US DOE Better Plants Summit

Resource Recovery Electrical Energy
(R2E2)
May 16, 2017

Bruce Bartel – NEW Water
Treatment Manager
Who or What is NEW Water?

- Brand of Green Bay Metropolitan Sewerage District
- Wastewater treatment services for 18 municipalities
- Two treatment facilities serving NE Wisconsin 24/7/365
Protecting our most valuable resource, water
Green Bay Facility
32 mgd
De Pere Facility
8 mgd
De Pere Solids Handling

- Sent to the Green Bay Facility
  - 7 mile force main
  - Processed and disposed at the GBF
R2E2
Resource Recovery Electrical Energy Project

Most cost-effective solution to replace solids handling at the Green Bay Facility

Tools to treat wastewater as a resource
Background Information

Three main drivers:

- Aging infrastructure
- Environmental regulations
- Increased capacity needs
R2E2

- R2E2: Solids & Digestion Facilities
  - Includes:
    - Anaerobic Digestion
    - New Solids Building
    - Centrifuge Dewatering
    - Dryer
    - Biogas Storage
    - Electrical Energy Generation
    - Nutrient Recovery
    - Ash Dewatering and Storage
    - Installation of Fluid Bed Incinerator Equipment
R2E2

- R2E2: Solids & Digestion Facilities
  - Energy Recovery:
    - Biogas to run two – 2.2 MGW I.C. Engines
    - Heat from the I.C. engines to heat the anaerobic digesters
    - Heat recovery from the fluid bed incinerator to run dryer
    - Autogenous incinerator operation
    - Nutrient harvesting to produce fertilizer product
R2E2 Timeline

- Planning Stage (2008-2011) **Complete**
- Design Stage (2012-2015) **Complete**
- Equipment Procurement (2013-2014) **Complete**
- Construction Project #1 (2014) **Complete**
- Construction Project #2 (2015-2018) **Underway**
- Implementation (2018)
- Construction Project #3 (2019)
## R2E2 Costs

<table>
<thead>
<tr>
<th>Project Phase</th>
<th>Approximate Costs</th>
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</thead>
<tbody>
<tr>
<td>Engineering Services</td>
<td>$25,000,000</td>
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<tr>
<td>Fluidized Bed Incinerator Equipment</td>
<td>$21,200,000</td>
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<tr>
<td>Construction Project #1</td>
<td>$6,300,000</td>
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<tr>
<td>Construction Project #2</td>
<td>$114,000,000</td>
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<tr>
<td>Construction Project #3</td>
<td>$2,500,000</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$169,000,000</strong></td>
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</tbody>
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R2E2 Benefits

• Addresses the original project drivers:
  – Aging infrastructure
  – Environmental regulations
  – Increased capacity needs

• Lowest cost plan over a 20-year planning period

• Generate about 50% of NEW Water’s energy needs
R2E2 Benefits

- Accept different wastes (i.e. dairy, sugar, and food processing) that can boost energy production
- Use approx. 90% less natural gas than current system
- Struvite is a slow release fertilizer; $400,000/year revenue
Back to the Future: Resource Recovery and Electrical Energy (R2E2)

1935: GBMSD Plant

- Sludge Drying Beds
- Chlorinated Effluent
- Methane Storage
- I/C Engines/Gen
- Primary Clarifiers
- Wastewater Wetwell
- Laboratory
Thank You!

Questions / Comments?

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For more information please visit:
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Stay connected with us: