

# ***Air Force Civil Engineer Center***

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*Integrity - Service - Excellence*



**Waste To Energy/Waste  
Water Recovery  
JOCOTAS**

**18 Nov 2014**



# AGENDA

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- **Waste to Energy**
- **Waste Water Recovery and Reuse**



# Waste to Energy

- **Processes 2–3 tons per day of municipal solid waste**
  - Can be doubled with addition of second primary chamber
- **No sorting, sizing or special waste handling**
  - Aluminum sheets, plastic water bottles, food-high moisture waste
  - Large heavy duty truck tires
  - Full sized wood pallets, dunnage
- **Packaged in 2 20-ft containers**
- **Operates in a batch mode, top load**
  - Does not require constant operator attention
    - Each batch processed within 24 hours
    - Loading, startup ~ 2.5 hours
    - Gasification cycle ~ 10 hours
    - Cool down ~ 2 hours





# Waste to Energy



Top Load



No Sorting

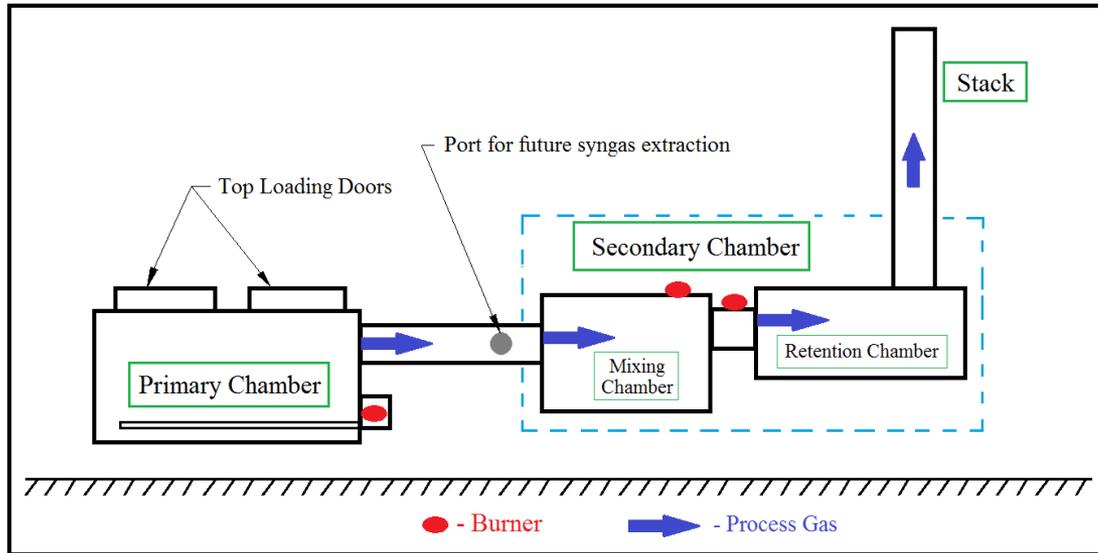


12 hours later

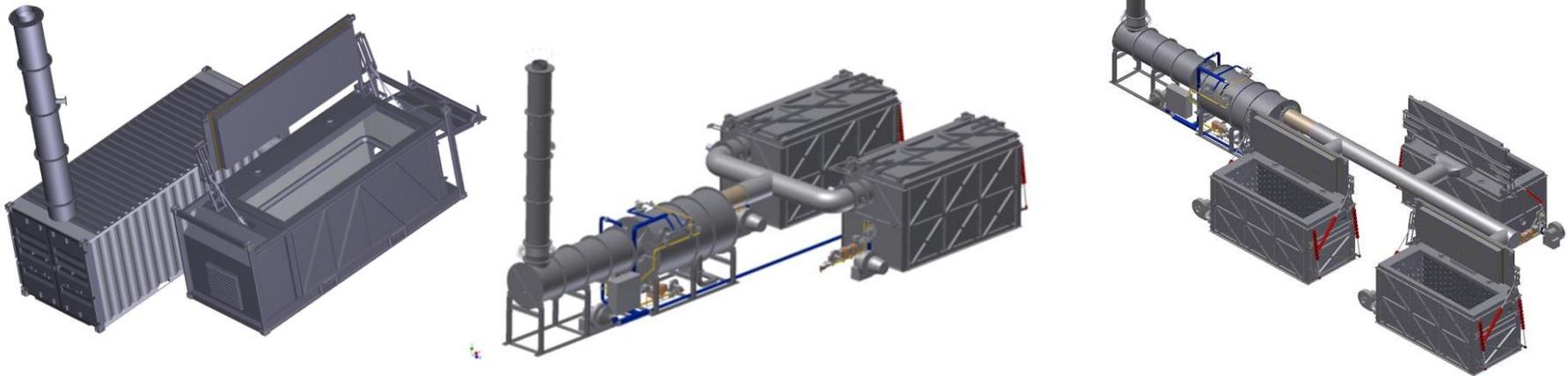




# Waste to Energy



Expandable through addition of second and/or third primary chamber; 2 batches per day





# Waste to Energy Status, Path Forward

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- **Demonstration at contractor's facility, 6–10 Oct14**
- **Complete manufacturing and contractor testing**
- **Emissions testing at contractor's facility Dec 14**
- **Ship system to Tyndall for continued testing**
  - **Continue to work permitting issues at Tyndall**
  - **Work site preparation at Tyndall**
- **Potential future efforts; currently unfunded**
  - **Continued testing at Tyndall**
  - **Additional primary chambers (currently only one)**
  - **Syngas recirculation into system; potential storage?**
  - **Address any findings from current testing**



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## ■ General requirements

- Housed in a maximum of a BICON
- Weigh less than 10,000 lb
- All connections compatible with current BEAR
- Processed water must meet or exceed reuse standards (preferably potable standards)
- Minimum throughput of 15,000 GPD
- Must not be a biological based system
- Designed to maximize energy efficiency



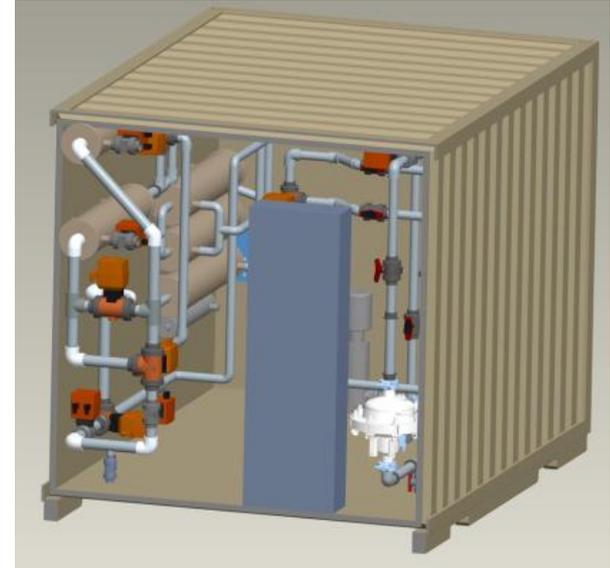
## ■ Status

- System broken down into 3 subsystems for development; Pre-filtration, Ultrafiltration, Nanofiltration and reverse osmosis
- Systems tested at sub-scale
- Each subsystem designed and optimized independently in instrumented test systems
- All technologies finalized and tested as full system
- Drawings developed for integration into Bicon container; may be possible to fit into a Tricon
- All testing to date very positive



## ■ Path Forward

- Complete full system testing
  - Complete final system design for CDR
  - Continue to revise Process & Instrumentation Diagram and 3-D models for final build and packaging
  - Begin final system build
  - Extended contractor in-house testing
  - Ship to Tyndall for testing at Silver Flag site
- ## ■ Potential future efforts; currently unfunded
- Extended system testing and improvement
  - Energy savings development/enhancement
  - Black water development





# Questions



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