This Energy News contains excerpts of articles picked up from selected daily newspapers & magazines.
The Aam Aadmi Party-led Delhi government on Monday announced incentives on purchase of battery operated two-wheelers by up to ₹10,000 and electric autos by ₹30,000 in its electric vehicle policy that aims at curbing vehicular pollution by adding five lakh new electric vehicles in five years. The Delhi Electric Vehicle Policy 2019 approved by the state cabinet on Monday focuses on electric twowheelers, shared transport vehicles and goods carriers or freight vehicles, since they contribute to majority of the vehicular pollution, an official statement said. “The primary goal is to improve Delhi’s air quality by bringing down emissions from the transport sector. To do so, this policy will seek to drive rapid adoption of Battery Electric Vehicles (BEVs) such that they contribute to 25% of all new vehicle registrations by 2024,” the statement said. The Delhi government is targeting induction of 35,000 electric two, three and four wheelers and buses, 1,000 electric vehicles for last mile deliveries and 250 public charging and battery swapping stations. It has waived road tax and registration fees for all battery electric vehicles for next three years. The policy announced purchase incentive of ₹5,000 per kWh of battery capacity against ₹5,500 presently offered by Delhi Pollution Control Committee, besides a
scrapping incentive of up to ₹5,000 subject to evidence of matching contribution from the manufacturer or dealer. The state will allow ride hailing service providers to operate electric two wheeler taxis while all two-wheelers engaged in lastmile deliveries like food delivery and e-commerce logistics are expected to shift 50% of their fleet to electric by March 2023 and 100% by March 2025. Electric rickshaws and carriers will get an incentive of Rs 30,000 per vehicle and interest subvention of 5% on loans. Open permit system will apply for individuals who will be given permits on a first-come-first basis, subject to the cap of maximum number of autos permissible in Delhi, the statement said. Electric four wheelers will get a purchase incentive of Rs 10,000 per kWh of battery capacity for first 1000 cars subject to a cap of Rs 1,50,000 per vehicle. All leased cars used for commute of Delhi government officers will be transitioned to electric within 12 months. The policy mandates that new home and workplace parking should reserve 20% parking to electric vehicles. The Delhi government will provide 100% subsidy for the purchase of charging equipment up to Rs 6,000 per charging point for the first 30,000 charging points at homes and workplaces. The subsidy to be routed through the power discoms who will be in-charge of charger installations an electric vehicle board and a separate electric vehicle cell within the transport department will be set up for implementation of the policy. The incentives under the policy will be obtained from multiple sources such as pollution/diesel cess, road tax, environment compensation charge etc to be aggregated under an umbrella, non-lapsable state EV Fund.

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How Shenzhen transforms itself to become a model for e-mobility adoption

From a small fishing village located on the coastline of the South China Sea close to Hong Kong, Shenzhen has transformed itself into an ultra modern metropolitan city with a population of 20 million, including floating. In just about 40 years, it has now become a reference city for electric mobility adoption. Developed as a model special economic zone by the Chinese Government, Shenzhen, during Deng Xioping regime, is home to some of the
biggest home-grown companies that include Huawei Technologies, Tencent, BYD among others. In barely four decades since its early planning, it has emerged one of the most buoyant cities in the world, transforming itself into an ultra modern urban hub with modern transport network of metro rail and public transport buses. Aided by the Chinese government with generous subsidies, the entire transport bus fleet in Shenzhen, which is about 17,000-strong, have all gone electric, while thousands of cabs (more than 22,000) have all gone electric, setting an example to the world on how it has transformed its entire public transport network into electric bus fleet. Joseph Ma, Deputy General Manager, Shenzhen Bus Group Company, explained how, in barely 10 years, the entire public transport network of the city has all now electric powered.

Ma said: “This would not have been possible but for the support and funding by the Chinese government, which had taken a policy decision to transform public transport into electric mobility, and also support from the local municipality.”

**Hybrid buses**- Around the year 2007-8, the first set of hybrid dual train buses were deployed, followed by electric buses in the Shenzhen Bus in 2011 and gradually the entire fleet of buses of not just this company but two other operators providing public transport, were slowly moved to hybrid buses and then gradually to electric buses. Significantly, not just the buses, but all the cabs operated by the company are now electric. Taking through the command and control centre in the headquarters, Ma explained how the entire fleet management is handled remotely with at least seven cameras fitted on each bus, powered by GPS network, helping move about 2 million passengers per day and about 800 million passengers per annum.

“We have to compete with the metro services. Our’s is a smart bus fleet and the cost of bus management has been reduced to 50 per cent. And as per government’s mandate we retire buses after eight years in service,” he said.

Ma said, “Some of the transport networks from India, including from Delhi, visited them and that he would love to be associated with them sharing the learning and experience.” Ma said that around 2010, there was growing
concern about vehicular pollution and the focus was shifted to early adoption of electric mobility. A number of other cities too are expected to deploy electric mobility.

**Infra development** - While the transport system has changed in the past 12 years, when this correspondent first visited Shenzhen in 2007, the city has seen remarkable transformation, with ultra modern high rise buildings, amazing road and rail networks and dime a dozen malls. Among the tall buildings that have come up, the Ping a Finance Centre stands the tallest, at 600 metres. Considered to be the tallest office building complex in the world, and the fourth tallest with 116 floors. It provides an amazing panoramic view of Shenzhen City. One can make it to the top in 55 seconds at 10 metres per second to embrace the sky and land in the ground floor in lesser time, without realising the height. IT could have become the tallest in the world but for the restrictions imposed by the aviation authorities. It took about seven years to develop the structure, where some of the biggest names in the world have taken office space. It is second tallest building in China and the 4th tallest building in the world. It also broke the record of having the highest observation deck in a building at 562.2 m (1,844 ft.). The progress made by Shenzhen in electric mobility is being closely tracked globally.

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**Electric 3-wheeler mkt hots up as cos look at alternate mobility**

The electric three wheeler market is suddenly red hot right now as a host of technology startups and vehicle manufacturers look to enter alternative mobility. First, Chetan Maini co-founded Sun Mobility announced its tieup with Piaggio to launch electric Ape three wheeler variants on their swappable battery architecture. Now Bengaluru-based Altigreen is all set to roll out cargo and passenger three-wheelers based on their own patented drivetrain platform through ‘multiple’ OEM partnerships. While Amitabh Saran, CEO, Altigreen Propulsion Labs is tightlipped, industry sources say tieup talks are on with the likes of Bajaj Auto, Scooters India and Lohia Auto. Meanwhile OEMs like Lohia
Auto say three-wheelers — including those on the Altigreen platform — will be their focus area for an electric mobility play. Altigreen, said Saran, is currently getting product type approvals from ARAI and the three wheelers, both cargo and passenger, should hit the market by February-March. “Commercial vehicle category becomes obvious choice for electrification because this segment is driven by rupee per kilometre. But the customer needs rugged variants for last mile connectivity which can match petrol, diesel, CNG versions in terms of price and performance,” he added. Mobility experts expect India’s roughly 8 lakhs strong domestic three wheeler market to move to electric in the next decade. “Internal combustion version will continue to be manufactured for export market which is a good 40% of the total three wheeler sales in India,” said Ayush Lohia, CEO, Lohia Auto Industries.

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Govt. allows battery-run bikes for last-mile connect

Soon, Delhi might witness a large number of battery-run motorcycles providing last-mile connectivity to people who rely on public transport to commute across the city. These bikes may also emerge as an alternative to booking cabs. On Monday, the Delhi cabinet approved a policy to allow electric two-wheeler taxis by app-based ride-hailing services such as Uber and Ola. The policy will soon be notified. The move is aimed to provide a big boost to clean last-mile connectivity. Delhi government will provide a purchase incentive of Rs 5,000 per kWh of battery capacity. For an average electric two-wheeler, the applicable incentive would be approximately Rs 10,000 as compared with Rs 5,500 presently being offered by Delhi Pollution Control Committee as subsidy for battery operated electric vehicles, a statement by Delhi government statement said. Bike-taxis operate in many areas of the National Capital Region such as Gurgaon, Noida and Ghaziabad under different app-based platforms. Many ride-hailing service providers have been trying to introduce similar services in Delhi but the regulations did not allow bike-taxis. During the odd-even scheme implemented from November 4 to 15 this year, Uber had offered the use of 5,000 bike-taxis to improve first and last mile connectivity. The bike-taxis would have helped ferry one lakh commuters to and from metro stations.
every week. The Delhi government, however, didn’t take up the offer at the time.

“At Uber, we believe the future of mobility is shared, electric and multi-modal. We are working towards building an ecosystem to bring more electric vehicles to the market. We wholeheartedly support the Delhi government’s vision to make the city the electric vehicle capital of India,” an Uber spokesperson said. Ola, meanwhile, despite being contacted repeatedly, did not comment on the issue.

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With Make in India, BYD looks to make country EV hub for the region

BYD Co Limited, the diversified business conglomerate based in Shenzhen, China, is on expansion mode in India through the ‘Make in India’ drive. It is in the process of stepping up its engagement in India in the entire electric mobility chain and electronics, while also seeking to transform it as a hub for the region. The company is evaluating the possibility of introducing pure electric passenger vehicles and exploring business prospect for rail transit. Build Your Dreams, set up in the Shenzhen Special Economic Zone in 1995, has made its India entry with a tie up with Olectra Greentech (Goldstone) for supply of electric buses. It is now looking at expanding its manufacturing base in Chennai, where it
manufacturers electric buses. During this correspondent’s recent visit to BYD headquarters in Shenzhen, and its facilities, Zhang Jie Ketsu, Executive Director of BYD India, said the company has made India a strategic market by not only offering its products and solutions, including offerings in the electric mobility space, but also wants to turn it into a hub for the region. The company, which is into electric mobility spanning various applications, electric buses, cars, elevated rail, trucks, cargo vehicles, forklifts and lithium ion battery packs, is looking at offering its electric mobility in a solutions form for not only transport and logistics businesses but also for energy back up management. During a tour of the company research and development centres; and manufacturing units for cars, forklifts and lithium ion battery packs for electric vehicles, new energy solutions and various other applications, company executives explained how it has grown to be a leading cutting-edge solutions provider for the entire electric mobility business. In the Chennai manufacturing facility, located on a 35 acre site, the company plans to expand to manufacture electric buses by almost tripling the capacity and stepping up its battery assembly line.

**A $20-billion company**

BYD, which has grown over the years with a combination of organic growth and some strategic acquisitions, including the acquisition of an automotive manufacturer, now is a major player in China offering its electric mobility solutions. It has grown to be a $20-billion company, employing over 2,20,000 people with facilities in several countries, including the US and Europe. It has more than 214 of its made-in-India electric buses deployed across at least six cities, including the hilly tracts of Manali in Himachal, the busy roads of Mumbai and in Hyderabad (as part of the Telangana State Road Transport Corporation fleet, providing connectivity to the airport). It is betting big on the upcoming opportunities under the Indian government’s FAME II policy. Zhang said the company was engaged in talks with several players and believes that the best way to expand its business is by collaborating and entering into strategic engagements. “These days, while businesses compete with one another, they also engage with competitors sharing knowhow and technologies. We work closely with Daimler,” he said. Over the years, the company has made big strides with its lithium ion batteries: some of its latest cars in the Tang range
are capable of running 600 km per charge. It has launched a four-seater electric vehicle in India as also electric forklifts. It is evaluating bringing in other models as well to India. Having introduced T3 MPV and T3 Mini Van series in India, it is conducting feasibility studies for other models as well.

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Piaggio launches electric 3-wheeler

Marking its entry into the electric vehicle segment, Piaggio Vehicles Pvt Ltd (PVPL), a 100 per cent subsidiary of the Italian Piaggio Group, has launched its new electric range, Ape Electrik. Electric three-wheeler Ape E-City is the first product launched under the range. The Ape E-City offers zero emission with nearly no noise and vibration making it a last mile mobility solution for urban India. With advanced Li-ion batteries, automatic gear box, no gear and clutch, doors for safety, Ape E-City is the first 3-wheeler to have smart swappable batteries.

The Ape E-City is priced at ₹1.97 lakh (ex-showroom Delhi)

Diego Graffi, MD & CEO of Piaggio Vehicles Pvt Ltd, said, "We have developed both swappable and fixed battery technology solutions. We have faith that with the governments focus on EVs in the 3-wheeler category and Piaggio’s own vision of developing innovative EV solutions, mass adoption of EVs is a near reality.”

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Tata Motors unveils Nexon EV

Tata Motors on Thursday unveiled Nexon EV, the company’s first electric SUV for personal buyers which uses the company’s new electric vehicle technology platform Ziptron. In September, Tata Motors had announced a shift in its EV strategy with a focus on the personal segment by introducing Ziptron. Ziptron is aimed at finding solutions to common concerns around EVs like range, power, durability, safety and charging infrastructure.
**Pricing and features**- Scheduled to be launched in January 2020, the Nexon EV is expected to be priced between Rs 15 to 17 lakhs. Bookings for Nexon EV will begin from tomorrow onwards (December 20), at a rate of Rs 21,000. It can be booked either through company’s official website or through select authorized dealers. The company claimed that the Nexon EV delivers a range of more than 300 kms on a single charge. “When plugged into a Fast DC Charger, the Nexon EV will replenish 80 per cent battery capacity within 60 minutes. In addition, the Nexon EV can be charged from any 15-amp plug point,” the company said.

“After introducing our cutting-edge EV technology, Ziptron, we are thrilled to unveil the first EV featuring this technology – The Nexon EV. This is a high performance, connected vehicle that is uniquely suited to address the aspirations of Indian customers and break all barriers for EV adoption. We are confident that this development will mark an important milestone in India’s electrification journey, and further reinforce our commitment towards developing sustainable and responsible mobility solutions for India,” said Guenter Butschek, CEO & MD, Tata Motors. In October, the company started selling Tigor EV for personal buyers, making it Tata Motors’ first electric car for personal buyers. Until then, it was limited to sales to the Government and commercial fleet buyers.

**Specs**

The car will come with a warranty of eight years or 1,60,000 kms - whichever is earlier - on battery and motor. Nexon EV is equipped with a 129 PS permanent-magnet AC motor powered by a 30.2 kWh lithium-ion battery. Tata Motors’ new EV will be launched in three variants – XZ+ LUX, XZ+ and XM. It will be available in three colour options – Signature Teal Blue colour, Moonlit Silver and Glacier White. Nexon EV also offers 35 mobile app based connected features.

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Morris Garages (MG) Motor India on Thursday said it is working on a sub-₹10 lakh electric car for the Indian market. Speaking on the sidelines of an event to unveil its electric sports utility vehicle (SUV) – ZS, Rajeev Chaba, President and Managing Director, MG Motor India, said, “If electric vehicle (EV) has to become mainstream, the price point has to be less than ₹10 lakhs. You have to have a smart concept...we are looking at that smart concept right now.” He said the company is yet to decide on the shape of the car, the volumes to be produced and where to produce it. “We want to be a serious player in this market. And this EV is a way for us to differentiate ourselves from other big players in the market. We cannot compete with other big players so easily. They have been there for 25-30 years — laid the foundation — so we need to differentiate, be disruptive,” Chaba said. He said the company’s team has started looking at the EV concept.

**Consumer insight** - “Even consumer insight and acceptance of that concept is very important. If there is favourable response from consumers, it could take three years...We feel the next inflection point will come when we are able to launch EV in less than ₹10 lakhs. Then the volumes will start coming,” Chaba added. According to analysts and industry veterans, if MG is able to price the product well then it could be one of the first automobile manufacturers in India to launch an EV at such a price point. Meanwhile, MG said it will launch the electric SUV ZS in January and prices will also be announced then. According to sources, the company may price the ZS between ₹22 lakhs and ₹25 lakhs. The
ZS EV is MG’s first ‘pure electric Internet SUV’ with a clean, efficient and fast powertrain. The advanced 44.5 kWh, liquid-cooled NMC (Nickel Manganese Cobalt) battery from CATL, one of the world’s largest battery manufacturers, gives the car a travel ranges of 340 km on a full charge. It delivers 353 Nm of instant torque and 143 PS power, accomplishing 100 kmph from a standstill in 8.5 seconds.

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Electric cars racing at 270 kmph are test labs for SUVs, sedans

Not every advance in electric-vehicle technology takes place inside the sterile calm of a research laboratory. BMW AG, Volkswagen AG’s Audi and a Silicon Valley-based battery maker are helping push the boundaries by racing electric-powered cars through Saudi Arabia, New York, London and Seoul at speeds topping 170 mph. Breakthroughs made by competitors in Formula E, which started its sixth season over the weekend, are being incorporated into family SUVs and sedans — and even India’s electric rickshaws — as manufacturers seek to improve and extend their electric lineups while nations gradually phase out gas guzzlers. More powerful batteries and better motors, energy-management software and braking systems are all being transferred from the racetrack to the showroom.

“What we are doing in Formula E is highly relevant back on the road,” said Dilbagh Gill, chief executive officer and team principal of India’s Mahindra Racing, the motorsport unit of Mahindra & Mahindra Ltd. “We are able to come in and help them immediately in improving the product.”

Formula E, which began in 2014 with an “E-Prix” in Beijing, has 12 teams, almost all of which involve automakers producing or developing battery-powered vehicles for consumers — such as Nissan Motor Co. and Tata Motors Ltd.’s Jaguar brand. Volkswagen’s Porsche and Daimler AG’s Mercedes-Benz brand are new participants in the 14-race season that opened Friday in Saudi Arabia. The schedule runs through July, concluding with the two-day London E-Prix. Briton Alexander Sims, racing with BMW i Andretti Motorsport, won Saturday’s race on the outskirts of the Saudi capital, Riyadh. Envision Virgin Racing’s Sam
Bird won Friday’s opening race. Last season’s champion was DS Techeetah, the Chinese-owned team of PSA Group’s DS Automobiles. Its DS E-Tense FE20 machine can accelerate from zero to 100 kph (62 mph) in 2.8 seconds. DS Automobiles is taking the powertrain — parts including the motor and inverter — from its Formula E entry and putting it inside a concept car called the DS X E-Tense. It also will use the same operating software across its planned range of electric passenger vehicles. PSA Group, also home to the Peugeot and Citroen brands, is targeting a fully electrified fleet by 2025.

“The cars that win in Formula E are the most energy efficient, which is largely driven by software,” Paris-based DS Automobiles said. “Everything we do in Formula E with algorithms and software we try to replicate in series production.”

Also read: The real reason we’re not driving electric cars

Rules intended to limit costs for teams and keep the series competitive mean racers use a standardized lithium-ion battery manufactured by a unit of Newark, California-based Lucid Motors Inc. During the first four seasons of Formula E, drivers needed to change cars in the middle of a race — leaping from one cockpit into another — because the power packs couldn’t complete a whole event, which typically lasts about 45 minutes. Lucid’s batteries, introduced last season, eliminate the need for that switch. “The real reason we are doing this is to demonstrate that we have world-class technology, which will find its way into our forthcoming road car,” said Chief Executive Officer Peter Rawlinson, previously chief engineer of Tesla Inc.’s Model S. The company plans to start producing its Lucid Air sedan in Arizona next year, boasting of a range topping 400 miles and a speed exceeding 200 mph. Lucid’s Formula E batteries pack in more energy than alternatives that are commercially available for regular cars, said James Frith, a London-based analyst for BloombergNEF. “If Lucid can transfer this technology to commercial electric vehicles, it could give them a real advantage,” he said. Another key focus for Mahindra, DS Techeetah, Audi and the others is finding the best way to slow a car down. Since most vehicles lose energy as heat when a driver hits the brakes and causes friction, electric race cars use regenerative braking systems. In effect, a car’s motor goes into reverse to both slow the wheels and act as a generator to send
power back into the battery. The technology helps to boost driving range, meaning passenger cars could use smaller batteries, said Allan McNish, team principal of Audi Sport ABT Schaeffler.

“Regenerating energy is going to be a key factor for the development of road cars,” said McNish, an ex-Formula 1 driver and a three-time winner of the 24 Hours of Le Mans endurance race. For Nissan, the technology transfer goes both ways, Azusa Momose, a spokeswoman, said. Racing engineers working with the Nissan e. dams team are drawing on the company’s experience developing the electric Leaf hatchback. “They share the same DNA,” Momose said in an email. Formula E cars are at the leading edge of energy management and powertrain development, she said. Yet not all the gains are connected with technology or software. Mumbai-based Mahindra will share racers’ cockpit tips with India’s auto rickshaw drivers to help them extend their battery’s range between refills. India is home to about 1.5 million battery-powered, three-wheeled rickshaws. Mahindra is among the manufacturers of electric versions.

“As soon as they improve range, their earning capacity improves,” Gill said. Putting high-speed EVs onto circuits using regular city streets is considered another major benefit to the racing series, lifting the profile of the battery-powered sector in key consumer markets. Formula E races last season drew more than 400,000 spectators and a cumulative TV audience of 411 million people, the series said in September. Last season’s racers zipped along Brooklyn’s Clinton Wharf and Hong Kong’s Victoria Harbour. This season, competitors will loop around the National Monument in Jakarta, and, in the U.K., teams will tackle a circuit that weaves inside the ExCeL London exhibition center and then back outside onto the city’s Royal Docks.

“You are racing in the heart of cities, and that’s where electric vehicles will be driven,” McNish said. “You are effectively taking your product to the people.”

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Ather Energy to set up plant in Tamil Nadu

Ather Energy has signed a memorandum of understanding (MoU) for a 4-lakh sq ft electric vehicle manufacturing facility with the Tamil Nadu Government at the Investment and Skill Development Conclave in Chennai. Ather Energy has already announced its plans to expand to 30 cities in the next few years and this MoU will help scale up production plans for the same. The built-up factory will be located in Hosur, Tamil Nadu and is supported by the government of Tamil Nadu under its EV Policy, a statement from the company said. This MoU comes on the heels of a big push for electric two-wheelers by State & Central Governments with an updated FAME policy, GST reduction, and benefits for taxpayers on loans for electric two-wheeler purchase.

Read: Tamil Nadu signs MoUs worth ₹5,000 crores, the statement said the facility will not only cater to the EV manufacturing demand but also for Ather’s lithium-ion battery manufacturing which is a key area of focus for the company going ahead. The investment is an opportunity for value creation in the sector and will create job opportunities for the region. More than 4000 employees will be trained in requisite skills in the EV sector as a part of this initiative over the next five years. Ather Energy opened pre-orders in July 2019 for Chennai and pre-orders till December are full. The third batch of Ather 450s is now available with deliveries expected in February - March '20. The company has been
offering test rides at their experience centre, Ather Space in Wallace Garden Street, Chennai. It has also been investing in setting up fast-charging infrastructure in Bengaluru and Chennai. Currently, Chennai has ten fast charging points and more will be added in the coming months. Post the success in the two cities, Ather is gearing up to launch in Hyderabad, Pune, Delhi and Mumbai in the coming year. Tarun Mehta, Chief Executive Officer (CEO), Ather Energy said Ather is rapidly scaling up and we need to expand our production capacity to meet the growing demand. "The new unit will help us meet the demand for the next few years across the country. Tamil Nadu has been a hub for automobile manufacturing, and they have been working closely with us in their effort to build an EV ecosystem. A manufacturing facility at Hosur was an ideal choice considering that it is close to our R&D facilities in Bengaluru and most of the existing and potential future supply base is operating in the region. The availability of a built-up option of our desired scale and proximity helped in the decision making."

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**Tata Motors bullish on electric vehicle market**

Tata Motors, which unveiled the Nexon EV, its first electric car on Thursday for personal buyers using Ziptron - the company’s new electric vehicle technology platform - is bullish on the nascent EV market. The overall EV market can attain a penetration of 10-15 per cent in the next 5-6 years, driven by sales in the personal segment too, said Shailesh Chandra, President – Electric Mobility Business & Corporate Strategy. Currently, electric cars mostly cater to the fleet segment in the country. Only around 1,500 electric cars were sold for personal use in the last eight months, according to Sohinder Gill, Director General, Society of Manufacturers of Electric Vehicles. The Nexon EV is expected to be priced between Rs 15 to 17 lakh when it is launched in January. As more and more products with a value proposition similar to that of Nexon EV enter the market, the electric cars market will also expand, he said. From the first quarter to the third quarter of this year, the EV market has already grown 2.5-3 times, he said. “So, next year, I believe that there is no reason why the (overall EV) market cannot (be) double the size of today,” Chandra told BusinessLine.
**Shift in EV strategy**- Tata Motors will also be launching another electric car, Altroz EV, next year. In September, Tata Motors announced a shift in its EV strategy with a focus on the personal segment by introducing Ziptron. Ziptron is aimed at finding solutions to common concerns around EVs like range, power, durability, safety and charging infrastructure. Electric cars for personal buyers will see a steep adoption, as the overall market for automobiles is “heavily skewed” towards the personal segment, with the fleet segment taking up just a small fraction of the market, Chandra explained. He said that the fleet segment only constitutes 10 per cent of the total passenger car market, whereas 90 per cent of the industry caters to the personal segment. If the government extends the benefits under the Faster Adoption and Manufacturing of (Hybrid) and Electric Vehicles scheme (FAME) to the personal segment as well, the potential for electric cars in the personal segment can be even bigger, he said. Currently, FAME benefits are not applicable to personal buyers of electric cars. Chandra said that the FAME scheme should be extended to the personal car segment as well, when asked about his expectations from the government to propel sales of electric cars for personal buyers. Tata Motors’ EV strategy centre around creating optimisation parameters, he said. “Nexon EV is an example of how you optimize performance, range and price, rather than dialling up significantly on one of them,” he said. He said that with this product, concerns around the range anxiety, price and performance are taken care of. Tata Motors claimed that the Nexon EV delivers an anxiety free long range of more than 300 km on a single charge. When plugged into a Fast DC Charger, the Nexon EV will replenish 80 per cent battery capacity within 60 minutes. In addition, the Nexon EV can be charged from any 15-amp plug point, it said. The car will come with a warranty of eight years or 1.60 lakh kms - whichever is earlier - on battery and motor. “It is a value proposition which is well packaged to really trigger excitement among consumers. Because otherwise, for any other offering (until now), there was compromise on one (factor) or the other. This (Nexon EV) is the first real package, I would say, which has been thought through from a consumer perspective. It is not a cut-pasted solution. We have attempted to do the right thing, thinking from a consumer mindset,” said Chandra.

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IIT-H, ItsEV to jointly develop Li-ion batteries for EVs

Indian Institute of Technology Hyderabad in collaboration with ItsEV Inc hosted an International workshop on 'Dawn of a New Era for Indian Automotive Industry' by creating New Lithium-ion Battery Fits for high temperature and promoting pollution-free EV World in India in the campus on November 30, 2019. India at present imports Lithium-ion batteries from China, South Korea, Japan or Europe, which are made into battery packs and marketed. Even though a billion people use Lithium ion batteries, there is not even a single indigenous manufacturing company producing Li-ion batteries. The Government of India plans to convert 30 percent of all vehicles on the road into Electric ones by 2030. This joint collaboration between IIT Hyderabad and ItsEV Inc can play a major role in the development of Lithium-ion batteries in India and contributing to the 'Make In India' campaign. Addressing the event, Chief Guest Jayesh Ranjan IAS, Principal Secretary to Government, Department of Industries and Commerce and Information Technology, Electronics and Communications Department, Government of Telangana, said, "Telangana Govt. is one of the first 10 states in the country which is working on policies for 100 percent adoption of EV for public transport. This will motivate individuals to also go for EV, which will help in reducing problems such as traffic Management and pollution. The introduction of a product like this can be a breakthrough."

A research group led by Dr Surendra K. Martha, Associate Professor, Department of Chemistry, IIT Hyderabad, has substantial expertise in the development of cathodes, anodes, electrolytes and performance studies, among others, for Lithium-ion and Sodium-ion batteries. The group has demonstrated high energy density lithium-ion batteries having double the energy of Lithium-ion batteries during 2018. The Researchers have demonstrated 100-200 mAh sodium-ion cells to Research Centre Imarat (RCI), Defence Research and Development Organization (DRDO) laboratory in Hyderabad Speaking on the occasion, the Guest of Honor Katsuo Matsumoto, Chief Representative, JICA (Japan International Cooperation Agency), India Office, shared how JICA, a Japanese Government Agency, is looking to tap business opportunities in India close to Rs. 2 trillion. He has also spoke about how Japanese institutions are promoting Indian Talent though Knowledge
exchange and providing scholarship for bright candidates. Till date, about 116 students of IIT Hyderabad have been offered a scholarship to study in Universities in Japan.

The objectives of this workshop include

- To develop Li-ion batteries in India that fits for High-Temperature operation
- Reduce investment of reduction rate 70% (not having dry room)
- The expense of reduction rate: 80%
- ItsEV will provide full technical support for training technicians, students, scientists in Japan so that we can develop indigenous Lithium-ion batteries, this may help to increase EV production in India operating high-temperature conditions, reduce pollution
- Student exchange programmes
- IITH and ItsEV Inc together will bring out a battery through joint collaboration, which will be superior to the other existing batteries in India.

Delivering the welcome address, Prof. BS Murty, Director, IIT Hyderabad, said, "This demonstration of Lithium-ion Battery operated 3-Wheeler Electric Vehicle (Auto) will give wonderful outcome 10 years down the line and will play a significant role in the growth of both the countries - India and Japan. We are looking to tie-up with industries around to take-it for production India."

Speaking on the occasion, Kazuo Chiba, President, ItsEV Inc., explained why a product such as this is needed for countries like India where traffic is one of the major problems. This Lithium-ion battery operated EV powered by Solar Power will also reduce huge wiring set-up required for electrically powered EV. The Population required of public transport of best quality, affordable price and good to the environment will support this project in India. Prof. Vijayamohananan K. Pillai, Indian Institute of Science Education and Research (IISER), Tirupati, emphasized the need to go for EVs. It will also save the environment by reducing carbon footprint and create a livelihood in India by generating approximately 50,000 employments by 2022. A demonstration of an EV3Wheeler, developed by ItsEV Inc, Japan, equipped with Japanese Lithium-Ion Batteries, was also held on the occasion. It consists of 16 modules, each having 4 cells. Each cell has a nominal voltage of 3.75 V. Each module consists of 2 Series and 2 Parallel Cells. The pack consists of 2 parallel and 8 series
modules having a nominal voltage of 60V and 130 Ah. The 'EV3Wheeler Lithium-Ion Batteries can be charged directly from Solar without using electricity. Currently, the solar panels are provided by Sahaj Solar Pvt Ltd, Ahmedabad.

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Why the income-tax sop has not electrified EV sales

The government’s announcement in July that additional income-tax deduction of ₹1.5 lakh will be provided on interest paid on loans taken to buy electric vehicles (EVs) has not translated into higher EV sales till now. In fact, due to a host of reasons, sales of electric two-wheelers and four-wheelers plummeted during April to September 2019, compared to the corresponding period in 2018, according to data shared by the Society of Manufacturers of Electric Vehicles (SMEV), the registered association representing EV makers. State Bank of India is the only bank in the country to have launched a loan scheme exclusively for EVs — ‘Green Car Loan’ (Electric Vehicle). Under this scheme, only nine loans have been sanctioned since its launch in June, according to a source. Among other benefits, the scheme offers loans at 20 basis points lower than the interest rate on existing car loan schemes. Six top banks that offered vehicle loans did not respond to e-mail queries from BusinessLine on whether
loans for EVs have seen a surge since the announcement of the tax deduction in July.

**Negligible impact** - According to credit rating agency CRISIL’s analysis of this measure, the cumulative benefit to a buyer on purchasing an electric scooter would be between ₹2,500 and ₹6,000 (3-4 per cent of the vehicle cost) over a two-three-year loan tenure. For a passenger car, this would amount to 5-6 per cent of the vehicle cost over a loan tenure of five to six years, it said. This measure has had a negligible impact on the sales of EVs, said Sohinder Gill, Director General, SMEV. For it to have an impact, the government has to identify where the sales are happening, he added. Between April 1 and September 30, 2019, 46,000 units of electric two-wheelers, priced below ₹70,000 were sold, compared to 6,000 units priced above ₹70,000, he said. This measure should benefit buyers of high-end electric cars and two-wheelers who pay tax, he said. But it has not had the desired impact, data show. Those who buy two-wheelers priced below ₹70,000 mostly do not even pay income-tax, he said, apart from the fact that the benefit that can accrue out of this is also less. Only around 1,500 electric cars were sold for personal use in the last eight months, said Gill.

**Dearth of loans**- There are also hardly any loans available for customers who wish to purchase electric two-wheelers, said Gill. Less than 5 per cent of electric two-wheelers are financed currently, Gill pointed out, while more than 60 per cent of petrol two-wheelers are financed, to drive home the point that banks are reluctant to give loans for EVs. This is because it remains a small volume segment, where there is no clarity on to boost sales, the government should mandate public sector banks to treat extension of loans to purchase electric vehicles as priority sector lending the resale value and battery replacement cost, he said. Ravneet Pholeka, Chief Business Officer, Ather Energy, said, “While it is difficult to isolate the impact of one initiative, overall, these have increased the conversations around EV and purchase preference among scooter buyers. We see high demand from both our markets (Bengaluru and Chennai) and are booked out till the first half of next year. The consumer sentiment around EVs is positive due to these initiatives and we should see higher volume of high-performance EVs next year.”
FAME incentives - But measures like Faster Adoption and Manufacturing of (Hybrid) and Electric Vehicles-II (FAME-II) incentives, as well as the incometax deduction announced by the government, have not have not had an impact on the upfront cost of the EV for the buyer, said Suraj Ghosh, Principal Analyst, Powertrain & Compliance Forecasts, IHS Markit, referring largely to four-wheelers. Although the tax deduction, along with the GST reduction on EVs from 12 per cent to 5 per cent, have improved sentiment, this has not translated into higher EV sales, affirmed Hetal Gandhi – Director, CRISIL Research. Fall in private consumption due to a moderation in economic growth and high discounts on traditional internal combustion engine (ICE) vehicles, with the ongoing inventory liquidation, has hampered EV sales, said Gandhi. One of the main reasons for this drop in sales is the change in the eligibility norm for availing subsidy under the second phase of the FAME scheme rolled out by the government this year, said Gill. FAME-II has tighter rules pertaining to the minimum range and minimum speed, which have made electric two-wheelers costlier, he said. Under FAME-I, which was applicable till March 2019, the norms were simpler and the majority of electric two-wheelers sold were affordable, city-speed scooters, he pointed out. The sales being higher this year for two-wheelers, without the FAME subsidy, reflects customers' acceptance of affordable, low-cost scooters, said Gill.

“By increasing the speed and range limit under FAMEII, customers are facing difficulty in availing the benefits for the vehicle of their choice.

“It is important to note that the FAME-II scheme was launched with a vision to spur sales and create an effective ecosystem for EVs. However, due to some anomalies in the new scheme, it seems difficult to fulfil the desired results,” he said. Gill said that the market is still evolving for electric cars as most of them are now being sold through tenders to organisations like ESSL and State governments, which place orders based on their requirements. FAME benefits are not applicable to personal cars. Gill said to propel sales, the government should mandate public sector banks to give priority sector lending to electric vehicles. There is also an immediate need to revise the current FAME-II demand incentive for electric two-wheelers to ensure that the good work done under FAME-I does not go waste, he said. FAME-I offered a subsidy of ₹22,000, which
has been reduced by ₹12,000-₹18,000 for 90 per cent of the affordable segment under FAME-II, said Gill.

“It is imperative to bring back the “customer needs” in focus, that is, efficiency and affordable e-mobility.

“Hence, revise the current demand incentive of ₹10,000 per kWh of battery capacity and offer an upfront subsidy of ₹20,000 per kWh, similar to the incentive offered to buses,” he said.

The government can also look at offering non-fiscal incentives such as a reduction in SGST, road tax and permit to make vehicles more affordable, said Gill. EV players are hopeful that various schemes will start showing results in the future. According to Mahesh Babu, CEO, Mahindra Electric, given that electric vehicles are in the process of becoming mainstream in India, measures like the GST reduction, benefits on incometax, and a strong FAME II policy will encourage more automakers to make EVs in India.

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Chennai to see the rise of e-rickshaws

MAuto, a private auto rickshaw service provider, has introduced about 100 e-rickshaws on Chennai roads for commuter services. The company will retrofit conventional petrol auto rickshaws with electric motors to run on batteries. The converted e-rickshaws for public commuting were flagged off by the Tamil Nadu Chief Minister Edappadi K Palaniswami here on Friday. The development follows an agreement signed by the State government with the Dubai-based

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KMC Group and M Auto Electric Mobility at a Business Leaders Forum meet in Dubai during the recent visit of a delegation led by the Chief Minister. Under the agreement, the companies have planned to invest about ₹100 crore in a unit for converting petrol-powered auto rickshaws into e-rickshaws. These e-rickshaws offer a range of up to 100 km per full charge. This vehicle has a camera, GPS system and panic button for safety purposes. These e-rickshaws can be booked through mobile app – Mauto Pride. The State government recently launched an EV policy with sops to promote them. Also, several companies are in talks to offer last mile connectivity from metro stations in the city. Here e-rickshaws are seen as a cost-effective option.

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EMote Electric to roll out geared e-bike Surge in 2020

EMote Electric Pvt Ltd is set to launch Surge, a geared electric bike. Claiming that Surge is India’s fastest e-bike, Pranav Singanapalli, founder and Chief Executive of eMote Electric, and winner of the Nasscom Design4India Award 2018, told BusinessLine that Auto Expo 2020 at Greater Noida in February will be the launch platform. The vehicle is expected to hit the roads in the first half of 2020. Highlighting the features of the e-bike, he said: “It can not only go toe-to-toe with petrol vehicles, but also surpass them in battery performance and speed, offer complete computer and smartphone integration and an entire ecosystem built around a fast-changing high-performance electric drive train. It has 70 litres of storage space, is fun to ride, has a reverse mechanism and a gear box.”

“It takes just about four seconds to pick up from 0 to 60 and the battery recharge time is 30 minutes,” he added. “The first prototype of the vehicle was ready in 2015. It was then without a gearbox. The improvised model with a semi-automatic mechanical gear box has been a major leap from the earlier model. This vehicle was ready for rollout in August 2018. But we are planning to officially announce the commercial launch at Auto Expo 2020.”

“We have a vehicle-level certification. We only need to do component-level certification before the launch,” he said in reply to a question. eMote is in the
process of building five or six e-bike prototypes. It has set a target to sell 10,000 vehicles in the first year of launch. “We are not funded at present and this has put the break on a few things. Going forward, we will look for distributors and funds as we grow in size,” said Singanapalli.

EESL inks pact with HPCL to set up EV battery charging infrastructure

State-owned Energy Efficiency Services on Monday said it has signed memorandum of understanding with Hindustan Petroleum Corporation for setting up charging infrastructure to boost electric mobility. As a part of the national electric mobility programme, Energy Efficiency Services (EESL), a joint venture of four national public sector enterprises under the Ministry of Power, and HPCL have entered into a two-year MoU to set up public charging infrastructure across the country, the company said in a statement. The MoU covers collaboration for planning, development and installation of charging facilities at suitable locations for two, three, and four-wheeler vehicles.

"With the installation of public charging stations, the range anxiety of EV owners is expected to reduce, which will increase the adoption of electric
mobility. This will also bring down automobiles emissions, enabling cleaner and greener environment, in turn, safeguarding public from health risks," the company said. Commenting on the partnership, EESL Managing Director Saurabh Kumar said that this tie-up will address the range anxiety concerns that EV-adopters may have. "Increased access to charging infrastructure is vital for the uptake of electric mobility across the entire EV ecosystem of two, three, and four-wheelers. Our partnership with HPCL will also establish more visibility of charging infrastructure, sending a signal to the general public that India's electric mobility vision is being realised in full potential," he added.

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**Car Cos to Soon Take BS-IV Vehicles Off the Production Line**

Honda Cars India, Toyota Kirloskar and Renault India will cease production of Bharat Stage-IV vehicles on January 31, two months ahead of the country’s transition to the cleaner BS-VI emission standards. Other automakers such as Mahindra & Mahindra and Tata Motors too have aggressively started correcting BS-IV production and inventory, while Maruti Suzuki and Hyundai Motor India have already started selling several petrol-run models that meet the upcoming emission rules. The companies are trying to ensure that there is no fire sale, as seen during the transition from BSIII to BS-IV transition for two-wheelers and
commercial vehicles. While they scale up production of BS-VI vehicles, even as oil marketing companies make fuel compliant with the new regulations available pan India, they will seek to clear the stock of BS-IV units that cannot be sold or registered from April.

1. BS-VI fuels aren’t currently available in most parts of the country.

According to multiple vendors, the planned output for December and January is down 30-40% at Toyota, 30-50% at Honda, about 30% at Mahindra and 20% at the passenger vehicle division of Tata Motors. Toyota said the company was doing a pipeline correction to liquidate stocks by December and work towards a smooth transition to BS-VI.

“Customers are also aware of the model year price rise in January and the significant price hike of diesel vehicles by 15-20% post BS-VI,” said the Toyota Kirloskar spokesperson. He said this had led to increased demand for BS-IV vehicles, helping it “in pushing retail sales and enabling successful runout of products before the shift to BS-VI”.

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Honda Motorcycle bets on first-mover advantage in shift to BS-VI norms

Even as two-wheeler makers are preparing for transition to BS-VI norms, Honda Motorcycle & Scooters India (HMSI) seeks to have the first-mover advantage through a clear strategy and early transition to the new emission regime. Though the festival season gave some respite by way of better demand, the momentum didn’t last for long as the sales of bikes and scooters continued to drop and the manufacturers had to cut inventories. Meanwhile, the industry expects some pre-buying to happen as the prices of vehicles will go up by at least 10 per cent. While many two-wheeler companies such as Hero, TVS and Yamaha have started introducing BS-VI version of their products, HMSI appears to be leading in the shift to the BS-VI regime.

“We were the first to launch BS-VI products and start sale of the same in the market. We launched our BS-VI-compliant Activa 125 in September and
followed it with BS-VI motorcycle SP 125,” YS Guleria, Senior Vice-President – Sales and Marketing, HMSI, told BusinessLine.

He said HMSI plans to complete its BS-VI transition before the deadline. HMSI has worked out a clear strategy to make its BS-VI products appealing to customers despite the likely price increase of 10-15 per cent for its vehicles. The company has also used the opportunity to upgrade its products thereby promising more value for money. “We aimed to provide a lot of value and industry-first features in our BS-VI products. The new Activa 125 BS-VI has 26 new patent applications, while SP 125 BS-VI has 19 new patent application. New features such as silent-start system, technology for higher mileage etc are all acknowledged by our customers,” said Guleria. Meanwhile, about 90 per cent of its 1,000-plus dealers are reported to have started selling the new Activa. According to its internal tests, there was no issue in the performance of the product. “The company is not despatching its BS-IV Activa anymore. There is no stock with us at the factory. It is only BS-VI versions and we are satisfied that we are getting a lot of bookings for the new Activa 125 despite the market slowdown,” said Guleria.

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BS4 & BS6 price gap to boost used car market

As the auto industry readies itself for a transition to BS6 emission norms, how will the used car market react to the shift? Pre-owned car marketeers say the price differential between a BS4 and BS6 vehicle will be sharp enough to make second-hand cars an attractive proposition, ensuring that the industry continues to clock double-digit sales growth throughout 2020. As discounts on new cars hit an all-time high this December, the used car market will have the latest models for customers to choose from. The country’s second-hand car market has clocked 12% increase in sales so far in 2019 at 4.2 million units and is set to record a 15% increase in 2020. “A number of BS4 models are now attracting hefty discounts. Given that their BS6 variants will cost Rs 10,000-Rs 50,000 more for petrol variants and Rs 50,000- Rs 1 lakh more for diesel variants, the price differential between a discounted BS4 car now and a BS6 car after April 2020 will be around 20%,” said Ashutosh Pandey, CEO, Mahindra
First Choice Wheels. This, he said, will make used vehicles a better price-value proposition after April 2020. The domino effect on preowned cars, say industry veterans, will be two-fold. For one, it will increase the supply of the latest models into the used car pool as customers upgrade less than 3-year-old cars. “The impact would be prominent across the category, including hatchbacks, but will be more pronounced in SUVs,” said Sunny Kataria, VP (auto), OLx. Used car marketeers say the relatively new car pool means that older variants are now being pushed to the tier-3, tier-4 cities. OLX platform data shows a -26% drop in the demand for the older generation Santro Xing compared to a 26% jump in demand for Maruti Baleno. “The older models are going deeper into hinterland markets, which are served by unorganised players,” Pandey said. “In metro markets, which are served by online organised players, consumers are trading up for newer models or pricier categories.”

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Govt. may List 8 Single-Use Plastic Items

The Centre is likely to identify as many as eight articles as ‘single-use plastic’ items that will be discontinued on a priority basis, including plastic cutlery, plastic bags and certain Styrofoam items. Defining single-use plastic is the first step in the direction of doing away with such products in India by 2022, as called for by Prime Minister Narendra Modi during his Independence Day address. While many states have banned plastic, there are wide variations in implementation and the range of products covered. After consulting stakeholders, the environment ministry is close to announcing a clear and uniform definition of single-use plastic, ET has learnt. Earlier, there had been speculation that single-use plastic would be banned from October 2, but the government clarified that no such move had been proposed. Industry representatives had written to the environment ministry seeking a clear definition of single-use plastic products and guidelines on phasing them out. The ministry, having asked states to start curbing single-use plastic, has been working on a practical and implementable definition of such products, officials told ET. The idea is to completely phase out single-use plastic where it is replaceable with environment friendly alternatives and to bring in a robust
segregation, collection and disposal mechanism for single-use plastic. The ministry wrote to the states in September asking them to curb production of plastic bags, irrespective of thickness and size, and Styrofoam (thermocol) cutlery and to encourage manufacturers and consumers to shift to other environmentally friendly material. It asked states to support local bodies in improving segregation of waste at source, their collection and transportation and called upon entities generating plastic waste to find ways to take them back. The Jal Shakti ministry has stepped in to ensure proper disposal of plastic waste. It is preparing to set up a unit to gather and recycle plastic waste. Every village will be asked to start waste segregation. They will send plastic waste to block-level units that will convert the aggregated waste into bales, shred them and transport them to aggregators for recycling to build in a sustainable mechanism.

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Waste-to-energy plant in Aravallis get green court’s seal of approval

The National Green Tribunal (NGT) has ruled in favour of the Municipal Corporation of Gurugram’s (MCG’s) proposed waste-to-energy (WTE) plant in the Aravallis, at the Bandhwari landfill site, 17 kms from the city. The Tribunal said it was “unable to interfere with the grant of environmental clearance for the waste processing facility.” Environmentalists, however, criticised the ruling saying it would be an ecological disaster. The Tribunal was of the view that “there is a huge waste dump site which cannot be left unattended and such waste has to be processed and removed” and this necessitated the plant to be set up. The Tribunal gave its order on December 20, which Hindustan Times has reviewed. HT was the first to report, on November 12, that the proposed WTE plant had been granted an environment clearance by the ministry of environment, forests and climate change. On December 17, HT reported that the MCG had concealed important information from the MoEFCC while seeking clearance for the project. City-based environmentalist Vivek Kamboj, who has previously challenged violations of the SWM Rules, 2016, at the Bandhwari landfill site, subsequently filed an application challenging the EC, saying it had
been obtained in violation of the environment ministry’s EIA Notification, 2006 and is liable to be revoked.

“Main grievance of the appellant claiming to be resident of the area and concerned about environment is that the Project Proponent has concealed material information with regard to existence of the sacred grove of Mangar Bani which is in close proximity to the project site as well as several water bodies and eco-sensitive areas in the Aravalli landscape. The project does not fulfil the siting criteria. The data with regard to air quality is not correct and Waste to Energy Plant will further deteriorate the air quality,” the NGT’s principal bench noted in its recent order, which was issued after just one hearing in the matter.

However, “even though the data furnished by the Project Proponent may be open to challenge, the fact remains that there is a huge waste dump site which cannot be left unattended,” said the NGT bench, led by Adarsh Kumar Goel, the Tribunal’s chairperson.

Activists have alleged that, by upholding the EC, the NGT went back on its previous order from July 10 this year, in which it directed the MCG to adopt the “Indore model” of waste management to remediate the Bandhwari landfill. “If Indore model is to be adopted, wholly or in part, no further tender process is necessary,” the Tribunal had noted.

“Now, by declining to examine the technicalities of the EC, the NGT has in essence approved a project that will be ecologically disastrous for the region. The groundwater is already polluted, as evidenced by multiple reports. Due to combustion of refuse derived fuel, locals will have to deal with air pollution in the form of toxic furans and dioxins which will be emitted in their environment,” said Vaishali Rana Chandra, a city-based activist who has been tracking the matter for several years. Moreover, the establishment of a plant, activists said, would incentivise the production of waste to produce electricity.

“We have laid substantive reasons in our application explaining why WTE plants are counterproductive to solving urban waste management issues, but the court has decided otherwise,” said Vivek Kamboj, applicant in the matter. While disposing Kamboj’s petition, the NGT also added that, “The operation of waste
processing facility must be subjected to appropriate vigilance by the State Pollution Control Board and all necessary safeguards be employed as per conditions of EC.” It is these very conditions, activists say, which have already been violated. “The NGT has essentially legitimised past violations by the project proponent. It is entirely against the spirit of the EIA notification,” said Kamboj. Amit Khatri, deputy commissioner in Gurugram and commissioner of the MCG, did not respond to requests seeking comment for this story.

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Ggm civic body hid info for waste plant nod

The Municipal Corporation of Gurugram (MCG) withheld important information from the Union environment ministry while seeking environmental clearance (EC) for its proposed waste-to-energy (WTE) plant in Bandhwari, according to documents reviewed by Hindustan Times. HT was the first to report, on November 12, that the ministry of environment, forests and climate change (MoEFCC) had granted EC to the proposed WTE plant. A copy of the ministry’s EC letter, dated November 1, is with HT, as are copies of MCG’s application form and Environment Impact Assessment (EIA) report. When asked in its application form: “Whether there is any Court Cases pending against the project and/or land in which the project is proposed to be set up?”, the MCG neglected to inform the ministry’s Expert Appraisal Committee (EAC) about existing litigation pending in the National Green Tribunal (NGT). Filed by city-based activist Vivek Kamboj on September 16, 2015, the NGT petition (OA 415 of 2015) challenges violations of environmental law at the Bandhwari landfill, where the MCG has been dumping about 900 tonne of untreated municipal waste every day for the past six years. On November 2, 2013, a fire broke out at the site’s waste treatment facility, putting an end to segregation and recycling. Since then, over two million tonne of waste has accumulated into a pile higher than the Aravalli hills around it. Kamboj’s petition was disposed of on July 10, 2018, with directions to MCG to take “immediate steps to manage the legacy waste”. The petition was renumbered (OA 514 of 2018) on August 21 the same year and the tribunal is currently monitoring compliance with its directions of the July 10, 2018, order.
A petition can be renumbered for different reasons of technicality. For example, when a case is referred from a zonal bench to the principal bench, it is renumbered. In this case, the principal bench was already hearing the petition. After it was initially disposed, the NGT renumbered the application so that it could proactively continue to monitor compliance with its directions. One cannot say that there is no litigation pending," said Rahul Chaudhuri, a lawyer with Legal Initiative for Forests and Environment (LIFE), who is representing Kamboj. The NGT has been giving relevant orders from time to time in the case. In an order dated April 24, 2019, it said: “Present is classic instance of incapacity, incompetence and unwillingness of the Municipal Corporation, Gurgaon to perform its duty to handle solid waste in a scientific manner.”

On July 10, 2019, in light of unsatisfactory progress toward remediating the landfill, the NGT instated a committee headed by the Haryana chief secretary and directed the MCG to reclaim the landfill by following the “Indore model”, whereby the Indore Municipal Corporation recovered 80% of a 100-acre dump site through bio-mining, segregating and recycling the legacy waste. Experts and activists agree that this model is far less harmful than burning waste for electricity, and negates any need for MCG’s proposed WTE plant. “The waste-to-energy model, on the other hand, incentivises the production of waste to create refuse derived fuel (RDF) and releases toxic emissions in the air,” said Kamboj. By the year 2035, Gurugram and Faridabad (which also sends its garbage to Bandhwari) will together generate over a quarter of Haryana’s solid waste, according to projections by the state pollution control board. “We should be thinking about ways to reign in this number, instead of creating more demand for waste,” Kamboj added. In its Environment Impact Assessment (EIA) report, submitted to MoEFCC in March this year, MCG once again did not mention the presence of existing litigation against the landfill. However, it pointed out that an older legal matter was settled. “One PIL was filed before National Green Tribunal vide M.A. NO: 1310 OF 2017 IN ORIGINAL APPLICATON NO.415 OF 2015 the same has been disposed of and the compliance report has been submitted,” the EIA report said. This refers to Kamboj’s 2015 petition, disposed of by the NGT in 2018. The EIA report does not mention that the tribunal has continued to proactively monitor the status of the case under a
renumbered petition (OA 514 of 2018). “This crucial piece of information has been left out,” Kamboj said. Amit Khatri, deputy commissioner, Gurugram, and commissioner of the MCG, did not respond to a detailed questionnaire seeking comment. Saurabh Nain, sanitation inspector, MCG, however, claimed, “When we first moved the application, there was no pending case”. When asked why details of the existing litigation were excluded from the EIA report, Nain said, “The ministry is now a party to that petition and is aware of the matter, so there was no need for further disclosures.”

Pollutants from the landfill have now allegedly leached into Bandhwari’s groundwater, which was deemed unfit for human consumption by the Central Pollution Control Board (CPCB) in 2017. Yet, in the absence of canal water supply from Gurugram, residents in Bandhwari continue to drink, wash and cook with it. MCG did not disclose to the EAC any information about groundwater contamination in the area, despite reports confirming it. The 2017 CPCB inspection found that the water contained iron, manganese, boron, calcium, chlorides and nitrates in excess of India’s drinking water standards (IS 10500:2012). MCG sanitation inspector Nain said he was unaware of this report. An independent report from 2015, by Rekha Singh, an environment expert certified by the Quality Council of India (under the MoEFCC), found that the groundwater in Bandhwari contained calcium, cadmium, magnesium, fluoride, phenolic compounds and mercury in excess of India’s drinking water standards. Nain said he was not in a position to comment on independent findings. There is no mention of these studies in the MCG’s EIA report. “The spirit of the EIA notification mandates that such disclosures be made to the ministry’s expert appraisal committee,” said Vaishali Rana Chandra, an environmentalist who has been tracking the matter for many years. This August, another report by the National Environmental Engineering Research Institute suggested that contamination from the landfill has likely spread downstream via the underlying aquifer, to the neighbouring villages of Mangar, Bialiawas and Gwal Pahari. Groundwater samples from 14 locations within a 5km radius of the landfill were found to be “highly contaminated” with pathogenic bacteria and heavy metals in excess of India’s drinking water quality standards. “This is a preliminary report and nowhere does it say that the contamination is due to the landfill,” said Nain. The MCG’s own EIA report,
based on data collected between December 2016 and February 2017, is in stark contrast to these findings. It states that “heavy metals were found to be absent in the ground water analysed at seven locations” around the landfill. It also stated that “parameters like chloride, calcium, magnesium, nitrate and fluoride were found within the desirable limit” of Indian drinking water standards. This report has never been made public by the MCG, despite rules mandating that it made available for public scrutiny for a period of 30 days before submission to EAC. In an order dated March 1, 2019, the NGT observed, “It is clear that damage to the environment is taking place by contamination of ground water on account of leachate discharge.” Lastly, when asked if there is any forest land involved in the project, MCG responded “No” in its application form, failing to disclose to EAC that the site is located on 30 acres of Aravalli land. Of this, 14.86 acres come under the Aravalli Plantation Project, which as per earlier Supreme Court orders, gives the land legal “forest status” with protection under the Forest Conservation Act, 1980. The land is also recorded as “gair mumkin pahad” or uncultivable hilly land, in the revenue books, and is protected by MoEFCC’s Aravalli Notification of 1992. Nain’s response to this was that, “Forest clearance had already been taken by the Haryana Shahri Vikas Pradhikaran in 2008 for a waste treatment facility on site. Therefore no fresh forest clearance is required.” A former senior forest department official contested this. “If there is a new project for which fresh EC is required, forest clearance also needs to be taken afresh. You cannot build a WTE plant on the basis of clearance for a waste management facility,” this person said on condition of anonymity. Also not disclosed in the application form is the close proximity of site to Mangar Bani, Delhi-NCR’s last remaining patch of original forest, which is also, for locals of Mangar village, a sacred grove (which is already reeling under various biotic pressures). “The stretch of Aravalli forest between Bandhwari and Damdama acts as a wildlife corridor between Asola Bhatti in Delhi and Sariska in Rajasthan,” said the former senior forest department official. Gaurav Khare, the Union ministry spokesperson, did not respond to a detailed questionnaire seeking comment for this story. Yashpal Yadav, former MCG commissioner, said, “I cannot comment as I am no longer connected with the project.”

Activists have maintained that these apparent violations make the EC liable to be cancelled, as per the provisions of Para 8 (vi) of the EIA Notification, 2006,
which states: “Deliberate concealment and/or submission of false or misleading information or data which is material to screening or scoping or appraisal or decision on the application shall make the application liable for rejection, and cancellation of prior environmental clearance.”

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**War on pollution in mega push for electric vehicles**

The Delhi cabinet, chaired by chief minister Arvind Kejriwal, on Monday approved the Delhi Electric Vehicle (EV) Policy, 2019, with an aim to reduce air pollution by offering subsidies and waiving road tax and registration fee for electric vehicles bought in the national capital. The policy also has a provision to impose a pollution cess on petrol vehicles in the near future. It has also proposed increasing road tax for luxury vehicles in the city after a few years, said Jasmine Shah, vice-chairperson of the Dialogue and Development Commission of Delhi (DDCD) which drafted the document. Currently, a cess of ₹25 paise per litre is imposed on every diesel vehicle in Delhi which goes towards the Air Ambience Fund (AAF) using which the air quality monitoring stations are operated. On implementation of the policy, 50% of this cess will be used to create ‘State EV Fund’, while 50% will go to the AAF.

The EV policy, however, is yet to be notified and the schemes under it will be valid for a period of three years from the date of its notification. Those buying an electric vehicle will be exempt from road tax and registration fee. At present, road tax ranges from 4% to 10% of the cost of the vehicle whereas registration fee could cost up to ₹3,000. The government aims to register at least five lakh EVs in Delhi in the next five years. Delhi has 83,730 electric vehicles out of a total of over 11 million vehicles registered in the city. Of the 83,730 registered EVs, a mammoth 75,567 are e-rickshaws. There are only 908 private electric cars and 3,703 e-two-wheelers in Delhi. Kejriwal, while making the announcement in a press conference on Monday, said the policy, once implemented, will make Delhi the ‘EV Capital of India’. “Along with reducing pollution levels in the city, the policy also aims to generate employment in the transport sector. Maximum emphasis is laid on two-wheelers, public transport and shared vehicles, and goods-carriers,” he said. A subsidy of ₹5,000 per kWh
of the battery capacity will be given on the purchase of two-wheelers and ₹10,000 per kWh for the first 1,000 e-cars subject to a cap of ₹1,50,000 per vehicle. To push people to shift to EVs and scrap their fuel-based vehicles, the policy also has a scrapping incentive. “The Delhi government will give up to ₹5,000 to two-wheelers, ₹10,000 to cars and ₹7,500 to auto-rickshaws (petrol, diesel or CNG) for getting them scrapped. This will be in addition to what the manufacturers offer. This means if a two-wheeler manufacturer is offering ₹5,000 for an old motorcycle, the Delhi government will an equal amount. The same rule will apply to every category of vehicles,” said Shah.

Experts said the Delhi government’s decision to prioritise two-wheelers, commercial and freight vehicles over private cars in its EV policy is the right move. Sanjay Gupta, head of transport planning department at the School of Planning and Architecture, “Given that more than 70% (over 7.3 million of over 11 million) of Delhi’s registered vehicles are two-wheelers, the EV policy is well placed and is likely to be easier to be complied with. Electric cars are still very expensive compared to e-two-wheelers which can be bought in Delhi even in ₹70,000 or less.”

However, the government should also focus on creating enough charging spaces within the city and beyond, he said. “It should collaborate with neighbouring cities to have enough infrastructure as working in silos won’t help. Many in Delhi take their vehicles out to Gurugram or Noida for work. They need to have charging infrastructure in such cities too,” Gupta said. Kejriwal termed the policy a significant step towards ensuring cleaner air in the city. “Vehicles are the biggest source of pollution in the capital and amount to 40% of PM2.5 air pollution levels and 80% of carbon monoxide in the air,” he said.

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Delay in framing rules for global carbon market is a huge disappointment

The International Emissions Trading Association has said that it is a “huge disappointment” that framing of rules for global carbon trading has been delayed by (at least) a year more. The rules for operationalisation of an emissions trading mechanism, as envisaged under Article 6 of the Paris Agreement, could not be agreed upon by negotiators at the recently-concluded 25th Conference of Parties meeting at Madrid. In an e-mail to BusinessLine, IETA’s CEO, Dirk Forrister, however, noted that “countries don’t have to wait on rules to get started in market cooperation.”

In Paris in December 2015, all countries put on the table what they would do for combating global warming/climate change. These Nationally Determined Contributions (NDCs) became commitments under the Paris Agreement.

Cost saving- IETA has estimated that a robust market for carbon trading can help reduce the cost of meeting the NDCs by $320 billion a year, by 2030. Carbon trading refers to trading in instruments that entities would earn for their climate actions, such as putting up a renewable energy plant. A question is whether there would be a buyer for carbon credits even assuming that an international framework for trading is in place. On this, Forrister said: “The tools of carbon trading will be used extensively if countries are serious about getting to Paris goals of net-zero emissions by mid-century.”
Many countries are still developing their national programmes to implement the Paris Agreement and “we expect many of them to outline plans for the use of international markets,” he said. Some, such as Jairam Ramesh, Congress leader and a former climate negotiator of India, argue against carbon markets, on the grounds that they are only gamed and used by the developed countries to evade commitments. On this, Forrister said that there ought to be “strong accounting systems”.

“We expect that any UN-sanctioned body that would measure and verify reductions and approve the issuance of carbon instruments would have strong safeguards in place to ensure reductions were real,” he said. “Markets rely on confidence; it will be the UN’s task to deliver that confidence,” he added. In a IETA press release issued today, Forrister observed that the failure in Madrid wouldn’t stop countries from co-operating on building “high integrity markets of the future.” “Since the UN climate process has stalled, the opportunity will move to bilateral and regional markets, where pilot systems are already in formation,” the release says.

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Grow your own green garden, with hydroponics

Name of the company: Agro2o Set up in: March 2018 Based in: New Delhi Founder: Yash Vyas Funding received: In search of investment What it does: It is an agritech start-up working in the sector of ‘smart hydroponics’. It offers a line of intelligent soil-free SMART GARDEN™ products which make it possible to grow fresh and chemicalfree herbs, vegetables, flowers, medicinal plants, in the comfort of one’s home using hydroponics technology. The smart garden uses light with required spectrum for photosynthesis. Through Agro2o® the company strives to create solutions for better living, where everyone has scope to access clean, affordable and nutritious food in sync with nature. How it does it: In the first phase, Agro2o is offering its product SMART GARDEN™, Renaissance, under the SmartHomes segment. It is Asia’s first smart indoor hydroponics device, aimed at individuals keen to grow their own food in urban settings. A 12-plants device with a patented design, which helps to grow a variety of herbs and other edibles, it is embedded with IoT and allows one to
monitor plant growth on one’s phone. The next offering will target tier 1 and tier 2 cities, through a 4-pod device called Savour. Using sensors, advanced hydroponics, and intelligent growing algorithms, Agro2o® Renaissance ensures optimum growth conditions for the plants and allows them to reach their full potential, guaranteeing quality, taste, and yield. It is a self-sustaining device that can be controlled and monitored with a smartphone or tablet. It also enables plants to grow 4-5 times faster than traditional gardening, using 90 percent less water. Automated hydroponics is an untapped market in Asia and India. Agro2o’s line of Smart Garden™ will be the first to launch in Asia. Big moment: Through extensive R&D on hydroponics in Indian conditions and with the help of Electropreneur Park, Delhi University and STPI, a technology has been devised to grow plants using water and non-GMO seeds in an automated system. What’s in store: Leveraging smart hydroponics technology to grow plants at home, in buildings, and even on large-scale farms. The aim is to revolutionise the way plants are grown. The first product, Renaissance, is a successful example of a ‘Make in India’ model.

Impact: With climate change looming and pollution creeping in from the air, food and water, sooner or later there is a need to take control of things in order to preserve the planet. The idea is to use sustainable and eco-friendly technology to ensure optimum use of resources to help people grow plants organically using smart hydroponics. Hydroponics is one of the fastest-growing agriculture technologies in the world. In the US, Europe and Singapore, it has become part of the lifestyle through portable home kits that allow people to grow plants in a limited space.

Vision: To contribute in shaping a future where food is fresh, green and organic. The company’s vision is to target revenue between ₹300 crores and ₹350 crores from India in the next five years and expand subsequently to the West Asian and European market.

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India improves on climate performance, enters top 10

India for the first time ranks among the top ten countries in the Climate Change Performance Index (CCPI) which is being released annually after analysing four parameters— greenhouse gas (GHG) emissions, renewable energy, climate policy and energy use. The country has, in fact, improved its ranking from 11th last year to ninth this year. The first three spots in the CCPI were, however, left vacant symbolically as none of the countries assessed is on a trajectory compatible with the Paris Agreement, signed in 2015. The top three performers are Sweden (fourth), Denmark (fifth) and Morocco (sixth). The CCPI is a ranking of 57 countries and the European Union (EU), is collectively responsible for about 90% of the global GHG emissions. The CCPI 2020, released by three international NGOs — Germanwatch, New Climate Institute and Climate Action Network — on the sidelines of the ongoing UN climate change conference (COP25) on Tuesday, shows that the EU collectively (22nd) and China (30th) rank below India in the list whereas the second largest global emitter, the USA, figure at the bottom. The CCPI report noted that the current levels of per capita emissions and energy use are still comparatively low in the country. “While the country receives an overall medium rating in the renewable energy category, India’s 2030 renewable energy target is rated very high for its well-below-2°C compatibility,” said the report.

It added, “Despite an overall high rating for its ‘Climate Policy’ performance, experts point out that the government has yet to develop a roadmap for the phase-out of fossil fuel subsidies that would consequently reduce the country’s high dependence on coal.” Besides the USA, some other countries in the ‘very low’ rating category in the CCPI are Turkey, Poland, Japan, Russia, Canada and Australia. However, on the positive side, 31 of the 57 high emitting countries are showing falling emission trends. “The new Climate Change Performance Index shows signs of a global turnaround in emissions,” said Ursula Hagen of the Germanwatch.

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क्लाइमेट को गंदा कर रही गैस को खा जाएगा यह बैक्टीरिया

इसाइल के रिसर्च रूपरेखाओं ने एक ऐसा बैक्टीरिया विकसित किया है जिससे ग्रीन हाउस गैसों को कम करने में बहुत बड़ी मदद मिलती है। यह बैक्टीरिया हमारे वातावरण में कार्बन डाइऑक्साइड कम कर देगा। मीडिया रिपोर्टों के मुताबिक इस बैक्टीरिया को इसाइल के बीजमैन इंस्टिट्यूट ऑफ साइंस ने सिर्फ कार्बन डाइऑक्साइड खाने के लिए विकसित किया है। ये बैक्टीरिया, जो हवा में कार्बन से अपने शरीर का पूरा बायोमास बनाते हैं, हमारे वातावरण में ग्रीनहाउस गैस को कम करने और ग्लोबल वार्मिंग के खिलाफ लड़ते में भविष्य में मदद कर सकते हैं। स्थानीय भूगोलिक इस बैक्टीरिया को लगभग एक दशक की लंबी प्रक्रिया के बाद पूरी तरह से जांच करने तैयार किया गया है। पहले जहां ये बैक्टीरिया शुगर खाकर कार्बन डाइऑक्साइड बनाते थे, वहीं री-प्रोग्रामिंग के बाद यह कार्बन डाइऑक्साइड कंप्यूटर कर शुगर बनाने लगे। यानी इस्तेमाल किये जाने के लिए वायुमंडल में मौजूद कार्बन का उपयोग किया। वैज्ञानिकों ने अपने लैब में बैक्टीरिया को जीनोम के रूप में कार्बन डाइऑक्साइड बनाने के लिए उनके शरीर में उन्हें फॉर्मेट नामक पदार्थ से ऊर्जा पहुँचाने दिया। उन्होंने यहां पत्रकारों से बातचीत करते हुए कहा वक अभी तक पूरी दुनिया में इसे लेकर इसे प्रयोग किया जा रहा है। अगर ऐसे ही चलता रहा तो चपटाता रहा तो यह एजेंसी का उपभोक्ता के लिए भारतीय कार्बन की आपूर्ति के मार्गदर्शक के रूप में उपयोग किया। इसके अलावा, उन्होंने बैक्टीरिया को एक जीन डाटा जो उन्हें फॉर्मेट में ऊर्जा पहुँचा देता है। हालांकि बैक्टीरिया की डाइट बदलने के लिए वह यही कारकों नहीं रहे थे। बैक्टीरिया की हालाती इस प्रोसेस में कम से कम मात्रा में शुगर दी जाने लगी। यह महत्वपूर्ण बात है कि इस बैक्टीरिया ने नए दिशानिर्देश दिए हैं और हमें कार्बन डाइऑक्साइड को खाना बनाना शुरू कर दिया।

एपी, मैड्रिड: संयुक्त राष्ट्र के सेक्रेटरी जनरल ऐंटोनियो गुतारेस ने क्लाइमेट चेंज पर चेतावनी देते हुए कहा है कि अभी तक पूरी दुनिया में इसे लेकर जो प्रयास हुए, वे पर्याप्त नहीं हैं। अगर ऐसे ही चलता रहा तो पछताना पड़ेगा। उन्होंने यहां पत्रकारों से बातचीत करते हुए कहा कि 2015 के पैरिस समझौते के तहत पूरी दुनिया वैज्ञानिक जानकारी और तकनीक के जरिए ग्लोबल वार्मिंग को 1.5 डिग्री सेल्सियस पर तीन लेगी लेकिन असली समस्या राजनीतिक इक्ष्जाशक्ति का है। हमें प्रकृति के खिलाफ जारी अपने ‘युद्ध’ को रोकना होगा।

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**PM2.5 share down, Delhi’s air less toxic than Mumbai’s:**

SAFAR

Delhi’s air is a lot less toxic than the air in Mumbai. The concentration of the finer PM2.5 particles in the overall PM10 concentration in the national capital has reduced over the last four years, an analysis carried out by the System of Air Quality and Weather Forecasting and Research (SAFAR) has revealed. Gufran Beig, project director, SAFAR, said on Friday that the ratio of PM2.5 in the overall PM10 concentration has been recording a decline in Delhi since 2016, with it dropping from around 55% in 2014 to 45% in 2019. In comparison, Mumbai has a PM2.5 to PM10 ratio of 65%. “Mumbai’s air at present is more dangerous. Even if the air is less polluted in Mumbai, the impact on human
health may be more,” he added. Beig was speaking at an annual conclave by the Centre for Science and Environment (CSE) — “Controlling Air Pollution — What next?” on the measures which will be required across the country for the next few years to control pollution levels. He said an analysis was carried out, analysing data from Ahmedabad, Mumbai, Pune and Delhi. Among these, Beig said Delhi’s reducing PM2.5 to PM10 ratio stood out the most. “When the fuel quality worsens, cities will have high amount of PM2.5 in PM10 concentration. For Delhi, a dip started occurring in 2016 and between 2017 and 2019, there has been a further decline. The ratio of PM2.5, which used to be 55% in the PM10 concentration, has now come down to 45% and this is a positive sign for Delhi,” added Beig. Explaining the difference, he stated a PM2.5 concentrations of 200 micrograms per cubic metre in Delhi will be equivalent to a PM2.5 concentrations of around 130 micrograms per cubic metre in Mumbai in terms of the damage to human health. “In terms of toxicity, the carcinogenic elements found in Mumbai’s air were the highest, followed by Pune and Ahmedabad. Delhi has been improving in this regard by switching over to cleaner fuels and reducing the entry of trucks which use adulterated fuel,” said Beig. Anumita Roy Chowdhury, executive director, research and advocacy at CSE said that the trend in improvement is a long-term effect of the measures that have been taken to clean up Delhi’s fuels. “The switch to CNG and PNG has been significant. Power plants have been shut down in the last decade and we have also stopped the usage of coal,” added Chowdhury. SAFAR’s analysis also showed a declining trend in the annual PM2.5 concentrations for Delhi, with it falling from around 115 micrograms per cubic metre to around 91 micrograms per cubic metre this year.

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Oil is on track for the biggest yearly gain since 2016 as declining US crude stockpiles eased oversupply concerns, and heightened geopolitical risk gave the commodity a boost. Futures climbed as much as 1% in New York after closing at the highest level since September on Friday. American crude supplies fell by 5.47 million barrels in the week ended December 20 for a third straight decline, according to data release Friday. Iran on Monday seized a fuel tanker in the Strait of Hormuz while the US on Sunday launched air strikes on five Iranian-backed bases in Iraq and Syria, stoking fears of geopolitical risk creeping back into the supply picture.

“Oil seems to be supported by the large drawdown from last week’s inventory numbers, some geopolitical risk factors rising over the weekend and this morning, as well as a weak dollar,” says Phil Flynn, senior markets analyst at Price Futures Group. Oil is poised for its best year in three, after a breakthrough in US-China trade talks and a commitment by the Organization of Petroleum Exporting Countries and its allies to deepen output cuts lifted prices. Hedge funds remain upbeat on crude, increasing bullish wagers on Brent oil to a seven-month high, despite comments from Russia that OPEC+ would discuss ending supply curbs next year. West Texas Intermediate for February delivery rose 25 cents to $61.97 a barrel on the New York Mercantile Exchange as of 11:09 a.m. Prices are also set for the biggest monthly gain since January. Brent crude for February settlement added 51 cents, or 0.75%, to $68.67 a barrel on London's
ICE Futures Europe exchange. The global benchmark crude traded at a $6.71 premium to WTI. While concern lingers over rising production from non-OPEC nations including the US and Brazil, some of those worries were countered by a drop in American crude inventories to the lowest level in two months. The decline came despite the first dip in exports since late November, according to Energy Information Administration data on Friday. Gasoline stockpiles, however, rose for a seventh week to the highest since mid-March.

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**Fuel prices firmed up on global cues: Pradhan**

Domestic fuel prices have firmed up in recent days on global cues, according to Minister for Petroleum and Natural Gas Dharmendra Pradhan. “Consumers in India feel the pinch of rising crude oil price as product prices also move in tandem with international cues,” Pradhan said at Federation of Indian Chambers of Commerce & Industry’s 92nd annual convention. “A few days’ back US President Donald Trump tweeted that the US and China have made progress in ironing out their differences. The two inked an agreement for purchase of soybean. This improved the market sentiment and crude oil prices rose by some $2 to $3 a barrel,” Pradhan. “This led to a firming of product prices in India pinching the pockets of consumers. This is how geo-politics works,” he added. Brent crude prices have firmed up from $60.92 a barrel at the beginning of December this year to close at $66.32 a barrel on Friday. This has reflected marginally in auto fuel price too. Diesel price in Delhi is up from ₹65.78 a litre on December 1 to ₹66.34 a litre on Friday. Petrol price has registered a slight
decline and was sold at ₹74.63 a litre on Friday, down from ₹74.91 a litre on December 1.

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RIL tears into Centre’s affidavit trying to block its $15-billion deal with Saudi Aramco

Reliance Industries has mounted a strong counter to the government petition in the Delhi High Court seeking to block its $15-billion deal with Saudi Aramco, saying that the petition is an abuse of process as no arbitration award has fixed any final liability of dues on the company. In a counter affidavit, Reliance said it was a “falsehood” to say that the arbitration tribunal had passed an award requiring the company and its partners to pay $3.5 billion to the government. It added that the petition is an abuse of process as “it portrays that a sum of money is due and payable under the final award and purports to compute the money payable on a basis neither found in the arbitration award nor disclosed in the petition.” The government, it said, has calculated on its own volition the revised figure of its share of profit from oil and gas production allegedly due by extrapolating the purported finds.

Pending dues- The affidavit came in response to the government moving the Delhi High Court seeking to block Reliance selling 20 per cent stake in its oil and chemical business to Saudi Aramco for $15 billion, in view of pending dues of $3.5 billion in Panna-Mukta and Tapti oil and gas fields. An international arbitration tribunal issued a partial award in October 2016 in the dispute between the Government of India (GoI), BG Exploration & Production India Limited (BG) and Reliance Industries Limited (RIL) regarding the Panna-Mukta and Tapti Production Sharing Contracts (PSC). Certain parts of the 2016 award by the tribunal were challenged by BG/RIL before an English court wherein it decided some parts of challenge in favour of BG/RIL and directed the arbitration tribunal to reconsider those parts of the 2016 award. The tribunal, having reconsidered, issued another partial award in December 2018 which was in favour of BG/RIL. Reliance said pursuant to the 2018 award, the government’s claim comes down very significantly — a fact which the government has not taken cognisance of and approached the Delhi High Court prematurely for
enforcement of its claim computed based on its interpretation of the 2016 award. The government has challenged the 2018 award and the English court is yet to pronounce its judgment.

One of the most significant issues pending before the tribunal is an increase in the Cost Recovery Limit under the PSC. The arbitration tribunal is scheduled to hear BG/RIL’s application for increase of PSC Cost Recovery Limit next year. If the tribunal decides in favour of BG/RIL, the Centre’s computation of sums allegedly payable by ONGC, BG and RIL is expected to further comedown.

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**Methanol Blend on Cards, may Trim Oil Import Bill by 5k Cr**

The government is looking at introducing methanol-blended fuel pan India — a move that can potentially reduce one’s fuel bill by at least 10%, lower vehicular pollution levels by over 30%, and save the exchequer ₹5,000 crore in annual import bill. Road transport and highways minister Nitin Gadkari has written to petroleum minister Dharmendra Pradhan, asking him to “make all efforts” to make methanol widely available for commercial use at fuel stations, officials told ET. Currently, vehicles in India use up to 10% ethanol-blended fuel. But the cost of ethanol production is comparatively high at ₹42 a litre. Methanol, or
methyl alcohol, is estimated to cost less than ₹20 a litre. Indian Oil Corporation is already making M15 blended fuel — with 15% methanol and 85% petrol — available for commercial use. “The ministry of road transport and highways has put the regulatory framework in place, and it is now the petroleum ministry’s job to make the fuel available,” a road ministry official said. The ministry has notified regulatory standards for methanol blends M15, M85 and M100, or neat methanol. The industry is backing the move. “Multi-fuel option is definitely worth exploring from energy security point of view,” said Rajesh Menon, director general at industry body Society of Indian Automobile Manufacturers (Siam). “We are in talks with Niti Aayog on a possible road map.”

**SUPPLY PLAN IN PLACE**

Niti Aayog member VK Saraswat, who has been helming the methanol economy project since its inception two years ago, confirmed to ET that 65,000 km of trial run on M15 blended fuel has been successfully completed and there is no tweaking required in vehicles to run on methanol blended fuel. The think tank had projected annual reduction of $100 billion in crude imports by 2030 if the country moves to 15% blended fuel both for transportation and cooking. India is the third-biggest oil importer globally. Our crude oil import stands at close to ₹5 lakh crore annually with 2,900 crore litre petrol and 9,000 crore litre diesel consumed. Methanol is currently being manufactured at Assam Petrochemicals where the current production capacity is 100 tonnes per day and the company hopes to ramp up its production six-fold to 600 tonnes per day by April 2020. Commercial production of methanol from coal will soon be started in West Bengal and Jharkhand with state governments having allotted a dedicated coal mine each for this. The plan is to have an installed capacity of 3-4 million tonnes in the next five to eight years to help replace 50% of fossil fuel requirement.

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The Supreme Court’s directive to telecom service providers to pay the pending dues pertaining to the underpaid licence fees and associated penalties and interest could adversely impact the non-telecom companies including GAIL, Oil India, and Power Grid Corporation. This is because a small portion of revenues (under 2%) of these companies comes from the optical fibre cable (OFC), which these companies have laid across their gas and power distribution networks. However, according to the Supreme Court’s decision regarding the adjusted gross revenue (AGR) does not distinguish between telecom and non-telecom companies and considers entire revenue of the companies for the calculation of the penalties. The total pending payment related to AGR dues for non-telecom companies is around ₹2.3 lakh crore and more than 90% of this is from the thee three listed companies. The AGR liability is the highest for GAIL at around ₹1.2 lakh crore, followed by ₹40,000 crores for Oil India, according to Emkay Global, a domestic brokerage house. For Power Grid, the liability is estimated to be around ₹22,000-25,000 crore. In case of GAIL, gas transmission, gas marketing, LPG and petrochemicals segment form a major chunk of the revenue. GAILTEL, the company’s telecom arm has an OFC network of 12,000 kilometres. A senior official at Power Grid told ET that at the time of signing the licence agreement with the telecom ministry, it was made clear that only telecom revenue would be considered for the purpose of the licence fees. “It has therefore surprised us to know that core earnings are used to calculated AGR dues,” he added. Power Grid’s telecom revenue increased by 9.3% year-
on-year to ₹663.3 crore in FY19. Its total telecom network increased by about 27% to over 60,900 km. These non-telecom companies are in the process of filing their responses in the next few days to the AGR demand. The uncertainty surrounding the final outcome and any prolonged arbitration may keep the upside limited for their stocks until clarity emerges about the treatment of AGR for non-telecom companies.

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Oil India keen on acquiring full control of Numaligarh Refinery

State-run Oil India Ltd may pitch for full control of Numaligarh Refinery Ltd (NRL), according to two executives aware of the development. NRL is a subsidiary of state-run Bharat Petroleum Corp. Ltd (BPCL). As part of its strategy to divest stake in BPCL, the government on November 21 decided to carve out NRL from BPCL. BPCL holds 61.65% stake in NRL, while Oil India holds 26% and the government of Assam 12.35%. Oil India did not reply to an email sent on December 6. NRL was set up at Numaligarh in Assam’s Golaghat district, in accordance with provisions of the Assam Accord signed on August 15, 1985, and has been associated with the industrial and the economic development of the region. The capacity of NRL is being expanded from the present 3 million metric tonnes per annum (MMTPA) to 9 MMTPA at an investment of ₹22,594 crores. The expansion project is targeted to be completed in four years and expected to meet the refining requirements of the North-East region. The expansion involves laying down a crude oil pipeline from Paradip in Odisha to Numaligarh and a product pipeline from Numaligarh to Siliguri. NRL enjoys the status of a Mini Ratna public sector unit. “The Assam state government is keen on keeping NRL as it is central to the state. Oil India has also been lobbying hard to take full control of NRL. Citing security concerns, Oil India and the state government have together conveyed their willingness to the central government to acquire NRL,” said a senior official from an oil marketing company and the first person cited above. He spoke on the condition of anonymity as he is not allowed to speak to the media. Reports of the BPCL stake sale led to widespread agitations across Assam with the workers’ union in NRL
holding regular protests outside the refinery. The refinery has 954 permanents and 2,000 temporary employees.

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Not sure if HPCL was accurately evaluated when divested to ONGC

The Comptroller and Auditor General (CAG) of India has cast aspersions over the valuation of Hindustan Petroleum Corporation Limited (HPCL) when the centre was selling its stake to Oil and Natural Gas Corporation (ONGC) Limited. The CAG has made this observation in the General Purpose Financial Report of Central Public Sector Enterprises (CPSEs). “From the replies of Department of Investment and Public Asset Management (DIPAM) and the Ministry of Petroleum and Natural Gas (MoPNG) and in absence of the supporting sheets (containing future estimations viz. free cash flow, debt inventory and estimation of refinery margins) provided by HPCL to the Technical Adviser for arriving at the price, audit could not derive an assurance that the price was correctly arrived at,” the CAG said.

“Scrutiny of the Pricing Analysis Report revealed that the Transaction Advisor had rectified some linking errors in the data provided by HPCL. Audit therefore, requested MoPNG to provide the relevant calculation/working sheet with regard to the price arrived at (while factoring free cash flow, debt inventory and estimation of refinery margins) and recommended by EC (Evaluation Committee) for the deal,” the CAG noted.

But the Petroleum Ministry said that the information/records sought by the CAG were not available in the Ministry. The CAG indicated that this is in contravention to DIPAM’s Guidance Note–III on Strategic Disinvestment. According to the note, records of deliberations by Advisors along with working sheets, supporting documents (in paper & electronic form records) should be kept for future reference by the Administrative Ministry. According to the CAG, the Petroleum Ministry had subsequently replied that the Asset Valuer had informed that all workings, methodology/approach and assumptions had been incorporated in the Inception Repot and Valuation Report which had already
been provided to Audit. The CAG also said that over 40 per cent of the dividend proceeds to the exchequer from Public Sector Enterprises has been accrued from 14 government companies under the Ministry of Petroleum and Natural Gas. The CAG also noted that these 14 companies contributed 28,859 crore representing 40.90 per cent of the total dividend declared by all Government Companies and Corporations. In toto there were 644 Central Government Public Sector Enterprises (CPSEs) under the audit jurisdiction of the Comptroller and Auditor General of India as on March 31, 2018. These included 450 Government Companies, 188 Government Controlled Other Companies and 6 Statutory Corporations. The CAG report dealt with 420 Government Companies and Corporations (including 6 Statutory Corporations) and 165 Government Controlled Other Companies. In all, 101 Government Companies and Corporations declared dividend of ₹ 70,562 crores during 2017-2018. Out of this, dividend received/receivable by the centre stood at ₹ 42,229 crores. This represents an 11.83 per cent return on the total investment of ₹ 3,57,064 crores in all Government Companies and Corporations. The non-compliance to the government directive on declaration of dividend by 53 CPSEs has resulted in a shortfall of ₹ 9,417.75 crores in the payment of dividend to the exchequer for 2017-2018. The report also said that 231 Government Companies and Corporations earned profit of ₹ 1,66,197 crore during 2017-2018 of which, 71.83 per cent (or ₹ 1,19,379 crore) was contributed by 52 Government Companies and Corporations in three sectors namely, Petroleum, Coal and Lignite, and Power.
Tata Power Company plans to expand its power distribution business to more circles with an aim to get a customer base of at least a crore, a top executive told ET. On Monday, Tata Power Company announced that it has emerged as the successful bidder to own the licence for electricity distribution and retail supply in five circles, constituting the Central Electricity Supply Utility of Odisha (CESU). The company, which generates power and distributes electricity in Mumbai, Delhi and Ajmer, will double its customer base with the addition of this distribution business to 50 lakh. “We are not putting any money directly in power generation, except through the platform we have created (Resurgent Power). We are definitely looking at expanding power distribution business under the PPP model. Now, we have 50 lakh customers which we are looking to double,” Praveer Sinha, chief executive officer, Tata Power, told ET. Resurgent Power, a joint venture between Tata Power International, ICICI Bank, Kuwait Investment Authority and State General Reserve Fund of Oman, recently acquired the 1,980 mw-Prayagraj Power. “Odisha has come up with
PPP arrangements for power distribution in three other circles — we are looking at that. We are also looking at other states going through the process of preparing documentation for power distribution and franchising,” he said. Average demand of CESU is around 1,300 mw with annual input energy of 8,400 million units. Tata Power will have the licence for power distribution for 25 years initially. The proposed sale of CESU to Tata Power will be through the formation of a special purpose vehicle entity. The government of Odisha will own 49% equity stake in the proposed SPV, and Tata Power will hold 51% with their management. Tata Power plans to invest Rs 300-500 crore every year on capex on the Odisha distribution business, the chief executive said. “Right now, the AT&C (aggregate technical and commercial) losses in this business is 30-32%, we want to reduce it to 15% in the next 5 years. Thereafter, we will definitely bring it down to less than 10%,” he said, commenting on the Odisha discom.

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**KUSUM guidelines aren’t watertight**

The agricultural sector accounts for about 80 per cent of the country’s groundwater extraction and for about 20 per cent of the country’s electricity consumption. As electricity for this sector is either free or highly subsidised, there is no incentive for the farmer to use water and energy resources.
efficiently. The power discoms (distribution companies), in turn, are reeling under the subsidy burden and provide low-quality electricity to agriculture, characterised by unreliable supply, long outages, and high voltage fluctuations. This has an effect on agricultural productivity and groundwater extraction. The recently announced KUSUM (Kisan Urja Suraksha evam Utthaan Mahabhiyan) scheme by the Ministry of New and Renewable Energy (MNRE) attempts to address some of these issues related to power supply for agriculture. KUSUM is presented as a solarisation scheme aimed at benefiting farmers. The scheme has three components. Component A aims at setting up 10,000 MW of decentralised ground solar or other renewable power plants. Component B involves introduction of 17.50 lakh standalone solar agriculture pumps of individual capacity up to 7.5 HP. Component C aims at solarisation of 10 lakh grid-connected agriculture pumps at individual farms. Component A promotes distributed solar energy generation with a solar plant capacity of 500 kW to 2 MW. As per MNRE guidelines, the solar plant requires a dedicated evacuation infrastructure (feeder). A competitive bidding process for tariff determination, with a ceiling tariff as per latest solar energy tariff order of the respective States, is being proposed. Wasteland and degraded land shall be identified and leased from farmers. If agriculturally productive land is utilised, the co-location of solar energy production and crop cultivation is recommended. This will require elevated structures and a more dispersed solar array arrangement to permit sufficient sunlight for crop cultivation. For the first time, a compensation mechanism for the backing off of the grid is recommended. The promotion of distributed renewable energy generation (DREG), solar and other renewables, is a welcome move. The requirement for a dedicated feeder for evacuation of electricity generated by the DREG results in unnecessary infrastructure costs and occupies valuable discom substation bays. One key advantage of distributed solar energy generation is the fact that production and consumption of electricity occur at the same location, or in close vicinity to each other, thereby reducing T&D losses and optimising the utilisation of existing electrical distribution infrastructure. The proposed competitive bidding process for tariff determination proposed is unlikely to attract any bidders, as the capital cost of smaller renewable generators is typically higher than the capital cost of larger systems. It is financially not feasible for the generators. One
alternative approach is that the locational value of distributed solar energy
generation, particularly the avoidance of T&D losses, may be priced and used
to provide an incentive to the generator in addition to the solar tariff. The
discom and the generator may share the savings on transmission (and
distribution losses).

Grid-connected power

Component C of KUSUM promotes grid-connected solar for agricultural service
connections (behind-the-meter).

The guidelines recommend that size of the solar system in kW is at twice the
pump’s capacity in kW; the solar energy generated to meet the electricity
required for irrigation needs and the solar energy surplus must be injected into
the grid; discoms will purchase excess power from the farmer at the rate
decided by the respective State; and the central financial assistance is limited
to pumps of up to 7.5 HP. A domestic content requirement for the solar system
components is mandatory. The priority is set on small and marginal farmers.
The guidelines also give priority to farmers already using, or about to adopt,
micro-irrigation systems. As electricity is free of cost for the agricultural
consumers, the suggested financing model (with a 40 per cent contribution by
the farmer) are unlikely to work. Alternatively, a third party may invest in the
solar system and sell the gross-generated solar energy to the discom. To make
this approach acceptable to the farmer, a ‘solar farmer incentive’ to to reduce
water and electricity consumption can be introduced. The attempt to converge
KUSUM with ongoing micro-irrigation and efficient pumps schemes presents a
great opportunity to improve water and energy efficiency. However, the
guidelines are silent on how this will be achieved, and there may be the risk of
the proposed convergence being ignored altogether. This presents a severe risk
factor in further increasing groundwater extraction on account of agriculture.

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The Indian Energy Exchange (IEX), India’s leading energy exchange, is hopeful of being able to introduce a trading platform for wind and solar power, early next fiscal. When this happens, wind and solar energy companies who put up plants in future, or those who have some surplus capacity not committed under long-term power purchase agreements (PPA) could sell their electricity on the IEX — which is expected to fetch them a better price. However, it would need the approval of the federal electricity regulator, the Central Electricity Regulatory Commission (CERC), which “is in an advanced stage,” said Rohit Bajaj, Senior Vice President and Head—Business Development, IEX. Bajaj told Business Line that the regulator wanted to collect comments from stakeholders first. Accordingly, “The first and foremost comment was, ‘please bring it in ASAP’,” Bajaj said.

**Low tariffs**- Wind energy companies are reeling under what it believes to be unviable, low tariffs. These tariffs, determined through competitive bidding processes — where the company that offers to sell power the cheapest gets to sign longterm power purchase agreement — had fallen as low as ₹2.43, before firming up slightly to ₹2.93. The industry believes that it has to get upwards of ₹3.25 to stay viable, but companies, backed by turbine manufacturers, bid low regardless in order to keep their factories running. Once committed under a
PPA, the energy companies have no option but to keep selling power for the agreed period of time, typically 25 years, at those tariffs.

‘REC mechanism’- But future wind projects can keep a part or whole of their capacity outside long-term PPAs. Power from such ‘merchant’ capacity can be traded on the exchange. Today, there is about 4,000 MW of wind capacity under the ‘REC mechanism’. The energy companies (developers) that own these projects sell their power to the State electricity distribution companies (Discoms) for the same prices as the Discoms’ average cost of power purchase. Because they opt not to sell their green power for higher prices, the developers get ‘renewable energy certificates’ that can be traded in the market. The certificates will be bought by those entities under obligation to purchase either green power, or, failing that, the certificates. As some of the REC projects have completed their PPAs, they can now sell their power on the exchanges.

It is pertinent to note that the IEX had given a somewhat similar proposal to the regulator a few years ago. The CERC had rejected it saying that the “market condition at present is not conducive for the introduction of this product.” Rajesh Mediratta, Director (Strategy and Regulatory Affairs), told BusinessLine that the IEX had given a different petition this time around. Earlier, the proposal was for the ‘day ahead market’, but now the idea of ‘term ahead market’, or letting renewable energy companies offer electricity for sale after more than a day, has been mooted.

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A $39-billion wind company bets hydrogen is the key to climate goals

One of the world’s biggest developers of offshore wind farms thinks its massive turbines could be key to the production of hydrogen in a greener way and ultimately, stemming climate change. Over the past decade, offshore wind has pushed from a frontier technology to a multi-billion-dollar industry that provides green power cheap enough to compete with fossil fuels. Orsted, a Danish company, anticipates that the scale and efficiency of wind farms at sea can play a crucial role to supply heavy industry with green hydrogen. Hydrogen
is important because it's one of the few fuels that can burn hot enough to make steel and cement, two of the most polluting industries. At the moment, most hydrogen is derived from natural gas and causes greenhouse gas emissions. Getting the element from electrolysis driven by wind farms would make it a zero-emissions fuel, since no carbon dioxide comes with hydrogen in the combustion process. As long as these heavy industries rely on polluting fossil fuels, it may be impossible to achieve the goals in the 2015 Paris Agreement on climate change. "You cannot do it without hydrogen," Anders Nordstrom, head of hydrogen at Orsted, said in an interview. "Everything that can be electrified, you should electrify, but that leaves a substantial part of de-carbonisation where hydrogen is the second-best option because electricity isn't feasible."

Manufacturing is responsible for about 10 per cent of global carbon dioxide emissions because it relies on high-temperature furnaces that mostly run on fossil fuels such as coal and oil. Some processes like cement require chemical reactions that throw off CO2 in addition to the emissions from burning fuels. Hydrogen can be used as an alternative fuel in many of those processes. The issue is getting the gas without making more CO2. Machines known as electrolyzers can create the hydrogen by splitting it out of water molecules. And when it burns, hydrogen leaves only water vapour behind. If the whole process is powered by a wind farm, no emissions are involved. To Orsted, it makes sense to pair offshore wind farms with hydrogen electrolyzers. Wind turbines are bigger and run more often when they're sited at sea instead of on land - often enough that they sometimes spin when the grid can't absorb more power. Hydrogen factories could take that power and turn it into a gas. That would deliver another benefit in that they can store that energy for use later - something that's more difficult when the energy comes in the form of electricity. As the industry pushes to rapidly expand offshore wind in Europe, electrolysis may also help balance the variable generation rates of wind farms. When the wind doesn't blow that strongly, electrolyzers could be turned down. When the wind picks up, the hydrogen production could be scaled up. Since 2018, Nordstrom has run a small team of people at the Danish energy company that's focused on hydrogen. During 2019, the company unveiled a pair of pilot projects in the UK and Germany. A failed bid for an offshore wind farm off the coast of the Netherlands also included plans to incorporate green hydrogen.
Orsted is continuing to develop hydrogen projects in the country and has a pipeline of other projects around northwest Europe, Nordstrom said. The major challenge is cost. Green hydrogen costs between US$2.50 and $6.80 (S$3.40 and $9.2) a kilogramme to make, due to the relatively high costs of renewable-powered electrolysis, according BloombergNEF. That would need to fall below US$2 in order to make renewable hydrogen competitive with coal, and to around 60 cents to beat the cheapest natural gas-based production, according to BNEF. That cost could come down to be competitive with fossil fuel by 2030, according to Nordstrom. A number of factors would need to fall into place to achieve that, such as increased scale of electrolysis projects, cheaper and more efficient electrolyzers and a higher carbon price, he said. The executive sees a parallel between hydrogen and offshore wind in terms of their level of development. Just a few years ago, offshore wind was more expensive than nuclear power. Now it rivals coal on cost in some places.

"We are where offshore wind was 10 years ago," Nordstrom said. "It's the same cost journey we need to take." Green hydrogen will also have to contend with competition from natural gas, which can be used to make hydrogen as well. That method produces carbon dioxide in the process. By 2025, Orsted will move beyond studies and have electrolyzer projects up and running, including a 30-megawatt project it's part of in Germany, Nordstrom said. Beyond then, scale and potential is hard to forecast. "It's quite difficult to predict where we'll be in 10 years," Nordstrom said. "There's an exponential feel to what's happening at the moment."

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The percentage of renewable energy in India’s energy mix has risen steadily to nearly 9 per cent from the 2014-2015 levels. But, the current installed renewable energy capacity of the country pales against the 282 GW conventional power generation capacity. This is because despite the high installed generation capacity of renewable projects, a lower plant load factor reduces the amount of energy produced from these projects. Till now, 83.38 GW of renewable energy capacity has been installed as on October 31, 2019. This includes 31.69 GW from solar, 37.09 GW from wind, 9.95 GW bio-power and 4.65 GW hydro power. According to data, the percentage of renewable energy in total electricity supplied in energy terms has risen from 3.72 per cent in 2014-2015 to over 8.9 per cent in 2019-2020 (till October 2019). Within renewable energy, solar showed the highest increase, up from 45,99.02 million units in 2014-2015 to 39,268.2 million units in 2018-2019. But, wind continued to dominate India’s renewable energy footprint, supplying over 62,036.38 million units in 2018-2019, up from 33,768.3 million units in 2014-2015.

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Red-hot South leads the way in harnessing, generating green energy

Southern States have always had a niche in the industrial map of India. Be it in embracing industrialisation or accelerating reforms, the region has always progressed better. In the past decade or so, the South has made its contribution in the area of renewable energy. Tamil Nadu, for instance, has scripted a success story in harnessing wind energy and continues to be the leader in the category. Backed by attractive policies and favourable environment, Karnataka has demonstrated significant progress in solar energy sector. Andhra Pradesh and Telangana are not far behind in making progress in the area of clean energy. In the past four years, southern States have registered significant growth in addition of new capacity in the renewable energy sector. As of September 30, 2015, Tamil Nadu, Karnataka, Andhra Pradesh, Telangana and Kerala had installed capacities of 8466 MW, 4606 MW, 2094 MW, 72 MW and 216 MW, respectively. But the capacity addition in the region grew manifold with investors making a beeline to the southern States to execute solar and wind projects. As of October 31, 2019, the country’s cumulative grid-interactive installed capacity in the renewable sector stood at 83,379 MW, of which the wind and solar segments accounted for 37,090 MW and 31,696 MW, respectively. Of the total capacity of 83,379 MW, southern States — Tamil Nadu, Karnataka, Andhra Pradesh, Telangana and Kerala — together contributed almost half of the capacity at 40,309 MW. At 14,335 MW as of
October 31, Karnataka was the top State in terms of installed capacity of total renewable power, followed by Tamil Nadu, which had an installed capacity of 13,457 MW. Andhra Pradesh and Telangana occupied the 6th (8072 MW) and 8th (4,017 MW) positions respectively. Kerala’s total capacity was 427 MW. While Karnataka is the leader in the solar power sector with a total capacity of 6,497 MW, Tamil Nadu tops in wind power with an installed capacity of 9,232 MW.

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Not a sunny scenario for renewables

Babubhai Patel, a farmer living in Vahelal village of Gandhinagar district, was pleasantly surprised when he calculated his earnings from the solar installations under the Gujarat Government’s pilot project — Suryashakti Kisan Yojana (SKY). “It has been exactly a year since we installed 71.5 kW of solar panels in about eight guntha (roughly 800 sq mt). It was surprising for all in our family, when we got our first instalment of payment for the first four months of power generation. After deducting all costs and interest payments, net earning stood at ₹85,000. We are yet to receive payment for the remaining eight months. This means our annual earnings from this small set-up will fetch us multiple times more than what we normally earn from farming” he exclaims, with a sparkle in his eyes. Eleven other farmers also followed him to look for “Solar earnings” using the State government’s novel idea of solar installations on agricultural land. Babubhai recorded peak generation of 427 units per day during last
winter, while the average stood at 302 units since installation in December last year.

Launched in 2018, the scheme was a feather in the Solar cap for the State. The momentum, however, couldn’t last long. After the pilot got over, no new installations came up under the SKY Scheme. Meanwhile, in February 2019, the Centre came out with a similar scheme of ‘Kisan Urja Suraksha evam Utthaan Mahabhiyan (KUSUM)’ aiming to set up grid-connected solar power plants each with capacity of up to 2 MW in the rural areas. The devil lay in the details. Unlike SKY Scheme, which allowed farmers to bear just 5 per cent of the project cost and provided 35 per cent loan with the State utility as its guarantor besides 60 per cent subsidy, KUSUM Scheme couldn’t catch the fancy of the farmer community. “The farmer contribution was increased to 35 per cent in KUSUM, from 5 per cent in SKY Scheme. This will benefit only the wealthy farmers or those with bank loan facility. The soul of SKY was in its minimum contribution from farmers, which KUSUM doesn’t have, so it is not so popular among farmers at present,” says Harshad Patel, another farmer from Vahelal.

**Solar sunset?**

Gujarat has had a glorious solar experience under its 2009 Solar Policy. Soon after that, the then UPA government at the Centre brought in the Jawaharlal Nehru National Solar Mission in 2010, ushering in the “solar era”. Gujarat has shown the way in sustainable energy solutions over the years. But the present appears full of challenges, which weighs on the future of investments in the sector and benefits to the end users. Since the launch of the new Solar Power Policy in 2015, Gujarat has been grappling with implementation bottlenecks, disconnect between the policies and on-ground reality besides land acquisition and issues of right of way (ROW) challenges. Pranav Mehta, Chair of the Global Solar Council, feels the key to a sustainable renewable sector lies in the policy implementation. “The State agencies aren’t using practical solutions. Despite recommendations from Central agencies and Ministry of New and Renewable Energy (MNRE) to push for third party sale of power and allowing open access, Gujarat is not encouraging the same, thereby giving advantage to the other States,” he says.
“The 2009 policy was implemented very well with close cooperation of all concerned government agencies and private sector and collectively we could achieve success. But now we have an ambitious target of 30,000 MW for Gujarat and while everything appears to be optimistic, there are certain implementation bottlenecks in the existing scheme, including penalties, which pose a challenge,” Mehta told BusinessLine. Showcasing a policy direction on renewables in Gujarat, State Energy Minister Saurabh Patel announced a 30,000-MW hybrid park in Kutch, the Central nod for which is awaited. The Government has identified about 60,000 hectares of land on which all the projects will come up. However, the idea doesn’t seem to have gone well with the developers, who stand to lose the liberty to choose a land suitable to their project economics. This, according to a section of developers, may push up the cost, thereby the tariff bidding as well. There are also concerns from a practical viability point of view, such as the policy insistence of having locally manufactured cells to be used for solar rooftop projects; the country doesn’t have sufficient indigenous cell making capacity. As per an industry estimate, as against solar module generation capacity of about 9 Gigawatt (GW), cell capacity is only at 3 GW.

**Too many players**

Heavy penalties in cases of unavoidable, genuine delays of implementation have resulted in financial loss, impacting the spirit of investors. Another challenge is threatening the sector in the form of emergence of non-serious players in the engineering, procurement and construction (EPC) segment. An EPC contractor and leading solar project consultant, Kunj Shah, CMD of Zodiac Energy Ltd, believes that government’s lenient approach in opening up the tendering process to even inexperienced players unsettles the market. "Unlike wind generation, solar project installations do not require specialised knowhow. Additionally, the start-up buzz has caught the fancy of the government as well, which has opened the tendering process even to the novice players. We have seen cases where inexperienced players quote completely unrealistic prices in government tender for solar installations under given schemes, and they emerge as L1 bidder. This absurd price doesn’t just distort the price but impacts the businesses of the serious players.”
These EPC players are appointed for installation and maintenance of the projects under government schemes for a specified period. However, the kitty of this EPC segment — which is largely dominated by unorganised SME players — has grown bigger multi-fold in the past few years, making the market crowded and leaving less room for profitable business.

“On one side we have fierce competition in this wafer-thin margin, and on the other there are delays in subsidy payments from the government. This is blocking a good amount of cash for the players. If this is a short-term phenomenon, we can handle, but can’t be sure about the future if this continues for long,” states Shah, who is also Senior Associate at National Solar Energy Foundation of India.

A Some smooth sailing

However, developers who entered into long-term renewable PPAs with State discoms have fared better. Leading independent power producer (IPP), Torrent Power Ltd, which has total renewable installed capacities of over 650 MW in the State (including 138 MW in solar and 520 MW in wind), has had a smooth experience in Gujarat. “So far as solar projects are concerned, our experience has been pleasant. We have installed 50-MW project at Charanka Solar Park and we are very happy with the full support received from government. We installed another 88-MW project near Surat on our own land and have received full support from government authorities as regards evacuation and other aspects of this project,” says a Torrent Power spokesperson via email. But of late, corporate investors, especially the large developers having capacities of 5 MW and more, have underlined availability of land and right of way as the major issues. Also, to a limited extent, the transmission corridors also involve RoW issues. “The problem is for the new projects, which are coming up in the State under the new policy. The biggest of the problems is the land acquisition for the project,” says an industry source not willing to be quoted. Amid all this, the tariff has gone down below ₹3/kWh (or unit), which means at the prevailing rate, repayment period for the investment has got extended. In sum, Gujarat has lost its numero uno position to other States.

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Nasa’s solar mission sends spectacular data trove

Nasa’s Parker Solar Probe, having survived its closest encounter so far with the Sun, has sent back a “spectacular trove” of data on its corona, the super-hot outer edge of its atmosphere, scientists said on Wednesday. The car-sized probe, launched in August last year, will come within some six million kilometres of the Sun’s surface during a series of fly-bys at other distances and trajectories over seven years. It is hoped it will allow a better understanding of the solar wind and electromagnetic storms, which can cause chaos on Earth by knocking out the power grid. One puzzle concerns the corona itself which at one million degrees is many times hotter than the sun’s surface at 6,000C, when it would normally be expected to cool the further from the heat source.

“So the corona finds a way to heat up. We are looking at the physical processes which allow that to happen,” said Alexis Rouillard at France’s National Centre for Scientific Research (CNRS) and co-author of one of four reports on the probe’s initial findings published in the journal Nature.

“Even with just these first orbits, we’ve been shocked by how different the corona is when observed up close,” said Justin Kasper, a professor of climate and space sciences and engineering at the University of Michigan. A summary by the University of Michigan noted that it had been thought that oscillations in the Sun’s magnetic field might have caused the corona to heat up and were expecting to get data to confirm that. Instead, they reported much more powerful, “rogue” magnetic waves strong enough to switch the direction of the magnetic field completely that may be the energy source for the corona. Scientists were also surprised by what they found about the acceleration of the solar wind, the outward stream of protons, electrons and other particles emanating from the Sun. It was known that closer in, the Sun’s magnetic field pulls this wind in the same direction as its rotation, so the team expected this effect would weaken further out. “To our great surprise, as we neared the Sun, we’ve already detected large rotational flows -- 10 to 20 times greater than what standard models of the Sun predict,” Kasper said. “So we are missing something fundamental about the Sun and how the solar wind escapes.”
“This has huge implications. Space weather forecasting will need to account for these flows if we are going to be able to predict whether a coronal mass ejection will strike Earth, or astronauts heading to the Moon or Mars,” he added. Stuart Bale, professor of physics at the University of California Berkeley, recalled that a “major space weather event” in 1859 blew out telegraph networks on Earth and one in 1972 set off US naval mines in North Vietnam. With society now even more dependent on sophisticated technology, “big disturbances from the Sun are potentially a very serious thing,” Bale said. “If we could predict space weather, we could shut down or isolate parts of the power grid, or shut down satellite systems that might be vulnerable.” Nicky Fox, Nasa’s project scientist for the probe, told reporters the fact that humanity had flown a spacecraft into the atmosphere of a star was in itself a stunning accomplishment. “The fact that it’s our nearest star and it has a profound effect on us here on earth is even better, but we’ve waited for decades and decades, to understand these mysteries.” The probe is named after US solar astrophysicist Eugene Parker who first developed the theory of solar wind, describing a system of magnetic fields, energetic particles and plasmas that make up the phenomenon

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Govt. moves to allay fears of farmers with demo of solar plant on a field

After several attempts to launch a solar power project on agricultural land, the Delhi government has decided set up a smaller plant to demonstrate to farmers that it would not affect their yield. Senior government officials said the demo project — capable of producing 110 kW power per day [1 kWh = 1unit] — will be set up on an acre of land within the Krishi Vigyan Kendra, located in the western peripheries of Delhi near Kanjhawla. The research institute will consume the power produced by the plant in its premises. In July 2018, the Aam Aadmi Party (AAP) government in Delhi had announced the Mukhyamantri Kisan Aay Badhotri Yojana – a scheme to increase income of farmers. Under it, the government said, they would ask farmers to allow solar power plants on their land. However, the scheme is yet to kick off in the Capital. Senior
government officials attributed the problem to the fact that land holdings in Delhi are largely scattered. According to government estimates, a full six acres will be needed for setting a 1 MW [or, 1000 kW] solar power plant, which would be capable of generating over 1.2 million units of electricity annually. Even the farmers who consented, the government official said, later came back with lots of queries — the most common being whether the land would lose fertility, or if yield would reduce after the solar panels are installed. This, they assumed, would deprive the land of direct sunlight, among other things, the government officials said. The operational model was prepared and tender documents were finalised but it failed to take off amid so much concerns, said government officials. To allay these concerns, the government will go ahead with the demonstration by January. Under the scheme, farmers would be able to continue with agriculture even after the power plants are set up as the solar panels to be installed would maintain a minimum height of 3.5 metres from the ground, allowing for farming activities, tractors to ply on the fields and other machinery to be used. The farmers would be paid ₹1 lakh per acre a year, and the rent would increase by 6% compounded annually. Once allowed, the plant would exist for 25 years. The farmers would also get 1,000 units of energy produced by the plant each year for every acre they rent out for the project, officials said. According to the statistical handbook of Delhi, the total cropped area in the national capital is 34,750 hectares, which roughly translates to around 85,870 acres. In September this year, government officials said that the power department in Delhi received consent from farmers for only 150 acres, located mostly in the western and northwestern peripheries of the city.

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After selling 205 megawatt (MW) of its operational solar energy portfolio to the Adani Group, the Essel Group has reached an agreement to sell the remaining 480 MW — currently under construction — to Adani Green Energy, two people with direct knowledge of the development said. The Adani Group has agreed in principle to buy out the remaining portfolio, one of the people said.

“Adani Green is big on renewable power and has over 5.5 GW of portfolio with almost half of it already operational. After acquiring Essel Group’s solar assets in Punjab, Karnataka and Uttar Pradesh, they have agreed to buy the remaining assets too, once Essel Group operationalises them,” he added. Adani Group did not respond to an email till press time on Sunday. A spokesperson for Subhash Chandra-promoted Essel Group said it was exploring various proposals from prospective partners. “Any additional details cannot be shared at this stage due to confidentiality agreements,” the spokesperson said. Adani Group had signed an agreement in August this year to acquire the 205 MW of operational solar assets for ₹1,300 crore. Essel Group’s total solar energy portfolio consists of 685 MW of installed and under-construction projects. At the time of deal, Essel Group said it was also in talks to sell the remaining assets. The sale of solar energy assets was part of Essel Group promoters’ overall divestment process to reduce debt and repay lenders. A significant portion of the promoters’ debt has already been paid after they sold 26.7% stake in Zee Entertainment Enterprises to institutional investors. The group is also selling non-media assets to square
off debt within those companies. ET had reported earlier that Essel Group promoters were in talks to sell six of 14 road projects to National Investment and Infrastructure Fund (NIIF), including four operational and two under-construction toll roads. The deal has, however, not been finalised yet.

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Centre weighs bailing out clean energy companies

The Centre is considering offering state governments concessional loans from public sector lenders Power Finance Corp. (PFC), Rural Electrification Corp. Ltd (REC) and Indian Renewable Energy Development Agency (IREDA) to help power distribution companies clear green energy dues. These three companies are the largest lenders to the power sector, and the move is expected to resolve a growing crisis in the clean energy sector even as India chases ambitious targets in renewable energy. With record low solar and wind power tariffs, banks are wary of lending to renewable energy developers as they suspect the viability of such projects. The loans are expected to be made available at cost plus nominal fee to help clear the backlog that has resulted in electricity distribution companies (discoms) owing ₹67,237 crores at the end of October for power bought from generation companies (gencos). In return, the respective borrowing state governments will have to either offer a sovereign guarantee or escrow one or more of its revenue streams to the lender. In poor financial health, discoms have delayed payments to gencos even as the Centre steps up efforts to supply round-the-clock power to all. The inability of discoms to make payments has also added to the pain in the Indian banking sector as clean energy developers are facing difficulties to service their debt. The backlog of dues owed by discoms to gencos ranges from two to 15 months. A spokesperson for the ministry of new and renewable energy confirmed the development, saying, “This is one of the options being considered.” The mounting outstanding dues to the generators had the potential to dent India’s image as a clean energy champion and comes when new solar tenders of around 15,000 megawatts are in the pipeline. According to government documents reviewed by Mint, “the state government would use loan amount strictly for making payments to RE (renewable energy) generators on Fifo (first
in, first out) basis. For receiving loans, the state governments would undertake to make payments in future to the RE generators on time”. The payment security measure is being sought keeping in mind the issue of non-performing assets (NPAs) in the Indian financial system. According to finance minister Nirmala Sitharaman, NPAs of India’s public sector banks came down to ₹7.9 lakh crore at the end of March. In comparison, gross NPAs were ₹8.65 lakh crore at the end of December 2018 and ₹8.69 lakh crore at the end of September 2018. “This recourse has been provided to the states provided they offer a sovereign guarantee or escrow one or more of their revenue streams. This will help guarantee repayment of loans and also help sustain the clean energy sector,” a senior government official said on condition of anonymity.

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India should develop thorium-based nuclear reactors as an alternative source of energy

India should start developing thorium-based nuclear reactors as an alternative source of energy, said A Sivathanu Pillai, President, Project Management Associates, and former CEO & MD of BrahMoS Aerospace. Thorium is a weakly radioactive metallic chemical element. India’s reserves of thorium are at least three times larger than its uranium reserves. Its exploitation requires a proper sequencing of reactor-fuel cycle technologies in the overall programme, he said at the 9th edition of TANENERGY Summit 2019 organised by FICCI and the Tamil Nadu State Council on the theme: Emerging Energy Scenario in the Current Economic Trend.

Abundant Supply—Nearly 25 per cent of the world’s thorium ore is available in India, especially in Kerala and Tamil Nadu. Thorium has high thermal conductivity and higher melting point. For instance, 6 kg of thorium metal in a liquid-fluoride reactor has the energy equivalent of 66,000 MW hr. This is equivalent to 230 train cars (25,000 tonnes) of bituminous coal or 600 train cars (66,000 tonnes) of brown coal, he said. With availability of abundant thorium, India can take the lead in thorium-based reactors, he added. According to the World Nuclear Association, out of the 63,55,000 tonnes of thorium resources
available globally, India has 8.46 lakh tonnes, followed by Brazil with 6.32 lakh tonnes and Australia with 5.95 lakh tonnes. Other major countries that have thorium resources include the US, Egypt, Turkey, Venezuela, Canada, Russia, South Africa and China, the association’s website said. Thorium is found in small quantities in most rocks and soils, where it is about three times more abundant than uranium. Thorium is very insoluble, which is why it is plentiful in sands but not in seawater, in contrast to uranium. Thorium is not itself fissile and so is not directly usable in a thermal neutron reactor. However, it is ‘fertile’ and upon absorbing a neutron will transmute to uranium, which is an excellent fissile fuel material, the association said.

**Power from solid waste**- Pillai also suggested generation of power through municipal solid waste. This is already being done in Salem, and can be replicated elsewhere. The pollution in Delhi, for instance, can be curbed by turning the waste into power. It is possible to generate nearly 5,000 mw of power through the 900 plants across India, he added. On getting energy from oceans, Pillai said uranium seawater extraction makes nuclear power completely renewable. Nearly 4 billion tonnes of uranium in seawater could fuel 1000 of 1,000 MW nuclear plants for 100,000 years, Pillai said. It gets continuously replenished and is as endless as solar and wind, he pointed out. This is a huge project and nations should join hands in this, he said. India should invest in developing clean coal technology; reduce oil imports and promote alternative solutions such as electric vehicles and tap ocean thermal energy and uranium, he said.

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**TN, Karnataka lead in renewable energy growth**

Tamil Nadu and Karnataka are leading the growth of renewable energy India with the two States accounting for a third of new capacity additions as well as generation of clean energy. Though Tamil Nadu lost the top position in renewable energy capacity addition to Karnataka, the State leads in clean energy generation as of now. During April-October 2019, the renewable sector in the country generated about 84,490 million units (MU) of energy, which was about 10 per cent of the total energy generated in the country during the period. Tamil Nadu occupied the number one position with 14,567 MU
generation, followed by Karnataka at 14,554 MU. Gujarat took the third position with 10,392 MU. Maharashtra and Rajasthan occupied the fourth and fifth positions at 8,822 MU and 8,296 MU respectively, according to government data. However, during April-September 2019 period, Tamil Nadu’s generation was 14,034 MU when compared with 12,999 MU of Karnataka. A significant drop in wind generation capacity during October in Tamil Nadu reduced the gap between the two States in the month. While solar power drives renewable power generation capacity for Karnataka, its wind that brings a major chunk of power generation in Tamil Nadu. During 2018-19, the total renewable power generation in India was 126,759 MU, up significantly from 101,839 MU in 2017-18. “The States of Karnataka and Tamil Nadu are among the highest renewable power generators in India. Both States, being urban and industrialised, demand for power is consistently high. Investor confidence During April-October 2019, the renewable sector generated about 84,490 million units of electricity, which was about 10 per cent of the total energy generated in the country is still high in both States for renewable energy in terms of open access projects and rooftop projects,” said Manu Karan, VicePresident, CleanMax Solar.

Renewable energy capacity- As of October 31 this year, India’s total installed renewable energy capacity stood at 83,379 MW, of which wind and solar (includes both ground-mounted and rooftop) segments accounted for 37,090 MW and 31,696 MW, respectively. At 14,335 MW as of October 31, Karnataka was the number one State in terms of installed capacity of total renewable power, while Tamil Nadu, which was the top State 2-3 years ago, had an installed capacity of 13,457 MW during the period. While Karnataka is the leader in the solar power sector with a total capacity of 6,497 MW, Tamil Nadu retains its top position in the wind power sector with an installed capacity of 9,232 MW. Tamil Nadu’s progress in solar has not been impressive, and capacity addition has hit a slow lane despite the announcement of new solar policy this year. It has achieved a little over 3,000 MW in solar capacity including rooftops as of October this year, up from 158 MW in September 2015. The State has set a target to achieve about 9,000 MW installed capacity by 2023 in solar.
**Major worry** - “For these two States to continue to lead renewable energy installation and adoption momentum, everyone has to worry about the respective State Discoms’ financial health. They would have to reinvent their revenue model with a focus on how to add value to distributed generation and open-access power generation business models,” said Karan.

“An option could be that Discoms offer, for a fee, payment security to renewable energy developers, to assist in the collection of payments from the consumers. This can be enforced by taking necessary action against defaulters in case of any delay in payments. Also, certain restrictive policies on net-metering that are proving to be a hindrance in the adoption of rooftop solar should be eliminated for easy accessibility and availability for any customer to go green,” he added.

Meanwhile, solar projects to the tune of 17,998 MW are at various stages of installations across the country and tenders for 36,278 MW capacity projects have been issued. With new tenders of around 15,000 MW planned in the remaining period of 2019-20 and 2020-21, the Centre is racing towards its target in the solar power segment. In wind power sector, bids for 15,100 MW of wind power projects have been issued so far, out of which projects of 12,162.50 MW capacity have been awarded.

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पानी से बना हाइड्रोजन ईंधन जल्द गाड़ियों में इस्तेमाल होगा

यूएनएसडब्ल्यू की अनुवादी वैज्ञानिकों की टीम ने हाइड्रोजन और जल्द गाड़ियों में इस्तेमाल करने के लिए बहुत सस्ता और टिकाऊ तरीका खोज निकाला है। प्रदूषण की मात्रा कम होने पर भारत के लिए यह खोज अत्यंत महत्वपूर्ण साबित हो सकती है।

हाइड्रोजन और जल्द गाड़ियों में इस्तेमाल होने के लिए बहुत सस्ता और टिकाऊ तरीका सोचा जा रहा है। यूएनएसडब्ल्यू की अनुवादी वैज्ञानिकों को हाइड्रोजन उत्पाद का बनाने के लिए बहुत सस्ता और सावधानीशीर्ष काम किया जा सकता है। यह शोध नेर्गुण्युत के शोंस पवन के में प्रकाशित हुआ है।

सस्ती धातुओं का होता प्रयोग : इस प्रक्रिया में लोहा और निकल जैसी धातुओं का उपयोग होता है, जो पृथ्वी पर अधिक मात्रा में पाए जाते हैं। अब तक 'बॉट-रूटिल्टिंग' प्रक्रिया में कीमती धातुओं जैसे रूथेवनयम, लैटिनम और इरिवडयम का उपयोग होता था। अब इनकी जगह लोहा और निकल जैसी सस्ती धातु का उपयोग होगा, जो अब इस प्रक्रिया में उत्पर्वर्क के रूप में काम आएंगी।

यूएनएसडब्ल्यू लॉर्ड्स के क्षेत्र में फोर्सनर चुचान झाओ कहते हैं कि पानी के विभाजन में दो इलेक्ट्रॉड पानी में एक इलेक्ट्रिक को चार्ज करके हमारे हाइड्रोजन को आक्सीजन से अलग कर देता है और इस ऊर्जा को ईंधन के रूप में उपयोग किया जाता है। झाओ कहते हैं कि इस प्रक्रिया में उर्जा की खपत बहुत कम होती है। इस उत्पर्वर्क एक छोटी नैनो-केल इंटरफेस होता है जहां लोहा और निकल परमाणु स्तर पर विलेख किया जाता है, जो पानी के विभाजन के लिए एक सक्रिय भाग बन जाता है। यह वह भाग है जहां हाइड्रोजन को आक्सीजन से विभाजित किया जा सकता है और ईंधन के रूप में सोखा जा सकता है। अंशुतक्षण की वातावरण में छोटा दिया जाता है।

हाइड्रोजन अर्थव्यवस्था को बढ़ाया जा सकता है- इन धातुओं की कम कीमतों के कारण हाइड्रोजन अर्थव्यवस्था को तेजी से बढ़ाया जा सकता है। लोहे और निकल की कीमत नी रूपये और 1,389 रूपये प्रति किलोग्राम है। इसके विपरीत, रूथेवनयम, लैटिनम और इरिवडयम की कीमत 832 रूपये, 2,978 रूपये और
4,919 रुपये प्रति ग्राम है, दूसरे शब्दों में कहें तो यह हजारों गुना अधिक महंगे है। लिथियम-बैटरी चालित इलेक्ट्रिक कारों को चार्ज करने में लगने वाले घंटों की तुलना में हाइड्रोजन भरने का काम मिनटों में किया जा सकता है।

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