

Is India Going to Waste?



Waste Water, Waste Management and Waste-to-Energy

**2018 ENVIRONMENTAL PERFORMANCE INDEX FINDS AIR QUALITY AS THE LEADING
ENVIRONMENTAL THREAT TO PUBLIC HEALTH**

Switzerland tops the report while India falls to the bottom tier, illustrating the challenge of sustainable development

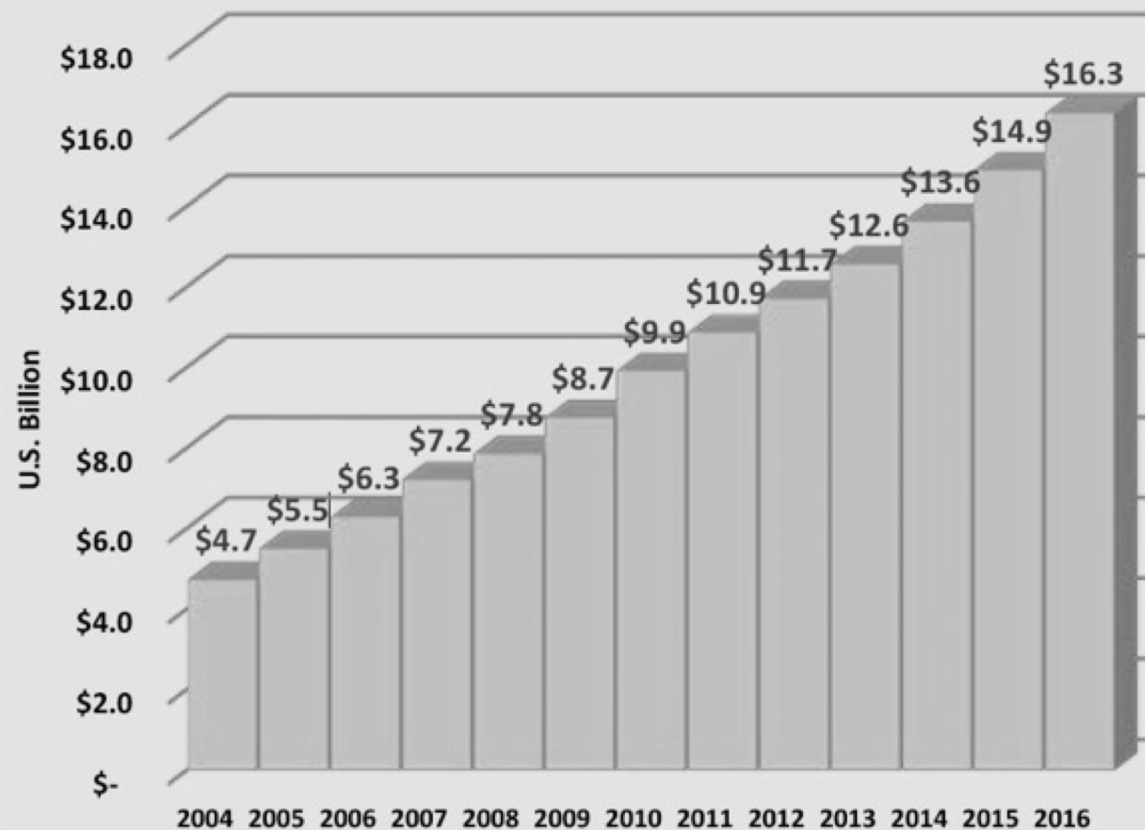
DAVOS, Switzerland, January 23, 2018 – The 2018 [Environmental Performance Index](#) (EPI) finds that air quality is the leading environmental threat to public health. Now in its twentieth year, the biennial report is produced by researchers at Yale and Columbia Universities in collaboration with the World Economic Forum. The tenth EPI report ranks 180 countries on 24 performance indicators across 10 issue categories covering environmental health and ecosystem vitality. Switzerland leads the world in sustainability, followed by France, Denmark, Malta, and Sweden.

Switzerland's top ranking reflects strong performance across most issues, especially air quality and climate protection. In general, high scorers exhibit long-standing commitments to protecting public health, preserving natural resources, and decoupling greenhouse gas (GHG) emissions from economic activity.

India and Bangladesh come in near the bottom of the rankings, with Burundi, Democratic Republic of the Congo, and Nepal rounding out the bottom five. Low scores on the EPI are indicative of the need for national sustainability efforts on a number of fronts, especially cleaning up air quality, protecting biodiversity, and reducing GHG emissions, said the researchers. Some

India - The Market

Figure 1: India Environmental Technologies Market



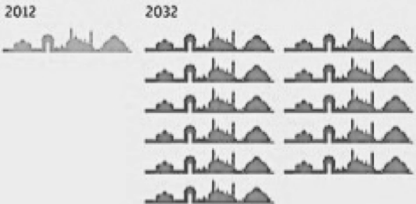
Source: *Environmental Business International with OEEI Analysis, 2016.*

India – Urbanization

The Urban Effect

Cities

In 20 years, India's cities will have to accommodate 250 million to 300 million more people than they do today. That's the equivalent of 11 New Delhis.



Electricity

Of the 1.4 billion people of the world who have no access to electricity in the world, India accounts for over 300 million.



Water

Only 74% of urban households in India are served by piped water supply. No Indian city has piped water 24 hours a day, seven days a week—4 to 5 hours of supply per day is the average.

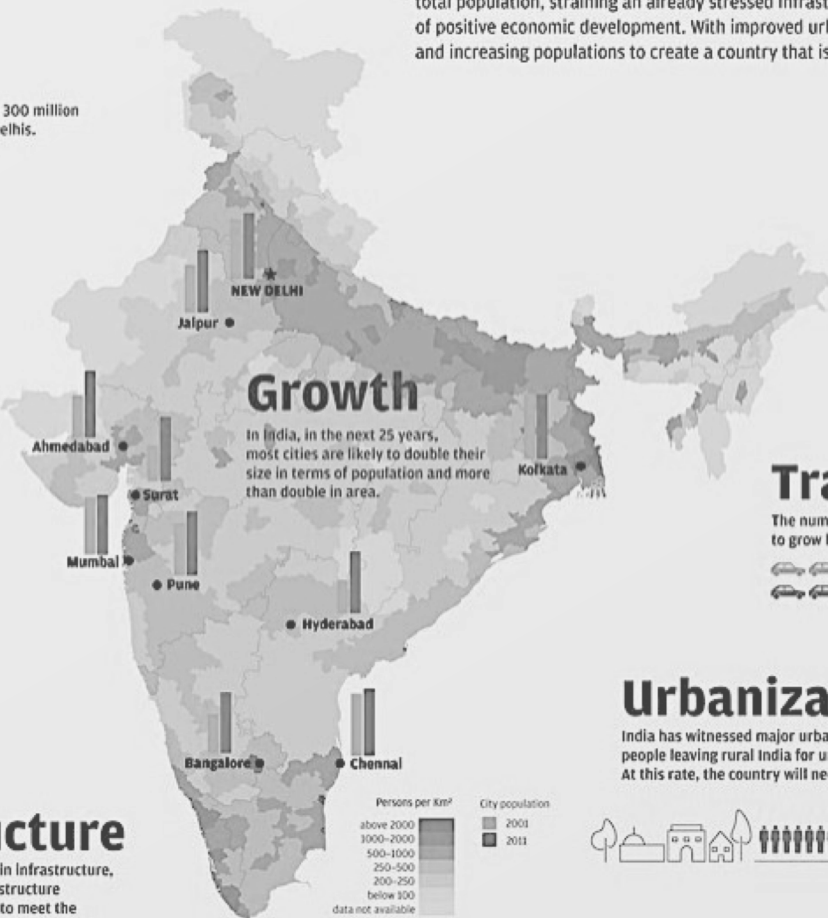


Infrastructure

Despite increased investments in infrastructure, an estimated \$1 trillion in infrastructure improvements will be required to meet the country's resource needs over the next 5 years.

Sustaining Growth in India through Better Urban Planning

With a population of more than 1.2 billion, India is projected to be the world's most populous country by 2025. By 2050, it is estimated that India's urban population will constitute nearly half of the country's total population, straining an already stressed infrastructure. The good news: urbanization is an indicator of positive economic development. With improved urban planning, India can tackle urbanization challenges and increasing populations to create a country that is poised for sustainable growth.



1. CHINA

2. USA

3. INDIA

Pollution

By 2015, India is expected to become the world's third largest emitter of carbon dioxide—it ranked fifth in 2005.

Transportation

The number of private vehicles in India is expected to grow by more than 3 times by 2021.



Urbanization

India has witnessed major urbanization in recent times, with an estimated 30 people leaving rural India for urban areas every minute during the next 20 years. At this rate, the country will need some 500 new cities in the next two decades.



Market Size: Waste Water

- Estimated US\$ 126 billion of capital investment over next 20 years to meet basic potable water and sanitation needs
- In real terms, capital expenditure on water and wastewater infrastructure poised to grow 83% between 2015 and 2020 - ARR* of US\$ 16 billion by 2020
- Wastewater treatment expected growth of 15.3% CAGR** between 2015 and 2020 reaching US\$ 6.78 billion in 2020 (2015: US\$ 3.3 billion)
- Drinking water treatment and supply segment will reach US\$ 9.4 billion in 2020 (2015: US\$ 5.5 billion)
- Major tenders expected for municipal wastewater treatment and water supply projects:
 - Ahmedabad (US\$ 364 million)
 - Bangalore (US\$ 271 million)
 - Kochi (US\$ 300 million)
 - Mumbai (Malad – US\$ 296 million and Bandra – US\$ 289 million)

* ARR = annual run rate

** CAGR = compounded annual growth rate

Potential Sectors: Waste Water

Municipal Water and Wastewater Treatment

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

Municipal Water and Efficiency

- Monitoring technology
- Leak resistant transmission systems

Industrial Process and Wastewater Treatment & Reuse

- Engineering and construction services
- Water reuse equipment and services
- Advanced filtration
- Membrane filtration
- Reverse osmosis
- UV disinfection
- Anaerobic digestion
- Nitrification
- Biological denitrification
- Membrane bioreactor systems

Environmental Engineering and Consultancy

- Environmental impact assessment

Market Size: Waste Management

- By 2030 India's waste management market projected to be worth US\$ 18 billion at US\$ 15 per capita
- Report on Infrastructure in India by the Central government's High Powered Expert Committee projected an investment of US\$ 771.65 billion over 20 years from 2011-12
- In same report, investment requirement for waste management conservatively estimated at US\$ 9.56 billion
- Report also estimates additional requirement of US\$ 391.73 billion for general O&M cost (2030)
- Cost for O&M in municipal solid waste management assessed at US\$ 53.9 billion (2030)

Capital and O&M requirement in municipal waste management sector in US\$ billion (2030)

Capital expenditure	A. Investment for unmet demand	2.24	
	B. Investment for additional demand	3.33	
	C. Investment required for replacement	3.99	
			9.56
Operation and maintenance (O&M)			53.92
		Total	63.48

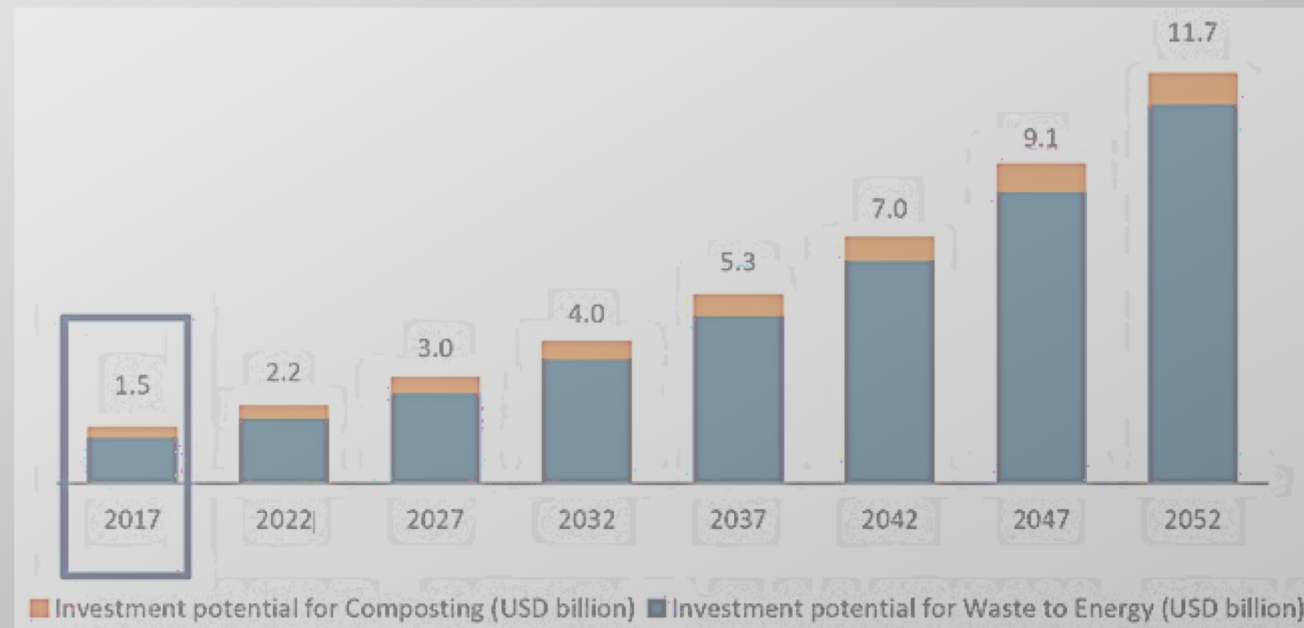
Potential Sectors: Waste Management

Solid Waste, E-waste and Hazardous & Medical Waste

- Waste handling equipment
- Gasification, pyrolysis and incineration technologies
- Waste treatment technologies
- Waste management systems design expertise
- Landfill design and engineering
- Brownfield site remediation design and equipment
- Soil contamination testing and monitoring equipment

Market Size: Waste-to-Energy

- India's potential to generate energy from waste was approximately 956 MW in 2017
- Estimated to increase to 2.2 GW by 2030
- By 2052, total waste-to-energy generation potential in India estimated at approximately 5.4 GW
- Of this, about 5% has been harnessed as in 2017
- Waste to energy market estimated at US\$ 1.5 billion (2017)



Potential Sectors: Waste-to-Energy

Thermo Chemical

- Gasification
- Pyrolysis
- Liquefaction
- Plasma-techno

Thermal

- Direct combustion

Biochemical

- Fermentation
- Anaerobic digestion

Mechanical and Thermal

- Pulverizing and drying

Government and Official Organizations

Central Government Ministries

- Ministry of Environment, Forest and Climate Change
- Ministry of Water Resources, River Development and Ganga Rejuvenation
- Ministry of Drinking Water and Sanitation
- Ministry of Housing and Urban Affairs
- Ministry of Finance

Institutions/Organizations

- Central Pollution Control Board
- State Pollution Control Boards (SPCBs)
- Pollution Control Committees (PCCs)
- State Urban Development Departments
- Department of Economic Affairs
- Niti Aayog
- National Institute of Urban Affairs

Official Environmental Acts and Rules

Water and Waste Water

- Water (Prevention and Control of Pollution) Act 1974
- Water (Prevention and Control of Pollution) Cess Act 1977

Waste Management

- Municipal Solid Waste (Management and Handling) Rules, 2000
- Bio-Medical Waste (Management and Handling) Rules, 2003
- Batteries (Management and Handling) Rules, 2001
- Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008
- Plastic Waste (Management and Handling) Rules, 2011
- E- Waste (Management and Handling) Rules, 2011

Wildlife and Forests

- Wildlife (Protection) Act 1972
- Forests (Conservation Act) 1980
- Environment Protection Act 1986
- Biological Diversity Act 2002

Renewable Energy

- National Renewable Energy Act 2015

Air

- Air (Prevention and Control of Pollution) Act 1981

Noise

- Noise Pollution (Regulation and Control) Rules, 2000

Functions of Pollution Control Boards

Central Pollution Control Board (CPCB)

- Advising Central government
- Coordinating activities of State Pollution Control Boards
- Organizing programs
- Setting standards
- Collecting, compiling and publishing data
- Preparing manuals
- Establishing laboratories

State Pollution Control Board (SPCB)

- Advising State government
- Setting standards
- Obtaining information, surveying and sampling, keeping records, sanctioning/ refusing permissions
- Authorizing representatives to enter, inspect and examine or conducting searches
- Re-structuring pollutant outlets
- Suggesting efficient methods

Smart Cities Mission

- 5-year program (2017-2022) launched by the central Ministry of Housing and Urban Affairs in June 2015 with results expected post-2022.
- Total cost of projects (April 2018): US\$ 31 billion
- Each city to create a Special Purpose Vehicle (SPV) for implementation to which Central and State Governments will contribute US\$ 75 million each
- 99 cities selected in 5 rounds (January 2018) based on Smart Cities Challenge. Current status:
 - Round 1: 51% of the projects in cities selected have been tendered or under implementation
 - Round 2 and 3: Nearly all the cities have set up SPVs
 - Round 4 and 5: Under various stages of planning
- Since the launch of the mission, US\$ 1.5 billion has been released by the Central government
- 753 projects worth US\$ 3.8 billion have been completed or started work on-ground
- About 287 projects worth US\$ 2.2 billion are in tendering stage and the works on-ground are expected to start very soon

AMRUT Mission

- Total outlay for Central government mission estimated at US\$ 7.7 billion
- Launched in June 2015 with focus of urban renewal projects to establish:
 - Infrastructure ensuring adequate sewage networks and water supply,
 - Transportation,
 - Green spaces and parks,
 - capacity building for ULBs
- Central Ministry of Housing and Urban Affairs responsible for mission implementation, in collaboration with the State governments of the respective selected cities
- Scheme dependent on public private partnership model (PPP) model. Possible to link local state schemes related to water supply and sewerage, as also Swachh Bharat Mission to AMRUT
- 500 cities proposed to be covered which include all State capitals, cities with over 100'000 population, heritage cities, tourist destinations, hill stations/islands, etc.

Swachh Bharat Abhiyan - Clean India Mission

The Clean Indian Mission contains two sub-missions:

- Swachh Bharat Abhiyan - Urban of the Ministry of Housing and Urban Affairs
- Swachh Bharat Abhiyan - Gramin (Rural) of the Ministry of Drinking Water and Sanitation

Key components:

- Construction of individual house-hold latrines(IHHL)
- Community toilets and sanitary complexes
- Public toilets
- Solid and liquid waste management (SLWM)
- Information education and communication and public awareness
- Capacity building and administration
- Availability of sanitation material through rural sanitary mart, production centers, etc.

Cost estimated by Government of India: US\$ 10 billion of which:

- Central Government share: US\$ 2.36 billion
- States-ULBs contribution: US\$ 788.25 million

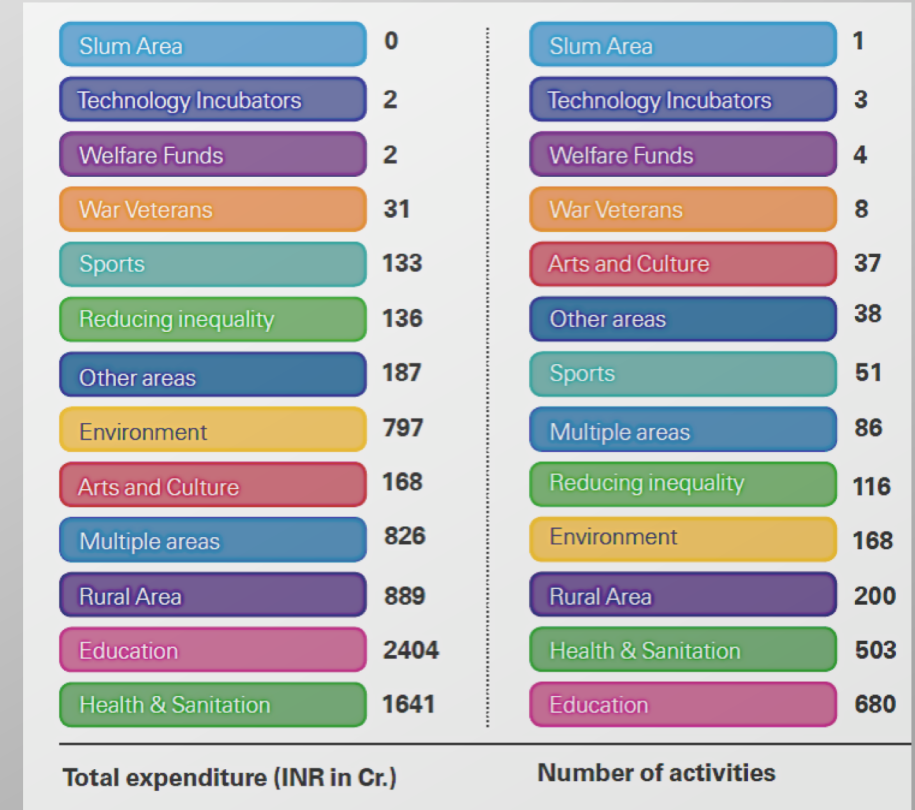
In 2016, the World Bank loaned US\$ 1.5 billion as support and US\$ 25 million as technical assistance (mostly for the Gramin (rural) mission)

Corporate Social Responsibility

- Corporate Social Responsibility (CSR) Rules outlined in the Companies Act of 2013 and came into effect on 1 April 2014
- However, the mandate of spending 2% of net profit on CSR initiatives is only “recommendatory” and not a statutory obligation
- Applies to firms with a net worth of at least US\$ 83.5 million or revenue of US\$ 167 million or net profit of US\$ 833'500
- Such companies should spend 2% of their average profit in the last three years on social development-related activities such as sanitation, education, healthcare and poverty alleviation, etc.

Highest 5 contributing sectors were:

- Energy & Power (US\$ 408.35 million)
- Banking, financial services and insurance (US\$ 207.17 million)
- IT Consulting and Software (US\$ 155.10 million)
- Consumer products (US\$ 94.90 million)
- Mining & Metal (US\$ 91.54 million)



Challenges and Hurdles

Challenges

- Properly assessing the potential of your India market
- Planning a long-term, sustainable business strategy for a price sensitive market like India
- Adapting existing technologies to local conditions
- Understanding existing Central and State government incentives, policies, laws, etc.
- Identifying challenges related to scale and different trading and cultural environments
- Recognizing issues related to differences in standards, testing and certifications
- Instituting a suitable local presence
- Dealing with fragmentation of the market across regions
- Establishing first local pilot project
- Keeping up with established and new competitors

Hurdles

- Bureaucracy and red tape
- Price sensitivity and planning local price points to remain competitive
- Transparency in tenders
- High tariffs and multiplicity of taxes at Central, State and city levels
- Corruption
- Constant changes and revision in policy
- Limited sophistication of local partners
- Legal and contractual obligations
- Logistics and infrastructure bottlenecks



India Entry Strategy

Thank you

India: A Ready Market for Swiss Environmental Technology SME's

Fachhochschule Nordwestschweiz (FHNW), 5210 Windisch

Wednesday, 18 April 2018

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