone disinfection
- Pumps, pipes and valves
- Storage technologies
- SCADA systems
- In-line monitoring systems
- Trenchless technologies
- Anaerobic digestion
- Nitrification
- Biological denitrification

### Market Links and Contacts

Ministry of the Environment

[www.moe.gov.qa/English/SitePages/Default.aspx](http://www.moe.gov.qa/English/SitePages/Default.aspx)  
[www.ctc.gov.qa/tender-en.aspx](http://www.ctc.gov.qa/tender-en.aspx)

Qatar Petroleum Qatar Petroleum

[www.qp.com.qa/en/SupplyManagement/Tenders/Pages/Tenders.aspx](http://www.qp.com.qa/en/SupplyManagement/Tenders/Pages/Tenders.aspx)

Qatar Gas

[www.qatargas.com.qa/English/Tenders/Pages/default.aspx](http://www.qatargas.com.qa/English/Tenders/Pages/default.aspx)

RasGas Company Limited

[www.rasgas.com/ContactUs.html](http://www.rasgas.com/ContactUs.html)

KAHRAMAA Qatar General Electricity & Water Corporation

[www.km.com.qa/Business/Pages/Tenders.aspx](http://www.km.com.qa/Business/Pages/Tenders.aspx)

U.S. Commercial Service Qatar

[www.export.gov/qatar](http://www.export.gov/qatar)

- 
- <sup>1</sup> UNEP. "Global Environment Outlook 5". Chapter 14: West Asia. 2012. p. 375-6
- <sup>2</sup> UNEP. "Global Environment Outlook 5". Chapter 14: West Asia. 2012. p. 375
- <sup>3</sup> Masood, Ahmed. "\$30 a Barrel". *International Monetary Fund's Finance & Development*. March 2016. Vol. 53, No. 1. <http://www.imf.org/external/pubs/ft/fandd/2016/03/ahmed.htm>. Accessed April 26, 2016
- <sup>4</sup> UNEP. "Air Quality Policies: Oman". 2015.
- <sup>5</sup> "Transformation of Waste Management in Oman". Presentation - Innovative Waste Management Technologies W.S. September 30, 2015. [https://www.unescwa.org/sites/www.unescwa.org/files/events/files/7.\\_transformation\\_of\\_waste\\_management\\_in\\_oman\\_-\\_mohammed\\_al-harthy\\_-\\_beah.pdf](https://www.unescwa.org/sites/www.unescwa.org/files/events/files/7._transformation_of_waste_management_in_oman_-_mohammed_al-harthy_-_beah.pdf). Accessed April 25, 2016
- <sup>6</sup> "Industrial Waste Facility to be established in Sohar". Technical Review Middle East. May 20, 2015. <http://www.technicalreviewmiddleeast.com/power-a-water/water-a-environment/industrial-waste-facility-to-be-established-in-sohar>. Accessed April 25, 2016
- <sup>7</sup> Zafar, Slaman. "Solid Waste Management in Oman." *EcoMENA*. April 3, 2016. <http://www.ecomena.org/solid-waste-oman/>. Accessed April 25, 2016
- <sup>8</sup> Global Water Intelligence. 'Oman boosts private sector role in desalination' Vol 15, Issue 4 (April 2014)
- <sup>9</sup> Global Water Intelligence. Oman Country Overview. 2016.
- <sup>10</sup> Global Water Intelligence. Oman Country Overview. 2016.
- <sup>11</sup> U.S. Commercial Service,. (2014). Doing Business in Oman: 2014 Country Commercial Guide for U.S. Companies. U.S Department of Commerce.
- <sup>12</sup> Global Water Intelligence. "Oman doubles up on its desalination plans" Vol 16, Issue 2 (February 2015)
- <sup>13</sup> Global Water Intelligence. 'Oman boosts private sector role in desalination' Vol 15, Issue 4 (April 2014)
- <sup>14</sup> U.S. Commercial Service,. (2014). Doing Business in Oman: 2014 Country Commercial Guide for U.S. Companies. U.S Department of Commerce.
- <sup>15</sup> U.S. Energy Information Administration (EIA). Qatar Country Analysis. <http://www.eia.gov/beta/international/analysis.cfm?iso=QAT> Accessed April 25, 2016
- <sup>16</sup> Qatar General Secretariat for Development Planning. *Qatar National Development Strategy 2011-2016*. p. 221-2
- <sup>17</sup> Walker, Lesley. "Report: Qatar's air pollution unacceptably high 44 percent of the year." *Doha News*. November 10, 2014.
- <sup>18</sup> Madan, Arushi. "Air Pollution in Middle East". Tunza EcoGeneration. March 20, 2016. <http://tunza.eco-generation.org/ambassadorReportView.jsp?viewID=37804> Accessed April 25, 2016
- <sup>19</sup> Walker, Lesley. "Some 400 tons of waste added to Qatar's landfills daily." *Doha News*. September 22, 2014.
- <sup>20</sup> Asaba, Baset. "Qatar to Advance Solid Waste Management". *Utilities-me.com*. February 7, 2016. <http://www.utilities-me.com/article-4083-qatar-to-advance-solid-waste-management/> Accessed April 25, 2016
- <sup>21</sup> Team, D. (2013). Water, electricity consumption in Qatar jump amid efforts to reduce usage - Doha News. Doha News. Retrieved 11 December 2015, from <http://dohanews.co/water-electricity-consumption-in-qatar-jump-amid/>
- <sup>22</sup> BMI Research,. (2015). Competitive Landscape - Qatar - 2015. *Bmo.bmiresearch.com*. Retrieved 11 December 2015, from [https://bmo.bmiresearch.com/article/view?article=1095184&advanced\\_search=1&matches=5184&page=1&position=5&keyword=qatar%20water](https://bmo.bmiresearch.com/article/view?article=1095184&advanced_search=1&matches=5184&page=1&position=5&keyword=qatar%20water)
- <sup>23</sup> BMI Research,. (2015). Competitive Landscape - Qatar - 2015. *Bmo.bmiresearch.com*. Retrieved 11 December 2015, from [https://bmo.bmiresearch.com/article/view?article=1095184&advanced\\_search=1&matches=5184&page=1&position=5&keyword=qatar%20water](https://bmo.bmiresearch.com/article/view?article=1095184&advanced_search=1&matches=5184&page=1&position=5&keyword=qatar%20water)
- <sup>24</sup> BMI Research,. (2015). Competitive Landscape - Qatar - 2015. *Bmo.bmiresearch.com*. Retrieved 11 December 2015, from [https://bmo.bmiresearch.com/article/view?article=1095184&advanced\\_search=1&matches=5184&page=1&position=5&keyword=qatar%20water](https://bmo.bmiresearch.com/article/view?article=1095184&advanced_search=1&matches=5184&page=1&position=5&keyword=qatar%20water)
- <sup>25</sup> Global Water Intelligence Water Project Pipeline.