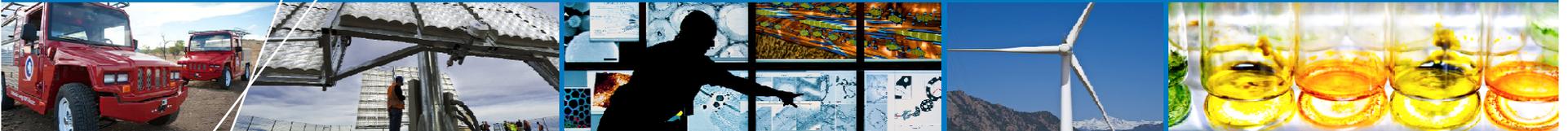


# Waste-to-Energy



## Army Net Zero Conference

Jerry Davis

National Renewable Energy Laboratory

Project Development and Finance Group

19 Jan 2012

# WTE Considerations

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- **Volume of solid waste stream**
  - Large-scale commercially proven systems require >300 tpd
    - For a DoD installation, this requires partnership with local municipality
  - Small-scale systems are yet-to-be proven
    - Possible use of plasma arc gasification for destruction of medical or hazardous waste improves WTE project economics
- **Solid waste disposal cost**
  - Coastal or island locations typically favorable due to land constraints and high costs to build new landfills
  - Over \$70/ton could support WTE
- **Energy costs**
  - Over \$.12/kWh is favorable for WTE

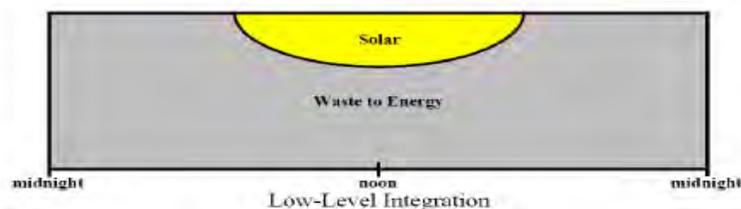
# Developing WTE Projects

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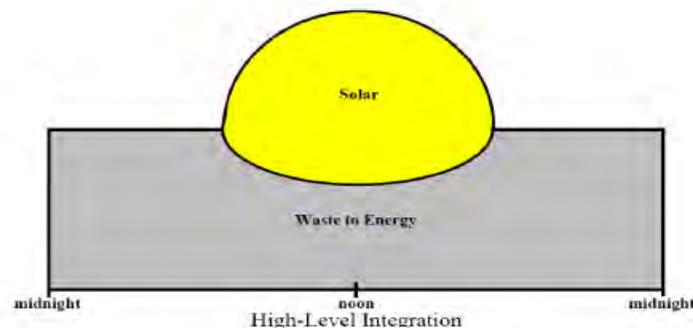
- **Secure the resource**
  - Off-post sources have become valuable commodities
- **Secure an off-take agreement**
  - May require several agreements, depending on project size and energy needs on the installation
- **Identify permitting needs**
  - Gasification units arguably categorized as incinerators
  - EPA emissions requirements for combustion WTE systems are being revised

# Fort Bliss WTE – CSP Project

- Hybrid plant: base load power from WTE; CSP offsets or augments WTE when available



Scenario 1: 12% Solar Contribution



Scenario 2: 26% Solar Contribution

- Partnership with City of El Paso for WTE Feedstock
  - 320,000 tons per year of residential solid waste
    - Estimated 32 MW base load, 53MW peak generation
  - 680,000 tons per year of commercial solid waste
    - Estimated 90 MW base load, 140 MW peak generation
- Off take issues
  - Ft Bliss' total load range in FY 2010 was 24 MW to 60 MW
    - Load is growing but still likely to export a significant amount of power for larger plant scenarios
    - 3<sup>rd</sup> Party Power Purchase Agreement (PPA) are not currently allowed in this region
- NEPA Environmental Impact Statement (EIS) is in progress
- Request for Information (RFI)
  - Proposed economics of \$19/ton tipping fee and \$.06/kWh electricity

# Hickam Commissary, Joint Base Pearl Harbor Hickam

- Project stakeholders
  - Army (ARL, Natick, IMCOM PAC)
  - Navy (NAVFAC HQ, PAC & HI)
  - NREL
  - Defense Commissary Agency (DeCA)
- Small-scale gasification WTE demonstration using food waste and cardboard from the commissary



Project Location (Photo Credit Community Power Corp)



Biomax<sup>®</sup> 100 (Photo Credit Community Power Corp)

- 100kW unit resulted from RDECOM (ARL & Natick) WTE program
- NREL funding minor design upgrades to facilitate 24/7 operation
- Currently navigating site approval and permitting processes
- Scheduled to begin operating summer of 2012

Thank you!



NREL Campus: Golden, Colorado