



The 2016 Bi-annual Meeting of the Global WTERT Council

October 6, 2016

Waste to Energy

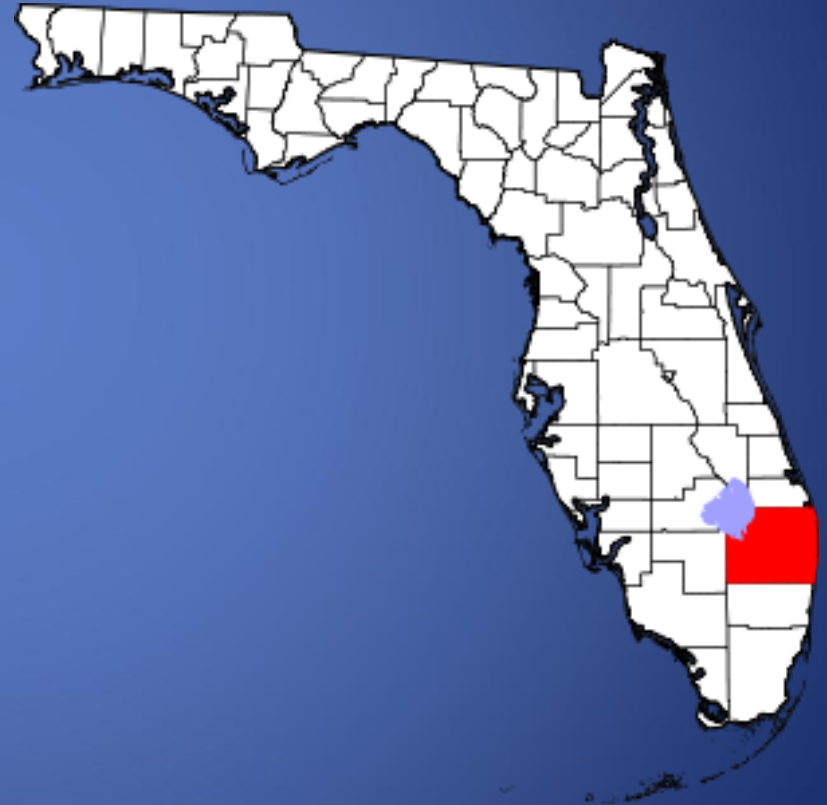
The Palm Beach County Experience

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Palm Beach County, Florida

- Largest geographic county in Florida at approximately 2,400 square miles
- Third largest in population at approximately 1.4 million residents
- Growing to 1.8 million by 2040
- Two million visitors annually
- Thirty Eight (38) Municipalities
- 668,000 Households
- 246 million SF of Commercial Property
- Major Industries are Tourism, Construction and Agriculture





What is the Solid Waste Authority of Palm Beach County?



Photo - Solid Waste Authority of Palm Beach County

- Dependent Special District established in 1975 responsible for management of the solid waste generated in Palm Beach County, Florida.
- Approximately 390 employees with annual budget exceeding \$280,000,000.
- Funded by a non-ad valorem assessment, tip fees, energy and recovered material sales.

The Integrated System

- Two Renewable Energy Facilities (5000 TPD)
- Recovered Materials Processing Facility
- Landfill (325 Acres; capacity through 2050)
- Biosolids Processing Facility
- Two Household Hazardous Waste Facilities and Five Drop-off Locations
- Six Transfer Stations (70% of delivered waste)
- Permitted Yard Waste and C&D Recyclers that recycle approximately 600,000 tons of yard waste, C&D debris and metals annually





Renewable Energy Facility #1

- Refuse Derived Fuel WTE Facility
- Initial Operation in 1989
- Refurbished in 2009
- Processes 2000 TPD Post Recycled Municipal Solid Waste
- Three RDF Processing Lines
- Two dedicated RDF Fueled Boilers
- 67 MW Renewable Energy, equivalent to powering more than 30,000 homes
- 25,000 TPY of recovered metals
- Added 20+ Years to Life of Landfill





Renewable Energy Facility #1

Twenty-Seven Years of Successful Performance

Operational Parameters	Value
Post Recycled MSW	21,836,000 tons
Ferrous Recovered	839,000 tons
Non-Ferrous Recovered	88,000 tons
Gross Energy Produced	10,494,000 MWh
Net Energy Produced	8,985,000 MWh



Renewable Energy Facility #2

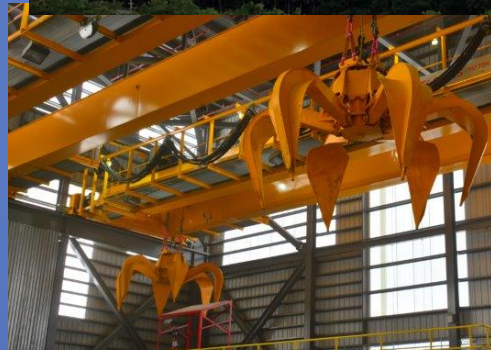
The Palm Beach County Experience

Achievable

Affordable

Sustainable

Repeatable





REF #2 Implementation

The Decision

- The year is 2007
- Projected landfill depletion is 2031
- A “Crisis not Emergent”
- Renewal of REF #1 contract is approaching in 2009
- Need to provide landfill capacity for ash and process residue
- REF #1 is at capacity and has been for 10+ years
- The SWA Board did not wish to permit our 1600-acre “western” landfill site
- The SWA Board rejected three alternative sites presented by willing sellers
- The SWA Board rejected waste export to a regional landfill due to environmental and cost factors
- Expansion of waste-to-energy moved to the top of the list



REF #2 Implementation

The WTE Alternatives

- **Expansion Option** – New facility chosen over adding a boiler to REF #1 to better accommodate future growth.
- **Site Selection** – Site adjacent to REF #1 chosen over the distant site of a closed cogeneration plant eliminated an expensive, time consuming and risky siting process.
- **Sizing** – 3000 TPD chosen to accommodate future growth as more cost-effective than a phased approach.
- **Technology** – Mass Burn technology chosen over emerging alternative technologies as a proven solution presenting the highest probability of success in the shortest time period.
- **Timing** – Accelerated from 2017 to 2015.
- **Procurement** – Design-Build-Operate model chosen to provide a single point of responsibility.



REF #2 Implementation

The Keys to Success

- Assembled a great team – Experienced staff, consulting engineers and financial professionals.
- Changed perceptions of Waste-to-Energy by addressing the common objections from the beginning.
- Public outreach – highlight the economic and environmental benefits over and over and over again.
- Leveraged twenty years of successful experience with REF #1.
- Leveraged the Authority's strengths – the non-ad valorem assessment on the tax bill; statutory, contractual and economic flow control; and, good will.
- Considered proposals only from experienced WTE facility operators.
- Maintained a single point of responsibility through the end of the operating agreement (DBO).



REF #2 Implementation Public Outreach was Critical



- More than two dozen public Board meetings or workshops over 5 years during which every critical decision was made.
- Meetings with Homeowner's Associations, Community Groups, Environmental Groups and Neighboring Cities.
- Required Homeowner Notification – 65,000 First Class Mailings.
- Materials Separation Plan public notices and meetings from June 2009 to July 2010.



REF #2 Implementation

Changing Perceptions of WTE

Perception that WTE is Risky

- Authority's twenty years of successful operation of REF #1.
- Eleven operating WTE facilities in the State of Florida.
- New WTE facilities being constructed in Europe and Asia.
- The Authority commissioned a white paper evaluating and comparing the performance history of existing and emerging WTE technologies, including Mass Burn.



REF #2 Implementation

Changing Perceptions of WTE

Perception that WTE is Expensive

- Financial Projections demonstrating that future rates would be no higher than \$180 per year per single family home equivalent, compared to \$156 in 2009 (FY 2016 rate is \$170).
- Debt service coverage (bond covenant) within historical healthy range.
- Long term cost \$6 per single family home per year greater than constructing and operating a landfill.
- Palm Beach County jobs.
- Beneficial financial impacts to the local economy.



REF #2 Implementation

Changing Perceptions of WTE

Perception that WTE is not Environmentally Friendly

- Provided studies comparing WTE to landfills and fossil fuel power plants.
- Countered two most often stated objections:

Air Emissions

Water Consumption

- Emphasized two most valuable sustainability benefits:

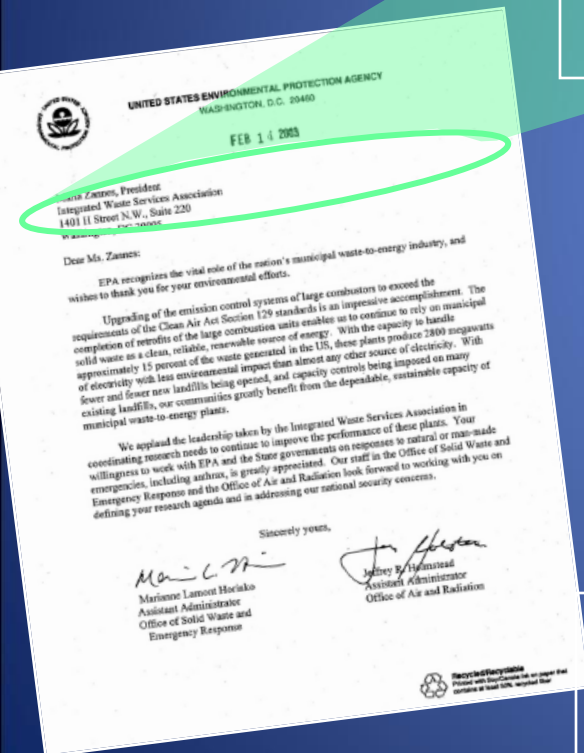
Landfill Avoidance

Clean Renewable Energy



Benefits of Waste to Energy

- Least environmental impact for power plants according to EPA (February 2003)
- Converts 4 million tons of Florida garbage/year to 534 megawatts of Power/day
- NCRRF has processed 13M tons of waste since the 1980's – saving 13M barrels of oil
- Reduces expended landfill volume by 60%
- More favorable than landfills for greenhouse gas emissions according to EPA (September 2006)





Changing Perceptions of WTE

Air Quality

Areas of Emphasis

- REF #2 as a net greenhouse gas reducer when reduced landfill emissions are considered
- REF #2 as the most advanced and cleanest WTE facility in North America
- REF #2 as the only WTE facility in North America utilizing SCR for NOx control
- REF #2 Air Permit limits lower than USEPA Standards



Changing Perceptions of WTE Water Consumption

PBREF No. 2 was designed to minimize the use of potable water and produce minimal effluent

- **No increase in the Authority's Groundwater Allocation**
- **Air Cooled Condenser**
- **Reuse of process water from REF #1**
- **Recycling and reuse of internal process water**
- **Rain water harvesting from more than 12 acres of facility roof area and storage in a 2 million gallon cistern for later use**
- **Water balance was a critical evaluation factor**



Air Cooled Condenser

Two Million Gallon Rainwater Harvest Tank





Changing Perceptions of WTE

Sustainability through Fossil Fuel Avoidance

REF #2 produces enough clean renewable energy to power more than 40,000 homes



Turbine Generator



Changing Perceptions of WTE

Sustainability through Landfill Avoidance

- REF #2 extends the life of the landfill to nearly 2050
- REF #2 reduces the volume of MSW by more than 90%
- SWA is pursuing ash reuse

Refuse Pit



MSW Combusting on Grate



Changing Perceptions of WTE

More than a Solid Waste Mgmt. Facility



Environmental Education

LEED® Platinum Certified
Education Center



Green Roof



A group of people, mostly men, are seen from behind, standing in front of a large orange wall. The wall features the text "WE DO NOT INHERIT THE EARTH FROM OUR ANCESTORS WE BORROW IT FROM OUR CHILDREN" in large, white, sans-serif capital letters. The people are wearing various casual attire, including polo shirts and a baseball cap. Some are looking at a display or table in front of them. The scene appears to be an indoor event or exhibition.



1975-2015

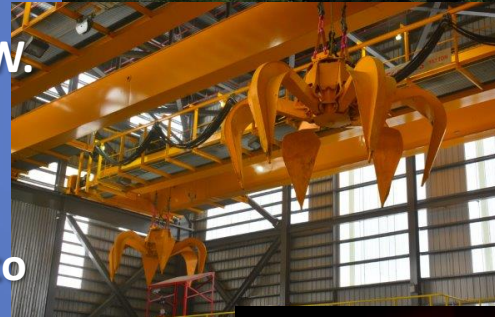


40 YEARS
SOLID WASTE AUTHORITY
of Palm Beach County

Renewable Energy Facility #2

The Palm Beach County Experience

- First project of its kind in almost 20 years in the US.
- Cleanest WTE facility in N. America.
- Processes 3,000 TPD of Post Recycled MSW.
- Reduces waste landfilled by over 90%.
- Increased landfill life by 20 years .
- 96 MW of Renewable Energy, equivalent to powering more than 40,000 homes.
- 25,000 TPY of Recovered Metals.
- More than 1 million hours of PBC construction labor.
- More than \$137 million spent with PBC vendors; \$36 million with small firms.



Achievable

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THANK YOU!

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