Summary of Environmental Benefits of EFW Facilities

Through application of advanced technologies, solid waste can now be considered a resource to create energy and other materials. Doing so allows conservation of natural resources that would otherwise be used. As populations increase, the amount of residual waste requiring disposal is expected to increase proportionately, limited only by the impact of up-stream "reduce" and "recycle" actions to lessen the amount of waste destined for landfills. Failure to capitalize on using waste as a resource can negatively impact the environment through:

- increased consumption of natural resources, such as fossil fuels;
- increased emissions of pollutants including greenhouse gases (GHGs); and
- increased permanent loss of land used for landfills.

Allowing resources to go to landfill as waste increases GHG emissions associated with landfill operations and emissions of landfill gas produced by the decomposing waste. Methane, a powerful GHG with more than 30 times the 100 year global warming potential of carbon dioxide, is a major component of landfill gas.

Many tonnes of natural resources must be used to replace each tonne of material that is disposed of in a landfill. Extraction and refining of natural resources are responsible for the majority of the energy inputs and pollution emissions (including GHGs) associated with consumer products.

The objectives of Energy from Waste (EFW) facilities are diversion of waste from landfill to minimize the impact on the environment, and use of wastes as a resource for energy production and the recovery of recyclable materials.

The environmental benefits of an EFW facility are:

- reduction in volume of waste sent to landfill;
- reduction in fossil fuel consumption for on-site landfill equipment operations;
- recovery of ferrous and non-ferrous metals from waste (resource recovery);
- reduction in use of natural resources;
- reduction in land used for landfills;
- reduction in waste-related GHG emissions;
- generation of electricity for use on-site and/or for sale to the grid;
- potential generation of steam energy for sale to nearby consumers;
- potential creation of marketable materials from EFW residues; and,
- return of the land to a useful purpose at the end of the EFW's facility's life-span.

Resource recovery also has socio-economic benefits. Studies have shown that recycling can create up to seven times more employment than landfilling.

Various EFW technologies were evaluated based on feasibility for use in the SAEWA system. These included refuse derived fuel with combustion; mass burn combustion; gasification; and plasma arc gasification. An evaluation was completed for each of the technologies to compare the potential environmental impacts from each technology option against those from landfill disposal for the same quantity of waste. Based on the evaluation, when compared to landfill disposal, use of a 300,000 tonne/year mass burn EFW facility in the SAEWA waste system results in the following estimated environmental benefits:

- a reduction of approximately 218,000 L/yr in on-site equipment fuel usage (a 62% reduction);
- a reduction of approximately 120,000 tonnes/yr of waste to landfill (a 60% reduction);
- an increase of approximately 5,400 tonnes/yr of ferrous and non-ferrous metals recovery from waste;
- an increase of approximately 205 MWh/yr of electrical energy generated; and,
- an average reduction of approximately 236,000 tonnes CO_2E/yr of GHG emissions (a 95% reduction), which equates to 7,098,166 tonnes of CO_2E reductions achieved over an assumed 30 year life-span of the EFW facility.