Getting around India's energy efficiency conundrum

The road towards energy efficiency hasn't been easy due to lack of funds, resulting in the govt rolling out a number of policies that include a market-based trading mechanism for moving towards cleaner cooking fuels

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The government's UJALA (Unnat Jyoti by Affordable Lighting for All) scheme cut the price of an LED bulb to Rs38 apiece in 2016 from around Rs310 in 2014. This has helped dissipate doubts over the country's ability to run the world's largest energy efficiency programmes. Photo: Bloomberg

New Delhi: India's embrace of energy efficiency measures is perhaps best reflected in its programme to expand the use of LED (light-emitting diode) bulbs. The government's UJALA (Unnat Jyoti by Affordable Lighting for All) scheme cut LED bulb prices to Rs38 apiece by August 2016 from around Rs310 in 2014. This gave India's efforts to cut energy use a shot in the arm, and helped dissipate doubts over the country's ability to run the world's largest energy efficiency programmes.

The efforts received another fillip when Indian Railways in December decided to shift to LEDs for its non-traction needs by March-end. Also, the LED thrust was cited in federal think tank NITI Aayog's draft national energy policy that focuses on decarbonization through energy efficiency and renewable energy. "Energy efficiency, which entails using less energy for the same service, is an important element in energy policy. For example, the recent campaign by the government to replace regular bulbs by LED bulbs has the potential to cut energy load by 20 GW and save nearly 100 billion kWh worth of energy each year after replacement of all incandescent bulbs," stated the policy. GW is gigawatt and kWh is kilowatt hour.

The catalyst

The success of its efforts has raised confidence levels at Noida-based Energy Efficiency Services Ltd (EESL), a government-owned energy services company. Operating out of the Inland Waterways Authority of India's office, the company has been offering large procurement contracts such as those for LEDs in the energy sector, enabling businesses to leverage scale and achieve economy to bring down prices.

"Over the last decade, people have started (focusing) from energy conservation to energy efficiency," said S.P. Garnaik, chief general manager (technical) at EESL.

India's energy efficiency market is estimated at $23 billion (around Rs1.5 trillion) with a vast potential to grow.

"Essentially, about 4% of the investment in the economy every year goes towards energy efficiency. This is only the energy efficiency part. So if I am buying a refrigerator, only the part that has to do with energy efficiency is 4%. The rest of the 96% are things that I would have done anyway," added Ajay Mathur, director general at The Energy and Resources Institute (TERI).

Climate change imperatives

India is now the biggest emitter of greenhouse gases after the US and China, and is among countries most vulnerable to climate change. India plans to reduce its carbon footprint by 33-35% from its 2005 levels by 2030, as part of its commitments to the United Nations Framework Convention on Climate Change adopted by 195 countries in Paris in 2015.

"The intervention will be in the super-efficient technologies. That's where you get the major chunk to play. Of our INDC (Intended Nationally Determined Contribution) goals of 33-35%, emission intensity reduction from the base line value, around 50% will come from energy intensity. So, that makes it a big chunk," added Garnaik, who has earlier worked at Bureau of Energy Efficiency.

The road hasn't been easy. Apart from technological risk aversion, energy efficiency measures also faced financing challenges, impeding any large-scale intervention. This resulted in such programmes needing government backing as demonstrated globally—A case in point being Finnish state-controlled energy utility Fortum's role in developing electric vehicle (EV) charging infrastructure in the Nordic country. This was primarily driven by the government's target of 38% share of renewables in its energy mix by 2020.

"Energy efficiency is hugely important," Adair Turner, former chairman of the UK Financial Services Authority, said in an interview.

Keeping this in mind, the National Democratic Alliance government is working towards giving appropriate price signals for achieving demand-side response. This ranges from perform, achieve and trade (PAT) programme, a market-based energy efficiency trading mechanism for moving towards cleaner cooking fuels. Other measures in the works include redefining India's mobility architecture through EVs, improving energy efficiency of electrical appliances, motors, agricultural pumps and tractors, and even buildings.

A growing market

Experts believe there is a growing market around India's energy efficiency drive.

"A competitive power market is evolving and there is increased focus on access, efficiency, quality, and affordability of supply and on decarbonizing the sector," according to a TERI report titled *Transitions in Indian Electricity Sector*.

This, in turn, is throwing up different business models which are bound to disrupt the conventional energy landscape.

"Pace of technological developments around efficient equipment, renewable and storage; innovations especially behind the meter and data generated across specific customers will destroy demand as we know on

the grid and spawn various market and business models to coexist," said Sambitosh Mohapatra, partner (advisory, power and utilities) at PwC India.

This holds importance given that thermal power sector emissions are significant in India. Of the installed power generation capacity of 334,399.83 megawatts, 58% is fuelled by coal. According to Centre for Science and Environment, of the total emissions from the industrial sector, the power sector alone contributes 60% of the PM (particulate matter), 45% of sulphur dioxide, 30% of nitrogen oxides and 80% of mercury emissions.

Early favourable signs are there. With an investment of $4.07 billion, the first phase of the PAT programme resulted in $1.46 billion savings.

"There should not be any financial incentive or subsidy. You have to create that market. So, the market-based mechanism is the key to survive," said Garnaik of EESL.

This comes at a time when the Rs16,320 crore Pradhan Mantri Sahaj Bijli Har Ghar Yojana (Saubhagya) launched last year will provide the architecture through which the government seeks to reduce import of fossil fuels, promote induction cooking and heating, and charging EVs, apart from the initial target of providing lighting.

New frontiers

Also, new frontiers are opening up with EESL exploring a £55 million (around Rs500 crore) acquisition of a district cooling, combined heat and power utility in the UK, and a $12 million investment in the first utility scale energy storage facility by Leclanché and Deltro Energy to balance the Ontario power grid. Also, a tri-generation project where natural gas will be used for generating electricity, heating and cooling is in the works in India.

District cooling is a concept wherein instead of having cooling everywhere, there is a provision for central cooling, post which cold air gets circulated.

“It’s particularly when you get to heating and cooling that energy efficiency becomes hugely important. Because otherwise, you can only decarbonize by building enormous quantities of electricity, which would be physically possible but is just not an economically sensible thing to do,” added Turner, who is also the chairman of the Institute for New Economic Thinking.

The concept is gaining traction here. After a study conducted by United Nations Environment Programme in Pune, Thane, Rajkot, Bhopal and Bhubaneswar, EESL will be conducting a district cooling pilot programme in Thane estimated to cost around Rs1,000 crore.

To be sure, India’s earlier energy efficiency efforts have not been very successful.

“The National Mission for Enhanced Energy Efficiency (NMEEE), launched under the National Action Plan on Climate Change (NAPCC) has not been able to achieve its intended goals due to poor inter-sectoral linkages. Energy efficiency programmes cannot be run on a stand-alone basis and require close coordination between energy supplying and consuming sectors, as well as with technology development, management apparatus and finance streams,” states the draft national energy policy.

“It (energy efficiency) needs to (be at the centre stage of policy planning),” added TERI’s Mathur, who is also a member of the Prime Minister’s Council on Climate Change.

Given the impediments, NITI Aayog has pitched for an “overarching energy efficiency policy”, along with making energy efficiency as a priority lending sector for banks and financial institutions. Also, it has underlined the importance of enforcement of the existing codes as the key to the success of India’s energy services companies model.

However, due to the complexities involved, it is not an easy task as articulated by the TERI report which states, “India’s electricity demand across sectors is therefore a complex function of the growth resulting from

increasing aspirations, economic growth, and higher electrification of activities on the one hand, and the reduction in electricity requirements due to efficiency improvements across different sectors on the other."

Also, India's clean energy space is going through a trying time. With developers vying for big-ticket wind and solar power auctions to land record low tariffs, concerns have been raised over the long-term sustainability of such projects. In addition, India's ambitious target of 175GW of clean energy capacity by March 2022 still seems a tall order, given that most states are yet to align their renewable purchase obligation trajectory with that of the Union government's.

"The first few years were spent just to make people aware about how the energy can be conserved, why it has to be conserved and how it is important in the national perspective. Now, those low-hanging fruits are gone. Now, we have to actually move into the next level," said EESL's Garnaik of the challenges ahead.

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