ENERGY EFFICIENCY SERVICES LIMITED
A JV of PSUs under Ministry of Power, Government of India

INNOVATING ENERGY

EARTH DAY 2024

A clean, green and energy efficient world beckons

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Editor's note

Dear Readers,

The summer is well and truly upon us, hotter and more unforgiving than before. The temperatures recorded in each of the past 10 months were the highest ever for that month in human history. And every time we turn on the fan or the air-conditioner for respite from the heat, we unwittingly end up exacerbating global warming. That's not to say that we shouldn't use these appliances, but that we should try and minimize the environmental impact of doing so. The solution is simple and obvious and one that we at EESL continue to advocate strongly: using energy-efficient appliances and technologies for all our personal, social, and economic needs.

There is no dimension – residential, commercial, industrial, agricultural, or any other – where energy efficiency cannot help in reducing energy consumption and greenhouse emissions. At homes, we can use energy-efficient models of fans, air conditioners, bulbs, tube lights, and cooking stoves. Workplaces and public places can be newly equipped or retrofitted with energy-efficient variants of these appliances. The cooling and heating solutions used for industrial processes can be of the energy-efficient variety too, as can the pumps and the lamps used by our farmers and rural populace.

It is often harder to let go of the old than to embrace the new. Large swathes of rural India, who need easy and affordable access to basic amenities and essential facilities such as lighting and power are likely to happily embrace solar pumps, solar lamps, and energy-efficient appliances, especially if they didn't have these things in the first place.

Urban citizens, on the other hand, must make the more difficult decision of consciously moving away from the energy-guzzling devices and appliances that they have grown accustomed to. If the climate warrior within them needed a wake-up call, it is already here. More than five decades after 'Earth Day' was instituted, life on Earth is more precariously placed than it ever was in the past.

'Fighting climate change' makes it sound like we are fighting an external adversary, or as if nature is conspiring against us. The truth is that we are battling our own habits, our own inertia, and our own myopic self-interests. And energy efficiency is an ally we can certainly do with.

Yours Truly,

Nitin Bhatt

Deputy General Manager, PR & Sales, EESL

Becoming climate warriors by adopting green appliances

Mr. Vishal Kapoor, CEO, EESL

A report in 2023 by the International Energy Agency suggested that the world needed to double progress on efficiency between then and 2030 to improve energy security and affordability while limiting global warming to acceptable levels. I believe that efforts directed towards enhancing energy efficiency should start at the first level with how we define and measure comfort and convenience that is consistent with the global principles of sustainability. We spend a large part of our lives indoors. The indoor environment is thus a crucial domain in which climate action should play out.

Energy saved is energy gained. The onus of taking steps to save energy rests not just on governments, industries, and establishments, but on citizens too. The simplest of all solutions involves replacing household appliances such as conventional fans, lights, and air conditioners with energy-efficient variants.

Energy efficiency also has tremendous capacity to abate greenhouse gas emissions. Each of us can assume the role of a climate warrior and contribute to energy conservation by adopting energy-efficient appliances at home, at work, in commercial and industrial establishments, and for everyday activities. CLASP estimates suggest that 20 basic appliances including meters contribute up to 40-45% of the world's energy consumption. This presents a huge potential for energy savings if we start using the energy efficient version of these appliances.

Ceiling fans, the most widely used cooling appliance in India, account for a large percentage of the overall electricity consumption of households. This percentage can be significantly lowered with the use of brushless DC (or BLDC) fans, which are more energy-efficient and consume much less power as compared to traditional ceiling fans. A typical conventional fan consumes around 78 watts of electricity, whereas a BLDC fan consumes only about 28 watts.

Similarly, energy-efficient variants of air conditioners can yield huge energy and monetary savings while providing the same levels of comfort as regular ones. By retrofitting the air conditioning systems in old buildings, we can improve energy efficiency, air quality, and thermal comfort – all at once. The energy-saving potential in these cases is as high as 30-50 percent.

Light bulbs are yet another widely used appliance across the world. A 7W LED bulb provides the same amount of light as a 14W compact fluorescent bulb or a 60W incandescent light bulb. Replacing conventional bulbs at home and on streets with

LED bulbs can reduce CO2 emissions by billions of tons.

Solar-powered cookstoves and induction cooktops make cooking faster and more energy-efficient in Indian kitchens. The per unit efficiency of induction cooktops is slightly better than that of conventional electric resistance units and much higher than that of gas stoves. Solar induction cookers also reduce indoor air pollution, which otherwise poses a risk to human health.

Industries account for about 40 percent of India's total electricity consumption, with electric motor-systems alone accounting for 28 percent. However, most of the motors that have been traditionally used in the country have low energy efficiencies. This increases energy consumption and affects price competitiveness of businesses. The adoption of high-efficiency IE3 motors can address these challenges.

Even farmers can join the sustainability drive. At the farm level, BEE 5-star energy-efficient agricultural pumps can ensure more than 30% reduction in energy consumption. The pumps have smart control panels that can be remotely and easily operated by farmers.

EESL's efforts have, over the years, created strong markets for a range of energy-efficient products such as super-efficient air conditioners, IE3 and IE4 motors, cooking stoves, and star-labelled fans, bulbs, tube lights, solar agri-pumps, and solar lamps. We need to drive wider and deeper adoption of such appliances in new markets and among new user segments. We can accelerate India's transition to a net zero economy by making a transition ourselves – from being energy consumers to becoming climate warriors.

Energy-efficient LED bulbs, Integrated battens, and Inverter bulbs: Exploring the world of green illumination

Mr. Animesh Mishra, Chief General Manager and Head (Sales & PR), EESL

Illumination stands as the cornerstone of development in any modern-day economy. It serves as the backbone for connectivity, trade, education, and safety. A well-established lighting infrastructure not only fosters societal and economic growth but also promotes cultural advancement. Accessible and affordable household lighting is vital for physical, mental, and social well-being, as it facilitates education, personal development, and safety.

However, it is imperative for lighting solutions to be sustainable and environmentally friendly. Recognizing this need, India has emerged as one of the pioneers in advocating for a sustainable and energy-efficient lighting infrastructure, both at the personal and national levels.

Energy-efficient and sustainable lighting solutions, such as Light Emitting Diodes (LEDs), can significantly reduce electricity bills for families while providing better illumination in homes. Moreover, the cost savings contribute to increased disposable income and lifetime savings, thereby enhancing the quality of life, fostering prosperity in local communities, and expanding energy access for all.

Energy Efficiency Services Limited (EESL) has been at the forefront of making illumination greener and more energy-efficient through groundbreaking initiatives like UJALA (Unnat Jyoti by Affordable LEDs for All) and the Street Lighting National Programme (SLNP). The extraordinary story of UJALA was the tailwind behind the technological leapfrog from incandescent bulbs to LEDs within only half a decade.

Among the latest offerings from EESL is the innovative inverter bulb – a remarkable fusion of innovation, functionality, and reliability. These bulbs, engineered to confront power outages directly, signify a paradigm shift in emergency lighting solutions. EESL's rechargeable inverter bulb is a game-changer in the lighting industry, providing up to 4 hours of battery backup and ensuring uninterrupted illumination even during the darkest hours.

EESL's LED bulbs, offering up to 90% energy savings, have empowered Indian consumers to actively participate in the ongoing energy transition. Taking it a step further, EESL now offers

a 5-star 6-Watt LED bulb that provides the same intensity of light but consumes 30% less electricity than a 9-Watt LED bulb, delivering double the benefit to consumers.

In addition to this, EESL's LED battens boast cutting-edge technology, offering an impressive light output of 2200 lumens, surpassing market alternatives by 10%. It provides superior surge and overload protection for added reliability. Additionally, our LED battens are also contributing to cleaner, greener, and brighter illumination, further solidifying the organization's commitment to sustainable lighting solutions.

The shift towards energy-efficient LED bulbs, integrated battens, and inverter bulbs not only benefits individual households but also contributes significantly to environmental sustainability and national energy conservation efforts. With initiatives like those spearheaded by EESL, the journey towards a greener and brighter future through sustainable illumination is well underway.

Sustainable cooling: A crucial imperative this summer

by Mr. Anil Chaudhary, Chief General Manager, Technical Projects; Quality & Inspection; Sustainable Development Unit

As we have approached yet another summer, cooling requirements are going to bring in additional enhanced, Carbon footprints. Indian Cooling Action plan (ICAP) depicts in the report that India's per capita space cooling energy consumption is around 1/4th of the world's average, 1/12th of Japan, 1/27th of US. In overall Energy front, India's per capita Energy consumption is 1/3rd of World's average, around 1/6th of Japan and 1/13th of US. With India's economy growing rapidly and projected to peak around 2045, only supply-side management shall not suffice as India would be needing 3 times of Energy today to be at par with world's average. With inevitable rise in cooling requirement with India rubbing shoulders with world's best economies, it is pertinent for cooling systems to be very energy efficient and sustainable.

ICAP specifies for emphasis on efficient Space cooling requirements in Buildings, AC & Refrigeration Technologies, Cold Chain Technologies and Cooling in mobility. Besides fans, all other cooling systems viz. Room Air Conditioners, Refrigeration, Cold Chains, Chillers, Transportation Acs rely on efficient refrigeration/ air condition technologies along with climate friendly refrigerants. For cooling to be sustainable, it has to be marriage of energy efficiency with the refrigerant transition.

All around the world, air-conditioning and refrigeration systems have long relied on using climate-damaging fluorinated refrigerants. The ongoing phase-out of HCFCs in developing countries and the newly adopted global HFC phase down offers opportunities to adopt energy efficient climate-friendly alternatives. Coupling energy efficiency with the HFC phase-down can significantly increase the climate benefits of the Kigali Amendment.

Not only India, but as global temperatures also rise alongside income levels in the developing world, the demand for air-conditioners is set to explode. To ensure this demand can be met without devastating climate impacts, it is vital that cooling systems are as sustainable as possible.

Increasing the power source of Renewable Energy shall make cooling requirements more and more sustainable.

EESL having mandate of bringing up most efficient technologies in sustainable way, for its adoption

pan India, have already launched BLDC fan Programme with consumption per fan reduced to 28-32 W compared to 75 W conventional Fans.

EESL has launched Super-Efficient AC programme with ISEER 6.2 and 5.8 for 1.0T & 1.5 T ACs respectively. These ACs are more efficient than conventional 5 Star ACs with ISEER 5.0.

EESL is also developing programme for replacement of Chillers as Chillers are around 9% of cooling energy guzzlers and most industries have Chillers as old as 20 years or more.

EESL is venturing into Cold Chain sector as it shall have huge requirement of Energy while India aims for food security with lesser work force deployed in Agri sector in due course at par with developed nation.

NABCONS, a NABARD subsidiary, has estimated a monetary loss of INR 1520 billion annually for

54 crops and commodities on accounts of post-harvest losses. Over one-third of this is in the fruit and vegetable value chain - around 19 million MT of F&V, excluding potato and onion, are lost annually across the value chain corresponding to a financial loss of INR 570 billion. In addition, the produce wastage leads to GHG emission in tune of 1.05 – 2.09 tons of CO_2 per ton of produce loss.

Cooling infrastructure at the farm gate and aggregation point, especially for Fruits and Vegetables, can significantly reduce Post Harvest Loss (PHL) and improve farmers' income and livelihoods for fruits and vegetables (F&V), which represent the produce with highest PHL.

At farm gates, studies have revealed that MCS of around 5 MT are best suited to address the issue. (Farm gates comprise almost 50% of loss in entire cold Chain). Only around 1000 MCS are deployed in the country, with requirements estimated as high as 196000-225000 MCS.

While meeting this huge requirement, MCS has to be highly energy efficient to combat additional power requirement.

EESL while having structured discussions with NCCD & BEE has finalized specifications for ISO container sized, portable, Highly efficient, 5 MT MCS with zero ODP and lowest GWP refrigerant. The MCS shall have commensurate Solar Panels, for making it entirely sustainable solution.

Making Cold chain efficient have triple advantage, i.e Food Security, Energy Saving & Sustainability, reduction of GHG by PHL.

For passive cooling methods, EESL has already piloted with installation of heat barriers in glass windows and results have been quite encouraging. This would eventually reduce the space cooling requirements in buildings. The modalities of scaling up is being devised.

Sustainable cooling is critical and imperative requirement to achieve net zero by 2070.

Cooling industry in India: Driving energy efficiency for a sustainable future

by Mr. Ajay Raj, AGM Technical and Cluster Head Western Region, EESL

In the face of rapid urbanisation and a burgeoning population, there is a clear need for a shift towards sustainable, clean, and energy-efficient cooling technologies. Recognising the urgency of this need, India has taken proactive steps to address the challenge, spearheading initiatives such as the India Cooling Action Plan (ICAP) to pave the way for a greener future.

The aggregated nationwide cooling demand is projected to grow approximately eightfold by 2037-38 from the 2017-18 baseline. This staggering growth underscores the necessity for sustainable cooling solutions that not only meet the escalating demand but also mitigate environmental impact. Access to cooling has emerged as a development imperative and an equality issue, particularly as climate change-induced heat waves pose significant health risks to vulnerable populations.

India's pursuit of energy-efficient cooling solutions aligns seamlessly with key international agreements, including the Kigali Amendment to the Montreal Protocol, the Paris Agreement, and the UN Sustainable Development Goals (SDGs). Initiatives such as the Kigali Cooling Efficiency Programme (K-CEP) are instrumental in driving collaborative research and innovation to accelerate the transition away from hydrofluorocarbons (HFCs) towards more sustainable alternatives.

India has unveiled ambitious energy efficiency policies targeting chillers, a significant consumer of energy in commercial buildings. These policies are poised to yield substantial benefits, including a cumulative avoidance of 28 TWh of electricity consumption and a reduction of 23 million tons of CO2 emissions through 2030.

Envisioning a sustainable future, India aims to implement green space cooling strategies by 2040, with the potential to slash annual GHG emissions by 213 metric tonnes of CO2 equivalent. By improving the efficiency of cooling technologies such as air conditioners, ceiling fans, and chillers, the nation can achieve substantial energy savings, estimated at 30% by 2037–2038.

India is striving to enhance energy efficiency in chillers while integrating environmentally friendly refrigerants with low global warming potential (GWP). The need of the hour is to accelerate market penetration of energy-efficient chillers and catalyse investments in efficient central cooling

technologies. The current installed capacity of chillers is about 6 million TR and is expected to grow to 38 million TR by 2050, which highlights the considerable potential for the integration of energy efficiency in the sector.

India's cooling industry stands on the cusp of transformation, with energy efficiency emerging as a cornerstone for sustainable development. Through initiatives like the India Cooling Action Plan and stringent energy efficiency policies, the nation is poised to unlock immense potential for environmental protection and human well-being. As India marches towards a greener future, collaboration between policymakers, industry stakeholders, and the public will be pivotal in shaping a sustainable and resilient cooling ecosystem for generations to come.

Communication Workshop

We conducted a communication workshop for our Cluster and Programme heads. Throughout the workshop, we delved into the intricacies of effective media engagement, exploring various communication tools and considerations for interactions with the press.

Top energy trends from India & across the globe

India adds record 18 GW renewable energy capacity in FY24

India has added a record renewable energy capacity of 18.48 GW in 2023-24, which is over 21 per cent higher than 15.27 GW a year ago, according to the latest data of the Ministry of New & Renewable Energy. However, industry experts said there is a need to add at least 50 GW of renewable energy capacity annually for the next six years to meet the ambitious target of 500 GW of renewables by 2030. According to the data, India's installed renewable energy capacity is 143.64 GW as of March 31, 2024, excluding 47 GW of large hydropower capacity (each plant is more than 25 GW or above). They pointed out that renewable energy capacity stood at around 190 GW, including large hydro projects, and therefore, India needs to add 310 GW in the next six years or at an average of 50 GW per annum.

Energy efficiency is a low-cost option to meet the growing energy demand: DG, Bureau of Energy Efficiency

Director General of the Bureau of Energy Efficiency (BEE), Abhay Bakre, emphasised the significance of energy efficiency as a cost-effective strategy to meet India's escalating energy demands. Speaking at a stakeholder roundtable discussion titled 'Doubling the Rate of Energy Efficiency of Indian Industry 2030', Bakre underscored the importance of energy efficiency in the national energy strategy. "Energy efficiency is a low-cost option for meeting the growing energy demands," Bakre stated. He also highlighted the role of FICCI in advancing the national energy efficiency agenda and stressed the necessity for international knowledge exchanges and the sharing of success stories from other countries to enhance India's efforts.

India's energy requirement will increase by 2.5 times by 2047

The energy requirements of India will be increased by 2.5 times by the year 2047, and right now around 84 per cent of India's energy is produced using coal, said Venu Gopal Mothkoor, Senior Specialist- Energy, NITI Aayog. He further added that achieving CO2 emission targets necessitates a focus on energy efficiency and demand electrification, which could potentially reduce CO2 emissions by 51 per cent by 2047. Speaking at a roundtable discussion organized by FICCI (Federation of Indian Chambers of Commerce and Industry) on 'Doubling the Rate of Energy Efficiency of Indian Industry 2030' he also underscored the pressing need to address this surge in energy requirements.

India needs at least 1 mn fast chargers to adopt EVs by 2030: Amitabh Kant

The G20 sherpa and former NITI Aayog CEO, Amitabh Kant has said that India needs at least one million fast chargers to adopt electric vehicles (EVs) by 2030. In a post on X, he said that instead of importing, the country needs to push localization content in manufacturing, with megawatt-hour charging for buses and commercial vehicles. "All EV players & startups instead of creating tech silos must work together to build an interoperable fast-charging network. This is critical for providing impetus to the EV movement in India," Kant wrote.

Launch of the report on energy transitions to achieve India's net-zero targets

A meeting was held for the launch of the report titled "Synchronizing Energy Transitions Towards Possible Net-Zero for India: Affordable and Clean Energy for All" prepared by IIM Ahmedabad as part of a study project that was sanctioned in November 2021 by the Office of the Principal Scientific Adviser to the Government of India with part-funding (one-third) from Nuclear Power Corporation of India Ltd (NPCIL). The report attempts to answer key questions related to India's energy trajectory such as how much energy India needs to achieve the high value of the Human Development Index (HDI); what are pathways to achieve this; what the energy mix projections for this until 2070 (our declared net-zero target year); what would be the cost of electricity to the end user; what would be the carbon emissions until 2070; what would be the investments required for energy transitions towards net-zero at 2070; estimation of other challenges and opportunities (RE integration, the requirement of critical minerals, Carbon Capture Utilisation and Storage (CCUS), natural gas, ethanol, hydrogen) in energy transitions towards achieving net-zero in 2070.

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