

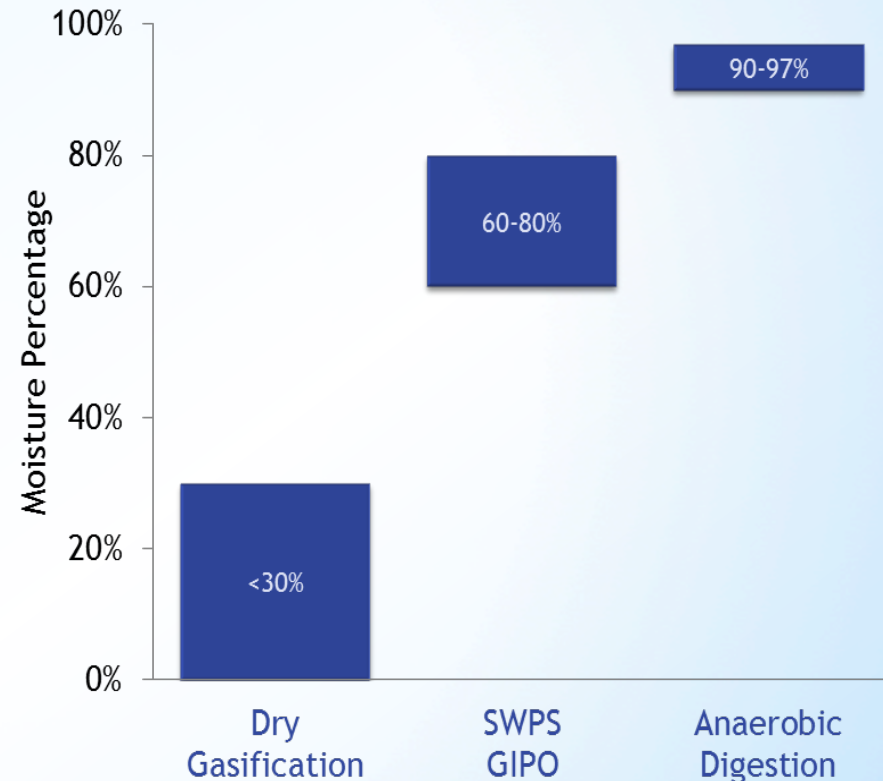
Sustainable Waste Power Systems



Point of Contact:
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Our Niche

- SWPS brings new technology to address wet problematic waste
 - Eliminates parasitic loss due to drying of material
 - Handles high solids content or high water content
 - Fast Processing Speed



Modular and Microscale System

- Pollution Mitigation
 - On-site microscale localized approach to Sustainable Waste Management
 - 3 tons/day
- Fossil Fuel offsets
- Preventing contamination from Agricultural Runoff

Positive Economic Impacts

- Economic Benefits for Customer
 - \$ 1.9 M Total System
 - 2.3 MM BTU/ton or 700 kW-hr thermal NET output
- Economic Benefits for Public
 - Green Industry/Clean Tech Growth
 - Local manufacturing jobs
 - R&D Positions
 - Positive returns for Businesses and Government
 - Financial Model-Purchase-Internal Rate of Return (IRR) at 12% and Payback Period (PBP) of 5.75 years
 - Financial Model-Lease-IRR at 23% and PBP of 3.84 years

Technology Progress

Intellectual Property

Landscape Letter of Opinion
2008

Patent Filing
2009

Divisional Filings
Feb 2014

Process Patent Award
April 2014

Additional Patent Filings
On-Going

SWPS/CCNY Wet Gasification
Lab IP Generation

Engineering

Proof of Concept Design
2008

Prototype V 1.0 Design
Spring 2012

Prototype V 2.0 Upgrade
Dec 2012

Prototype V 2.1 Upgrade
March 2013

Modular GIPOplant Design
Sept 2013

GIPOplant Capacity
Development Engineering

Physical Construction

Bench Top Proof of Concept
Devolitization Reactor
2007

Prototype V 1.0
Sept 2011

Prototype V 2.0
Jan 2012

Prototype V 2.1
April 2012

Public Demonstrations/
Lab Results
Jun/Jul 2013

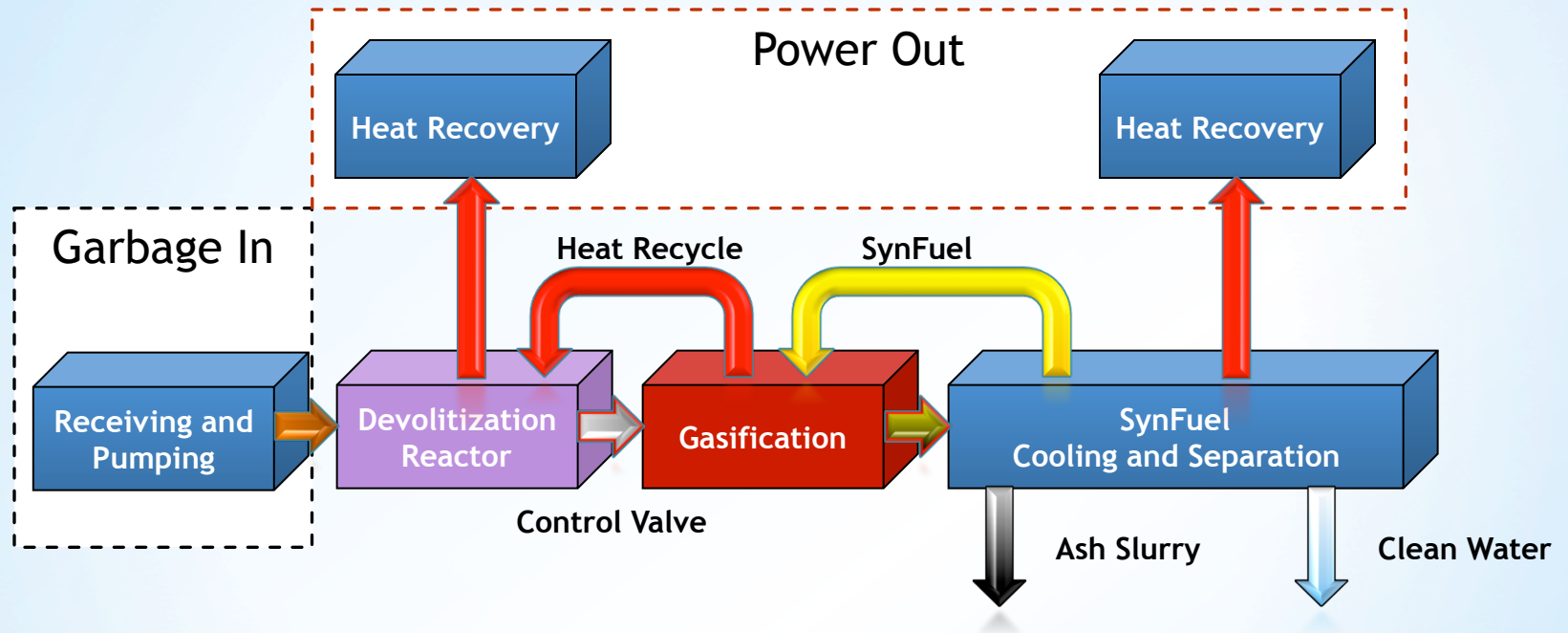
Constructing Commercial Unit
and Donation of Prototype to
CCNY Fall 2014

University Partnerships



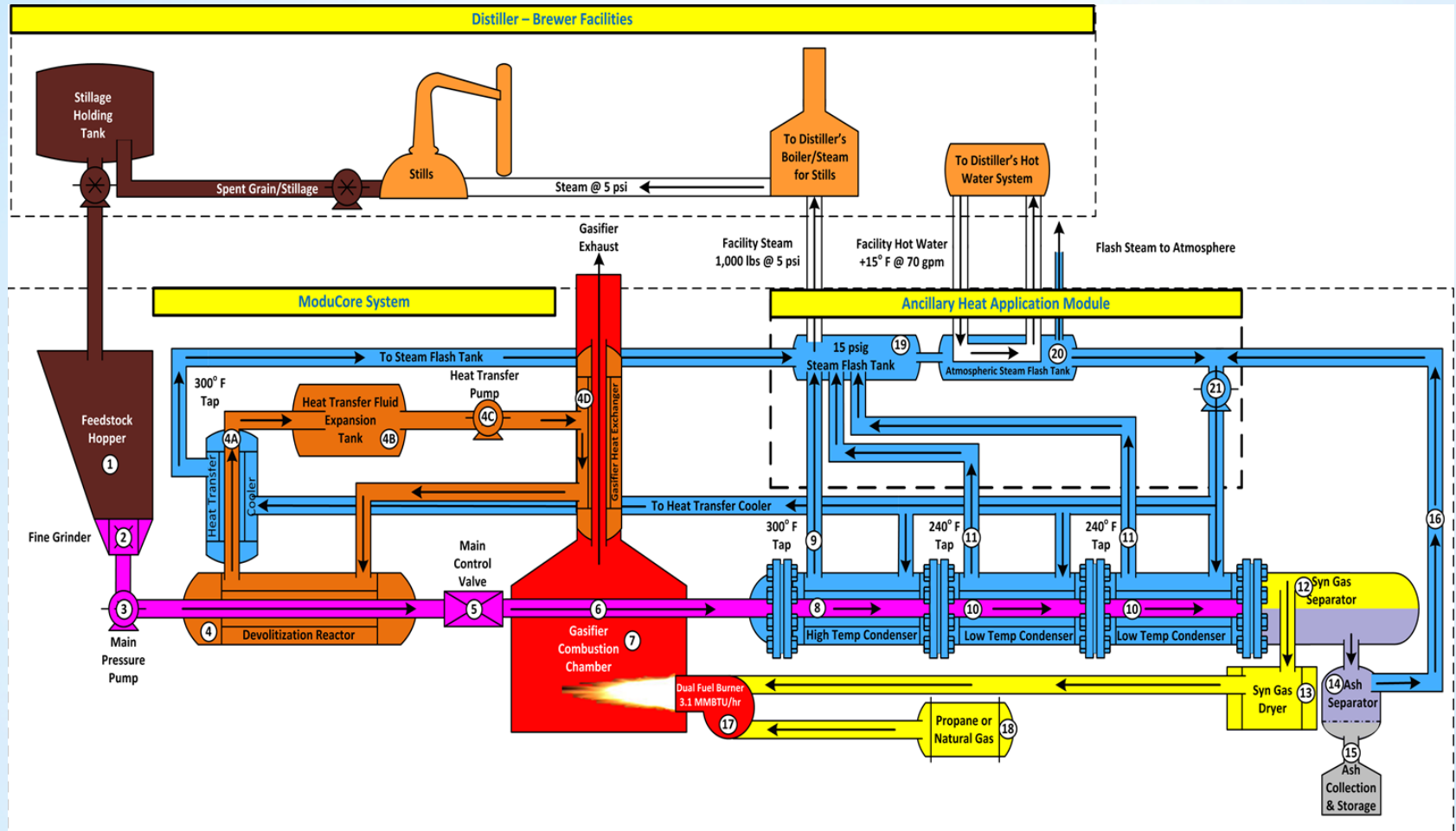
- SWPS partnering with Dr. Marco Castaldi at The City College of New York (CCNY) as Principal Investigator under Sponsored Research Agreement
- CCNY partners with Columbia University in the Waste to Energy Research and Technology (WERT) Council
- CUNY Center for Advanced Technology and Dr. Myron Wecker support
- SUNY Ulster-Empire State Development
- SWPS is transferring the GIPO Process Prototype to CCNY for study this Fall 2014
- SWPS will be involved in student education and engagement for research grant dollars in graduate thesis research with Dr. Castaldi as Advisor

Our Technology-GIPO



Fuel Conversion Not Incineration

Process Schematic



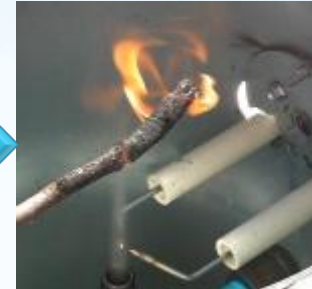
Our Prototype



Various Runs and Demonstrations



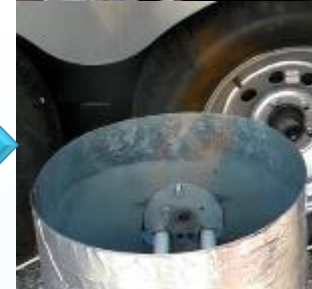
Wet
Ground
Corn Cobs



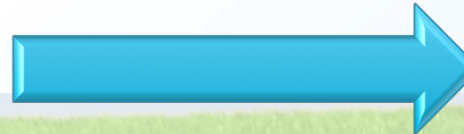
Ground
Meat &
Packaging



Synthetic
Municipal
Solid Waste

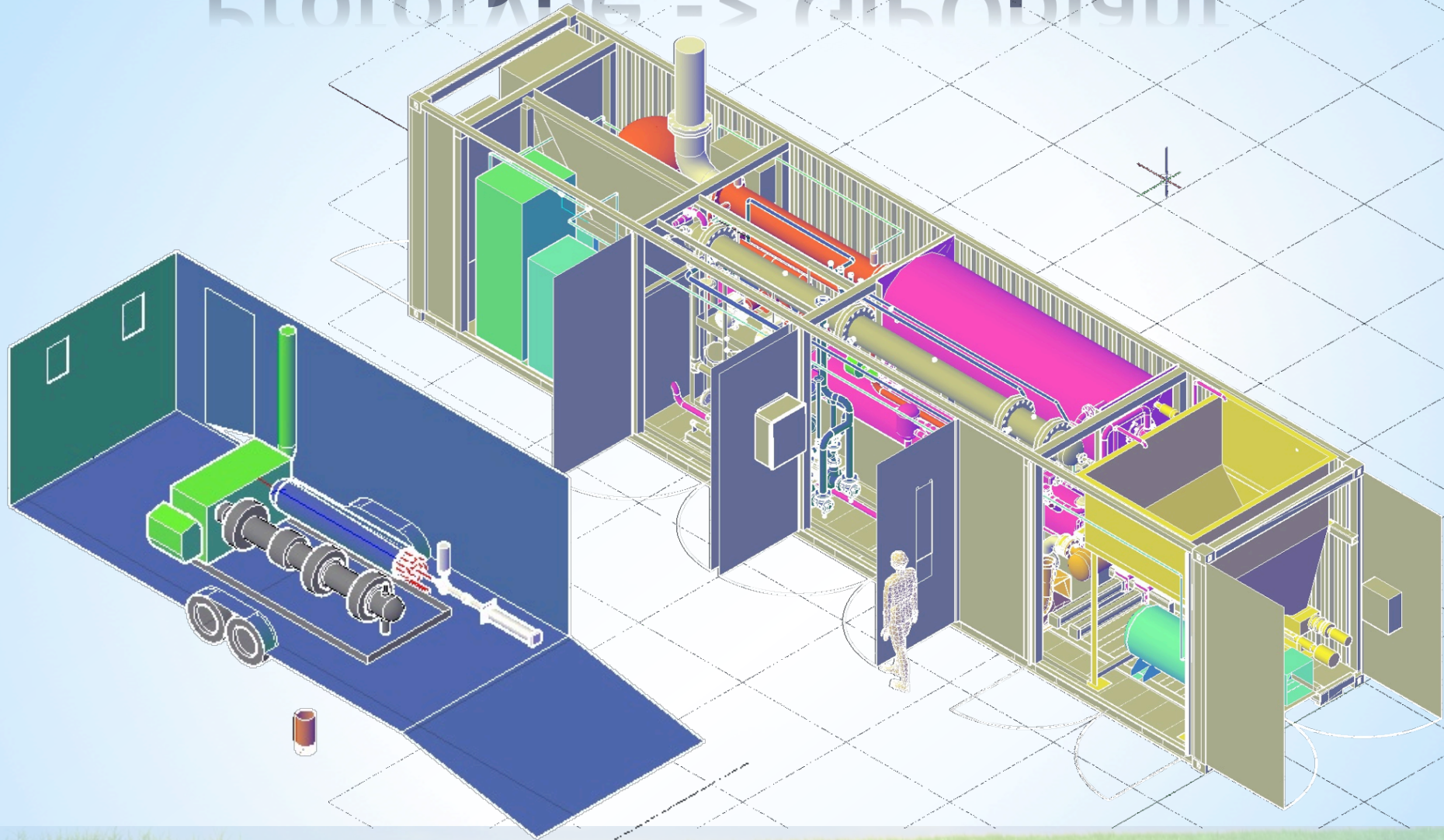


Grain
Stillage



<http://youtu.be/Uir9oZ3CS5M>

Prototype -> GIPOplant



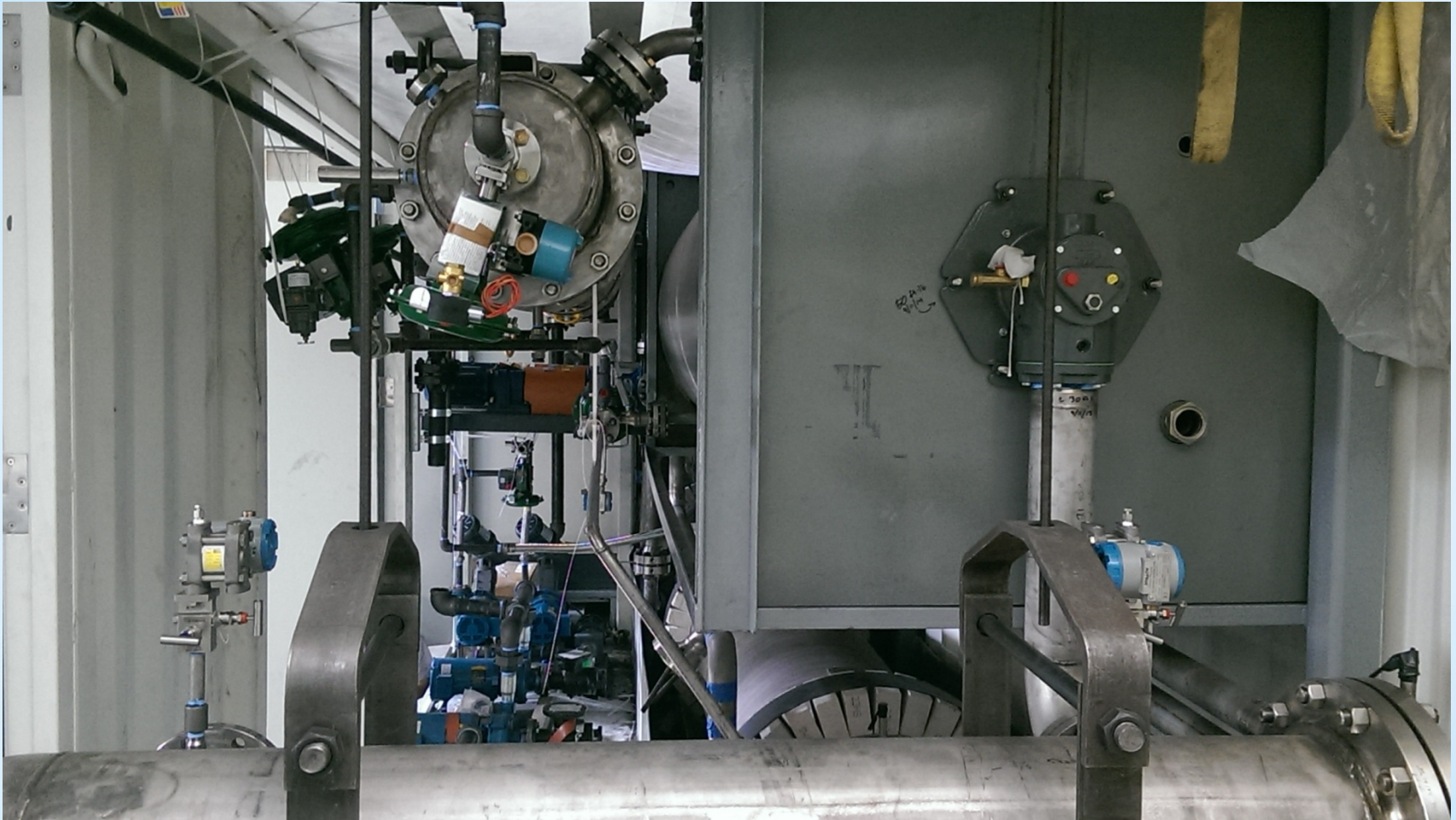
CONSTRUCTION



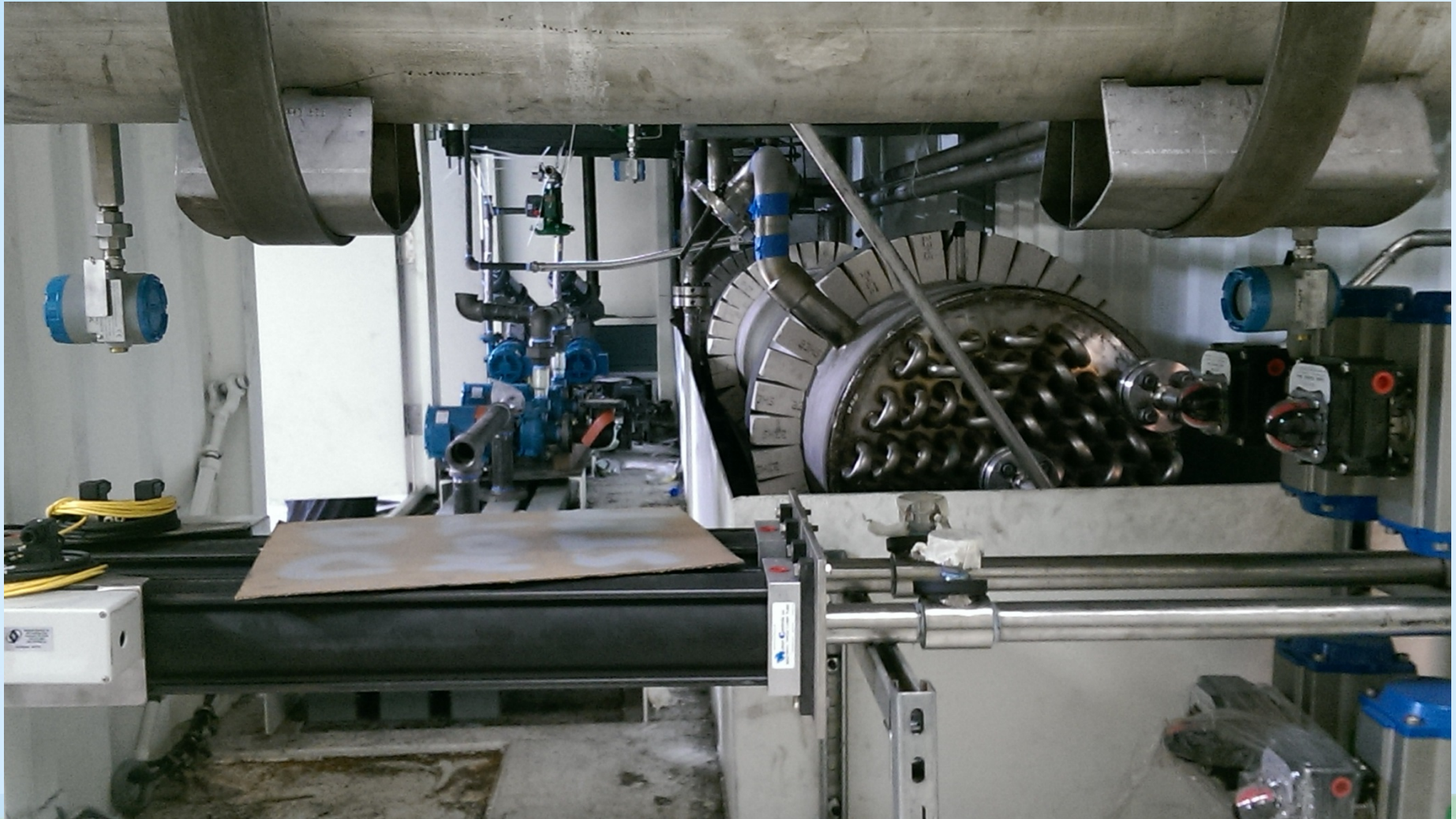
CONSTRUCTION



CONSTRUCTION



CONSTRUCTION



CONSTRUCTION



Our First Customer



Waste Conversion
\$208,000 per year savings

Heat Supply
Appx. \$300,000 per year savings

Stabilizes waste and heat costs to allow growth



See the Video On YouTube
<http://youtu.be/4weLoLDKLy8>

Technical Summary

Significant Advantages:

1. Wet Process Efficiency:
 - a) No drying: Intake of raw wet waste
 - b) Carbon + Water = $H_xC_x + CO + H_2$
 - c) No additional air or oxygen required
 - d) No venting - closed system
 - e) No process side odor or harmful exhaust
 - f) Easy Heat recovery: water to water
 - g) Immediate, complete capture of HAZMAT
 - h) Ash slurry is easy to pump and transport
2. Resilient Process:
 1. Fault Tolerant
 2. Feedstock Tolerant
 3. High Quality SynGas - EVERY TIME
3. Water driven process is self scrubbing:
 - a) No tar production
 - b) No furan or dioxin production in fuel
 - c) No Siloxane production in fuel
 - d) No NOx, SOx in fuel
 - e) No Additional Equipment Required!

Significant Advantages:

4. Compact Footprint:
 - a) Tier 1 system smaller than competition (40' x 8')
 - b) Tier 2 system generates power with four 40' containers
 - c) Tier 3 system unmatched size at 60' x 100'
5. Cost:
 1. Modular system sizes optimize capital expenditure
 2. Feedstock flexibility
 3. Cost per ton competitive marketplace