ECONOMIC TIMES, Delhi, 10.2.2023
Page No. 20, Size:(19.59)cms X (24.99)cms.

'Green hydrogen is no longer a pipe dream – it will be a significant element in deep decarbonisation worldwide'

Stefan J. Reichelstein is Professor Emeritus at Stanford University's Graduate School of Business. Speaking to **Srijana Mitra Das**, he discusses green hydrogen – and why this could be a breakthrough:

Q. What is the core of your research?
A. My work over the last ten years has focused on the entire economics of decarbonisation. This means the process of the world's economies transitioning away from using fossil fuels to energy sources and production methods that involve far fewer emissions and ultimately, no emissions. We study the economics of this transition, how this could evolve and whether humanity can do this in time to avoid the most severe damages of climate change.

ET evoke

Q. Within this field, could you explain what 'green hydrogen' is?
A. This is an energy platform which has come into the world's focus over the last five years. It is a different type of hydrogen from what is used in industrial processes now — green or electrolytic hydrogen is based on renewable electricity and water. The technology involves an electrolyser, water and electricity — the latter is infused into the water, splitting hydrogen from oxygen, creating 'green hydrogen'.

There are three types of electrolyser technology for this currently on the market — these are alkaline electrolysis, PEM electrolysis and solid oxide cell electrolysers. Alkaline technology has been around for some time, PEM has been built up and deployed rapidly in many countries and solid oxide is a latecomer, with lots of excitement around it, partly because this is a reversible fuel cell. Electrolytic hydrogen involves electricity, water, oxygen and hydrogen. Here, solid oxide electrolysers can operate in reverse — you take the hydrogen, run it through a fuel cell and get back electricity and water. This lets you use the hydrogen as an energy storage device, somewhat like a battery.

Q. What will influence green hydrogen's widespread adoption across industry?
A. The first order of business is placing green hydrogen in a position to replace hydrogen obtained now from steam methane reforming — currently, many chemical companies use natural gas and obtain hydrogen from it but release CO2 emissions in the process. This is 'grey hydrogen'. Green hydrogen needs its cost perspective to compare favourably with this, so it can displace grey hydrogen which is responsible for about two and a half percent of all CO2 emissions in the world. Many companies are working actively on this. Green hydrogen can then be used in many applications including transport — there is discussion around how, in a couple of decades, airplanes could be hydrogen-powered — with buses, trucks, ocean shipping, etc.

Q. The development of green hydrogen evokes comparisons to gold mining or solar energy just as it began to boom – are these accurate estimates?
A. At the moment, these are expressions of hope and excitement — but there is also a lot of data to make this look plausible. The rapid development of green hydrogen is no pipe dream. Earlier, we had the expression 'Hydrogen is the technology of the future — and it always will be'. People thought it wouldn't ever happen. But now, partly because of government policies globally, the cost of electrolysers is coming down. The efficiency of these has also been improving. And what this depends on is green electricity, which has been declining in cost too. These three factors — the electrolyser's cost, its efficiency and the electricity price — have all been moving in the right direction, making green hydrogen much cheaper than it was just a few years ago.

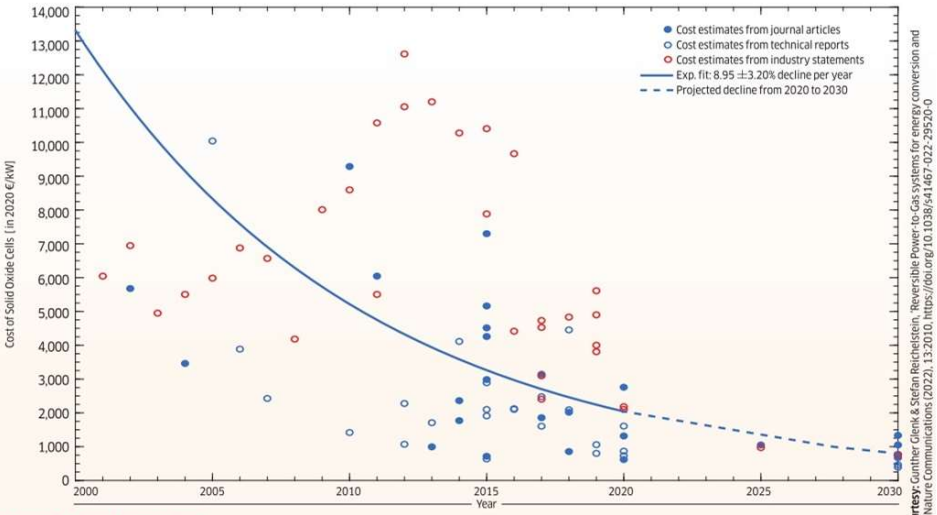
Q. Renewable energy is often less costly than fossil fuel-based power – so, why does the latter still prevail?
A. Fossil fuel-based electricity is available when you need it — it is dispatchable. You can crank up your natural gas or coal-fired power plant, let this run and get power throughout the hours and seasons. However, solar and wind energy are only available at certain times. This is the variability issue around them. We need to store the energy generated here and make it available when consumers need it. Adding the cost of storage makes the price comparisons between wind and solar and natural gas and coal closer. Hydrogen is important here as it makes energy storage relatively inexpensive.

Q. What does 'deep decarbonisation' mean – and what is driving this?
A. This means decarbonisation which is comprehensive and includes all sectors of the economy. Our emissions problem in most economies is concentrated in power generation and transportation but there is another chunk — industrial production processes in steel, cement, chemicals, etc. — that also causes emissions. Deep decarbonisation means these hard-to-decarbonise sectors also lowering emissions.

This depends on accommodating public policies — we're seeing many instances now of countries making emissions more expensive by pricing carbon or providing tax-based incentives to embrace decarbonised energy. These policies shape the economics of companies and households making their energy decisions, from the adoption of an electric vehicle to installing solar on a rooftop or building a renewable power plant. If governments accelerate such policies for about a decade, the energy transition will be significantly enhanced.

Views expressed are personal

A Favourable Fall: The Cost of Solid Oxide Cells



Nearing A Transformation: As the price of its key elements declines, experts in many nations are looking eagerly at the rapid development of green hydrogen which could improve many industrial emissions levels

Data Courtesy: Gunther Glenk & Stefan Reichelstein, 'Reversible Power-to-Gas systems for energy conversion and storage', Nature Communications (2022), 13:2010. https://doi.org/10.1038/s41467-022-29520-0

"Many chemical companies currently use natural gas and obtain hydrogen from it but release CO2 emissions in the process – this is 'grey hydrogen'. Green hydrogen needs its cost to compare favourably, so it can displace grey hydrogen which causes about 2.5% of all CO2 emissions worldwide"

"Three key factors – the cost of electrolysers, their efficiency and clean electricity prices – have all been moving in the right direction, making green hydrogen cheaper"

TIMES OF INDIA, Delhi, 10.2.2023
Page No. 6, Size:(3.62)cms X (18.43)cms.

'Industries in NCR dist shift towards green fuel'

TIMES NEWS NETWORK

New Delhi: Industries in Delhi-NCR are beginning to move towards using cleaner fuels, a new assessment done by Centre for Science and Environment (CSE) of two major industrial areas in Alwar district of Rajasthan has found. However, limited PNG availability and its soaring price are making it difficult for them to go greener and new particulate emission standards are being overlooked by industries firing biomass, states CSE.

The study has surveyed and analysed the pattern of fuel shift, changes and tentative costs required for making this shift, challenges faced by industries for shifting towards cleaner fuels and the strategies they adopt to combat them. CSE has done in-depth assessment of two industrial areas — Matsya Industrial Area and Bhiwadi.

Nivit Kumar Yadav, programme director, industrial pollution, CSE, said, "Though these industries are changing their fuels, a few significant points need to be kept in mind to make cleaner fuel usage a sustainable option — these include the issue of PNG availability, its soaring prices and the challenge of meeting new PM emission norms using biomass as a fuel."

Yadav, "But our study found that industries are not making enough efforts to mitigate PM emissions. Bag filters or electrostatic precipitators can bring down emissions below 50 mg/Nm^3 – but only one out of 15 surveyed biomass-firing industries has a bag filter."

ECONOMIC TIMES, Delhi, 10.2.2023
Page No. 12, Size:(21.13)cms X (8.22)cms.

Adani Total Gas Q3 Net Profit Rises 18%

BETTER NUMBERS Rise in quarterly net profit on the back of price hikes; total income was up 27% at ₹1,193.69 cr

Our Bureau

Mumbai: Adani Group's city gas distribution arm Adani Total Gas Ltd has reported an 18% year-on-year increase in quarterly net profit on the back of price hikes the company implemented.

Net profit for the December quarter stood at ₹150.19 crore compared with ₹127.61 crore in the year-ago quarter, the company said on Thursday. Total income was up 27% at ₹1,193.69 crore compared with ₹939.87 crore.

The company said in a regulatory filing that after the critical Hindenburg Report, as an additional corporate governance measure, the management of Adani Group is evaluating an independent assessment of the matter.

"During the quarter, ATGL has delivered a good performance with its calibrated approach despite the high input gas price scenario," said Suresh P Manglani, CEO of Adani Total Gas. Manglani said that while the gas sector has been seeing volatility in prices due to geopolitical issues, ATGL has seen a moderation in the international gas prices in the recent weeks.

Global gas prices reached record highs due to supply disruptions and sanctions after Russia invaded Ukraine last February. To offset this impact and manage volatility, the company said it sourced gas through bilateral trades and the Indian Gas Exchange. Short-term contracts, on the other hand, helped it improve gas cost. "We are confident that this, coupled with the increase in domestic gas supply and expected increased allocation to the CGD sector, will drive increased demand across both PNG and CNG segments," he said.

The company has already completed a minimum work programme for FY24 towards the steel pipeline network in 11 of 15 of the geographical areas awarded to it in the 9th and 10th CGD rounds and is working with a virtual pipeline in the balance GAs.

For the first nine months of the fiscal, the company saw a 30% year-on-year increase in CNG volume on account of customer activities along with network expansion of CNG stations. PNG volume decreased by 11% on lesser offtake of gas—mostly industrial consumers--owing to high PNG prices resulting from higher gas cost.

"In spite of high gas prices, ATGL had taken a calibrated approach in maintaining balanced pricing strategy and despite passing on high gas prices to its consumer, ATGL sustained its volume and growth, thereby helping sustain its EBITDA of Rs 702 crore on Y-o-Y basis," the company said.

PIONEER, Delhi, 10.2.2023
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Comfortable with India buying Russian oil; no sanctions: US

PIONEER NEWS SERVICE
NEW DELHI

As India continues to procure fuel from Russia during the ongoing Ukraine conflict despite objections from western countries, the US has said it is not looking at imposing sanctions against India and is "comfortable" with oil purchase.

US Assistant Secretary of State for European and Eurasian Affairs Karen Donfried late on Wednesday said that the relationship with India is most consequential and while the policy approach of the US and India may differ, both share a commitment to uphold the order based on international rules and have

respect for territorial integrity and sovereignty.

US Assistant Secretary of State for Energy Resources Geoffery Pyatt added the US was "comfortable" with India's approach on Russian oil purchase "but we value the dialogue that we continue to have on the issue". He also mentioned how energy security was invariably part of most bilateral discussions lately.

India continues to buy discounted oil from Russia despite the West's sanction. Moscow has become New Delhi's second biggest oil supplier, replacing Saudi Arabia, after Iraq. Moreover, New Delhi has so far refrained from voting against Russia in the UN on the issue of its military action in Ukraine.

The US has backed its decision on the price cap imposed on Russian oil and said it was an opportunity for India, even though it is not participating in it, to negotiate a better price. In December, US National Security Council spokesman John Kirby said the price cap "will lock in the discount on Russian oil" and countries like China and India would be able to bargain for steep price reductions.

Continued on Page 2

Comfortable with India buying...

From Page 1

The idea of the price capping was to squeeze the revenue of Russia that is fuelling the war in Ukraine and the US diplomats indicated that they believe the sanctions are having their intended impact.

Over the last months, India has been buying more and more cheap Russian oil and refining it into fuel for Europe and the US. Fuel refined in India is not considered to be of Russian origin.

India shipped about 89,000 barrels a day of gasoline and diesel to New York last month, the most in nearly four years, according to data intelligence firm Kpler, reported news agency Bloomberg. Daily low-sulfur diesel flows to Europe were at 172,000 barrels in January, the most since October 2021, Bloomberg reported.

US Assistant Secretary Pyatt said the energy security agenda that India and US are pursuing together is particularly important in light of what Russian President Vladimir Putin has done over the past year to disrupt global energy markets.

"By weaponising Russia's oil and gas resources, Russia has demonstrated that it will never again be a reliable energy supplier. It also caused a short spike in global oil and gas prices which continue to ripple around the world," Geoffrey Pyatt said.

Though India is not a participant in the price cap, it has effectively used its negotiation leverage which it derives from the price cap and the fact that large portions of the global market are no longer accessible to Russia, to drive down price of Russian crude, Pyatt said.

SET TO SURPASS PRE-COVID YEAR AMOUNT

CPSEs to increase capex by a quarter during next fiscal

Finalise plans to raise investments from own resources ₹3.23 trn

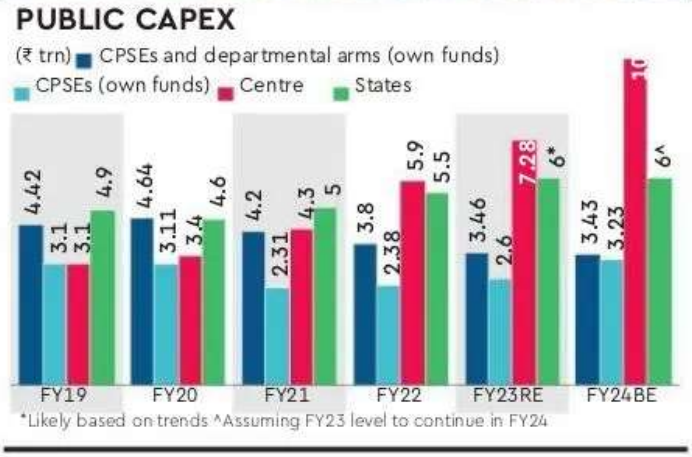
PRASANTA SAHU
New Delhi, February 9

THE CENTRAL PUBLIC sector enterprises (CPSEs), key contributors to public capital expenditure, have drawn up plans to increase investments from their own resources by 24% on year to ₹3.23 trillion in the next financial year, surpassing the pre-Covid year's achievement of ₹3.1 trillion in FY20.

The CPSEs' investment increase next year would be led by the petroleum sector, which would invest ₹1.06 trillion from its internal and extra-budgetary resources (IEBR) in FY24, compared with ₹84,000 crore in FY23. Indian Oil Corporation would invest ₹25,741 crore in FY24, up 83% on year. Oil and Natural Gas Corporation would continue its robust investment in exploration assets with capex of ₹30,125 crore in FY24 compared with ₹29,950 crore in FY23.

As per the plan, power sector CPSEs would invest ₹60,805 crore in FY24 compared with ₹52,878 crore in FY23. While NTPC would projected to invest ₹22,454 crore in FY24 (similar to FY23), National Hydro Electric Power Corporation and Satluj Jal Vidyut Nigam would step up the gas on capex net year.

Among others, atomic energy CPSEs plan to invest ₹13,059 crore in FY24 as against ₹10,927 crore in FY23 from their IEBR resources.



On the other hand, the Centre's budgetary support to departmental arms — the railways and the NHAI — skyrocketed in FY24 as it sought to step up capex to boost economic growth and job creation.

The railways and the NHAI, which together invested ₹1.9 trillion from their IEBR resources, would invest just ₹20,000 crore from IEBR in FY24. The Centre, which has halted fresh borrowings from the NHAI in FY23, almost halted fresh borrowings by railways in FY24 to insulate the poor finances of such entities, as their public service-oriented projects can't generate sufficient revenues to service debt. "The government funding means the cost of funds made available to department arms would be lower. Also, it would set a precedent for states to bring such off-budget liabilities incurred through their PSEs to the balance sheet," NR Bhanumurthy, vice-chancellor of Bengaluru's BASE University, said.

In fact, the investment from own resources by CPSEs and departmental arms together in FY24 would be at about ₹3.5 trillion, almost at the level of FY23, despite the massive reduction in IEBR funding by railways and the National Highways Authority of India.

For the third year in a row, the government extended a massive budgetary capex support to the railways with ₹2.4 trillion for FY24, up 50% on year, and accounted for one-fourth of the Centre's ₹10-trillion capex outlay for next year. For the NHAI, the budgetary capex support would be ₹1.62 trillion in FY24, up from ₹1.42 trillion in FY23 revised estimate and ₹57,060 crore in FY22.

The NHAI doesn't have its own sources of funds. It collects annually about ₹14,000 crore through tolls and passes it on to the Consolidated Fund of India. The total borrowings of the NHAI rose to about ₹3.5 trillion by March 31, 2022, from ₹1.8 trillion as of March 31, 2019, forcing the Centre to stop fresh debt raising by the highway maker.

Despite the pandemic-induced impact, the public capex (Centre, states and CPSEs) is estimated to rise from 6.29% of GDP in the pre-pandemic FY20 to 6.45% in FY24.

The gross fixed capital formation (investment) to GDP ratio increased to 34.6% in Q2 FY23 from 33.4% in Q2 FY22, owing to a strong capital expenditure push by the Centre, state governments and CPSEs. The public capex (Centre, states and CPSEs) would increase by 57% in six years through FY24 to ₹19.5 trillion as the Centre's strong capex push aims to boost economic growth amid headwinds from the global slowdown and not-so-strong private capex.

The Centre's budget for FY24 has made a record provision of capex — ₹10 trillion for FY24 (compared with ₹7.28 trillion in FY23), including ₹1.3-trillion capex loans to states.

HINDUSTAN TIMES, Delhi, 10.2.2023
Page No. 1, Size:(14.76)cms X (43.34)cms.

Energy emissions will fall by 2025... but very slowly

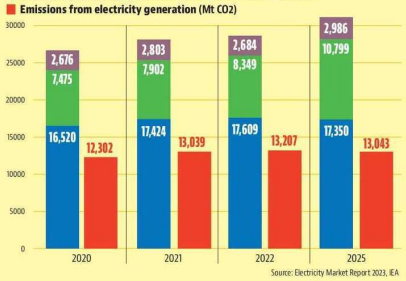
By Abhishek Jha

At the rate of emissions seen in 2022, the world will exceed the benchmark of 1.5° Celsius warming over pre-industrial levels in the next nine years, according to a 2022 report of the Global Carbon Project. This means the global carbon budget – the amount of emissions required to keep warming under this level – needs to be tracked every year. A report released by the International Energy Agency (IEA) on February 8 gives a disaggregated estimate of electricity emissions for 2022 (they account for about a third of total emissions) along with projections up to 2025. Here is what the report shows.

1 Emissions from electricity will decline marginally by 2025 due to rapid increase in renewable sources

Electricity generation added 13.21 Gt (gigatonnes or billion tonnes) of CO2 in 2022, 1.3% more than in 2021. However, a change in this sector is underway. According to IEA's projections, electricity emissions will decline at a compound annual growth rate (CAGR) of 0.4% up to 2025. This is expected due to increased adoption of renewable and nuclear sources for electricity. To be sure, rough calculations suggest the pace of adoption of such non-fossil sources is still slower than needed. In absolute terms, the expected decline in emissions from electricity generation amounts 0.055 Gt CO2 per year until 2025. The world needs to decrease emissions by 1.4 Gt CO2 per year to reach net zero emissions by 2050, according to the 2022 Global Carbon Budget report.

Emissions and source of electricity generation

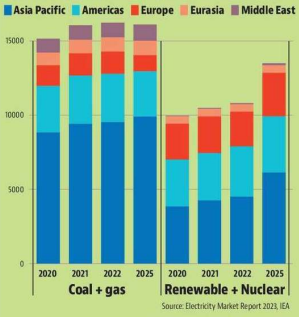


Source: Electricity Market Report 2023, IEA

2 Who is doing their bit in reducing electricity emissions?

The answer to this question is not as simple as one might expect. In absolute terms, the answer seems to be Europe and the Americas, which will reduce their coal and gas electricity generation by 409 Terawatt hour (TWh) and 201 TWh by 2025. However, the global decline will be only of 86 TWh because other regions increasing generation from dirty sources. However, this does not necessarily mean that the latter are not doing their bit. For example, countries in the Asia Pacific region are expected to increase coal and gas electricity generation the most in absolute terms, but they are also increasing renewable and nuclear generation the most. In other words, it is the demand growth in this region that will increase the use of so-called dirty electricity here. The net result will be that the share of fossil sources in the region's total electricity generation will actually decrease by 5.8 percentage points by 2025.

Electricity generation by source (TWh)



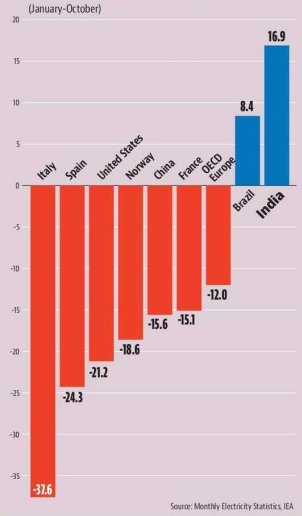
Source: Electricity Market Report 2023, IEA

Nonetheless, one can argue, as developed countries do, that developing nations should decrease their use of fossil sources for electricity even faster given the small carbon budget they have. This is an ongoing debate in global climate negotiations. Developing countries' argument against a target for reducing emissions is two-fold. One, they have not used their fair share of the carbon budget in the past. Two, they are not using it even now. This can be seen in IEA's data too. Asia (where two of the world's most populous and polluting countries are located) accounts for 59% of the world's population and the Asia Pacific region (this includes less populous Australia and New Zealand) generated 57% of fossil-based electricity in 2022. The Americas produced 19% of such electricity, when they account for only around 10% of world population. Europe, on the other hand, produced such electricity in proportion to its population share.

3 The climate crisis can affect generation from non-fossil sources

While renewable capacity is expanding, last year showed how late adoption of these sources is already hurting our capacity to transition. Europe suffered one of the worst droughts in at least 500 years and there were similar conditions in the Sichuan region of China. This decreased their hydro power generation. "This has underscored the potential impact of changing climate patterns on power systems as low hydro-power generation puts additional strain on the remaining dispatchable conventional fleet and increases the cost of electricity supply. Despite these uncertainties, our current outlook sees global hydropower supply grow in 2023-2025 on planned capacity expansions," the IEA report says.

Change in hydropower generation in 2022 comapred to 2017-2021 average in %



Source: Monthly Electricity Statistics, IEA

4 Renewable capacity also needs investment in grids for their use

This is a point that HT highlighted earlier in relation to India's increasing installed capacity in renewable electricity and the IEA report also touches upon this. Why is there a need for investment in grids? Renewable sources of electricity are less stable because the sun and wind are not available 24x7 as coal or gas are. The disruption in hydro power due to drought (as mentioned above) is also an extreme example of this. Therefore, the effective use of these sources requires that a drop in generation in one place can be quickly offset by a surplus in another. This flexibility or even good quality grids is often missing in developing countries. An earlier IEA report for emerging and developing economies showed the investment required in grids for transition. According to it, investment in transmission and distribution will have to more than double by 2026-30 (compared to 2016-20) for a sustainable development scenario (SDS) and quadruple for a net zero scenario. For India, the rate of increase in investments will need to be slightly faster than the group average.

Annual average EMDE investment in power grids in IEA sustainable development scenario
(Billion US$ 2019)

Source: Financing Clean Energy Transitions in Emerging and Developing Economies 2021, IEA

STATESMAN, Delhi, 10.2.2023
Page No. 8, Size:(28.92)cms X (13.96)cms.

Govt willing to give cooking gas subsidy if global prices come down: Hardeep Puri

AGENCIES
NEW DELHI, 9 FEBRUARY

If international gas prices come down, the government could give relief to consumers on cooking gas through subsidy, the Parliament was told on Thursday.

Petroleum Minister Hardeep Puri said in Lok Sabha during Question Hour on Thursday that the government imports 60 per cent of the total domestic requirement of gas.

"There is a (existing) subsidy of Rs 200. What is this subsidy? It is tax payer's money... The ones who are most vulnerable, we are always ready to help if it is left to this House and the honourable Prime Minister. It would be ideal if the international or the Saudi Contract Price could further come down from $750. It would enable domestic LPG to be sold at even more economical rates," he said.

"The import price is linked to what is called the Saudi Contract Price.

"The interesting thing is that the Saudi Contract Price during the last two years or so - if we have to use this as a reference period - has gone up from $250 per metric tonne to something like $900 per metric tonne. Today also, I think it is around $751 per metric tonne," Puri added, while replying to a starred question on providing greater subsidy to people on cooking gas.

Despite rising international gas prices, the minister said the government is sensitive to the requirements of the consuming population.

"We did not allow the cost of domestic LPG to increase. Saudi Contract Price went up by 333 per cent and yet the price increased was very small for the domestic LPG," Puri said in his response.

Even during the pandemic, when the poor were suffering due to the lockdown, the government gave three cylinders free of cost to them, he told the House.

INDIAN EXPRESS, Delhi, 10.2.2023
Page No. 13, Size:(14.47)cms X (21.34)cms.

Green hydrogen challenge

The fuel has potential to maximise decarbonisation of energy sector, energy use in transport, buildings and industry. To meet targets, government must work with multiple institutional bodies

SWETHA RAVI KUMAR AND PARUL BAKSHI

C R Sasikumar

ON INDIA'S 75TH Independence Day, Prime Minister Narendra Modi announced the National Hydrogen Mission to make the country a production and export hub of green hydrogen. This mission was approved by the Union Cabinet on January 4, 2023 with an initial outlay of Rs 19,744 crore ($2.3 billion) over the next five years, aimed at producing 5 MMT (million metric tonne) per annum with an associated renewable energy capacity addition of about 125 GW (giga watt) by 2030. While the green hydrogen dream seems appealing, critical challenges must be examined to help design appropriate pathways to realise this vision.

Hydrogen is produced through water electrolysis, something most of us would have learnt in our science textbooks in school. When the electricity used in the water electrolysis is produced from renewables, it is termed as green hydrogen.

Sustainability experts have ascribed an entire colour spectrum to hydrogen — green, blue, grey, black, and brown depending on their ability to totally avoid or capture the greenhouse gases produced in the process of making hydrogen. However, our focus is on green hydrogen as it has the potential to maximise decarbonisation of the energy sector and the use of energy in end-use sectors such as transport, buildings and industry. While the stated benefits of the National Mission are galore — savings to the tune of $12.5 billion from fuel imports, averting 50 MMTs of annual emissions of Carbon dioxide, fresh investments to the tune of $100 billion, and 6,00,000 green jobs, there are several challenges too. The challenges to produce and use green hydrogen can be classified into 4Es — electrolyser, energy source, end use and endogenous resources. We will delve into each one of them in this article.

Electrolyser challenge: According to IEA (International Energy Agency), as of 2021 the global manufacturing capacity of electrolysers stands at 8 GW/year. So, if India were to achieve its 2030 target, it would need anywhere from 60-100 GW of electrolyser capacity, which means almost 12 times the current global production capacity. India currently has launched projects to manufacture electrolysers, but the actual numbers as of today are negligible. Also access to critical minerals such as nickel, platinum group metals and rare earth metals such as lanthanum, yttrium and zirconium could hinder scaling up electrolyser manufacturing capability in India. These resources are concentrated in countries such as China, Democratic Republic of Congo (DRC), Australia, Indonesia, South Africa, Chile and Peru. India also has limited processing capabilities in these minerals. This challenge would entail India setting up largescale manufacturing, building expertise and securing geo-political partnerships for procurement of critical minerals, and improving overall technical and economic viability of electrolysers year-over-year while competing with other global players.

Energy source challenge: As per current estimates a completely efficient electrolysis system would require 39 kWh of electricity to produce 1 kg of hydrogen. This is, however, a laboratory tested figure and a typical operational figure is about 48 kWh per kg of hydrogen. Green hydrogen requires renewable energy as a source of electricity. India currently estimates a capacity of 125 GW of renewable energy to meet its green hydrogen 2030 targets, which would be in addition to the already proposed targets of 500 GW renewables energy capacity. So far India has only achieved 119 GW of the 175 GW targeted capacity using solar, wind, bio-power and small hydro. In addition to the generation capacity, the transmission capacity that includes a smooth facilitation of cross-border exchange of power between states is a critical requirement. Overall, this challenge would require India to add efficiently and economically close to 100 GW of overall renewable energy capacity per year over the next seven years and make available dispatch corridors and mechanisms.

End use challenge: Currently, most of the demand for hydrogen comes from the chemical industry to produce ammonia for fertilisers, followed by refining for hydrocracking and the desulphurisation of fuels. It can be a source of heat for industry, especially in hard to abate and electrify sectors such as steel, cement and aluminum production. In the transport sector, it can be used as fuel for heavy duty vehicles, aviation and shipping. The conversion efficiency from one form of energy carrier to another in the end use application will determine the scale of green hydrogen's applicability. For instance, where electricity can directly serve the purpose, having alternative energy carriers for the same use case would not make technical or economic sense. Hydrogen is a highly combustible and volatile element and its potency in other forms such as ammonia or methanol is only relatively reduced. If one were to look at green hydrogen being produced and stored in different forms for later use, it is critical to establish safety standards for storage and transportation, adding to the cost of hydrogen as a fuel.

It has been estimated that the production of one kg of hydrogen by electrolysis requires around nine litres of water. Moreover, in the case of India, an independent assessment suggests a requirement of approximately 50 billion litres of demineralised water supply. As several parts of India are already severely water-stressed, solutions need to be found to cater to this additional water demand. While desalination has been suggested, this will not only increase the physical footprint of the required infrastructure, but also potentially add to competition for land use.

Endogenous resources challenge: It has been estimated that the production of one kg of hydrogen by electrolysis requires around nine litres of water. Moreover, in the case of India, an independent assessment suggests a requirement of approximately 50 billion litres of demineralised water supply. As several parts of India are already severely water-stressed, solutions need to be found to cater to this additional water demand. While desalination has been suggested, this will not only increase the physical footprint of the required infrastructure, but also potentially add to competition for land use, impact biodiversity and create challenges and limitations in the location of electrolysers. This challenge would require the proposed green hydrogen hubs to strike a fine balance between being renewable energy rich, water resource rich and being close to hydrogen demand (end-use) centres for them to be economically feasible while keeping the additional costs minimum.

In 2020, the world produced around 90MMT of hydrogen. The International Renewable Energy Agency (IRENA) estimates that hydrogen and its derivatives will account for 12 per cent of global final energy consumption by 2050 (IEA estimate 530MMT), with two-thirds coming from green hydrogen. Currently, the global levelised cost of producing green hydrogen ranges between Rs 250-650/kg ($ 3-8/kg) while India aims to produce green hydrogen in the range of Rs 100-150/kg ($ 1-2/kg) by 2030. This would mean India will have to address all the challenges listed above as well as coordinate across multiple institutional bodies both public and private in record time. This is undoubtedly a steep uphill task but a moonshot worth undertaking for India!

The writers are from the Florence School of Regulation's Global Unit, a centre of excellence for discussions and knowledge exchange on energy policy and regulation, based in New Delhi

PIONEER, Delhi, 10.2.2023
Page No. 10, Size:(12.67)cms X (11.38)cms.

HPCL reports ₹172 cr profit in Q3 as oil prices fall

PTI ■ NEW DELHI

After two consecutive quarters of losses, Hindustan Petroleum Corporation Ltd (HPCL) on Thursday reported a net profit of Rs 172.43 crore in October-December 2022 as a fall in oil prices helped it recoup some of the losses on sale of petrol and diesel.

Standalone net profit of Rs 172.43 crore in the third quarter of the current fiscal compared with Rs 868.86 crore profit in the same period a year back, according to a stock exchange filing by the company.

HPCL and other state-owned fuel retailers did not revise petrol and diesel prices when international oil prices touched multi-year high last year. That led to them booking losses in two back-to-back

quarters.

However, rates softened in the third quarter. This should have warranted a reduction in petrol and diesel prices but the oil companies held on to retail prices to recoup the losses they had booked in the previous six months.

Revenue from operations rose to Rs 1.15 lakh crore from Rs 1.03 lakh crore in October-December 2021.

The company processed 4.83 million tonnes of crude oil in the quarter, up from 4.24 million tonnes in the previous year.

HPCL said it earned USD 11.40 on turning every barrel of crude oil into fuel during April-December 2022 as against a gross refining margin of USD 4.50 per barrel.

"This is before factoring the impact of special additional excise duty (windfall tax) and road and infrastructure cess levied on export of select petroleum products, effective July 1, 2022," it said. "During this period, due to the suppressed marketing margins on certain petroleum products, the profitability is impacted."

Also, the company booked a foreign exchange loss of Rs 1,951.64 crore during April to December as compared to a gain of Rs 183.01 crore a year back.

MINT, Delhi, 10.2.2023
Page No. 6, Size:(5.74)cms X (8.65)cms.

India's fuel demand slips in January

India's fuel demand slipped in January after hitting a nine-month peak in December, hit by lower mobility due to cold weather in parts of the country and a slowdown in industrial activity. Consumption of fuel, a proxy for oil demand, was about 4.6% lower than the previous month at 18.7 million tonnes in January, data from Indian oil ministry's Petroleum Planning and Analysis Cell (PPAC) showed on Wednesday.

Sales of diesel fell 7.6% in January from a month ago to 7.18 million tonnes, while sales of petrol, fell 5.3% to 2.82 million tonnes, the PPAC data showed. "Festive season is over, and cold temperatures might have played a role," said Refinitiv analyst Ehsan Ul Haq.

India's manufacturing industry started the year on a weaker note, expanding at its slowest pace in three months in January as output and sales growth slackened, a private survey showed.

REUTERS

INDIAN EXPRESS, Delhi, 10.2.2023
Page No. 5, Size:(18.68)cms X (16.48)cms.

Man held for mowing down journalist made similar attempt on an activist two years ago

Tried to run over anti-refinery activist, 3 FIRs against him earlier: Ratnagiri police

VALLABH OZARKAR
RAJAPUR (RATNAGIRI), FEBRUARY 9

PANDHARINATH AMBERKAR, arrested for allegedly mowing down journalist Shashikant Warishe on February 6, has a history of run-ins with persons opposed to the setting up of a refinery and petrochemicals factory in Maharashtra's Ratnagiri district. Police records show he had earlier too allegedly tried to run over an anti-refinery activist.

In April 2020, the activist, Manoj Mayekar, son of the then sarpanch of Kumbhavade village where Amberkar too hails from, was injured after allegedly being hit by Amberkar's SUV. Mayekar was in a Kolhapur hospital for two weeks. Booked after a case was filed, Amberkar was later granted bail.

Amberkar is now in the custody of Rajapur police for his alleged role in the Warishe murder case.

A journalist with a local Marathi newspaper, Warishe died after being run over by a vehicle, allegedly being driven by Amberkar.

Amberkar fought with those who opposed refinery

The incident took place last Monday after Warishe wrote a report against Amberkar.

Headlined 'Photo of criminal on banner alongside PM, CM and DCM, claim farmers protesting against refinery', it alleged that Amberkar had criminal antecedents.

According to the FIR registered by Nate police in Ratnagiri, the earlier incident involving Amberkar had taken place in April 2020 when Manoj Mayekar was heading home to Kumbhavade on a motorcycle. Driving a vehicle at high speed, Amberkar hit the motorcycle,

CONTINUE ON PAGE 6

• Similar attempt on activist 2 yrs ago

and left Mayekar injured.

The FIR states that the incident was the fallout of a quarrel that Amberkar had with Mayekar and his father Pandhari Mayekar. The case is being heard in the magistrate court in Rajapur taluka.

Mayekar's father Pandhari, who was the village sarpanch then, said his son opposed the refinery which angered Amberkar.

"My son was against the refinery and had been speaking against it on social media as well as other platforms. Amberkar would ask him to join pro-refinery activities, but Manoj would not listen. He told him that he would never join any pro-refinery activity, and that he didn't want the refinery. This angered Amberkar. He would look for an opportunity to target him. He knocked down my son… he did this to terrorise us and the villagers," Pandhari Mayekar told *The Indian Express*.

At the Amberkar house, his family members refused to speak on the issue. They said they knew nothing about it and had no relations with him. The Rajapur police, who now have custody of Amberkar, said they have found that there are at least four FIRs registered against him.

Police inspector Janardan Parabkar of Rajapur police station told *The Indian Express*: "Including this murder case, there are three more FIRs registered against him. While one is in Nate police station, the other three are in Rajapur. There are also some NCs (non-cognisable offences) registered against him. A preventive notice was also issued against him."

In one case, Amberkar and a few others had attacked an anti-refinery activist in court premises. They were booked by police for riot, assault and criminal intimidation. In another case, he was booked for threatening anti-refinery activists.

The Ratnagiri Refinery & Petrochemicals Limited, promoted by public sector oil companies, was initially planned in Nanar village of Ratnagiri. The then undivided Shiv Sena opposed the project, citing opposition from residents. After Uddhav Thackeray became CM, he announced that no refinery would come up at Nanar. In March 2022, it was proposed that the refinery would be set up at Barsu. Activists and villagers have been protesting against the refinery project in the Konkan region, fearing pollution and destruction of the area, which is largely dependent on agriculture and is famous for its Alphonso mangoes.

ECONOMIC TIMES, Delhi, 10.2.2023
Page No. 18, Size:(7.78)cms X (18.34)cms.

Oil's Well That is Reorienting Well

Developments bode well for India's energy needs

India is on course to doubling its petroleum refining capacity and gas pipeline network to feed the world's fastest growth in energy demand over the next decade. A reorientation in global energy supplies is expected to assist in the accelerated build-up of energy infrastructure. New Delhi has used the Russia-Ukraine conflict and ensuing Western sanctions on Moscow's energy exports to secure cheaper fuel that could eventually be bought in rupees. India is also expected to gain by selling refined petroleum to Europe and the US, which fetches better prices. Foreign interest in energy exploration has been historically muted and the government has shrunk off-limits areas to draw upstream investments from overseas.

To compensate for the hump in processing capacity of fossil fuels, GoI is pushing an ambitious energy transition agenda to meet its climate commitments. This involves drawing investments and retooling the regulatory structure to favour renewables. The latest budgetary allocations point to the government's commitment to switching to clean energy sources, with a special emphasis on green hydrogen — emissions-free gas electrolysed using renewable energy — that is being seen as the game changer. India is positioning itself as a major exporter of green hydrogen, apart from reducing its dependence on imported fossil fuel.

Investments in India's energy sector have traditionally been hobbled by weak exploration and cost recovery. Politically influenced retail energy prices have crimped capacity addition and the situation has not improved to warrant optimism about future investments. State-owned power distribution companies, obliged to keep rates low, have racked up enormous dues to electricity generators, which, in turn, find it difficult to pay coal vendors. State-owned oil refiners are required to hold pump prices during a global spike in crude oil prices, taking a hit to their bottom lines. Price caps on domestically produced natural gas limit producers' appetite to invest. Renewables could lower policymakers' price sensitivity by lowering costs of India's energy mix. Emerging technologies could break the low investment trap for one of the world's largest energy market.

ECONOMIC TIMES, Delhi, 10.2.2023
Page No. 13, Size:(12.90)cms X (5.44)cms.

COMPANY EYES ASSETS IN AFRICA AND LATIN AMERICA

ONGC Videsh Signs Pact with Argentina's YPF

NEW DELHI ONGC Videsh Ltd, the overseas investment arm of state-owned Oil and Natural Gas Corporation (ONGC), is eying exploration and production assets in Africa and Latin America. OVL signed a memorandum of understanding (MoU) with YPF SA of Argentia on the sidelines of the India Energy Week in Bengaluru, a company statement said.

"The MoU seeks to enhance cooperation between the two companies in the energy sector, including but not limited to cooperation in the areas of exploration and development of upstream oil and gas opportunities, promote investment and cooperation, and forging closer ties between research and training centres," it said.

YPF, Argentina's largest integrated energy company, is 51% owned by the Argentine government and 49% listed in the New York and Buenos Aires stock exchanges. **PTI**

FINANCIAL EXPRESS, Delhi, 10.2.2023
Page No. 22, Size:(5.44)cms X (12.98)cms.

OVL eyes assets in Africa, Latin America

ONGC VIDESH (OVL), the overseas investment arm of state-owned Oil and Natural Gas Corporation (ONGC), is eying exploration and production assets in Africa and Latin America.

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It is engaged in oil and gas exploration and production, being the largest shale operator outside of the US, and is also involved in transportation, refining and marketing of natural gas and petroleum products.

OVL is India's flagship overseas oil firm. It currently has stake in 32 oil and gas projects in 15 countries, spanning from Venezuela to Vietnam.

Its managing director Rajarshi Gupta, speaking on the sidelines of the conference, said the company is interested in exploration and production investment opportunities in countries like Ghana and Suriname.

Funding important to make decarbonisation affordable: Ruia

As countries chart out decarbonisation plans, an Essar group executive said funding for reducing carbon dioxide emissions and improving technologies was essential to make it affordable.

"The single biggest opportunity for us is to transition and decarbonise existing infrastructure, and simultaneously build future-centric clean fuel capacities," said Prashant Ruia, Director, Essar Capital. —PTI

MINT, Delhi, 10.2.2023
Page No. 6, Size:(5.74)cms X (8.33)cms.

OVL signs pact with Argentina's YPF

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BUSINESS STANDARD, Delhi, 10.2.2023
Page No. 10, Size:(32.48)cms X (38.92)cms.

The rise and rise of fossil fuel

Though green energy was the focus of India Energy Week, India's rising demand for coal, gas and oil dominated the talks

SUBHOMOY BHATTACHARJEE
New Delhi, 9 February

Green energy was supposed to take centre stage at the India Energy Week, the ministry of petroleum's flagship programme. Ironically, it was fossil fuels, coal in particular, that hogged the limelight.

The key number there is that India will shoot past 1 billion tonnes of coal production in FY24. This marks an impressive 11.6 per cent annual growth rate over FY23, something the country has never achieved. That serves to emphasise an impressive growth in India's demand for fossil fuel as was evident in Prime Minister Narendra Modi's speech at the inauguration of the India Energy Week. "Today India's share in global oil demand is around 5 per cent but it is expected to reach 11. India's gas demand is expected to increase by 500 per cent," he said.

These are big numbers. Though the pace of energy transition to renewable energy (RE) and green hydrogen will also accelerate, there is, for the time being, a massive rush to create capacity in oil, gas and coal in India. In 2022, the sharp escalation in global gas prices had sowed deep doubts over how far it could remain a transition fuel in India's energy mix, considering its share in the economy had come down to 6 per cent from more than 8 per cent in 2015. But Modi pointed out to the global energy sector leaders assembled in Bengaluru: "In the next 4-5 years, the gas pipeline network in India will reach 35,000 km. This means that huge investment opportunities are being created for you in India's natural gas infrastructure."

Supporting Modi's statement on the role of fossil fuel economy, Sultan Al Jaber, UAE's minister of industry, CEO of Abu Dhabi National Oil Company and designated COP 28 president, said India was grappling with policies that held back emission and not progress. He described this position as an "inclusive energy transition".

Paradoxically, India expects coal demand to shoot up precisely because of the introduction of electric vehicles to replace internal combustion engine-based ones that run on mostly imported oil. Coal Minister Pralhad Joshi had made this point last year at an investors' meet. "The need for coal is going to double by 2040 with the rise in electric vehicles and the increased demand for electricity. Therefore, we need to ramp up our coal production to meet this growing energy requirement."

What does this mean in terms of numbers for the coal sector in the near term? In a Parliament reply in February this year, the target for coal production has been fixed at slightly over 1 billion tonnes for FY24. Even if rake shortage and other usual supply-side challenges rear up, the target is likely to be achieved since the pace of increase till January is already above 16 per cent, according to coal ministry data. The ministry is particularly concerned that a hot summer should not create a crippling shortage of fuel at the power plants this year.

For next year, Coal India Limited (CIL), the country's largest producer, has already identified 15 additional projects with a total rated capacity of 168.58 million tonnes (MT) annually for award to the mine development operators. Of these 15, a Letter of Award has already been issued to nine projects.

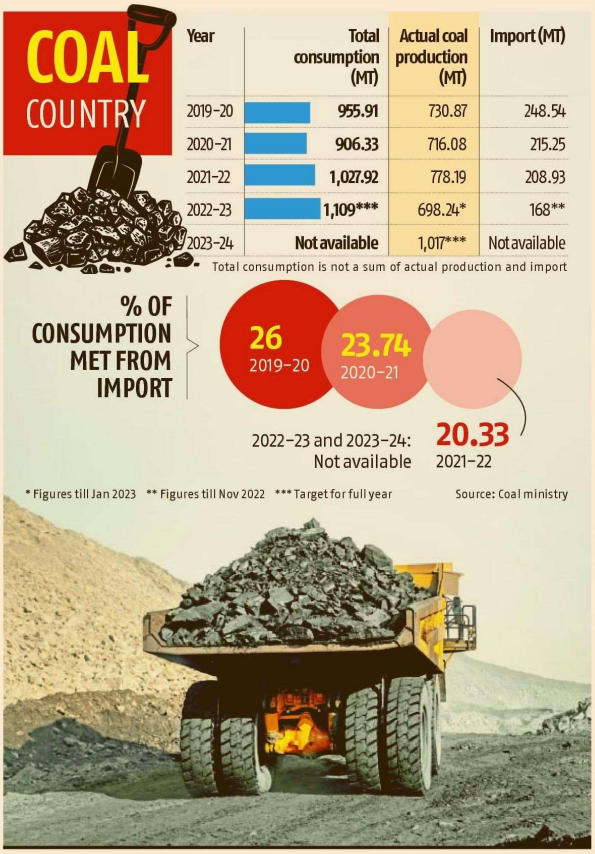
The coal entrepreneurs seem to have cottoned on to the fact that there is no doomsday arriving for the sector anytime soon. In the on-tap auctions for coal mines that the coal ministry has been running since June 2020, where there were often no bidders, a total of 99 bids for 36 coal mines were received for the fifth round of auctions in November 2022. "This is the biggest response received for commercial coal mine auctions," the ministry noted in its website.

This has international implications. Energy consultancy CoalMint data shows India's imports of thermal coal rose 15 per cent in calendar 2022 despite the domestic ramp-up in production. It has helped keep the prices of coal in the international markets high. Indonesia, from where India imports about 12 per cent of its domestic requirements, has targeted an export of 500 MT in calendar year 2023, a 10.6 per cent annual rise.

Nowhere is this more evident than in the demand for gas by India's leading importers like Petronet and Gail. Akshay Kumar Singh, managing director of Petronet, told reporters at the India Energy Week that it wanted to secure 12 MT a year of additional supply under long-term contracts. "That's equivalent to about 60 per cent of the nation's deliveries last year, according to ship-tracking data," noted *Bloomberg*.

Similarly the government has already cleared a ₹35,000-crore support to the Ministry of Petroleum and Natural Gas as allocation for energy transition, net-zero objectives and energy security. Ministry officials said the sum would help them finance the cost of building environmentally better equipped refinery capacity to process crude. India's current capacity is around 250 million metric tonnes per annum (MMTPA), which is being increased to 450 MMTPA under a vast expansion plan. While it is the oil marketing companies that will mostly finance the modernisation expected to cost ₹1 trillion, the budget support will come in handy, they said.

Minister for Petroleum and Natural Gas Hardeep Puri made the same points in favour of the three dirty fuels at the event. "Unless we survive the present, we will not be able to go into the world of clean and green energy." His prescription is that "while affordable traditional energy resources are essential for meeting the base-load requirements, new sources of energy, which are cleaner, sustainable, and innovative, are critical for combating the menace of climate change". Expect more records in domestic coal production soon.



VIRAT VAIBHAV, Delhi, 10.2.2023
Page No. 5, Size:(8.08)cms X (10.56)cms.

अप्रैल 2022 से ओएमसी ने पेट्रोल, डीजल की कीमतों को नहीं बढ़ाया

वैभव न्यूज ■ नई दिल्ली

सरकार ने बृहस्पतिवार को बताया कि अप्रैल 2022 से तेल विपणन कंपनियों (ओएमसी) ने पेट्रोल और डीजल की कीमतों को नहीं बढ़ाया है और इनकी कीमत कच्चे तेल के मूल्यों से नहीं बल्कि अंतरराष्ट्रीय बाजार में संबंधित उत्पादों की कीमतों से जुड़ी होती हैं। लोकसभा में राकेश सिंह के प्रश्न के लिखित उत्तर में पेट्रोलियम एवं प्राकृतिक गैस राज्य मंत्री रामेश्वर तेली ने यह बात कही। उन्होंने बताया कि कच्चे तेल का मूल्य जनवरी 2022 में 84.67 डॉलर प्रति बीबीएल से घटकर जनवरी 2023 में 80.92 डॉलर प्रति बीबीएल हो गया। मंत्री ने कहा कि इस दौरान पेट्रोल का अंतरराष्ट्रीय मूल्य 96.16 डॉलर प्रति बीबीएल से थोड़ा घटकर 95.59 डॉलर प्रति बीबीएल तथा डीजल का मूल्य 97.09 डॉलर प्रति बीबीएल से बढ़कर 111.22 डॉलर प्रति बीबीएल हो गया। रामेश्वर तेली ने बताया कि घरेलू बाजार में पेट्रोल और डीजल के खुदरा मूल्यों को क्रमशः 26 जून 2010 और 19 अक्टूबर 2014 को बाजार निर्धारित बना दिया गया था और तभी से सार्वजनिक क्षेत्र की तेल विपणन कंपनियां पेट्रोल और डीजल के मूल्य निर्धारण के संबंध में उचित निर्णय लेती हैं। उन्होंने बताया, छह अप्रैल 2022 से ओएमसी ने पेट्रोल और डीजल के मूल्यों को नहीं बढ़ाया है।

AMAR UJALA, Delhi, 10.2.2023
Page No. 9, Size:(3.52)cms X (4.58)cms.

ईंधन की कीमत घटी तो कम हो सकते हैं एलपीजी के दाम : पुरी

नई दिल्ली। अंतरराष्ट्रीय बाजार में ईंधन की कीमत 750 डॉलर प्रति मीट्रिक टन से नीचे आती है, तो घरेलू एलपीजी को और भी किफायती दरों पर बेचा जा सकता है। केंद्रीय पेट्रोलियम और प्राकृतिक गैस मंत्री हरदीप सिंह पुरी ने लोकसभा में एक सवाल के जवाब में यह बात कही। गैस सिलेंडरों की लागत कम न करने के सवाल पर उन्होंने कहा कि हमने घरेलू एलपीजी की लागत नहीं बढ़ने दी। वहीं, स्मार्ट सिटी से जुड़े शशि थरूर के सवाल पर उन्होंने कहा इसके तहत चुने गए लगभग सभी 100 शहर 'काफी अच्छी' प्रगति कर रहे हैं। एजेंसी

VIRAT VAIBHAV, Delhi, 10.2.2023
Page No. 15, Size:(8.43)cms X (16.66)cms.

जियो-बीपी ने 20 प्रतिशत एथनॉल वाला ई-20 पेट्रोल पेश किया

एजेंसी ■ नई दिल्ली

रिलायंस इंडस्ट्रीज और ब्रिटेन की बीपी के संयुक्त उद्यम जियो-बीपी ने 20 प्रतिशत एथनॉल मिश्रण वाला पेट्रोल पेश किया है। उन्होंने बताया कि यह सरकार की कच्चे तेल का आयात और कार्बन उत्सर्जन कम करने के कार्यक्रम के अनुरूप है। कंपनी ने बृहस्पतिवार को बयान में कहा, इसके साथ ही जियो-बीपी ई-20 ईंधन उपलब्ध कराने वाले पहले खुदरा विक्रेताओं में शामिल हो गई है। कंपनी ने कहा, ई-20 ईंधन के अनुकूल वाहनों के मालिक चुनिंदा जियो-बीपी पेट्रोल पंप से यह ईंधन ले सकेंगे। जल्द ही इसका विस्तार पूरे नेटवर्क में किया जाएगा। ई-20 ईंधन में 20 प्रतिशत एथनॉल और 80 प्रतिशत पेट्रोल होता है। पेट्रोल में एथनॉल मिश्रण के कार्यक्रम से जहां कच्चे तेल का आयात घटेगा और कॉर्बन उत्सर्जन में कमी आएगी, वहीं इससे किसानों की आय भी बढ़ेगी। कंपनी ने बयान में कहा, भारत का ईंधन और परिवहन उद्योग तेजी से बढ़ रहा है। उम्मीद है कि अगले 20 साल में यह दुनिया का सबसे तेजी से बढ़ने वाला ईंधन बाजार बन जाएगा। उन्होंने बताया कि इसी सप्ताह प्रधानमंत्री नरेंद्र मोदी ने बेंगलुरु में भारत ऊर्जा सप्ताह-2023 में 20 प्रतिशत एथनॉल मिश्रण वाला पेट्रोल पेश किया था, जिसकी बिक्री कुछ राज्यों के चुनिंदा पेट्रोल पंप पर शुरू हो गई है।

PUNJAB KESARI, Delhi, 10.2.2023
Page No. 8, Size:(2.42)cms X (5.81)cms.

तेल टैंकर में सफाई के लिए उतरे 7 की मौत

काकीनाडा, (पंजाब केसरी): आंध्र प्रदेश के काकीनाडा जिले में बड़ा हादसा हुआ है। ऑयल फैक्ट्री के टैंकरों की सफाई के दौरान सात मजदूरों की मौत हो गई है। मौत का कारण मजदूरों का दम घुटना बताया जा रहा है। हादसे के बाद इलाके में हड़कंप मच गया है।

पुलिस ने बताया कि रागमपेट गांव के पास खाने के तेल की फैक्ट्री है। ये हादसा गुरुवार सुबह करीब सात बजे हुआ है। चश्मदीद ने हादसे के बारे में बताया है।