# The State of Water:

## Why it is a great time to be in the business!

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Science, Engineering & Construction

# Agenda

- Introduction
- Future trends
- A couple quick examples
- What does it mean for the YP?
- Wrap up & Questions

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# What are you looking for?

- A small sample of YP's provided the following:
  - Work that is not boring
  - Opportunities to learn new things
  - Some have desire to do good for the environment
  - Stability
  - Want to use what has been learned

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# Traditional Treatment

- Activated Sludge process discovered Late 1800's
- Many treatment plants only had primary treatment until late 1960's
- Secondary treatment boom – Clean Water Act, 1972
- Has remained relatively unchanged since.
- Focus always on meeting discharge permit conditions.

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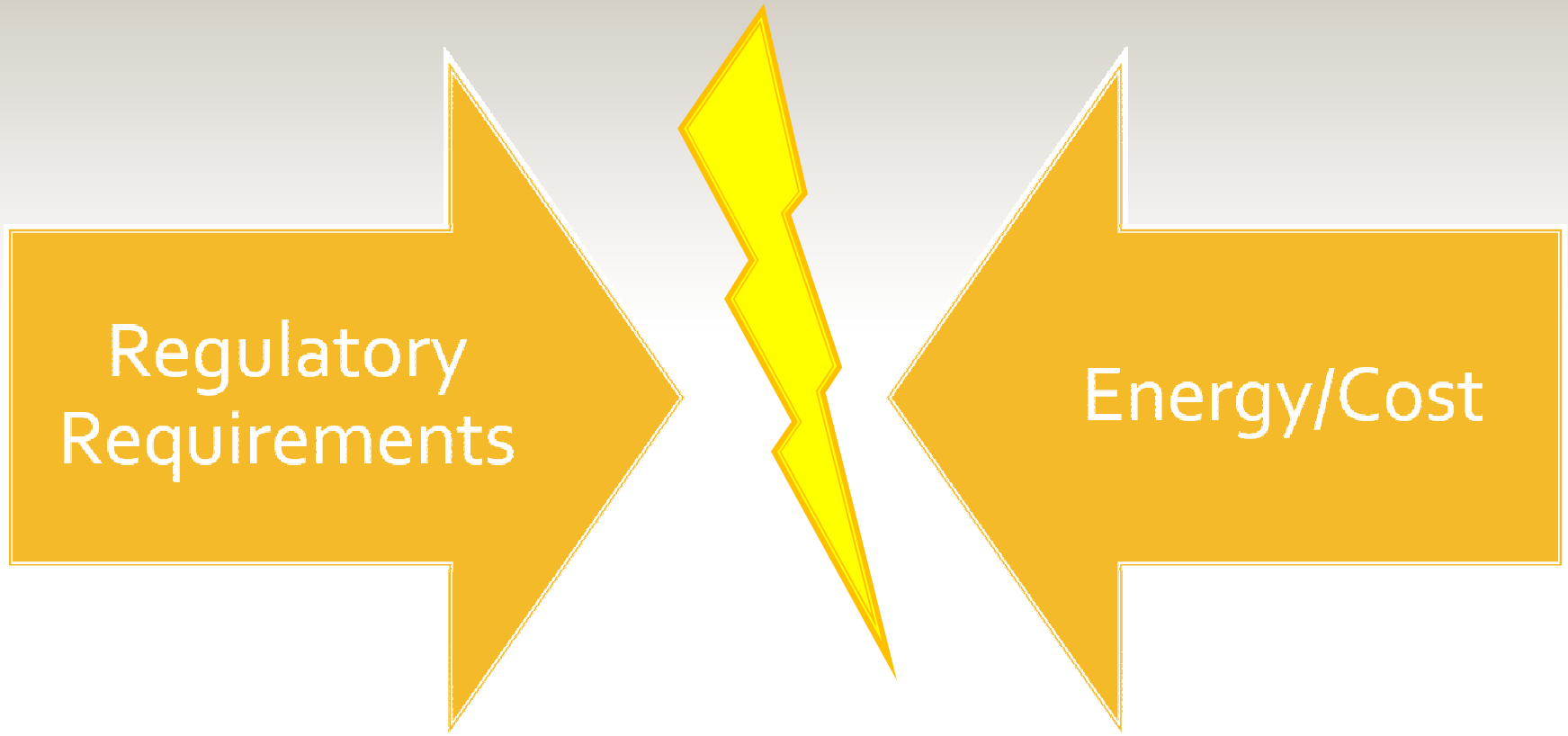
# Water market driven by:

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# Market is also seeing an attitude shift

EPA United States Environmental Protection Agency

## We need a cultural shift

**Current: use water & energy once & dispose of it (tax payer costs)**

**Integrated Resource recovery (tax payer revenues)**

Open linear system

Closed loop system

Dr. Nicholas Ashbolt, EPA
http://www.ecosanservices.org

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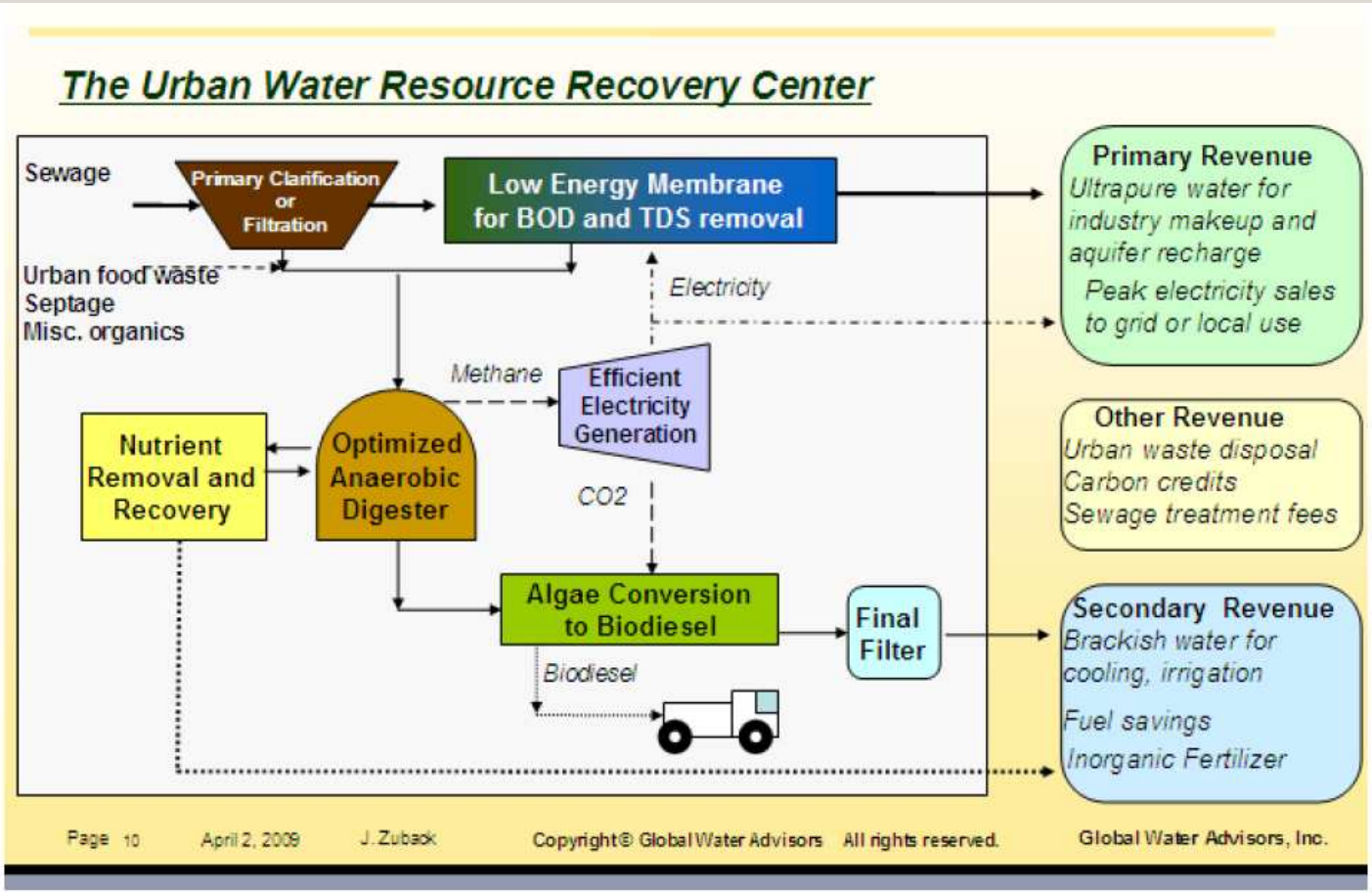
# Example 2:
# Urban Resource Recovery Center

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# Plant is a hub not the end.


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# Innovative Urban Planning

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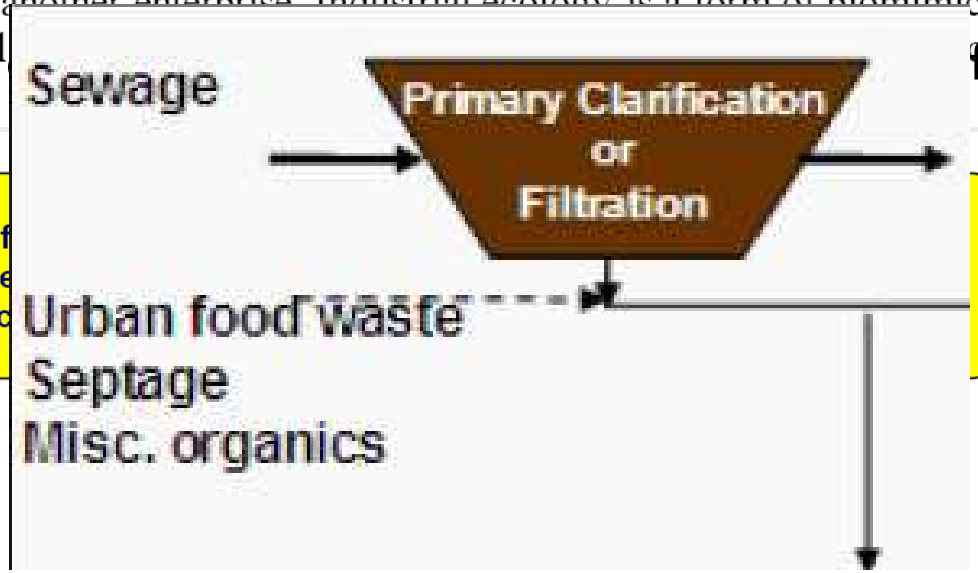
# Public – Private partnerships

In the field of industrial ecology, the waste outputs of one enterprise are converted into input resources for use by another enterprise. Industrial ecology is a form of biomimicry that aims to reduce the ecological [illegible] cles for water and materials.

… waste outputs … for … another

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# What can be recovered?

- Water – Heat/Cooling, irrigation, water recharge, urban planning
- Nutrients – Phosphorus, nitrogen & carbon
- Energy – Liquid and solid
  - Biogas
  - Solids combustion (incineration, gasification, etc)
  - Hydraulic

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# Example 3:
# Only treat what has to be treated.

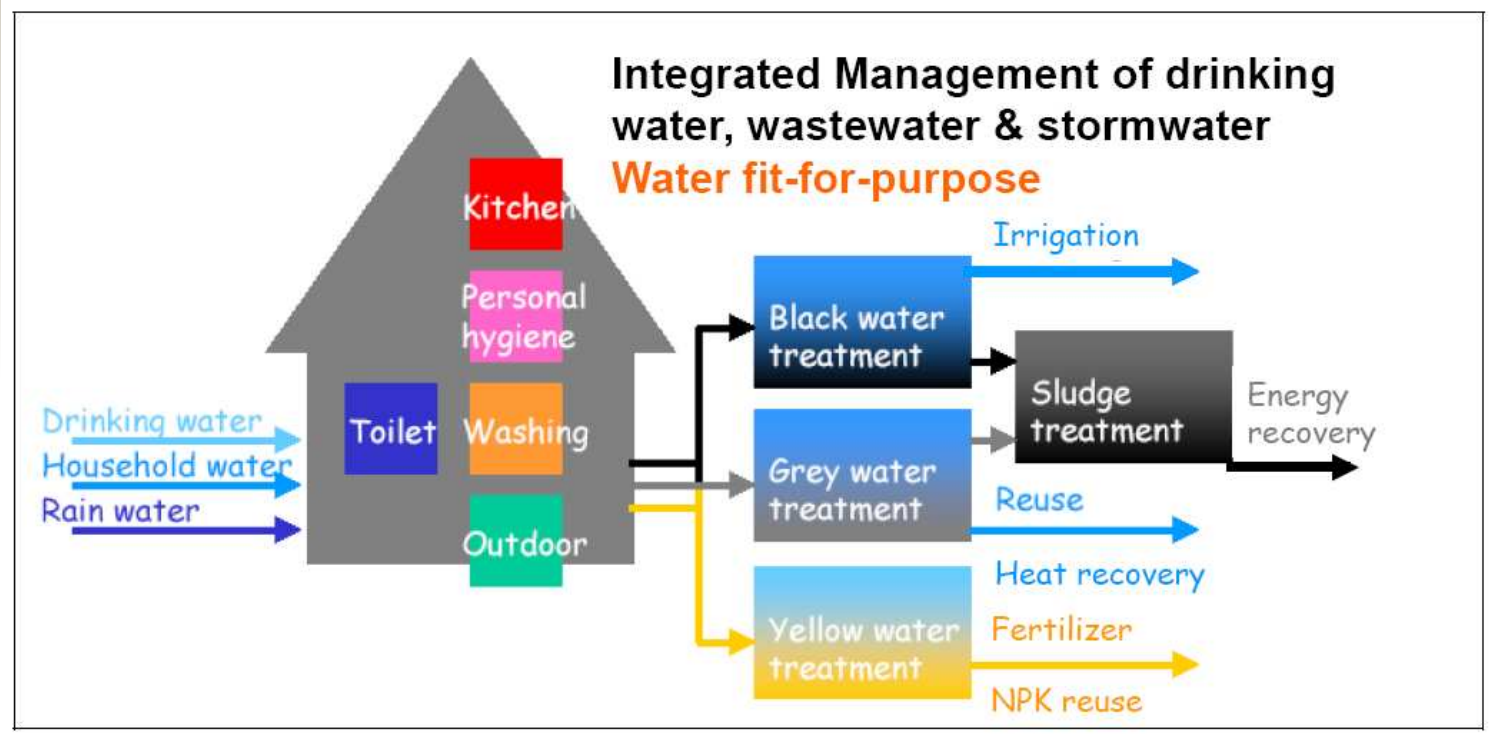


**Figure 3:** Source-separation options that start at the household (adapted from *Ashbolt et al.* 2006)

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# Waste to Resource …

Table 1 – Projected Revenue, Energy and O&M Costs for Trucked Waste Co-digestion

| Waste Source | Waste Volume | Projected Tipping Fees | Projected Methane Gas Value | Projected O&M Costs | Projected Net Benefit |
|---|---|---|---|---|---|
| | (Trucks per Week) | ($/Year) | ($/Year) | ($/Year) | ($/Year) |
| Spent Barley | <1 | $5,000 | $7,000 | ($12,000) | $1,000 |
| Liquor Still Waste | <1 | $4,000 | $11,000 | ($13,000) | $2,000 |
| Meat Production Float | 19 | $200,000 | $345,000 | ($300,000) | $245,000 |
| Soft Drink Can Crushing Waste | 1 | $10,000 | $9,000 | ($2,000) | $17,000 |
| Mustard Production Waste | 7 | $73,000 | $38,000 | ($40,000) | $71,000 |
| Noodles and Rice Production Waste | 1 | $10,000 | $39,000 | ($35,000) | $14,000 |
| Brewing Malt | <1 | $5,000 | $6,000 | ($5,000) | $6,000 |
| Dairy Acid Whey and Lactose | 14 | $147,000 | $200,000 | ($55,000) | $292,000 |
| | | | | | |
| **Totals** | **45** | **$450,000** | **$650,000** | **($460,000)** | **$640,000** |

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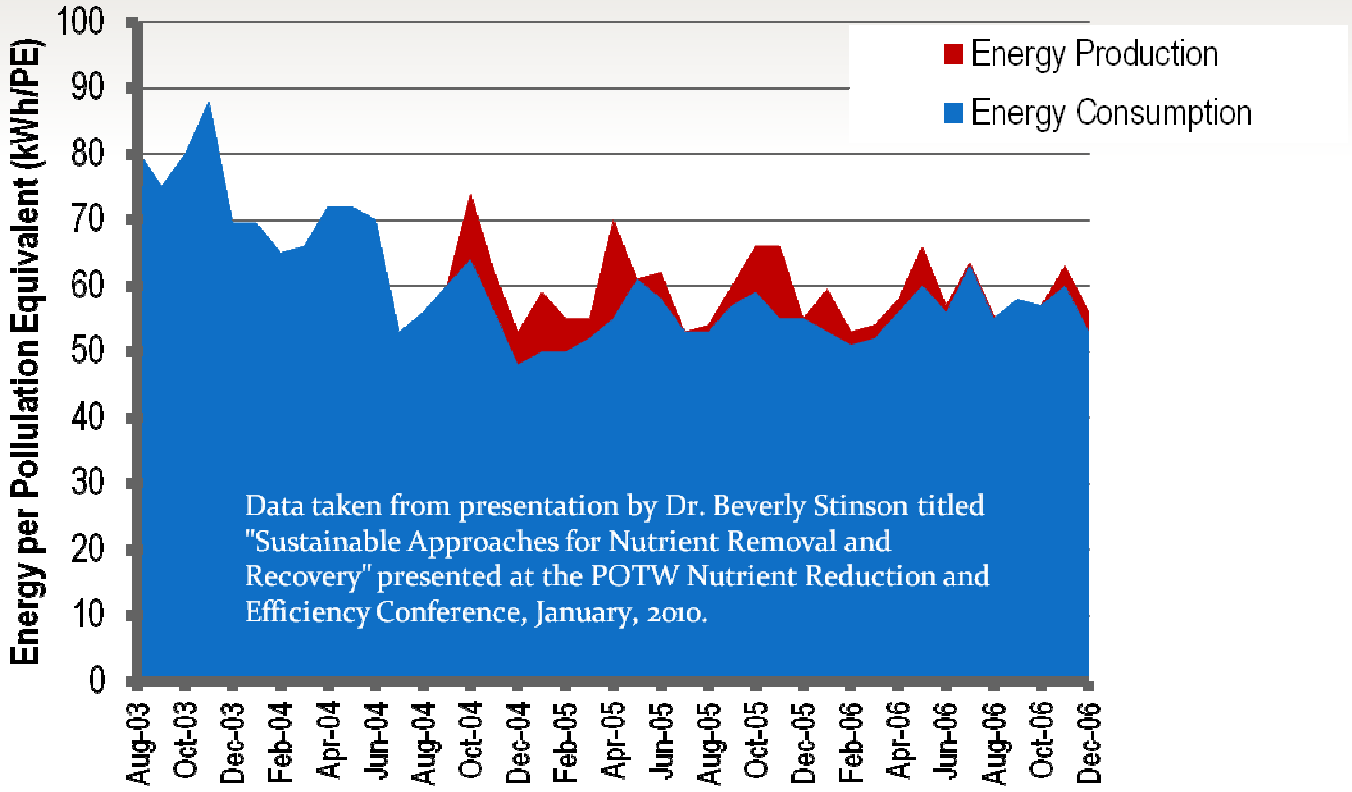
# Energy producer?

**Figure 1: European Wastewater treatment plant**
**Energy Data**
**August 2003 to December 2006**
**Production vs. Consumption**

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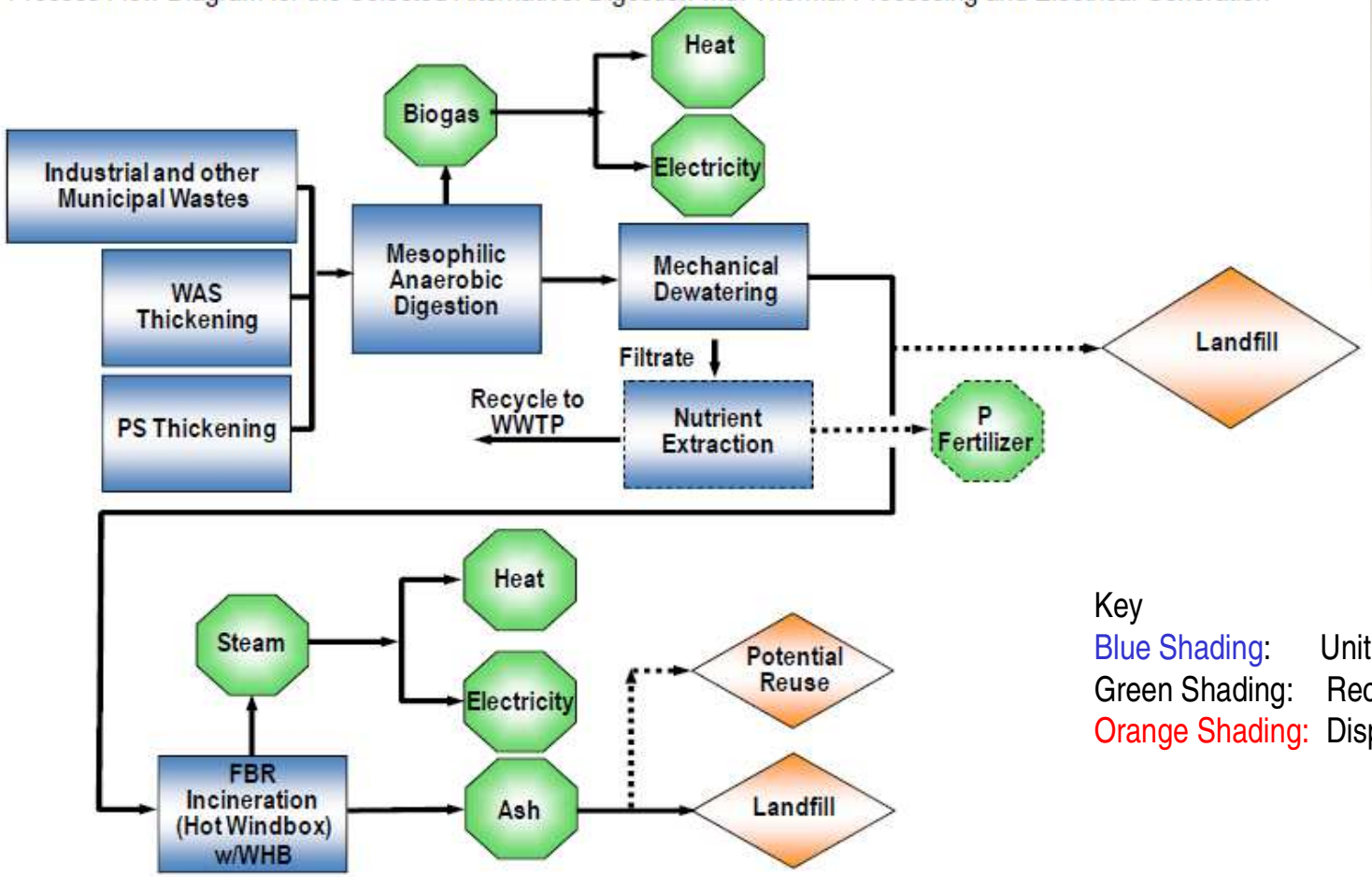
# Solids treatment – Optimize recovery

FIGURE 6-1
Process Flow Diagram for the Selected Alternative: Digestion with Thermal Processing and Electrical Generation




Key
Blue Shading: Unit process
Green Shading: Recoverable
Orange Shading: Disposal

Copied from Green Bay Metropolitan Sewerage District, 2011, *Solids Management Plan - Final*

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# GreenWhey Project – Waste to energy

## Regional Waste to Energy Project

**PROJECT HIGHLIGHTS**

- Over 300,000 gal of high strength wastes from over 10 food processing facilities
- Generate 3.2 MW of electricity
- Generate 362 million BTU per day heat

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# Future of Wastewater Treatment

- Shift toward recovery & reuse
- Shift toward centering treatment as a hub
- Discharge permit is important but other factors are also important
- Public/Private partnerships are important (i.e. urban ecology).

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# What does this mean for you?

- Recall what you are looking for?
  - Work that is not boring
  - Opportunities to learn new things
  - Some have desire to do good for the environment
  - Stability
  - Want to use what has been learned

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# Wrap up

- What does the future look like?
  - Full of promise
  - Providing opportunities to make a difference
- What do you want to do?
- Have I convinced you that it is a great business to be in?

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# Questions?

# Thank You!

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