Hydrothermal upgrading of waste plastics: an environmental impact study

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***Supporting Information***

Table S1 – Life cycle inventory for HTU process

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| **Waste plastic treated: 21550 tonnes/annum** | | |
| **Stage** | **Process** | **Data** |
| Feedstock Treatment | Transport by truck to facility | 160 km |
| Shredding (ferrous metal and non-ferrous metals) | 241 tonnes/annum |
| Dry cleaning | 550 tonnes/annum |
| Transportation by truck of dry-cleaned contaminants to landfill | 30 km |
| Electricity consumption | 5800 MWh/annum |
| HTU | Electricity consumption | 16,200 MWh/annum |
| Natural Gas (start-up fuel and pilot lights) | 440 MWh/annum |
| Process Gas to Boilers | 1,600 tonnes/year |
| Potable water consumption | 900 tonnes/annum |
| Demineralised water consumption | 14,000 tonnes/annum |
| Process water consumption | 8,500 tonnes/annum |
|  | Transportation by truck of hazardous waste to landfill | 20 km |
| Transportation of wastewater for disposal | 20 km |
| Atmospheric Emissions from HTU | NO and NO2 expressed as NO2 | 5506 kg/annum |
| SO2 | 965 kg/annum |
| NH3 | 284 kg/annum |
| CO | 2764 kg/annum |
| Waterborne Emissions from HTU | Suspended Solids | 350 kg/annum |
| TOC | 450 kg/annum |
| Cr | 0.4 kg/annum |
| Cu | 0.7 kg/annum |

Table S2 – LCA results for HTU process

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| **Impact Categories (unit)** | **Hydrothermal upgrading** |
| Climate Change (kg CO2 eq.) | 478 |
| Terrestrial Acidification (kg SO2 eq.) | 0.773 |
| Freshwater Eutrophication (kg P eq.) | 5.02 x 10-3 |
| Ozone Depletion (kg CFC-11 eq.) | 2.06 x 10-11 |
| Fossil Depletion (kg oil eq.) | 122 |
| Freshwater Ecotoxicity (kg 1,4-DB eq.) | 0.0927 |
| Human Toxicity (kg 1,4-DB eq.) | 22.2 |
| Ionising Radiation (kg U235 eq.) | 77.1 |
| Marine Ecotoxicity (kg 1,4-DB eq.) | 0.0956 |
| Marine Eutrophication (kg N eq.) | 0.0652 |
| Metal Depletion (kg Fe eq.) | 4.3 |
| Natural Land Transformation (m2) | 2.21 x 10-3 |
| Particulate Matter Formation (kg PM10 eq.) | 0.251 |
| Photochemical Oxidant Formation (kg NMVOC eq.) | 0.775 |
| Terrestrial Ecotoxicity (kg 1,4-DB eq.) | 0.0143 |
| Water Depletion (m3) | 90.6 |
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