

Biomass and Biogas Policy

Promoting clean heat, power, fuels and soil amendments

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www.MABEC.org



About MABEC

- Promotes the use of biomass to produce clean heat, power, fuels and soil amendments throughout the Mid-Atlantic region
- 30+ organizations across the region
- Formed in 2011
- Programs cover education and policy
- Dues: \$2,500 \$250
- Join today: <u>www.MABEC.org</u>





Thermal Energy



Adapted from: U.S. Energy Information Administration

- **9%** of thermal comes from biomass
- In 2008, industry officials convened to give a voice to the biomass thermal portion of the energy sector



Organic Material

• With what infrastructure will we manage:

- 66,500,000 TONS of food waste each year
- The sludge from 31 BILLION gallons of wastewater EVERY DAY
- The manure AND NUTRIENTS from 8 BILLION cows, chicken, turkey and pigs

• Where will the nutrients for US agriculture come from?

- 12,840,000 short TONS of nitrogen (N) needed
- 4,321,000 short TONS of phosphate (P₂O₅) needed
- Nitrogen is mostly made from ammonia using fossil fuels
- Phosphorus mining in the US creates radioactive waste—or we import it



How Biogas Systems Work





Policies to Help Project Development

- Decrease development time
 - Example: Make permitting and interconnection easier.
 - Why: Less time to develop = less expensive installations
- Decrease project costs
 - Example: tax credit
 - Why: society benefits from the construction of certain systems
- Force purchases from some customers
 - Example: Public entity must buy some product
 - Why: Revenue for the project, easier to get financing.
- Help project developers sell their gas/energy. Revenue for the project, easier to get financing:
 - Example: Credit based market policy
 - Why: public entities want to incentivize certain projects for the greater good
- Require feedstock to go to certain destinations
 - Example: Large food waste generators must recycle food waste
 - Why: Certain stream of input material = financing possible



A Bill Becomes Law



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- Must originate in the House of Representatives
- Changes Internal Revenue Code of the United States
- Policies
 - Section 45 Production Tax Credit (1.1 cents/kWh for 10 years) with election to take Investment Tax Credit (30% of capital costs)
 - Need tax liability
 - BTU Act: new investment tax credit for highly efficient biomass systems
 - Agriculture Environmental Stewardship Act (HR. 3744): new investment tax credit for non-electricity biogas systems and nutrient recovery systems



Origin of HR 3744

- Problems:
 - 1. Tax code does not equally support all kinds of biogas projects (i.e., those that generate electricity and pipeline quality gas)
 - 2. Algae blooms are an increasing threat to commercial, recreational and other activities
- Solution:
 - Incentivize the construction of systems that can address the problems
- Conudrum:
 - What should qualify?
 - What should be excluded?



HR 3744

15	"(5) QUALIFIED BIOGAS PROPERTY.—		
16	"(A) IN GENERAL.—The term 'qualified		
17	biogas property' means property comprising a		
18	system which—		
19	"(i) uses anaerobic digesters, or other		
20	biological, chemical, thermal, or mechanical		
21	processes (alone or in combination), to		
22	convert biomass (as defined in section		
23	45 K(c)(3)) into a gas which consists of not		
24	less than 52 percent methane, and		
1	"(ii) captures such gas for use as a		
	(ii) captaros such gas for ase as a		
2	fuel.		





From U.S. Code, Section 45K(c)(3) - link can be found here https://www.law.cornell.edu/uscode/text/26/45K

(3)BiomassThe term "biomass" means any organic material other than—
(A) oil and natural gas (or any product thereof), and
(B) coal (including lignite) or any product thereof.



- Certain projects, if approved by a government body can generate credits in addition to other products
- The credits can be sold in an open marketplace
- Quantity of credits determined by government policy
- Value of the credits determined by what customers will pay
- Examples:
 - Renewable Electricity Certificates/Credit (REC) = 1 MWh
 - Renewable Identification Number (RIN) = 1 gallon gasoline (equivalent) = 77,000 BTU (for non liquid fuels)
 - Low Carbon Fuel Standard Credits = [depends on carbon intensity score]



* compared to a 2005 petroleum baseline



RNG Fuel Pathways



PATHWAY	FUEL TYPE	FEEDSTOCK	PRODUCTION PROCESS	D CODE
Q	Renewable Compressed Natural Gas, Renewable Liquefied Natural Gas, Renewable Electricity	Biogas From Landfills, Municipal Wastewater Treatment Facility Digesters, Agricultural Digesters, and Separated MSW Digesters; and Biogas From The Cellulosic Components Of Biomass Processed In Other Waste Digesters	ANY	D3
т	Renewable Compressed Natural Gas, Renewable Liquefied Natural Gas, Renewable Electricity	Biogas From Waste Digesters	ANY	D5

- D3 RIN ≈ \$2.50
- D5 RIN ≈ \$0.75

Applied RIN Math



• For upgraded biogas/RNG as vehicle fuel Electricity: 1MMBTU will run a • Fossil NG = 3.00/MMBTU + 100kW engine for +D3 RIN @ $$2.50 = $30.00/MMBTU_{Manure, MSW}^{Biosolids}, LFG 1hr}$ @ ^ORD5 RIN @ \$0.75 = \$9.00/MMBTU Food waste \$.05/kWh + 1/10 of a RECOther ite lite life [i life [ite]ite]ite ite





+ \$3 -\$30/MMBTU if you can sell into the LCFS Market

American Biogas Council www.americanbiogascouncil.org

Project example:



A 42 MGD WRRF is considering whether to not take in 60,000 TPY/0.16 MGD (0/4%) food waste, and if they do, how to account for the RINs—accept 100% D5 RINs or calculate a D3/D5 split for the biogas produced.

100% D3 RINs	100 % D5 RINs	Split 23% D3 RINs 77% D5 RINs	
WITHOUT food waste	WITH food waste		
300 MMBtu/day	1,000 MMBtu/day	1,000 MMBtu/day	
\$3,200,000 gross revenue/yr.	\$3,200,000 gross revenue/yr. + food waste tip fee	\$4,900,000 gross revenue/yr. + food waste tip fee	
@ \$2.50 per D3 RIN	@ \$0.75 per D5 RIN	@ \$2.50 / D3 RIN, \$0.75 / D5 RIN	
	Same revenue (+ tip fees)	\$1.7 million in additional RIN revenue!	



Reference: 1 MMBtu = 11.727 RINs

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How much might the tipping fee be worth?

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@ \$2.50 per D3 RIN	@ \$0.75 per D5 RIN	@ \$2.50 / D3 RIN, \$0.75 / D5 RIN
	Same revenue (+ tip fees)	\$1.7 million in additional RIN revenue!
	Tipping Fee: 24,000 TPY food waste (dry) 156,550 gal/day (wet, 10% TS) \$0.15/gal. tipping fee \$23,500/day \$8.6 million/year!	

www.americanbiogascouncil.org



RIN Price Fluctuations





www.americanbiogascouncil.org Data: Progressive Fuels Limited

RIN D3 Pricing Forecast





California Low Carbon Fuel Standard (LCFS)



- California Air Board charged with reducing Carbon Intensity (CI) of transportation fuel by 10% by 2020 as part of Global Warming Solutions Act of 2006
- Developed LCFS as essential cap and trade program in 2010
- Entities unable to meet requirement purchase credits from those who do meet it
- 2016 Credits Sold: 5+ million credits @ \$101/MT CO₂e
- 2016 RNG Credits Sold: ~350,000 (7%)

Carbon Intensity



- The lower, the better (and more valuable)
- 2 pathways were developed by ARB for mesophilic anaerobic digestion at wastewater treatment plants in 2014
- Site specific pathways could also be developed and utilized
- Plan for price uncertainty and volatility

Feedstock	Delivere	Carbon Intensity gCO2e/MJ			
	d fuel	Mean	Min	Max	
AD Wastewater Sludge	CNG	19	8	31	Treating <20MGD
Animal Waste	CNG	-264	-273	-255	\$25-30/MMBTU
Landfill Gas	CNG	48	37	67	\$4-6/MMBTU

 LCFS credits in California varied from \$75/ton to \$150/ton of CO2 equivalent in 2017.

For comparison, Gasoline and Diesel CI are both ~ 96 CO2e/MJ



Organics Recycling Policy

Basic Formula: Build it and they will come

IF

- You are a large organic waste generator; AND
- There is an organic waste recycling facility nearby; AND
- The facility will receive your material

THEN

- By a certain date, you must recycle your organic material
 ELSE
- Nothing happens





Organics Recycling Policy

Municipalities: San Francisco, Seattle, Austin, Vancouver, New York City, most starting in 2009-10

2011: CT, Public Act 11-217 (updated in 2013)

BIVENERGY

2012: VT, Universal Recycling Law, Act 148—all organics, largest generators first, effective 7/1/2016

2013

- CT: Public Act 13-285 (update to 2011)—Commercial organics, effective 1/1/14
- NYC: Local Law 146-2013—Commercial organics, effective 7/1/2015

2014

- MA: 310 CMR 19.000 regulations—Commercial organics, effective 10/1/14
- RI: An Act Relating to Health and Safety—Commercial organics, effective 1/1/2016
- CA AB 1826: Mandatory Commercial Food Waste Recycling, effective 1/1/2016

2015

• MN: Statute 115A.151 Public Entities; Commercial Bldgs; Sports Facilities, effective now

2019

• NY, MD & NJ

BI ENERCY COUNCIL

Join us this September 17-18 at MABEX in Baltimore, MD

More info:

www.MABEX.org

Promotes deployment of systems that convert woody biomass and non-woody biomass (organics) to energy

Biogas, biomass to heat and power, and soil amendments

30+ organizations across the Mid-Atlantic

• Dues: \$2,700 - \$500

• Join today:

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Questions?

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