

**ADVANCING WASTE TO ENERGY TECHNOLOGY  
DESIGN AND PERFORMANCE  
OF  
EPI FLUIDIZED BED RDF-FIRED POWER PLANTS WORLDWIDE**

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Energy Products of Idaho has designed and installed numerous waste to energy systems in the United States and Europe, with others currently under development. Among the latest are a number of installations in operation and/or construction in Italy. The systems design have undergone some changes over time to stay ahead of changing regulations and performance requirements.

The paper will review the evolution, to-date, of the EPI fluidized bed technology, specifically as it has been adapted for waste to energy facilities. Basic design criteria, equipment configurations, emission requirements over the past fifteen years will be presented. Operating data from the most recent facilities will be presented. Design issues and performance improvements will be presented. The recent facilities in Italy represent the most advanced design to meet the projected European Community standards for waste to energy system emissions which are more stringent, in most cases, than comparable standards in the US.

### **Background**

The potential for energy recovery from waste has been documented numerous times over the past three decades. Since the first "energy crisis" of the early 1970's, the energy potential from municipal waste has been studied and promoted, dignified and vilified, and, yet, even to this day, remains largely untapped. In spite of numerous waste-to-energy projects completed during the hey-day of mass-burn technology of the 1980's, a substantial majority of the world's waste continues to end up buried in some multi-lined, leak-protected, surface covered, off-gas-collected, hole in the ground, fondly known as a landfill. In a society marked by space travel, instantaneous world-wide electronic communications, digital TV, neighborhood cell towers, and continued advances in every form of technology imaginable, we somehow still maintain the illogical attitude that landfill disposal of wastes is the preferred solution.

Depending upon geography and socio-economy, the contents of a municipal waste stream can vary significantly. In the US and most industrialized nations where significant emphasis is placed upon 'time', the fast-food, microwave dinner, disposable mentality in the consumers goods industry has driven packaging and wrapping technology to new levels; thereby generating significant percentages of paper and plastic wastes in the disposal makeup. Combined with the putrescible wastes resulting from foodstuffs, vegetables, and other organic matter, the fraction of energy-containing materials in a typical waste stream can approach 75-90%. In less-developed regions, the putrescible fraction comprises the majority of the makeup, with packaging materials much lower. A typical waste in the US will contain between ten to twelve million Btu per ton, equivalent to nearly two barrels of oil. Considering the current US population in excess of 280 million, each generating about one ton of waste per year, this equates to over five percent of the annual consumption of oil in the entire country. To date, only about 15% of that energy is being recovered. Roughly speaking, there remains an as-yet untapped energy resource capable of generating 18,000 MW of electrical energy. Of course, not all of that is practical or economical to recover. The balance of this paper discusses one technology currently capable of tapping into this vast energy resource worldwide.