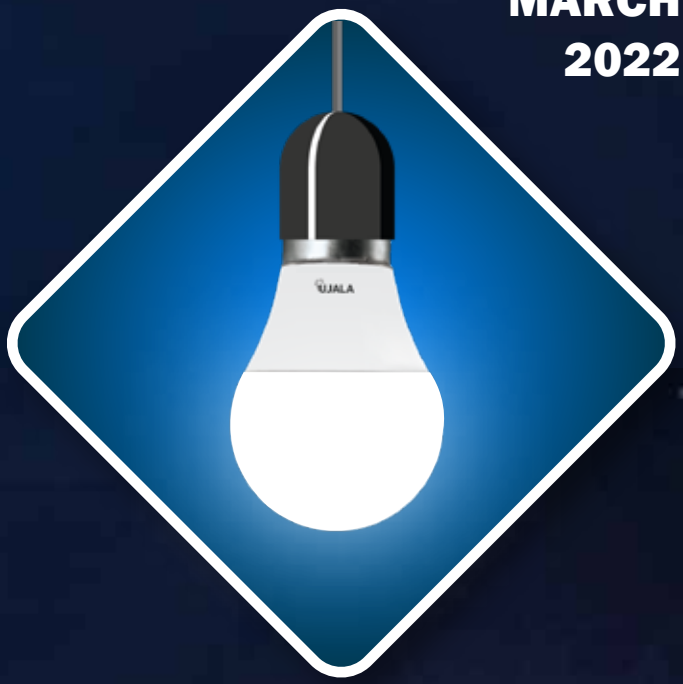
ENERGY EFFICIENCY SERVICES LIMITED
A JV of PSUs under the Ministry of Power

EDITION 38
MARCH
2022

INNOVATING ENERGY

India's LED lighting success: Enabling benefits to the citizens of India



IN FOCUS

Global Energy Trends

INSIDE STORIES

Editor's note

Abhishek Gupta
GM Technical
Energy Efficiency Services Limited

Energy-Efficient LEDs & its impact on environment

Anand K Yadav
AGM
SIDBI, Bhopal

The energy-efficient lighting sector must grow parallel with core industries like steel

Mukesh Gupta
CGM, Bar & Rod Mill
BSP, SAIL

Brightening India, the LED way

Arun Pal
Excutive Vice President
Unit Head - DCPP
Jindal Steel & Power Ltd.

India must continue its impressive domestic LED growth story, aim for global leadership

Abhishek Agarwal
Addl. Commissioner
Raipur Nagar Nigam

Energy-intensive steel industry looks to push consumption, reduce emissions

Sanjeev Jain
Chief Engineer
(CREDA)

Editor's Note

Dear Reader,

Sustainable lighting is essential to a nation's growth and prosperity. India has led the way in creating a sustainable and energy efficient lighting infrastructure, in homes and outside, by the way of LEDs. LED lights have emerged as a viable lighting alternative in the last few years, reducing the dominance of traditional lighting like fluorescent and incandescent lights. LEDs are known to emit light up to 90% more efficiently than incandescent light bulbs and 80% more efficiently than CFLs, thereby saving both energy and electricity costs. With their myriad of benefits, both in terms of power and money, LED lights have completely transformed the lighting industry.

In this newsletter, themed around **India's LED lighting success: Enabling benefits to the citizens of India,** we seek to explore this very pivotal component of India's climate and developmental ambitions, with insightful and varied perspectives from a host of industry leaders. 'Energy-Efficient LEDs & its impact on environment' explores the linkages between LEDs and environment and makes a case for ramping up the use of LEDs and other energy efficient solutions. 'The energy-efficient lighting sector must grow parallel with core industries like steel' deep dives into the need for steel companies to make carbon footprint reduction an integral part of their operations and corporate policies. In 'Brightening India, the LED way' we discuss India's LED journey, and the various initiatives that have helped India in becoming a leader in the LED space. We then shine the spotlight on how LEDs have given a boost to India's exports, employment, and economic growth, and have put the country at the forefront of the global transition to energy-efficient lighting, in the article 'India must continue its impressive domestic LED growth story, aim for global leadership.' Finally, in 'Energy-intensive steel industry looks to push consumption, reduce emissions,' we look at the need for reduction of emissions by the steel industry, and the role energy efficiency can play in that regard.

We have already seen the remarkable impact of LEDs widespread adoption in India. Now, with the integration of emerging technologies into the lighting sector, we are witnessing a new era of smart LEDs. India's path to increased energy efficiency and reduced emissions can only be paved by the proliferation of LEDs in the country.

Abhishek Gupta
GM Technical
Energy Efficiency Services Limited

Energy-Efficient LEDs & its impact on environment

According to IEA's energy outlook, India's energy use has doubled since 2000, with 80% of demand still being met by coal, oil and solid biomass. This rising demand will require interventions on a massive scale and increasing the efficiency of energy use is the most feasible and affordable alternative. India has emerged as a global leader in leading the charge against rising emissions with its visionary five-point agenda, as outlined during COP26. Thus, improving the energy efficiency of the nation gains greater importance.

Currently, India has the world's largest energy efficiency portfolio and has built a robust ecosystem for stakeholders across diverse sectors. Energy efficiency interventions such as the Unnat Jyoti by Affordable LED for All (UJALA) has brought down LED prices to almost a tenth of market prices and has helped reduce energy usage considerably. The Light-Emitting Diode (LED) is one of the most energy-efficient and promising lighting technology in the world. LEDs have longer life spans, are more durable, and offer superior light quality than other types of lighting. LED bulbs have outstanding operational lifetime expectation of up to 1,00,000 hours. This is 11 years of continuous operation, or 22 years of 50 % operation.

India has been a forerunner in LED adoption, with its highly successful UJALA programme. LEDs in India have resulted in estimated energy savings of 48.30 billion kWh per year with avoided peak demand of 9,769 MW. However, the most significant impact has been on the environment, with GHG emission reduction of 39 million t CO_2 per year. LEDs offer myriad of benefits to the environment and are the most efficient way of illumination and lighting, with an estimated energy efficiency of 80% - 90% when compared to traditional lighting and conventional light bulbs. They are also free of toxic chemicals, while most conventional fluorescent lighting bulbs contain a multitude of materials like mercury that are dangerous for the environment. LED illumination also produces little infrared light and close to no UV emissions.

Thus, it is critical for us to continue ramping up the use of LEDs and other energy efficient solutions. Recognising the need for encouraging Energy Efficiency, especially in the MSME sector for their survival and growth in the long run, SIDBI has taken a gamut of initiatives through dedicated loan products and other promotional activities. SIDBI has been operating focused concessional lending schemes for energy efficiency and cleaner production from various multilateral/ bilateral agencies. SIDBI is also providing risk capital and equity support for innovation projects related to energy efficiency, cleaner technologies and renewable energy. Our implementation assistance to MSMEs has resulted in energy efficiency investment of ₹330 crore and a reduction in CO_2 emission by 2.55 million tonne.

SIDBI has been and will continue to be a strong proponent and enabler for the development and adoption of energy efficiency in India.

Anand K Yadav
AGM
SIDBI, Bhopal

The energy-efficient lighting sector must grow parallel with core industries like steel

India's climate action goals, which include achieving net zero emissions by 2070, are hugely significant in the context of the growing worldwide concerns about the generation and usage of energy. As one of the world's biggest economies and a guiding light for other developing countries, the onus is on India to meet its ambitious goals for growth and development in a sustainable manner. India is well positioned to pioneer a new model of economic development that avoids carbon-intensive approaches and embraces energy efficiency. Indeed, energy efficiency, which the International Energy Agency once called "the first fuel", will play a very important role in determining how successfully India addresses its energy challenges.

There are several policy measures in place already; they just need to be implemented well and with a vision for long-term success rather than short-term gains. Meanwhile, robust, government-backed energy efficiency programmes, such as those being implemented by EESL, have achieved admirable success over the years in reducing the energy used by and emissions arising from sectors such as buildings and transportation, and other major industries.

Industries, on their part, should also look to improve energy efficiencies and adopt low-carbon technologies themselves. Today, there are technologies that can help in decarbonizing even the hard-to-abate, energy-intensive sectors such as iron and steel. Adopting them can not only reduce the cost of production but also help in meeting environment goals and regulatory requirements. The simplest among them involve not the core industrial processes but building-related measures such as better insulation and energy-efficient lighting, both of which have significant energy-saving potential.

It is commendable that EESL and MECON are working together to devise energy efficiency and resource conservation measures for the steel and mining sectors. Among the solutions they are working on is retrofitting existing buildings, systems and structures with LED lights and installing super-efficient AC systems and technologies that improve indoor-air quality.

SAIL is aware of and sensitive to the concerns around climate change and has made carbon footprint reduction an integral part of its operations and corporate policies. In February last year, the company signed an MoU with EESL for conducting an energy audit of SAIL's corporate office in New Delhi. SAIL has also won the Golden Peacock Environment Management Award for three successive years, most recently in 2021.

Among the many other initiatives that the company is undertaking to reduce its carbon footprint, SAIL is gradually shifting to LED lighting in all its facilities. The company's focus on energy conservation is not something new; it goes back many years, even before the climate change issue had reached the worrying proportions of today. SAIL's Bhilai steel plant had won the National Energy Conservation Award in 2013 and 2014 for efficient utilization and savings of thermal and electrical energy consumption.

It is clear that energy efficiency, through technology, processes and lightings, will become increasingly important elements of India's energy story in the coming years. Every company should do its best to write a chapter it can be proud of.

Mukesh Gupta
CGM, Bar & Rod Mill
BSP, SAIL

Brightening India, the LED way

Illumination is one of the most pivotal needs of a society. It is an enabler of the development of a nation, facilitating connectivity, trade, education and safety. A thriving lighting infrastructure can propel positive evolution of a nation, from a social, economic and cultural standpoint. However, it is also crucial for lighting to be sustainable and ecologically viable. It needs to synergize with the SDGs of a nation, especially through the parameters of cost and energy efficiency. India has been one of the frontrunners in recognizing the need for a sustainable and energy efficient lighting infrastructure, at both personal and national level by promoting the use of LEDs.

LEDs are vastly more energy efficient than their traditional counterparts. They emit light up to 90% more efficiently than incandescent light bulbs and 80% more efficiently than CFLs. This efficiency is due to that fact that LED bulbs require significantly less wattage than incandescent or CFL bulbs. In fact, according to reports, fluorescent lights waste 95% of their energy as heat and only use 5% to actually generate light. Conversely, LED use 95% of their energy to emit light, clearly highlighting their considerably superior utility.

An important breakthrough in India's efforts to reduce emissions and move towards a cleaner energy ecosystem, has been the proliferation of LED bulbs in India. The LED market in India was in its embryonic phase, just a few years ago, albeit with massive untapped potential. Recognizing this opportunity, the government launched its domestic lighting programme - Unnat Jyoti by Affordable LEDs for All (UJALA) in 2015. This programme sought to address India's high cost of electrification and high emissions from inefficient lighting. UJALA, which was implemented by Energy Efficiency Services Limited (EESL), has single handedly created a market for energy efficient LED bulbs in India, bringing down the cost of LED bulbs from INR 310 to INR 38. This was truly transformative, leading to large scale adoption of LEDs.

UJALA has been vital in making the use of the most efficient lighting technology at affordable rates for the domestic consumers, the new normal and has benefitted them by way of reduced energy bills. UJALA has also enabled a wave of awareness for consumers around the utility of using efficient appliances, leading to a marked shift in their buying preferences from low first cost-based purchases to lifecycle cost. Furthermore, with the rise of demand for LED bulbs, the domestic lighting industry has received a significant impetus.

The proliferation of LEDs in India has acted as the harbinger of positive social, economic and ecological change, improving the quality of life of its citizens, generating prosperity in local communities and providing increased energy access to all.

Arun Pal
Excutive Vice President
Unit Head - DCPP
Jindal Steel & Power Ltd.

India must continue its impressive domestic LED growth story, aim for global leadership

Light bulbs are one of the most widely used electric appliances in the world, consuming about 15% of the total electricity. Over the years, amidst growing awareness about the need for energy efficiency and smarter power consumption, Light Emitting Diode (LED) lights and bulbs have come strongly to the fore. Up to 75% more energy-efficient than incandescent and compact fluorescent (CFL) bulbs, LEDs can play a key role in enabling smarter electricity access with a lower carbon footprint. They have already become the preferred choice in industrial, commercial, and domestic applications.

LEDs are integral to the digitalization of streetlights under the Smart Cities Mission by the Government of India. The goal is to have smart, energy-efficient streetlights whose intensity can be adjusted as required. Conventional streetlights can be switch on and off when needed, but their intensity remains the same throughout. In contrast, LEDs can be programmed for a flexible "dimming schedule" that adjusts the light intensity based on what is happening in the local environment.

LEDs can also help in reducing mercury pollution. In 2018, India committed to phasing out mercury-based fluorescent lighting products by 2025. In the five years before that, the market for LED lights in India had grown astronomically, from annual sales of 5 million bulbs in 2014 to about 670 million in 2018. The price of LEDs, meanwhile, dropped from Rs 400 to Rs 70 during this period. India has continued to strongly promote and adopt LEDs since then and has emerged as the world's second largest producer of LEDs.

The growing domestic demand for LEDs is driven as much by government initiatives as by the pro-environment sentiment among industrial, corporate and retail consumers of electricity across urban and rural areas. The Unnat Jyoti by Affordable LEDs for All (UJALA) scheme by the Government of India played a huge role in creating a thriving market for LEDs in India, bringing down the cost of LEDs even further and making them widely and easily accessible for the masses. The government's Street Lighting National Programme (SLNP) meanwhile, is replacing conventional streetlights with smart and energy-efficient LED lights. Both these programmes have enabled large-scale socioeconomic transformation and yielded significant benefits in terms of costs savings, and reductions in emissions and peak demand.

Moreover, LEDs can give a significant boost to India's exports, employment, and economic growth, and put the country at the forefront of the global transition to energy-efficient lighting. This entails improvements at all levels of the supply chain and the value chain, including the crucial functions of R&D manufacturing, which are the centre of attention. The Production Linked Incentive (PLI) scheme for white goods, approved by the Government of India, will help in making LED manufacturing globally competitive and creating economies of scale. The PLI scheme will also have a positive impact on sectors like automotive, which are finding many, new, diverse applications for LEDs. The stage is well set for LEDs to light the way ahead for India and the rest of the world in environment-and-business-friendly lighting.

Abhishek Agarwal
Addl. Commissioner
Raipur Nagar Nigam

Energy-intensive steel industry looks to push consumption, reduce emissions

India produced 118.1 million tonnes (MT) of steel in 2021, and the industry is poised to see tremendous growth in 2022. However, amidst growing urgency to reduce carbon emissions and limit global warming, the Indian steel industry is facing its biggest hurdle in the form of its high carbon footprint, owing to its dependence on iron ore and coal as steel feedstocks.

On the one hand, India is keen on increasing its per capita steel consumption, increasing its steel export, and attracting foreign investment. On the other hand, the production of clean steel, using processes with low carbon footprint, remains a concern.

The steel industry's energy, emission, and consumption woes

In a report published in 2020, the IEA said that the iron and steel sector is responsible for a fifth of industrial energy consumption in India, with coal accounting for 85% of its total energy consumption. India's steel sector is also emissions-intensive and contributes almost a third of direct industrial CO_2 emissions. The processes in India use more primary iron ore versus scrap steel in terms of ratios as inputs compared to other countries. Moreover, the sector is heterogeneous and uses a wide range of equipment with dated and inefficient technology. The issue is compounded by the presence of numerous small-to-medium steel mills that are less efficient and more polluting.

India's steel consumption witnessed a seven-fold increase between 1991-92 and 2019-20. In the same period, the economy grew nine-fold, underlining the link between economic growth and steel consumption. Despite this growth, India's per capita steel consumption in 2019-20 was less than a third of the global average. The gap is even starker between rural and urban India. In 2020-21, per capita consumption of steel in rural areas was just 21.5 kg as compared to 176 kg in urban areas.

Efforts to address the issues

The Ministry of Steel is working with the Ministry of Rural Development and the Ministry of Agriculture to increase awareness in rural areas about the usage of steel. The Centre has also constituted a Joint Working Group for developing standardised design and layouts of housing configurations with steel structures. At the same time, the government has also been making several policy interventions to meet its climate goals.

The National Steel Policy-2017 aspires to increase per capita consumption of steel to 160 kg and reduce average CO_2 emission intensity to around 2.4 t/tcs by 2030-31. In 2019, the government notified the Steel Scrap Recycling Policy with the aim of increasing scrap as raw materials for finished steel products. The Government has recently also announced the Green Hydrogen Mission for promoting the utilisation of green hydrogen in India. The use of green hydrogen in steel production can significantly reduce emissions.

The Perform, Achieve and Trade (PAT) is a flagship scheme under the National Mission for Enhanced Energy Efficiency (NMEEE). It is a market-based mechanism for enhancing energy efficiency, under which the government sets energy-saving targets and companies have to achieve them. The achievers get Energy Saving Certificates (ESCerts).

Meanwhile, the Steel Association of India (SAI) has prepared a list of policy enablers that can push green steel in the country. This includes preferential public procurement of green steel, introduction of standards for green steel, and more.

Steel production is concentrated in India's steel belt of Odisha, West Bengal, Jharkhand and Chattisgarh owing to the presence of iron ore, coal deposits, and seaports. Any transition away from conventional steel-making processes in India will need to factor the implications for jobs, supply chains, production patterns, etc.

Sanjeev Jain
Chief Engineer
Chhattisgarh State Renewable Energy Development Agency (CREDA)

Source: Mongabay

India's Prime Minister Shri Narendra Modi delivered the National Statement at COP 26, in Glasgow, Scotland on November 01, 2021. Photo from Press Information Bureau.

Top energy trends from India & across the globe

- **Indian scientists design system for energy-efficient hydrogen production**
  Indian scientists have designed an electrocatalyst system for energy-efficient hydrogen production with the help of electrolysis of urea, which is helpful towards urea-based waste treatment with low-cost hydrogen production. Compared to water electrolysis, urea electrolysis helps reduce the energy requirement for production of hydrogen by 70 percent. The energy-intensive counterpart of water splitting, oxygen evolution, can be replaced with urea oxidation in this process, in which low-cost, earth- abundant Ni-based catalysts are widely applied. The main challenge associated with urea oxidation is retaining the prolonged activity of the catalyst as the strong absorption of the reactive intermediate (COx) on the active site, referred to as catalyst poisoning, causes activity loss.

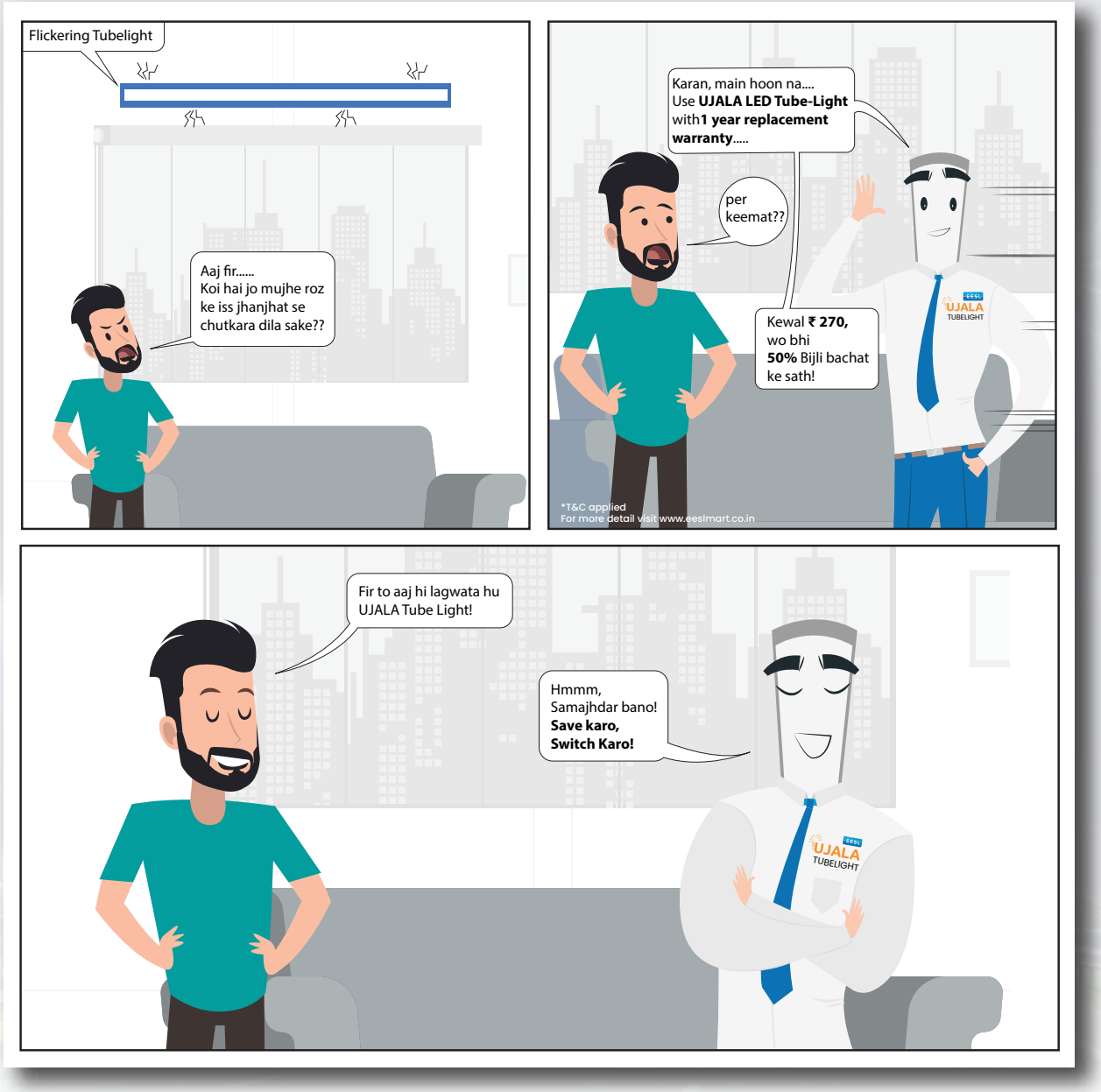
- **At IEA Ministerial Meeting, global energy leaders vow to strengthen energy security and accelerate clean energy transitions**
  Global energy leaders met in Paris this week for the International Energy Agency's 2022 Ministerial Meeting, sending a strong message of unity on the need to strengthen energy security, reduce market volatility, and accelerate clean energy transitions worldwide. Chaired by US Secretary of Energy Jennifer M. Granholm, the two-day meeting took place amid the severe energy market turmoil and energy security concerns triggered by Russia's unjust and unprompted invasion of Ukraine last month. In addition to ensuring global energy security, the IEA has a new guiding principle: supporting countries in the global effort to attain net zero greenhouse gas emissions in the energy sector by mid-century. The new IEA mandates cover areas such as ensuring energy security during the energy transition and leading the global energy sector's fight against climate change, with a notable emphasis on expanding the IEA's work on the critical minerals needed for clean energy technologies.

- **Energy transition holds key to tackle global energy and climate crisis**
  Short-term interventions addressing the current energy crisis must be accompanied by a steadfast focus on mid- and long-term goals of the energy transition. High fossil fuel prices, energy security concerns and the urgency of climate change underscore the pressing need to move faster to a clean energy system. International Renewable Energy Agency (IRENA) launched the World Energy Transitions Outlook at the Berlin Energy Transition Dialogue. The report sets out priority areas and actions based on available technologies that must be realised by 2030 to achieve net zero emissions by mid-century. It also takes stock of progress across all energy uses to date, clearly showing the inadequate pace and scale of the renewables-based transition.

- **How declining coal plants efficiencies are jeopardizing India's COP26 emission targets**
  As in many developing countries, fossil fuels dominate in India's electricity generation. Coal still plays a major role in meeting the country's burgeoning energy needs, but there are gaping inefficiencies in energy use and carbon dioxide emissions. On the efficiency front, reduction targets for energy use specified for coal plants under the existing policy i.e. Perform Achieve and Trade (PAT) introduced in 2012, were less than the energy saving potentials, resulting in substantial inefficiencies in energy use. As per Central Electricity Authority (CEA) estimates, annual emissions in electricity generation are likely to increase from 922 million tonnes in 2018 to 1287 million tonnes by 2030. To meet India's COP 26 targets, it is imperative that existing coal plants lift their performance in energy use and CO 2 emissions. Given the lack of CO 2 emission targets for electricitygeneration and the current lax energy saving targets, it is likely that energy and emissions performance will continue to deteriorate.

- **Russia-Ukraine war shakes Europe path to energy independence, climate goals**
  Before Russia's war in Ukraine, Europe's most pressing energy policy goal was reducing carbon emissions that cause climate change. Now, officials are fixated on rapidly reducing the continent' s reliance on Russian oil and natural gas. To wean itself from Russian energy supplies as quickly as possible, Europe will need to burn more coal and build more pipelines and terminals to import fossil fuels from elsewhere. This dramatic shift comes amid soaring fuel costs for motorists, homeowners and businesses, and as political leaders reassess thegeopolitical risks from being so energy-dependent on Russia. While some are calling for an immediate boycott of all Russian oil and gas, the EU plans to reduce Russian gas imports by two-thirds by the end of this year, and to eliminate them altogether before 2030.

ENERGY EFFICIENCY SERVICES LIMITED
A JV of PSUs under the Ministry of Power



UJALA

Unnat Jyoti by Affordable LEDs for All

Lighting New India With Affordable And Environment Friendly LEDs.

Holi Celebration

Colours are what make us feel alive.
Fill your life with colours of happiness.