

## COVANTA ESSEX WASTE TO ENERGY FACILITY

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**Participants:** Viviana Avalos, Ministry of Energy of Chile.

### **Description**

The Essex County Resource Recovery Facility, is New Jersey's largest WTE facility. It is located in Newark, New Jersey.

Operating as Covanta Essex Company, the Newark facility serves the refuse disposal needs of 22 municipalities in Essex County and the surrounding region, also from New York City. 50% of waste comes from Essex County and 50% from NYC.

The facility opened in 1990, and was sponsored by Essex County.

The facility combusts 2,800 tons per day of municipal solid waste (MSW) and generates approximately 65 megawatts of electricity. The plant also recovers ferrous (steel) and non-ferrous (aluminum, brass, copper, etc.) materials for recycling.

- Commercial operation: 1990
- Waste processing capacity: has a permitted processing capacity of 2,800 tons of solid waste per day, or approximately 1 million tons per year.
- Energy-from-Waste System: Three 930 tons per-day furnaces, Duesseldorf (DBA) Roller Grate System and ash handling system.
- Energy Generation: Two General Electric 35 megawatt units.
- Air Pollution Control Equipment: Acid gas scrubbers injecting lime, fabric filter baghouses, selective non-catalytic reduction systems for nitrogen oxide control and continuous emissions monitoring system<sup>1</sup>.

### **Notes**

- The plant is owned by Covanta, but the land is owned by Essex County.
- The facility takes mostly MSW, but also commercial solid waste. They can't take construction and demolition waste.
- Covanta holds waste contracts with the waste collection companies (waste hollers). There is a strict "Flow Control", wich determines were a certain municipality's waste can be disponded off.
- The Gate Fee is about US \$80 per ton (price is confidential).
- They have important social opposition from surrounding neighbours who wants them gone. The facility was installed 30 years ago, when there where no neighbors around, and they now want all industry gone.
- We discussed about the "Lock in effect". Trish mentioned that in the US this effect does not happen, as there is no WTE overcapacity and still most MSW goes to landfill. However, there is a need for WTE plants to be located close from where waste is generated, and not in rural areas that don't produce a lot of waste. Covanta Warren facility had to close in 2019. At its peak, [Covanta](#)

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<sup>1</sup> <https://www.covanta.com/Our-Facilities/Covanta-Essex>

Warren Energy Resource Co. LLC employed 39 and could process 550 tons of municipal solid waste a day, generating up to 13.5 megawatts of energy.

- The facility has a recent problem, from burning waste that contains iodine. It produces a bright purple smoke out of the stack. It is an increasing problem for the facility, having had 20 episodes this year. They get complaints and stronger public opposition. 3 to 4 plants in the US have this problem. They are doing research to understand the reactions that is causing this purple smoke, it has to do when there is no more SO<sub>x</sub> in the combustion chamber.
- There is increasing inspection of hospital waste, to find radioactive waste. When this happens, the whole truck is rejected.
- There is continuous air monitoring of SO<sub>2</sub>, NO<sub>x</sub> and opacity. Dioxines, PM<sub>10</sub>, PM<sub>2,5</sub> and mercury, are tested once a year, under full capacity and normal operating conditions, with measurement repeated 3 times to get an average. One of the main public concern, is that not all emissions are monitored continuously. This is because the technology of measuring this emissions isn't fully developed, not even in Europe.
- Between 2012 and 2014, Covanta replaced the electrostatic precipitators for baghouses. The investment cost for this retrofit was US \$100 million.
- Boilers are shut down for 10 days every year for maintenance. They send it to Covanta's metal recycling plant, called Fairless Hills, in Pensilvania.
- The ash from combustion is processed to extract metal for recycling.
- Covanta has a regional processing facility in Fairless Hills, Pensilvania. The facility sorts metal material by type and cleans the metal, which gives them a higher-value and more saleable end product in all market conditions<sup>2</sup>.
- Fly ash is mixed with the bottom ash, so that it complies with regulation and it can be sent to landfill as a daily cover. They have to sample the ash every hour.
- Currently, ash reuse is a focus for Covanta.
- Auxiliary fuels: Each boiler has auxiliary burners that use low sulphur diesel. This is used for the first ignition, so that the boiler reaches its optimal temperature for good combustion. Otherwise, air emissions rise during start up. The same happens for turning the boiles down.
- Right outside the facility there was no smell, or visible emissions from the stack.
- We also discussed about the importance of qualified and experienced personnel, as the good environmental performance highly depends on the operation and maintenance of the plant.
- All the energy that the facility produces is considered renewable energy by the Department of Energy, and it is accounted towards achieving the Federal Government renewable energy goals.

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<sup>2</sup> <https://www.covanta.com/Sustainability/Energy-from-Waste/Metals-Recycling>

## Photos of the Facility

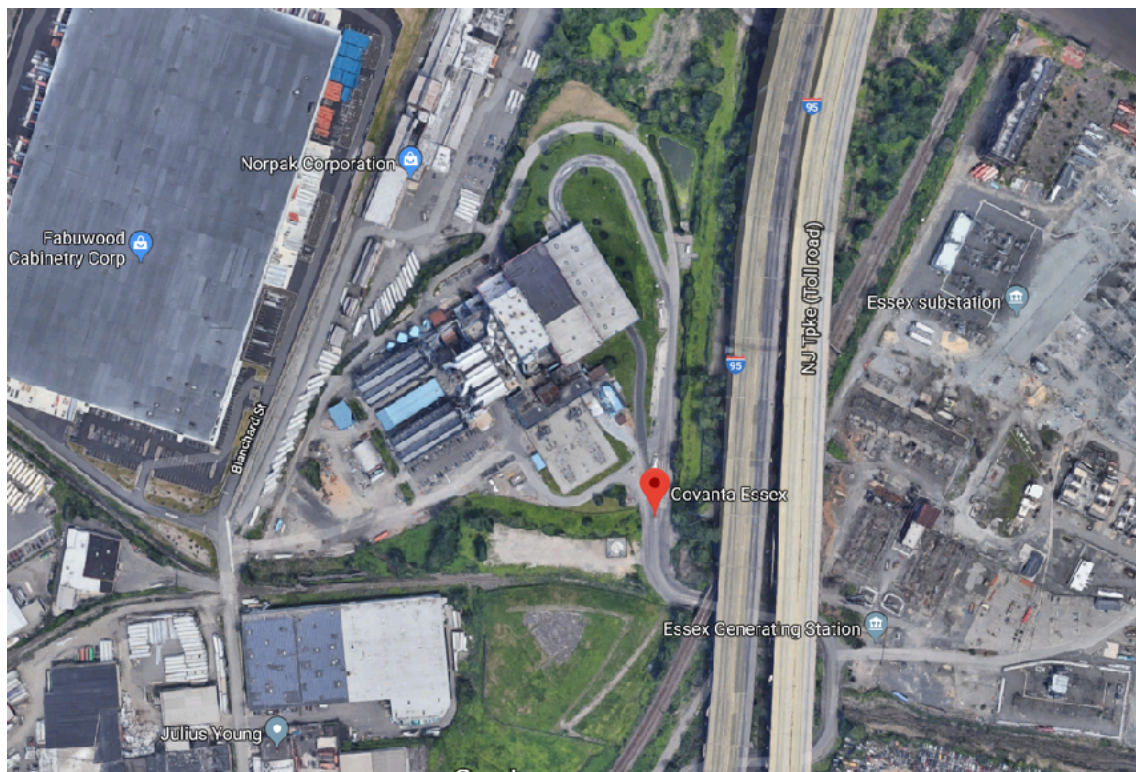


Figure 1: Location of Covanta Essex WTE, NJ.



Figure 2: View of the Facility from the outside. It is located in Newark, in an industrial area.



Figure 3: Municipal waste is delivered to the facility and stored in a bunker. It's closed for delivery on Sundays, where they use up the waste stock. In addition to Municipal Waste, Covanta is allowed to receive commercial and industrial waste, but receives mostly MSW.

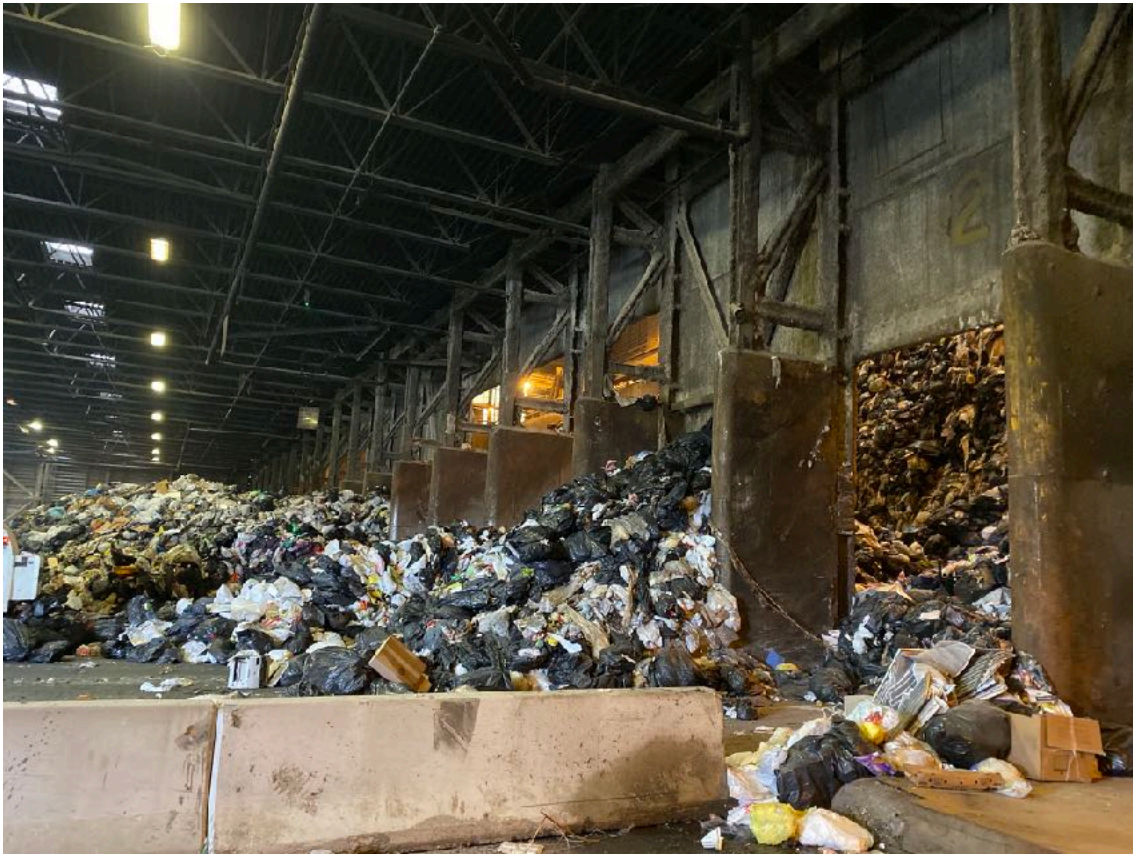


Figure 4: Bays for waste reception (16 bays in total)

The building around the tipping and bunker area are under negative pressure and use this air in the combustion process to control odor. The air inside the bunker is sucked by the boilers for the combustion process. Whenever a boiler is down, they have to manage the inside pressure of the bunker to maintain negative pressure conditions.



Figure 5: Crane operator, who is responsible for managing waste inside the waste bunker and feeding the boilers.

The bunker has 90 feet (27 mts) of height. The operator has to use waste that is stored in the bottom of the bunker, so that it doesn't decompose. Waste stays in the bunker between 3 to 5 days. Whenever there are bulky items such as refrigerators, the operator has to pick them up with the crane and leave them on the side.

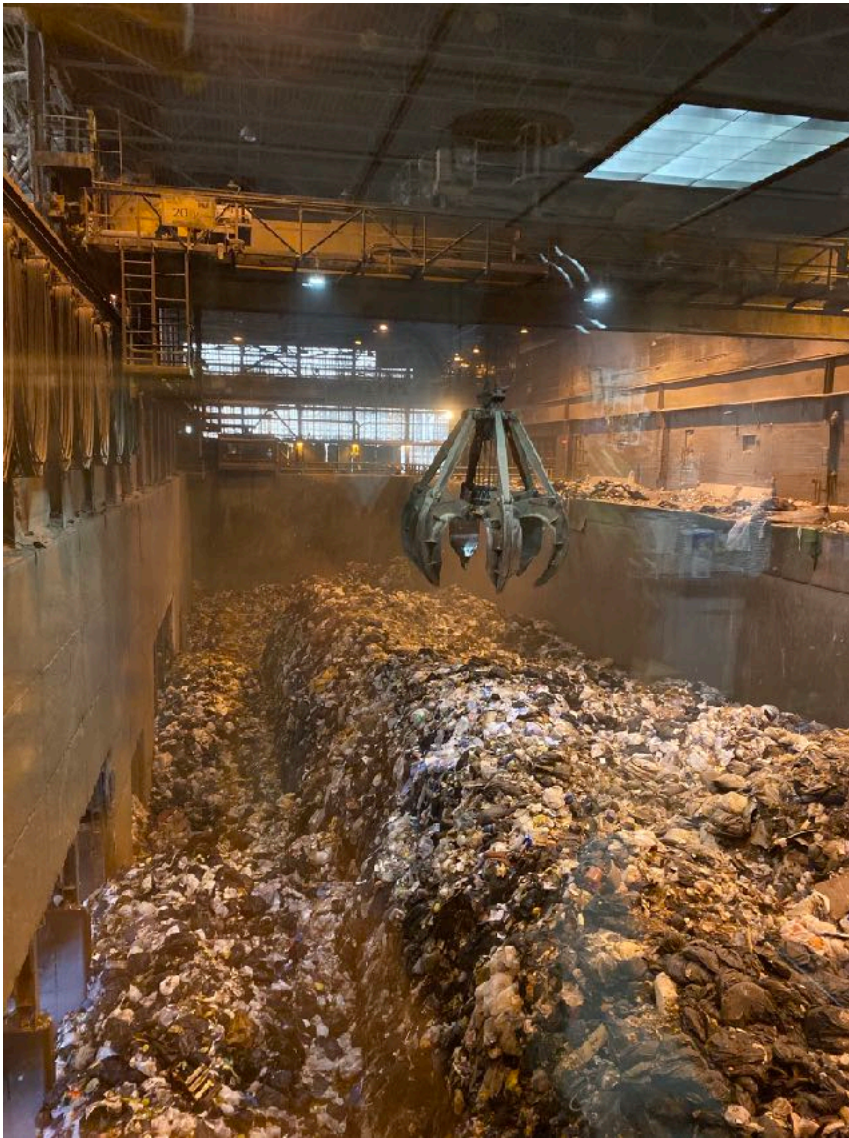


Figure 6: Waste bunker and the cranes.

There are two cranes, but only one was operating, the other crane was on maintenance. Waste is transferred to a combustion chamber where self-sustaining combustion is maintained at extremely high temperatures.



Figure 7: Bottom of the Roller Grate System.





Figure 8: Energy generation, two General Electric 35 megawatt units.<sup>9</sup>

