

# Ways to increase energy efficiency



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The role of energy efficiency (EE) in fostering economic growth and energy security has only come to the forefront in the last two decades. Economic growth has always been linked to increase in per capita energy consumption with little regard to how effectively the energy is utilised. Concerns over global warming and the need to reduce greenhouse gas (GHG) emissions have forced mankind to consider decarbonisation of society through lowering of fossil fuel use. The cornerstones of GHG emission reduction are EE and renewable energy. Whereas renewable energy still remains an expensive proposition for developing countries, EE is a win-win option in most cases. In developing countries where EE is low, projects that increase EE can have a positive return on investment. In most cases EE projects have a payback period of less than five years, and in most cases it is between one and two years if low interest rate financing is available.

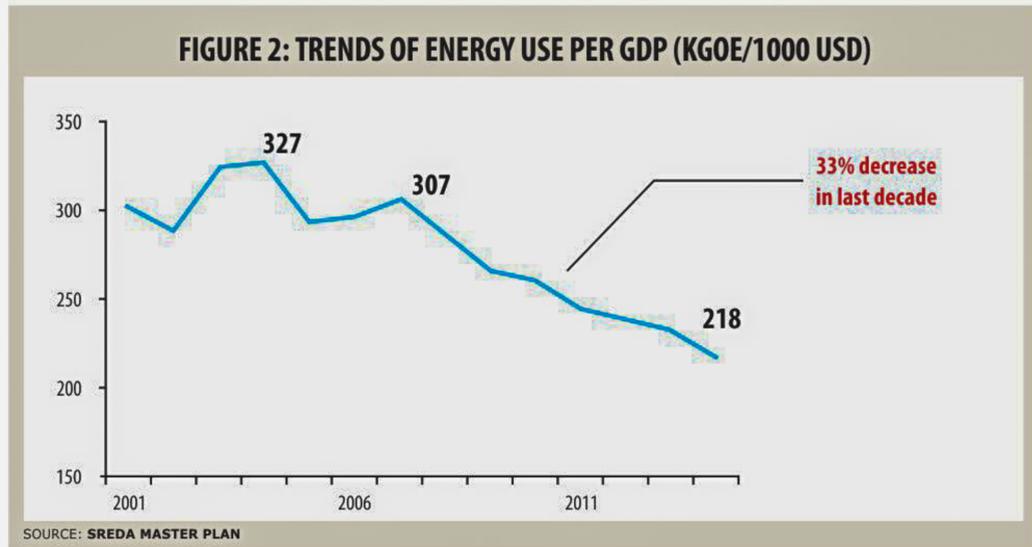
The reasons EE is important for Bangladesh are: (i) domestic natural gas is depleting very fast; (ii) despite having significant deposits of high quality coal, the country is unable to mine it; (iii) industries are prone to using low efficiency inexpensive equipment and devices; (iv) extremely low level of maintenance of industrial equipment; (v) factory upgradation is only undertaken when some sort of failure or shutdown occurs; (vi) the apex agency called Sustainable and Renewable Energy Development Authority (SREDA), set up to oversee EE, is yet to undertake any concrete measures; and (vii) financial institu-

tions are not aware of the investment possibilities in EE projects.

From the long list of barriers to the efficient use of energy, it is clear that Bangladesh is lagging behind in the deployment of energy efficient technologies. The task of supplying energy to fulfill the requirements of 2021 and beyond is enormous. A BUET study points out that over 90 percent of the fuels required to produce electricity in 2030 will have to be imported. If 20-25 percent EE can be achieved across all sectors then the primary energy import requirement for power generation can be brought down to 70-75 percent, thus saving the country billions of dollars. In fact, even meeting the 70 percent import bill may prove to be an onerous task let alone the 90 percent requirement. The monumental task ahead in the event that no significant quantity of

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gas is discovered and our coal is left underground can hardly be overemphasised. To what extent the government is



aware of the enormity of the task is difficult to gauge. What can certainly make the task of primary energy supply more manageable is the efficient use of energy.

A master plan to pursue the goals of SREDA has been formulated through the funding and technical assistance of JICA. The Master Plan ([http://sreda.gov.bd/files/EEC\\_Master\\_Plan\\_SREDA.pdf](http://sreda.gov.bd/files/EEC_Master_Plan_SREDA.pdf)) sets out the following three principal areas of action: (i) standardisation and labelling; (ii) energy audit and energy managers' programme; (iii) building EE programme.

The first programme deals with STAR labelling of energy consuming devices and equipment such as refrigerators, air conditioners, motors, etc. The second programme is about energy audits in energy intensive industries. Through this programme industries will learn how to conserve energy and how to design programmes to improve EE. This programme also requires that all large energy consuming industries must have an energy manager. To begin the programme 110 industrial establishments have been identified in the Master Plan. These industries will also be instructed to improve their Specific Energy Consumption (SEC) and achieve a benchmark set for that industry category. The last programme deals with improving EE of commercial buildings. Since most commercial buildings are air-conditioned these days, the focus is naturally on cooling.

Due to lack of adequate funding and manpower, SREDA is still struggling to get any of the programmes started. Thus the very good Master Plan lies idle. After an initial burst of activity in the standardisation and labelling

programme, where five devices were standardised and provided with STAR rating, the programme has been halted due to lack of funding. The audit and managers' programme is still in the design phase, and no activity has been planned in the building programme. A similar agency in India, known as Bureau of Energy Efficiency (BEE), was set up more than two decades back. BEE has been able to develop the full culture of EE in India.

The most recent study dealing with EE in Bangladesh is the Intended Nationally Determined Contributions (INDC). The INDC, which is a GHG

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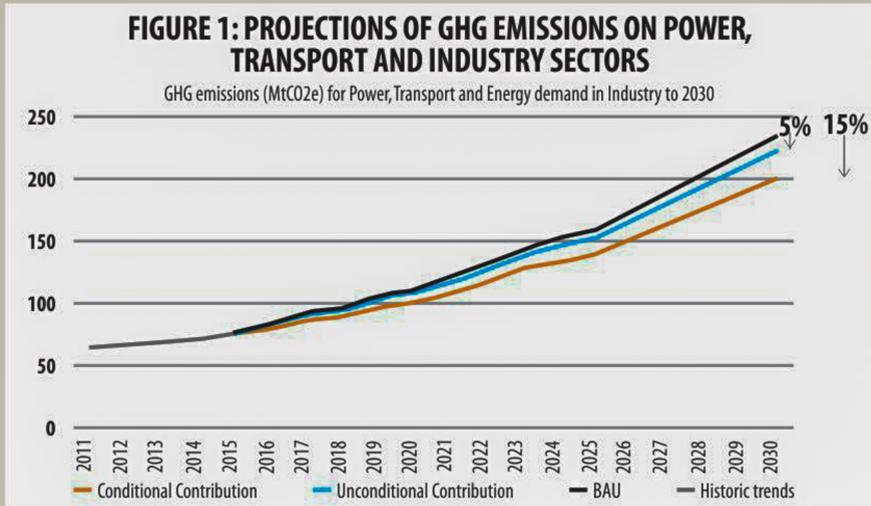
emission reduction study, dealt with only three sectors - power, industry and transport. It found that up to 15 percent reduction (see Figure 1) in the country's total GHG emission or fuels can be achieved if a variety of measures are undertaken in these three key sectors.

In the power sector, INDC considered repowering, clean coal technology and renewables. In the short- to medium-term there are also prospects of upgradation of the transmission and distribution infrastructure. The principal barrier identified in supplying reli-

able electricity is the limitation of the distribution network. Many REB PBSS have seen no investment since these were set up in the eighties. As a result, the technical distribution losses are increasing day by day. In the long run, however, so much new infrastructure would have to be built that the old infrastructure may constitute a small fraction of the total. In that case the EE improvement issue would be trivial, but all that depends on the government actually achieving its 2021 and 2030 goals and targets. If these do not materialise then the old infrastructure would be heavily used. In that case EE improvement of the transmission and distribution infrastructure could play a big role.

In repowering, INDC has advocated replacing the steam turbine power plants by Combined Cycle Gas Turbine (CCGT) power plants. CCGT power plants using the same quantity of gas can give 50-60 percent more electricity compared to the existing steam turbine power plants. In the year 2014-15, the overall efficiency of all power plants in Bangladesh was 33 percent. This is an extremely low value considering the fact that gas is the main fuel for power generation. Even if the oil and coal fired power plants are excluded the efficiency of the gas fired power plants is only slightly above 40 percent. The best performing CCGTs can reach an efficiency of 58 percent, with an average value of 55 percent. For intermediate and peaking loads gas turbines of efficiency around 40 percent are commercially available whereas those in Bangladesh have an average efficiency below 25 percent.

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