Integrated Recycling System

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One of the most oil-consuming activities in the globe is plastics industry that drains 685 gallons of oil per ton of plastic produced. Moreover, landfilling – the most common waste management method – has delivered the largest amount of human-caused methane, a gas that is 84x more potent than carbon dioxide in the short term and responsible for 25% of the current manmade global warming. The proposed solution is a new plastic recycling facility that utilizes landfill gas to generate electricity to power a plastic recycling process. This process starts with sorting plastic waste using infrared spectroscopy. The sorted plastics are then inserted into a microwave assisted reaction with a susceptor to reform plastics, consuming the lowest amount of energy possible with the highest product quality. The reformed plastic is then used to manufacture new ready-to-use plastics. These plastics are to be used as fabric in textiles production or as a concrete aggregate in construction industry. The prototype design requirements were set to be accuracy, quality, affordability and optimization. Testing the prototype, superficial results were shown in terms of meeting the specifications. All in all, the system succeeded in establishing a new basis for waste management methods, reducing the carbon footprint of this sector.