Welcome

Welcome to the Durham York Energy Centre, an energy-from-waste facility that provides the Regions of Durham and York with sustainable waste management. The DYEC processes 140,000 tonnes of garbage per year that remains after maximizing waste diversion programs, including reducing, reusing, recycling and composting. Rather than burying garbage in landfills, we process garbage to create enough energy to power 10,000 homes - and recycle metal enough to build 2,500 cars every year! Using proven technology with state-of-the-art pollution control systems, the facility reduces the volume of material landfilled by 90 per cent, reduces greenhouse gas emissions and complies with the most stringent environmental standards in the world.

Before we get started, let me explain the many ways in which you can explore our state-of-the-art-facility:

- You can click on the front facing arrow to start walking
- You can also jump to the Next Stop by clicking on the Next Stop button
- If you already know where you want to go, you can select any location by using the list on the left
- Lastly, remember that you can explore any particular location in more detail by clicking on the 360, Photos, or Video icons.

Scale House

It all starts at your home. Garbage is collected at the curb, inspected at a transfer station and then sent to the energy-from-waste facility where the first stop is the scale house. Here, transport trucks containing garbage are weighed into and out of the facility. This allows us to record the amount delivered. Approximately 20 trucks deliver up to 600 tonnes of waste per day - five days per week. Each scale is equipped with detectors to ensure that no radioactive material is delivered. Another eight trucks per day deliver supplies and haul away ash and recyclable metals. They are also weighed to ensure we know exactly how much material leaves the facility.

Tipping Floor

Here inside the tipping hall, this is where garbage becomes our fuel! Transport trucks unload their contents - up to 35 tonnes of waste at a time - either directly into a giant storage pit or onto the floor for inspection. An operator using a large front end loader manages waste deliveries and pushes the garbage, now our fuel, into a large concrete storage pit. All the air in the tipping hall is drawn through large fans and used in the combustion process. This ensures the tipping hall remains under negative air pressure to contain any dust and odours generated during the delivery process.
Waste Bunker and Grapple

You're looking at the waste storage pit where we store and manage up to 3,000 tonnes of garbage at a time. The giant pit extends approximately 8 meters deep into the ground. An operator using a grapple attached to an overhead crane mixes and "fluffs" waste to make it as homogenous as possible - this helps ensure even, consistent combustion. Once the waste is properly mixed, the operator loads waste into hoppers which lead to the combustion chamber. Up to 18 tonnes of waste is fed into the hoppers every hour.

Combustion Chamber and Boiler

Now this is where the operation heats up. Waste is fed onto a feed-table where hydraulic rams push it onto a stoker grate to be burned at extremely high temperatures—in excess of 1000°Celsius. The system—in this case a Martin Reverse Reciprocating Grate—stokes and agitates the waste, ensuring continuous combustion. The process is closely controlled using a number of automated and manual controls that maintain complete combustion. Heat and gases released from the process travel through the boiler transforming water inside steel tubes into high pressure steam. To control nitrogen oxides, combustion is staged using a Very Low NOx system and ammonia is introduced using a selective non-catalytic reduction system.

Turbine

After the steam is superheated, it travels through pipes to a steam turbine generator to produce electricity. The high pressure steam rotates the turbine blades and releases energy. The steam turbine is coupled to an electrical generator that produces electricity.

Electricity Generation

Welcome to the switchyard, where electricity from the generator is fed directly into the local electrical grid. The switchyard uses large transformers to convert the generated voltage up to extremely high voltages for long-distance transmission on the grid. Overall, the facility generates up to 17.5 megawatts of renewable base load energy. A small portion of the energy is used in-house to power the operation of the facility. The rest is delivered to the community—enough to power over 10,000 homes!

Air Cooled Condenser

Exhaust steam from the turbine is condensed into water using an air cooled condenser. The air cooled condenser uses ambient air supplied by large axial fans to cool the steam. The condensed water is returned back to the boiler and reused in the process. The air cooled condenser saves substantial quantities of water compared to wet cooling systems and reduces the facility's impact on the environment. The Durham York Energy Centre is a 'zero waste water discharge' facility, meaning that all process water is reused internally. Only the facility's restrooms connect to the sewer system.

Air Pollution Control

The DYEC is equipped with state-of-the-art emissions control and monitoring systems. First, an automated combustion control system, overseen by well-trained operators with standardized procedures, ensures continuous and safe operations. Next, a selective non-catalytic reduction system and a Very Low NOx combustion system control nitrogen oxides in the combustion chamber. Flue
gas is then treated in a dry recirculation scrubber system—which controls acid gases, dioxins and furans, and heavy metals by injecting hydrated lime and activated carbon. A baghouse that employs thousands of filter bags captures any particulate matter that remains. This advanced technology reduces emissions to levels that are fully protective of human health and the environment. Continuous emission monitoring systems operate 24 hours a day to ensure compliance with emissions standards that are equal to or more stringent than any in North America or the European Union.

**Residual Materials & Metals Recycling**

After combustion, metal and a non-hazardous ash residue remain. The residue is about 10 per cent of the original volume of the garbage delivered to the facility. Ash and metal is conveyed to a building where large pieces of metal are first removed. The remaining material is then conveyed to a large rotating drum magnet where ferrous metals - magnetic iron-based metals - are separated and collected. Next, an eddy current separator works to propel and collect non-ferrous metals - like aluminum and copper. Remaining ash is collected, encapsulated in cement and safely landfilled - or in the future, may be beneficially reused. Nearly 3,000 tonnes of metal per year is recovered and recycled - enough to build approximately 2,500 cars!

**Control Room - Monitoring, Controls and Oversight**

Welcome to the control room where we monitor and control operations of the facility 24 hours a day, seven days a week. It also serves as the communications hub for the entire operation. Using innovative technology and software, highly trained, provincially licensed operators monitor and control the entire process. Emissions are closely monitored through a real-time continuous emissions monitoring system, and operators control and adjust the combustion process, steam flow, and air pollution control equipment, along with many other process parameters associated with the numerous automated systems throughout the facility. The operators working with all of these controls ensure the safe, efficient, and reliable performance of the facility.