

# WASTEWATER ANAEROBIC DIGESTION COMES TO MAINE



LEWISTON  
AUBURN  
WATER  
POLLUTION  
CONTROL  
AUTHORITY

Serving  
Lewiston, Auburn  
and surrounding  
communities  
since 1974

2013

**CDM  
Smith®**



**Facility Location:**  
535 Lincoln Street  
Lewiston, Maine 04240

# LAWPCA Snapshot

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- Operating since 1974 as a Wastewater Treatment Plant
- Receives flow from Lewiston and Auburn
- Wastewater treatment
  - 32 million gallons per day (mgd) facility peak capacity
  - 12 million gallons per day (mgd) average daily flow
  - 35,000+ domestic users
  - 23 significant Industrial users
  - 26 septic & holding tank waste communities
- Compost Facility in operation since 1993



# LAWPCA Operation

## Hours of Operation

Plant is staffed 6 AM to 4 PM  
7 days/week  
363 days/year  
On-call operators from  
4 PM to 6 AM

## Staffing Levels

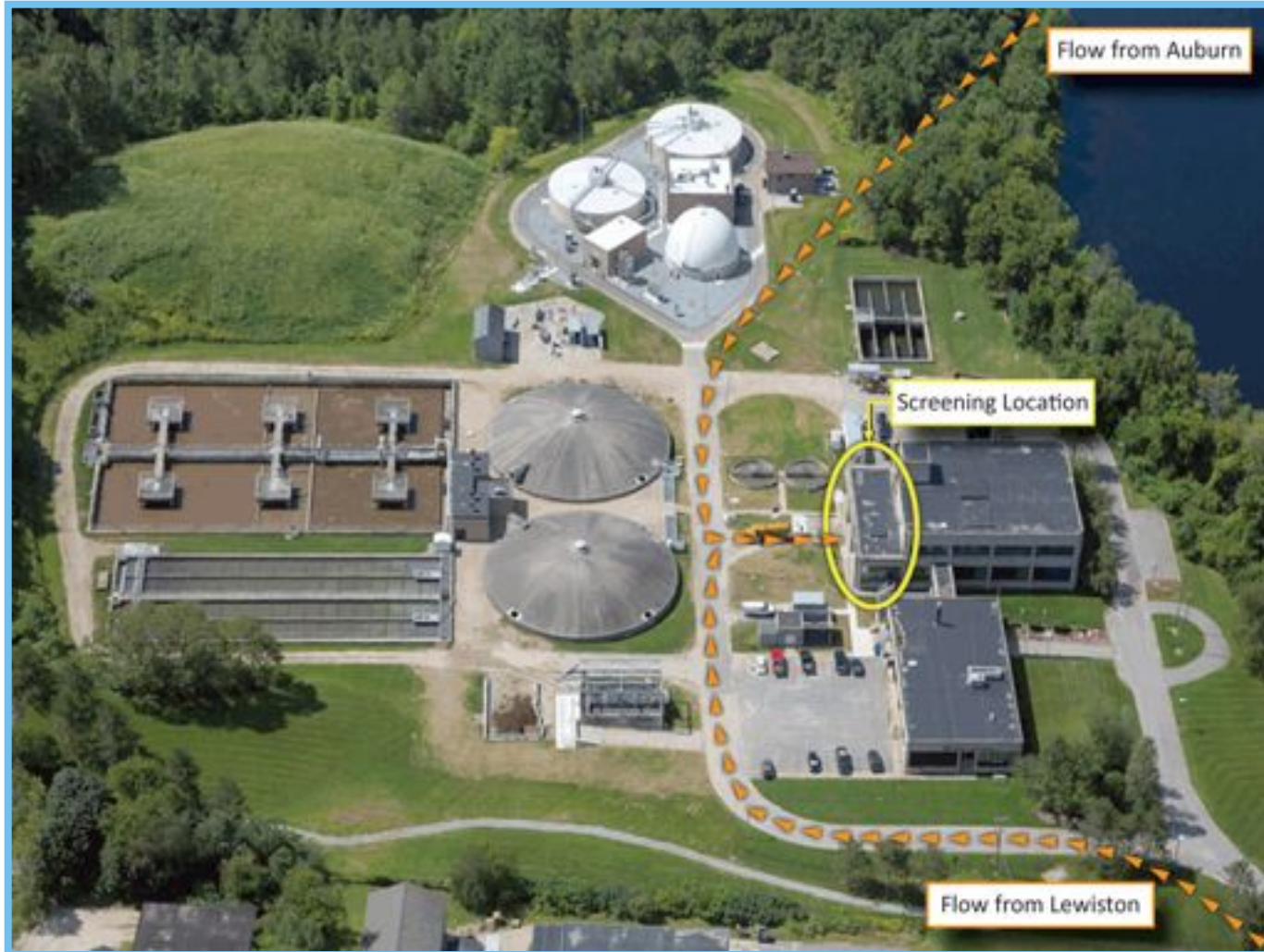
18 Treatment plant staff  
3 Compost facility staff

Main WWTP SCADA (Supervisory Control  
and Data Acquisition) Control Room





# Treatment Plant Overview

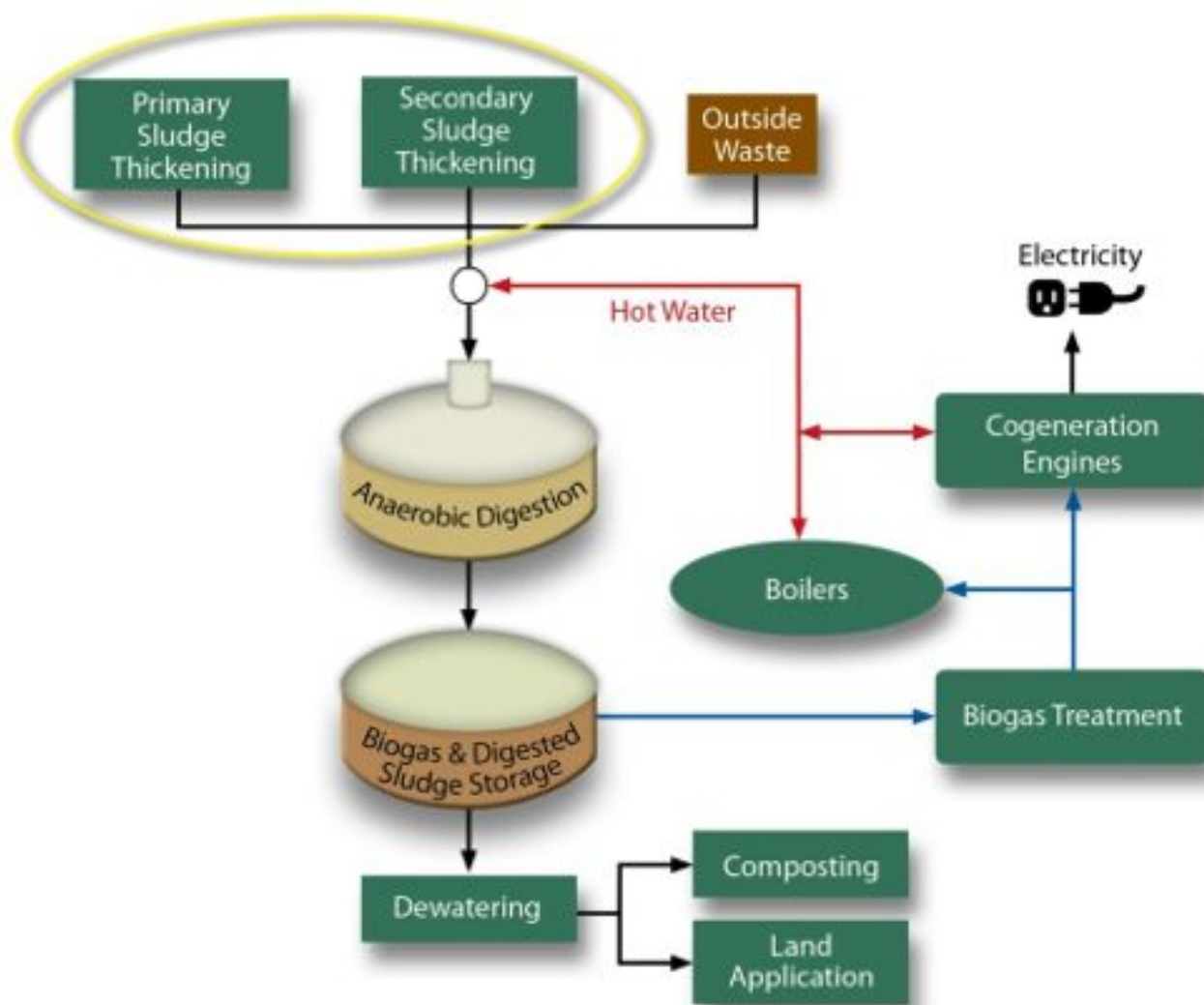


Wastewater enters the plant from Auburn and Lewiston

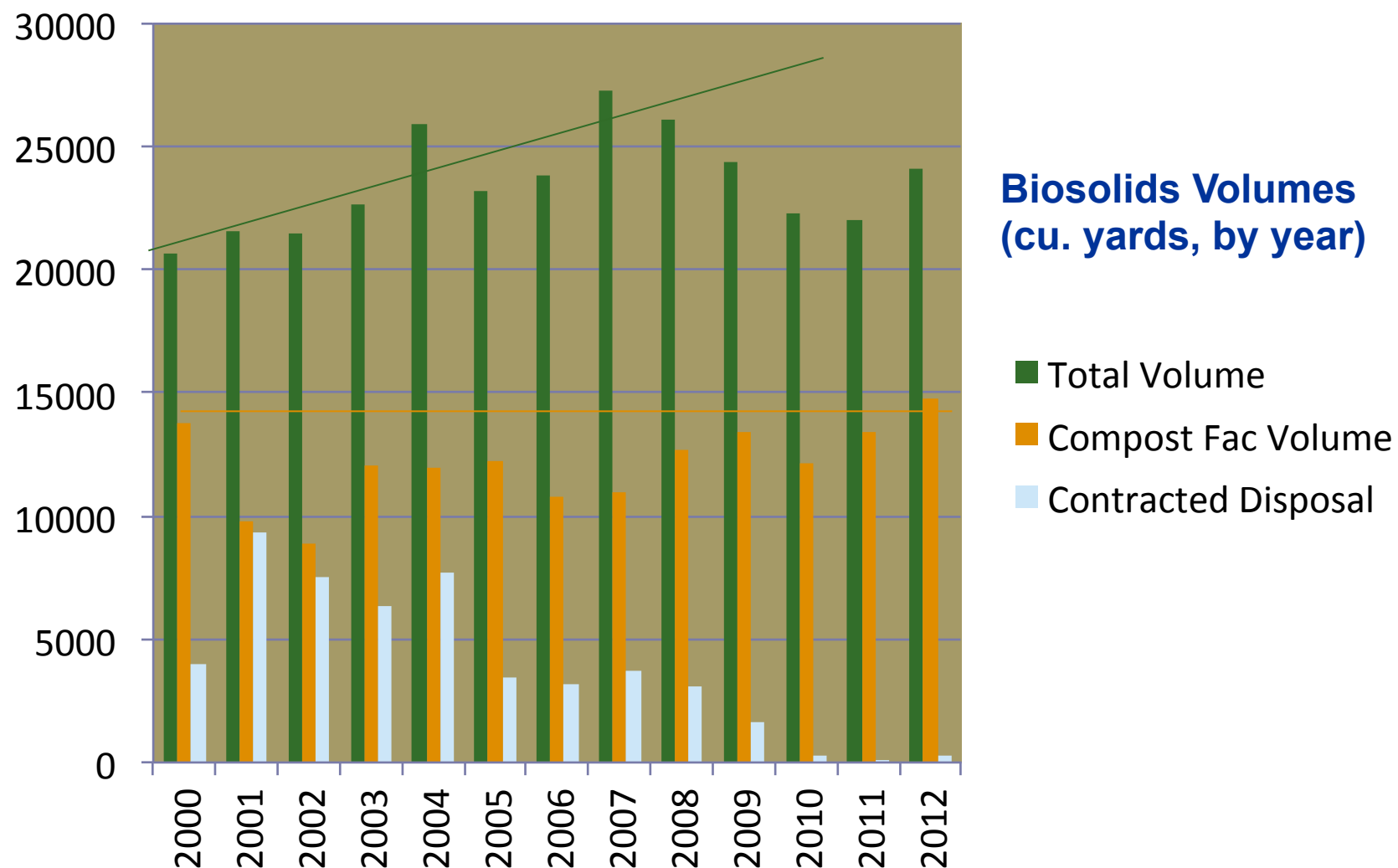
Screening removes materials  $\frac{3}{4}$ -inch or larger including rags, leaves, etc.

Screening material is landfilled

## Solids Processing Schematic



# Why Add Anaerobic Digestion?

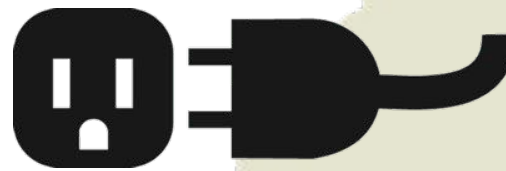




# Benefits of Anaerobic Digestion and Energy Recovery

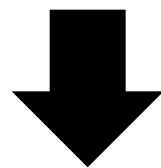


Plant-wide purchased power



**55%**

Biosolids Management Costs



**35%**

CO<sub>2</sub> Emissions



**80%**



## Cost Savings from Proposed Project

• Solids Thickening and Dewatering .....	\$24,040
• Lime Stabilization .....	\$90,000
• Farm Spreading Supplemental Fertilizer.....	\$30,000
• Composting Costs .....	\$186,600
• <b>Reduced Compost Sales</b> .....	<b>\$22,000</b>
• Vehicles, Electricity and Heating Fuels.....	\$93,600
• Biosolids Land Application.....	\$116,000
• Biosolids Contract Disposal.....	\$157,000
• <b>Digester Equipment Maintenance</b> .....	<b>\$33,000</b>
• =====	
Total Net Projected Annual Savings.....	\$640,000



## Other Important Steps to “Get There”

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- Contract with CDM Feasibility Study December 2008
- Board of Directors Tour of Nashua and Franklin
- Conceptual Design and Soil Borings
- Presentations to Auburn and Lewiston City Councils
- Search for Grant Funding (mostly unsuccessful)
- Preliminary Design
- Value Engineering Study
- Breakout of Co-Generation Engines as a Bid Alternate
- Efficiency Maine Grant for Co-Generation Only
- Construction Contract Award for \$11,140,548
- Bid Alternate/Change Order #1 for Co-Gen \$817,000

## Anaerobic Digestion

**Digesters: 2**

**Total capacity:**

1.38 million gallons

Mesophilic, 97°F

Conventional, Cylindrical fixed cover with gas cupola.

Rotamix mixing system.



## Biogas and Digested Sludge Storage



Biogas and digested sludge are stored prior to subsequent processing

**Gas storage:**

33,000 cubic feet

**Digested sludge storage:**

168,000 gallons



## Biogas Treatment



Biogas is treated to remove impurities such as moisture and hydrogen sulfide.

Siloxane removal was not included, but space left for future addition if needed.



## Biogas Utilization



Biogas is used as a fuel in engines to produce electricity or is used in boilers to produce hot water

The hot water produced by the engine cooling jackets or boilers is used to keep the digesters at the correct temperature.

Reciprocating engines were chosen over micro-turbines due to size, ability to handle somewhat “dirtier” gas, and maintenance needs.

## “As Built” Financial Picture

- Total Construction Cost \$12,732,570
- Total Engineering Cost \$2,799,694 (17.7% of total proj cost)
- Total Project Cost \$15,532,264 \*
- 1% SRLF Loan with 5.96% Principal Forgiveness
- \$330,000 Efficiency Maine Grant for Co-Gen Units
- Operational Savings (including power produced)
- Renewable Energy Certificates
- Outside Wastes accepted to digester
- Solids from other WWTPs for Composting
- 20 year, \$7,000,000 bond paid off in 2013
- NO NET INCREASE IN SEWER RATES!

## Step IV – Sludge Dewatering



Digested solids are dewatered using existing belt filter presses

**Biosolids (2012):**  
24,100 cubic yards



## Biosolids Utilization



40% of the biosolids are used on area farms for fertilization as class B biosolids

**LAWPCA** biosolids have helped sustain area farms  
***for over 30 years!***

LAWPCA has over 20 farms in the class B program. Response to date for the digested class B product has been positive.



## Biosolids Utilization

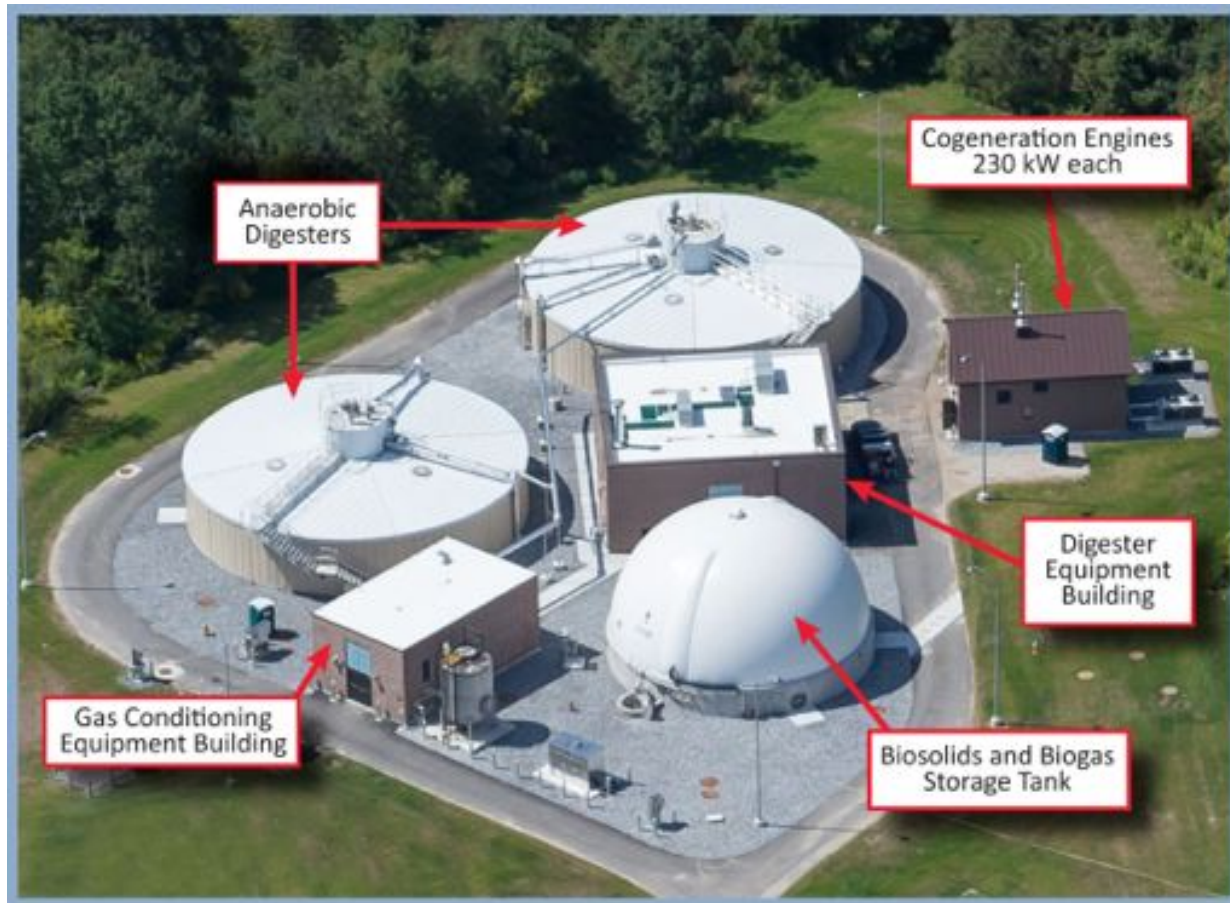


60% of the biosolids are converted to a (class A) compost product

**MaineGro** compost is sold to contractors, landscapers, and the general public



# Anaerobic digestion and energy recovery facilities



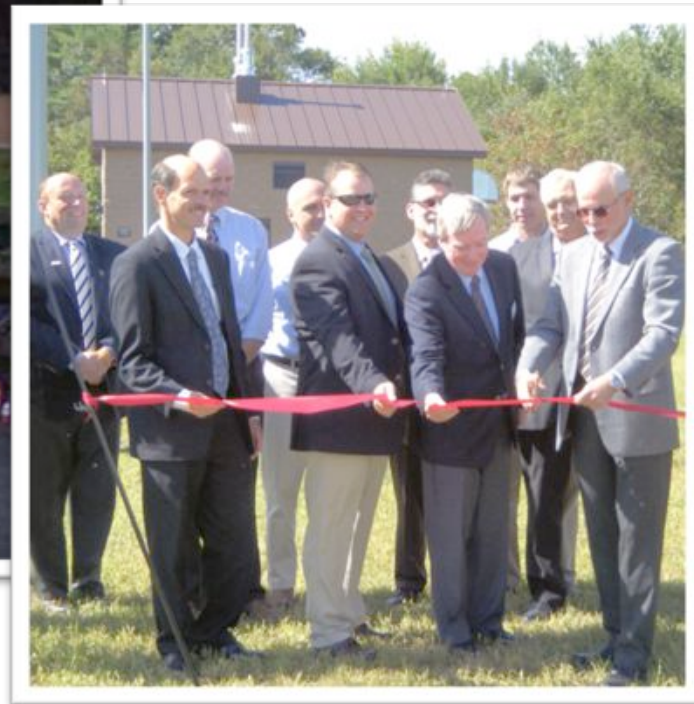
## Operational Results to Date

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- Stable Digester Operation, 1 minor upset
- 59% VSS reduction, 30 day +/- SRT
- Volatile Acids to Alkalinity Ratio average 0.12, pH 7.6
- 41.5% volume reduction in Biosolids
- Wetter cake solids from 17% to 13.5%
- Higher Polymer use
- Running one of two Co-Gen units 175 KW average
- No outside wastes yet



# Anaerobic Digestion/Energy Recovery Facilities Completed Summer 2013



LEWISTON AUBURN WATER POLLUTION CONTROL AUTHORITY

