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## Converting carbon-based waste with thermolysis

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**Statement of the Problem:** Our current methods of dealing with carbon-based waste virtually all have one undesirable side-effect, contribution to climate change. Whether the material is being decomposed through landfill or composting or incinerated as the city of Edmonton is doing, 100% of the greenhouse gasses in the waste material is being released into the atmosphere. Only through Thermolysis can we prevent a portion of those greenhouse gasses from escaping and contributing to Global Climate Change. The thermolysis process puts the waste into a high-temperature environment without the presence of oxygen, such that combustion and incineration cannot occur. The high heat acts to break the material at the molecular level and separate the material into three components: oil, syngas, and biochar. Each of these materials has a value, and particularly with the biochar, a substantial value. Biochar has over 53 uses currently and is particularly well known for its agricultural applications. However, for the overall sake of the environment, the most significant characteristic of biochar is that it holds in greenhouse gasses. Approximately 30% of the greenhouse gasses in a carbon-based waste stream will remain with the biochar and stay sequestered for literally thousands of years. Biochar's next most significant characteristic is that of water retention. Watering requirements for agricultural applications can be reduced by up to 1/3rd and where it has been applied to golf courses the savings in water amount to a million \$ per year and more. The thermolysis process itself does not create pollution, and more than that, it removes micropollutants from the waste material. For example, over 95% of pharmaceuticals are removed by the process and all pathogens in sewage sludge are removed. This technology can and should replace landfills and composting facilities across Canada.

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