

BALANCING THE CENTIGRADE - AN ENERGY EFFICIENT APPROACH

*Saurabh Kumar



Introduction

Energy efficiency is an important pillar of India's efforts towards energy security. The multifold benefits of energy efficiency programs and interventions – reduction in costs of both consumption and supply of energy, decarbonization and air pollution mitigation, facilitation of wider energy access – make a strong case for this sector to be a key component of energy development strategies in developing and developed countries alike.

India's energy efficiency programs have saved approximately 13 GW of annual generation capacity, translating to savings of over USD 10 billion in the form of avoided capacity generation and reduced energy bills. This achievement is testament to over 4 decades of dedicated effort involving enabling legislations and extensive collaborations by domestic and international stakeholders in the public and private sectors.

India will need to amplify and accelerate this momentum of multi stakeholder cooperation as it balances the achievement of its development ambition and embarks on an ambitious programme to reduce the intensity of its carbon emissions by 33-35% by 2030, relative to 2005 levels.

Additionally, with at least 178 nations across the world geared towards controlling global temperature rise to 2°C within this century, the need for the exchange of economical and effective solutions is immediate. With its proven success in scaling energy efficiency and implementing the world's largest energy efficiency portfolio, India should harness its capability to assume a more prominent role as a multinational convener of knowledge and best practices in mainstreaming the principle of energy conservation, and so facilitate global progress towards a climate resilient future.

Genesis of energy efficiency in India

The formal advent of India's energy conservation and efficiency movement can be traced to the 1970s with the establishment of India's Fuel Policy Committee, which was focused on optimising electricity generation and transmission in lieu of a global fuel crisis, and with the launch of fuel efficiency training and consultancy services for the industrial and transport sectors by the National Productivity Council. The 1981 Inter-Ministerial Working Group on Energy Conservation (IMWG) was the first institution in the nation to identify energy savings targets and recommend policies to enable industrial compliance with metrics of efficient energy use.

These early efforts to sensitize policymakers and the private sector, including incentivisation of energy conservation by industries and the observance of National Energy Conservation Day, eventually culminated in the development of milestone legislations such as the Energy Conservation Act 2001 and the Electricity Act 2003, which created clear directions for energy efficiency in industry, one of India's largest power consumers. Specific measures were further elucidated in the National Mission for Enhanced Energy Efficiency (NMEEE), including among

other measures, market-based initiatives to induce consumers – individuals, households, institutions or industries – to reduce their energy consumption and enable India to meet global standards of energy efficiency.

Self-Sufficiency in Energy Efficiency

These legislations laid the groundwork for a wide variety of initiatives that have today led to measurable reductions in India's energy consumption patterns. The nation's energy intensity declined by 58% between 2005-06 and 2015-16, and is projected to decline a further 37% by 2040.

Energy efficiency has grown more prominent in the Indian energy consumer's conscience over the last decade. This win has involved the active participation of a wide variety of stakeholders – over 600 industries, who have reduced their CO₂ emissions by over 30 MT through the Government of India's Perform, Achieve & Trade (PAT) scheme and monetised energy savings with tradable Energy Savings Certificates; households and municipalities across India that have saved over 39 billion kWh of energy by adopting Light Emitting Diode (LED) lighting alternatives; government entities that have introduced the Energy Conservation Building Code, as well as building and infrastructure developers who have grown India's green building footprint to 4.5 billion square feet over the last two decades.

This represents only a fraction of India's potential in leading the world in sustainable development practices, and in harnessing its annual USD 12 billion energy efficiency market.

Programs grounded firmly in creating demand momentum for energy efficiency have played a critical role in transforming India's growth story. A widely heralded initiative is the UJALA (Unnat Jyoti by Affordable LEDs for All) programme that was inaugurated by Hon'ble Prime Minister of India in January 2015, and that has distributed over 300 million LED bulbs across India, translating to estimated annual cost reduction of USD 2.4 billion in consumer electricity bills and annual CO₂ emission reductions of nearly 32 million tonnes.

Subsequently, the sale of LED bulbs in the Indian market increased from 0.1% in 2014, to 15% within two years, with a projected increase to 60% by 2020. Due to a concerted bulk procurement effort, the market price for LED's has also reduced by nearly 80% during the course of the program's implementation.

Similarly, the installation of 6.1 million LED streetlights in 28 states and Union Territories across India, covering over 80,000 kilometres of roads, have saved over 1.46 billion kWh of energy per year and reduced annual GHG emissions by 1.39 million tonnes.

India has also endeavoured to maximise efficiencies through the digitisation of energy with the launch of its smart energy revolution. With the ongoing implementation of net metering policies and a recent

endeavour to procure and install 5 million smart meters -which achieved a unit price 50% lower than the market rate - India aims to power its growth by integrating more informed energy consumption and renewable-energy production with cutting-edge technologies like the Internet of Things (IoT) and automation.

Another high impact initiative is the Government of India's ongoing electric mobility program, which envisions 6 million electric and hybrid vehicles on India's roads by 2020, targeting savings of 120 million barrels of oil and 4 million tons of CO₂, and lowering of vehicular emissions by 1.3 percent by 2020. The National Mission on Electric Mobility and National Electric Mobility Mission Plan 2020, launched earlier this year, are aligned with this vision, along with the scheme for Faster Adoption and Manufacturing of Hybrid and Electric vehicles (FAME).

Apart from aggressively working towards creating a cohesive EV ecosystem, Central and State governments are working on implementation of various policy measures to boost both the manufacture and adoption of EVs in India. While several states have initiated the launch and development of policies to enable domestic manufacture of the cars, government entities have also demonstrated interest in procuring these vehicles for their own use and initiated the establishment of charging infrastructure.

Initial efforts towards the large-scale procurement of these vehicles has indicated encouraging results, with the procurement price of these vehicles reducing by 25% relative to the prevalent retail price.

For India, a market that is highly price-sensitive, the price precedent and long-term impacts are driving demand for energy efficient solutions. Through the use of such market-based initiatives, India has managed to create self-sufficient programs that not only provide traditional benefits like energy saving and emission reduction, but also trigger large-scale investments in green products, leading to new job creation.

Energy efficiency programs are thus leading to the creation of local manufacturing units, improving technical knowledge, creating jobs, and increasing India's skilled workforce.

The most noteworthy aspect of the success of these programs, all of which EESL has been proud to implement, is that the market transformation is being achieved without any subsidies from the government. EESL has mastered the energy service business model to aggregate demand for energy efficiency technologies and so encourage not only domestic manufacture of these applications, but also make energy efficiency an affordable and attractive prospect for the Indian consumer.

EESL's Pay-As-You-Save (PAYS) model has facilitated faster adoption of transformative solutions. The upfront cost is borne by EESL and the monetised savings over time are used to recover the cost of investment from the energy consumer.

While EESL's projects address areas as diverse as lighting, mobility, municipal water management, trigeneration, agricultural pump sets, and solar panels, what unites them is an organizational philosophy of 'Enabling More'— more transparency, more transformation, and more innovation. EESL has pioneered innovative business approaches to successfully roll-out large-scale programs that allow for incentive alignment across the value chain and rapidly drive transformative impact. These business models are scalable and replicable across geography and projects, and aim to create market access for efficient and future-ready transformative

solutions that create win-win situations for all stakeholders.

Leveraging collaborations for accelerating global energy efficiency

Including EESL, there are today 127 energy service company (ESCO) formally registered with the Bureau of Energy Efficiency (BEE), a government agency created to develop programs to enhance energy conservation in India. Collective efforts of organisations committed to energy efficiency in India, including these ESCOs, have given credence to the idea that energy efficiency has the potential to be any nation's 'first fuel'. The strong demand and adoption for energy efficient products have signaled global interest, bringing about innovative financing schemes and support from multilateral funding agencies.

What is remarkable is that India has achieved significant changes through technologies and solutions that can be deemed conventional by global standards. Even EESL's most recent venture into trigeneration with the acquisition of the award-winning UK-based Combined Heat & Power major, Edina is an effort to expand the portfolio of energy efficient solutions that have been proven in developed markets. EESL is endeavouring to introduce this technology to India in parallel with district cooling and battery storage, which will enable the establishment of increasingly flexible power supply systems that can operate in island-mode.

That said, India needs to take the lead in driving innovation – in the manner of financing, technology intervention and business models - to sustain the momentum of change created in the last few years. With energy consumption in India expected to increase by 165% by 2040, the continued intervention potential for energy efficiency is significant. That India is capable of addressing this potential is evidenced by the 2.6x growth in the energy efficiency market between 2010 and 2016, as per World Bank estimates.

Visionaries and innovators in India confront several challenges in the promotion of energy efficiency solutions: High upfront costs in the development of new, efficient and futuristic technology solutions; Perception of high risks by potential financiers and uncertainty of energy cost-savings and returns; Significant initial capital investments and long payback period from energy efficiency upgrades; and, inefficient market structures aggravated by lack of awareness and qualified capacity among suppliers, promoters, financiers, and end-users.

Our efforts towards energy sustainability have revealed the potential for significantly greater progress through international integration of efforts, exchange of knowledge and sharing of best practices across borders.

What India and the world needs to capitalise on this momentum is stronger stakeholder participation across the value chain. An ideal scenario would be one where every industry, and all demand-side usage and supply-side interventions are energy efficient by design. Creating mutually beneficial partnerships will need a sharp understanding of energy usage, technologies, and business needs, and acquisition of resources and knowledge from leading Indian and international research institutions. With the world today transforming energy systems to implement energy efficiency, the time is opportune for India to not only bring home, but also share, global practices to achieve common climate change and sustainable development goals. Across cities, villages states, businesses, and homes, India has never had a better time to transform energy use everywhere.

India has established collaborative platforms and partner initiatives, be

they the establishment of International Solar Alliance, expansion of EESL's UJALA programme to Malaysian state of Melaka, or the sharing of best practices on domestic and street lighting with Kingdom of Saudi Arabia. The first International Symposium to Promote Innovation & Research in Energy Efficiency 2017 (INSPIRE-2017) - organised jointly by Energy Efficiency Services Limited, Alliance for an Energy Efficient Economy, World Bank (WB), Bureau of Energy Efficiency (BEE), The Energy & Research Institute (TERI), Government of India's Department of Science and Technology (DST), and the MacArthur Foundation – unveiled several heretofore hidden opportunities for collaboration.

Tapping into the resources and knowledge of research institutions is a must, as is looking into innovative funding options provided by multilateral organizations. There is a significant need to identify, incubate, commercialise, test and scale markets for new technologies that have the potential for high impact, while also generating awareness about the business case for the adoption of such technology. Such support can give much-required impetus to a country's energy initiatives – regardless of its position on the trajectory of economic growth and sustainable development - and encourage its rapid progress towards charting new frontiers for the global energy efficiency landscape.

Collective effort towards global energy security

The motto, “United We Stand, Divided We Fall,” is appropriate for the

situation in which the world finds itself today. The need of the hour is to pool our knowledge resources and share best practices, collectively identifying the models and technologies that will resonate the strongest with each nation's development needs and growth ambition.

With mounting pressures of climate change on economies across the world, it is imperative for nations to identify and implement solutions that enable transitions for energy security that are cheaper, faster and more scalable while also powering holistic growth. India has identified such solutions in the realm of energy efficiency through compelling business propositions to promote technology interventions.

We have found an energy savings based, zero-subsidy model to have delivered encouraging results. But, a lot more can be done across a wider spectrum of economic activities, and as a nation, we are open to exploring different avenues on our journey to energy security and sustainability.

India has endeavoured to make its path to energy security an all-inclusive prospect for all stakeholders and EESL is prepared to do its part in this effort.

* *Mr. Saurabh Kumar currently leads Energy Efficiency Services Limited (EESL), as its Managing Director. He is an Indian Revenue Service officer of 1992 batch.*



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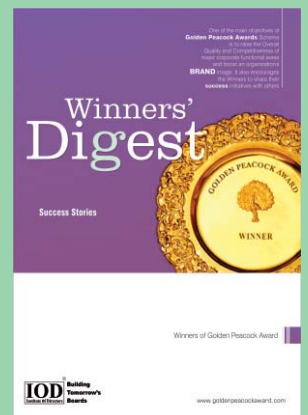
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