

Brief Note on Refuse Derived Fuel (RDF)

Currently, out of total waste disposed in Landfills/ Dumpsites, 17-20% is non-recyclable combustible fraction of waste which can be used as a substitute of coal in various industries and particularly in cement industry. India has 238 Cement plants with cement production capacity of 501 million tonnes and can safely substitute 15% of its coal/ petcoke requirements by combustible portion of waste i.e. RDF. India generates 62 million tonnes of MSW annually, which is expected to increase to 165 million tonnes by 2031.

India has to go a long way in promoting Thermal substitution of fossil fuel by Alternative Fuel & Raw Material (AFR) such as RDF and Bio-mass etc. Against the global average of 19% of replacement by AFR, the European Union have achieved Thermal Substitution rate at about 40% (26% from waste + 14 % by Bio-mass). Countries like Netherlands, Austria and Germany are co-processing RDF in cement plants in the range of 60-70% total coal consumption. However, in India, the average TSR in cement industry is estimated at 4% out of which the share of RDF is less than 1%.

Recently, on World Environment Day on 5th June 2018, cement industry has committed to achieve 25% TSR by 2025, in the presence of Hon'ble Prime Minister, raising confidence for its substantial use in immediate future.

It is found that sound policy framework exists for RDF in form of SWM Rules 2016 exists to utilise 5% RDF available within 100 km of Cement plant, however, this could not effectively take off due to lack of RDF Standards and other mechanism for its rollout. Accordingly, Ministry has come out with guidelines on Usage of RDF in Various Industries. The salient feature of guidelines are as under:

Salient Feature of the Guidelines

- (i) **Standards for RDF in 3 grades** having calorific value varying from 3000-4500 kcal/kg i.e equivalent to coal.
- (ii) **Indicative maximum and minimum rates for sale of RDF by ULBs have also been worked out for guidance as below:**

Unit	SCF	RDF Grade III	RDF Grade II	RDF Grade I	Industrial Coal	Petcoke
Kcal/Kg	1500	3000	3750	4500	3000-4200	7900 – 8300

Minimum Rs./Tonne (assumed @ Rs. 0.4 per 1000 Kcal/kg)	600	1200	1500	1800	4500	9000
Maximum Rs./Tonne (assumed @ Rs. 0.8 per 1000 Kcal/kg)	1200	2400	3000	3600		

- (iii) The guidelines suggest modification in **Clause 18 of SWM Rules 2016**, as reproduced below:

Existing Clause

Clause 18: Duties of the industrial units located within one hundred km from the RDF and Waste to Energy plants based on solid waste

“All industrial units using fuel and located within 100 km from a solid waste-based RDF plant shall make arrangements within six months from the date of notification of these rules to replace at least 5 % of their fuel requirement by RDF so produced.”

Modified Clause for incorporation in SWM Rules, 2016

Clause 18: Duties of the industrial units especially Cement Plants and Waste to Energy Plants for usage of Segregated Combustible Fractions (SCF) and/or RDF as below:

“The cement plants located within 400 km from a solid waste-based RDF plant shall make necessary arrangements to utilise RDF in the following phase wise manner at price fixed by State Government: -

- a) *Replace at least 6% of fuel intake, within one year from the date of amendment of these rules (equivalent calorific value/Thermal Substitution Rate) by Municipal Solid Waste based SCF and/or RDF, subject to the availability of RDF.*
- b) *Replace at least 10% of fuel intake within two years from the date of amendment of these rules (equivalent calorific value/Thermal Substitution Rate) by Municipal Solid Waste based SCF and/or RDF, subject to the availability of RDF.*
- c) *Replace at least 15% of its fuel intake within three years from the date of amendment of these rules (equivalent calorific value/Thermal Substitution Rate) by Municipal Solid Waste based SCF and/or RDF, subject to the availability of RDF.”*

The transport cost for SCF/RDF up to 100 km from the cement plant shall be borne by cement plant, however, beyond 100 km cement plant can transport at its own cost or by ULBs as mutually agreed upon by the parties.”

(iv) Financial Impact

The guidelines also provide insights on calculation to use RDF as fuel in Cement clinkers, within a pay-back period of 4 years.

The additional revenue requirement can be met by increasing per bag cost of Rs. 0.41 for a conventional mechanized hopper system for low RDF inputs (Rs. 550 lacs) and

Rs. 1.85 per bag for advanced automated feeder systems with capital cost of Rs. 2000 Lacs for utilizing higher quantities of RDF.

(v) Rollout Models of Use of RDF

To expeditiously achieve the objectives of Swachh Bharat Mission, the RDF standards need to be supported with operational and financial models. Accordingly, in the report, three implementation models along with model tender document and model agreement between ULB, Cement plant & RDF plant operator have been incorporated: