

## Estimation of marginal costs at existing waste treatment facilities - DTU Orbit (08/11/2017)

### Estimation of marginal costs at existing waste treatment facilities

This investigation aims at providing an improved basis for assessing economic consequences of alternative Solid Waste Management (SWM) strategies for existing waste facilities. A bottom-up methodology was developed to determine marginal costs in existing facilities due to changes in the SWM system, based on the determination of average costs in such waste facilities as function of key facility and waste compositional parameters. The applicability of the method was demonstrated through a case study including two existing Waste-to-Energy (WtE) facilities, one with co-generation of heat and power (CHP) and another with only power generation (Power), affected by diversion strategies of five waste fractions (fibres, plastic, metals, organics and glass), named "target fractions". The study assumed three possible responses to waste diversion in the WtE facilities: (i) biomass was added to maintain a constant thermal load, (ii) Refused-Derived-Fuel (RDF) was included to maintain a constant thermal load, or (iii) no reaction occurred resulting in a reduced waste throughput without full utilization of the facility capacity. Results demonstrated that marginal costs of diversion from WtE were up to eleven times larger than average costs and dependent on the response in the WtE plant. Marginal cost of diversion were between 39 and 287€Mg<sup>-1</sup> target fraction when biomass was added in a CHP (from 34 to 303€Mg<sup>-1</sup> target fraction in the only Power case), between -2 and 300€Mg<sup>-1</sup> target fraction when RDF was added in a CHP (from -2 to 294€Mg<sup>-1</sup> target fraction in the only Power case) and between 40 and 303€Mg<sup>-1</sup> target fraction when no reaction happened in a CHP (from 35 to 296€Mg<sup>-1</sup> target fraction in the only Power case). Although average costs at WtE facilities were highly influenced by energy selling prices, marginal costs were not (provided a response was initiated at the WtE to keep constant the utilized thermal capacity). Failing to systematically address and include costs in existing waste facilities in decision-making may unintendedly lead to higher overall costs at societal level. To avoid misleading conclusions, economic assessment of alternative SWM solutions should not only consider potential costs associated with alternative treatment but also include marginal costs associated with existing facilities.

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