



# Anaerobic Digestion in Maine

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*Protecting Maine's Air, Land and Water*

# DEP License Required?

- Facilities digesting only manure and agricultural wastes → No
- Facilities (including farms) digesting manure and residuals/solid waste from off-site → **Yes**
- WWTPs digesting own sludge → No
- Facilities digesting Type II (or Type III) from off-site → **Yes**



# Licensing ADs in Maine

- *Solid Waste Management Rules: Processing Facilities, Chapter 409*
- Siting standards - setbacks to water supplies, natural resources, property boundaries, airports, etc.
- Design and operating standards – environmental monitoring, leak detection, odor management, final disposition of digester outputs



# Design and Operating Standards

- Design capacity – accommodate throughput
- Sampling and Analytical Work Plan for feedstocks and residuals
- Run-off, storm water and leachate control for 25-year, 24-hour storm
- **Odor control**
- If digester is below grade, leak detection required



# Digestate

- Digestate – material remaining after anaerobic digestion (liquid and solid)
- If used as soil amendment
  - *Agronomic Utilization of Residuals*, Chapter 419
- If other off-site beneficial use such as animal bedding
  - *Beneficial Use of Solid Wastes*, Chapter 418



# Regulating ADs

- Annual (at least) DEP inspection
- Annual reports
- Analytical requirements – feedstock dependent
  - Heavy metals
  - Salmonella or fecal coliform
  - Semi-Volatile Organic Compounds (SVOCs)
  - Volatile Organic Compounds (VOCs)



# Odor Control

- Main compliance issue faced by ADs
- 99% of complaints are for odor issues
- Properly-sized biofilter or other odor control equipment
- Receiving area can be a major source of odor



# Maine AD Facilities

- Currently 3 in operation
- Exeter Agri-Energy in Exeter, ME
- Village Green in Brunswick, ME
- Lewiston-Auburn Water Pollution Control Authority (LAWPCA) in Lewiston, ME





# Anaerobic Digesters in Maine



# Exeter Agri-Energy

- Co-located with Stonyvale Farm
  - Stonyvale is second largest dairy in Maine with ~1,000 milking cows
- Licensed in 2011, began operating in 2012
- (2) 396,000-gallon digesters
- (2) feedstock receiving tanks
- 1 MW combined heat and power (CHP) unit
- “Bio-separator” for digestate processing



# Exeter Agri-Energy



# Exeter Agri-Energy (cont.)

- Feedstocks
  - 7,300,000 tons manure from Stonyvale
  - 6,649 tons liquid food residual, FOG, Glycerol, DAF sludge (from ME, NH, MA, RI)
  - 8,154 tons source separated organics (ME, MA)



# Exeter Agri-Energy (cont.)

- Depackager
  - Separates packaged food from plastic, metal, styrofoam, cardboard containers
  - Add water to form slurry then to AD



# Exeter Agri-Energy (cont.)

- Outputs
  - 5,825 MW-hr electricity
  - 10,950 cubic yards dairy bedding from dewatered digestate (bio-separator) to Stonyvale
  - 11,000,000 gallons liquid digestate to Stonyvale and used on farm fields as fertilizer per the approved Nutrient Management Plan





# Exeter Agri-Energy (cont.)

- On the horizon
  - Approved for expansion to double size of facility to ~1,584,000 gallons and add 2 1-MW engines
  - Revising design to build 1 larger digester rather than 2 smaller digesters
  - Working with composter in South Berwick, ME to consolidate organics from southern Maine and other parts of New England for shipment to AD



# Village Green

- Located at former Brunswick Naval Air Station
- Licensed in 2015, began operating in 2016
- (1) 850,000-gallon digester
- Liquids receiving tank
- Receiving hopper with grinder and macerator
- 230,000-gallon equalization tank
- 1-MW combined heat and power (CHP) unit





# Village Green



# Village Green (cont.)

- Feedstocks
  - 18,301 tons biosolids (ME, NH, MA)
  - 17,042 tons septage (ME)
  - 348 tons FOG (ME)
  - 1,545 tons food residuals (ME, MA)



# Village Green (cont.)

- Outputs
  - 1,961 MW-hr electricity to local utility
  - 54,085 tons liquid digestate/process water to POTW
  - 10,175 tons dewatered digestate to landfill



# Village Green (cont.)

- On the horizon
  - Recently approved to land-apply Class B dewatered digestate on 126 acres in central Maine
  - Investigating pilot project to land-apply Class A liquid digestate
  - Investigating pilot project to compost dewatered digestate
  - Goal is to keep all digestate out of landfill

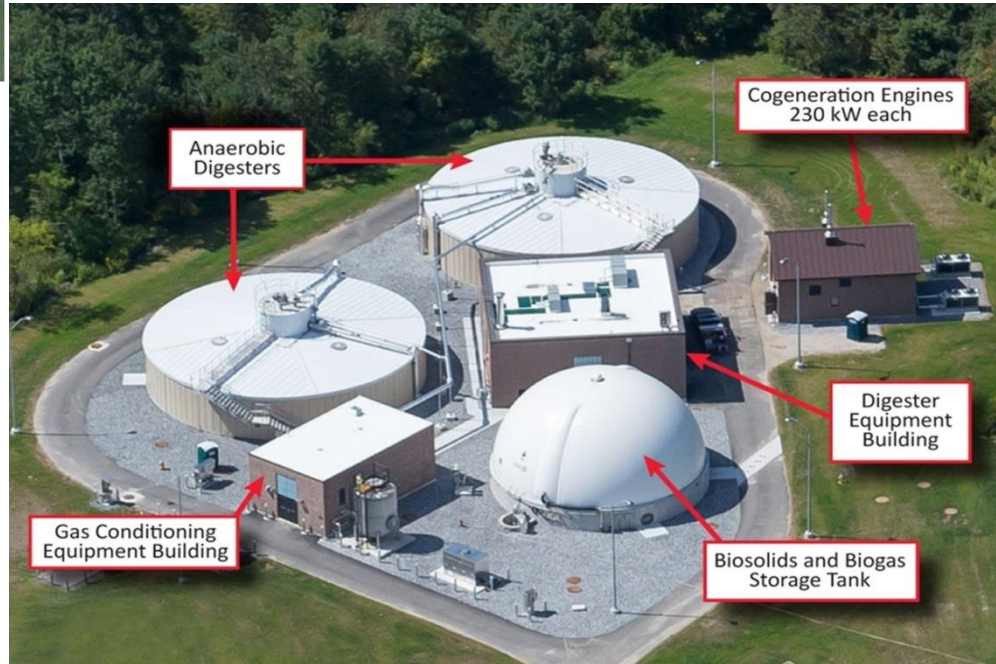


# LAWPCA

- Located at the Lewiston-Auburn Water Pollution Control Authority's 14 MGD WWTP
- Began operation in 2013
- 2 700,000 gallon digesters
- 168,000-gallon digestate/biogas storage tank
- Feedstock receiving station
- 2 230-kW CHP units



# LAWPCA



# LAWPCA (cont.)

- Feedstocks
  - Brewery waste (42,294 gallons\*)
  - Chicken processing waste/DAF waste (96,000 gallons\*)
  - FOG
  - Liquid food residuals (25,400\*)
  - Biodiesel production waste (glycerol)
  - Deicing fluid (48,115\*)
  - Yogurt whey (not currently)

\*Data from February and March 2017

# LAWPCA (cont.)

- Outputs
  - 1,941 MW-hr electricity
  - All liquid digestate back to WWTP
  - 9,255 cubic yards Class B dewatered digestate (biosolids) land-applied
  - 4,307 cubic yards dewatered digestate composted at LAWPCA compost facility in Auburn, ME





# LAWPCA (cont.)

- On the horizon
  - No major changes expected
  - 2018 will be first time they take one of the digesters down for clean out





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