

Production of Biomass Fuel for Resource Recovery: Trash Recycling in Dade County, Florida

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ABSTRACT

Dade County, Florida has been in the forefront of resources recovery from municipal solid waste since the early 1980's. The County completed its 3,000 tons per day (six days per week) refuse derived fuel waste-to-energy facility in 1982. The Resources Recovery facility is operated under a long-term agreement with Montenay-Dade, Ltd. The trash processing capability of this facility was upgraded in 1997 to process 860 tons per day (six days per week) of trash into a biomass fuel which is used off-site to produce electrical energy. Under current Florida law, facilities like trash-to-fuel that produce alternative clean-burning fuels for the production of energy may receive credit for up to one-half of the state's 30 percent waste reduction goal.

Introduction

Prior to waste diversion problems, and the U. S. Supreme Court decision invalidating waste flow control by local government, Dade County, Florida was preparing to expand its 3,000 tons per day refuse derived fuel waste-to-energy facility by 50 percent. Industrial revenue bonds in the amount of \$190 million were sold in 1990 to finance the expansion, and to retrofit the facility with a new air quality control system to meet federal maximum available control technology standards.

Localized opposition to the expansion resulted in formation of a Citizens Task Force For Solid Waste Management in 1991. This group, appointed by the Board of County Commissioners, was charged with evaluating the need for additional waste disposal capacity and the appropriateness of the planned expansion to fulfill that need. The Task Force was staffed by a consultant team, hired by the County to prepare its master plan for solid waste management, and members of the County's solid waste management department. After two years, thirty meetings, and countless hours of staff time, the Task Force agreed that additional waste disposal capacity was needed and that the expansion of the Resources Recovery facility was the appropriate technology.

The Board of County Commissioners, however, was not convinced and asked the consultant to continue to evaluate other technologies. At approximately the same time, Montenay-Dade, Ltd. was approached by Okeelanta Corporation, a central Florida sugar producer, regarding Montenay's ability to provide biomass fuel for an electric power plant Okeelanta was planning. The Trash-to-Fuel (TTF) alternative was born. TTF had several advantages over expansion of waste-to-energy capacity at the Resources Recovery facility. The process was less costly than on-site combustion, off-site combustion was more attractive to residents in the vicinity of the facility, and in 1993 the County was successful in its effort to have the state legislature amend the state's Solid Waste Management Act to allow clean-burning fuels, used for the production of energy, to count toward achievement of the state's 30 percent waste reduction goal for counties.

Although waste diversion problems and associated financial impacts were threatening to derail the TTF project, the County and Montenay were able to mutually agree on modifications to their operations and

management agreement that take into account unstable waste flows to the facility. The new agreement, dated September 1, 1996, requires the County to deliver all the garbage available in the County's solid waste management system, up to 936,000 tons, but no less than 572,000 tons. The County must also deliver a minimum of 400,000 tons of trash for TTF and on-site combustion, the on-site portion of which may be displaced by garbage (130,000 tons). The result is an overall annual minimum waste delivery requirement of 972,000 tons and a maximum of 1,206,000 tons depending on waste flow (refer to figure 1). Moreover, to assist with the financial impacts of the loss of revenue producing waste tonnage, the revised agreement provided for a reduced fee of approximately \$5 per ton for 234,000 tons of the 936,000 tons to be combusted on-site, thereby reducing overall facility costs by more than \$1 million per year.

The TTF Process

The TTF process was constructed at a cost of approximately \$26 million and is currently in start-up mode. Under the County's operations and management agreement with Montenay, the operator guarantees that TTF will process 270,000 tons per year of trash (862 tons per day, six days per week). The TTF processing fee to the County is \$22.41 per ton, plus an additional fee of \$1.36 per ton for the resulting processed fuel that qualifies for recycling credit under state law. When debt service cost and transportation of rejects and residue for TTF are factored in, the total cost per ton is approximately \$38.

The primary components of the process are a trash sorting floor where reject and non-processable materials are removed from the trash stream, a material storage pit (existing), hoppers, conveyors, shredders, ferrous metal separation, material sizing trommels, material storage bunkers, load-out area, and outbound scale. The biomass fuel material produced must contain no more than 3 percent oversized material (over 5 inches in diameter) in order to meet customer specifications.

TTF outputs include biomass fuel 50 percent, fines 30 percent (dirt, grit and stones), rejects 17.6 percent (non-biomass materials sorted from the incoming trash stream), and ferrous metals 2.4 percent (refer to figure 2). The fuel is hauled out by Okeelanta at its sole cost, and no payment is made to Okeelanta for taking the fuel. The fines are categorized as primary (loamy dirt material) and secondary (stones). The primary fines will be supplied to a third party for plant nursery use. The County is responsible to accept up to 10 percent of the total incoming TTF material as primary or secondary fines annually (27,000 tons). This material may be used as landfill cover by the County. Disposition of fines above the 10 percent fines guarantee is the responsibility of Montenay. A special unmanned scale was constructed to weigh-out the fuel and fines. The County is responsible for disposal of up to 17.6 percent of the total incoming TTF material as rejects annually (47,520 tons). Disposition of rejects above the 17.6 percent rejects guarantee is the responsibility of Montenay. Ferrous metals recovered from the TTF process are transferred to the Resources Recovery ferrous bunker for further processing by Namco International Corporation, an on-site third party metals processing company under contract with Montenay.

Conclusions

Dade County was successful in negotiating unique waste delivery guarantees and financial enhancements to ensure that this innovative expansion of its Resources Recovery facility would proceed without WFC. Without reinstatement of local government waste flow control (WFC) authority by the federal government, however, the formation of public/private partnerships to develop facilities similar to Dade's TTF process elsewhere in the State of Florida, or elsewhere in the nation is unlikely. In South Florida, the potential for development of such facilities is reduced further by the abundance of low cost waste disposal alternatives, primarily landfills.

References

1. Official Florida Statutes 1995. Published by the State of Florida, Tallahassee.
2. Third Amended and Restated Operations and Management Agreement by and between Metropolitan Dade County, Florida and Monteny-Dade, Ltd., September 1, 1996; Resolution number R917-96.
3. Non-Exclusive Agreement Between Metropolitan Dade County, Florida and Waste Management Inc. of Florida for Provision of Municipal Solid Waste Disposal Services, October 27, 1995.

DADE COUNTY, FLORIDA

TRASH-TO-FUEL PROCESS

...WASTE - WASTE TO FUEL ...
 ...WASTE TO FUEL ...
 ...WASTE TO FUEL ...

300

200

100

TONS IN THOUSANDS



OUTPUTS

TRASH INPUT

BIOMASS FUEL (158K) FIBRES (81K)
 FERROUS METALS (61K) REJECTS (48K)

**DADE COUNTY, FLORIDA
 RESOURCES RECOVERY FACILITY
 GARBAGE AND TRASH COMMITMENTS**
 September 1, 1996

From:
 September 1, 1996

After:
 RTIAPCD**

AOSWGT*	Garbage Minimum	572,000
	Trash Maximum	364,000
Total		936,000

AOSWGT	Garbage Minimum	572,000
	Trash Maximum	130,000
	Subtotal	702,000

ARTGT*** 270,000

Total 972,000

MAXIMUM WASTE DELIVERY AMOUNTS

If garbage is available for delivery,
 County must deliver up to - 936,000

ARTGT - 270,000

Maximum Waste Delivery Amount - 1,206,000

*AOSWGT - Annual On-site Waste Guaranteed Tonnage
 **RTIAPCD - Recyclable Trash Improvements Actual Performance Completion Date
 ***ARTGT - Annual Recyclable Trash Guaranteed Tonnage

(Figure 1)

DADE COUNTY, FLORIDA TRASH-TO-FUEL PROCESS



- -
- BIOMASS FUEL (135K)
 FINES (81K)
- REJECTS (48K)
 FERROUS METALS (6K)

(Figure 2)