T-8
SWANA TECHNICAL POLICY

Conversion Technologies, Resource Recovery, and Energy Recovery as Part of Integrated Solid Waste Management

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I. Background

SWANA supports **integrated solid waste management systems** that prioritize waste reduction and recycling while recognizing the essential role of **resource recovery**, including materials recovery, landfill gas recovery, energy recovery, conversion technologies (CTs), and waste to energy (WTE), consistent with international, federal, state, provincial, and local governmental plans, goals, and/or mandates.

No single approach can manage all waste effectively; therefore, communities and their higher-level government authorities must evaluate and apply multiple complementary solutions where they are environmentally responsible and economically viable.

State-of-the-art recovery and energy technologies, when properly planned, sited, designed, constructed, and operated, can reduce volumes of waste, conserving landfill capacity, maximize recovery of materials, generate energy and steam, reduce greenhouse gas emissions, and provide long-term public benefits. SWANA supports conducting a full analysis and due diligence before selecting any specific waste management method for use and implementation, as applicable.

II. Definitions

Please reference T-0 Definitions for full definitions. For the purposes of this policy:

- **Resource Recovery** includes the recovery of materials, energy, fuels, and landfill gas and biogas from any waste source.
- **Waste to Energy (WTE)** refers to technologies that combust waste to recover energy in the form of electricity, steam, or heated water.
- **Conversion Technologies (CTs)** are technologies that process waste, or a portion of the waste stream, into fuels, chemical products, energy, or other useful products using thermal, chemical, mechanical, or biological processes, excluding traditional mass burn WTE, refuse derived fuel, conventional composting, and anaerobic digestion.

- **Integrated Solid Waste Management (ISWM)** refers to a coordinated system that includes waste reduction, reuse, recycling, composting, recovery technologies, and disposal. It is further defined in T-0 and T-1 as: environmentally and economically sound, systematic approach to Solid Waste handling that combines Source Reduction, Reuse, Recycling, Composting, Energy Recovery, collection, transfer, transport and disposal in Sanitary Landfills, Solid Waste Combustors or other Solid Waste Disposal and processing facilities in order to conserve and recover resources and dispose of Solid Waste in a manner that protects human health and the environment.

III. Policy Position

SWANA supports resource recovery, conversion technologies, and waste to energy as integral components of an integrated solid waste management system, provided they:

- Are consistent with a waste hierarchy (refer to SWANA T-3), or comparable frameworks in other countries;
- Complement and do not undermine waste reduction, reuse, recycling, and composting/anaerobic digestion programs;
- Are supported by sound engineering, environmental performance, economic viability, and public health protections; and
- Are implemented in compliance with all applicable federal, state/provincial, and local laws and regulations.

SWANA supports engaging in a process for analysis and due diligence before selecting or implementing any specific waste management method for use and implementation, which may include the following aspects, as applicable and feasible:

- Understanding the technical feasibility of proven recovery and energy technologies;
- Economic incentives;
- Full cost accounting that includes avoided disposal, environmental benefits, and long-term system costs;
- Training and certification programs that promote professional, ethical, environmentally sound, and competent facility management.

Approved by the SWANA Board of Directors on April 19, 2026

IV. General Policy Principles

1. **Consistency with Planning**
   Resource recovery, WTE, and CT facilities shall be consistent with federal, state/provincial, and local integrated solid waste management plans, including long-term capacity needs.

2. **Risk Awareness**
   Communities must recognize that some emerging technologies have limited commercial operating histories on processing waste, and should evaluate technical, regulatory, financial, and market risks accordingly.

3. **Economic Evaluation**
   Projects require significant capital investment and should be reviewed by qualified financial specialists using life-cycle cost analysis, including:

   - Siting, design, construction, and operation;
   - Residue management and disposal;
   - Costs of financing, design, operations, and maintenance; and
   - Reasonable projections of revenues (energy, fuels, materials, renewable energy credits, and carbon credits).

4. **Environmental Performance**
   Facilities must meet or exceed applicable environmental standards and incorporate best available control technologies.

V. Best Practices

SWANA supports the following of industry best practices as listed in Appendix A, related to facility planning, siting, design, construction, commissioning, and operation. This list is not intended to be all-inclusive, but to serve as high-level guidance of the steps and components to undertake, as possible and feasible.

VI. Conclusion

SWANA recognizes that sustainable solid waste management requires a comprehensive, balanced approach. Resource recovery, waste to energy, and conversion technologies—when applied thoughtfully and responsibly—can play a vital role in reducing landfill dependence, recovering valuable materials and energy, and advancing environmental and economic goals. Communities are encouraged to evaluate all appropriate options and implement those best suited to their needs within an integrated solid waste management framework.

APPENDIX A: BEST PRACTICES

1. Planning

Planning for resource recovery, WTE, and CT facilities should include:

- Waste analysis, and evaluation of current and projected waste volumes and characteristics.
- A Life-cycle analyses[i] of environmental and public health issues.
- Comparison of direct and indirect costs and values.
- Compatibility with source reduction, recycling, and composting programs.
- Assessment of community risk tolerance.
- Public education, outreach, and feedback on the proposed approach and its impacts, with a balanced approach that presents that various options or alternatives were considered.
- Economic feasibility analyses of each option before investing capital in facility development or entering into an operations or service contract . Use full cost accounting, including avoided costs and tipping fees paid for disposal of non-processible waste and residue.
- Assessment of product markets and long-term revenue stability.
- Technical and commercial feasibility analyses of each type of conversion or combustion system under consideration, including waste compatibility, feedstock specifications, and pre-processing requirements.
- Evaluation of environmental and regulatory requirements.
- Independent engineering review, including mass and energy balance.
- Use of experienced, certified/licensed consultants and legal counsel for feasibility, procurement, and contracts.
- Consideration of proven operating history on representative waste streams.

2. Siting

Facilities should be sited based on:

- Consistency with land use plans and zoning
- Proximity to waste supply and energy or product markets
- Access to existing infrastructure (roads, rail, utilities, transmission, steam users)
- Minimization of transportation/traffic impacts
- Consideration of environmental justice, equity, and community engagement

3. Design

Facilities shall be designed following these best practices:

- Be designed by experienced, registered engineers and licensed professionals
- Be engineered for long-term, high availability operation
- Maximize material and energy recovery
- Incorporate energy efficient systems and minimize water and chemical use
- Achieve zero or minimal wastewater discharge where feasible
- Include systems for waste screening and measurement
- Control stormwater run-on and runoff
- Minimize and control air emissions, including greenhouse gases
- Incorporate continuous emissions monitoring systems where appropriate
- Support beneficial use of residues and maximum material recovery
- Provide for safe transport and proper or appropriate disposal of non-recoverable residues
- Allow for public observation and education, when feasible, based on safety and operational considerations

4. Construction

Construction shall be performed by licensed contractors experienced in industrial and energy facilities and include:

- Professional construction management
- Quality control, inspection, and certification oversight

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5. Commissioning

Facilities shall be properly commissioned and tested to verify:

- Compliance with design and permit conditions
- Achievement of performance guarantees
- Reliability and environmental performance

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6. Operation

Facilities should be operated to high professional standards and:

- Be managed by certified and trained operators, in compliance with regulatory requirements
- Implement Asset Management; predictive maintenance programs (e.g. ISO 9001 and ISO 14000 in their most recent issue)
- Employ real time operational and emissions monitoring, in compliance with regulatory requirements
- Provide continuous training for personnel
- Maintain strong worker and public safety programs
- Control access to authorized users only
- Implement effective waste inspection programs to prevent prohibited materials
- Manage residues consistent with permits and design intent
- Continue to investigate latest technologies to protect public health and the environment, and adopt those technologies if feasible for the facility

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