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Introduction

India is home to 17.5 per cent of the world's population, but only has 4% of the world's water resources at its disposal. This inherent lack of sufficient water resources is reinforced by a rapidly growing demand for water which is projected to overtake the availability of water throughout the entire country within the next decades.

Between 2012-17 the government will invest USD 1,000 billion in infrastructure of which water industry constitutes an important part. The 12th 5-Year Plan specifies that 50 per cent of this investment should be private and PPP investment, thus representing enormous opportunity for Danish firms in the water industry. Ambitious projects like the Namami Gange Project (aiming at cleaning the Ganga River by 2020) have been launched and the possibility for foreign investment is great. The project is vast and will draw on the entire spectrum of water competences from water monitoring, to water management and treatment. The project is a key priority for PM Narendra Modi and the entire government so it is the perfect opportunity to showcase Danish competences.

Urbanization, increasing population, and rapid industrialization means that demand for water is expected to rise 20 per cent within the next decade. Moreover, depletion of groundwater levels due to irrigation demand in major river basins is expected to be a reality by 2050. Last but not least the per capita availability of water in India has been reduced from 5,277 cubic meters in 1995 to 1,545 cubic meters today and according to a UN report it is projected to fall to 1,140 cubic metres by 2050. A country is considered water-stressed if it has less than 1,700 cubic meters per person. In short, India is facing a desperate situation of water shortage.

With the emphasis of the new government on creating 100 smart cities, this is a huge anticipated demand of water. Denmark has smart technologies which have been proven effective over the decades. Smart cities create opportunities particularly for intelligent pumping solutions and real time water monitoring.

'Swach Bharat' or Clean India, is a government project which contains important opportunities for Danish companies, not least within sanitation and water treatment solutions. Especially, easily implemented and compact containerised solutions would be useful in heavily populated urbanised areas but also reedbed solutions where the water could be naturally and sustainably treated before being discharged into rivers or reused would have great potential as part of the Swach Bharat project.

The total Indian water market is estimated to be worth around US\$ 12 billion. While the government sector contributes about 50 per cent of this, the private industrial sector provides the remaining business. The overall water market is growing at 15-20 per cent every year.

Since 1980 the Indian government has shown increased commitment to improving its water and sanitation sector. By opening up for privatization, it is the hope that foreign technology and knowhow will help India develop its water supply and water treatment systems. However, despite 100 per cent allowance for FDI for municipal water and wastewater treatment projects, the water industry remains almost entirely controlled and managed by the state. Some stakeholders in the industry therefore believe that one cannot speak of an industry per se, but rather a sector.

Industry and Key Drivers

Drinking Water & sanitation

In the Indian national budget for 2015-2016, investments in drinking water and sanitation amount to US\$ 1.05 billion. Private investments in water and sanitation amounted to US\$ 135.1 million in 2013.

Between 1990 and 2012, 534 million people gained access to an improved drinking water source in India. This showcases a tremendous improvement, yet there is still substantial room for further development. 29% of the rural population, or 244 million people, and 23% of the urban population, or 90 million people, still lack access to safe sustainable water. From 1990 to 2012, 291 million people gained access to improved sanitation. Yet only 60 per cent of the urban population and 24 per cent of the rural population has access to sanitation services. For the total Indian population, 35 per cent has access to sanitation services. With the Swachh Bharat campaign as the focal point in promoting cleanliness and seeking an end to open defecation, PM Modi has pledged to build toilets for 600 million by 2019.

The primary sources of drinking water which includes surface water and groundwater are contaminated by different physical impurities, agricultural and industrial wastes, and underground chemicals and minerals. Water borne diseases are widespread. Hence, there is a great scope and opportunity to do more, which in turn means high market opportunities for private companies wanting to enter the Indian drinking water industry.

India is seen as one of the fastest growing bottled water markets in the world. The rising demand is fueled by a combination of safety and hygiene awareness coupled with higher disposable incomes. This is supported by the fact that sales of bottled water grew from US\$ 363.8 million in 2007 to US\$ 1.4 billion in 2012, which yields

a Compounded Annual Growth Rate (CAGR) of 24.7 per cent for the period. According to TechNavio's analysts forecast, the market is estimated to be worth \$2.67 billion by FY 2018, growing at CAGR of ~22%.

India's domestic water consumption is expected to triple from 2000 to 2050 and per capita water consumption is expected to double from 89 litres/day in 2000 to 167 litres/day in 2050.

Sewage Water

90 per cent of the total wastewater in India continues to be discharged without any treatment. To make the numbers tangible, approx. 6.2 billion litres of untreated industrial wastewater is generated every day across India. Furthermore, around 1.3 billion litres of raw sewage and 250 million litres of industrial effluent are added to the Ganges River daily. Besides industrial wastewater, untreated domestic wastewater is also a major source of pollution. In 2012, nearly 40% of sewage treatment plants and pumping stations did not conform to operation and maintenance standards. Many wastewater treatment facilities are closed due to improper design and poor operation and maintenance. This constitutes a major problem as discharge of untreated sewage is the single most important cause for pollution of surface and ground water in India.

Thus, the market for water treatment in India is experiencing immense expansion and investment these years. The market is growing at about 15-20 per cent annually.

Only around 30 per cent of the wastewater generated in India's major metropolitan cities is treated, and the cities now face severe water shortages. The River Yamuna's 22-km stretch in Delhi is barely 2 per cent of the length of the river, but contributes over 70 per cent of the pollution load. Water scarcity and strict regulation has led many industries to adopt water-recycling systems especially in the food, textile, pharmaceutical, chemical and power industries. Zero liquid discharge systems and wastewater recycling are becoming increasingly popular in India.

Moreover, India lacks sewage systems and wastewater management plants sufficient to meet the needs of its growing urban population. In many cities the sewer systems are in appalling condition – or simply non-existing - and need extensive maintenance or replacement. This creates opportunities for installing in-situ solutions such as compact containerised water treatment systems but also solutions like reedbed systems that could treat the effluent before it is discharged into local ecosystems.

There is a growing trend towards public private partnerships (PPP) for water and wastewater treatment plants and distribution systems. The government is launching ambitious infrastructural PPP projects and the scope for foreign investment is enormous. The Danish Water Forum projects in Rajkot (Non-Revenue Water/leakage detection) and other initiatives in New Delhi (study of retrofitting an existing sewage treatment plant) and Jamshedpur (study on tertiary treatment of municipal wastewater) are recent examples of how Danish firms in collaboration with the Danish government can help the Indian authorities in bringing state of the art, yet cost-effective in the long run, water treatment technologies to India.

Climate Changes

Increasing extremities in temperature, rising sea levels and disruptions to rainfall patterns are of great concern to the Indian government as it is affecting the livelihood of especially the population employed in agriculture and the coastal population. Monsoon rain from June to September is the primary source of water in India, yet with increasing climate variability, Indian monsoons are becoming less predictable and reliable. The frequency of extreme weather events, such as floods and droughts, has increased over the past decades causing supplies to diminish.

Three of India's largest cities – Mumbai, Kolkata and Chennai – are located in a coastal region. Moreover, the melting of the Himalayan glaciers could result in water stress in the Ganges Basin and agricultural production could be reduced by 4.5-9 per cent in the next three decades due to climate change, according to the World Development Report 2010 on climate change.

Population displacement and infrastructural damage can harm the business environment as well as add to India's existing poverty problems, increasing the risks of social unrest.

Therefore, India launched its first National Action Plan on Climate Change (NAPCC) in 2008. The plan outlines existing and future policies and programs addressing climate mitigation and adaptation. It identifies eight core “national missions” running through 2017. One of these missions is the National Mission on Strategic Knowledge for Climate Change which aims at gaining a better understanding of climate science, impacts and challenges. It envisions a new Climate Science Research Fund and it aims at increased international collaboration in which private sector initiatives play a greater role in developing adaptation and mitigation technologies, for instance through venture capital funds. Denmark has competences in studying the impact of climate change using sophisticated hardware and software solutions which would complement the work of the National Mission on Strategic Knowledge for Climate Change. Their aim is to have integrated water resource management (IWRM) as a policy tool

Overall, the plan focuses on enhancing resource efficiency, energy conservation and promoting renewable energy, and it thus represents opportunities for Danish companies.

Opportunities for Danish Companies

- The two large government programmes Swach Bharat and Namami Gange constitute huge opportunities for Danish companies.
- Opportunities exist to provide technical consultancy in the waste water treatment industry through the contractual and/or joint venture route.
- The Make in India programme which aims at attracting companies to produce their products in India provides opportunities through facilitating a favourable business environment for production companies.
- There are great opportunities for companies working within the area of potable water filtration and the bottled water industry.
- The Indian government's investment in and focus on PPP in ambitious infrastructural projects, including water resource management (WRM), represents potential for Danish firms to offer their expertise.
- As the water treatment market is moving from chemical treatment and demineralisation technologies to greater use of membrane technology, there are great opportunities for companies working with this technology.
- The Special Economic Zone scheme offers incentives such as duty free imports and tax exemptions, but requires environment impact assessments. Hence, companies working with environmental initiatives are well poised to offer their services in this area.
- Limited capabilities of Indian firms in designing technologies for larger scale water treatment plants opens up opportunities for Danish companies.
- Since most of the capacity expansion happens in already populated areas, technologies like trenchless piping, equipment and consultancy also offers big scope for Danish companies.
- Given the vast coastline of India and ever expanding need of land for habitation or industrialization, Environmental Impact Assessment studies and Coastal Zone Management studies also create opportunities for Danish companies.
- The Indian Government has revived the mother of all projects – the interlinking of major river networks all over the country, thereby connecting the water-deficit and the water-abundant areas. The project valued at over US\$ 100 billion is one of the largest in the world. It brings a massive set of requirements for equipment and construction and thus the project poses yet another big opportunity for Danish companies.

Challenges for Danish Companies

- The Indian drinking water industry and water treatment equipment industry are very cost competitive, which can sometimes limit Danish companies using expensive technologies. However, niche technologies are not limited by these conditions.
- Companies often have to show how their technology performs, at least in pilot-testing or demonstration projects.
- The bureaucracy and corruption in India represent a significant hindrance on the ease of doing business in India. However, the new government is clamping down on this issue.
- Locally fabricated equipment is about 30 per cent cheaper than imported equivalents.

Conclusion and Recommendations

Water is a critical resource which can enhance India's economic growth, improve the quality of life of its people and ensure environmental sustainability.

The problem as of now is not of availability of water. Instead, the issues are optimal management, better distribution mechanism, reduction of high rates of leakages, retreating wastewater and harvesting rainwater. The best way to approach these problems is to adopt innovative and futuristic management techniques – minimum use of water, recycling and reusing waste water for industrial uses and ensuring a highly efficient water use in irrigation.

Danish companies with their highly innovative products and knowhow can fit in very well and collaborate with Indian partners in this fast growing market.

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The Trade Council is a part of the Ministry of Foreign Affairs and is the official export and investment promotion agency of Denmark. The Trade Council benefits from around ninety Danish Embassies, Consulates General and Trade Commissions abroad. The Trade Council advises and assists Danish companies in their export activities and internationalization process according to the vision: Creating Value All the Way.

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