

CRMC Bioenergy Facility

Presentation at
2015 R3 Recycling & Organics Conference
and Trade Show
March 30, 2015

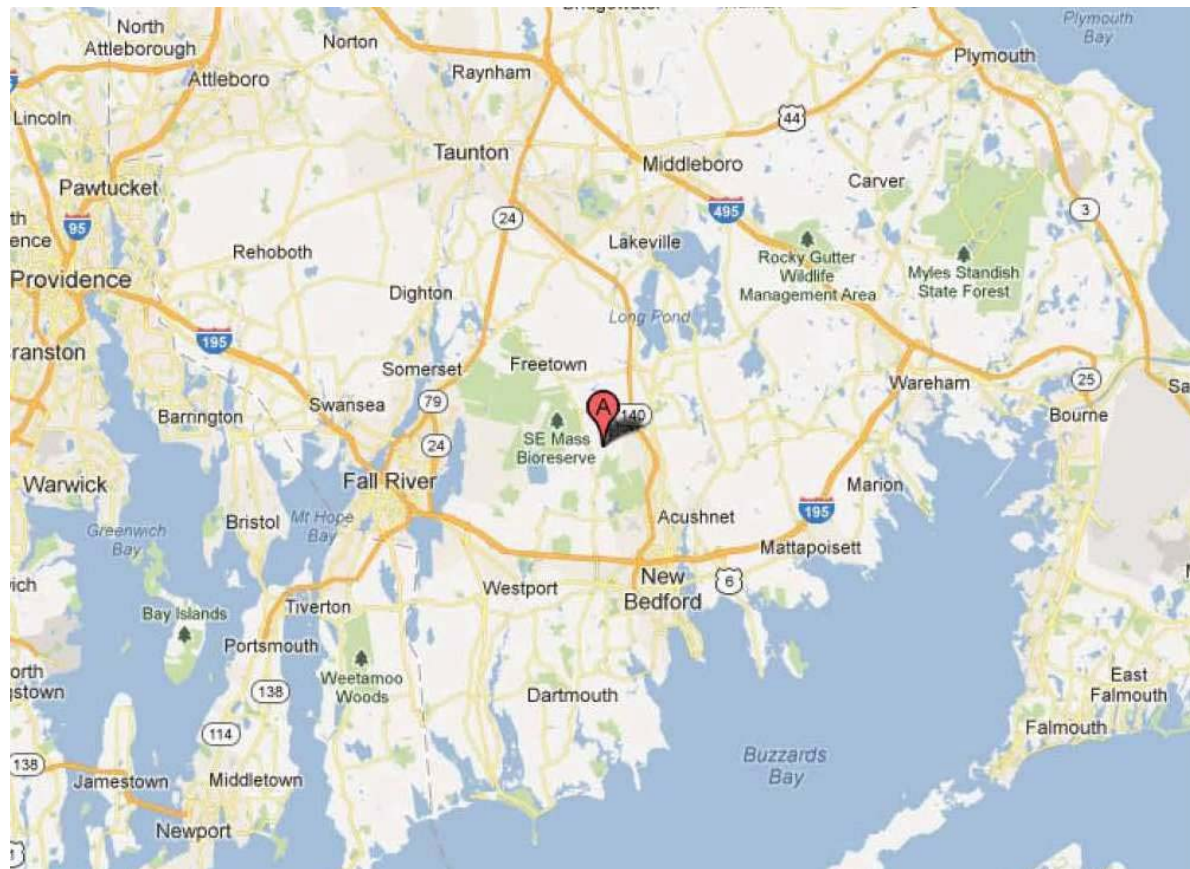
CommonWealth

Resource Management Corporation

CRMC Experience and Capabilities

- Management consulting: 24 years in solid waste and renewable energy industries serving private and public sector clients
- Project development, ownership and operation:
 - Co-developed 7 landfill gas-to-energy facilities (LFGTE) facilities
 - Developed, owned and operated 3 LFG utilization facilities
 - Currently own and operate 2 LFGTE facilities and 1 AD facility
 - First AD facility in New England integrated with LFGTE facility and landfill

CRMC Bioenergy Facility: Location



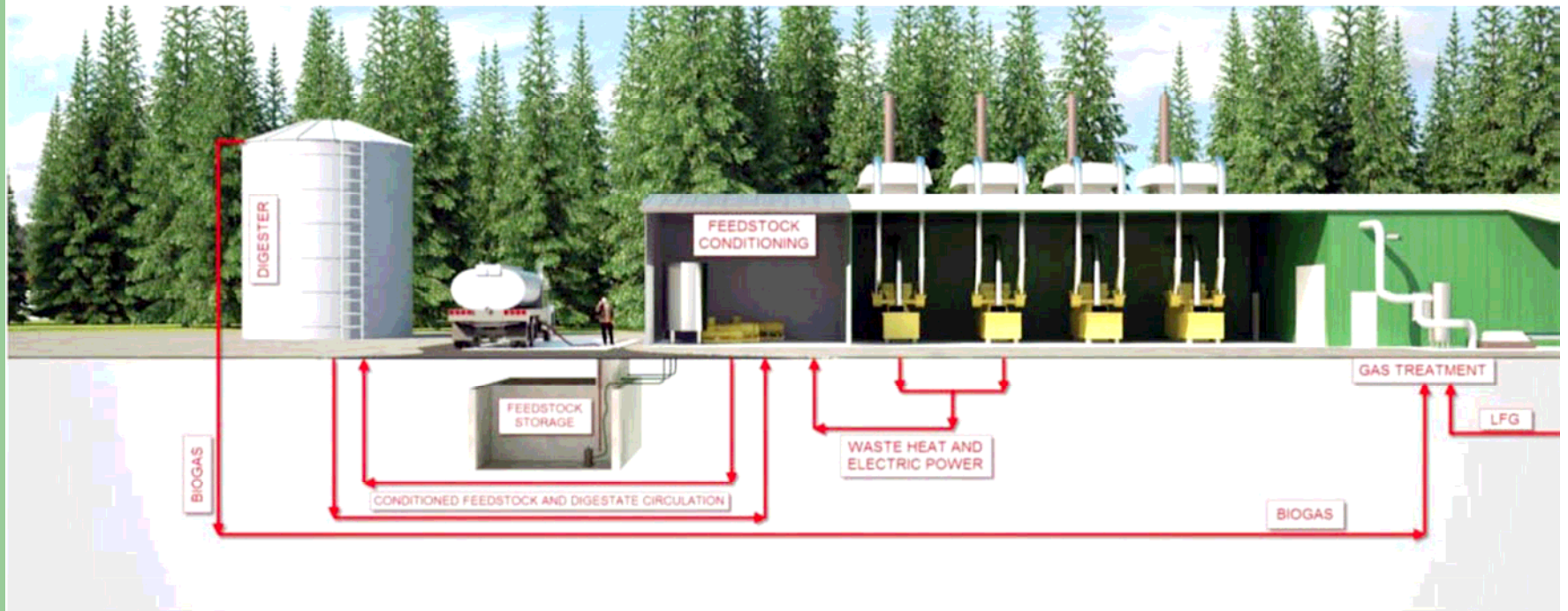
CRMC Bioenergy Facility: Project Components

- Initial phase (pilot): Operational since November 2014
 - Feedstock receipt and storage
 - 36,000 gallons intake capacity in three underground tanks
 - Pumpable form of Food Waste, WWTP sludge, FOG
 - Feedstock conditioning: Mix and heat feedstocks
 - Digestion
 - 100,000 gallon anaerobic digester
 - Continuous feed, wet, mesophilic anaerobic digestion
 - Continuous hydraulic mixing
 - 1 million gallons per year
 - Products: biogas (~1 to 1.5 MMBtu/hr) and digestate
- Final commercial scale: Initial phase x 10
 - 1 million gallon anaerobic digester
 - Digestate processing
 - Products: biogas (~10 to 15 MMBtu/hr) and digestate

Integrated components

- Renewable energy power plant (3.3 MW)
 - Owned by CommonWealth New Bedford Energy LLC
 - Operational since 2005
 - Fueled by biogas from landfill and digester
 - Provides thermal energy, power, and odor control to CRMC Bioenergy facility
- Crapo Hill Landfill
 - Owned by Greater New Bedford Regional Refuse Management District
 - Active MSW landfill serving New Bedford and Dartmouth
 - Operational since 1995
 - Provides end-uses for digestate
 - Injection in closed, capped area to increase LFG production
 - Substitute for water in posi-shell, daily landfill cover
 - Additive in yard waste compost

Integrated system



CRMC DARTMOUTH BIOENERGY FACILITY - GENERALIZED PROCESS FLOWS

Objectives of First Phase Operation

- Determine quantities of biogas and incremental LFG
 - use excess power plant capacity
- Determine incremental components required to build and operate at final commercial scale
 - Transform packaged food waste to depackaged food waste slurry
 - Transform digestate to usable and marketable form outside landfill uses
- Aggregate pumpable SSO direct from sources and through liquid waste haulers
- Determine type and size of uses for biogas and digestate

CRMC Bioenergy Facility

Front View: CRMC Bioenergy Facility and CNBE LFGTE Facility



CRMC Bioenergy Facility Side View of Digester, Receiving Area, Process Building



CRMC Bioenergy Facility

Back View of Digester, Receiving Area, Process Building and Landfill



CRMC Bioenergy Facility Process room



Barriers to AD development

- Food waste market yet to emerge
 - No enforcement of food waste ban
 - Packaged solid food waste incompatible with use options
 - Sources of food waste slow to act
- End uses of digestate
- Key market drivers mismatch with traditional financing
 - SSO supply agreements, digestate uses, and PPAs
- DEP BACT policy on digester power emissions