

INTERNATIONAL
ENVIRONMENTAL
SOLUTIONS

Road To Zero Waste

Transforming Waste to Energy

August 2009



The IES Advanced Pyrolytic System: A Conversion Technology

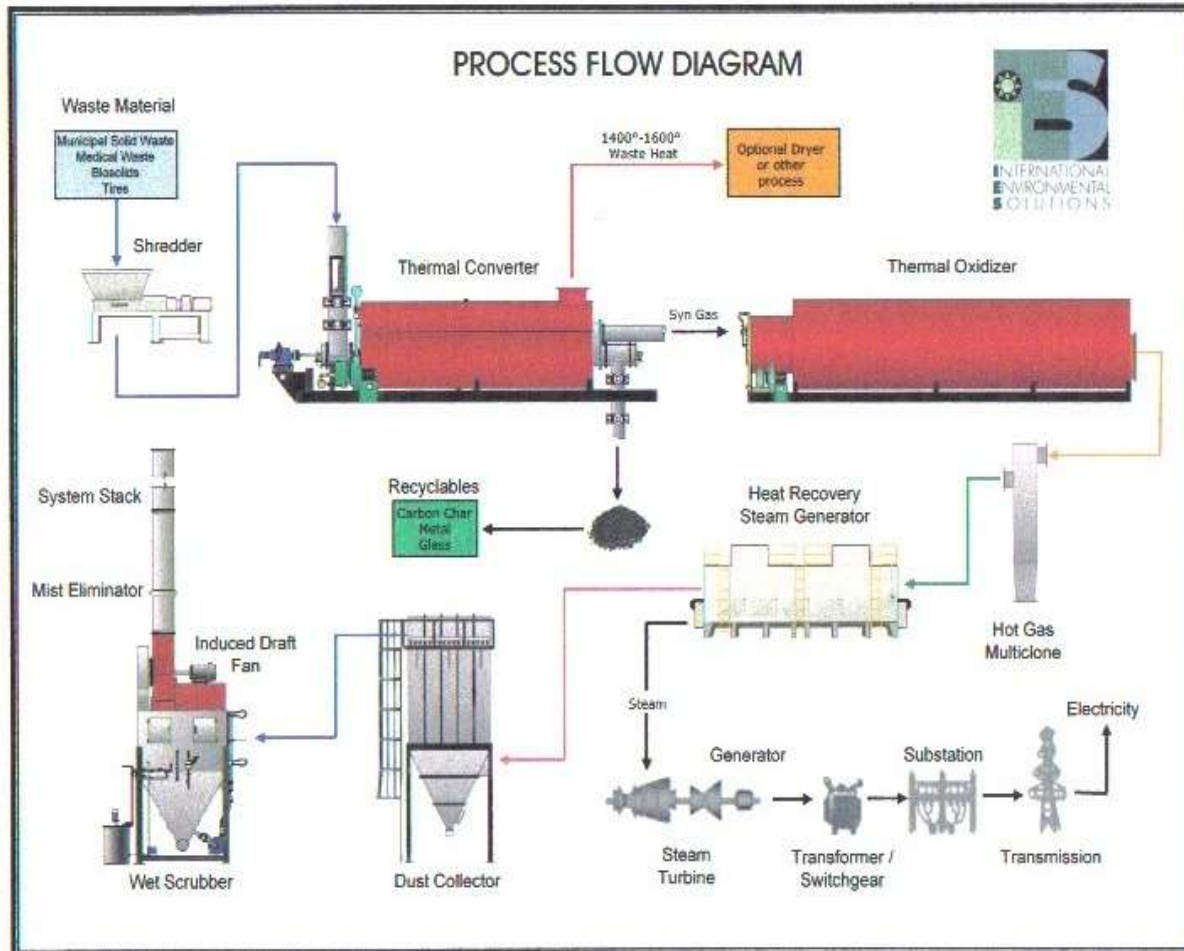




BENEFITS OF IES ADVANCED PYROLYTIC SYSTEM

- Proven successful operation of Commercial size system at Romoland Facility in Southern California
- Successfully passed South Coast Air Quality Management Districts (SCAQMD) stringent air quality limits which allows other projects to reference for permitting.
- Highly efficient system with virtually no harmful substances remaining, either in the atmosphere or as a residue.
- Continuous feed eliminates the problems found in most batch systems and allows for renewable energy production.
- The APS qualifies as a Renewable Energy in most RPS States; Federal determination will not be finalized until September in the Senate (Waxman Markey Bill); Considered as Renewable in the EU
- Modular systems allow for growth, easier installation, and flexibility in the design of facility
- Flexibility in the processing of different Waste Products
- System is automated to provide a safe and stable environment; Easy to operate
- Designed for trouble free operation and minimal downtime.
- Flexibility to work with other processes • Competitive Capital Costs and Operational Costs

A PROVEN PROCESS DEMONSTRATED AT SCALE





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Riverside County, California

Current Update

- ❖ IES has completed its research and development of a new design. This has been constructed as a 8 TPD System. The system should be operational for testing within 10 – 12 weeks. This design will reduce the operational cost. This 8 TPD system will be installed in Ventura County as a Joint Venture with the County and IES at Toland Landfill.





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Update

- ❖ **IES has Teaming relationships with:**
 - ❖ **BAE Control Systems - Manufacturing & Automation**
 - ❖ **Parson Brinkerhoff - Design Engineering for Projects**
 - ❖ **Air Products - Hydrogen research and production**

- ❖ **IES has been chosen as the technology for multiple projects (partial list):**
 - ❖ **Tahiti - Integrated Energy Park (1) 8 TPD System**
 - ❖ **Ireland - Projects in Tullamore, Galway, Limerick (6) 125 TPD Systems**
 - ❖ **Izmir, Turkey - (1) 125 TPD System (Hazardous waste plant)**
 - ❖ **Burrtec Waste, Riverside County - (1) 125 TPD System; Expanding to (3) 125 TPD**
 - ❖ **Istanbul , Turkey - (1) 125 TPD for Medical Waste / MSW**
 - ❖ **Czech Republic (Paper Factory) - (1) 40 TPD expanding (1) 125 TPD**
 - ❖ **Salbris, France / Town of Kalpice, Czech Republic / Brewery in South Bohemia**

- ❖ **IES is aggressively pursuing its research in Hydrogen production utilizing the IES system. Plans to complete research over the next 18 months - 2 years to target transportation fuel for new Hydrogen vehicles. Several new conversion products are in the process of being constructed to optimize the environmental impacts associated with these technologies as well increase the energy efficiencies.**



IES COMPETITIVE POSITIONING

• **Greater fuel flexibility, lower cost and lower emissions than GASIFICATION**

- Gasifiers operate on more homogenous fuel; cannot handle mixed waste like MSW
- Higher capital and operating costs due to added complexity of syngas cleanup
- Gasifiers do not qualify as renewable in CA and other states
- Vendors: EPI (US), Ze-gen (US), Nexterra- Wood only (Canada), ThermoSelect (Germany), Ntech (Australia)

• **Lower cost and lower emissions than INCINERATION**

- Incinerators are only competitive at large scale (1,000 tons per day or more)
- Higher capital and operating cost due to extensive pollution control
- Incinerators do not qualify as renewable in most states but this may change (Waxman-Markey Bill)
- No new incinerators have been built in the US in over 15 + years
- Vendors: Wheelabrator, Foster Wheeler, Covanta, Novo Energy, Von Roll

• **Lower cost and higher efficiency than PLASMA ARC**

- Plasma has high fuel flexibility but very low conversion efficiency due to very high operating temperature
- Plasma is only appropriate for very high cost waste; very high capital costs and O&M.
- Vendors: GeoPlasma (Atlanta); Plasco (Ottawa); Alt NRG, Adaptive Arc
- No Plasma Arc Technology has ever been permitted in US other small R&D

• **Simpler, more efficient than COMPETING PYROLYSIS TECHNOLOGIES**

- Competitor's batch processes limit scalability and capacity factor
- Competitor's syngas cleanup increases complexity and cost
- Competitors: Dynamotive - Oil (B.C._ Compact Power (UK), Kinsei (Japan); however, not "true" pyrolysis (Pyrolytic Gasification)



IES PROJECT ECONOMICS

A Snap Shot

- **Host: Barna Waste located in Galway, Ireland**
- **Project: 200 Ton per Day Waste to Energy system**
- **Estimated Cost: 23 million euros (\$32,720,000)**
- **Waste Feed: Post Recycled MSW / generating Electricity**
- **Structure: 10 - 15 Year PPA with Airtricity**
- **Estimated Cost: 23 million euros (\$32,720,000)**
- **Est. Annual Revenues¹: \$ 11,181,389** • **Est. EBITDA²: \$ 6,997,402**
- **Simple Payback: 4.8 years** • **ROI: 21.6%**

¹ Includes sale of electricity and tipping fees, but not carbon credits. Based on disposal fees of € 80 (\$100/ton) per ton and power sales at € 90.00 (\$0.11) per MWh

² Before debt service

³ Note: In U.S. tipping fees are lower and at a tipping fee of \$45/ton (\$0.11/kw), a facility would need to process 600 tpd (gross) at a cost of \$81,325,000. This has approximate 5.5 year payback / ROI 19.2%.



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Next Steps to Commercialization

- ❖ **IES NEEDS INVESTMENT CAPITAL TO ALLOW FOR FULL COMMERCIALIZATION AND IMPLEMENTATION INTO WASTE-TO-ENERGY MARKET**
 - Complete its commercial product lines
 - Expand on its management and support staff
 - Strengthen IES's Financial position for warranty purposes
 - Allow for successful implementation of Project Pipeline
 - Maximize the relationships with Strategic Partners
 - Continued development of new innovations in technology through R&D

- ❖ **SUPPORT LEGISLATION FOR CONVERSION TECHNOLOGIES AS RENEWABLE ENERGY**
 - Stabilize RPS Standards, both State and Federal Legislation (i.e. Waxman Markey Bill)
 - Allow for Tax Incentives and credits to be equal to other qualified sectors, i.e., biofuels

- ❖ **SUPPORT CAPITAL INVESTMENT IN WASTE-TO-ENERGY**
 - Direct Investment into Technology Development and Optimization
 - Project Financing
 - - Early Stage Project Financing
 - - Long-Term Project Financing and Development
 - Utilize Multiple avenues to mitigate Financial Risk. Take advantage of ARRA funds that could allow for first round projects to be implemented for these new technologies, i.e. DOE Low interest loans, Grants with up to 30% capitalization of project