

International Symposium on Bioplastics, Biocomposites and Biorefining – ISBBB Conference – July 2018

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Enerkem biorefineries: Setting a new global standard in biofuels, chemicals and waste management


What if this



WORLD'S FIRST COMMERCIAL MSW-TO-BIOFUELS AND CHEMICALS FACILITY

ENERKEM ALBERTA BIOFUELS

Capacity:	38 million litres per year (i.e. 1 X standard Enerkem system)
Feedstock:	25-year agreement with City of Edmonton for 100,000 dry tonnes of MSW per year
Products:	Biomethanol, cellulosic ethanol

THE CITY OF EDMONTON'S INTEGRATED WASTE MANAGEMENT CENTRE



20% Recycled

40%Composted

30% Biofuels

10% Landfill

90%

WASTE DIVERSION

1. Integrated Processing & Transfer Facility
2. Recycling center
3. Composting center
4. Enerkem biorefinery

Edmonton

ALBERTA INNOVATES

Transitioning to a circular economy

Value added bio-based products to the consumer



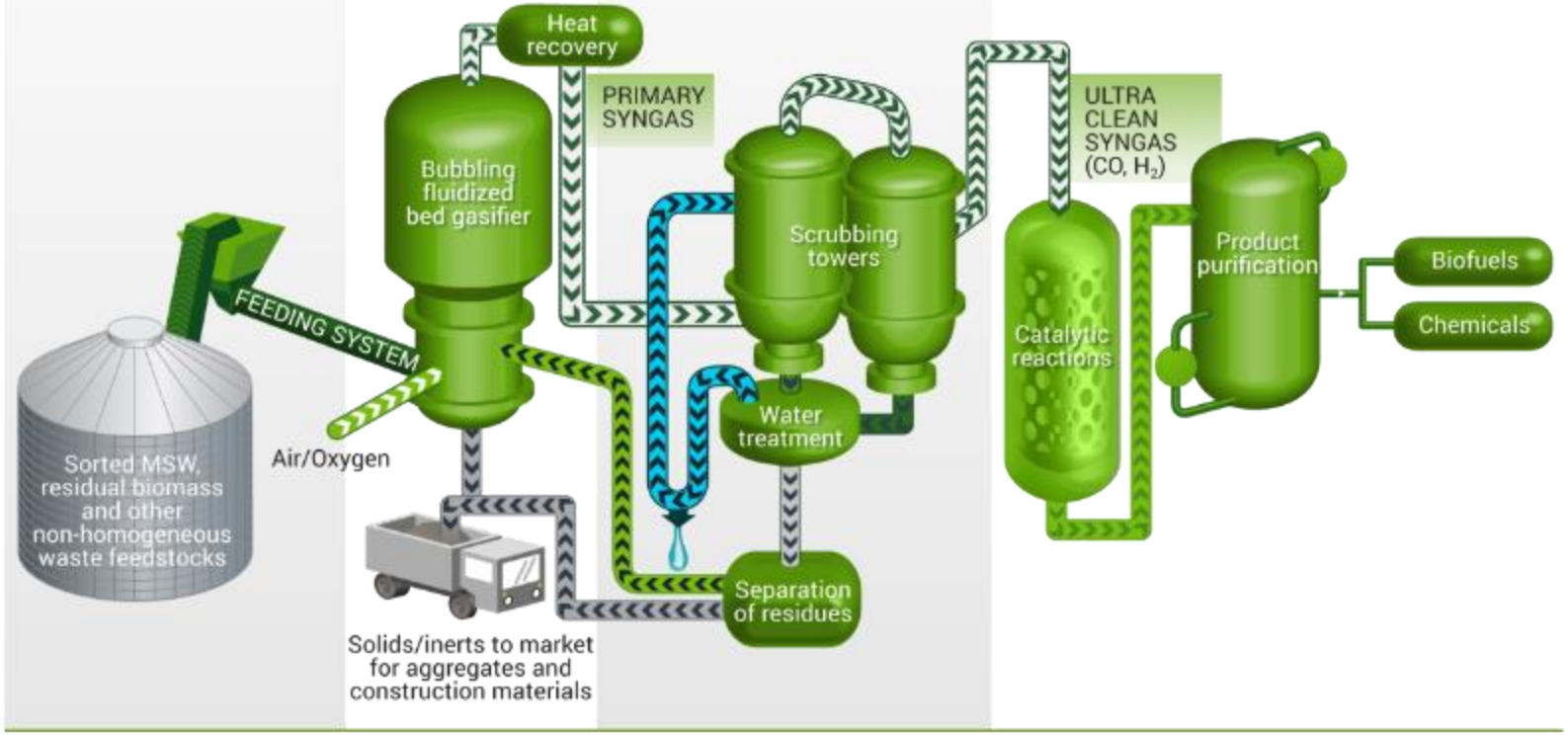
Post-consumption waste generation

Replacing fossil sources with low-carbon methanol and ethanol

Converting waste into biofuels and renewable chemicals

An efficient “carbon-recycling” process

Feedstock preparation	Gasification	Cleaning and conditioning process	Catalytic synthesis and product purification
Sorting, shredding, drying (if required) and feeding	Conversion of carbon-rich residues into synthetic gas	Primary syngas purification	Conversion of chemical-grade syngas into final renewable products



* *Municipal solid waste*

The Enerkem solution



Solid Waste Management:

USD 25.32 billion in 2013; estimated to be worth USD 40 billion in 2023

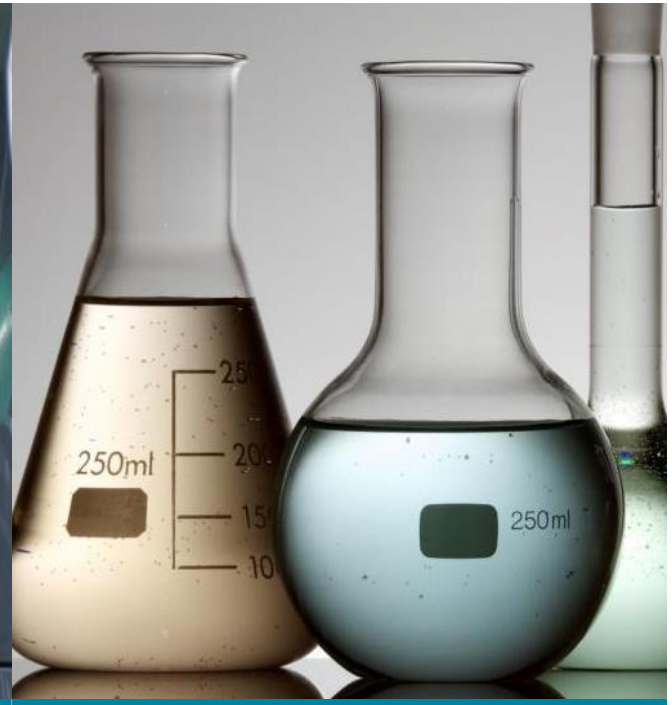
(source: World Energy Council)



Low Carbon Transportation Fuels:

USD 168 billion in 2016; expected to reach USD 218.7 billion in 2022

(source: World Energy Council)



Renewable Chemicals:

Over USD 49.22 billion in 2016; expected to reach above USD 102.76 billion in 2022

(source: World Energy Council)

Enerkem

Bringing clean innovation to reality

Rigorous path to commercialization

Enerkem Today

Testing Phase (2002-2008)	Demo Phase (2008-2012)	Commercialization Phase (2012-2016)	Commercial Growth Phase (2017+)

Sherbrooke University (Lab)



Sherbrooke (Pilot)



Westbury Plant (1/10th Full-Scale Plant Size)



Enerkem Alberta Biofuels (Full-scale)



Varennes, Rotterdam, Barcelona, Minneapolis & UK



Lab → Pilot → Demo Syngas → Demo Methanol → Demo Ethanol → Scale-up and Organizational Set-up → Large-Scale Global Rollout

Enerkem



Next facility to be located in Varennes, Quebec, Canada

- **Capacity:** 38 million litres (1 standard Enerkem system → possibility to add more systems)
- **Feedstock:** Non-recyclable/non-compostable urban waste from industrial, commercial, institutional sectors as well as construction and demolition debris
- **Products:** Methanol, Ethanol

Using waste as a feedstock for the chemical industry

Waste-to-Chemical project in Rotterdam

- Flagship project for development of bio-based and circular economy in EU
  - Will convert non-recyclable residual urban waste into methanol
  - Methanol to be used as advanced biofuels for transportation and as low carb everyday products
- High level of integration with existing infrastructure in Port of Rotterdam
  - Pipeline connections for all key consumables and product off-take
  - Several synergies possible with complimentary plants located within the Port
- Joint venture project pursued in partnership with industry-leading consortium
  - All to participate in project with equity commitment
  - Enerkem is technology provider, lead contractor and equity partner



Air Liquide creative oxygen

AkzoNobel

Enerkem

Port of Rotterdam

Enerkem



Rotterdam Waste-to-Chemical Facility

Input:	Up to 360,000 dry tonnes of residual, ‘non-recyclable waste
Output:	Two production lines with total output of up to 220 tonnes of “green” methanol
Benefits:	60-70% reduction in GHG emissions vs. incumbent technologies

OTHER PROJECTS

- Biomethanol facilities in Europe
- Projects under development in Canada and the U.S.
- MOUs in China and other regions of the world





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