Vol.No.02 Issue No.2 Kochi February 2021

CONSTRUCTION

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#### SPECIAL FOCUS

The infrastructure sector has become the biggest focus area for the Indian Government, which plans to spend US\$ 1.4 trillion on it to boost sustainable development. Subhankar Mitra, MD-Advisory Services (India), Colliers, and Siddhart Goel, Senior Director-Research (India), Colliers, analyses the infrastructure investment challenges before the country. With two ase studies: Singapore and UAE.



Infrastructure

Adani Enterprises and DP Jain & Co have scored big in National Highway Authority of India's auction of 5th bundle of highway projects proposed to be executed under the Toll-Operate-Transfer (TOT) model, beating competition from domestic and international players.

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# **Diploma in Geodesy**

Geodesy, which has applications in such diverse areas as monitoring of soil health, water resources, droughts, polar ice cover, oil spills, landslides, earthquakes, and in GPS timing and autonomous vehicle development, is the subject of a post graduate diploma programme launched by IIT Kanpur.

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CONSTRUCTION PHILOSOPHY

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# Vision is the thing

Nations progress when there is vision driving the actions of those who govern. Nations smaller than India have shown what vision can achieve with the right vision, right action and the right attitude. In the early days of freedom, India had set an example for the newly independent nations with monumental investments in infrastructure, education and culture. Though we lost our way later, the inheritance from the period are what India has been built upon.

But no nation can lean entirely on its inheritance for sustenance and progress. That is where the huge investment plans unveiled by Finance Minister Nirmala Sitharaman in her 2021-22 Budget assumes great significance. Her proposal to raise infrastructure investment over the coming year by a whopping 34.5%--from Rs. 4.39 lakh crore in 2020-21 to 5.45 lakh crore in the coming fiscal--should act as a much-needed trigger for growth and job generation. The National Infrastructure Pipeline (NIP) proposed as part of this Budget plan should also turn out to be a major milestone in the nation's march forward.

With the kind of human resource potential that India has, it is time we unleashed our creative energies to build a new India. The gargantuan infrastructure plans of the Narendra Modi Government should make that possible. But nothing good can come if we do not have doers with the right kind of skills, attitude and commitment. In this comeback issue of CP, we focus on the infrastructure challenge before India and, in an exclusive interview with 'Metroman' E. Sreedharan, we look at how the nation is so badly in need of a community of technocrats with integrity.

Together let us raise our voice for a quality future!



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# India needs technocrats with integrity: E. Sreedharan

The nation can build good infrastructure only with zero political interference and technocrats with integrity, says 'Metroman' **E. Sreedharan** in an exclusive interview given to CP Consultant Editor **C. Gouridasan Nair**.

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# 486 MoUs signed at 6th Maritime India Summit

As many as 486 Memorandums of Understanding (MoUs) envisaging a total outlay of \$47.01 billion (Rs. 3.39 lakh crore) were signed by 23 ports/ agencies/authorities during virtual Maritime India Summit (MIS) held from March 2 to 4.

The Summit also saw 400 investible projects with a total outlay of \$31.07 billion (Rs. 2.24 lakh crore) being showcased for follow-up action. The MoUs related to port modernisation and new port development, ship building, ship repair and ship recycling, inland waterways development, international shipping and bulk cargo transportation, port-led industrialisation, use of renewable energy in ports, maritime skill development and maritime financing and insurance. Inaugurating the summit, Prime Minister Narendra Modi said India's maritime sector offered huge opportunities for investors from across the globe. He also launched the 'Vision 2030' document aimed at developing Indian maritime industry at par with top global benchmark in the next 10 years.

In his opening remarks, Minister of



State for Ports, Shipping and Waterways Mansukh Mandaviya, said the summit was one of the biggest virtual summits in the world attended by 1.7 lakh participants from more than 100 nations.Addressing the conference, External Affairs Minister S. Jaishankar said India would commemorate March 4 as 'Chabahar Day'.

Transport Minister of Afghanistan Qudratullah Zaki, Armenia's Infrastructure Minister Suren Papikyan, Iran's Minister of Roads Mohammad Eslami, Russia's Deputy Minister of Industry Oleg N Ryazantsev, Uzbekistan's Deputy Minister of Transport Choriyev Jasurbek Ergashevich were among those who were present at the virtual meet, which had EY as the knowledge partner and FICCI as the industrial partner.

# MoRTH announces rating mechanism for National Highways

The Ministry of Road Transport and Highways (MoRTH) has announced a system of rating for 18,668 km of completed 4/6 lane NH stretches covering 343 toll plazas.

The rating mechanism has been created by the National Highway Authority of India (NHAI) to ensure greater accountability to road users who pay user fee for use of developed National Highways. Under the new rating system, each toll plaza of highway will be judged based on three major criteria viz. efficiency, safety and user services.

These criteria have been further divided into a total of 39 parameters which include average speed, road condition, facility for public like VUP/ PUP/FOB, service road, delay at toll plaza, accidents, incident response time, wayside amenities, general cleanliness, etc.

The Ministry has also begun real-time monitoring of toll plazas across the country using its central monitoring system along with bundle of analytics and quick decision-making inputs. The initiative is expected to facilitate savings in commute time, improve customer experience, save fuel and reduce carbon footprint.



# POWERGRID's 320 kV 2000 MW Pugalur-Thrissur HVDC project commissioned



Prime Minister Narendra Modi inaugurated POWERGRID's 320 kV 2000 MW Pugalur (Tamil Nadu)-Thrissur (Kerala) HVDC project on February 19 via video conference. The Prime Minister also dedicated a 50 MW Kasaragod Solar Power Project to the nation.

Speaking on the occasion, the Prime Minister pointed out that the 2000 MW state-of-the-art Pugalur-Thrissur High Voltage Direct Current system was the first HVDC interconnection of Kerala with National Grid and would facilitate transfer of huge quantum of power to meet the growing power demands of the State. This is also the first time the Voltage Source Convertor (VSC) technology has been introduced in the country for transmission, he noted. Speaking on the occasion, Power Minister R.K. Singh said that country's inter-regional transmission capacity has increased from 35,950 MW in 2014 to 103,550 MW now. The The VSC technology would enable safe and faster transmission with reduced losses with facility for transmission through cables.

The technology facilitates smart grid, provides greater flexibility in reactive power management and also enables integration of renewable energy resources. The project was executed at a cost of Rs. 5,070 crore, he said.

# Kerala's Uralungal labour cooperative bags NH contract

Uralungal Labour Contract Cooperative Society (ULCCC) has has beaten construction majors to bag the contract to develop the 39 km road from Thalappadi to Chengala on the NH-66 as a six-lane road stretch in North Kerala.

The project, which is part of the Bharatmala Pariyojana, is being built on hybrid annuity model with a 15year maintenance contract. This is the first time that the ULCCC has made a standalone bid and won the contract of the National Highways Authority of India (NHAI). The other bidders were the Adani Group, Megha and the KNR Group.

The Uralungal Society is the only contractor from Kerala eligible to participate alone in the tender for the National Highway Development Programme, which includes projects such as the Bharatmala and the Golden



Quadrilateral Super Highway.

The Society got the contract for the first stretch from the state border for 21704.125 crore. The construction period is two years and the estimated cost is 21,268.53 crore. Only 40 per cent of the contractual amount will be allotted during the construction phase. The rest of the amount will be given as 30 instalments during the remaining 15 years. The contractor would have to secure 60 per cent of the construction cost and also bear the interests on its own. The tender process for 11 stretches from Thalappadi to Kodungallur and three stretches from Paravur in Alappuzha district to Kadampattukonam for the six-laning project from Kasaragod to Thiruvananthapuram are currently on. Of these, the tender processes of stretches from North to Kapirikkadu have been completed and the remaining will be completed soon.



# TN sets apart Rs. 6,683 cr for metro projects

The Tamil Nadu Government has allocated ₹6,683 crore for various metro rail projects in Chennai. The detailed feasibility report for setting up the metro rail for about 44-km in the first phase has already been prepared.

The government has proposed five corridors, covering a total distance of 144-km. The first corridor would cover 26km between Ukkadam and Kaniyur, the second 24km between Ukkadam and Bilichi near Karamadai on the Mettupalayam Road, the third 42km between Thanneerpandal on Thadagam Road and Karanampettai on Trichy Road, the fourth 44km between Karunya Nagar and Ganeshapuram, and the fifth corridor would cover 8-km between Ukkadam and Vellalore, where the integrated bus terminus would come up.

Odisha to invest Rs. 2,296 cr for road infra

The Odisha Government has targeted construction 1,000 km of roads, 30 bridges and two railway over bridges at an estimated cost of Rs. 2,296 crore under the Road Development Programme. It has also plans to build 4,000 km of rural roads under PMGSY and Rs. 2,000 crore has already been set apart for it. The roads are being developed under the Biju Express Scheme which will act as an economic corridor for Western Odisha. An outlay of Rs. 912 crore is proposed under Biju Setu Yojana, Rs. 781 crore for improvement of RD roads and bridges and Rs. 300 crore for 416 ongoing and 142 new road projects under Mukhya Mantri Sadak Yojana.



Earlier, the Chennai Metro Rail Limited (CMRL) had selected Systra, the engineering and consulting firm to conduct a feasibility study for implementing the project in the city. It had in its report suggested four corridors but after that the CMRL had decided to create a fifth corridor, connecting Ukkadam and Vellalore.



# Deendayal Port crosses 100 MMT in cargo handling

Deendayal Port Trust, one of the 12 Major Ports of India, has crossed 100 MMT (Million Metric Tons) in cargo handling. Deendayal Port, known earlier as Kandla Port, is situated in Kutch, Gujarat.

Deendayal Port handled 13.25 MMT of liquid cargo and 43.76 MMT of dry cargo and containers at Kandla. It also handled 43.30 MMT at Vadinar (which includes transhipment). The containerized cargo crossed 4.50 lakh TEU during this period, grossing a total of 100 MMT overall. Major commodities handled by the Deendayal Port are crude oil, petroleum products, coal, salt, edible oil, fertilizer, sugar, timber, soya bean and wheat.

# Tax break likely for DFI proposed in Budget

The Development Financial Institution (DFI) proposed in the 2021-22 Budget by Finance Minister Nirmala Sitharaman is likely to get tax break during the initial years of its operation. The DFI is pro-

posed to be formed



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by subsuming the India Infrastructure Finance Company (IIFCL) into it. The DFI, which would be focused exclusively on infrastructure projects, would access low-cost fund having longer repayment periods using various instruments such as bonds.

The DFI would also focus on project appraisal and long term finance,

with the objective of making each project taken up by it viable in the long run.

# NHAI debars SNC Lavalin for two years



The National Highways Authority of India (NHAI) has debarred SNC Lavalin Infrastructure (formerly SPAN Consultants) from engagement in future NHAI projects for two years.

"The firm was engaged for consultancy services for four-laning of Parwanoo-Solan section in the state of Himachal Pradesh. However, it failed to deliver as per the contract provisions which led to loss of time and increased costs, besides litigation. A show-cause notice was served to the firm on account of deficient services in consultancy services for feasibility report for the project. However, the firm failed to respond to the same," NHAI said in a statement.

Some major discrepancies in the consultancy services of the project included faulty alignment and inadequate provisions for protection of slopes after hill cutting resulted in damage to nearby buildings and delay in completion of the project resulting in toll loss.

NHAI is in the process of finalising performance rating of consultants and contractors. Rating of developed highways has already been released by NHAI. These ratings will also be considered in future bidding of projects.

# NHAI told to restructure debt, raise funds

The National Highways Authority of India (NHAI), which has been getting weighed down by its accumulated debt of Rs. 97,115 crore, has been told by the Parliamentary Standing Committee on Transport, Tourism and Culture, to explore ways to restructure its existing debt and raise long-term funds.

In its report tabled in Parliament this week, the Standing Committee has also asked NHAI to prioritise schedule for completion of its delayed road projects. "The Committee is distressed to note the huge debt servicing liability of NHAI in the upcoming years," the panel said, pointing to the debt servicing liability of Rs 38,997 crore for 2021-22, Rs 28,800 crore for 2022-23 and Rs 29,318 crore for 2023-24.

The committee noted that the debt servicing liability of NHAI for the next three financial years is higher than the estimates that the Ministry had provided to the Committee during its examination of Demands for Grants (2020-21). The Committee asked the NHAI to prioritise the completion of its delayed road projects to prevent further cost escalation in such projects.

The Committee also told the NHAI to prepare proposals to raise longterm funds through the upcoming Development Financial Institution announced in the Budget. Finance Minister Nirmala Sitharaman had announced that a sum of Rs 20,000 crore was being provided in the Budget to capitalise a Development Financial Institution (DFI).

The government's objective is to create a lending portfolio of at least Rs. 5 lakh crore for this DFI in three years' time. She had said that a Bill would be introduced in Parliament to set up the DFI.



10.000

# E. Sreedharan Nation needs technocrats with integrity

E. Sreedharan is a living icon for all who believe in integrity and commitment in public service. The nation has honoured him with the Padma Bhushan for the engineering marvels he has executed with a needle sharp eye on costs, benefits and the greater common good. Guiding light of Construction Philosophy (CP), Sreedharan says public project costs would be 20-25% lesser if technocrats with integrity and proven capabilities are put in charge of projects and political interference is kept to the minimum. Excerpts from an exclusive interview given to CP Consultant Editor C. Gouridasan Nair. Economic meltdowns always trigger a flurry of public investment programmes, primarily to get economies moving and create jobs. Construction of the Interstate Highway System in the U.S. is perhaps a case in point. Do you see the same happening in India as indicated by the Rs. 5.54 lakh crore allocation in the 2021-22 Budget for infrastructure development?

**S** ee, in America, after World War II, there was a complete economic breakdown. President Eisenhower built the highways as he wanted to revive the economy and generate employment. That was intended to help the economy to grow. We are also faced with almost the same situation here. The economy has plummeted due to Covid. This is the best time to lay the foundation for growth of infrastructure. Earlier, the understanding was that economic development happens in rural areas, in agriculture. That battle we have won. This is the correct time to develop urban infrastructure and what Finance Minister Nirmala Sitharaman has done is the right thing. But, I would still say that this is not adequate.

#### Why?

T here is no meaning in talking about investment if we don't have a clear plan of action to mobilize the resources. We are depending entirely on taxes and import duties to fund development. That is not enough. We have to generate wealth in this country. And we cannot go on being dependent on borrowing. Since Independence, we have been going on borrowing. This must stop.

You mean to say you don't see a clear plan of action underpinning the investment plans? Like Jawaharlal Nehru who wanted to create a network of public infrastructure such as dams, hydel projects, universities, etc.?

V ou are right, we need a national plan of action. And also a plan to raise the resources. Simply depending on the World Bank, ADB, etc. is not the right thing to do.

# How then can we raise money for infrastructure development? Through new instrumentalities like the KIIFB?

t is okay to borrow from within the country, but if we go on borrowing from outside, it will prove to be a burden in the long run. Take the case of the Indian Railways. Why can't they mobilize resources from within by carrying more passengers and more freight, charging a higher user fee? People are willing to pay if we can assure quality services. They should have raised the user fees long ago to mobilize money for railway development. For the past several years nothing of the kind has



## **COVER INTERVIEW**

been done, except for some adjustment here and there. That applies to all aspects of government.

#### But is that possible?

Yes, by all means. Take land revenue, for instance. We are paying a very small sum as land tax. My son who lives in the U.K. is paying land and house tax which is 40 times that in India. Why don't they collect a higher tax from people who can afford it? I can understand if a person living below the poverty line cannot pay. They can be given some other help.

### One problem we face is loss of faith in the system... There are very good projects, but people don't trust the government to complete them on time and then there is corruption...

True, our delivery system is very bad. We are not able to deliver projects on time and within the budget, ensuring that they are corruption-free. Why? My basic analysis is that we are entrusting projects to people who are not competent, very often with the IAS people. See, most of these projects are highly technical. Scientists and engineers can execute them with understanding, but the government would most often entrust them with the IAS people. There are brilliant ones among the IAS officers, but the problem is that they are not there for long. They get posted to different places and posts. So, there is no commitment, no accountability.

Take the case of the Metro projects going on in the country today. Except those being handled by technocrats, all the Metros are behind schedule by three to five years. In the case of the Kochi Metro, we did not allow anyone to interfere. There were some delays in land acquisition, but nothing else. So, people who handle projects should be technocrats with good track record and credible integrity.

It is very easy to draw up a project and put an IAS man in charge. They won't be there for long. And in our country, their tendency is to control everything, not allowing the technical people to work with freedom. That will hurt the project execution and its quality. This type of delivery has to change. Wherever possible, only technocrats with proven integrity should be put in charge of projects and they must be given sufficient tenure to complete the project.

### You were fortunate to be given a free hand...

hen I was being selected for the Konkan Railways, it was the Minister who made the nomination. George Fernandez was the Railway Minister at the time. I gave him the blueprint of the Konkan Railways, particularly the project costs and how money could be raised.



There is no meaning in the talk about investment if we don't have a clear plan of action to mobilize the resources.

That appealed to him very much and that is why he put me in charge. But my appointment had to be approved by the Public Enterprises Selection Board. The government order was to appoint me for three years. The PSEB, on their own, decided that Konkan Railway cannot be completed in three years. They, therefore, recommended to the government that I must be appointed for a period of five years or till the project is completed. The government agreed.

But when the new government came, they wanted their man to be posted in my place. They wanted me to go after two years! They put a lot of pressure on me to resign and go! But I stayed on till I completed the project. So, the right per-







## **COVER INTERVIEW**

The real issue is that high moral and ethical values are vanishing from our society. We need more and more people committed to values. We need to teach youngsters values and integrity, but parents are so busy these days that they are unable to do this.

son should be chosen, the tenure should be defined and he should be given full freedom. If you choose the right person, you will not have these corruption scandals. They happen only when the top man is not interested or he is himself corrupt.

# You had a lot of freedom with the Delhi Metro...

There was a lot of reluctance to appoint me in the Delhi Metro. It got delayed by eight months on the argument that I was too old for the job. I was well past 60 at the time. It stayed that way until the then Cabinet Secretary Mr. T.S.R. Subramanian put his foot down. I didn't know him, though. He asked if a Prime Minister—he was referring to Mr. Atal Behari Vajpayee—could hold the country together at the age of 70, why can't Mr. Sreedharan head the Delhi Metro? That settled the issue. If a man is really good and doing well, why not pick him and give him the freedom to do what he wants in the best interests of the country?

# What are the benefits of timely completion of a project?

f you are able to complete a project on time, you can save at least 20-25% in cost. In every project that DMRC has taken up, we have been able to make this kind of savings, because of timely completion and avoidance of corruption. It was only because of such savings that I could reconstruct the Palarivattom bridge free of cost. In the developed world, they are very particular about timely completion of projects.

That is because the work is entrusted with people of proven capabilities and they will not indulge in any malpractice. That trust is reWherever possible, only technocrats with proven integrity should be put in charge of projects and they must be given sufficient tenure to complete the project.

quired. Here politicians want a share from every project. Actually, projects are often drawn up in such a way that they can take a cut. Several projects that can be taken up at the Central level are done by State governments so that politicians can make money.

The real issue is that high moral and ethical values are vanishing from our society. We need more and more people committed to values. We need to teach youngsters values and integrity, but parents are so busy these days that they are unable to do this.

### What is your estimation of the private sector, particularly the corporate sector? Have they been committed to the values that you speak about?

would speak only about the Tatas. They have shown great commitment. Then there are individuals like Narayana Murthy and Kris Gopalakrishnan. Corporates are not doing enough. Even their CSR funds are manipulated. If you take the CSR content of big corporates, the CSR funds are consumed by themselves and not spent for the common man. I don't get it if want to renovate my local school. Sense of social responsibility and the idea that they have the responsibility to look after society are missing. In the U.S., most of the universities are supported by corporate bodies. We need a change in the attitude of the corporates. Today, they are concerned only about profits.

# Is something fundamentally missing in our education system, particularly as it applies to engineering and pure sciences?

Yes, very much, particularly in technical education. Don't go by the results of the IITs. They are doing well because they get the cream as students. That is not the case with most other educational institutions in the country. The Foundation for Restoration of National Values that I had founded had filed a PIL on poor standard of technical education



# **COVER INTERVIEW**





If you take the CSR content of big corporates, the CSR funds are consumed by themselves and not spent for the common man.

in the Kerala High Court. The government tried to escape saying that it has set up a committee to study the issue. The matter is still pending there.

There also seems to be little concern for the environment when we draw up and execute projects. How can we build without hurting the environment?

hen we implement a project, we must ensure that we do not hurt the environment. We should also ensure that there is no displacement. I have practiced that all along. When implementing the Konkan Railway project, I had to cut down trees in the reserve forest. The State government had given me the go ahead, but the Centre had not. Fortunately, the secretary at the time was T.N. Seshan, who was my classmate. He asked me to go ahead with the warning that he will impose a fine on me as required under the law. He fined me Rs. 1 crore. There was no other option, but I am clear



## **COVER INTERVIEW**

I am clear that measures necessary to reduce environment impact is absolutely essential when a project is conceived and executed.

that measures necessary to reduce environment impact is absolutely essential when a project is conceived and executed.

Looking at the recent disaster in the Himalayas where a glacier avalanche resulted in flash floods that destroyed two hydel dams and claimed several lives, don't you think we have gone too far with our constructions in the Himalayan region?

The Himalayan region is very fragile. It has to be handled very carefully. Let there be no doubt that any intervention there will have definite consequences. The water sought to be stored there is not meant for that area. Why should we then think of constructing huge dams and all that? If you see the Himalayan geology, it is unpredictable. The two power stations got destroyed because they were wrongly located.

I have myself had a little experience there. The railway line from Jammu to Srinagar was thought of in 1998. It was sanctioned in 2004 by the Atal Behari Vajpayee government. Among the engineers, there was a lot of confusion about what the alignment should be. Majority disagreed with the alignment already planned. The Railway Board did not agree. They put committees after committees. Work started in 2005 and should have been over in six years, but even today only 30% of the work has been completed.

Some people went to the Delhi High Court against it. The High Court appointed me as a technical adviser. The question was whether the railway line was being laid in the right alignment. I went there and studied the terrain. I found that the way the alignment had been taken, it will not hold. The geology of the Himalayan region is such that it will get washed away. I submitted my report stating that the alignment is faulty. I also stated how the alignment could be reworked. This was done in 2014. Even today they have not taken any decision on it. They have sunk a lot of money and

## **COVER INTERVIEW**

At the NITI Ayog today, if you go and meet a member, he has no time to think. He is so busy with bureaucratic work. He is always running around attending meetings. Nobody has time to sit calmly and think what is needed



don't want to lose it. I said it is better to forget the money already spent and have a new alignment as it would be more stable.

# What should be the national perspective on the country's infrastructure?

w e have a long way to go there. For instance, we are still dependent on coal mines for generating power. Most countries have given up coal mining, but we have not. The country has tremendous potential to tap solar energy. We should use our water resources only for drinking and irrigation. We need people with vision in the Planning Commission, but sadly that has been dissolved. At the NITI Ayog today, if you go and meet a member, he has no time to think. He is so busy with bureaucratic work. He is always running around attending meetings. Nobody has time to sit calmly and think what is needed. We need a think tank. The government should take advice only from them. I am not against putting people in positions based on political considerations. We have a lot of qualified people, but the government would pick up only some IAS people.

Don't you think there is also need for more discussions and more efforts at building consensus on reforms and development?

he ruling and Opposition parties must find some common ground on such issues. Everybody should keep the country at the top. 98473 33333 (PRAVEEN)

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# Transformative approach to highway construction

An 18-mile stretch of Georgia interstate is pushing the technological envelope with respect to safety and sustainability in road construction. The Ray Project, which leverages solar energy, recycled tires, vehicle telematics data and valuable roadside right-of-way, is showcasing how America's highways can be transformed into more ecologically beneficial, revenue-generating infrastructure.

The Ray Project is a non-profit organization that works in close collaboration with the Federal Highway Administration (FHWA) and Georgia Department of Transportation. Projections show that connected and autonomous vehicles could help reduce crashes by 40% or more.



# Sarens launches new electric ring crane for heavy lifts

Sarens has announced the launch of the SGC-90, a new environmentally-friendly electric ring crane that the global heavy lift and move specialist says is ideal for projects in the nuclear, logistics, construction, and offshore wind sectors. Nicknamed "The Little Celeste", the newest crane in Sarens' fleet was developed in response to market demand for heavy lift cranes with capacities greater than 80,000TM. Its ring diameter is 35m, maximum counterweight is 2,700t, and maximum load moment is 99,000t. It can be configured in a variety of ways, with main boom



lengths of 100, 120, and 130m and a small jib of 200t. The Sarens heavy duty and light jib can also be used to reach further or attain a higher hook height.

As an electric crane, the SGC-90, can be connected to the electric grid and be fully powered without a traditional fuel source, unlike all other SGC cranes in Sarens' fleet, which are hydraulic cranes. The new model can also produce its own energy, recovering and reusing the electricity it generates each time it lowers a load. When connected to a grid, it recovers all produced energy and feeds it back, reducing energy consumption by up to 40%.

The crane conforms to the latest crane standards for safety and security. Directive, static, and dynamic overload tests as well as function and safety tests have all been successfully performed and witnessed by a certification company.



# Robotics technology to aid house construction

Emerging robotics technology may soon help construction companies and contractors create buildings in less time at higher quality and at lower costs. Purdue University innovators are testing a construction robotic system that uses an innovative mechanical design with advances in computer vision sensing technology to work in a construction setting. The technology was developed with support from the National Science Foundation, USA.

# Germany to boost energy efficiency in buildings

Germany is supporting steps to increase energy efficiency in buildings with subsidies and incentives worth 6 billion euros (\$7.2 billion) this year. The measures supported by the federal government would include programmes to modernise existing buildings with better insulation

The push should help the housing sector in Europe's most populous country move towards its goal of becoming climate-neutral by 2050, and with it enable Germany to reach its

# UAE's Arada launches \$2.2 billion Masaar project in Sharjah



Arada Group of the United Arab Emirates has launched an 8 billion dirham (\$2.2 billion) upmarket gated community project in Sharjah. The announcement comes as fewer projects are being launched in neighbouring Dubai, where the real estate sector is in a deep downturn caused by excessive development over the past decade. The 19 million square foot, 4,000 unit Masaar project will be delivered in phases from 2023 and completed by 2028. Around 15,000 people are expected to eventually live in the community, which along with residential and commercial facilities will feature green spaces and an international school. The project will be financed through equity, debt and sales, Khoshaibi said.

Arada is owned by Sheikh Sultan bin Ahmed al-Qasimi, chairman of the Basma Group, a Sharjah conglomerate, and Prince Khaled bin Alwaleed bin Talal, chairman of Dubai-based KBW Investments. wider climate protection targets over the next three decades. The modernisation drive could, however, increase the cost of living for Germans as, by law, landlords can pass on the cost of investments by raising rents.

# Tokyo's apartment prices rose to near bubble-era high in 2020: Data

Prices of newly-built apartments in the Tokyo area rose 1.7% last year, approaching the record highs seen during Japan's asset-inflated bubble era that ended in the early 1990s, the country's Real Estate Economic Institute said. Higher construction costs due to preparations for the Olympics and popularity of high-rise condominiums in formerly industrial waterfront areas helped drive the average apartment price up to 60.84 million yen (\$586,410), the highest since 1990 when it reached a record 61.23 million yen.

The most expensive unit was a 690 million yen (\$6.65 million) condominium in Daikanyama, the real estate data and consultancy firm said. The number of sales fell 12.8% from a year earlier to 27,228 units, however, down around 70% from 1990 levels. Real estate website Suumo said in a report last week that low interest rates and tax breaks helped sustain property demand amid the coronavirus outbreak.

Unlike people in other big cities such as New York which saw an exodus to the suburbs during the coronavirus pandemic, Tokyo residents appeared more interested in moving to new developments in central locations to reduce their commuting times, it said.

# **Mohocon** shows the way in off-site construction

M ohocon, a startup from Denmark, is taking off-site construction (OSC) to the next level by building sustainable modular houses inspired by the structure of honeycombs.

The company has been leveraging the advantages of hexagon-like dynamically constructed buildings, paired with OSC innovations such as recycled materials, quick manual assembly, low weight, and self-supporting structure, etc., to build the houses.

The construction industry in smart cities faces a

lot of challenges owing to labour shortages, time overruns and overall efficiency. With off-site construction many of these issues can be addressed by manufacturing construction components and structures at locations different from the site of use employing prefabricated, preassembled, modular, volumetric and similar solutions.

This ensures faster installation, pre-assured quality, less dependency on weather conditions, reduced need for on-site skilled workers, and, in total, higher efficiency.



### **STARTUP ZONE**

SKILL<sup>ø</sup> LYNC

Skill-Lync founders Suryanarayanan Paneerselvam and Sarangarajan Iyengar (L-R)

# American Firm Ansys Ties with Indian Startup Skill Lync

Ansys is known to develop, market and support engineering simulation software used to predict how product designs will behave in real-world environments. Their sole focus is Engineering Simulation. With consistently advancing technology, Ansys has been leading the engineering simulation world for over 45 years. Skill-Lync provides job leading courses for Mechanical, Electrical and Civil Engineering students in India and across the world. Whilst being just four years old, Skill-Lync has pioneered advanced engineering education for mechanical engineers and has placed over 300 students overall. 06 January, 2021, India: In a bid to provide in-depth learning on Electric Vehicles to undergraduate engineering students in India, Chennai headquartered global start-up Skill-Lync partners with global leader in design & simulation software provider Ansys to launch 'basic courses in Electric Vehicle (EV) technology' for free. The course covers different mechanical and electrical aspects of simulations with respect to an Electric Vehicle including design & simulation and setting up of the charging infrastructure. With the world leaning towards greener ways to re-engineer things, the future is looking bright for electric vehicles. Which is why it is extremely prudent for engineering students - both mechanical and electrical engineers in their undergrad to understand the different aspects of electric vehicles. As part of this partnership, Ansys has provided access to several softwares to create an introductory course to understand the basics of electric vehicles. The course enables students with essentials in the fundamentals of Ansys Fluent®, PExprt, SI Wave, Maxwell® and Icepak. The duration of this course is 8-12 weeks. Students can complete the courses using the Ansys student version of the software available free of cost. The Basics of Electric Vehicle Simulations course is designed to give students a walk-through on how different EV components are engineered using simulation. The course covers everything from the design of key components, basics of battery thermal management and computational fluid dynamics. It is split into 4 components wherein each component deals with one particular aspect of an Electric Vehicle. The 4 components which are covered include Battery Thermal Management System, Electric Motor Design, DC-DC Converter Design and External Aerodynamics.

# **Don Bosco** engineeringcollege helps 75 startups in 2 years

**S** upported by the department of science and technology of the government of India, the business incubation centre at Don Bosco College of Engineering at Fatorda has assisted 75 startups over a period of two years. Of this, 45 were identified to be incubated, including 15 which have been incubated virtually, said CEO of the Forum for Innovation Incubation Research & Entrepreneurship (FiiRE) at the college, DS Prashant.

Of the incubated business ideas, an apparatus and method for regulating temperature of animals and a heavy duty paper bag manufacturing method are among five incubated at FiiRE, which have applied for a patent, Prashant said. FiiRE works as per the guidelines of the Startup India policy, which is to build a strong ecosystem that is conducive for the growth of startup businesses, to drive sustainable economic growth and generate largescale employment opportunities. This is achieved with an additional focus on the innovation, product design and the core team that is driving the idea towards implementation," said Prashant.

He said FiiRE also provides co-working spaces for the incubatees with various facilities such as meeting rooms, conference rooms, open work areas and an auditorium.



## **STARTUP ZONE**

# **Salesforce's** 1st India bet is a Hyderabad startup

**S** alesforce has made its first investment in India. Its venture arm, Salesforce Ventures, which has backed firms like Zoom, has led a \$15 million financing in HR-tech startup Darwinbox.

The five-year-old startup helps organisations manage digitally their human resources needs, including hiring, on-boarding, touchless attendance, and employee management. The company has seen a three times jump in revenue in

the last 12-15 months, Darwinbox co-founder Chaitanya Peddi said. The growth was aided by the pandemic induced demand for digital solutions.

Salesforce's backing will help the Hyderabad-based firm to expand in new markets. It will also tap into the expertise of the US cloud

solutions major for building new products. Peddi will also work with Salesforce India chairman Arundhati Bhattacharya to build partnerships and address market opportunities.

Existing investors Sequoia Capital India, Lightspeed India, Endiya Partners, and 3one4 Capital have also participated in this round. The company has now raised a total of \$35 million.

10 startups shortlisted for the Amazon Global Selling Propel Accelerator

Amazon India has announced 10 startups as finalists for their Amazon Global Selling Propel Accelerator programme launched in partnership with Startup India. The programme is aimed at supporting startups to reach customers around the world.

The accelerator programme is aimed at providing startups an opportunity to get mentorship from Amazon leaders, VCs, and leaders from Startup India. "We got a phenomenal response to the programme, with over 500 entries within 2.5 weeks of launch. It is a great opportunity for Indian startups to showcase their 'Made in In-

salesforce

dia' innovation and entrepreneurial spirit at an international scale, and create a truly global consumer brand and we are humbled to be a part of their journey," said Abhijit Kamra, Director, Global Trade at Amazon India.

Bengaluru-based Azani Active is a high-performance nutrition and personal care brand created by athletes, nutritionists, and fitness experts.

Launched in 2019 by Nimisha and Manav Dhanda, Mumbai-based D'Moksha is an

> eco-friendly home linen brand that offers handcrafted, environment-friendly home linen made with sustainable fabrics like hemp.

> Jaipur-based Femora was launched in 2019 by Manushree Khandelwal. The kitchenware brand offers utensils and storage products.

Launched in 2018, Delhi-based Rage Coffee is involved in the manufacture, marketing and distribution of coffee products.

New Delhi-based Sirona, founded in 2015 by Deep and Mohit Bajaj, is a feminine hygiene brand that launched products such as standand-pee device (PeeBuddy) for women, natural period pain patches for menstrual cramps (Sirona), natural-coloured pads, menstrual cups, and tampons.

Gurugram-based Slurrp Farm is a healthy food brand aimed at young children to ensure a positive impact on their health outcomes.

Mumbai-based Soulflower, founded by Amit Sarda and Natasha Tuli in 2001, is a homegrown personal care brand that offers natural and plantbased beauty products.

Mumbai and Pune headquartered in True Elements offer plant-based, wholefood breakfast, and snack products. Founded by Puru Gupta and Sreejith Moolayil in 2014, the startup aims to raise awareness and make people conscious about their health.





The infrastructure sector has become the biggest focus area for the Indian Government, which plans to spend US\$ 1.4 trillion on it to boost sustainable development. A key proposal in Budget 2021-22 is for an increase of 34.5% in capital expenditure for physical infrastructure to Rs. 5.54 lakh crore, which would help achieve the goals set for National Infrastructure Pipeline (NIP).

Subhankar Mitra, Managing Director (Advisory Services) and Sidhart Goel, Senior Director (Research), Colliers India, make a comprehensive analysis of India's infrastructure development challenges with two case studies on Singapore and the United Arab Emirates (UAE)



ndia is one of the fastest urbanizing countries in the World. In absolute terms, it is adding more than 10 million population every year to its cities. As the country progress towards a 50% urbanization rate over next two decades, the infrastructure sector becomes highly responsible for propelling India's overall development.

The infrastructure sector has become the biggest focus area for the Indian Government, which plans to spend US\$ 1.4 trillion on it to boost sustainable development. Since 2014, the government has been taking multiple steps to enhance the infrastructure throughout the country as it has a multiplier effect on the overall economy. Over the years, rapid development has been taken place in sectors such as railways, highways, aviation, ports and metros. This has enhanced overall logistics across the country and improved connectivity. Infrastructure has a spill-over effect on the real estate and logistics industries. India was ranked 44 out of 167 countries in World Bank's Logistics Performance Index (LPI) 2018, which means that there is tremendous scope for improvement and growth.

A key proposal in Budget 2021-22 is for an increase of 34.5% in capital expenditure for physical infrastructure to Rs. 5.54 lakh crore, which would help achieve the goals set for National Infrastructure Pipeline (NIP). Launched in December 2019 with 6,835 projects, NIP has now been expanded to 7,400 projects and around 217 projects worth Rs 1.10 lakh crore under some key infrastructure ministries have been completed.



## **SPECIAL FOCUS**

Over the years, various policies and missions have been introduced in different sectors with targets and guidelines. Different initiatives like the Swachh Bharat Mission, Pradhan Mantri Awas Yojana, Jal Jeevan Mission, Metro Rail Policy, two rural electrification schemes, etc. have set goals to achieve good quality of infrastructure within a specific time-frame.

From a social infrastructure standpoint, the government has given a thrust to the health and well-being of its citizens. Under Budget 2021-22, the government plans to develop the primary, secondary, and tertiary health systems, and strengthen and developing the existing healthcare institutions through an outlay of Rs. 2.2 lakh crore.

However, there is still much scope in the infrastructure sector as it is still in a state of evolution and the government is aware that it alone cannot develop and maintain all the necessary infrastructure. Paucity of adequate funds and cost and schedule overruns are some of the prominent hurdles in achieving the set goals. There is still a long way to go to bridge the gap between the rural and the urban infrastructure, including connectivity and the access to basic amenities.

Data from various ministries suggest that the country is yet to meet some of the global benchmarks for a good quality of life for its citizens. Thus, the role of the private sector is also significant in the development of infrastructure and the government is trying to make projects financially viable to attract huge volumes of private investment domestically as well as internationally.

Let us assess the individual performance of the major infrastructure types in India.

### **Physical Infrastructure**

#### Transport

The transport sector lies at the core of the overall physical infrastructure and economy for the country. For the country to progress, efficient connectivity from and to different parts of the country is a must. Owing to its importance, 'Smart cities' are now adopting the plug and play model, where the basic infrastructure including roads and pipelines are being provided prior to the construction. This ensures availability and access to basic services for the residents that will be accommodated post construction of the city.

The section below highlights the different sectors of transport infrastructure with their ongoing schemes and policies and what progress has been made so far.

### Highways

India has one of the largest road networks of the world spread over 5.9 million kilometres, including the national and state highways, and the urban and rural roads. The government is planning to further expand this network since it plays a crucial role in the economy. The National Highway Authority of India (NHAI), respective States' Public Works Department (PWD) and the Border Road Organization (BRO) are the key bodies engaged in construction and up-gradation of highways for the country.

Under the Ministry of Road Transport and Highways (MoRTH), the major ongoing programme is the 'Bharatmala Pariyojana' Phase-1 (2017-2021). It envisages the development of 26,000 km of economic corridors along with 8,000 km of Inter corridors and 7,500 km of feeder routes. The Union Budget 2021 proposes spending Rs. 1.18 lakh crore for 8,500 kms of highways and

The country is yet to meet some of the global benchmarks for a good quality of life for its citizens.



Figure 1 Source: Ministry of Road Transport and Highways (up to Nov 2020) economic corridors till March 2022, and for constructing an additional 11,000 km of highways<sup>1</sup>.

Currently, 3,800 km of construction has been completed in the Bharatmala Pariyojana and 13,000 km road work has been awarded. The efficiency of highways construction peaked in 2019 when the pace of highway construction was at 30 km per day, which fell to 28 km per day in the corresponding year 2020. The government is constantly focusing on the road construction and the sector has been receiving increasing funds every year. Even after bearing the consequences of Covid-19 on the economy, the government has declared the highest ever allocation for this sector, which is an increase of nearly 32% from the previous year.

To attract more investments and fund highway projects, the National highways Authority of India is expected to operationalize India's first Infrastructure Investment Trust (InvIT) very soon, which would be government sponsored. Six roads assets have received approvals for InvITs. Further, the FDI policy suggests 100% FDI for roads and highways under the automatic route. These investments would ensure a smooth inflow of capital required for the construction, which would lead to a multiplier effect on other sectors and an overall uplift in the economy.

#### Railways

Railways are the lifeline of the Indian transport network since they facilitate connectivity and enhance mobility of passengers on a mass scale at relatively cheaper costs. They have also served as the backbone of freight movement throughout the length and breadth of the country. The rail network in India is spread over 1.2 million km making it one of the world's largest networks in the world. The ease of travel and the affordability makes it a primary means of connectivity in the urban as well as the rural areas. Time-to-time budgetary

1 https://www.indiabudget.gov.in/

## **SPECIAL FOCUS**

enhancements in the Indian railways have been made by the government. In the Union Budget 2021, the Finance Minister announced a sum of Rs. 1.1 lakh crore for the Indian Railways. The Indian Railways have prepared a National Rail Plan 2030, which aims to bring down the logistics cost to boost the government's 'Make in India' initiative.

To enhance the passenger experience and provide better services, the 'Adarsh Station' scheme was launched in 2009-10. The scheme aimed at upgrading and modernizing the eligible suburban stations with modern facilities like escalators, lifts, WiFi, foot over bridges along with the upgrade of the station building. The scheme has achieved 92% of its target out of the total of 1,253 stations<sup>2</sup>. A separate station redevelopment program has been created for the redevelopment of stations in major cities and tourist centres.

Under the electrification mission, the Indian Railways plans to electrify 100% of its broad-gauge route by 2024. Around 63% of the routes have already been electrified across the country under this mission. The electrification would lead to lower levels of air pollution by reducing the carbon emissions. Also, this would reduce the dependence of railways on imported fossil fuels. An estimated of Rs. 14,000 crore would be saved, which could be used for other upgrade activities.

In a move to cater to the demand deficit that exists, the government on July 2020, announced the first step towards privatization of Indian Railways. Under this 151 trains are to be introduced with 109 routes of operations. This will result in only 5% of the total operations being run by the private players, initially.

Greater availability of seats, apart from technology-enabled experience are some aspects that Colliers expects. A new institutional framework is also required to efficiently manage the operations. While it is expected to bridge the large gaps between demand and supply, on the flip side, there is a high chance of this leading to increased fares. The government would have to move ahead keeping the lower income groups and the marginalized sections in minds.

#### Ports

India's maritime industry supports 90% of the country's trade by volume. India has a coastline of 7,517 km with 12 major ports administered by the central government and around 200 non-major ports, administered by the respective state governments where they are located. Indian major ports handled a traffic of 477.8 million tonnes (mt) during April-December 2020 compared to 523.8 mt in the corresponding period of 2019, a decline of 8.8% due to the pandemic <sup>3</sup>.

To enhance the port-led development and activities, the government launched a flagship programme, 'Sagarmala' in 2016. The programme aims at providing good port infrastructure, port development, increasing the operational efficiency of the ports and capacity expansion by at least 2,500 million metric tonnes per annum (MMTPA) by 2025. The current capacity of Indian ports is 1,500 MMTPA.

The government has allowed 100% FDI under the automatic route for the construction and maintenance of ports and harbours. Further, a ten-year tax holiday has been given to enterprises involved in the business developing or operating ports. In the Union Budget 2021, the Finance Minister has announced to develop 7 more port projects, which would be developed at a

2 https://www.drishtiias.com/daily-updates/daily-news-analysis/adarsh-station-scheme

3 http://ciiaime.com/pdf/sectors/Ports&Shipping.pdf

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While much has been done to support the growth in the port sector, the sector faces huge challenges, which need to be addressed to accelerate growth. The inadequate road network around various ports makes it challenging to transport goods speedily. The existing ports also need support with machinery and equipment to handle large volumes of cargo. Further, housing needs of the labour need to be tackled as the under-supply of skilled labour due to improper facilities affects the productivity and efficiency. Finally, there are often delays in getting the environment clearances, which leads to time and costs overruns.

#### Metro

Metro rail facilities in India) have shown substantial growth in the recent years. As of 2020, there are 694.5 km of operational metro lines and 13 metro railway systems with 540 stations in the country. Another 739.3 km lines are under construction  $^4$ .

Though Kolkata's metro service was the first to function in the country in 1984, the construction of the phases 2 and 3 are delayed due to various reasons like lack of funds, delay in land procurement, shifting of underground utilities, non-cooperation from between the government and the stakeholders, etc. Meanwhile, the Delhi metro is considered to be a pioneer metro system in the country. Presently, the Delhi metro network consists of about 389 Km with 285 stations connecting the regions of Delhi, Noida, Gurugram. Currently, phase 3 and phase 4 are under construction and will expand the total network to 413.8 km. After the completion of Phase-IV, the Delhi Metro is also the first metro rail and rail-based system in the world to be certified by the United

4 https://urbantransportnews.com/page/metro-rail-projects-in-india

## **SPECIAL FOCUS**

Though it is mandatory to set up a UMTA in every state, it still has not been set up in most of the states or is ineffective because they have not been given statutory powers to comprehensively deal with all the urban transport in the cities.

Nations to get carbon credits for reducing greenhouse gas emissions <sup>5</sup>. The current status of metro systems in other Indian cities is:

- Operational metro rail systems Ahmedabad, Bengaluru, Chennai, Gurugram, Hyderabad, Jaipur, Kochi, Lucknow, Mumbai, Nagpur and Noida-Greater Noida.
- Major expansions underway Ahmedabad, Bengaluru, Delhi, Kolkata, and Mumbai.
- New metro rail systems currently under construction Agra, Bhopal, Indore, Kanpur, Meerut, Navi Mumbai, Patna and Pune.
- Approved metro rail systems Gorakhpur, Kozhikode (Calicut), Surat and Thiruvananthapuram (Trivandrum).

In 2017, the Union Cabinet approved the New Metro Rail Policy which aims for significant development in the metro rail systems of the country. The policy has opened up opportunities for the private investors as it has made mandatory to include the PPP model in order to be able to obtain central assistance for new Metro Rail projects. Currently, Hyderabad is the world's largest metro rail project in PPP model. The policy also made it mandatory to set up a Unified Metropolitan Transport Authority (UMTA) in every city, which would be responsible for drafting Comprehensive Mobility Plans (CMP) with multi-modal integration of transport systems for that city.

It also empowers the state in evaluation and selection of third party agencies for new metro proposals, to set up a permanent Fare Fixation Authority for timely revision of fares and to generate maximum non-fare revenue through advertisements, lease of space to ensure maximum financial viability of the projects. The Union Budget 2021-22 proposed two new metro technologies -Metro Lite and Metro Neo to provide metro rail systems at a much lesser cost in Tier 2 cities and peripheral areas of Tier 1 cities.

Although the policy created the road map for substantial improvements in the present and future metro projects, its' implementation has not been as successful as envisaged. Though it is mandatory to set up a UMTA in every state, it still has not been set up in most of the states or is ineffective because they have not been given statutory powers to comprehensively deal with all the urban transport in the cities. Due to the presence of multiple stakeholders and the absence of a CMP, there is lack of integration in the various transport systems operating in the city, which has an effect in the ridership of these metros.

### Housing

Permanent housing (popularly called 'pucca' houses) has been one of the most undersupplied infrastructures since independence and the demand has increased many folds over the decades due to a variety of factors pertaining to demographics, dilapidation in existing supply, demand-supply mismatches, litigation, etc. Various estimates by government, academic and private sector entities suggest that current undersupply of permanent housing units is estimated at more than 12 million units in urban areas and more than 50 million units in rural areas. To cater to this increasing demand, the central government has introduced various schemes and policies from time to time, which include Rajiv Awas Yojana (RAY), Jawaharlal Nehru National Urban Renewal Mission (JNNURM), National Housing and Habitat policy, Pradhan Mantri Awas Yojana (PMAY) - Urban and Gramin.

However, we will focus on urban housing in this article as dealing with

<sup>5</sup> http://www.delhimetrorail.com/about\_us.aspx



Urban) https://omay-urban.gov.in/covid19/progress/4.pdf , Colliers International
#### **SPECIAL FOCUS**

rural housing will be exhaustive and will need a separate article by itself. In the year 2015, the government launched the PMAY with the agenda of 'Housing for All' by 2022. PMAY - Urban has 4 verticals - in-situ slum rehabilitation, beneficiary led construction, affordable housing in partnership, and Credit Linked Subsidy Scheme (CLSS). Further on 14 May 2020, with respect to 'Atma Nirbhar Bharat', an Affordable Rental Housing Complexes (ARHCs) scheme for providing ease of living to urban migrants/poor was announced.

While on one hand multiple measures have been taken to cater to the demand of affordable housing, the ground reality and implementation looks weak. According to Colliers' latest report on India's financial stimuli in 2020, the states of Goa, followed by Kerala and Telangana have seen the highest rate of completion of homes. The states of Haryana, Mizoram and Manipur have the lowest home completion rates. Per Colliers' analysis of PMAY-U data as of 16 November 2020, only about 12% of the total allocated investment has been released to the states between 2015 and November 2020. During the same period, about 3.8 million housing units were completed, accounting for about 35% of the total sanctioned housing units, indicating slow pace of construction and delivery. However, if we look at the year-wise progress, the sanction process has expedited since 2018. During FY2019-2020, the number of houses sanctioned is a 15x multiple of that in FY2015-2016 when the scheme was launched.

From a demand perspective too, 2020 has seen slow uptake for such units. In the backdrop of the COVID-19 pandemic leading to an adverse impact on people's economic status, the beneficiaries are struggling to raise the funds to complete the booking process. The pandemic has led to job losses, pay cuts and loss of livelihood leading to financial distress along with difficulty in accessing loans in these circumstances.

Overall, we believe that while PMAY-Urban had a slow start in the initial years, the Union government has realized the importance of the scheme in assuring the safety, health and well-being of its citizens. The government's latest Union Budget, announced in February 2021, represents more than a two-fold rise in outlay from the Union Budget announced in February 2020. The increased allocation ought to create more jobs and improve livelihoods of people. Further, we expect this to have a multiplier effect on the economy by stimulating demand for real estate ancillary industries such as cement, and steel, among others.

Earlier it was seen that the government was playing the role of the supplier as well as the enabler, but recently with verticals like Affordable housing in partnership in the PMAY-U, the shift can be seen towards a partnership approach. The lack of availability of resources and manpower had led to inefficient deliveries and shortages in housing. The partnership approach has increased the pace of development. In the Union Budget 2021-22, Section 80EEA of the Income Tax Act, an additional deduction of Rs. 150,000 on interest paid on affordable housing loans sanctioned on or before 31 March 2020, has received an extension by one year to loans sanctioned on or before 31 March 2021. Similarly, the tax holiday to the developers on the profits earned on affordable housing projects approved on or by 31 March 2020 also received an extension of a year. Both these aspects provide a push to the demand and supply of affordable housing units and help achieve the government's vision. However, this piecemeal approach is not desirable since it takes a while to build up a pipeline of new homes.

#### Water Supply

The Ministry of Jal Shakti was launched in May 2019, by merging the two prior ministries, Ministry of Water Resources, River Development and Ganga Rejuvenation and Ministry of Drinking Water and Sanitation.

Under the new Ministry, the government had announced the Jal Jeevan Mission - Rural, with the goal of enabling all households to have access to safe and adequate drinking water with service level rate of 55 litre s per capita per day (lpcd) within their premises by the year 2024. During the Union Budget announcement for 2020-21, the government also launched the Jal Jeevan Mission - Urban, with an outlay of Rs. 2,87,000 crore to provide universal water supply in all 4,378 statutory towns and sewage management in 500 cities of AMRUT <sup>6</sup>.

As per the Jal Jeevan Mission - Rural, as on February 2021, 67.7 million households had received tap water connections from the total 191.7 million rural households in the country. While in states like Goa and Telangana, 100% target has been achieved, Uttar Pradesh, Assam, Ladakh less than 10% of the households have water supply. These discrepancies highlight the levels of efficiency in the different states of the country, which could be based on availability of resources and/or funds. In the urban areas where the service level benchmarks suggest 135 lpcd, an average of only 69 lpcd is being supplied as per the Central Public Health and Environmental Engineering Organization (CPHEEO). This indicates that the demand-supply gap is very high in the urban as well.

Supply of fresh water cannot be anymore the only way to supply water as we are running out of fresh water due to the high pollution levels, improper storage, leakages, etc. As highlighted by the Prime Minister, measures like water conservation and rainwater harvesting can drastically change the water supply issues. However, to meet the current and the future demands of water, there is also a need to treat our wastewater. The lack of facilities to treat wastewater reduces this option of reusing water and becoming self-sufficient.

#### Power and Energy

The country's per capita power consumption has increased from 348-kilowatt hour (kWh) to 1,149kWh over the two decades, which accounts to a CAGR of around 4.8%. To cater to this demand, the power generation capacity has increased from 69.1 gigawatt (GW) to 344 GW at a CAGR of 6.4% over the last two decades till FY19. The progress of development in the power sector is also reflected by the fact that India's ranking on the parameter of 'getting electricity' on the World Bank's Ease of Doing Business Index has rapidly scaled from 137 in 2014 to 22 in 2019. However, the sector continues facing multiple challenges owing to limited availability of fuels, financially stressed assets, and plenty of under-utilized assets.

Under the Ministry of Power, different schemes have been created to achieve complete electrification. The two main schemes are the 'Deen Dayal Upadhyaya Gram Jyoti Yojana' (DDUGJY) and the 'Saubhagya' Scheme or 'Pradhan Mantri Sahaj Bijli Har Ghar Yojana' to complete provision of electricity access for every village and household in the Rural areas. The Saubhagya scheme helps achieve the last mile electrification by connecting the grid to the household level while DDUGJY targets access to electricity at the village level.

To target provision of clean cooking for women and improve their health,

#### SPECIAL FOCUS



The Pradhan Mantri Ujjwala Yojana (PMUY) was designed in May 2016. The scheme provided a free LPG connection to women living below the poverty line. The government pledged to provide 50 million free LPG connections by the year 2019 but achieved 80 million by 2019, which was supposed to be achieved by 2020. The implementation of PMUY was necessary since the long exposure to biomass cooking stoves leads to various respiratory diseases. The provision of LPG connections reduces the exposure and promotes clean cooking.

The government is further taking measures to shift to the renewable sources like electrification and solar photovoltaics (PV). The government has set a goal of installing 175GW of renewable energy capacity by 2022, of which the solar energy would be the highest. The numbers suggest that efficiency in implementation of power and energy has remained strong overall, but the pace must keep up with the rising demand, especially since Indians are connecting to a multitude of electronic and digital devices and increasing their adoption of electric vehicles.

#### Sanitation and Solid Waste Management

The urban population of India is more than 377 million constituting of 31.16% of its total population (according to Census 2011, GOI). The municipalities in most of these urban areas are heavily burdened with the task of waste management. According to the Central Pollution Control Board (CPCB) of India, 2018, the per capita waste generation is 0.85 kg/day, which has increased from 0.24 kg/day in 2001. It is estimated that only about 75-80% of the munici-



pal waste gets collected and out of this, only 22-28 % is processed and treated and remaining is disposed of indiscriminately at dump yards.

The government upgraded the Municipal Solid Wastes (Management and Handling) Rules 2000 and notified the new Solid Waste Management Rules, 2016. According to this, waste segregation and storage at source has been mandated. The Manual on Municipal Solid Waste Management, 2016<sup>7</sup>, by CPHEEO provides implementation guidelines for segregation, collection, transportation, treatment and disposal of Municipal Solid Waste. CPCB will coordinate with the SPCBs/PCCs of different states for regular monitoring and evaluation. The government also initiated the Swachh Bharat Mission in 2014 with an objective to eliminate open defecation, manual scavenging, devising modern and scientific municipal solid waste management, capacity augmentation for urban local bodies (ULBs), and mechanisms for private sector participation, etc. Swachh Bharat 2.0 was introduced in FY2021-22 to focus on other aspects of waste management like faecal sludge management and wastewater treatment, reduction in single-use plastic, effective management of waste from construction-and-demolition activities and bio-remediation of all legacy dump sites.

There is significant increase in the fund allocation for Swachh Bharat Mission from Rs. 12,300 crore in FY 2020-21 to Rs. 1,41,678 crore (for five years) in FY 2021-22. One of the major shortcomings of the Swachh Bharat Mission was that although it attempted to work on areas of manual scavenging and solid waste management, the primary focus was on elimination of open defecation both in the urban and rural areas. In the mission of making the urban and rural areas open defecation free, the focus was majorly on just building the toilet infrastructure rather than making them functional through proper water supply. Besides having a better fund allocation, Swachh Bharat 2.0 has broadened the

7 Solid Waste Management Rules 2016 — Vikaspedia

# One of the drawbacks inobjectives<br/>level verific<br/>level verific<br/>Social Infthe formulation of theSocial InfNational Health Policy is<br/>that it is mostly dependent<br/>on the private and<br/>non-profit health care<br/>services and does notHealth<br/>evel verific<br/>social Inf

services and does not clearly define the role of the government in strengthening the public health system and providing equitable, affordable and quality care to all.

#### objectives of the previous Swachh Bharat mission to include on the ground level verification and monitoring to achieve the required targets.

**SPECIAL FOCUS** 

#### Social Infrastructure

Health care sector is becoming one of the strong focus of the country both in terms of infrastructure, revenue generation and employment. Healthcare comprises a vast range of functions and amenities like hospitals, medical devices, clinical trials, outsourcing, telemedicine, medical tourism, health insurance and medical equipment. Indian medical tourism market is growing at 18% y-o-y and was expected to reach USD9 billion by 2020. The Government's expenditure on healthcare sector has grown to 1.6% of the GDP in FY20BE from 1.3% in FY16 and it allocated funds to the tune of Rs. 5.5 trillion (USD75.5 billion) in the Union Budget 2021, an increase of 34.5% from the previous year. The allocation includes the PM's 'Atma Nirbhar Swasth Bharat Yojana' with an outlay of about Rs. 64,180 crore over six years to develop and augment the existing capacities of primary, secondary, and tertiary care Health Systems. An allocation of Rs. 35,000 crore was also made in the Union budget for FY2021-22 for the provision of Covid-19 vaccines.

Around 17,000 rural and 11,000 urban health and wellness centers will be set up by the government to boost the primary healthcare system. The government introduced the National Health Policy in 2017, which is a revised module of the National Health Policy of 1983 and National Health Policy 2002. The main aim of the policy is to strengthen and prioritize the role of government in shaping the existing healthcare system to achieve a highest level of health and well-being across all age groups. This would be achieved through increasing access, improving quality and lowering the cost of healthcare delivery. The policy aims to achieve improved access to primary, secondary and tertiary services through a combination of public, private and non-profit healthcare service providers.

One of the drawbacks in the formulation of the National Health Policy is that it is mostly dependent on the private and non-profit health care services and does not clearly define the role of the government in strengthening the public health system and providing equitable, affordable and quality care to all. Also, the policy calls for major reforms across the healthcare sector but has limited funds to fulfil them.

#### Education

India had a total number of 37.4 million students enrolled in higher education in FY19. In 2020-21, there were 9,700 total AICTE approved institutes. Of the total, there were 4,100 undergraduate, 4,951 postgraduate and 4,514 diploma courses in AICTE approved institutes. The country is also emerging as one of the largest markets in e-learning after the US<sup>8</sup>. It is expected that this sector will reach US\$ 1.96 billion by 2021 with around 9.5 million users. 100% Foreign Direct Investment (FDI) had been allowed by the government in the education sector through the automatic route since 2002. According to the data released by Department for Promotion of Industry and Internal Trade (DPIIT), total FDI inflow in India's education sector stood at US\$ 3.2 billion between April 2000 and March 2020.

8 Education & Training Sector in India: Education System, Growth & Market Size | IBEF



The National Education Policy (NEP) 2020 was introduced by the Cabinet to bring about several significant changes in the entire Indian education system. The policy is aligned with the 2030 Agenda for Sustainable Development. This is a major step in the field of education taken up by the government after a prolonged gap of 34 years. The last education policy introduced was the National Policy on Education in the year 1986 and later modified in 1992. The only other major development in this field in between has been the Right of Children to Free and Compulsory Education Act 2009 which made free and compulsory elementary education in the country. Some of the major steps introduced in the policy include universalization of education from preschool to secondary level with 100% Gross Enrolment Ratio (GER) in school education by 2030.

The policy aims to increase the public investment in the Education sector to reach 6% of GDP at the earliest from current 4.4% (according to Budget 2017-2018). It also includes an open schooling system to bring back 2 crores 'out of school' children back into the mainstream schooling system. New educational structure of 5+3+3+4 curriculum has been introduced to replace the existing 10 + 2 system. The policy also aims for 3.5 crore seats to be added in the higher education sector and gross enrolment ratio to be raised to 50% from the current 26.3% (2018) by 2035. Multidisciplinary Education and Research Universities (MERUs) at par with IITs, IIMs, are also proposed to be set up as models of best multidisciplinary education of global standards in the country.

Technology and innovation will be used to make the education sector digitally empowered with the help of DIKSHA (Digital Infrastructure for Knowledge Sharing), an initiative of MHRD (Ministry of Human Resources Development)

#### **SPECIAL FOCUS**

launched in September 2017. An autonomous body, the National Educational Technology Forum (NETF), will be created to facilitate decision making on the induction, deployment, and use of technology, in education. According to Union Budget 2020-21, the Government had allocated Rs. 59,845 crore to the Department of School Education and Literacy.

Although the National Education Policy (NEP) 2020 is very important step taken up by the government, it has some shortcomings. The policy puts emphasis on digital education, but in a country like India, where almost 65% of the population lives in rural and unprivileged areas, there is shortfall in the digital infrastructure for the students of these areas. One of the main aim of the policy was to increase the public investment in the Education sector to reach 6% of GDP at the earliest, but according to the latest Union Budget 2021-2022, a total of Rs. 93,224 crore (Rs. 54,873.7 crore for school education and Rs. 38,350.6 crore for higher education) will be allocated for the Ministry of Education which is 6.13% less than the allocation made by the Union Government of Rs. 99,311 crore in 2020-21.

#### **Smart Cities**

In June 2015, the government announced a mission of developing 100 smart cities in India in a period of 5 years. The vision stated for this mission was "to drive economic growth and improve the quality of life of people by enabling local area development and harnessing technology, especially technology that leads to Smart outcomes." There are two components of mission- (1) the local-area development will be enabled through area-based development,

	Round 1	Round 2	Round 3	Round 4	Total		
No. of selected Cities	20	40	30	10*	100		
Period of Selection	Jan 2016	May to Sept 2016	Jun 2017	Jan 2018			
Total No. of Projects	829	1,959	1,891	471	5,151		
Investment (in ₹Crores)	48,064	83,698	57,393	15,863	2,05,018		
Avg. SCP Size (in ₹Crores)	2,403	2,092	1,913	1,586	2,050		

#### Four Rounds of Competition

\*Shillong selected in 100th Smart City in June 2018

Source: http://smartcities.gov.in/selection-process

During the next decade, the country is bound to experience huge growth in the infrastructure for which funds and investments would be required.



#### **SPECIAL FOCUS**

and (2) the existing citywide infrastructure will be developed through pan-city development.

An SPV was created for every city, which when selected would have 50-50 stakes of the ULB and the State/UT. The SPV is responsible for the planning, monitoring, managing of funds and the implementation of the mission at the city level. The smart city guidelines suggest convergence of the mission with other central programmes and schemes. The Atal Mission for Rejuvenation and Urban Transformation (AMRUT) was one of the key programmes linked to the mission since it envisaged urban renewal of physical infrastructure in the 500 selected cities with an allocation of Rs. 50,000 crore for 5 years. Other programmes like the PMAY scheme, Swachh Bharat Abhiyan and the HRIDAY scheme were also closely linked to the smart city mission.

A sum of Rs. 48,000 crore was approved for the smart cities between the years 2015 and 2019. Of the total approved budget, only half was allocated and of this only 75% had been released with a mere 36% utilization of funds. The budget allocation for smart cities for the year 2021 was Rs. 6,450 crore, similar to 2019 and 2020. According to the smart city mission a total of 5,151 projects were proposed out of which 2,255 projects have been completed <sup>9</sup>.

However, the smart cities mission has faced several challenges. The ground realty show that the ambitious smart city mission is lagging way behind its timeline. The selection of the smart cities was done in 4 rounds by creating a competitive format, due to which, for a 5-year mission, the selection process itself was going on for 4 years. The delays in the initially planned targets have now shifted the deadline to 2023. Delayed timelines aside, the key areas that need to be addressed for a successful implementation include better planning and governance. Each smart city plan should be robust and resilient such that the cities should not be planned as stand-alone cities. Better plans of how each city can be integrated in the existing ecosystem and complement their surroundings should be designed and implemented. The urban-rural linkages are essential in the Indian context and there must be synergy between the two. The target should not only be the development of the existing 100 cities, but how these would lead to sustained socio-economic development. The local government should have the capacity to take timely and effective decisions and be able to supply all services to all residents adequately and with superior quality.

#### Way forward

The government has been working on upgrading the infrastructure of the country in not only the urban areas but also the rural areas. The graph of the past five years would show a rapid increase in the overall development, except for the havoc caused by the pandemic in 2020. But the latest Union Budget 2021, highlights that the country is trying to recover and move ahead with resilience. Even so, there are a lot of bottlenecks that pose a serious concern in the robust development of Indian infrastructure.

The transport sector has been one of the worst hit sectors out of all due to the extended lockdown and complete or partial travel restrictions. This has also affected the PPP projects, as there will be a short fall in their revenues, especially the ones that rely on user fees, like the metro rails and the toll roads. Moreover, the government also need to focus on the health and education sector of the infrastructure. India's expenditure on public health has been a

9 http://smartcities.gov.in/#block-habikon-content



little over 1%, which has been consistent for the past many years. This is one of the lowest in the world according to National Health Accounts estimate. The covid-19 pandemic already exposed the vulnerable condition of our public health system. Hence, even post covid-19, the health sector should continue being a major area of focus since it's the basis of the human capital for the country. In case of affordable housing, less than 50% of the target has been achieved.

In India, the Smart City Mission has already completed five years but is lagging far behind its timeline. The mission has been picking some pace since 2018 but lot is yet to be done. If developed properly, the smart cities could have an extremely positive impact on the real estate sector. The sector is heavily dependent on corresponding infrastructure and availability of smart solutions providing a high quality of life. Further, developers are facing the challenges of lower FSI and densities owing to the already overburdened infrastructure. Stronger and smarter infrastructure provision could lead to enhanced FSI, which could in turn reduce the property rates leading to higher occupancy.

During the next decade, the country is bound to experience huge growth in the infrastructure for which funds and investments would be required. The government has already started working on several projects with partnership with private entities. The PPP model could be further explored and utilized better to fund various infrastructure projects considering the limitations of resources with the government.

The government has also relaxed several FDI regulations which would attract more investments in the infrastructure sector. InvITs are another means of attracting investments to aid the infrastructure players raise the required capital. A recent report by Colliers stated that investors' confidence is intact for investment in India's real estate post COVID-19. Given the various means of injecting funds in the Indian infrastructure sector, it can be expected that India has much to gain from its Infrastructural growth. In the coming years the infrastructure developed will be one of the key enablers in the success of the economy.

#### **Case Studies**



A bout 50 years ago, Singapore faced the challenges of overcrowding, poor living conditions and severe unemployment. Today, the city-state is an important global hub with world-class infrastructure and high standards of living. The government agencies' far sightedness and strong initiatives in planning have resulted in its present level of development. Two key sectors that can be taken as model cases for development in other developing nations like India include the transport and the housing sector.

#### Transport

The Land transport Authority (LTA) is a statutory body that spearheads the transport development in the city-state. Since its inception, LTA has had 4 rounds of planning, starting from the 1996 when the first white paper was produced with the key strategy of integrated transport and land-use planning and expanding the road network. The plan was thereafter revised in 2008, which was further revised in 2013 and then twice again targeting the years 2030 and 2040.

The modal share for public transport in Singapore was recorded to be 63% with a total of 7.54 million trips made every day in 2018, which LTA further plans to expand to 70% and 10 million respectively <sup>10</sup>. While planning for the expansion the government has tried to connect the island city-state by an integrated network of metro, bus, and walkways. The government has a people-centred land transport system, which has 3 key strategies

- (1) To make public transport a choice mode,
- (2) To manage the road usage, and
- (3) To meet the diverse needs of the people.

The first strategy aims at people preferring the public mode of transport and

9 www.lta.gov.sg/master-plans/pdf/LTMP-Report.pdf



#### Daily Ridership (in Million)

not owning a private vehicle. To achieve this, LTA is establishing a strong and integrated public transport system with the best facilities like affordable fares, improving bus speeds, reducing the waiting time and overcrowding. Through the second strategy the government has adopted a holistic approach that manages road expansion whilst restraining private vehicle usage for smooth movement of vehicles. An Electronic Road Pricing (ERP) system has been established to maintain the speed and congestion during the peak hours in high demand areas. Further, by charging a heavy parking charge and increasing taxes, the government is ensuring that the car usage is restrained. The third strategy aims at inclusivity. Since the social role of transport is to provide access to amenities and opportunities, the strategy aims at including various sections of the society such as the low-income groups, the elderly, wheelchair users, families with young children, pedestrians, and cyclists, whilst taking care of the environment.

#### **Lessons for India**

Comparing the land and transport model of Singapore with India, certain policies and guidelines can be adopted to improve the traffic management issues in the country. Singapore was facing a similar challenge of rapid urbanization in 1960 and 70s, which Indian cities are facing right now. The government had heavily invested ~30% of its GDP (during the growing phase) in improving the infrastructure over the years to achieve its current position. The public

Source: Land and Transport Authority (LTA)

#### **Case Studies**

#### SINGAPORE LAND TRANSPORT MANAGEMENT PLAN



transport system in Singapore has been able to decongest the roads and provide a smooth-flowing traffic. In India, the local and the state governments must create a robust and integrated public transport network in the cities to incentivize maximum people to use public transport.

The modal share of public transport for Singapore is 63% whilst in India stand at ~25% <sup>11</sup> (average of major Indian cities). A huge share of the population in India prefers the private mode of vehicles especially cars. India has been consistently working on constructing new roads and highways, flyovers, bridges and even bus rapid transit systems (BRTS) and metro rail networks. But it is crucial here to note how Singapore is not only developing new network but also restraining private vehicle usage, something which India has not been doing at all. Consequently, there is no disincentive to owning private vehicles in any Indian cities. On the contrary, the number of vehicles owned per family is only going up leading to increasing congestions, travel time, delays, pollution, wastage of fuel and frustration amongst commuters. The accessibility of the public transport for all the sections of the society in India is also highly questionable.

#### Housing

Singapore is often cited as a successful example of housing production

11 https://iihs.co.in/knowledge-gateway/wp-content/uploads/2017/11/Chapter-Urban-Transportation.pdf

Source: Singapore's land transport management plan (anu.edu.au)



amongst Asian cities. Majority of the housing stock produced in the city is developed and built by the Housing & Development Board (HDB), which is the key government agency looking after public housing in the city. More than 75% of the total housing stock in the city belongs to the HDB. They not only aim at providing affordable housing but also to provide good quality houses with all the basic amenities and recreational spaces. Singapore has a separate authority, known as the Singapore Land Authority, whose mission is to optimize the land resources for social and economic development. All the property transactions in the city including the private or through HDB are maintained by this authority. About 90% of the total land in the city belongs to the state, which is one of the key reasons for its successful and affordable public housing delivery.

While land plays a key role in the success of housing, there are other policies and eligibility criteria which create significant impact and social inclusion. HDB targets almost all sections of the society, having special provisions for the lower income groups and physically challenged. According to a report by Asian Development Bank Institute (ADBI), Singapore has one of the highest home ownerships at 90%. The Central Provident Fund (CPF) has helped achieve the citizens to own a property (on 99-year lease) by making compulsory social security savings for employees managed by the state. The employer and the employees must contribute a certain percentage of their salary to the fund, which can be later used for making down payments or paying instalments. Further, the state has imposed certain conditions after buying for the minimum occupation period, resale, and renting. These conditions restrict the occupiers from selling and renting the property to other users, promotes personal usage and ensures the control in the hands of HDB.

#### **Case Studies**



#### **Lessons for India**

The key difference between the Singapore and Indian housing provision is that in Singapore the land is owned by the state. This clears the hurdles of land acquisition and reduces the burden of huge land costs on the units. Undoubtedly, it is almost impossible for the Indian government to take over the ownership of all land in the country. Even then, takeaways can be taken from the public housing of Singapore. The Singapore model can be implemented for the land parcels reserved for the affordable housing through the Town Planning (TP) schemes. Many Indian cities are still not using TP schemes, but its effective implementation can bring out good quality of development. In the TP scheme, the land is reserved for provision of basic infrastructure and amenities. A percentage of this can be used for constructing affordable housing, which could have occupancy conditions like the Singapore model.

On comparing the existing PMAY scheme in India with Singapore's housing model, it can be seen that in India the target group is mainly based on affordability i.e. the income groups. Certain additional provisions should be given in the Indian housing sector to the undeserved sections of the society to make the policy more inclusive and effective.

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Metric	Singapore	India
GDP per capita (USD)	63,987	2.127
Population (million persons)	5.7	1.352
Infrastructure quality (0-100 best)	95.4	68.1
Infrastructure investment (% of GDP)	1	4.5
Private infrastructure investment (5-year average, USD millions)	635.4	1.314
Infrastructure gap (% of GDP)	0	1

Source: infracompass. gihub.org/comparecountries/ providing affordable housing but also to provide good quality houses with all the basic amenities and recreational spaces. Singapore has a separate authority, known as the Singapore Land Authority, whose mission is to optimize the land resources for social and economic development. All the property transactions in the city including the private or through HDB are maintained by this authority. About 90% of the total land in the city belongs to the state, which is one of the key reasons for its successful and affordable public housing delivery.

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**Case Studies** 

## United Arab Emirates (UAE)

The UAE is a federation of seven emirates, namely, Abu Dhabi, Dubai, Sharjah, Ras Al Khaimah, Ajman, Umm Al Quwain, and Fujairah. Abu Dhabi with a population of 1.48 million is the capital city of UAE, while the country's largest city is Dubai with 3.38 million population as of 2020. Both cities have observed a tremendous development in different urban sectors during the past few decades ranging from world class services to innovative policies combining them with latest technologies. Both the cities of Dubai and Abu Dhabi have been pioneers in sustainable public transportation.



#### Transport

The Abu Dhabi Department of Transportation (DoT) has made rapid improvements in this sector in the last few years through initiatives taken to promote sustainable public transport under the Abu Dhabi Transportation Mobility Management Strategy and the Surface Transport Master Plan (STMP). By 2030, the Abu Dhabi Transportation Mobility Management Strategy mainly aims to integrate the use of the existing and planned transport and land-use infrastructure through a network of multi-modal transport network thus reducing the dependency on private vehicles.

The Surface Transport Master Plan 2030 (STMP) is aimed to create a multi-billion Dirham integrated system of transport services comprising of regional rail, metro rail, trams, buses, taxis, water taxis, ferry service, park & ride, highways, and more. Apart from high capacity regional rail network, a metro rail network of 130 km is due completion by 2030. This will consist of a main loop and secondary lines connecting the CBD, capital city, airport and other important locations.



#### **Case Studies**

The high-density development areas will also be served by a large-scale tram network of 340 km of two-way track having stops within a walkable distance of 300 meters. Both the tram and metro stops will have integration with bus and taxi networks for seamless commute transfers. Water services like ferry and water taxi will also be integrated with the land transport modes for a truly multi-modal transport options for the commuters. Abu Dhabi is also venturing into futuristic sustainable transport modes by implementing the Personal Rapid Transit (PRT) concept in the city of Masdar, which features small solar powered programmable vehicles.

Real time multi-modal transport information is updated to the commuters through the Suhail app in Dubai and Derby app in Abu Dhabi. The Dubai police also devised a reward system of 'white points' to motivate those driving cars to abide by traffic laws and regulations. Apart from these, other policies like parking management and peak time parking charges within the Central Business District, park & ride facilities, congestion pricing are also in practice in both the emirates.

Both these emirates have provision for integrated smart cards. Nol cards are used in Dubai for availing all forms of public transport payments, which also has subsidised fare system for students, senior citizens, and people with special needs, whereas Abu Dhaabi has 'Hafilat Smart Card' for specially abled people where they can enjoy unlimited free access to city buses of Abu Dhabi and suburbs.

The Low Emission Vehicles Strategy of Abu Dhabi supports and provides strategies to increase the use of low-emission vehicles, both electric and hybrid, as well as vehicles using natural gas, in the emirate. In Dubai, the Supreme Council of Energy launched the Dubai Green Mobility initiative in 2015, which helped record the procurement percentage of hybrid and electric vehicles at 8% by the end of 2019.

#### **Lessons for India**

India can also embrace some of these transport policies like integration of its



#### **Case Studies**

various modes of transport system. Although the country has a varied range of public transport system ranging from suburban trains to para transit vehicles, most of these operate independently without any integration. Where there is provision and potential for water transport, these are poorly connected with the land transport and thus suffer ridership losses, which in turn leads to financial losses.

Integrated smart cards with subsidized fare system for students, senior citizens and specially abled people can be adopted by India. A tropical country like India can also run public vehicles on solar power. India is also gearing up on the move to adopt green mobility with the adoption of electric vehicles with the help of policies like National Electric Mobility Mission Plan (NEMMP) 2020 and Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME).

#### Water Supply

Recycled Water Policy was launched by Abu Dhabi Department of Energy (DoE) in 2019, which aims for optimal usage of recycled water. The policy compels the relevant entities to comply with the terms and conditions and requirements of purchasing, transmitting, distributing, supplying, and storing recycled water in a safe, efficient and economical way.

#### **Lessons for India**

India is one of the largest consumers of fresh water in the world, which in turn generates a considerable amount of wastewater and grey water. Effective wastewater management should also be adopted in India to include safe, hygienic, and economical usage of recycled water in the system.

#### Waste to energy production

The Policy for Energy Production from Waste (EFW) was launched by the DoE to enhance Abu Dhabi's strategies in both the energy and waste management sectors that affect supply and demand in the local energy sector. The policy outlines a set of relevant procedures, namely, coordinating between the energy and waste management sectors in Abu Dhabi; developing and selecting waste-to-energy projects; setting processes to cover costs and set prices for energy generated at waste-to-energy power plants; licensing, regulating, and monitoring waste-to-energy power plants; and outlining the Emirates Water and Electricity Company's commitments.

Construction of waste to energy plant is also in process in Dubai. The project will fulfil Dubai Municipality's vision of making Dubai the most sustainable and smart city by 2021, while also achieving their National Agenda's objectives for a 75% reduction in the number of landfills by 2021. The plant when completed will be able to process 6,000 tonnes of waste every day, producing 200 megawatts of energy <sup>12</sup>.

#### **Lessons for India**

India is also focusing on the waste to energy sector with more than 90 waste-to-energy projects. One of the challenges faced by this country is the large amount of unsegregated wastes being collected every day. However, these are not sufficient to manage all the landfill and energy needs of the country. Thus, we need to multiply our efforts in this direction at a rapid pace.

<sup>12</sup> https://asia.nikkei.com/Business/Energy/Dubai-plans-world-class-waste-to-energy-plant-run-by-Itochu



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\*T&C apply. Taxes as applicable. "Note: 1 sq. m. = 10.76 sq. ft.

### IT Kanpur Launches Diploma Programme in Geodesy

ndian Institute of Technology (IIT) Kanpur has announced the launch of a new programme- Diploma in IIT Geodesy, the science of measuring the Earth.

The new program, approved by the Board of Governors of the IIT, will be offered by the Department of Civil Engineering in three broad areas: Geodesy, Navigation and Mapping and Remote Sensing and GIS. The science of Geodesy has applications in monitoring earthquake, volcanic eruptions and landslides, and weather hazard recognition and response, soil health, water resources, drought surveillance, climate change including monitoring the polar ice cover, oil spill clean-ups, GPS timing and autonomous vehicle development.

The new D-IIT program will be open to candidates from



different backgrounds including Civil Engineering, Computer Science, Information Technology, Electrical and Electronics, Mining, Geoinformatics, Physics, Mathematics, Earth Science, Environmental Science, Geography, etc., with requirements for the MTech / MS(R) program of Geoinformatics specialization in Civil Engineering.

The one-year Diploma programme will add to the skillsets of working professionals from government institutions, industry, faculty members, and researchers in academic institutions involved in teaching and R&D in the areas of civil engineering, exploration, mapping and geo-information systems.

Dr Radhakrishnan, Chairman Board of Governors, IIT Kanpur said, "The D-IIT programs launched at IIT Kanpur will raise the national capability in Geodesy and Navigation and Mapping besides impelling advance data analytics into Remote Sensing and GIS." Prof. Abhay Karandikar, Direc-

#### Edusphere

tor, IIT Kanpur said "Geodesy is an area where well-qualified technical human resources, research activities, and geodetic infrastructure are required at the national level for the fast-developing infrastructure requirements in the country today. The National Centre for Geodesy (NCG) has been established to enhance expertise in Geodesy and allied areas. The Centre's primary aim is to act as a hub of excellence in teaching and research in Geodesy, both at the national and the international level. An important mandate is to generate highly qualified manpower in Geodesy and relevant disciplines. The initiation of the DIIT program is a step forward towards achieving this mandate."

Financial assistance for the D-IIT programme in Geodesy has been made available through the National Centre for Geodesy (NCG), supported by the Department of Science and Technology (DST), Government of India.





**Raincoat** offers protective cover for Sree Ramakrishna Advaitha Ashram

V.K. Jinachandra Babu

#### The problem

The main building of the Sree Ramakrishna Advaitha Ashram at Kalady, near to Cochin international airport, was an interesting case for us. The structure, which is 30 years old, had developed severe leakage at many areas of the bottom slab. Heavy load (grade concrete) had also affected the mother slab.

The top of the mother slab had peeled off at many places water was accumulating inside the concrete, resulting in the water entering the crack of the mother slab causing leakage below. There was also leakage in interior wall of the building as rainwater penetrated through the cracks on the wall, affecting the inside wall of the building.

We conducted hammer testing, moisture testing, etc., with the permission of the Ashram authorities and found the cause of leakage and its source to be the broken concrete portion We recommended removal of the all broken concrete portions with help of a structural engineer. The engineer then had a new concrete layer put on top of the mother slab, maintaining the slope of 1 in 100 with proper drainage system. After the water curing period, we suggested application of three layer Newcoat premium (terracotta) as suggested by the Ashram.

#### **Challenges faced**

The main cause of the leakage in the roof was heavy load of the broken concrete on the mother slab. As a result, cracks had developed in the





![](_page_60_Picture_2.jpeg)

mother slab area causing water to penetrate through this crack to the interior of the Ashram. There was also leakage through the exterior cracks during rain.

#### Action taken:

Removed the existing concrete/screed from the mother slab and reworked it. After curing the concrete layer for 28 days, the surface was cleaned and angle fillet (50mm\*50mm) was made between slab and the vertical parapet wall. This was followed up with Newcoat application from threshold area, angle fillet area of the slab (11tr/20sqft/3 times), after the Prime seal application with an interval of 6 to 8 hour. Ensured the grid marked (2m\*2m) on prime seal area for getting the correct coverage before the application of new coat under the three coat system. Total DFT was 1000 micron and after 7 days' proper air curing people were allowed to step on it.

On the exterior wall, the surface was cleaned of algae, moss/fungal growth were treated with biocide wash solution. All cracks were filled with (up to 10mm) repairing range of products such as Crack X paste and Shrink Free and cracks of more 10mm size were filled with PMM (URP modified mortar). After this, WPC was applied in single coat maintaining the coverage per litre 40 sqft with DFT of 130 micron. After 24 hours, a single coat of Raincoat Select was applied maintaining coverage of 65sqft per litre with DFT 210 micron (including raincoat system).

![](_page_61_Picture_0.jpeg)

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# Sany India launches its first 'Made in India' Piling Rig

any India, global major in the construction equipment Industry, has launched its first 'Made in India' Piling Rig, 'SR235' for the Indian market. With the best in class features, the new SR235 manufactured at Sany's state-of-theart manufacturing plant in Pune, Maharashtra, will give a boost to the government's 'Make in India' programme.

production base. Sany India has been majorly focusing on local manufacturing and technology, which would gradually reduce our country's dependence on construction equipment imports and would work as a vital cog in the wheel of the 'Make in India' initiative.

#### Develope"

It is noteworthy that with the launch of the piling rig, Sany India has further strengthened its local

Mr. Sanjay Saxena, Vice President & Business Head, Heavy Equipment, Sany Heavy Industry India Pvt. Ltd, said, "With the launch of our first ever Made

![](_page_62_Picture_6.jpeg)

![](_page_63_Picture_0.jpeg)

India SR235 piling rig, Sany India has reaffirmed its commitment to the 'vocal for local' initiative. Since day one, localization has been our prime focus and we have been strongly advocating and practicing the same."

He highlighted that for four years now, Sany India has been at No. 1 position in the piling rig segment with a dominant market share in the Indian market. Apart from piling rigs, the company also manufactures excavators, truck cranes, mining trucks, concrete boom pumps, transit mixer trucks, trailer pumps, and other equipment in the county. He further stressed that while localization would benefit the company and its customers, it would pave the way for largescale employment of youth.

Latest to join the Sany's piling league, localized SR235 piling machinery boasts of high efficiency and performance. It comes loaded with an impressively powerful 'Isuzu' engine producing 275 KW@2000 rpm with six gear control which significantly enhances its power and drilling capacity. For high-efficiency rotary drive, 13-15m friction Kelly and 12-15m interlocking Kelly made of high strength steel tubes are available in the piling rig. Its maximum output torque reaches 235kN.m, the maximum pile depth is 68m down, and the maximum pile diameter is 2000mm.

Furthermore, the machine is suitable for other common foundation work including drilling with continuous flight auger, double rotary head or Kelly bar, soil mixing, and piling work with a hydraulic hammer.

It is pertinent to mention that, Sany India, the leading global manufacturer of construction equipment in the country has carved a niche in the manufacturing space with its advanced robust products and ease of serviceability. With this new SR235, Sany is optimistic that the Indian construction scenario would take a quantum leap into a new dimension of utility application and herald a new era in the industry.

To provide round the clock customer service, Sany India has also set up a toll-free number 1800209337 for all queries related to sales and services. Customers can also obtain product related information & make enquiries through WhatsApp on 7058024625.

Sany India was incorporated in 2002 and offers the widest range of construction machinery in India and South Asia. In 2012, Sany India invested more than Rs 500 crore to develop infrastructure for R&D, manufacturing, quality inspection, testing, and service at their manufacturing facility at Chakan in Pune. Through this facility, the company operates in four business verticals viz: excavator, heavy equipment, concrete machinery, and renewable energy.

Presently, Sany India offers products like excavators, truck-mounted cranes, all-terrain and rough terrain cranes, crawler cranes, transit mixers, batching plants, boom pumps, trailer pumps, piling rigs, motor graders, pavers, compactors, reach stackers, rubber tyred gantry cranes, rail-mounted gantry cranes, mining equipment, wind turbine generators and many more.

The company has already established a strong network of around 36 dealers across India to cater to the growing demand and provide support to all its customers & associates. Sany has more than 15000 machines delivered on the ground, contributing to infrastructure development projects in India and other South Asian countries.

Owing to its widest product range, superior build quality, service commitment, innovative solutions, and global expertise, Sany India has achieved market leadership in various construction equipment segments. With the Government of India's focus on infrastructure development and modernization, the company is poised for tremendous growth.

![](_page_65_Picture_0.jpeg)

## **SWISH COATINGS** Lasting protection for roofs, terraces and walls

![](_page_65_Picture_2.jpeg)

hcoatings.com

#### **PRODUCT WORLD**

R oofs and terraces need special care, from harsh sunlight and heavy rainfall. With the construction boom of the last two decades, the need for water-proofing and heat deflection has also increased. This is opened up a huge market for roof care products across the country and an entire industry supplying a wide variety of roof care products.

Among the key players is Swish Coatings, a young ISO certified manufacturing company, located about 12 kms. from Coimbatore city. It started commercial production in 2009 and currently has a production capacity that is tuned to the requirements of the market.

Swish Coatings is mainly focused on production of Solar Reflective and Water Proofing coatings and allied products for the construction industry. Swish Coatings' Roof Shield (solar reflective and water proofing) is a dual purpose product that can be used for solar reflection (heat reduction) and water proofing.

Swish Coating has been marketing its products across India and in the Gulf countries, proof that its roof and terrace care products are widely accepted by customers in India and abroad.

Swish Coatings has been exporting its products through its partner concern, M/s Dhanalakshmi Industries, Coimbatore, to M/s Union Power Technical Services LLC., Dubai. Roof Shield has been tested in Dubai Central Laboratory as per ASTM Standards and certified for its quality and performance.

The certification notwithstanding, Swish Coatings is hard at work in its R&D division to improve the products based on feedback from the field.

#### **Roof Care Range of Products**

Roof Shield: Solar reflective and waterproofing for roofs and terraces

Roof Coat-016: Waterproofing/leak arresting for roofs

Roof Cool-018: Solar reflective and water repellant for roofs and walls

**Roofin 2K:** Slurry water proofing cementitious (including concrete, fibre-reinforced, acryl-ic-based) for bathrooms, tanks etc.

**Glass Coat\*:** Solar reflective, thermal insulative, ecco insulative and water repellant coating for pain glass panels for bathrooms, tanks etc.

Crack Sealant-016 Fibre-reinforced acrylic based, water repellant, crack filling for cracks on roofs and walls made of concrete etc.

**Roofcryl-017:** Transparent, acrylic based, water repellant coating for granites, tiles etc. Roof Care Range of Products

#### **Common Salient features:**

- 1. Acrylic based and hence UV resistant, water repellant, long lasting etc.
- 2. Fast drying coating compared to any other coating available and hence ideal for places like Kerala. Second and third coatings can be done continuously if the area is above 500sq. ft by a person without any break.
- 3. No peeling off even after years which is otherwise common in almost all acrylic based coatings.

![](_page_67_Picture_0.jpeg)

- 4. Two part Component and hence better than single component product.
- 5. All results based on actual field testing by Swish Coatings and not on certificates from labs in stimulated conditions.

#### **Roof Shield**

#### Solar reflective wateroproofing for all types of roofs and terraces.

Roof Shield is one of the best products available in the market with solar reflective and waterproofing properties combined in a single product.

Roof Shield, an innovative solar re-radiating compound, is being formulated by Swish Coatings after thorough research and field testing.

Roof Shield acts as solar insulator as well as leak arresting coating. The active chemical components (including imported UV protecting chemicals) in Roof Shield yield a flexible water proof coating and it minimizes the thermal build up. Roof Shield acts like a shield to prevent roof expansion and contraction, besides reducing the chance of roof leakage, and it lasts long.

Roof Shield is a mixture of high grade acrylic resin and specially graded and selected additives and, with fibre, it dries by evaporation to yield a tough, flexible, non-yellowing abrasion resistive and water repellent surface. It can be applied on all surfaces such as concrete, asbestos, tiles, galvalum, aluzinc, etc.

#### Features & Benefits

- Minimizes thermal expansion and contraction of buildings.
- Reduces the surface temperature by up to 21\*C during summer and thereby reduces the room temperature considerably
- Reduces the working hours of air conditioners and similar equipment
- Leads to lower power consumption and saves money on electricity usage
- Film thickness provides higher dry film thickness of 180 to 200 microns after three coat application
- Drying Time: Fast drying (within 30 minutes) facilitates application of second coat if exposed to direct sunlight
- Suitability: Can be used for flat as well as sloping roofs
- Strength: Higher tensile strength, shear resistance and bond strength with cementitious substrates
- Resilience: Forms highly elastic and resilient coating, thereby helping to withstand structural movements
- Abrasion resistant: No additional protective coating is required for roof subjected to foot traffic

#### **PRODUCT WORLD**

- Low weight addition: Light in weight does not add extra weight on the roof
- Non-toxic: It is non-toxic in nature and lead-free
- Easy to apply. Can be applied using a brush
- Most Economical

#### Roof Cool- 018

#### Solar reflective and waterproof coating for all types of roofs and terraces

#### Surface Temperature Reduction up to 16\*C during peak Summer

#### **Features and benefits**

- 1. Reduces room temperature. Reduces the working hours of air conditioners and similar equipment.
- 2. Leads to lower power consumption a saves money on electrical usage.
- 3. Drying time Fast drying Within 30 minutes, second coat can be applied if exposed to direct sunlight
- 4. Durability Resistant to UV and weather conditions
- 5. Abrasion resistant no additional protective coating is required for roof subjected to foot traffic
- 6. Easy to Apply Can be applied by brush easily
- 7. Weight addition light in weight does not add extra weight over the roof
- 8. Most Economical
- 9. With 4 kg of Roof Cool-018 pack about 400 sq.ft area can be covered Single Coat

#### Roof Coat- 016

- 1. Waterproofing/Leak Arresting Coating for all Types of Roofs and terraces
- 2. Fibre-enriched Acrylic Based Coating

#### **Features & Benefits**

- 1. Fibre-Enriched
- 2. Fast Drying -Within 30minutes, second coat can be applied if exposed to sunlight
- 3. Suitability can be used for flat as well as sloping roofs
- 4. Strength higher tensile strength, shear resistance & bond strength with cementitious substrates

![](_page_69_Picture_0.jpeg)

- 5. Durability Resistant to UV and Weather conditions
- 6. Abrasion resistant no additional protective coating is required for roof subjected to foot traffic
- 7. Easy to apply. Can be applied using a Brush. Less Expensive and Long Life

#### Roofin 2K

Roof Coat - Slurry Waterproofing/Leak Arresting Coating for

#### **Bathrooms before laying Tiles**

#### Fibre-enriched Acrylic Based Coating

#### **Features & Benefits**

1. Water permeability -excellent resistance to ingress of water.

- 2. Slip resistant provides slip resistant coating.
- 3. Adhesion excellent adhesion to concrete, and other natural stone.
- 4. Waterproof for concrete structures.
- 5. Abrasion resistant highly abrasion resistive.
- 6. Easy to apply. Can be applied using a Hard Brush.
- 7. Less expensive and long life

#### **Glass Coat\***

#### Roof Coat - Solar Reflective, Thermal Insulative, Ecco Insulative Water Repellant Coating for Plain Glass Panels

#### **Features & Benefits**

- 1. Available in different and desired Tints to suit the walls' colour
- 2. Reflects as well as retards transfer of heat and thus reduces heat gain inside the room in summer
- 3. Gives ground glass finish- Translucent Finish
- 4. It can be applied on all types of plain glasses
- 5. Highly water proof properties
- 6. Excellent bonding to plain glass
- 7. U. V. resistant qualities
- 8. Long lasting

#### **PRODUCT WORLD**

9. Can be applied with spray gun

#### Tank Cool- 018

Roof Coat - Solar reflective, water repellant coating for plain Sintex model plastic water tanks

#### **Features & Benefits**

- 1. Reduces surface temperature upto 14\*C during summerShort drying time –Dries within 30minutes. Second coat can be applied within 30 minutes if exposed to direct sunlight
- 2. Long durability Resistant to UV and weather conditions and lasts for years
- 3. Abrasion resistant no additional protective coating is required
- 4. Easy to Apply Can be applied by brush easily
- 5. Keeps the water cooler.
- 6. Less expensive
- 7. Area coverage
- 8. With 2kg of Tank Cool 018 pack about 75 sq.ft can be covered -2 coats

#### Crack Sealant- 016

An innovative 2 Part fibre-enriched compound for filling cracks up to 5 cm gap on concrete or cementitious substrate before applying roof care range of products.

#### **Features & Benefits**

1. Fibre reinforced

- 2. Fast drying Within 1-2hours, first coat can be applied on it if exposed to sunlight
- 3. Suitability can be used for flat as well as sloping roofs
- 4. Strength higher tensile strength, shear resistance & bond strength with cementitious substrates
- 5. Durability Resistant to UV and weather conditions
- 6. Water repellant
- 7. Abrasion resistant highly abrasion resistive.
- 8. Easy to apply. Can be applied using a putty blade.
- 9. Less expensive and long life

# Adani Enterprises, DP Jain & Co win in NHAI's TOT 5<sup>th</sup> bundle auction

Chenab bridge
#### **BIG INFRA WORLD**

A dani Enterprises and DP Jain & Co have outbid their competitors, including Canadian firm Canadian pension fund Caisse de dépôt et placement du Québec (CDPQ) and Singapore-based Cube Highways for two bundles in the fifth bundle of highways auctioned by the the National Highways Authority of India (NHAI) under the toll-operate-transfer (TOT) mechanism. The TOT model has been developed to encourage private participation in highway development. The two bundles have a combined length of 159.5 km, the first bundle size being 53.6 km and that of the second 105 km. NHAI has offered a 20year lease period for the two bundles with a total length of 159.5 km, both toll roads located in Gujarat. Among the domestic firms which had submitted technical as well as financial bids were IRB Infrastructure, Adani, Prakash Asphalting & Toll Highways (PATH) and the Nagpur-based DP Jain. Adani Enterprises won the first bundle with a financial bid of Rs. 1,011 crore. The next closest bidder a special purpose vehicle of the Canadian pension fund Caisse de dépôt et placement du Québec (CDPQ) which had quoted Rs. 646 crore.



DP Jain and Co. had quoted Rs. 603 crore, Prakash Asphaltings & Toll Highways (India) Ltd had quoted Rs. 555.55 crore), IRB Infra Rs. 518.4 crore and Cube Highways Rs 345 crore.

DP Jain & Co won the second bundle quoting Rs. 1,251 crore, beating CDPQ, which had quoted Rs 1,043 crore, Adani Enterprises (Rs. 944 crore), Prakash Asphaltings & Toll Highways (India) Ltd (Rs. 535.10 crore), IRB Infra (Rs. 408.6 crore) and Cube Highways (Rs 182 crore).

Under the TOT model, concessionaire has to pay a one-time concession fee upfront, which then enables the concessionaire to operate and toll the project stretch for the pre-determined 30 year concession period. This model is applicable to EPC and BOT (Annuity) highway projects, which have completed at least 2 years since the date of completion.

In the Budget for 2020-21, the NHAI had been given permission to monetise 12 such bundles covering over 6,000 km which is expected to mobilise around Rs 60,000 crore till 2024.

#### L&T to build two units of Kudankulam Nuclear Power Plant

Construction major Larsen & Toubro (L&T) has bagged the contract to build the 5th and 6th units

of the Kudankulam Nuclear Power Plant in Tamil Nadu.

The company has not revealed the exact value of the order, the contract falls under 'significant' category which ranges between Rs 1,000 crore to Rs 2,500 crore. The Kudankulam Nuclear Power Plant is India's first Light Water Reactor (LWR) of 6 units with a generation capacity of 1000 MWe each.

The contract is for construction of the reactor building, reactor auxiliary building, turbine building, diesel generator building and other safety related structures in 64 Months. The L&T is currently engaged in similar work at Kudankulam 3 and 4 units.

## Pune to have 170-km ring road costing Rs. 26,000 crore

The Maharashtra Government plans to give a big push to Pune's development with a ring road having a total length of 170 km. and costing an estimated Rs. 26,000 crore. Land acquisition for the project will begin this year.

The project was announced by Maharashtra Deputy Chief Minister and Finance Minister Ajit Pawar, who pointed out that a large number of passenger and goods vehicles from Konkan, Marathwada, northern Maharashtra and other parts were cur-

### **BIG INFRA WORLD**



rently passing through Pune disrupting smooth movement of traffic in the city.

Mr. Pawar said the government also proposed to constitute a finance development corporation under the State Public Works Department (PWD) to raise funds for improvement and regular maintenance of 3,03,842 kilometres of national highways, state highways, district and rural roads passing through the State. Simultaneously, all old diesel buses of MSRTC would be converted into CNG and electric ones at an estimated outlay of Rs.1,400 crore, he said.

## World's highest railway bridge nearing completion

Indian Railways is well on track to achieve another engineering milestone with Chenab bridge in Jammu and Kashmir, being built above the Chenab River having a height of 359 metres, 30 metres taller than the Eiffel Tower. When completed, it would be world's highest railway bridge.

The bridge is popularly known as Anji Khad Bridge, and its overall length is 1,315 metres. It will be India's first cable-stayed railway bridge and will be a key link in the 111-km stretch between Katra and Banihal which is part of the Udhampur-Srinagar-Baramulla section. Railway authorities say the bridge will be able to withstand up to 8 magnitude earthquakes and high-intensity blasts.

#### Ayodhya airport to become functional next year

The Ayodhya airport in Uttar Pradesh is expected to become functional early next year.

The Uttar Pradesh government has released Rs. 321 crore, forming part of the Rs. 1,0001.77 crore approved by it for land acquisition for the project. Earlier, the Centre had released its share of Rs. 250 crore. So far, 377 acres of land have been made available to the Airports Authority of India (AAI) for the development of the airport.

The Uttar Pradesh Government is also planning construction of a new terminal for the Chitrakoot airport. The airport at Chitrakoot, situated on the border of Madhya Pradesh amidst the Vindhyachal mountain ranges, is expected to spur religious tourism and contribute to the development of the Bundelkhand region.

The 296-km Bundelkhand Expressway, which is also under construction, starts from Chitrakoot, which is one of the six nodes of the defence corridor.



## Maharashtra cuts real estate premiums by 50%

Noting that the Covind 19 pandemic has dealt a big blow to the housing sector in the commercial hub of India and other parts of the State, the Maharashtra government has decided to reduce all premiums related to the sector by 50%. The reduction in premium cost will help soften the prices and help revive buying. The reduction in premium will benefit all stakeholders-the developers, who will have to bear only reduced construction cost, and customers, with lower prices. The government would also stand to benefit as the measure will revive the sector and result in increase in premium and levy collection.



### 72-acre township project in Kolkata: Ambuja Neotia, Satyaa sign deal

The Ambuja Neotia group has signed a major development deal with Satyaa Homes to develop a 72-acre township project at Kolkata's Rajarhat. The total retail sales value of the project units is estimated at Rs. 3000-4000 crore. Prominent micro-market in the north-eastern parts of Kolkata, Rajarhat is an important employment hub as it is home to major IT-ITeS companies. The area is also situated in close proximity to the Sector V, Salt Lake and the airport.



#### Port city of Kochi breathes easy with two major flyovers

The fast-growing Kochi city can breathe a little easier now that two major flyover projects have been commissioned on National Highway which virtually cuts through its central business district. The first of these is located at the .Vyttila junction, considered to be the busiest junction in the state with an estimated 13,000 vehicle crossings every hour. The 720m long flyover has 12m width on both sides and has three lanes. A metro rail bridge passes over the Vyttila flyover at a height of 5.5m. The second flyover, located at Kundannoor, some 2 kilometres away, is 800 m long. Work on the two flyovers was launched on March 26, 2018, at an estimated cost of Rs 74.45 crore. Contrary to the normal practice, both the projects were completed within the stipulated time-frame, saving approximately Rs 8.29 crore. Traffic flow beneath the flyover is being regulated using a signal system installed by the Cochin Smart Mission Limited (CSML).

# Salasar Techno wins contract to install ballastless tracks for Bengaluru metro



Salasar Adoruus Infra LLP, a subsidiary of Salasar Techno Engineering Limited, the India-based conglomerate in the engineering and infrastructure industry, has received the contract from TexmacoRail and Engineering Ltd. for the installation of ballastless railway tracks for the Bengaluru Metro Rail Corporation. SalasarTechno will build the ballastless track for about 175 km stretch. The company plans to complete work on 5 km every month. The design for ballastless tracks is highly consistent in track geometry and ensures longevity with low maintenance.



#### Rooftop solar industry seeks amendments to Electricity (Amendment) Rules 2020

The rooftop solar industry has urged the government to allow net-metering above 10 kilowatt and to remove compulsory gross metering above 10 kW. These changes, the industry says, would help high load consumers to move to clean localised energy, ensuring large-scale adoption of distributed solar energy. India has set an ambitious solar energy generation target, including 40 gigawatt (GW) rooftop by 2022.



KVIC to launch eco-friendly non-toxic wll paint

The Khadi and Village Industries Commission (KVIC) has launched an eco-friendly and non-toxic paint with anti-bacterial properties. The Khadi Prakritik Paints is a first of its kind product based on cow dung as its main ingredient. It is cost-effective as well as odourless and has been certified by the Bureau of Indian Standards (BIS). This paint is available in two forms--distemper paint and plastic emulsion paint, The paint, with anti-fungal and anti-bacterial properties, is free from heavy metals like lead, mercury, chromium, arsenic and cadmium. This technology will increase the consumption of cow dung as a raw material for eco-friendly products and will generate additional revenue to farmers and gaushalas. This is estimated to generate additional income of Rs. 30,000 per annum per animal to the farmers.

## HAPPENINGS

## London Build Online (March 15-24, 2021, virtual)

London Build Online, Britain's largest online construction event, will take place from March 15 to 24, 2021. London Build is the leading and largest construction and built environment show for London. With 100+ speakers and 1000s of attendees, this event is a must-attend for contractors in Europe, Middle East and Africa (EMEA) regions. The event also has a 'Women in Construction' networking event – all virtual this year.



### 'Smart Cities India 2021' expo at New Delhi from March 24 to 26

The annual Smart Cities India 2021 expo would take place at the Pragati Maidan, New Delhi, from March 24 to 26, 2021.



Since its launch in 2015, the Smart Cities India expo has developed into Asia's largest trade fair and conference on the subject. The event is organised by the India Trade Promotion Organisation (ITPO) & Exhibitions India Group and feature key verticals that make up the smart city framework of Smart Cities, including buildings, solar, transport, water, etc.

As many as 360 exhibitors are expected to participate in the expo that would cover 20,00 sq. metre area. The organisers are expecting over 16000 attendees to hear 292 speakers scheduled to address 49 sessions. As many as 2003 delegates from 45 countries have registered for the conference, which would have 42 startups in attendance.

## EnviroTech 2021 online meet on April 20-21

World Cement is organising EnviroTech 2021, an online conference focused on the latest technologies and best practices to reduce the cement industry's environmental footprint, on April 20 and 21, 2021.

The conference will feature a range of technical presentations from leading cement companies covering topics such as emissions reduction, energy efficiency, alternative fuels, environmental control systems, clinker substitution, waste heat recovery, carbon capture, storage and utilisation.

## 'INDIA STEEL 2021' at Mumbai from April 22 to 24

INDIA STEEL 2021, the 5th international exhibition and conference will take place at the Mumbai Exhibition Centre, Mumbai, from April 22 to 24.



A joint initiative of the Ministry of Steel, Government of India,

and the Federation of Indian Chambers of Commerce and Industry (FICCI), it is intended as a platform to all stakeholders in the steel and other related industries to interact with each other and explore new business avenues.

The conference has SAIL, JSW and TATA Steel as principal partners, NMDC and Jindal Steel and Power as co-partners, MSTC, Jindal Stainless and Essar as associate partners and Tata Communications as technology partner. The other partners are: World Steel, Thyssenkrupp, Wellspun Group, Deloitte, Kemar Automation and Material Recycling Association of India.

EnviroTech 2021 will also offer live Q&As with industry experts, and a host of interactive features for attendees including text chat, video conferencing, and a virtual exhibition. Headline sponsors of the event at FLSMIDTH and Beumer Group.

The conference would speakers from LafargeHolcim, FLSMIDTH, Beumer Group, Cinar Limited, Waste Knot, Turboden, thyssenkrupp, CTP, Kima Process, Votorantum Cimentos and Exergy.



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