

Edmonton Organics Processing Facility

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Background

Edmonton Waste Management Centre

- . No separate organics collection – 100% participation
- . Approximately 250,000 tonnes per year Municipal Solid Waste processed to remove organics
- . Approximately 120,000 tonnes per year organic fraction of MSW and 15,000 tonnes per year biosolids processed in Co-composter

Site Overview



Considerations

- . Peak organics during summer overwhelms co-composter, 40% is grass clippings
- . Only current product is low value
- . Solution needs to be integrated with co-composter
- . Energy use getting more expensive
- . Limited Institutional-Commercial-Industrial options for organic waste
- . Marginal site for expansion

Anaerobic Digestion Design Basis

- . Design capacity of 40,000 tonnes per year, based on peak loading and providing opportunity for ICI SSO materials
- . Biogas to be used for electrical generation in Combined Heat and Power generators
- . Operate CHPs in “island mode”, no connection to power grid
- . CHPs to be able to blend in natural gas
- . Ability to accept current compost feed material
- . Ability to produce compost product suitable for cure site
- . Easy to operate system, with minimal maintenance required

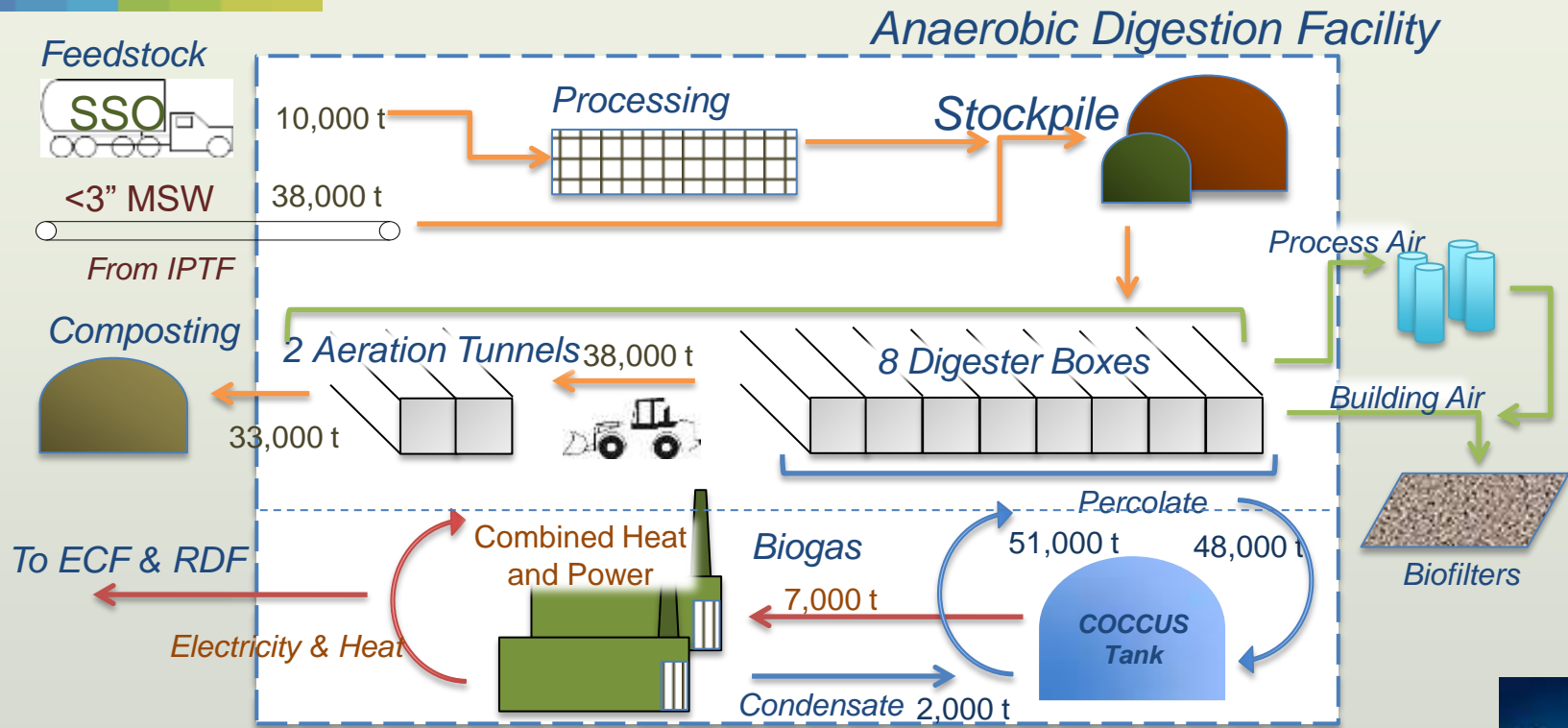
Anaerobic Digestion - Advantages

- . Opportunity to recover energy value of organics before composting
- . Electricity generation through combined heat and power generators (CHP) best option for site, but other options
- . Heat required for another process use
- . Process requirements fit with site
- . Grant availability
- . Opportunity to engage Institutional – Commercial – Industrial clients

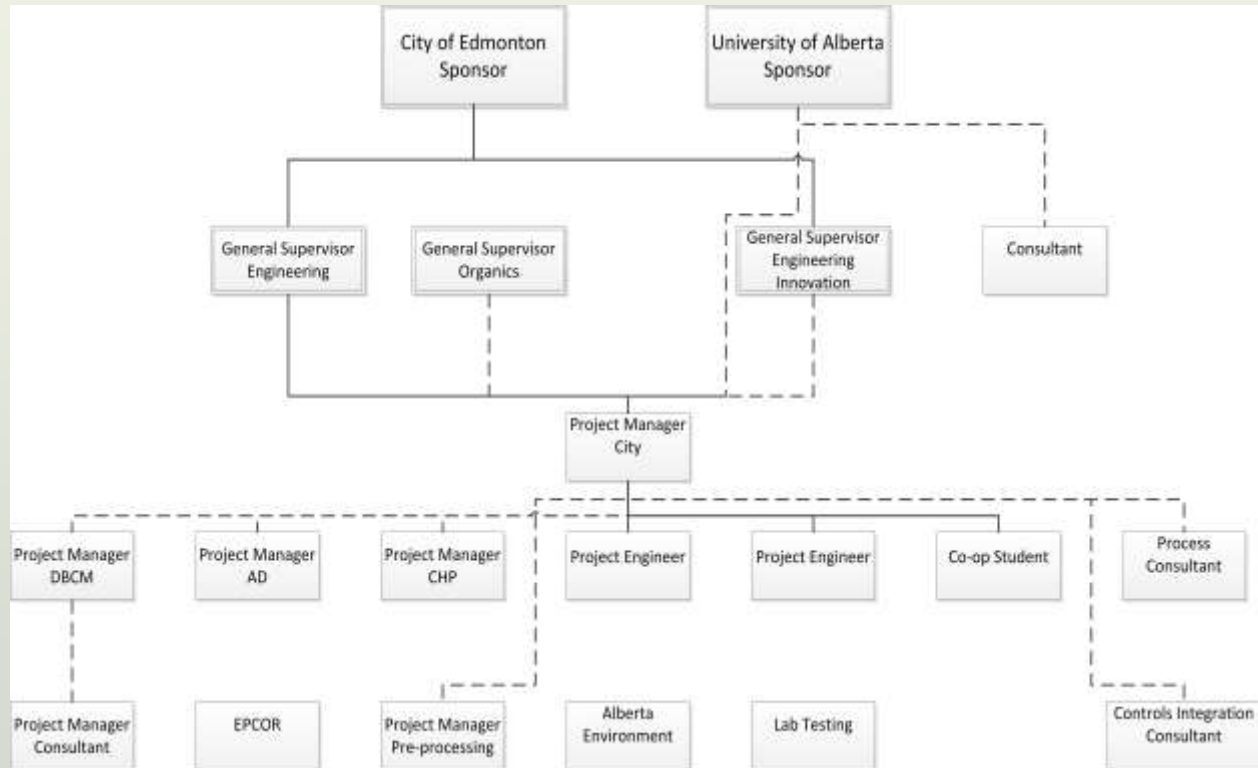
Anaerobic Digestion - Disadvantages

- . New process requires permitting
- . Vendors are mostly European-based
- . Not much design and construction expertise locally
- . Typical municipal procurement not practical
- . Requires multiple supply, design, construction, and commissioning contracts
- . Requires project team expertise

Integration into Co-Composting



Project Team



Project Delivery - Concept

- . Design and procurement hinge on biogas production and quality
- . Requires testing of biogas production from waste
- . Biogas production affects CHP size, flare size, etc.
- . Biogas quality affects CHP engines, pre-treatment requirements, and emissions
- . Some vendors can offer biogas production testing
- . It is good to have a third party capable of doing testing

Project Delivery - Permitting

- . Environmental guidelines for anaerobic digesters don't exist in many jurisdictions
- . Discussion of project with permitting organizations required
- . Emissions, noise, and odours are primary concerns
- . Many fire provisions are related to wastewater treatment digesters
- . Building permit variances will likely be required

Project Delivery - Procurement

- . Originally developed a “turn-key” RFP requiring Vendors to partner with local design and construction firms in November 2013
- . All bids came in substantially over budget
- . Re-tendered equipment portions separately in October 2014
- . After securing equipment contracts, tendered for Design-Build Construction Management in June 2015
- . Equipment suppliers responsible for commissioning
- . Performance holdbacks part of equipment contracts

Project Delivery - Design

- . City taking responsibility for design integration
- . Third party process design consultant
- . Each Vendor has their own design standards
- . Coordination meetings between Vendors' technical staff and DBCM Consultant
- . 30%, 60%, and 90% design reviews
- . Hazardous Operation (HAZOP) safety review

Project Delivery - Construction

- . Excavation completed in April 2016
- . Piling to begin in May 2016
- . Concrete to begin in July 2016
- . CHPs to be installed June 2017
- . Building erection to begin in March 2017
- . Mechanical completion in November 2017
- . Commissioning and start-up by end of 2017

Current Status

- . Operating approval received from AEP
- . Detailed design is near 90% completion
- . Excavation is completed, piling to start in May
- . Foundation permit received, building permit in progress
- . Plan to install and commission CHPs early on natural gas
- . Project is on schedule for late 2017 start-up

Thank you.

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