

CONVERTING WASTE TO ENERGY

Relevant for: Indian Economy | Topic: Infrastructure: Energy incl. Renewable & Non-renewable

On December 2, Karnataka Chief Minister B.S. Yediyurappa laid the foundation stone for a 11.5 MW waste-to-energy plant near Bidadi. This plant is expected to process 600 tonnes per day of inorganic waste. Bengaluru generates close to 5,000 tonnes of waste daily, of which about 2,500 tonnes is organic, about 1,000 tonnes inert material (sweeping waste) and 1,500 tonnes inorganic. This inorganic material, which consists of bad quality plastics and used cloth pieces, can be processed as Refuse Derived Fuel (RDF). This material has a calorific value of more than 2,500 kJ/kg, and can be used to generate steam energy, which can be converted into electric energy instead of burning coal and other materials used in traditional waste-to-energy plants.

The waste-to-energy plants usually accept the RDF material generated in organic composting plants. They also segregate the wet and inorganic material near the plant, convert organic waste to compost, and inorganic waste to energy. Typically, about 50 tonnes of RDF generate 1 MW of power, which indicates that the plant at Bidadi has been appropriately designed. Eight organic waste processing plants are operational within the city in Kannahalli, Seegehalli, Chikka Nagamangala, Doddabidarakallu, KCDC, MSGP, Lingadeeranahalli and Subbarayanapalya, and they receive more than 2,000 tonnes of waste collected by households, commercial establishments and markets. Although about 30%-40% of the material received is segregated organic waste and the remainder is mixed waste, the latter consists of about 40% inorganic waste which can be converted into RDF.

Handling inorganic waste that is not fit for recycling has always been a challenge. At present, these high-calorific materials are landfilled or left unhandled in waste plants and cause fire accidents. Attempts to send this material to cement kilns have not fructified. The proposed plant can source 600 tonnes per day of this RDF and generate 11.5 MW of power equivalent to 2.4 lakh units of power per day. This will reduce the city's dependency on unscientific landfills, reduce fire accidents, and provide a permanent solution to recover value from inorganic waste. However, there are some challenges.

Over the last decade, several Indian cities have been trying to set up such plants but a good demonstration model is yet to be established. Technology suppliers are international organisations who struggle with the change in quality and nature of waste generated in Indian cities. A few plants in India have stopped operations for this reason. The quality of waste generated in Bengaluru itself could be a hurdle. The plants require fine inorganic material with less than 5% moisture and less than 5% silt and soil contents, whereas the moisture and inert content in the mixed waste generated in the city is more than 15%-20%. Since segregation at source doesn't happen in the city, the collected waste material needs to be sieved using 80mm-100 mm sieving machines, which lets through organic material with more than 80mm-100 mm particle sizes into the inorganic waste. In addition, the sticky silt and soil particles can also reduce the calorific value. The other big challenge for this plant is the power tariff. Generally, the tariff at which the power is purchased by such plants across the country is around 7-8 Kwh which is higher than the 3-4 per Kwh generated through coal and other means. This could be a serious challenge to KPTCL as the selling price of power cannot be increased corresponding to the purchasing price.

If the plant eases the challenge of handling inorganic waste, the efficiency of organic waste processing/ composting plants would become better. If it is successful, the city would require three more waste-to-energy plants of similar size or six plants of smaller size considering the

potential to recover 2,500-3,000 tonnes per day RDF in the coming years.

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