



Edmonton Waste-to-Biofuels Project

Outline

- Overview of the Edmonton Waste Management Centre (EWMC)
- Edmonton's Journey to Biofuels Production
- The Edmonton Waste to Biofuels Project
 - The Partnership (COE, EAB & AIEES)
 - The 3 Components
 - Integrated Processing and Transfer Facility (IPTF)
 - Waste to Biofuels Facility
 - Advanced Energy Research Facility (AERF)

**Waste
RE-solutions**
Edmonton



Edmonton Waste-to-Biofuels Project

- 550 acres
 - Twelve waste processing facilities
 - Two major research facilities
 - Closed Landfill
 - Sewage biosolids storage/recycling lagoons
- Nine contractors, partners, tenants
- Over 400 employed today and
- 500 by end of 2014



Edmonton Waste-to-Biofuels Project

Community Relations / Events

- School Grade 4 Tours / engaging the community
- Presentations to over 13,000 Students & 3,000 adults per year
- EWMC Visitors





Edmonton Waste-to-Biofuels Project



Materials Recovery Facility (MRF) for recyclables



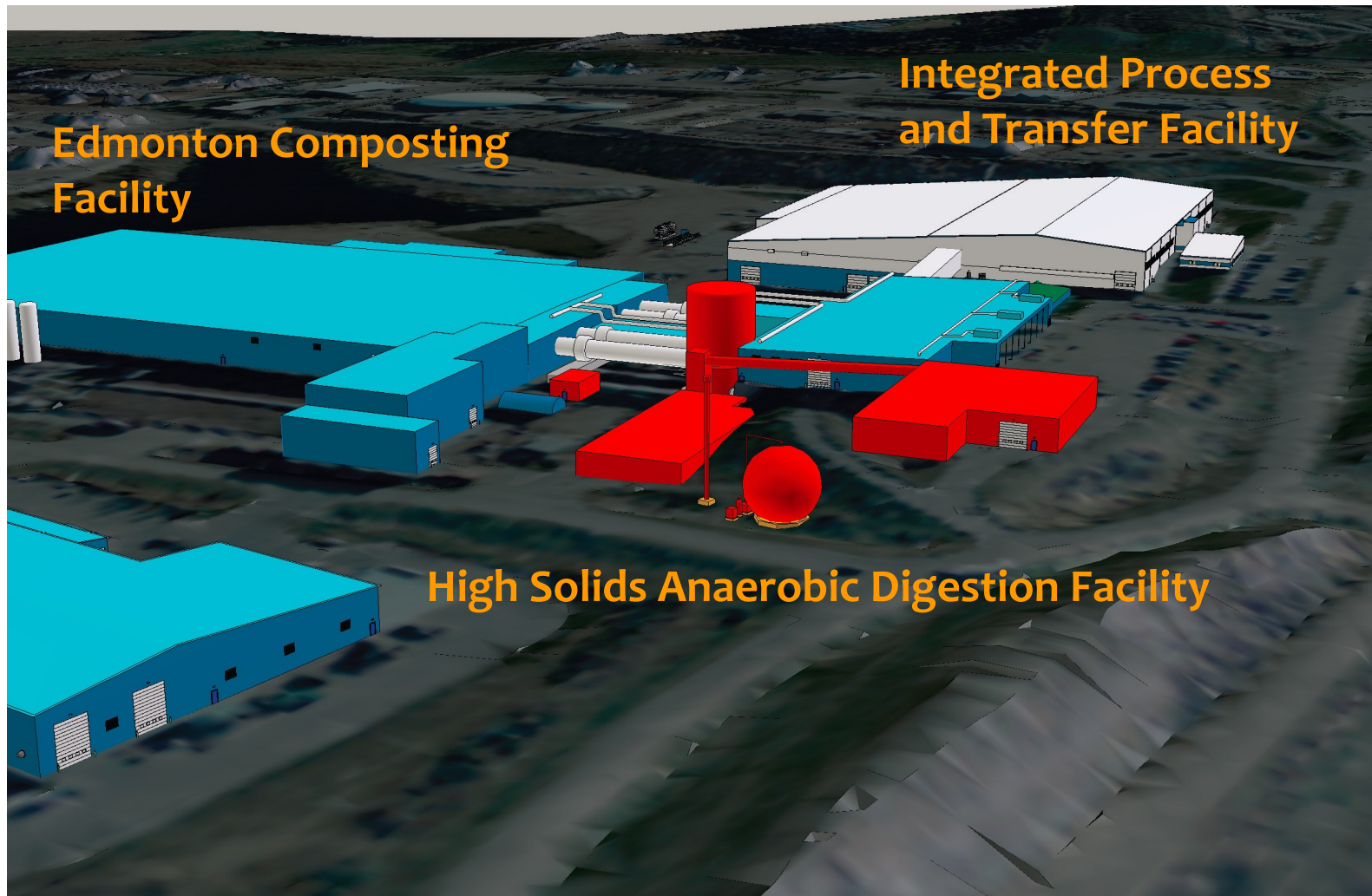
Edmonton Waste-to-Biofuels Project



Co-Composting Facility (for MSW & Biosolids)



Edmonton Waste-to-Biofuels Project





Edmonton Waste-to-Biofuels Project

Historical - Search for a Solution

- The City knew the landfill would be closing and that it would have to be hauling waste offsite (at higher costs!)
- City did establish recycling and composting programs, so it had maximized the 3-Rs - currently diverting 60% of the residential waste
- Specific targets included:
 - Increase Edmonton's landfill diversion rate for residential waste from 60% to 90%
 - Reduce Edmonton's need for landfilling, without going to traditional combustion systems



Edmonton Waste-to-Biofuels Project

The Journey to Biofuels Production

- Starting Premise - There is a better solution than landfill
- Review of global conversion technologies (2003)
- Enerkem was chosen:
 - Flexible and innovative technology platform (low temp fluidized bed)
 - Demonstrated ability to produce clean syngas from waste feedstocks
 - Ready for commercialization
- Research / Pilot Project – confirmed initial key performance parameters (2004-2006); Grant from AERI (1st Pelletization of RDF and then 2nd RDF fluff feeding system re-design)
- Grant Support (Alberta Innovates) (2006)

Project Officially Announced



Edmonton Waste-to-Biofuels Project

The Journey Continues...

- 2007/08 - Contractual Agreements & Environmental Permitting
- 2009 - Regulatory Approval
- August 2010 – Start of Construction
- 2014 – Mechanical Completion & Commissioning



Edmonton Waste-to-Biofuels Project

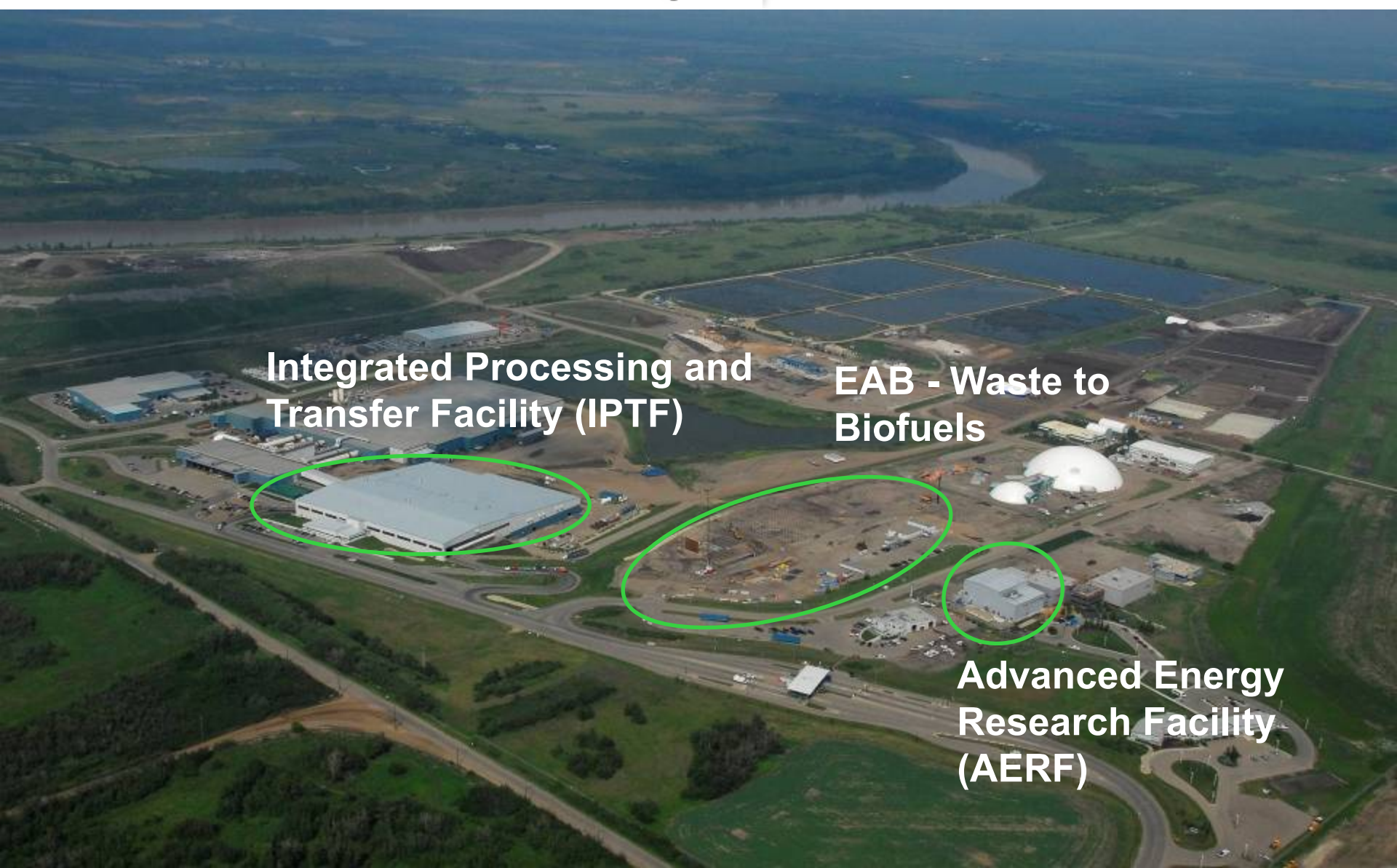
Overview of the New Project – Three Components, Three Partners

Facility	Primary Operator	Role	Cost
Integrated Processing and Transfer Facility (IPTF)	City owns and operates	Produces RDF (Feedstock)	\$90 M
Waste-to-Biofuels Production Facility	Enerkem owns and operates	Produces 38M litres of biofuels/year from provided feedstock	Approximately \$105 M (construction)
Advanced Energy Research Facility (AERF)	City owns. City & AIEES will direct activities	- Ongoing R&D activities - Higher value products - Process optimization	\$12.5 M

AIEES = Alberta Innovates Energy and Environment Solutions



Edmonton Waste-to-Biofuels Project



**Integrated Processing and
Transfer Facility (IPTF)**

**EAB - Waste to
Biofuels**

**Advanced Energy
Research Facility
(AERF)**



Edmonton Waste-to-Biofuels Project

INTEGRATED PROCESS AND TRANSFER FACILITY (IPTF)

Designed to optimize and enhance waste processing through mechanical and manual sorting:

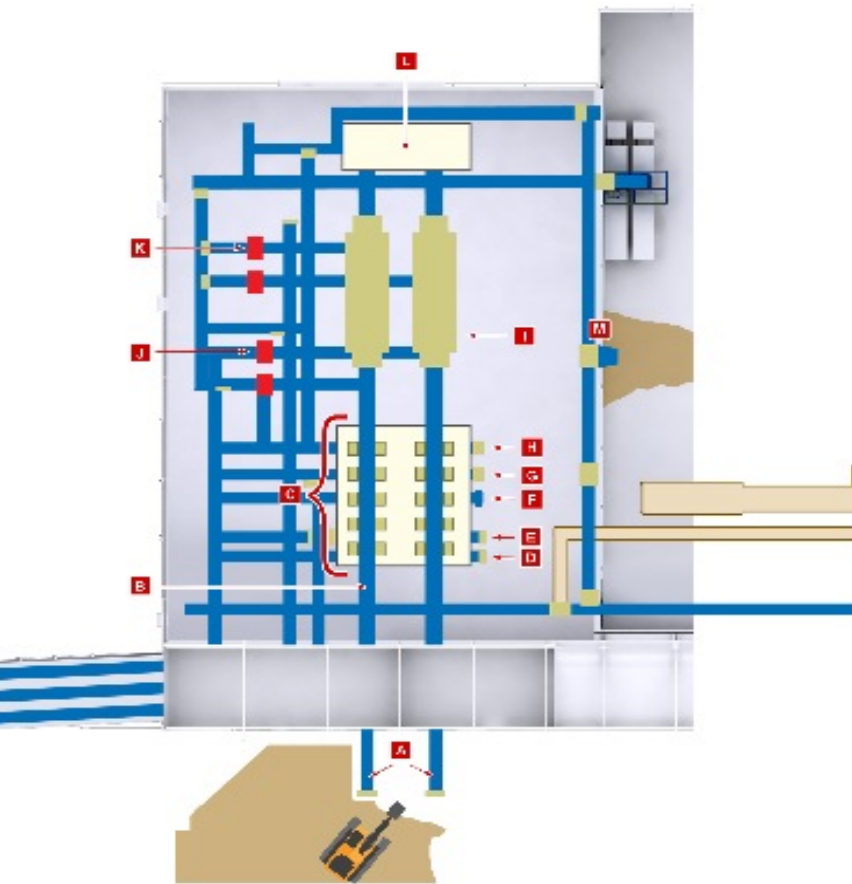
- Waste transfer station
- Waste Pre-processing system
- Refuse Derived Fuel (RDF) plant



Owner/Operator: City of Edmonton



Pre-Processing Stage Process Organics to Composting and AD Facility

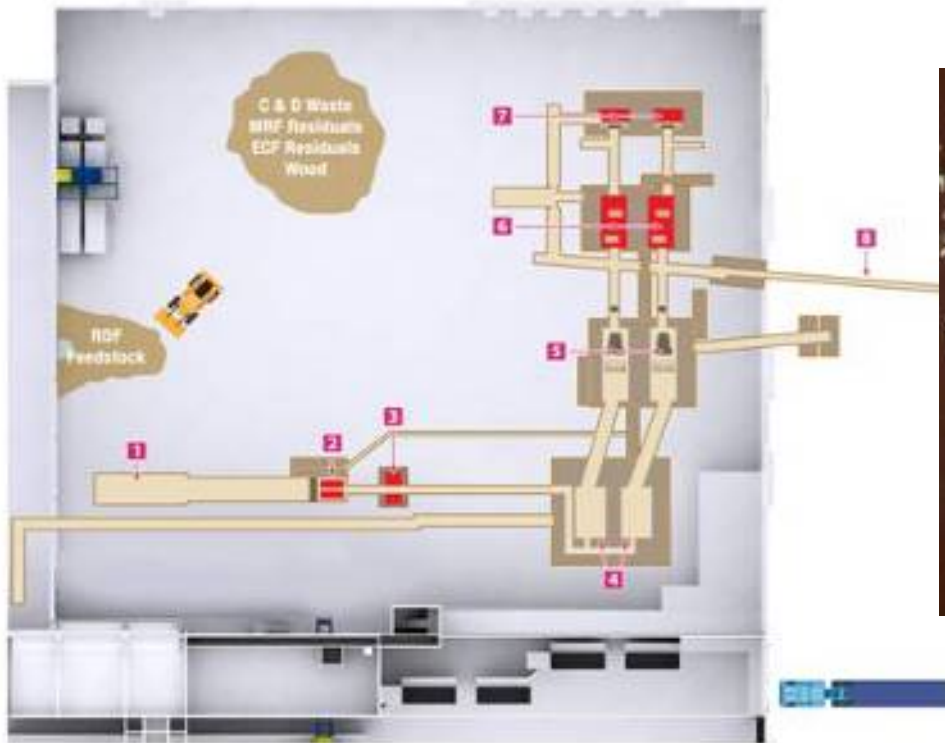


PRE-PROCESSING

- | | |
|-----------------------------|--------------------------|
| A Pit Conveyors | H Metal Recovery |
| B Infeed Conveyors | I Trommel Screens |
| C Sort Room 1 | J Magnets |
| D Cardboard Recovery | K Disc Screens |
| E Yard Waste | L Sort Room 2 |
| F Bulky Material | M RDF Feedstock |
| G Reject Material | |

Refuse Derived Fuel (RDF)

Process for Waste to Biofuel



RDF PLANT

- | | |
|--|---|
| 1 Infeed Conveyor | 6 Non-Ferrous Removal
<small>(Eddy Current Separator)</small> |
| 2 Pre-Shredder (15 cm) | 7 Re-Shredders (5 cm) |
| 3 Ferrous Removal | 8 Vecobelt <small>(air separator)</small> |
| 4 Fines Removal <small>(Finger Screens)</small> | 9 Load/Unload Storage |
| 5 Heavies Removal <small>(Wood Offcut)</small> | |

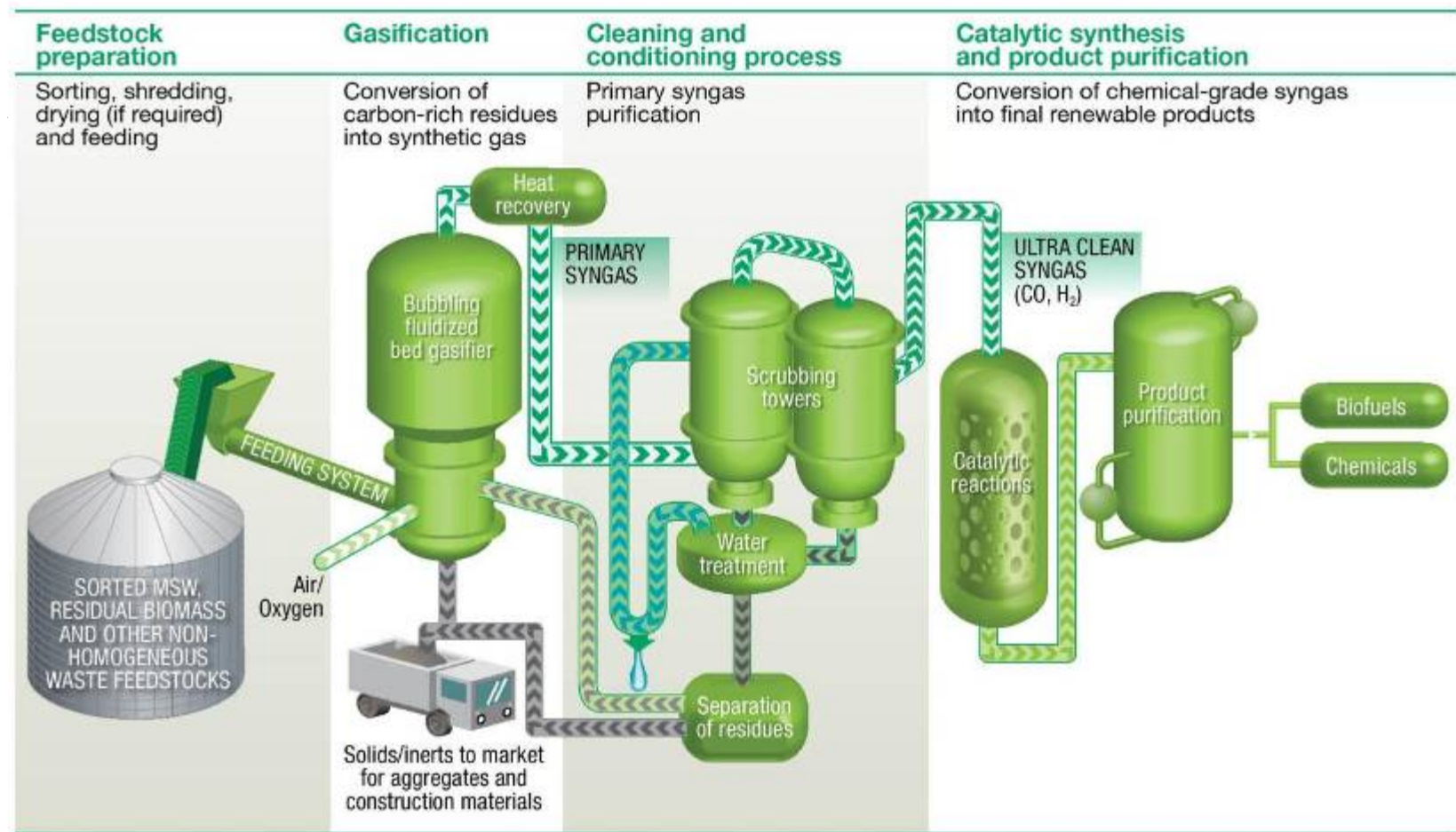


Edmonton Waste-to-Biofuels Project

ENERKEM OVERVIEW: WASTE-TO-BIOFUELS PROJECT



Edmonton Waste-to-Biofuels Project



* Municipal solid waste



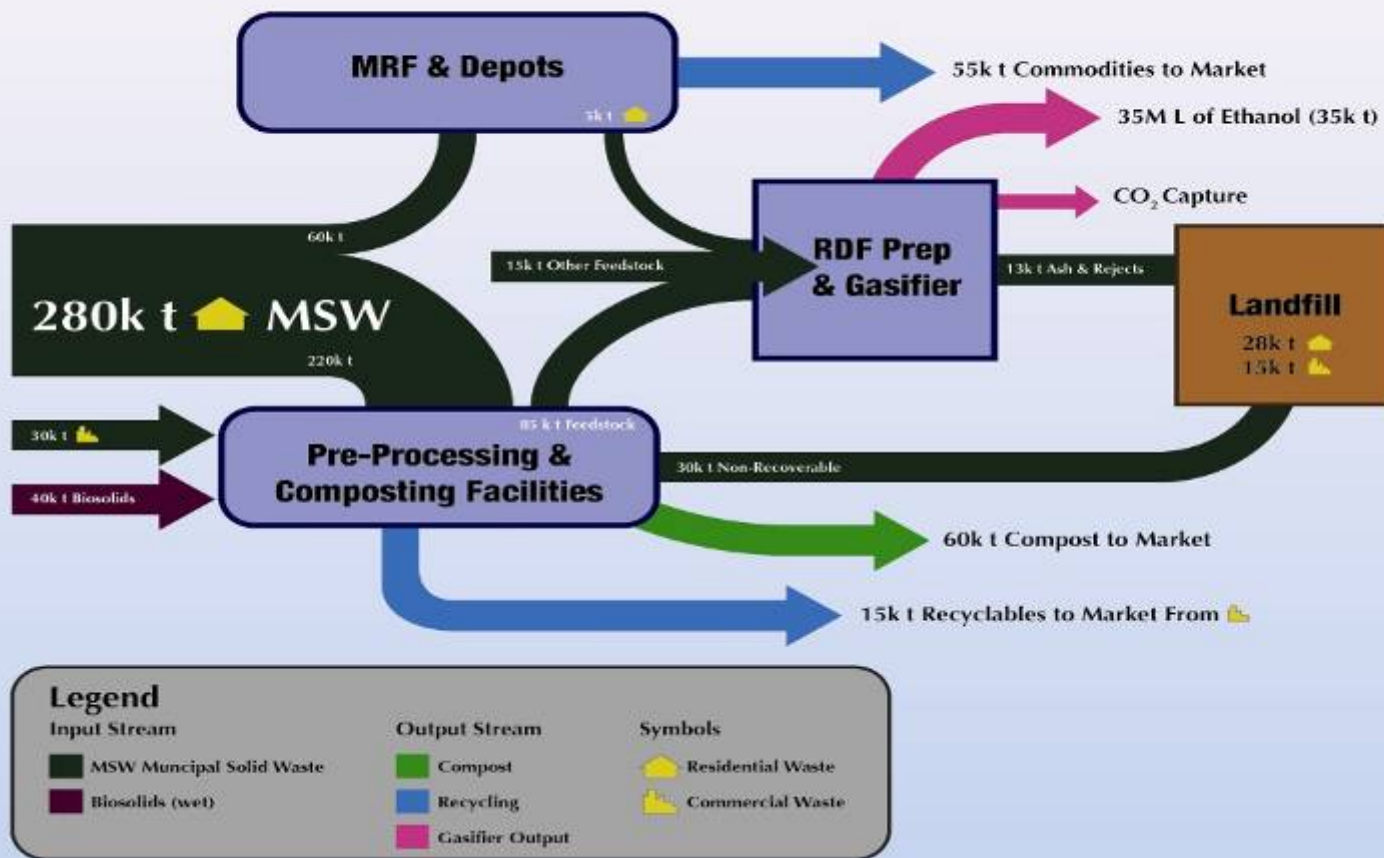
Edmonton Waste-to-Biofuels Project





Edmonton Waste-to-Biofuels Project

90% Diversion of Residential Waste Stream





Edmonton Waste-to-Biofuels Project

ADVANCED ENERGY RESEARCH FACILITY (AERF)

To develop and demonstrate innovative technologies converting residual biomass or waste feedstock into clean energy and products.

- Uses Enerkem's proprietary technology
- Joint steering and technical committee
- Government of Alberta support



Owner/Operator: COE





Edmonton Waste-to-Biofuels Project

Type: 300 kg per hour throughput pilot facility

Partnership:

- City of Edmonton
- Alberta Innovates – Energy and Environment Solutions (AIEES)
- Enerkem (*provides its proprietary technology*)

Status: Mechanical complete. In operation.

Location: Edmonton, Alberta, Canada
Adjacent to Enerkem's Commercial facility

System: Fully integrated for gasification, gas conditioning and alcohol production

Focus:

- Feedstock Variety
- ACC Plastic Trials
- Reforming optimization
- ATR, DMC, Membranes

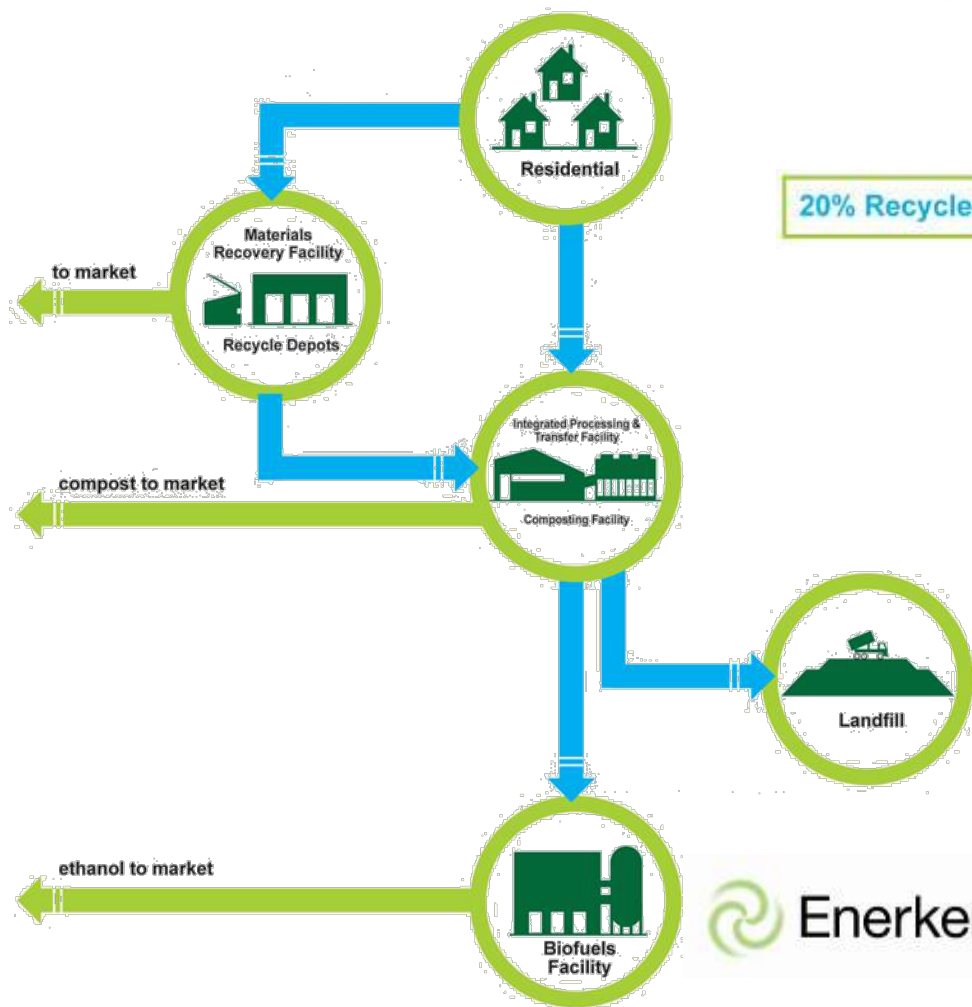




Edmonton Waste-to-Biofuels Project



20% Recycled; 40% Composted; 30% Biofuels; 10% Landfill



90%
WASTE
DIVERSION





Edmonton Waste-to-Biofuels Project

Thank you !



Christian Felske Ph.D. P.Eng.

*Technical Specialist - Processing,
Environment, and Research*

christian.felske@edmonton.ca

www.edmonton.ca