



## WASTE TO ENERGY CONVERTER (WEC) - ALL SERVICES | DoD CFD

### PURPOSE:

The Waste to Energy Converter (WEC) is a solid waste remediation system with two logistical priorities: reduce the need for waste disposal and reduce the need to import fuel into forward areas. Deployed forces generate enormous amounts of solid waste that is typically disposed of by burning it in open burn pits or burn boxes, or trucking it to landfills. Any of these methods consumes fuel and has negative environmental and force protection consequences. Burning waste creates operational and maintenance burdens, operations security concerns, safety and health issues, is environmentally harmful, and wastes energy. Backhauling waste is expensive, places Warfighters in harm's way, and consumes fuel. The WEC can help the military improve force protection by keeping trucks off the road, and the reduced logistics requirement can allow for Warfighters to focus on mission related tasks.

### CHARACTERISTICS:

In the course of WEC research and development, the CFD Equipment & Energy Technology Team (EETT) has explored several thermochemical conversion approaches. At this time, the most promising technology for effective and economical battalion-scale waste to energy conversion is air-blown downdraft gasification. Under this approach, raw waste feedstock is conditioned by sizing, drying, and/or densifying; the conditioned feedstock is converted into combustible gases; and the gases are burned to generate electricity in a tactical quiet generator adapted for bi-fuel operation. Initial prototypes concentrated on the 3.3-4.4 lbs (1.5-2 kg) trash per person per day generated by field food service operations, with an ultimate goal of handling most of the carbonaceous waste generated by a battalion sized camp. The systems are designed to be packaged in 20 ft (6.1 m) CONEX container(s) for compatibility with existing transportation assets.

### CAPABILITY & BENEFITS:

- Helps decrease the logistical burden of waste disposal and fuel resupply.
- Reduces solid waste to non-hazardous byproducts, resulting in a 95% reduction in weight and cube of carbonaceous feedstock.
- Produces electricity and heat, innovative energy sources that displace fossil fuel.
- Improves force protection by helping reduce the size of convoys while reducing signature and environmental impacts.
- Deploys rapidly for Force Provider, field kitchens, or command outposts.
- Minimizes specialized labor and training with automated control and operation.

### COMMENTS:

As a follow-up to previous WEC development, CFD EETT is upgrading a prototype WEC system for a high quality field demonstration in FY10. EETT is also investigating the development of a more capable 2-3 ton/day system. Other potentially viable technologies are being explored under the Environmental Security Technology Certification Program as well as the Foreign Comparative Test program, under which PM-FSS is evaluating a British pyrolysis waste destruction system.

The need for a solid waste remediation system is expressed in the Force Provider Expeditionary Capability Production Document, which calls for a solid waste disposal capability with an objective of waste to energy conversion. PM-FSS endorses demonstration of various WEC systems for competitive down-select and technology insertion into Force Provider procurements and upgrades. The PM FSS life cycle plan is to begin procurement of Force Provider waste disposal systems as early as FY13.

### POINT OF CONTACT:

#### DoD Combat Feeding

Phone: COMM (508) 233-4670

E-Mail: nati-amsrd-nsc-ad-b@conus.army.mil

**UNCLASSIFIED**

**3-4 Lbs./Person/Day**

**Producer Gas Displaces JP-8 in Tactical Quiet Generator**

**Mixed Solid Waste has 1/3 the Energy Density of Liquid Fuel, and the Wec Can Recover 50% of this Otherwise Wasted Energy.**

**WEC Prototype at Camp Grayling**

The diagram shows a complex industrial system with various components labeled: Pneumatic Conveyer, Gas Cooling Blower, Product Gas Filter, Heat Exchanger, Vacuum Pellet Conveyer, Rotary Cup Valve, Gasifier, Electrical Control Boxes, Pellet Hopper, Di-Pellets, Mixer, Cyclone, Hydraulic Assembly, Trash Inlet, Torsional Compensator, and Mission Shredder. A red arrow indicates the flow of waste from a container into the system. A green arrow points from the system to a tactical quiet generator. The photograph shows the physical prototype of the WEC system housed in a metal container at Camp Grayling.



**TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.**