

Integrated Waste Treatments at the Remondis Lippe plant

By Joe Ackerman



1 My reaction directly after touring the Remondis Lippe plant.

Imagine a place that receives many waste streams: smelting slag, infected dead animals from farms, waste plastic to recycle, wooden pallets, smokestack scrubbing sludge, wastewater that was too rich to put in the sewer, glitchy EV car batteries: nasty things that you would pay someone to get rid of for you. Now imagine that this one central place gathers 14 different waste streams and processes each of them to extract some aspect that can be converted to a useable resource. Imagine that these waste streams are integrated so that each one provides some necessary component for another process: the combustible part of one stream is used to produce electricity but also produces steam and air pressure to be used in other processes; the metal oxide waste is converted to colourant, or to flocculant needed in wastewater treatment, and the animal fat becomes biodiesel that can be used in the delivery fleet. In Canada, such scenarios are the stuff of “thought experiments” and passed off as imagination fit for some rosy wonderland. But in Germany, at the Remondis Lippe plant, this stuff is reality, and not only reality, it makes money.

The Remondis Lippe plant in north-central Germany is a dream come true for a recycler bent on zero waste. On an adapted aluminum smelting plant, many different industries have been incorporated into an integrated industrial facility. To begin with, there is the fire department. Sixty staff with 6 vehicles are a permanent fixture here to inspect incoming loads (700 semi-trailers arrive daily), check safety compliance and ensure fire prevention on the site. They want to lower insurance costs and avoid the recycler yard fires that are still common in the industry.



2 Various aspects of waste treatment ongoing at the Remondis Lippe facility. Image courtesy of Remondis website.

The plant receives many kinds of industrial wastes, for example:

- Smokestack scrubbing precipitate (sulfur from coal is acid rain forming and is removed with limestone, producing calcium sulfate). This is purified by calcination and exact water removal, producing mortar products (e.g. plaster of Paris) and drywall.
- By law, dead farm animals must be incinerated, so this facility receives animals, renders the fat into biodiesel and the meat biomass is dried and used as fuel to make electricity. Biodiesel production also accepts used cooking oil and is the major CO₂ diversion of the whole operation (152k of the overall 490k tonnes).
- Scrap wood is received and sorted into 3 grades: particle board feedstock, fuel pellets for sale and on-site power generation fuel. The biomass furnace also accepts medical wastes and offsite sewage sludge.
- A large scale compost system sorts incoming organics into an energy producing stream (via anaerobic digestion and methane production for the power station) before the residue is mixed with low energy material in compost tunnels. Several grades of finished material are produced for sale, each with varying texture and nutrient levels.
- In addition, waste streams such as steel smelting slag, aluminum oxide, electronic, appliance and plastic recycling material are all processed on site.

The site is energy self-sufficient with surplus power feeding into the national grid. Power demand is managed by a 12MW bank of re-used electric vehicle batteries that don't meet EV standards but are still fine for reserve power storage. There is also a chemistry lab on site that conducts water, biodiesel, gypsum product and other quality sensitive tests that are required.

For an envious Canadian viewing this amazing facility, I wonder how all this is possible and how can we start doing it back home. The answer undoubtedly is that here in Germany, the facility came together piece by piece, as each component was profitable and the engineers could see how

to best integrate the processes. Financial viability depends on the other avenues of waste disposal being too expensive (e.g., Waste to Energy incineration is over 200 euros/tonne and landfill is even more). These prices are likely supported by regulations such as high standards for effluent scrubbing, restrictions to off-shore disposal, and the upcoming closing of all landfills nationwide. Canada is a long way off in each of these areas, but the rewards of increased regulation on waste disposal are clearly evident at the Remondis plant.

Website: <https://www.remondis-lippe-plant.com/en/an-overview-of-the-site/>

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