ENERGY FROM CROP RESIDUE

In 2018 a study by the Central Electricity Authority of India (CEA) and the Japan Coal Energy Centre (Jcoal), a Japanese institution, said the 440-megawatt plant, shut since 2017, could be refurbished to generate clean power. The plant would burn agro-residues, in addition to coal, and thereby not only emit less but also help avert the thick smog generated by stubble burning in the region. It can thus set an example for reinventing utilisation of older coal power plants, suggested the study by CEA-Jcoal, working to ensure sustainable, low-carbon electricity supply in the country. The Punjab State Power Corporation Limited (PSPCL) agreed to converting one of its 120 MW units into a 60 MW paddy straw-fired unit after its committee estimated that the cost of conversion was lesser than establishing a new biomass plant. It also found that the conversion would decrease the cost of power generation and thus, reduce the burden on consumers.

SO, WHY THE PARADOX? Before analysing this, let’s first understand how co-firing offers a win-win solution for India. Under the technology, a part of the plant’s base fuel, coal, is replaced with biomass and burnt either in the same boiler or in separate units. This results in a sharp decrease in pollution load, particularly in regions where stubble burning is prevalent. Estimates show that 85- 100 mt of agro-residues are burnt across India every year. Punjab, Haryana and Uttar Pradesh contribute 60 per cent of it. Upon burning, 1 tonne of agro-residue releases 1,400 kg of carbon dioxide (CO2 ), 58 kg of carbon monoxide (CO), 11 kg of particulate matter (PM), 4.9 kg of nitrogen oxides (NOx) and 1.2 kg of sulphur dioxide (SO2 ).

First, co-firing helps avoid these emissions by creating a market for stubble. Second, it avoids emissions from the coal that gets replaced. Third, agro-residues emit less when burnt in power plants in controlled conditions and in the presence of pollution control technologies.

Biomass co-firing has played a vital transitional role in the decarbonisation of coal power in Europe, USA and the UK. It has also extended the lives of the old plant fleet. In fact, all major coal plants in UK have adopted biomass co-firing. These countries have mandatory regulations to increase the share of renewables in the electricity sector. A number of Asian countries such as Japan, China and South Korea have also adopted co-firing. While Japan is experimenting to increase the blend ratio by up to 84 per cent, China, the world’s largest agro-residue generator, has drafted extensive policy to manage biomass production and trading. As per the International Energy Agency (IEA), power from biomass will increase by a factor of 10 until 2050, primarily through co-firing, accounting for 7.5 per cent of the global generation.

This is an impossible task for small industries and pellet and briquette manufacturers who do not have the capacity to buy or store biomass in such huge quantities. For the power plants, the cost will keep increasing as blend ratio goes up. A perennial and higher blend ratio will thus require government support in terms of subsidy or other incentives. Though the Ministry of New and Renewable Energy has last year included biomass in the list of renewable energy, it suffers the same fate as any other non-solar renewable energy. State regulators have a target to source a certain amount of electricity from these sources under renewable purchase obligation. But utilities have defaulted on these targets due to lack of enforcement mechanism and non-existent penalties.

At the National Thermal Power Corporation (NTPC), which has been using biomass co-firing in its Dadri plant and plans to extend the practice to 18 other plants before the end of the year, an official says that one way of promoting co-firing is to move the plants up the merit order—a ranking that enables distribution companies to buy from plants that offer electricity at cheaper rate. At present, coal power plants in Punjab and Haryana feature at the bottom of the merit order because they are located away from the coal mines. This makes coal expensive for them and their electricity costly. Since biomass is available in plenty in these regions, the government can help them shift to co-firing on a priority basis and simultaneously push them up the merit order, suggests the official. The government should also fix a price for procurement. This will help stabilise the market faster.

(Source: DTE @down2earthindia.)