

Futuristic Solutions, Current Scenarios

eToilets, the self-flushing, self-monitoring technology-based sanitation solutions are no longer the stuff of science fiction. An Indian social enterprise has made them an innovative route to sustainable solutions. The improvements in the model continue... **BY BINITA SINGH**



A long drive for a short weekend getaway away from the heat and dust of a baking national capital is a welcome thought. You pack your boot with enough mineral water and fizzy drinks to keep your family hydrated for the entire journey. The only jarring note in this beautiful story is the lack of clean toilets for the essential short breaks en route.

Now re-imagine this journey where you have stopped en route the fascinating countryside drive for a toilet break somewhere in the late evening. You have found this location mapped on your GPRS. You find a futuristic looking stainless steel box with an 'eToilet' sign on it. Curious, you walk up to it and there is a display light outside the unit which is green, indicating status as 'unoccupied'. A sign on the unit says 'insert coin' and as soon as you have, the door automatically opens to reveal a gleaming well-lit interior. Upon entering

the toilet, indoor lights and fans switch on automatically. The pre-flush system wets the closet initially to ensure cleanliness. You finish your business and a signage prompts you to flush manually. In case in your hurry you have forgotten to flush, you are assured that the system will automatically flush after you exit. An automatic floor cleaning mechanism ensures pressure washing will also clean the floor automatically. You decide not to push the switch since you know it is programmed to function after a specified usage. This is the typical experience of using an eToilet—clean, hygienic, simple, convenient and even delightful if compared with the usual 'on the go' options. The best part is that this is not a dream.

Anvar Sadath, Chief Executive Officer, Eram Scientific Solutions (ESS), the company behind this revolutionary concept says, "eToilet is an indigenous revenue generating innovatively designed and engineered public sanitation model

with a unique ambience to suit Indian cities and urban locations. The long term vision envisages building a sustainable and well-maintained toilet and public infrastructure network across the country that is affordable and accessible to the common man. The idea is to make eToilets 100 per cent automated (non-touch) for use, self-sustainable, creating their own energy and water for functioning and powering the external environment."

Eram Scientific Solutions (an independent entity), part of Saudi Arabia-based US\$ 1 billion Eram Group, is primarily a research and development social enterprise with expertise in the water and sanitation sectors. ESS began its innovation-led journey in 2008 in Thiruvananthapuram, Kerala and in a short span of time introduced the evolutionary technology-integrated toilet concept in the market. The company's focus is on finding cost-effective scientific solutions to solve core infrastructure problems



in emerging countries and supporting their social development agenda. Led by the vision of Dr Siddeek Ahmed, Chairman and Managing Director, Eram/ITL Group, the company forayed into the nascent public sanitation sector in the country by instituting an R&D-based social enterprise Eram Scientific Solutions Pvt Ltd. Dr Ahmed's focus on sanitation stemmed from the realisation that lack of public sanitation affected women and children the most. Undeterred by the absence of an enabling framework, focussed industrial activities, infrastructure or competent manpower to address the inherent challenges of this non-glamorous industry, he established the public sanitation venture.

The visionary entrepreneur who had gained a world of experience through his involvement in more than 30 entities spread across 11 countries spanning Kingdom of Saudi Arabia, United Arab Emirates, India, Kingdom of Bahrain, Qatar, Kuwait, United Kingdom, Italy,

Korea, Malaysia and Turkey, was sure that ESS would prove to be a unique model of social enterprise. Sure enough, the flagship product using convergence of modern technologies, the electronic public toilet or eToilet, has by now gathered more than 34 honours, awards and recognitions from across the world. Bill and Melinda Gates Foundation (BMGF), the world's largest donor organisation in sanitation, acknowledging the potential of ESS' initiatives, has provided grants for further R&D and is also promoting collaboration among various grantees to bring world class sanitation solutions to the public in India.

"Till date, we have implemented over 650 eToilets located in extreme temperatures ranging from 50 degrees to -15 degrees centigrade, and 200 sewage treatment plants (STPs) across 16 states in India covering Kerala, Tamil Nadu, Punjab, Assam, Bihar, Chhattisgarh, Karnataka, New Delhi, Himachal Pradesh, Maharashtra, Haryana, etc.," informs Sadath. It took numerous trials and errors and subsequent changes in the next generation models in line with the requirements of end users for the first batch of successful eToilets to roll out. "Our first eToilet unit was implemented on a pilot basis in Kozhikode, Kerala in 2010," reminisces Sadath. Over a 1,000 clean, hygienic and aesthetically pleasing eToilets were provided by the company for government schools in Kerala in partnership with Suchi@ School programme and it was felicitated with the Kerala Chief Minister's Award for Public Innovation. The initiation by the Kozhikode government of this unique public toilet embedded with a self-washing mechanism and in-built coin validator drew public appreciation, especially from the women community. "In a short span of time, there was a considerable increase noticed in the usage of the eToilet," recalls Sadath.

The long years spent in research have helped the company in meticulous diagnosis of the sanitation crisis, and the eToilet (patent pending) solution, addressed the concerns of structural

integrity, ensuring cleanliness and hygiene and a dedicated maintenance plan through its product and service methodology. Built of stainless steel or mild steel enclosures and fitted with electronic systems for enhanced user experience and for tracking the status of toilets, these solutions endowed with automated access control systems, sensor-enabled water minimisation, self-washing and floor wash mechanisms, with functional LED light technology that lights up only when a person enters, natural ventilation with privacy and safety, were an instant hit.

"We work in the field of convergent technology applications for products and services. R&D is our main focus and technology is our watchword," says Sadath. In pursuit of this goal, the company encourages tie-ups and collaborations with like-minded organisations and individuals for social utility in developing such products. The modular eToilets are unmanned and given the self-cleaning attribute, they have a simple user interface. The comprehensive maintenance plan ensures that the eToilets are clean and hygienic for every user. Further, the stainless steel enclosures being durable and corrosion-resistant can withstand long term wear and tear. Sensors for water and electricity conservation and power back-up with coin



"...there was a considerable increase noticed in the usage of the eToilet...it received tremendous support from the locals."

Anvar Sadath,
Chief Executive Officer, Eram Scientific Solutions

operated entry ensure low maintenance. The toilets are programmed to flush 1.5 litres of water after three minutes of usage and 4.5 litres for longer usage, which ensures low water consumption. The performance status of the units can also be monitored via web using GPRS connectivity of the units. A full-cycle approach in sustainable sanitation is incorporated in the eToilet by integrating electrical, mechanical and web-mobile technologies.

Talking about the company's R&D strengths, Sadath says, "We have over six years of experience in implementing a high-end public urban sanitation model with multiple revenue sources across India." The core team comprises experts with more than 15-20 years experience in conceptualising and implementing large scale ICT for Development (ICT4D) projects in India. Its 15-member R&D team is currently implementing the Reinvent the Toilet Challenge (RTTC) Round 2 project which will culminate with an imperial model to be demonstrated at the RTTC fair. Dr Ahmed envisions a future in water and sanitation where waste water treatment industry and public sanitation facilities would stand for the principle of recycle, recover and reuse and will be pro-earth. Powered by this goal, the company is working on a concept of entrepreneur-driven models in sanitation, which would provide the twin benefits of upkeep of sanitation facilities and livelihood to marginalised segments, and continuous work on low-cost electronic public toilets. The web enabled health status report system started by Eram Scientific in Kerala is going to be replicated across geographies.

Enumerating the projects in the pipeline, Sadath says, "The latest in the line of eToilets is the e-Lite 14 eToilet for schools which is the world's most economically priced, solar-powered electronic toilet." The company will now be pushing this model under the corporate social responsibility route and



ANATOMY OF SUSTAINABLE E-TOILET SYSTEM

General Features

- ◆ Easy to install
- ◆ Consumes less water
- ◆ Power efficient
- ◆ Enhanced cleanliness through auto flushes & floor washing
- ◆ Unmanned operations
- ◆ Coin operated entry/free access
- ◆ Onsite waste treatment using anaerobic biodegradation
- ◆ No regular manual cleaning/maintenance required
- ◆ Outdoor advertising space on eToilet panels
- ◆ Built for Mild Steel eToilet- access controlled main door and side walls made of Powder Coated Mild Steel (MS)/CRS. Toilet floor and closet are to be Stainless Steel grade 304
- ◆ Built for Stainless Steel eToilet- access controlled main door and side walls made of SS grade 304. Toilet floor and closet are to be Stainless Steel grade 304

Functionalities

- ◆ Pre flush, Auto flush, Platform cleaning
- ◆ Stainless Steel platform with SS closet
- ◆ Stainless Steel/Mild Steel Assembly structure
- ◆ Sensors for Water/Electricity Conservation
- ◆ In-built water tank on top
- ◆ Web reports on health status
- ◆ Wash Basin & Health Faucet
- ◆ Power Backup
- ◆ Napkin Vending Machines & Incinerators for women toilets (optional)

through government funds, especially under the renewed focus on *Swachh Bharat* (Clean India). The enterprise is also working on the next generation prototype of eToilets that are self-sustainable and nutrient-energy-water recovering and meet international standards. ESS is collaborating with other grantees of the Bill and Melinda Gates Foundation for recovering water, energy, fertilisers or a combination of one or more of them through suitable sewage management solutions. Another work in progress is in collaboration with California Institute of Technology (CALTECH), Duke University and University of South Florida (USF) to integrate various models of eToilets with the processing units of the international collaborators and test the combined systems in several locations across India. The field trial with University of South Florida is part of another BMGF (Gates Foundation) collaborated grant, promoted by Biotechnology Industry Research Assistance Council (BIRAC), Government of India, which is nearing approval and initiation. The association with IDEO.org is yet another project supported by the BMGF. Eram has also been successful in integrating environment-friendly sewage treatment units in association with established national and international players like Defence Research and Development Organisation (DRDO) and ISEA, Italy.

The social enterprise has an ambitious vision of sanitation. Sadath says "A public sanitation infrastructure that will be of global standard and connected through various mobile and web-based technologies to increase access and enable monitoring. This will also bring developing nations at par with developed countries in terms of public health and sanitation." The ultimate goal of the sanitation innovator is "zeroing in on the need for an unerring, reliable and safe sanitation system integrated with an efficient sewage treatment system," informs Sadath. Certainly, a surefire way towards achieving the vision of *Swachh Bharat*! ■