

ENERGY FROM WASTE

Waste to energy (WtE) holds a large potential in India, both in urban and rural areas, yielding useful energy in a number of ways. Municipal solid waste (MSW) based WtE projects in the country were at 96 MW capacity in 2012. MSW is a heterogeneous mix of combustibles, organic matter and moisture. Energy generation through biochemical conversion or combustion, will depend on its levels of segregation and collection efficiency. This is a key focus area of Ministry of Urban Development as well as urban local bodies (ULBs) across the country. Hence, it is assumed under all scenarios that by 2047, both urban and rural areas will have MSW collection efficiency of approximately 100%, and segregation levels of approx 90% and 70 %, respectively. This analysis, captures rising volumes of MSW in power generation through multiple technologies.

Level 1

Level 1 assumes that there will be no capacity additions, and hence MSW based WtE capacity will remain at a level of 96MW. There will be no capacity additions even beyond 2017, primarily due to lack of inter agency coordination and favourable policies. Other key adverse factor will be limited understanding of technical issues involved in construction, operational and environmental aspects of MSW based WtE projects. Not much government impetus is assumed. Once the existing projects have lived their life, there will be no MSW based WtE projects, beyond 2037.

Level 2

Level 2 assumes that the capacity addition happens in line with 12th Plan targets, resulting in 153MW installed capacity by 2017. Most of it will still be based on mixed

MSW. With improving segregation levels and government's focus on WtE, by 2047; 25% of segregated urban organic MSW will yield 0.36 Mtoe of biogas and 20% of segregated rural organic MSW will yield 0.28Mtoe of biogas. Hence, 18% of total 'waste to electricity generation' potential will be realized, resulting in approx 3,500MW installed power generation capacity, 18% of segregated urban combustibles will be used as fuel yielding 0.002Mtoe of thermal energy.

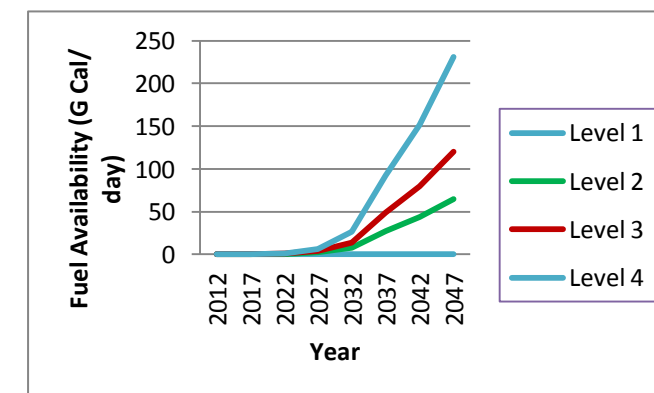
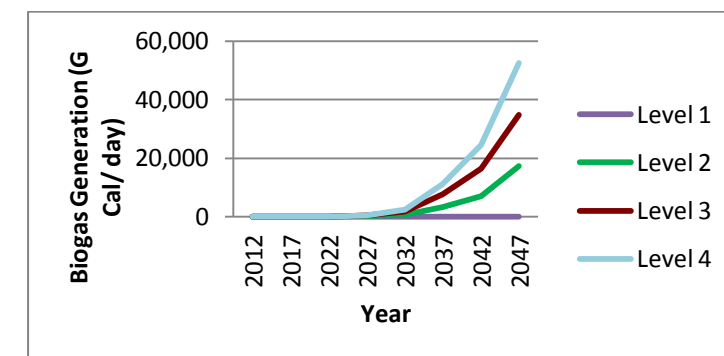
Level 3

Level 3 assumes that government and ULBs emphasize MSW based WtE as a key resource recovery option. The policies and incentives get aligned. Rural areas adopt organic MSW based gas as aided by its lower technology challenge. However in urban areas, evolving technologies like CHP still does not get any traction. By 2047; 50% and 40% of segregated urban and rural organic MSW will yield 0.72 Mtoe and 0.55 Mtoe of biogas, respectively. 30% of total 'waste to electricity generation' potential will be realized resulting in approx 5,850MW installed power generation capacity. 32% of segregated urban combustibles will be used as fuel yielding 0.003Mtoe of thermal energy.

Level 4

In this scenario, there are absolutely no barriers (economic, social or technical) to the growth of MSW based WtE. Inter - agency conflicts are also resolved. Environmental considerations in urban and rural areas drive this technology. Significant increases in fossil fuel prices, especially coal encourage the use of WtE. Fossil fuel externalities are priced. Energy security is consciously factored in energy planning. In this level, by

2047, 75% and 60% of segregated organic MSW in urban and rural areas yields 1.09 Mtoe and 0.83Mtoe of biogas, respectively. 30% of total 'waste to electricity generation' potential will be realized, resulting in approx 5,850MW installed power generation capacity. 63% of segregated urban combustibles will be used as fuel, yielding 0.012Mtoe of thermal energy. 30% of combustible urban waste will be used for CHP applications yielding 0.008 Mtoe of energy.



Note: Please see detailed documentation for references.