The EU-India Energy Efficiency Cooperation: Partnership to Implement Energy Conservation Building Code (ECBC) in India

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Abstract

Energy Efficiency (EE) is slowly gaining ground in policy making around the world. It is being seen as one of the most viable alternatives to reduce the chief culprits of Climate Change. Concerted EE measures can achieve almost half of Greenhouse gases (GHGs) targets as agreed in Paris agreement. According to World Energy Outlook Report 2017, EE has the potential to mitigate 44% of Carbon Dioxide (CO2) where renewables can deliver only 36%. EE was entitled as the "First fuel" by International Energy Agency in 2013 owning to its multiple benefits. UN has called to double the global rate of energy efficiency improvements under Sustainable Development Goals (SDG 7.3).

The European Union (EU) is one of the early movers to take concrete EE measures. For the EU, Energy Efficiency serves many purposes: "Energy Efficiency- Saving energy, saving money, protecting the climate". EU has implemented Energy Performance Building Directive since 2002 in its building sector. Buildings are the largest energy consumer and CO2 emitter in Europe. On the other hand, India is projected to demand one fourth of the world total energy by 2040. It is going to be one of the largest GHGs emitter due to its growing economy, fast urbanization, improvement in standard of living and climate vagaries. Extending its climate efforts to external sphere EU with India have solidified their cooperation on Energy Efficiency especially in the building sector.

In this regard, the paper briefly discusses the concept and benefits of energy efficiency, along with its meaning and scope in the European Union (EU) and India. Given that buildings are the second-largest final energy consumers in India as well, an attempt has been made to examine the EU's experience with its building-related directives and to analyze current developments in India's building codes. The study undertakes a comparative assessment

of regulatory frameworks, policy instruments, and implementation mechanisms adopted in both jurisdictions. The research further elaborates on the EU–India partnership in this field, highlighting areas of cooperation, knowledge transfer, and capacity building. It also dwells on the key challenges in achieving energy-efficient buildings, such as regulatory enforcement, technological barriers, and financial constraints, while exploring probable policy and institutional solutions.

Keywords: Energy efficiency, climate change, Sustainable Development Goal, energy conservation building code

The European Union is one of the early actors to recognize Energy Efficiency as the 'inhouse energy resource'. It is cost effective, sustainable and bring in various co benefits. The EU has taken a holistic approach towards energy efficiency by including it in headline targets in Climate and energy packages of 2020 and 2030. It has also implemented sector specific legislations and measures such as "Energy Performance building directive", Ecodesign and energy labelling, heating and cooling strategy, smart grid and metres etc. Being a normative actor, the EU commits itself to extend climate efforts through its external policy. Hence it collaborates with other states to move towards achieving Sustainable Development Goals (SDGs) 2030.

By 2040, India will account for one-fourth of the Global energy demand, making it one of the biggest contributors. Paradoxically, though, its per capita energy usage is still 40% below the global average (IEA 2021). The increase in energy demand in India would be driven by urbanization. Around 315 million people (about present US population) are projected to be living in India's cities by 2040. Further energy consumption will rise due to growing economy, improvement in standard of living and intensified heat waves due to climate change. This would lead to unbearable energy costs and very high carbon emissions in India. However, under the Scenario of an Efficient World, this energy demand growth may be capped at just 82% between present and year 2040. Hence, in this context the EU-India Energy Efficiency Cooperation becomes of utmost significance to ensure energy security and improve energy efficiency keeping climate protection in view. The cooperation is emphasized in EU- India Joint statement on clean energy and climate change[1] 2017 that 'The EU and India agree to cooperate on increased energy efficiency of products and industrial processes, as well as on further develop their existing cooperation on energy efficiency in buildings.'

In this regard, the paper broadly discusses about the concept and benefits of energy efficiency, its meaning and scope in EU and India. Since in India also,

buildings are the second largest final energy consumers, attempt has been made to study the EU's experience with regard to its Building directives and current developments in Building code in India. The research elaborates upon the EU-India partnership in the field; dwells upon challenges and probable solutions.

Concept of Energy Efficiency (EE)

In simple terms, Energy Efficiency caters to performing the same task while using less amount of energy or increasing productivity with same amount of energy. The origin of the concept of EE is traced to 1973 oil crisis, when western economies were majorly hit due to Arab oil embargo. The crisis exposed the risk of fuel dependency on outside sources and presented the energy saving or less energy consumption as the immediate solution. At this time, Lovins (1976) was one of the first to give meaning to Energy efficiency as 'using less energy to produce greater economic output'.

In academic literature several references have been made to Energy efficiency like "one of the largest resources" (Laitner J.A, 2013), "low hanging fruit". The International Energy Agency (IEA) market report changed the status of energy efficiency from a 'hidden fuel' to the 'first fuel' on account of its of multiple benefits (IEA 2013). It highlighted that conservation of energy by plugging in the energy wastage, is the cheapest, cleanest and immediate source of energy. Multiple benefits accrue to EE primarily due to reduction in fossil fuels consumption. These effects spillover to reduction in emission of greenhouse gases; lower demand of energy imports; energy supply sufficiency and lower energy price so lesser cost for households and industries. The benefits are further interlinked to opportunities like new jobs and investment avenues along with public health, environmental and economic positives in the long run (e.g., less air pollution and related health improvements) (Jollands et al.2010, IEA 2014, Fawkes S. 2013, Bernstein M. A, 2002). Hence EE is very important solution to ensure Energy Security, environment sustainability, industrial competitiveness, financial stability and well-being of people. Energy Efficiency improvements are subject to required technologies and judicious management of energy systems and information database at different levels. Therefore, every sector of the economy provides enormous scope of energy efficiency whether industry, buildings, transport or energy generation.

It must be emphasized that energy efficiency is a broad concept that encompasses more than merely adopting energy-efficient items; rather, it is based on the flow

of energy. It concerns with tackling energy losses, less energy usage, behavioral changes, innovative reusing of energy in process of energy production, transformation, transmission, distributions along with final consumption of energy. This requires not just techno-economic measures but also policies to make energy efficiency- way of life (Morvaj, Z. and Bukarica, V. 2010, Palm. J (eds.), 2010).

Energy Efficiency (EE) is gradually gaining traction in global policymaking due to its potential to enhance energy security and reduce fossil fuel consumption. Hence, UN has called for double the rate of improvements in energy efficiency at global level under SDG- "Affordable and Clean energy". As per estimates in World Energy Outlook, in contrast to renewable energy sources, which can only reduce CO2 by 36%, EE has the potential to reduce it by 44%. Hence, Energy efficiency measures further contributes to strengthen the fight against Climate Change (SDG 13); help improving the air quality in cities (SDG 11.6); and bring good health and wellbeing to people (SDG 3).

Meaning and scope of Energy Efficiency for EU and India

European Union and India are different type of political entities located in different geographical locations and level of economic development. The EU is constituent of many mature economies, attempting to accelerate its economic growth, on the other hand India is one of the fastest emerging economies. However, both are major energy consumers and among the largest Greenhouse gas emitters. Both the entities are endowed with lower presence of conventional energy resources. Both fulfill large share of their growing energy demands with imported energy and spend huge sum of their public budgets on it. Both the EU and India are ardently committed to Paris Climate agreement to reduce their emission intensity and achieve other climate goals. Hence it becomes imperative for both to take policy measures to improve Energy Efficiency.

European Union

There has been rising trend of energy import dependency in the European Union over the decades and its domestic energy production is on the fall (Eurostats, 2019). So, at present EU imports more than half of its energy from external sources, making it one of the largest energy importers globally. Such dependency charges a huge import bill on the union and poses threat to its energy security. Further energy sector contributes largest in Green house gases emission (80.70% in 2017) in Europe (European Parliament, 2019).

Hence, there is increased emphasis on reducing energy consumption in the union, where Energy Efficiency comes into play. EU believes that promoting Energy Efficiency can reduce energy bills for Europeans and help mitigating the climate challenges that is clearly visible through their tagline "Energy Efficiency- Saving energy, saving money, protecting the climate". It also means to lower their vulnerability to external energy suppliers and create new economic activities. The targets for energy efficiency have been revised upwards from 20% by 2020 to 32.5 % by 2030 in Energy and Climate Packages.

EU recognizes the fact that Every step of the energy cycle, from production to final consumption, needs to be more energy efficient. Various EE measures have been taken like Energy Efficiency Directive, Energy performance building directive, Heating and cooling Strategy, Ecodesign and energy labelling directive etc. Moreover, EU emphasizes that cost of EE measures must not outweigh the benefits. Therefore, EU strategies primarily focus upon sectors where the energy saving potential is greatest, like buildings. Since buildings in the EU are responsible for over 40% of energy consumption and 36% of CO2 emissions, they are the single biggest energy consumer in Europe (Eurostat, 2019).

In 2016, over half of the EU's overall final energy consumption came from the residential and industrial sectors, 25.7% and 25% respectively (EU energy in figures, 2018). Where in EU's residential sector, heating and hot water requirements solely constituted for 79% of total final energy use and cooling has fairly small share. In industrial sector also, 70.6% of energy was used for space and industrial process heating alone, 26.7% for lighting and electrical processes such as machine motors, and only 2.7% for cooling (CIEP, 2017). From these figures it is clear that, most of the energy in EU is consumed for heating purpose. Therefore, energy efficient mechanism for heating is vital for EU to achieve its energy efficiency targets.

EU set a goal in 2007 to attain 20% EE by 2020 compared to its anticipated energy use by that period. That is estimated roughly equivalent to closing of 400 power stations. In 2015, the Energy Union was established with Energy efficiency as its one of the strategic priorities and the EU is also promoting the principle of 'Energy Efficiency First' (Gouardères F., 2018).

India- India's energy consumption has more than doubled over the period of 2000- 2018 due to high economic growth, improvement in standard of living and increase in demand for energy services (IEA 2020). The India energy outlook

2021 projected that India's energy needs would drive the global energy demands mainly accounting for 25% of the share by 2040. It will move up from its fourth position to be the third biggest energy consumer over taking the European Union by next decade (IEA 2021).

With country's commitment to the Paris Summit 2015, India has to balance between its economic and environmental objectives in the context of its progressively increasing energy demand (Bhaumik S., 2018). Hence with huge government debts and high fiscal deficits, measures to improve energy efficiency becomes a strategic policy priority to India. As average cost of EE measures (USD 0.03) to save per kilowatt hour (kWh) of electricity is lesser than cost of generating same amount from a thermal power plant (USD 0.068) in India (IEA, 2017a). The Energy Efficiency outlook for India report estimates that India would be able to reduce its fossil fuel imports by 18% worth $440 billion in 2018 in the Efficient scenario (IEA 2016). Energy efficiency can make Indian industries competitive. It can help India achieve its Nationally Determined Contribution (NDC) objectives and control air pollution. An analysis by TERI showed that Energy Efficiency Scenario has the potential to reduce emission intensity by 41% by 2030 having a positive impact on overall energy sector (Mathur R. et al., 2018). Therefore, to make the current energy transformation cost-effective and sustainable. India implemented the "National Mission for Enhanced Energy Efficiency (NMEEE)" since 2011 as part of National Action Plan for Climate Change. NAPCC acknowledges energy efficiency as a key tool to address the challenges of climate change. In fact, according to report by Bureau of Energy efficiency (BEE), India has reduced its energy intensity by twenty percent in 2018-19 compared to 2005 level and saved Rs 89,122 crore (BEE 2020).

The scope of Energy Savings in India can be primarily realized from industry (45%) and buildings (30%), followed by the transport sector. Its space cooling demand are projected to quadruple by 2040 in building sector and use of electric appliances would also rise exponentially with improving living standards (IEA, 2019). Emerging economies would constitute majority share of the expected energy growth for space cooling by 2050. Just three countries India, China and Indonesia would contribute to half of global cooling energy demand growth (Thambi S., et.al, 2019). Energy demand for the purpose of cooling in India is projected to double by 2027 under the business as usual scenario.

However, with EE measures, it is possible to reduce emissions by 20% and the overall increase in energy demand by seventeen percentage. Again Buildings are the second in demanding final energy in India (BP, 2019) and Space cooling in

building sector continues to dominate with nearly 57% of total energy demand for cooling (Kumar, S., et. al 2018). Though at present and in short term much of the energy is used for lighting in India but in long term as clear from above, cooling energy demand will rise multifold. Hence in short term India's efforts can focus on LED lights and energy efficient fans but in long run viable energy efficient cooling solution are necessary. Hence, it is important to effectively implement and strengthen its efficiency standards through building energy codes.

EU Experience in Implementing its Energy Performance Building Directives (EPBD)

The importance of energy saving was first time realized by Europe and the world after the 1970s oil crisis that resulted into major economic and social upheavals. But the Energy Efficiency became the priority in EU energy policy in recent time only as EU was cautious and reluctant to impose strict regulatory measures taking into account the possible negative impact on the competitiveness of its domestic manufacturing and construction industry as well as the cost burden of expensive Energy Efficiency (EE) solutions of that time. With the time the cost of energy efficient products and technology has come down. Hence EU began imposing obligatory EE regulations with EU Energy Performance Building Directives (EPBD) in 2002.

Because EPBD was a directive issued by the "European Commission" and authorized by the Council of Ministers and the European Parliament. It is mandatory in terms of the set goals to be achieved by all the Member States. But MS are free to devise their own state laws in line with broad framework of the directive. Hence EPBD (2002) set some key requirements to be achieved by all MS with in specified time period-

1. Adoption of an Energy Performance (EP) calculation methodology that complies with EU guideline.

2. Establish Minimum standards for Energy Performance for new buildings and 'major renovations' for existing ones. These standards were to be reviewed after every 5 years.

3. All new structures and/or buildings that are for sale or rental must meet the requirements for "Energy Performance Certification (energy label)". For which energy audit to be conducted independently (EUR-Lex, 2007).

EU EPBD has been further added the target to achieve the 'Nearly Zero Energy Buildings (NZEB)' by the period 2019-2021. Some other reform measures have also been added with new directives like 'cost optimal' methodology (A form of life cycle analysis), mandatory EPC visibility on property sale or rent adverts, independent monitoring and control systems for EPCs. Further efforts are being made in the direction smart buildings including comfort criteria and smart financing.

Though the structural process of implementation of EPBD is similar, but there are many differences in measures taken by respective MS in terms of technical standards, types of software and format of databases, variation in design of EP certificates, kind of skill training, financing mechanisms as well as stringency of laws and punishment for non-compliance. To encourage communication and the sharing of best practices among its member states, the EU Commission established a collaborative forum (Kevin O'Rourke, 2018).

Energy Conservation Building Code (ECBC) in India

The assertion that "*India's building spree will shape its energy use for years to come*" in the India Energy outlook report 2021 shows the importance of construction of energy efficient building stock for India to determine its energy demands in the coming times. As the building space in India is projected to double in coming two decades, where most of the construction would happen in urban areas (IEA, 2021). The government's policy agency Niti Aayog, estimates that energy demand from India's buildings will increase by more than 800 percent in 2047 compared to 2012. Under the current standards, the country will face higher energy costs and skyrocketing consumption for decades. At the same time, air pollution will worsen, adding to the impact of climate change. That's why India needs better building efficiency policies and programs now.

The building sector in India is growing unprecedently accompanied by progressively increasing energy demands. Presently it constitutes for 38% of India's total annual primary energy consumption and 31% of the total annual electricity consumption. (NITI Aayog & Prayas, 2017). Moreover, there are prediction of addition of around 40 % of building stock in coming 30-40 years.

Hence, it becomes the priority to take measures for energy efficiency in Buildings. The Energy Conservation Building Code was launched by Government of India (GOI) to implement EE measures in new commercial buildings on 27th May 2007.For the development of ECBC, an Expert Committee was set up by India's

BEE that was supported and guided by United States Agency for International Development (USAID) and significant inputs were provided by various other stakeholders such as practicing architects, consultants, educational institutions and other government organizations. At present ECBC is a voluntary code which is applicable only to commercial buildings. Minimum energy standards for new commercial buildings are set under ECBC which have a connected load more than 100kW or contract demand of 120 KVA and above. (UNDP)

Since Power distribution and urban development both subjects come under concurrent list. The EC Act 2001 gives powers to the Central Government to develop and update ECBC and the state governments are provided with the flexibility to modify the code with respect to their local or regional needs and notify ECBC in the State Gazette and revise building Byelaws, whereas urban local bodies enforce ECBC and revises building modelling bylaws and approval process. Therefore, enforcement basically lies with the state governments. (AEEE, 2019)

The ECBC prescribes design norms and standards and mandatory requirement for building envelope, lightening and HVAC system (Heating Ventilation and Air Conditioning). The second version of ECBC was updated and released in 2017. This was done to expedite code installation and adequately meet ongoing advancements in energy efficiency. Although code compliance is voluntary, a few states began the process of making it mandatory for commercial building stock covered by the modified EC Act, 2001, by notifying ECBC in their gazettes (AEEE, 2017b). ECBC 2017 provides unique three tiered structure which paves the way towards the future of Near Zero Energy Building (NZEB). A Building's minimum energy savings should be 25% in order to be ECBC compliant. Additional energy efficiency performing new buildings would be graded higher as "ECBC Plus or Super ECBC" status with energy savings of 35% and 50%, respectively. The revised code 2017 sets provisions to integrate renewable energy sources in building designs with the inclusion of passive design strategies like daylight requirements and shading provisions. The code seeks cost effectiveness and the best possible energy reductions while maintaining comfort levels. By 2030, it is predicted that 50% less energy will be used if the code is successfully implemented for the construction of new commercial buildings nationwide. With a projected reduction in peak demand of over 15 GW annually and savings of energy almost 300 billion units by 2030, this would result in cost savings of Rs 35,000 crore and a reduction of 250 million tons of Carbon dioxide (PIB, 2017). Application of building codes

has the potential to reduce electricity consumption by 25%- 30% (Saurabh Diddi, 2017).

EU- India Energy Efficiency Partnership

An India-EU Clean Energy and Climate Partnership was established during the 2016 EU-India Summit. The partnership aims support and strengthen dialogue and cooperation on clean energy, energy efficiency and the implementation of the Paris Agreement. It fosters collaborative projects and research in the area and offers general guidelines for the EU-India energy and climate policy debate. Currently, the partnership's operations center on offshore wind energy, rooftop solar and solar Parks, smart grids, biofuels, energy efficiency in buildings, and the integration of renewable Energy and storage (EEAS,2019).

The goal of the EU's "Clean Energy Cooperation with India (CECI)" initiative is to increase India's ability to implement low-carbon energy generation and boost energy efficiency, which will help to slow down global warming. One of the three CECI implementation is "ACE:E2 (Adoption, Compliance, Enforcement for Energy Efficiency)". It focuses upon improving energy efficiency in building sector. Its main goal is to assist India in adopting, enforcing, and complying with the "Energy Conservation Building Code (ECB)" by disseminating practical knowledge from the EU's experience with industry best practices and enabling its adaptation to the Indian context. Additionally, it encourages European companies to collaborate with their Indian counterparts in the field of energy innovations. In essence, the project offers legal and policy support as well as technical aid for the creation and execution of energy efficiency laws for the building industry.

The EU through the ACE:E2 project mainly supports the four states (Maharashtra, Madhya Pradesh, Odisha and Bihar) in cooperation with India's Bureau of Energy Efficiency to Implement ECBC in commercial buildings. The project's scope has been further expanded to whole India through organizing regional and national workshops, publishing reports to help other states for implementing of ECBC. EU has funded this project with € 1.500.000 and its implementation is carried by "EXERGIA S.A." in collaboration with PwC India.

Energy Conservation Building Code (ECBC) is being implemented with EU collaboration under the project in the four Indian states in following steps -

1. Adoption- Institutional and legal framework is established through discussing and finalizing governance issue, action plan of a particular

state. Under the project the activities related to adoption of ECBC – amendment, notification, rules and integrating bye-laws have been undertaken in the four states after conducting various stakeholders meetings.

2. Compliance- It is also involved in developing a certification mechanism, monitoring and verification framework in these states. The project also developed and conducts training from a 2 hour to full day sessions, awareness programs and ECBC communication strategy involving various stakeholder.

3. Enforcement- Efforts are made to integrate ECBC in the bye laws and further in building approval process by respective PWD and Urban development departments. The project also supports the states in developing a certification mechanism and collection of energy performance database to improve monitoring.

4. Tools- the project is involved in developing various tools like notification user guide and demonstration project in consultation with BEE to ensure compliance. Under the Demo projects, prospective new building and other existing building are identified and their energy efficient design is developed, to be used as template like MEDA in Maharashtra and Intelligent City Operations and Management Centre, Bhubaneshwar (ACE:E2).

Conclusion

Though it has been more than a decade since the ECBC was first launched in 2007 but its effective implementation is still far from the scene. There are several challenges faced in India in this regard-

- Since ECBC is voluntary in nature, few states have notified it in their gazette to start the process of making compliance of code mandatory for commercial buildings under EC Act, 2001. It has to be first adopted by states and then implemented by local bodies after being integrated in bye laws. This process is immensely slow and complicated. More over states are at different stages of implementation of ECBC which is modified according to their local need. Though it is best based on "subsidiary principle", that creates better scope of decentralized planning, implementation and updation with respect to niche feedback.

Nevertheless, it also creates inconsistency and incongruence to measure the implementation of the code. This it becomes difficult to analyse, compare and monitor the implementation process over all. Hence in line with fire safety and other structural criteria, the revised code must also be made necessary by mainstreaming it into building design and construction.

- The implementation of ECBC is not just about the adoption of required legislation rather it requires the deployment of crucial energy efficient technologies and products. It becomes a very costly affair for India already facing financial crunch in the absence of effective transfer of clean technology at affordable prices. In this regard EU's efforts under ACE:E2 in the form of just the dissemination of knowledge rather than active participation and exchanges between various stakeholder and technology cooperation, do not seem sufficient. Therefore, there is need for increased business to business collaboration along with structured clean technology transfer protocols to increase dissemination of energy efficient products at affordable prices.

- There are still certain hurdles like cultural differences, slow administrative processes and lack of stringent IPR enforcement etc.. these issues often discourage European businesses to invest in India's Energy Efficiency market. In 2018, this market in India was estimated at $23 billion (around Rs1.5 trillion) with vast scope to further expand (Bhaskar U.,2018). To increase ease of doing business, the government of India has taken several proactive measures like "Invest India" unified platform. These efforts could further take a boost with signing of long awaited EU- India Free trade agreement (FTA).

- There is lack of awareness and access to information regarding the energy performance measures and standard mechanisms among builders, investors and buyers in India. According to "Natural Resources Defense Council" report, developers are generally unaware that buildings with energy performance certification have greater property values and are leased more quickly. At the same page, buyers don't get to know about advantages including reduced energy expenses, easier maintenance, and better insulation and ventilation based on climate zone. This leads to lack of momentum towards ECBC compliance in absence of popular demand. There is need for collaboration between

EU-India for research on cost and benefit analysis of energy efficiency measures, mobilization of resources and create awareness about the importance of energy efficiency improvements . In this regard, India could take a leaf out of EU's practice of mandatory disclosure of "energy performance certificates" on advertisement of building for sale or rental purpose.

- The efforts under ACE:E2 are still at a nascent stage, which could be further optimized through its collaboration with already active actors and projects in the field like AEEE(Alliance for an Energy Efficient Economy) a non-profit partnership by Indian businesses in Energy Efficiency, Shakti sustainable energy foundation, USAID ECOIII project, UNDP GEF etc. this could minimize any duplicacy of efforts and boost the level of activities with widened opportunities of joint collaborations in cost effective manner.

- There is going to be exponential growth in residential building stock due to rapid urbanization. hence the electricity consumption by residential sector also estimated to leap by more than eight times by 2050. Hence any possible EU-India collaboration under Skill India Program to provide training in Energy Efficient building designs to youth as local masons, Civil engineers and architects could make significant improvement in improving EE in the sector.

India's energy demands are growing exponentially in the backdrop of growing population, rising standard of living, progressing economy and expanding urbanization. In such juncture, it is need of the hour to mandate energy efficiency measures in a cross sectoral manner. It is not about just using energy efficient appliances but requires an overhaul in how we produce, transmit and use energy. It's short term strategy may cater to tackling the current demand like energy efficient lightening. However, for the long term it needs to increasingly invest in research and development as well as market mechanisms to derive the solution for efficient cooling demands. The cooling demands are going to form major chunk of its overall energy demand growth due to its tropical and subtropical climate and rising global temperature effects due to Climate Change. While the government of Inida has devised the "cooling action plan", EU- India partnership would need to deepen to fasten up the ECBC implementation across the country. It is suggested that the partnership should further entail possible

clean technology transfer at affordable prices as well as pave the way for joint production partnership in innovations like smart grids and smart meters. Moreover, the EU's own experience of EPBD implementation itself provide many useful lessons for smooth Building code implementation in India which is estimated to save 20-25% of energy. Hence this paper argues for 'Energy Efficiency first policy' in India with the motto of "Energy Saved is Energy Supplied". Such a policy aims to mainstream energy efficiency measures in to the overall energy policy making in India.

Endnotes

1 (EU- India Joint statement on clean energy and climate change, October 2017, https://www.consilium.europa.eu/media/23517/eu-india-joint-declaration-climate-and- energy.pdf)

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