

**SWANA TECHNICAL POLICY  
“CONVERSION TECHNOLOGIES”  
AS PART OF  
INTEGRATED SOLID WASTE MANAGEMENT**

**Policy**

SWANA supports the development of “Conversion Technologies” as an element of an integrated solid waste management system. “Conversion Technology” (CT) is a general term to represent a waste management technology that processes municipal solid waste, or portions of the waste stream, into fuels, chemical products, energy sources, organic soil conditioners or other useful products. The technology may utilize thermal, chemical, mechanical or biological methods to process the municipal solid waste. For the purposes of this policy, SWANA has not included traditional waste to energy technologies, such as mass-burn and refuse derived fuel or organics processing technologies, such as conventional windrow or in-vessel composting, or anaerobic digestion in the definition of CTs because those technologies are considered in other technical policies.

CTs offer the potential of managing a portion of the waste stream for recovery of marketable materials or energy, however it is important to carefully evaluate the technology to determine if it will be able to successfully complement the local integrated solid waste management system.

Many of these technologies, while demonstrated to operate on select portions of the waste stream have not, for the most part, been successfully operated on a commercial scale on traditional municipal solid waste feedstock, for an extended period of time in North America. The lack of operating experience on a traditional solid waste feedstock creates an inherent risk to communities who are developing waste processing and disposal capabilities for their entire waste stream. Risks can include the following:

- that the regulatory agencies may not be familiar with the technology, leading to a lengthy permitting and approval process;
- that the technology may not process waste on a long- term and consistent basis;
- that the technology may not be able to process mixed municipal waste;
- that the environmental performance of the technology may not meet required standards;
- that the product(s) produced by the technology may not be marketable;
- that the technology may not be able to operate on the basis of the economic pro forma provided and
- that the company promoting the technology and/or operating the facility may not remain solvent and committed to the technology.

These risks and others may be present to varying degrees and may be able to be managed with appropriate planning.

It should be noted that SWANA supports various methods of waste prevention, reuse, recycling, processing, energy recovery and disposal as part of an integrated waste management system. SWANA has developed technical policies to provide assistance to our members in making decisions regarding the components of their systems. These include the following Technical Policies:

- Policy T 2- Solid Waste Reduction;
- Policy T 6- Recycling as Part of Integrated Solid Waste Management;
- Policy T 7-Composting as Part of Integrated Solid Waste Management;
- Policy T 8- Waste to Energy as part of Integrated Solid Waste Management;
- Policy T 9-Landfilling as Part of Integrated Solid Waste Management.

The use of a CT should be consistent with the USEPA Waste Management Hierarchy (<http://www.epa.gov/wastes/nonhaz/municipal/hierarchy.htm>), or similar requirements in other countries, and with the state/provincial and local government's integrated solid waste management plan including existing and planned waste prevention, reduction and recycling programs. CT facilities should be operated by a manager with certification by the American Society of Mechanical Engineering (ASME), or a similar accredited organization in other countries. Permitting of CT facilities, as with other waste management facilities, should be consistent with the established and long term capacity needs of local government and their integrated solid waste management plans. CT projects require significant upfront capital, and the economic feasibility of these projects should be reviewed by financial specialists. The full costs for the siting, design, construction and operation should be included in the costs assigned to a facility within an integrated solid waste management system, including residue management and disposal of waste that cannot be processed by the CT. Expected revenues from sales of electricity, steam/heat, fuels or other products, as well as potential revenues related to renewable energy credits and carbon credits should be considered as part of the full cost accounting. The selection of a CT, similar to other waste management options, should be consistent with best practices regarding engineering, economics, environmental and public health issues. The use of CTs should be based on the assurance that during siting, design, construction and operation, the facility will comply with all federal, state/provincial and local government rules, regulations and permits.

During the past five years there has been a significant increase, (particularly in Europe and Asia), in the number and type of technologies that have been proposed and/or constructed for management of a portion of the waste stream. Communities considering CTs as part of their integrated solid waste management system should pay particular attention to the commercial viability of the technology, and look for companies/technologies with a successful track record. A primary question should be, "Has this technology demonstrated the ability to consistently (without interruption, during a prescribed period of time, under the specific performance requirements of the community) operate on a waste feedstock (quality and quantity) consistent with the adopted solid waste management plan of the community and in an environmentally sound manner?"

### **Position/Recommendations**

The following are considered to be best practices in the planning, siting, design and operation of CT facilities as a part of an integrated solid waste management system:

1. Planning for CT facilities should consider the following factors:
  - evaluation of need for the technology based on current and projected waste volumes and characteristics,
  - evaluation of compatibility with recycling, composting, waste-to-energy and source reduction efforts in the community's integrated solid waste plan,
  - evaluation of the risk posture of the community,
  - evaluation of the potential delivery process and business model (Design/Build, Design Build Operate, Design Build Own Operate, other methods)

The use of experienced consultants and attorneys for development of dependable feasibility, procurement and contract documents is recommended. Consideration of CTs should include the following evaluations and verifications prior to commitment to a technology: (a check list could also be provided):

- a. Independent engineering evaluation of comprehensive Mass and Energy balance.
- b. Site visit to operating facility(s) to verify viability of the technology.
- c. Verification of operations, availability and capacity, on mixed municipal waste feed stock and/or on residuals remaining after other recycling, reuse and recovery activities (i.e. post diversion MSW residuals ) for an extended, continuous period of time.
- d. Identification of pre-processing and other feedstock requirements.
- e. Verification of environmental performance.
- f. Determination of scale-up requirements and restrictions. Verification of the quality and quantity of facility products (electrical production, fuel, recyclables etc.) and byproducts (residue)
- g. Comments from local users, neighbors and regulators on the viability and compatibility of any reference facility-(ies).

2. Sites for CT facilities should be selected based on the following principles:

- consistency with local land use conditions and zoning codes,
- consideration of projected waste availability and energy demand for the immediate surrounding area to minimize transportation and transmission costs,
- siting in proximity to existing infrastructure such as roads, rail access, utilities, transmission lines, steam loops/customers, collection/transfer systems, material processing and recovery facilities, and residue reuse or disposal sites, and;
- consideration of, and adherence to environmental justice principles.

3. Facilities should be designed by registered professional engineers and other licensed professionals with clearly demonstrated knowledge in CT facility design, and shall be designed in accordance with the following principles:

- designed for long term operation at high availability levels,
- designed for environmental excellence in operations, including: use of energy efficient equipment, minimizing use of chemicals and water, maximizing reuse of resources within operations and zero discharge of wastewater,
- designed in a manner to maximize recovery of energy and other useable products
- designed with a means for the measurement of incoming solid waste and out-shipped residue, energy products and bi-products,
- designed with a means for the screening of incoming solid waste,
- designed to include or be a part of a system that includes household hazardous waste and electronic waste recovery programs when appropriate,
- designed to control run-on and run-off to minimize or prevent surface water contamination,
- designed with a means to minimize generation of and control emissions of green house gases and other air quality contaminants, to ensure compliance with applicable regulations,
- designed to incorporate continuous emissions monitoring systems,
- designed to support the beneficial use of residue,
- designed for maximum recovery of reusable materials from residue,
- designed to allow for the safe transport and disposal of unusable residue in permitted disposal areas, and;

- designed to allow observation of the facility and facilitate education of the public on the facility process.
4. Construction of CT facilities shall be conducted by licensed contractors familiar with industrial level energy generating or manufacturing facilities with appropriate construction management, monitoring and certification oversight.
  5. CT facilities should be properly commissioned and tested to ensure achievement of performance guarantees.
  6. Operation of CT facilities shall aspire to the following principles:
    - operated under the management of a provincial/state certified manager/operator in those provinces/states where certification is required,
    - operated by a manager with certification by ASME (or a similar organization in other countries) in the appropriate category of management and operation,
    - operated using an asset management program, as well as preventive and predictive maintenance programs performed to minimize outages and down time,
    - operated using real-time operational and emissions data to enable operation at the appropriate standards,
    - operated by providing training of all on-site personnel appropriate to their assigned area of responsibility,
    - operated with high standard safety programs (such as OSHA) focused on worker health and safety as well as the safety of customers and contractors at the facility,
    - operated with a provision for controlled access to the facility and use by only authorized users.

Several communities have developed a “Check List” of questions that are required to be answered before the waste professionals will entertain additional discussion of the proposed technology. A sample “Check List” can be provided upon request.

Approved by the International Board on April 14, 2014.

A handwritten signature in black ink that reads "Richard Allen". The signature is written in a cursive, flowing style.

Richard Allen, International Secretary

Dated April 15, 2014

Editorial changes approved by the Policy Committee on  
May 5, 2014