OVERVIEW OF IWT'S CONVERSION TECHNOLOGY APPLICATIONS

Presented To
Southern California
Conversion Technology Conference

July 29, 2016

IWT – Thermoselect Technology

- IWT has been in business since 1990. It is a development and technology company
- IWT licenses Thermoselect Conversion Technology from Vivera (a Swiss company) for use in the US and Caribbean
- The technology incorporates pyrolysis and gasification
- Processes MSW and produces a synthesis gas comprised of CO, H2 and CO2
- Syngas can be used to produce alternative fuels such as ethanol, methanol, diesel, jet fuel or to generate electricity
- Process also produces 5 recycled products which are sold
- Achieves 100% diversion of the waste it processes from landfills

Thermoselect Technology

- 43 patented processes – 300 patent awards worldwide
- Began operations in 1992 in Europe (110 tpd Demo Facility)
- 7 plants currently operating in Japan
- Facilities have operated reliably and safely for about 24 years processing millions of tons of waste.
- Major project announced for Antwerp, Belgium that will process 3.5 million metric tons of waste per year
- 2 facilities under development in US

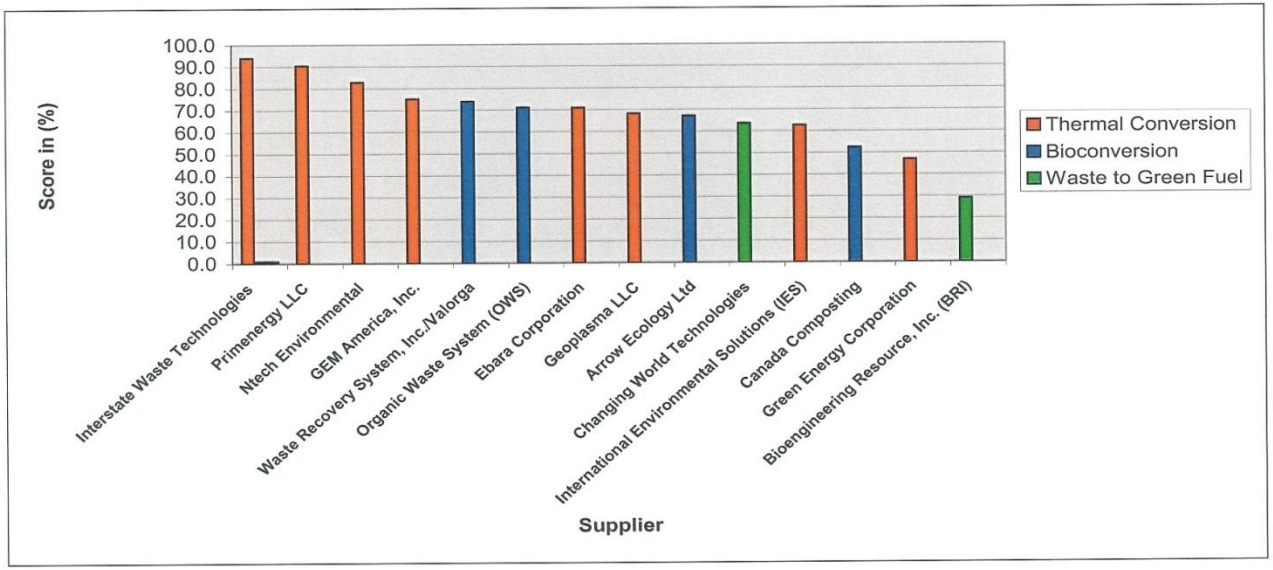
Independent Third Party Evaluation Of Conversion Technologies

- The County of Los Angeles sponsored a comprehensive study to evaluate commercially available non-incineration waste processing technologies beginning in 2004
- URS (now AECOM), largest engineering firm in the US, conducted the study
- The County and URS concluded the following:

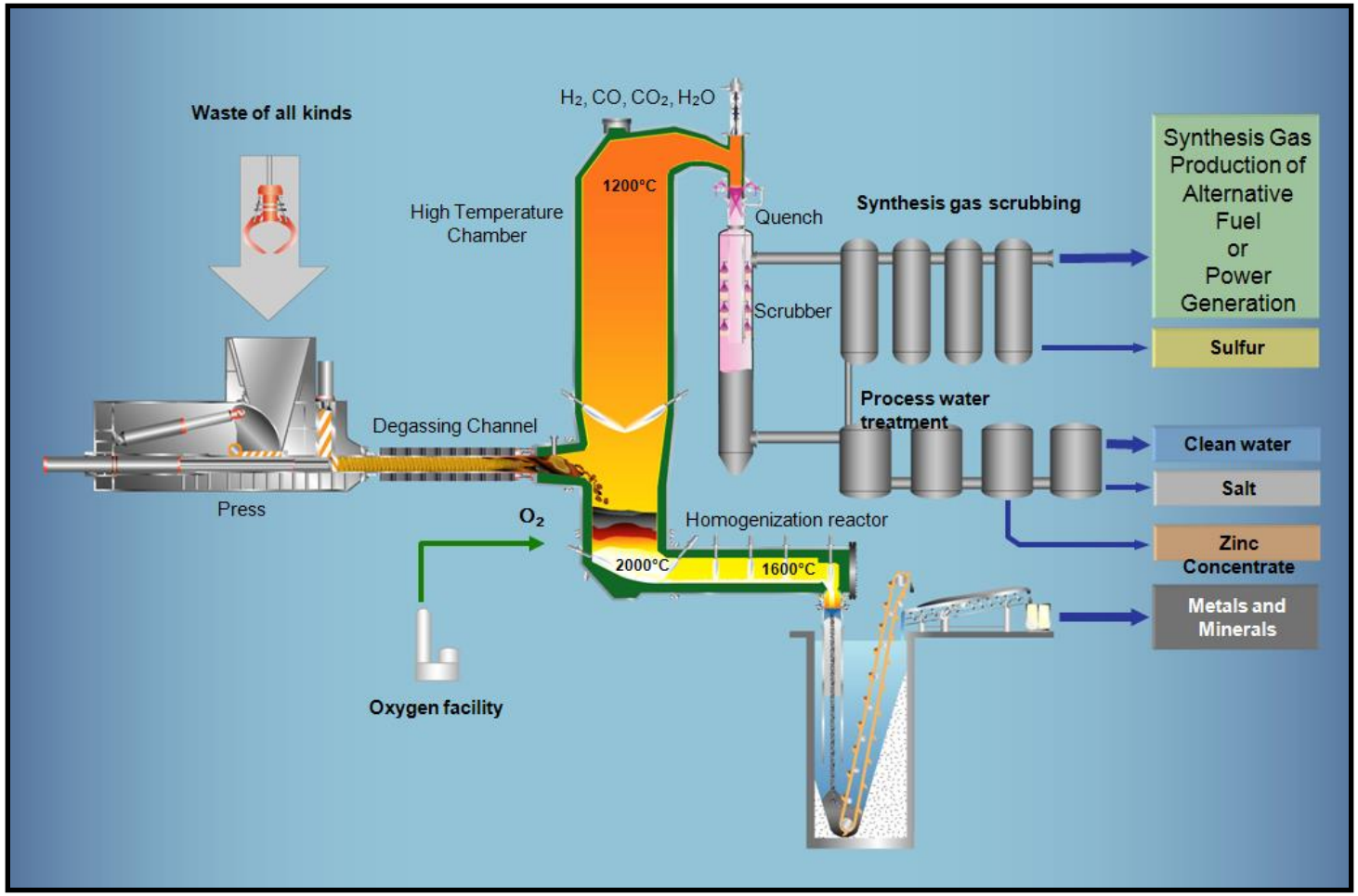
  Based on supplier credibility, existing operational experience, completeness of engineering, landfill diversion, permitability and economics, IWT and the Thermoselect technology were ranked #1
- The entire report is available on IWT's website at *iwtonline.com*
- The ranking of the top 14 study participants is included on the following page

Evaluation of Conversion Technologies

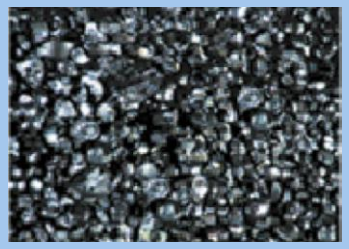
FIGURE 2-1
SCORES OF CONVERSION TECHNOLOGY BY SUPPLIERS

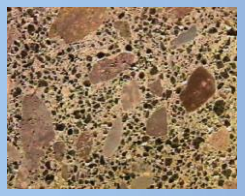


Thermoselect Process Overview



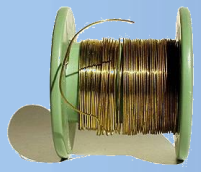
Vitreous Mineral Granulate





Concrete
Road Construction
Sand-Blasting

Iron-Copper Alloy



Metallurgy

Salt

Chemical Industry, Additive for Metallurgy

Sulfur

Chemical Industry,
Sulfuric Acid Production

Zinc-Concentrate

Zinc, Lead, Copper Recovery

THERMOSELECT FONDOTOCE, ITALY DEMONSTRATION FACILITY – 110 TPD

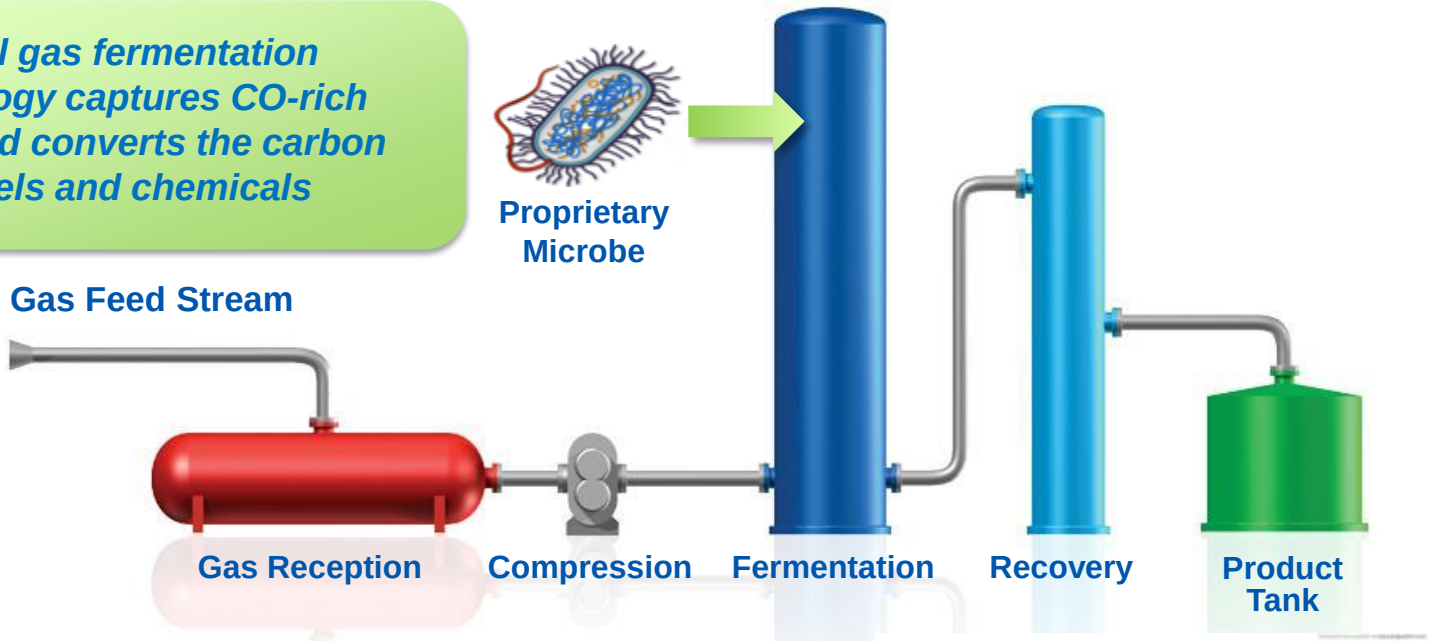
Projects in Japan

LanzaTech
Syngas To Ethanol Technology

- Over 200 patents granted; >400 pending
- Incorporates biological conversion of (H2 + CO) into ethanol through gas fermentation
- Uses microbes that grow on gases, rather than sugars as with traditional fermentation
- Proven technology used worldwide
  - 5 plants have operated since 2008
  - July 2015 announced partnership to construct $100 million biofuel production facility in Europe – startup Q4 2017
  - 4 commercial projects announced

The LanzaTech Process is Driving Innovation

Novel gas fermentation technology captures CO-rich gases and converts the carbon to fuels and chemicals



- **Process *<u>recycles</u>* waste carbon into fuels and chemicals**
- **Process brings underutilized carbon into the fuel pool via *<u>industrial symbiosis</u>***
- **Potential to make <u>material</u> impact on the future energy pool (>100s of billions of gallons per year)**

Environmental Benefits of Conversion Technologies Offered by IWT

- Uses non-incineration waste processing technology
- Diverts 100% of waste from landfills
- No ash is generated – No ash landfill is required
- Waste processing equipment produces no air emissions or process water discharges
- Minimal emissions from ethanol production equipment
- Produces the following approximate quantities of ethanol, RINs and LCFS credits per short ton of waste processed
  - 65 gallons of ethanol
  - 40 RINs
  - ½ ton of CO2(e) reduction
- Will reduce emissions from diesel trucks hauling waste to remote locations with the closure of landfills
- Reduces emissions from transporting ethanol from the mid-West to California
- Does not compete with food stocks such as corn

Contact Information

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