TATA

TCExpression

TATA CONSULTING ENGINEERS LIMITED

Volume 57, Issue 1 - December 2019

Saving the environment, one project at a time

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TCExpression
Volume 57, Issue 1 - December 2019

For restricted circulation

Dear Readers,

This edition of TCExpression, Saving the Environment, one project at a time, explores the importance of being environmentally responsible and showcases a few TCE projects that have made an impact. As we enter the new decade, this last issue of 2019 summarises events and happenings @TCE last year. Here's wishing our readers a very, very happy and prosperous New Year.

Happy Reading!

Alpna Singh

Reflections

Dear Friends,

2019 is behind us. It is the end of a decade, and we cannot close without reminding ourselves of what we achieved over the years. It fills me with great pride to share in 2019's last edition of TCExpression some of the successes over the past decade, which showcase TCE's cutting-edge operational capabilities and innovation prowess. We took part in the TBEM Assessment 2019 and were assessed as 'Emerging Industry Leaders' after crossing over to the 551-650 band. Last year, TCE moved up in rank in the ENR Top 225 International Design Firms to 127.

In the past decade, we got the opportunity to associate with the tallest statue in the world as engineering review consultants of the 182-metre-tall Statue of Unity. The success of ISRO GSLV launch, with TCE as a partner in design and engineering of the launch vehicle platform, was another enviable feat. TCE is proudly associated with ITER the world's massive fusion experiment with a collaboration involving thirty-five nations. Fifty of our young and bright minds are working on the project.

TCE expanded its footprint in the Middle East with the setting up of an office in Saudi Arabia and signing of an MoU with Saudi Aramco for various identified areas such as Power, Digitisation, Smart Cities, Energy Management, Water and Environment, etc.

In line with the UN's Sustainable Development Goals, TCE engaged in a variety of sustainability-driven projects — from waste management and sewerage treatment to smart cities and renewal of urban infrastructure — across the country. We now have a fair share in the development of infrastructure in India with 14 Smart Cities, 50 Amrut Cities, millions of metres of piping, multiple GWs of power generation, millions of litres of water and wastewater management, etc. Bagging Agra Metro rail project was not only a win of a project but the successful start of a new sector.

TCE, in FY19, achieved Rs1000-crore+ business acquisitions, and Rs100-crore+ PBT, bringing us closer to our target of crossing Rs1000-crore+ in revenues in the coming years.

Behind all our success is the hard work and commitment of each one of you at TCE, and the trust and patronage of our customers. I hope these and many more such stories featured in this edition of TCExpression will inspire us to do better and aim higher as we engage with our stakeholders in 2020.

I wish you all a happy and prosperous New Year!

Amit Sharma
Managing Director

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Saving the environment, one project at a time

Sustainability is no longer a wishful endeavour but an imperative for the world we live in today. As countries globally work purposefully towards meeting the UN Sustainable Development Goals (SDGs), Tata Consulting Engineers (TCE) is doing its bit through sustainability projects that make a difference

The clock is ticking as the world grapples with a host of challenges, from climate change and growing hunger and poverty to rising inequality and insufficient access to energy, education and justice. As with all life on the planet, these issues of sustainable development too are inter-connected.

Economic growth must be accompanied by efforts to end poverty, and strategies to address the social needs of health, education and jobs as also human rights. Development needs to be more equitable. And it ought to go hand-in-hand with the protection of the environment, given the far-reaching impact of climate change and pollution on global hunger, health and livelihoods.

It was with this in mind that the United Nations (UN) had issued 17 Sustainable Development Goals (SDGs) back in 2015 as a "blueprint to achieve a better and more sustainable future for all". It had called for action by all countries – rich, poor and middle-income – to achieve all the goals by 2030 to "promote prosperity while protecting the planet".

Governments, corporate houses and even individuals across the globe have since responded to the call and initiated various measures to promote growth while reducing the environmental burden on the planet. But they've barely touched the surface, as yet. In India, the Tata Group has taken the lead by committing to attaining leadership on the SDGs. Accordingly, Tata Consulting Engineers Limited (TCE) has undertaken many projects in line with the SDGs ranging from the conversion of waste to energy to reducing air pollution to clean water and sanitation, besides researching on solutions in the areas of sustainable transportation and construction.

The SDGs explained

The 17 SDGs enunciated by the UN cover every aspect of human development – from no poverty, zero hunger and good health and well-being to quality education, gender equality and reduced inequalities. They also include climate action, clean water and sanitation, affordable and clean energy, sustainable cities and communities, and responsible consumption and production, apart from providing decent work and economic growth, industry innovation and infrastructure, and peace, justice and strong institutions.

> "The Tata group is committed to integrate environmental, social and ethical principles into its business" as this is "central to improving the quality of life of the communities we serve globally and enhancing long-term stakeholder value".

In addition, there is the life below water and life on land goals to conserve the oceans and marine resources as also manage forests, combat land degradation and conserve biodiversity. And the final SDG is to revitalise the global partnership for sustainable development.

With just a decade left to achieve the goals, there is a growing urgency to meet these targets and raise the standards of human development. At the UN's recent SDG Summit in September 2019, world leaders called for urgent collective action over the next ten years on the goals.

As the UN's Sustainable Development Goals Report 2019 points out, the natural environment is deteriorating at an alarming rate with the past four years being the warmest on record. Moreover, global hunger is on the rise, at least half of the world's population lacks essential health services, and more than half of the world's children do not meet standards in reading and mathematics. And that's not even considering the growing social inequity and injustice worldwide.

India and the SDGs

India has an important role to play in the achievement of the SDGs, given that the country is home to 28% of the world's poor, according to the annual Human Development Index 2019 report. The NITI (National Institution for Transforming India) Aayog, which is the government's nodal agency for implementing the SDGs, has initiated various steps in this direction in keeping with India's commitment to the UN.

Nevertheless, the government faces an uphill task in ensuring that no one is left behind and that economic growth trickles down to the poorest of the poor, even as it balances development with the protection of the environment while upholding human rights. Given the enormity of the task, it is essential that corporate India steps in and commits to achieve the goals.

Leading the way

The Tata Group, which has a long history of working towards the SDGs even before they were enunciated by the UN, has formalised its commitment by forming the Tata Sustainability Group (TSG). The TSG is partnering with all Tata companies to embed sustainability in their core

businesses to achieve global leadership. Sustainability for the group means balancing economic, environmental and social performance to create long-term stakeholder value.

The Tata Sustainability Policy states that "the Tata group is committed to integrate environmental, social and ethical principles into its business" as this is "central to improving the quality of life of the communities we serve globally and enhancing long-term stakeholder value".

While the Tata Global Sustainability Council provides strategic direction to Tata group companies to achieve the SDGs, the TSG has also laid out key performance indicators on various parameters for this. These include emissions, energy, water, solid waste, volunteering in the community, gender diversity and also compliance with social, safety, human rights and environmental norms by its suppliers and distributors. It has also designed a Tata Sustainability Assessment Framework for mapping the maturity of sustainability practices, processes and initiatives within individual Tata companies.

Naturally, then, Tata Consulting Engineers (TCE) too is focused on achieving global sustainability leadership in its own business, as evident from the numerous projects undertaken, from waste management and sewerage treatment to smart cities and renewal of urban infrastructure.

Waste to energy

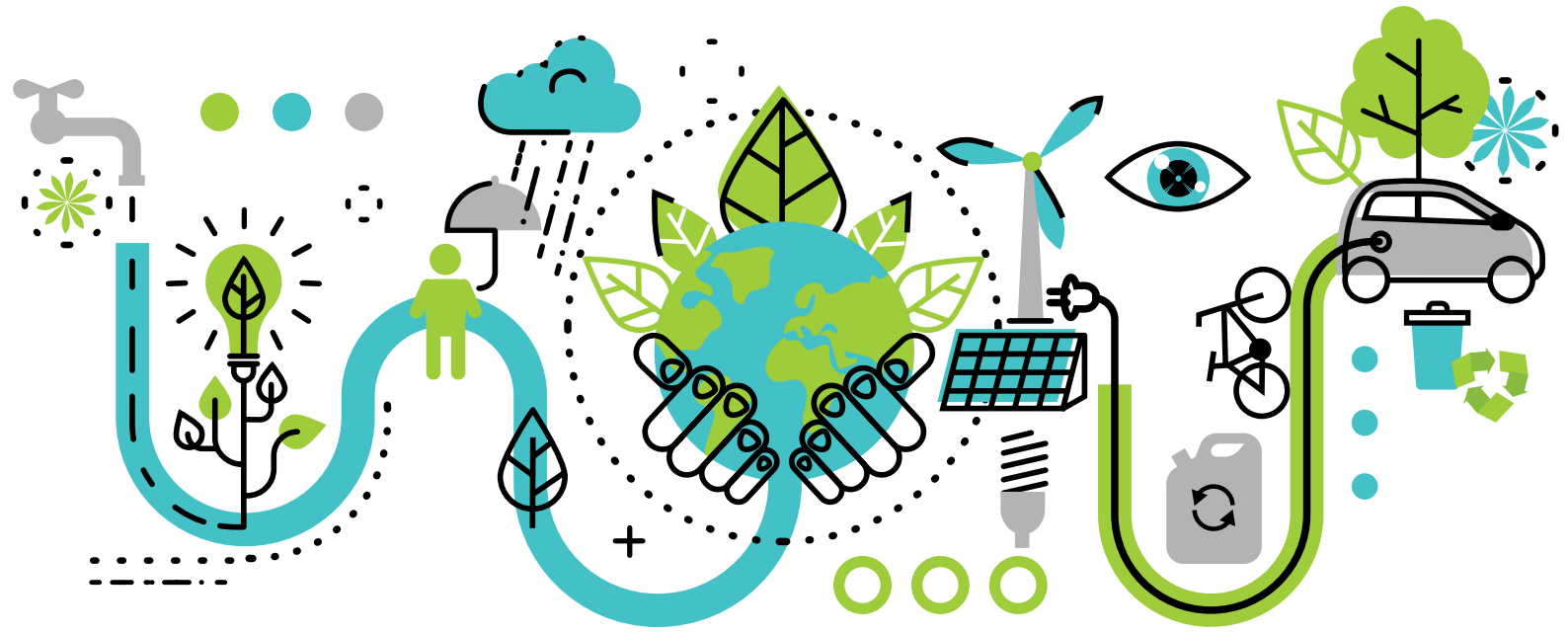
If the world is to achieve the SDG of sustainable cities and communities, one of the challenges it will have to address is the overburdened infrastructure, especially for waste collection, given the growth in urbanisation and consumerism.

Globally, 2 billion people were without waste collection services, and 3 billion people lacked access to controlled waste disposal facilities, according to data collected by the UN between 2010 and 2018. The problem will only worsen, going forward. The UN expects the total amount of waste generated globally to double from nearly 2 billion metric tonnes in 2016 to about 4 billion metric tonnes by 2050.

Even where it is collected, municipal solid waste (MSW) is not always disposed of correctly since many disposal facilities in countries like India are open dumpsites that contribute to air, water and soil pollution.

In fact, MSW management is a huge challenge in India since most urban local bodies face capacity and financial constraints to manage waste effectively. Random disposal of waste on low-lying lands has resulted in the accumulation of large piles of waste, especially in metro cities, across the country. The resulting emission of methane gas from landfill sites and percolation of leachate leading to groundwater pollution is also posing health hazards for those living in the vicinity of these landfills.

TCE's consultancy services for building waste-to-energy plants using incineration technology has an important role to play here especially since, as per the Swachh Bharat Mission, 100% of MSW generated in urban areas must



BAPL — A 'sustainable' success story

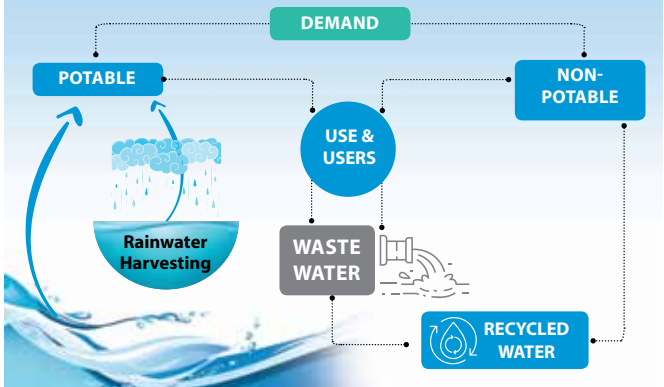
Indian cities are sorely lacking when it comes to water and wastewater management. While demand is rising, potable water sources are finite and located far away from the cities, necessitating large capital investment. On the other hand, unplanned disposal of wastewater has led to severe contamination of groundwater and surface water bodies.

Sustainable development is thus the need of the hour. TCE has shown the way here with its integrated water supply, sewerage and stormwater management plan for a 1,700-acre township set up by Bengal Aerotropolis Pvt Ltd (BAPL) near Durgapur in West Bengal. This has not only made the township's water resources sustainable but also resulted in Rs 17.6 crore of savings in capital costs that would have been otherwise required for creating new water assets.

The project is at various stages of construction but has already delivered huge benefits. Since the existing water sources were insufficient to meet the BAPL township's demand and huge investments would have been needed for a new water system from the river source, TCE proposed the use of fresh water for potable use and treated sewage for non-potable use. This has brought down the township's overall water demand by 57% and reduced the water requirement from fresh water sources. What's more, the complete reuse of treated sewage water also means there's zero discharge today.

That's not all. The township will also harvest 800 million litres of rainwater with TCE's storm water management plan, which includes the preservation of 22 existing lakes, digging of new wells and de-bottlenecking the Tamla Nallah. This will, in turn, recharge ground water resources. Thus, with TCE's expertise, sustainable development is no longer a pipedream for the BAPL township today.

Concept for Water Management



be disposed in a scientific way. Solid Waste Management (SWM) Rules 2016 promote the use of incineration technology to dispose of municipal solid waste.

TCE has designed the first waste-to-energy (WtE) project in Mumbai, which will come up at the Deonar landfill run by the Municipal Corporation of Greater Mumbai (MCGM). The WtE plant, which will process 600 TPD of MSW, is unique given that the Deonar site is located close to high-density human habitation and hence requires high environmental and social sensitivities, apart from meeting regulatory requirements for waste disposal. Thus, TCE's design entails very high levels of emission controls and monitoring.

The plant is based on incineration technology, which reduces solid waste volume by about 90%, thus reducing the land required for disposing of MSW. Besides, harmful greenhouse gases generated from unscientific dumping are eliminated and the leachate is also treated and reused in the plant.

TCE has also used its engineering expertise to overcome other challenges at Deonar. For instance, it has carved out the WtE plant's site outside the Coastal Regulation Zone area on which a large part of the landfill site falls, to overcome developmental restrictions. It has also mastered the technological constraints posed by the existing dumpsite in laying the foundation and constructing the plant.

TCE has completed a detailed project report and tender documents for the Deonar WtE plant and expects MCGM to award the work to the successful bidder soon.

Meanwhile, the company is on track to complete a Rs 280-crore WtE plant with a capacity to process 1200 TPD waste and generate 15 MW power in Vishakhapatnam for the Swachh Andhra Corporation. TCE is the independent engineer for the plant, which will cater to the requirements of 110 urban local bodies, including 13 municipal corporations and 17 municipal councils, in Andhra Pradesh. Around 80% of the project is already complete, and the plant is scheduled for commercial operation by June 2020.

Every drop counts

The recent water crisis faced by cities like Johannesburg and Chennai is only a harbinger of the water woes that human habitations across the globe are expected to face, going forward. Hence, the UN's SDG of clean water and sanitation assumes critical importance.

This is especially true for India as the country is among the top 10 water-poor nations in the world with per-person water availability being one-fourth of the world average. Most Indian cities have intermittent water supply given the widening demand-supply gap. Worse still, they experience high water loss, which could be as much as 50% in some cities. Hence, leakage control programmes are critical for reducing water loss and bridging the gap between rising demand and sustainability of water resources.

However, while most developed countries use the minimum night flow (MNF) method to detect leakages, this has limitations in India because of intermittent water supply. Hence, TCE has devised a mobile tanker methodology to assess water loss arising from leakages to improve supply. With this, the area under consideration is isolated and water is supplied to it from a mobile tanker unit. The water loss is then assessed by installing flow measurement units and leakage detection equipment.

TCE's mobile tanker methodology has been successfully used in several cities such as Ahmedabad, Chennai and Hyderabad, achieving a reduction of up to 50% of the baseline leakage rate. Its success in Kathmandu, in neighbouring Nepal, has helped make the city's water supply more sustainable.

That's not all. The company is also promoting sustainable development by designing integrated water supply, sewerage and storm-water management project for the 1,700-acre Bengal Aerotropolis township near Durgapur in West Bengal (see box, BAPL - A 'sustainable' success story)

Cleaning up the air

TCE's sustainability efforts aren't limited to improving

water supply and treating waste but also include reducing emissions to enhance the quality of air and enhance environmental sustainability, given that India has seven of the ten most polluted cities in the world.

After setting up a high-tech continuous emission monitoring system at Tata Steel's Jamshedpur plant in 2011, TCE has now undertaken a massive exercise to retrofit multi-pollutant control systems in over 32 coal-based thermal plants with a cumulative capacity of over 41 GW, across India. Coal-based energy is one of the biggest sources of greenhouse gas emissions in India. This is the first exercise of its kind in the country and will enable the plants to reduce their sulphur dioxide, nitrogen dioxide and suspended particulate matter (SPM) emissions in line with the new environmental norms of the Ministry of Environment & Forests (MOEF).

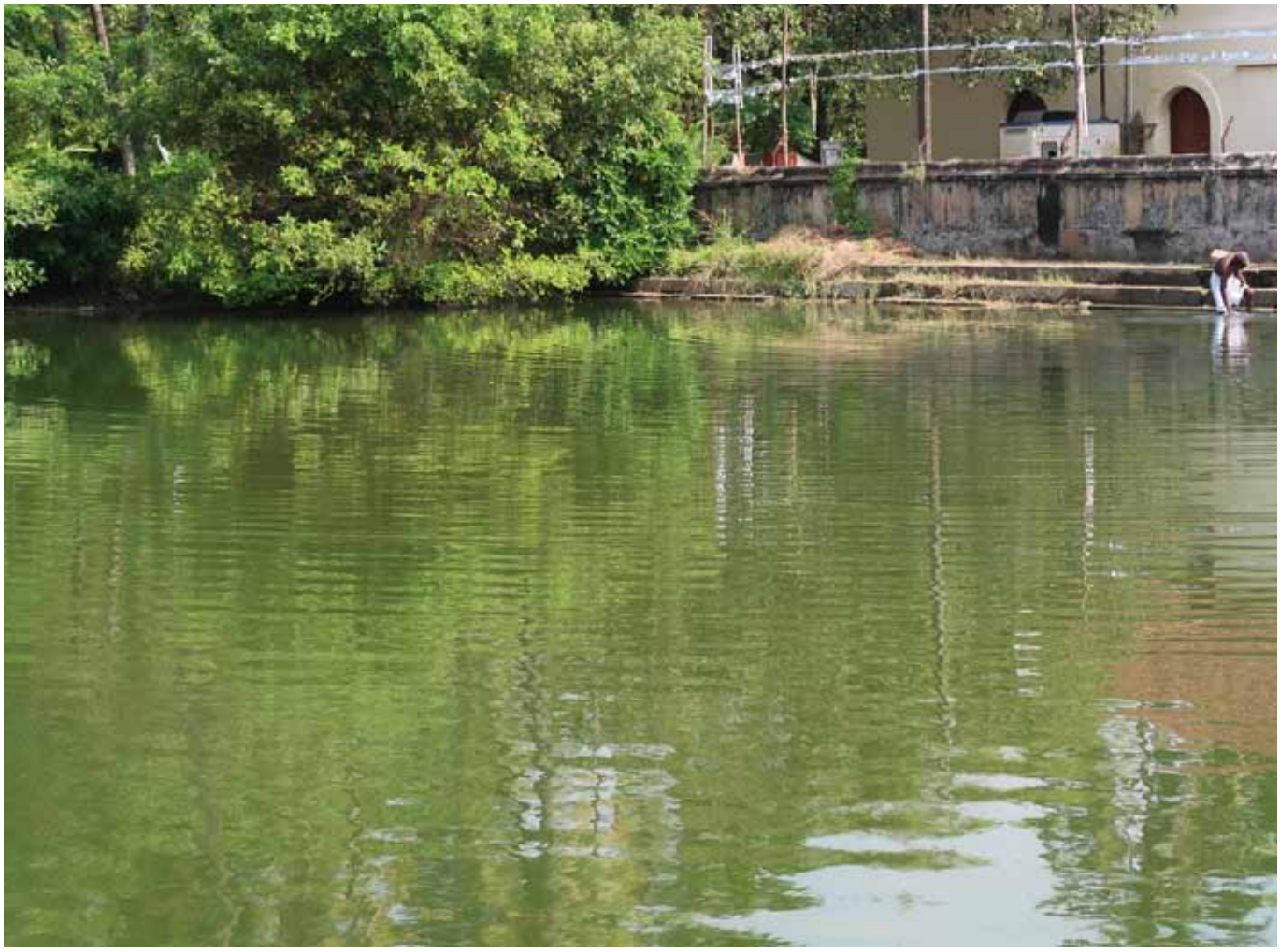
TCE has helped the ministry draft new environmental norms for thermal power plants and also sensitised the generators on the need to implement the retrofit systems, besides innovating on new methodologies for estimating flue gas emissions and recommending appropriate flue gas desulphurisation (FGD) technologies.

All these private-sector thermal power plants are now on their way to retrofitting air pollution control technologies in their existing units, which will help India move closer to achieving its ratified international commitments on harmful greenhouse gases under the Paris Agreement on Climate Change. TCE's new FGD technology implementation in the power plants will also promote sustainable development since the plants can convert their emissions into by-products such as gypsum and ammonium sulphate.

Renewing urban infrastructure

According to the UN, some 5 billion people will reside in cities by 2030. This calls for efficient urban planning and management to tackle the challenges brought by urbanisation. It also entails providing adequate urban infrastructure to promote sustainable development. Yet, India's urban infrastructure is woefully stretched in every aspect.

TCE has, over the years, taken up numerous urban infrastructure projects to promote sustainable development. For instance, the Sursagar lake in the heart of Bikaner was highly polluted because of an unplanned



Sustainable construction: Leading the way

The United Nations expects the world's population to increase by 2 billion to touch 9.7 billion by 2050. Imagine the cities, homes, offices, factories, markets, health facilities and transportation networks that will have to be built to sustain this growth. Naturally, this will entail enormous amounts of construction. But construction is one of the most resource-intensive industries globally as it consumes fast-depleting natural resources and causes pollution and global warming, leading to irreversible climate change.

According to the World Green Building Council, the built environment is responsible for almost 40% of global carbon emissions. Of this, 30% is embodied carbon emissions released during the manufacturing, transportation and construction phases of a building while the rest is due to the building's operations. It is estimated that buildings account for 40% of the global energy demand, over 10% of the world's freshwater withdrawals and 25% of the wood harvest.

TCE believes that the need of the hour is sustainable construction. The United Nation World Commission of Environment and Development (WCED-1987) has defined this as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" in its Brundtland Report.

Crucially, the Conseil International du Bâtiment (CIB) identified seven principles of sustainable construction in 1994. These include reducing resource consumption, reusing resources, using recyclable resources, protecting nature, eliminating toxins, applying life-cycle costing and focusing on quality.

TCE believes that structural engineers must adopt these principles from the design stage itself to promote sustainable construction. The first step is the choice of construction materials, chiefly concrete and steel. While both have good strength and durability, global cement production accounts for 8% of annual carbon dioxide (CO2) emissions, and steel production is energy-intensive.

Hence, construction companies are looking at re-using concrete as crushed sub-base today. TCE believes it can also reduce cement use – and therefore emissions -- by mixing fly ash with it. Besides, bolted steel construction can reduce welding and hence, the energy consumed during construction. Bolted steel also requires less energy while demolishing existing structures.

TCE's focus is thus on designing adaptable structures that are long-lasting to reduce the need for new construction. Importantly, it is taking the lead in spreading awareness of the sustainable principles of construction by demonstrating their implementation in its practice across the country.

sewerage system that saw most of the city's waste flow into the lake. TCE accordingly designed and executed the master plan for a sewerage system for Bikaner under the Rajasthan Urban Infrastructure Development Project, funded by the Asian Development Bank. This won it an Excellence in Infrastructure award in the Best Design Project category in 2011. The once degraded lake has been restored and beautified today.

Similarly, TCE has now completed the purification and bioremediation of Telibandha Talab and other lakes in Raipur under the Smart City Mission. Telibandha Talab had turned into a dumpsite for MSW. The company partnered with the National Environmental Engineering Research Institute to deploy the latter's patented phytoremediation technology using floating rafters and bio dosing to treat the wastewater and to reduce sludge in the lake.

TCE commissioned the project in less than eight months, and its wastewater treatment plant treats 1.5 million litres per day today. Subsequently, it has designed three other lake rejuvenation projects, which are under tender, besides preparing the project reports for several other such lakes under the Raipur Smart City Project.

This is only the beginning. Given its commitment to achieving sustainability and its numerous projects in areas from emission controls to sustainable urban development, TCE's efforts will go a long way in helping India achieve its SDG goals. ■

Electric Vehicles – Charging up for the future

EVs do not require direct fuel combustion, thereby contributing to transport policy goals such as increased energy security, better environmental compliance leading to reduced greenhouse gas emissions

Conventional automotive technologies (and the vehicles they power) have been under fire for some time now for their role in hastening climate change. That's hardly surprising – the transportation sector is known to be the largest consumer of oil and the second-highest contributor to CO2 emissions, worldwide. Now, it is also ripe for disruption by advancements in electric mobility.

Growing and valid concerns regarding the environment and the emergence of rideshare options have been driving a fundamental rethink of vehicular transportation and mobility as we know it. Electric Vehicles (EVs) are leading this change, riding on the promise of green technologies and sustainability. They also align with globally accepted sustainability goals such as increased energy security and better environmental compliance through reduced greenhouse gas emissions.

The global stock of electric passenger cars worldwide exceeded five million units in 2018. According to the International Energy Agency (IEA), China topped the list of countries with the highest number of electric cars sold – accounting for over half of the global sales of electric cars –

followed by Europe and the US. Norway is the world leader in the market share of electric cars.

A collective effort

EVs have seen an increased uptake in recent years thanks to growing policy support from governments, and commitments from the automobile industry. This trend is expected to continue as stricter emission regulations, rapid developments in fast charging and hydrogen supply infrastructure, better total cost of ownership (TCO) and higher consumer acceptance further help accelerate EV adoption.

Many governments have framed a future policy framework to encourage manufacturers to invest in EV development. As sales of EVs grow, and as new technologies evolve, we can expect economies of scale to drive down manufacturing costs. This will enable EV manufacturers to compete with traditional automotive technology companies on pricing, and grow their share in future vehicle sales.

A significant development on this front has been the Electric Vehicles Initiative (EVI), a multi-government policy forum established to accelerate the deployment of electric vehicles worldwide. India is among the 13 countries currently participating in this initiative. The EV30@30 campaign launched by EVI in 2017 sets a collective aspirational goal for all its member countries to achieve a 30% market share for electric vehicles (except two and three-wheelers) by 2030.

Ground realities

Stringent government regulations on emissions are already playing a significant role in driving EV adoption. Worldwide, many countries have been striving to meet lower CO2 emission targets. India, too, has the added incentive of reducing crude oil imports that contribute to its current account deficit. But while EVs have benefited from a combination of stringent rules and generous tax incentives so far, there are other factors at play.

New technology enhancements that help lower battery costs in Battery Vehicles (BVs), reduce charging time and improve driving range, will be vital to the growth in BV sales. Battery prices have dropped substantially over the past decade, leading to higher penetration of electric vehicles, especially in Europe and China. However, unless these drop to less than half of their current levels, BVs may find it tough to compete with internal combustion engine (ICE) vehicles on upfront acquisition costs.

Faster charging of batteries is another area BVs will need to work upon. Technology has matured from slow chargers to fast and ultra-fast chargers, effectively reducing the charging time of BVs considerably, and is continuing to evolve to improve charging time further.

Growth in charging infrastructure too has not kept pace with the BV aspirations of many countries. Recognising the importance of ready access to charging facilities in reducing downtime for BV customers, a variety of business models are emerging to fill this gap.

As an alternative to BVs, Hydrogen-based Fuel Cell Vehicles (FCVs) have been gaining momentum due to their fast-refuelling times and more extended driving range. They have an advantage over BVs in terms of weight, range as well as being environment-friendly. Lack of commercialisation and technology maturity have however hindered their large-scale growth, so far.

Production, storage and transportation of Hydrogen pose critical challenges because of its low volumetric density. Hydrogen storage as pressurised gas is widely employed, considering its reliability, acceptable efficiency and affordability for on-board vehicle. Transportation and distribution costs are essential factors that affect Hydrogen infrastructure. Producing Hydrogen on-site can further reduce costs.

Miles to go

Even as India started relatively late on the EV journey, the government's FAME (Faster Adoption and Manufacturing of Hybrid and Electric Vehicles) subsidy scheme for early adopters has entered its second phase.

The primary challenge for current and prospective Indian EV manufacturers will be around affordability in pricing and upfront acquisition cost for end consumers. The TCO of EVs including their resale value plays an equally important role in the Indian context. For BVs the replacement cost of the batteries will also have a bearing on the vehicle's TCO.

Setting up of an adequate number of fast-charging stations across the country's roads and highways is another operational challenge that will need to be addressed sooner. This aspect is especially important for commercial vehicles that often travel long distances and can afford minimal downtime.

Addressing these initial roadblocks will be the first step towards achieving cleaner and greener mobility solutions through EVs. But this journey – of reimagining transportation systems in line with future needs – will be worth the effort. ■

TCE Buzz

TCE's four articles published in the View Point, March 2019 edition

The March 2019 issue of Viewpoint magazine carried four essays written by TCE executives. Mr Dilip Sonwane (Infrastructure), Mr Ramesh Dahapute (Infrastructure), Mr Manos De (Technology), Mr Vicky Vivek (Mining & Metals), Mr K Jayaprakash (Technology), Mr M Sathish Rao (Program Management) and Mr Abhishek Gaurav (Program Management) authored the four articles.

51st Indian Water Works Association Annual Convention 2019, Indore

Indian Water Works Association (IWWA) organised 51st Annual Conference titled "Water Sector Infrastructure: Evaluation and Development" at Indore in January 2019. The convention had several activities around the theme with participation by members of IWWA and professionals from Central, State Government Departments, Water Utilities, Teaching, Training, Research institutions and International (AWWA, JICA) delegates.

Mr Dilip Sonwane delivered a lecture on "Optimization of Trunk Water Network using Colebrook White Equation". A water supply system involves a large initial capital outlay with maximum cost towards pipeline works. Hence, optimising the pipeline diameter is critical during the planning & design stage. He discussed the various hydraulic equations like Hazen-Williams, Darcy-Weisbach, Colebrook-White Equation, Modified Hazen-Williams (MHW) Equation and their merits and demerits and their applications. The Darcy's equation, in conjunction with Colebrook White, gives the most accurate results. He emphasised the use of Darcy's equation and appealed to Water Industry Experts and Suppliers to use Darcy's equation instead of Hazen William's.

2nd Annual Conference of Water Network Management, Delhi

Indian Infrastructure and Smart Utilities magazine organised their second annual conference on "Water Network Management: Minimising Non-Revenue Water (NRW); Improving Service Delivery" at The Lalit, New Delhi.

The theme of this conference was to examine the state of water network management in Indian cities with a focus on strategies and solutions for minimising NRW and improving service delivery. The conference mainly focused on noteworthy initiatives / best practices, upcoming opportunities, key challenges and the latest technologies and equipment.

Mr Bipin Bihari Singh and Mr Suvash Deo Bhatt both from TCE, Infrastructure attended the conference.

TCE at the 9th edition of Vibrant Gujarat Exhibition, Gandhinagar

TCE participated at the 9th edition of Vibrant Gujarat exhibition held at Gandhinagar showcasing some of its key projects running in Gujarat. The show saw many Tata brands coming together under the 'One Tata' concept. Vibrant Gujarat is a biennial investors' summit held by the Government of Gujarat. The event aims to bring together business leaders, investors, corporations, thought leaders, policy and opinion-makers. The summit as a platform to understand and explore business opportunities in Gujarat. Held from 18th to 20th January 2019, the theme for the summit was 'Shaping of a New India'.

Key persons who visited our pavilion included Tata Sons Chairman Mr N Chandrasekaran; Reliance Industries Chairman & Managing Director Mr Mukesh Ambani; Mr Ishwarbhai M. Bhavsar, Chairman, GEDA; Mr R. Mukundan, MD and CEO, Tata Chemicals; and Mr Raj Gopal who is additional chief secretary of Energy & Petrochemicals, Gujarat.

Inauguration of New 425-Seater Delivery Centre, Navi Mumbai

TCE is expanding its wings. On 12th July, Mr Ashok Sethi, Chairman TCE along with the MD, Mr Amit Sharma inaugurated its new state-of-the-art facility. This new wing will accommodate 425 more employees and is designed keeping an open structure, doing away with any hierarchy based system.

The event began with a formal ribbon-cutting ceremony followed by a facility tour, lamp lighting and keynote address.

3rd IoT & Embedded Tech India expo at Pragati Maidan, New Delhi

Dr Rajashekhar R Malur, Chief Technology Officer, TCE represented the company at the 3rd IoT & Embedded Tech India expo CXO forum held at Pragati Maidan in New Delhi.

The topic for the discussion was Industry 4.0: Innovation through digital collaboration. The key points discussed during the forum were: concept to the implementation phase, robotics & automation and impact of industry 4.0 on the economy and the manufacturing segments.

27th National Symposium on Cryogenics and Superconductivity at IIT-Bombay

The Indian Cryogenic Council jointly with IIT Bombay organised the 27th National Symposium on Cryogenics and Superconductivity (NSCS) at IIT Bombay campus in January 2019. TCE was one of the sponsors. This symposium provided an opportunity for professionals to discuss the latest trends and activities in the field of Cryogenics and Superconductivity. Participants from all over the country presented their most recent research work in the form of invited talks, contributed lectures and poster presentations.

The symposium provided a platform for young researchers, scientists and technologists to interact closely with the experts and practising engineers from a diverse background. TCE is currently involved in providing engineering services to ISRO on cryogenic engine test facility.

Conference on Water Supply

Mr Dilip Ganpatrao Sonwane, Group Sector Head – Built Environment, TCE, participated in a two days Conference on Improved Water supply organised by Indian Institute of Technology (IIT) Mumbai, National Environmental Engineering Research Institute (NEERI) Nagpur and Visvesvaraya National Institute of Technology (VNIT) Nagpur. Mr Sonwane spoke on Leakage Management for Intermittent Water Supplies. The outcomes of this workshop may feed into the revised CPHEEO Manual on Water Supply and Treatment. CPHEEO also recently released the Manual on Storm Water Management.

Round Table: Urban Mobility - Next Decade

Dr Rajashekhar R Malur, CTO participated in a round table discussion "Urban Mobility - The Next Decade" organised by the Institution of Engineering and Technology (IET). The discussion featured key players from the mobility ecosystem led by Mr Shashi Verma, CTO & Director of Strategy - Transport for London.

Delhi Jal Board Conference

Dr N.S. Srinivasa Rao, General Manager, Tata Consulting Engineers Limited, and Deepak Srivastava, Executive Engineer, Delhi Jal Board (DJB) spoke about the current state of wastewater collection infrastructure in India and New Trends and advancements in this regard.

TCE Offsite

Detailed Presentations, Intense discussions, Networking, and Breakout sessions over two days at the TCE offsite, Igatpuri.

Mission Innovation Workshop

Dr Rajashekhar R Malur, CTO TCE participated in the Mission Innovation IC7 deep-dive workshop on Low Carbon, Affordable Heating and Cooling of Buildings organised by Department of Science & Technology, Government of India

National convention of electrical engineers

Ms D Geethalakshmi, Discipline Head TCE made a presentation at the 35th National Convention of Electrical Engineers & National Conference on "Storing Energy for a Sustainable Future - Future Energy in any isolated World." The presentation focused on Battery Electric Vehicles challenges to reach the objective of EV30/30 in India. As part of challenges, various charging standards, environmental impacts, battery raw material, impact due to grid interface and policy consideration were deliberated. Fuel Cell Electric Vehicle, it's future and challenges was also addressed.

Conference by Federation of Integrated Conflict Management

The Board of Federation of Integrated Conflict Management, FICM invited Mr Sachin Mishra, Head Legal & Company Secretary, TCE as the Keynote Speaker and Guest of Honour at The India International Dispute Meet, TIIDM2019. The forum consisted of innovators in the field of domestic and international arbitration, mediation, dispute resolution, conflict management, corporate and organisational disputes resolution.

TCE participated in Global Exhibition of Services 2019

Chief Technology Officer, TCE Dr Rajashekhar Malur moderated Session 5: Engineering and Construction Services - Next Growth Engine for Indian Exports at the Global Exhibition on Services (GES) 2019. This session discussed: • The Niche areas of Engineering and construction services and their export potential • India's performance in Engineering/Construction consultancy and ER&D services • Digitalisation, Emerging Technologies, Innovation & India • Domain expertise, skillsets and training capabilities for engineering & construction professionals in India • Initiatives undertaken by the government to promote skilling and training of engineering & construction professionals. India has already demonstrated its potential in engineering goods to the world. Time has come to leverage its expertise in engineering services. According to the Ministry of Commerce and Industry, Government of India, construction services exports from India have gone up

from $1.004 billion in 2012 to $2.256 billion in 2018. NASSCOM says that the revenues of major Indian IT companies from Engineering Consultancy have grown much faster (more than double) as compared to a traditional software services business.

TCE Sponsored PLASMA 2019 Conference @ Chennai

TCE sponsored the 34th National Symposium on Plasma Science & Technology - PLASMA2019 in Chennai. Dr Bhadhuri - Director IGCAR spent some time to understand our Cryogenics Projects.

TCE participated in PowerGen 2019 @ Paris

Tata Consulting Engineers participated in the Power Gen Europe held during 12th - 14th Nov 2019.

TCE participated in 3rd Annual Conference on Flue Gas Desulphurisation

The India Infrastructure publishing (Powerline Magazine) invited Mr Anmoy Kumar, Project Manager & Team Lead (Environmental Sustainability Solution) and Mr Nilesh Mohite, Manager Business Development, as keynote speakers at the third annual conference 2019 on "Flue Gas Desulphurisation (FGD) Systems" held at New Delhi on 20th November 2019. The keynote address focused on the consultant's outlook on the Implementation of FGD based on revised Emission norms of MOEF & CC applicable for Coal-Fired Thermal power plants in India. The conference saw participation from CEA, MOEF, Major Power plant owners like NTPC & Tata Power, International OEMs/suppliers for FGD and Consultants.

PROJECT Highlights

Engineering Consultancy Services for power plant, Bhatinda

TCE recently signed up for providing Engineering Consultancy Services and feasibility study report to meet the new environmental norms of Ministry of Environment, Forest and Climate Change. The TCE report got the first technology approval from Central Electricity Authority (CEA), the first to get this approval among all the private sector Independent Power Producers for FGD and DeNOx system installation. In a first, TCE, which recommended wet stack with lower chimney height concept, was recognised and accepted by the industry. TCE provided unique solutions to minimise the plant/unit shutdown time required during the FGD & DeNOx system retrofit. TCE is pioneering similar challenging brown-field projects requiring retrofitting of Emission Abatement systems for various coal-based thermal power plants across the country.

Power System stability studies for SESA VAB complex, Panaji

Tata Consulting Engineers Limited carried out a comprehensive electrical system study for one of its clients SESA VAB complex located in Panaji. The captive power plant comprises two 30 MW steam turbine generators using waste heat from recovered coke oven process, and blast furnace processes. The captive power plant operates in synchronism with the state grid. The plant suffered frequent forced outages and blackouts, which were due to short circuit faults in the external grid that led to substantial financial losses. TCE recommended elimination of interruptions through the implementation of recommended islanding scheme and protection schemes, which resulted in enhancing productivity by averting 20 blackouts in two years.

2X100TPH CDQ for Coke Oven Battery#10 &11 and 40MW Captive Power Plant, Jamshedpur

TCE is involved in the conceptualisation and finalisation of a scheme including the feasibility of location for all units of CDQ facilities and Power Plant. TCE is also responsible for preparation of detail design and drawings based on assignment drawings and load data received from package vendors for balance plant areas. TCE is also providing Engineering services for Interfacing between coke oven battery 10 & 11, DM Water Plant, TG Unit, MRSS, LDC, EMC, utilities (clarified & cooling water, compressor air, instrument air etc.) and the proposed CDQ units and the Power Plant. The scope of the project includes the selection of technology supplier, package vendors, review of various drawings in respect to safety aspects related to PSRM & PSSR and project management consultancy services from inspection, project & cost management and supervision of site activities leading to contract closure.

Third MTPA Copper Concentrator Plant, Malanjkhand

Presently, 2 MTPA Copper Concentrator Plants are in Malanjkhand, Balaghat district of Madhya Pradesh. The company is planning to set up a 3rd new MTPA Copper Concentrator plant at the same location.

TCE has been appointed as a consultant for procurement support starting from the initial study, system design and engaging contractor for setting up this stand-alone 3rd MTPA copper concentrator plant.

Global Skill Park, Bhopal

The Government of Madhya Pradesh has proposed an ambitious project of improving the skill sets of its burgeoning youth population, by taking up of modernising its technical and vocational education and training (TVET) system. This project is for setting up a Global Skills Park (GSP) at Bhopal, to educate and impart knowledge of international standards to the promising young workforce in Madhya Pradesh.

Tata Consulting Engineers is the appointed Design and supervision consultant (DSC) to carry out detailed design engineering services involving campus master planning, obtaining statutory clearances, vetting of designs & drawings, preparation of bid documents, selection of contractors and construction supervision of the Global Skills Park.

The project site is surrounded by high-density housing, which may pose a challenging opportunity for TCE in the execution of this project.

Project Management Consultant for the implementation of smart city, Hubballi

Hubballi - Dharwad was one of the 27 winners of the "2nd Round Competition of SCM" based on the Smart City Plan launched by the Government of India to transform 100 Indian Cities into Smart Cities. Tata Consulting Engineers is the Project Management Consultant (PMC) for preparation of retrofitting plan for Hubballi-Dharwad's Area Based Development (ABD) including pan-city components and preparation of detailed project reports for various projects identified in the SCP.

The ABD proposal includes Redevelopment of 992 acres within the city, which impacts a population of about 1.1 lakh in the city. This pan-city project covers the entire area of 202 sq km Commercial and Administrative operations form the primary land use of the ABD area.

Indian Institute of Management, Raipur

TCE is associated with an educational project at IIM, Raipur with the responsibility of design engineering, project management and construction supervision. It covers development of Phase-I campus including buildings and an auditorium.

Deepening and Widening of Mumbai Harbour Channel & JN Port Channel

Commissioned in 1989, Jawaharlal Nehru Port Trust is one of the 12 major ports in India. JNPT has two channels; one for handling containers and the other for dry bulk cargo. BPCL / IOC developed a 3rd liquid cargo berth operational from 2002.

TCE bagged the contract for developing the 4th container terminal and development of a stand-alone container handling facility. This contract forms a part of the "Sagarmala" programme of the Ministry of Shipping to promote port-led development in the country, of which ₹2000 crore (approx) is for 'Deepening and Widening of Mumbai Harbour Channel & JN Port Channel (Phase-II)

The Scope of the TCE contract includes detailed design engineering, Procurement activities, traffic projection along with financial and economic viability, obtaining statutory clearances and structural analysis of the existing berths. TCE is also involved in providing project management and consulting services for augmentation of 220/33KV master unit substation for delivering electrical power to the fourth terminal of JNPT, along with Project management and contract administration services. TCE shall also be involved in assisting JNPT with audit queries and arbitration proceedings if any, post-project completion.

The project team recovered a total of 83 bombshells and 57 UXOs (Projectiles and Hand Grenades) during dredging activities. The project team also monitored storage and handing over of these UXOs to the Indian Navy with utmost care.

150 MLD STP at K&C Valley, Bangalore

Former Dy Chief Minister of Karnataka, Dr G Parmeshwar visited the project site of 150 MLD STP at K&C Valley in Bangalore, wherein engineers from TCE explained about the details and benefits of the project. The objective of this project is to:

1. Protect and improve the natural environmental resources in the vicinity of Bellandur Lake
2. Meet the statutory mandates
3. Improve water quality in streams, tube wells and surface water bodies
4. Maintain water balance in the downstream lake series
5. Reduce health risks and
6. Maintain microclimatic conditions suitable for the survival of aquatic life, environs etc.

To achieve these objectives a wastewater treatment facility of 150 MLD capacity with ASP process technology, including Biological Nutrient Removal (BNR) system and power generation facility is under construction by TCE adjacent to the existing facilities at K&C Valley. TCE will also be responsible for the operation & maintenance of the constructed facilities for the next ten years.

TCE signs an agreement with Bangalore Water Supply and Sewerage Board (BWSSB)

Tata Consulting Engineers Limited (TCE) has signed a contract with Bangalore Water supply, & Sewerage Board (BWSSB), Bangalore for JICA assisted consultancy services. Mr Vikram S Bapat, Head - Infrastructure Business Unit (IBU), Mr Satish V Deshpande, Head of Sales - IBU, Mr G N Virupaksha, Group Sector Head - Water and Mr Sudil Mani, Assistant General Manager – Business Development were present during the signing of the agreement.

This project aims to provide safe and stable water supply and sewerage services to the residents of Bruhat Bengaluru Mahanagara Palike (BBMP), especially 110 villages. TCE will be responsible for the construction and maintenance of a water treatment plant (775 MLD capacity), transmission mains, pumping stations and storage reservoirs) and sewage treatment plants of a total capacity of about 200 Mld around the periphery of BBMP. This project will improve living conditions of the present population of 16 lakh and an estimated population of 43 lakh by the year 2049 by augmenting water supply to Bangalore City from 1,460 Mld to 2,235 Mld.

Tata Consulting Engineers Ltd (TCE) signed an agreement with Offshore Wind Consultants Ltd

Tata Consulting Engineers Ltd (TCE) signed a deal with Offshore Wind Consultants Ltd (OWC) to synergise their collective expertise for providing engineering and project management services to India's growing offshore wind energy generation needs. The agreement between TCE and OWC is a giant step towards realising India's goal of 5 GW of offshore wind capacity by 2022 and 30 GW by 2030.

OWC is a part of Oslo-listed energy consultancy group Aqualis ASA, which is an independent engineering consultancy focused on the development and realisation of offshore renewable technology and projects for various oil & gas as well as maritime and shipping industries globally. OWC is involved with offshore wind development all over the world.

TCE signs agreement with Indian Institute of Science

TCE signed an MoU with Indian Institute of Science earlier this year. Mr Amit Sharma, MD, TCE was present during the MoU signing event. The main objective of the project is the development of app-based smart instrumentation using artificial intelligence for S-CO2 power blocks. Indian Institute of Science will submit the quarterly project report to TCE.

World's largest zinc concentrator commissioned

The world's largest single stream zinc concentrator was inaugurated by the South African President Cyril Ramaphosa earlier this year. TCE reached yet another milestone in a complex project managing from concept to commissioning.

The zinc mine in Gamsberg was defunct for 30 years. TCE's initial DPR study provided solutions to make this mine profitable. Gamsberg was not considered a viable deposit due to high manganese content and associated complications for zinc beneficiation. TCE's involvement in carrying out numerous investigations of the various possible beneficiation techniques have made the project viable by adopting Campaign Processing philosophy, including modification in Concentrator and state of the art floatation cells.

Inauguration of Gandhi Museum - Guwahati

On the occasion of Gandhi Jayanti, honourable Chief Minister of Assam Mr Sarbananda Sonowal inaugurated Gandhi Mandap, a Museum constructed in the memory of "The Father of the Nation" Mohandas Karamchand Gandhi, on the hilltop of Sarania Hill, Guwahati. TCE is the Project Management Consultant for Guwahati Smart City and for refurbishing the park as one of the milestones in the project.

Mumbai Sewage water Treatment Plants

In an attempt to recycle and re-use the sewage water, the Brihanmumbai Municipal Corporation (BMC) has been putting efforts since the last few years. However, in order to quicken the process, the civic body has decided to build seven new sewage treatment plants. Out of the seven sewage treatment plants, the treatment facilities at Ghatkopar and Versova will be taken care of by TCE.

Anjali Crossroads - Ahmedabad

Longest Flyover of Ahmedabad constructed at a cost of Rs99 crore at Anjali Crossroads was inaugurated by Honourable Minister of Home Affairs Mr Amit Shah and Honourable Chief Minister of Gujarat Mr Vijay Rupani. TCE partnered the AMC as Project Management Consultant.

First Water ATM inauguration – Agartala Smart City

Agartala Smart City Limited inaugurated the first Water ATM to produce potable water available to all at low cost. Ms Pratima Bhowmik, Hon'ble MP Tripura was present and she addressed the gathering. TCE, the PMC for the Agartala Smart City Project conceptualised the project, prepared DPR, RFP and supervised the installation of 10 Water ATMs in various parts of the city.

Successful Concept to Commissioning of a Plant

TCE delivered yet another Concept to Commissioning project. TCE is the Design and Engineering and Project Management Consultant for this project

TCE bags Agra Metro Rail Project

The Uttar Pradesh Metro Rail Corporation Limited (formerly known as Lucknow Metro Rail Corporation) has issued letter of acceptance (LoA) to the consortium of TCE, 3TI Progetti Italia-Ingegneria Integrata S.P.A. and Leap Infrasys Private Limited for a contract for Detailed Design Consultancy work for corridor-I of Agra Metro Rail project on November 13, 2019.

TCE Triumphs

TCE Awarded Patent on **"Process Treatment for Flue Gas"**

Process Treatment for Flue Gas is an innovative approach integrating condenser cooling with sea water-based FGC system – devised to implement FGD as a retrofit to a running power plant without additional water requirement.

Successful completion of PMC

Indian Concrete Institute, Bengaluru awarded a Certificate of Commendation to TCE for being the Project Management Consultants for Wipro IT SEZ Project, Bengaluru


Indian Concrete Institute
Bangalore Centre
CERTIFICATE OF COMMENDATION
Awarded to
M/s. Tata Consulting Engineers Limited
being the Project Management Consultants for
WIPRO IT SEZ PROJECT
Bengaluru, Karnataka
Which has been conferred the ICI (BC) - Birla Super Award for Outstanding Concrete Structure of Karnataka -Building Category- 2015
During Concrete Day Celebrations on Thursday, 26 September 2015
Dr. L. R. Manjunatha
Chairman
Indian Concrete Institute
Bangalore Centre
Er. Keshav Hegde
Joint President
UltraTech Cement Limited
Bangalore

1 million safe person hours

TCE celebrating achieving one million safe person-hours at MSME Bhopal.

Awarded Leadership in Rejuvenation and Protection of Fresh Water Systems in India

National Mission for Clean Ganga (NMCG) along with TCE was honoured with the award of "Leadership in Rejuvenation and Protection of Fresh Water Systems in India" in the 20th edition of Geo Smart India Conference. NMCG has been recognised as India's leading initiative in using geospatial technologies towards their river rejuvenation works. The organisation is also using cutting edge technologies like LiDAR to attain high-resolution maps and data for the entire Ganga river basin. TCE is the Project Management Consultant helping NMCG achieve mission objectives.

TCE Ranks 127 in ENR Top 225 International Design Firms

TCE ranks No. 127 in the widely watched annual ranking of ENR 2019 Top 225 International Design Firms. This ranking is based on revenues outside the home country in 2018. The special recognition was presented at the ENR-Construction World Global Awards 2019, New Delhi.

2 million safe man hours recognised

Indian Institute of Technology, Hyderabad recognised TCE for achieving Two Million Safe Manhours without lost-time injury during the period from March 2019 to October 2019

Chairman Mr Ashok Sethi honoured as Fellow Member of Institute of Directors

Mr Ashok Sethi, Chairman, Tata Consulting Engineers Ltd, was honoured by Mr Arun Arora, Board Member, Times Group, as Fellow Member of the Institute of Directors.

Mr Sethi has more than 44 years of experience in the power sector and held leadership positions in thermal / renewable generation, transmission, distribution & trading. The former COO and ED of Tata Power, he has vast experience as board member of key Tata Power subsidiaries and JVs including chairman of CGPL, MPL, IE , WREL (Renewable), TPTCL (Trading) & AGL. He is also Certified as an Independent Director by Institute of Directors (IOD).

He has contributed to sectoral reforms and provided insights into Regulations, Operations., Energy Efficiency and DSM. He has also authored papers in forums and media on tariff design, parallel license, embedded generation, grid integration with renewables, distribution technologies and customer service.

TCEndeavour

CARE | SHARE | RESTORE

Inauguration of Government Primary School in Saari, Rudraprayag, Uttarakhand

The Tata Uttarakhand Programme (TUP), post-2013 disaster rehabilitation in three districts of Uttarakhand, undertook a project to rebuild the dilapidated primary school in Saari with a total built-up area of 315sq m catering to 66 students from Grade 1 to 5. TCE was involved in the design, detailing, construction and supervision of the new school.

The new school consists of five multi-utility rooms, one office room and toilet facilities. The highlight of this construction project has been the community's participation in the safe demolition of the old building. Similar to its construction more than seven decades ago, one member from each family gave a day's 'shramdaan' which enabled demolition of the old building in three days. On May 2, 2019, in the presence of Ravi Kumar, block education officer; Sarita Negi, school principal; gram Pradhan Ghanshyam Lal; SMC president Laxmi Devi, school staff, students, parents and school management committee members, chief guest Mr K Ramesh, senior vice president, Tata Consulting Engineers (TCE), inaugurated the school.

In his address to the students and the community members, Mr Ramesh praised the community's voluntary efforts and conveyed his expectation that the new infrastructure will provide a better learning environment for their future generations and thereby strengthen the Tata group's legacy of working together for more significant social causes.

Sustainable livelihood initiative in the new clusters

After TCE's intervention, Khoripada turned out to be a model village. The sustainable livelihood programme in Khoripada in Maharashtra is successful in four focus areas: Sustainable Livelihood, Governance, Training and Awareness and Water Management.

Installation of two water filters in Khoripada helped enable safe drinking water and completion of well deepening and construction supported better availability of water. A training on sanitation helped provide an appreciation for better hygiene practices among the villagers, and a working capital provision helped SHG in chilly cultivation. After a successful model of Khoripada, the programme is now scaled up to include two new clusters — Hateri and Malghar — which consist of 8 small hamlets targeting 2000+ beneficiaries living in this area. The programme has completed construction of two farm ponds in Dapti and Navapada Villages. Technical survey for solar support concluded in Hateri village. Some families from Malghar Dapti and Navapada villages have been selected for vegetable and jasmine cultivation programmes.

School on Wheels Programme

TCE has provided a re-modelled bus to serve the purpose of education for the children of migratory workers who do not have any access to education. The bus visits four centres and one mobile library daily touching 75 students every day. In last FY 18-19, one fixed Education Activity Centre was established in one of the localities to get the maximum number of enrolments. The main objective of the program is enrolment of the students and providing bridge schooling for about 120 days, which will result in the admission of the eligible students in mainstream schools.

In the FY 18-19, a total of 391 students enrolled with a girls-boys gender ratio of 49:51. The dropout proportion of the students is high because of migration of their parents. Teachers have started with daily parent-teacher meetings to reduce the dropout rate and for sustenance of the programme. Children have started participating in various science exhibitions. TCE conducts various volunteering activities to engage employees in different events.

Skill Development for night school students

The company started the career awareness programme for 1,400 students going to 42 night schools. The programme is now more holistic by enrolling 61 students for job-oriented skilling programmes. The objective is to make at least 70% of students employable. All the students belong to the underprivileged section and counselling is provided to all. Out of total enrolment, the first batch of 25 students completed their courses and placed in various companies while the second batch (36 students) is pursuing their courses in different skilling centres.

13,154 man hours **1,009** volunteers **154** initiatives

INFRASTRUCTURE

Farm pond

Potable drinking water

Solar panel

Well construction at Khoripada

SUSTAINABLE LIVELIHOODS

Nursery development

Self-help group

Vegetable cultivation

Jasmine cultivation

HEALTH AND HYGIENE

Health camp

Health & hygiene awareness session for women

Training of health workers

Training of health workers

EDUCATION

Body shop and repairing

Graduation ceremony for the night school students

Fashion design course

Inside view of school on wheels bus

EMPLOYEE VOLUNTEERING

938 volunteers

4,050 volunteering hours

92 programmes

25,176 lives touched

Health and hygiene

6,832 beneficiaries

411 units of blood donated

1,158 trees planted

Education

14,767 students

Educational activities for **350** special kids

Other activities

2,008 beneficiaries

80 senior citizens visited

Climate change programme organised for **1,220** people

Sports day with underprivileged kids

Cleanliness drive

Visit to Asha School for differently-abled children

Awareness session on “No to single use plastic“

Awareness session on single use plastic, Kolkata

Visit to Premashraya, Kolkata

Visit to an old age home, Delhi

Road safety drive, Mumbai

Fitness session & sports day celebration, Delhi

Tree plantation, Jamshedpur

Health camp-Khoripada, Mumbai

Food supplies to students of Kenza International schoool, Kigali, Rwanda

Volunteers created a play room for the children of School of Hope, Jamshedpur

EVS session with kids, Mumbai

Teaching aids for kids, Pune

Employees made bags out of used newspapers, Bengaluru

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