



STATE OF VERMONT
JOINT FISCAL OFFICE

MEMORANDUM

To: Joint Fiscal Committee Members
From: Nathan Lavery, Senior Fiscal Analyst
Date: September 19, 2014
Subject: Grant Request #2700, #2701, #2702, #2703

Enclosed please find four (4) items that the Joint Fiscal Office has received from the administration.

JFO #2700 – \$97,443 grant from the U.S. Department of Agriculture to the Vermont Agency of Agriculture, Food and Markets. These funds will be used to study the economic feasibility using gas from farm anaerobic digesters as fuel for farm equipment.
[JFO received 09/05/14]

JFO #2701 – \$50,000 grant from Kent Whealy to the Vermont Department of Finance and Management. These funds will a portion of the cover costs associated with implementation and administration of new law that requires labeling of food produced from genetic engineering. The donated funds will be deposited in the Vermont Food Fight Fund.
[JFO received 09/05/14]

JFO #2702 – \$5,000 grant from Stonyfield Farm, Inc. to the Vermont Department of Finance and Management. These funds will a portion of the cover costs associated with implementation and administration of new law that requires labeling of food produced from genetic engineering. The donated funds will be deposited in the Vermont Food Fight Fund.
[JFO received 09/05/14]

JFO #2703 – \$1,000,000 grant from U.S. Department of Health and Human Services to the Vermont Department of Health. These funds will be used to increase access to health care services by increasing funding for loan repayment programs designed to recruit and retain primary care, dental, and psychiatry providers. This grant requires a \$1,000,000 state match that was appropriated in the FY2015 budget bill.
[JFO received 09/05/14]

Please review the enclosed materials and notify the Joint Fiscal Office (Nathan Lavery at (802) 828-1488; nlavery@leg.state.vt.us) if you have questions or would like an item held for legislative review. Unless we hear from you to the contrary by October 1 we will assume that you agree to consider as final the Governor's acceptance of these requests.

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 Department of Finance & Management
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Agency of Administration

JFO 2700

**STATE OF VERMONT
 FINANCE & MANAGEMENT GRANT REVIEW FORM**


Grant Summary:	This grant will be used to help determine the economic feasibility of using gas from anaerobic digesters on farms as fuel for milk hauling trucks and for farm equipment.				
Date:	9/2/2014				
Department:	Agency of Agriculture, Food and Markets-Agricultural Development Division				
Legal Title of Grant:	On-Farm Renewable Natural Gas Production for Transportation Fuels: A Feasibility Study				
Federal Catalog #:	CFDA # 10.773				
Grant/Donor Name and Address:	USDA Rural Development, 87 State Street, Suite 324, PO BOX 249, Montpelier, VT 05601				
Grant Period:	From: 10/1/2014		To: 9/30/2015		
Grant/Donation	\$97,443				
	SFY 1	SFY 2	SFY 3	Total	Comments
Grant Amount:	\$68,574	\$28,869	\$	\$97,443	

Position Information:	# Positions	Explanation/Comments
	0	

Additional Comments:

Has Vantage budget detail been reviewed and reconciled? Yes No HC (Analyst Initial)

Department of Finance & Management	RECEIVED	JOINT FISCAL OFFICE	9/2/14	(Initial)
Secretary of Administration			9/13/14	(Initial)
Sent To Joint Fiscal Office			9/5/14	Date



STATE OF VERMONT REQUEST FOR GRANT (*) ACCEPTANCE (Form AA-1)

1. Agency:	Vermont Agency of Agriculture, Food and Markets		
2. Department:	Agricultural Development Division		
3. Program:	(Agricultural Development Division)		
4. Legal Title of Grant:	On-Farm Renewable Natural Gas Production for Transportation Fuels: A Feasibility Study		
5. Federal Catalog #:	Catalog of Federal Domestic Assistance (CFDA) Number 10-773		
6. Grant/Donor Name and Address:	USDA Rural Development 87 State Street, Suite 324 P O Box 249 Montpelier, VT 05601		
7. Grant Period:	From:	10/1/2014	To: 9/30/2015
8. Purpose of Grant:	Determine the economic feasibility of using gas from anaerobic digesters on farms as fuel for milk hauling trucks and for farm equipment.		
9. Impact on existing program if grant is not Accepted:	Continued negative effects of a lack of employment opportunities and of job losses in rural communities in the Northeast Kingdom.		

	SFY 1	SFY 2	SFY 3	Comments
Expenditures:	FY 2015	FY 2016	FY	
Personal Services	\$	\$	\$	
Operating Expenses	\$23,315	\$9,816	\$	state indirect rate of 34%
Grants	\$45,259	\$19,053	\$	portion going to a consultant via a grant agreement
Total	\$	\$	\$	
Revenues:				
State Funds:	\$	\$	\$	
Cash	\$	\$	\$	
In-Kind	\$	\$	\$	
Federal Funds:	\$	\$	\$	
(Direct Costs)	\$	\$	\$	
(Statewide Indirect)	\$	\$	\$	
(Departmental Indirect)	\$	\$	\$	
Other Funds:	\$	\$	\$	
Grant (source)	\$	\$	\$	
Total	\$68,574	\$28,869	\$	

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STATE OF VERMONT REQUEST FOR GRANT (*) ACCEPTANCE (Form AA-1)

Appropriation No:	CFDA Number 10-773	Amount:	\$97,443
			\$
			\$
			\$
			\$
			\$
		Total	\$97,443

Has current fiscal year budget detail been entered into Vantage? Yes No

PERSONAL SERVICE CONTRACTS

11. Will monies from this grant be used to fund one or more Personal Service Contracts? Yes No
 If "Yes", appointing authority must initial here to indicate intent to follow current competitive bidding process/policy.

Appointing Authority Name: Charles Ross, Jr. Agreed by: _____ (initial)

12. Limited Service Position Information:	# Positions	Title
Total Positions		

12a. Equipment and space for these positions: Is presently available. Can be obtained with available funds.

13. AUTHORIZATION AGENCY/DEPARTMENT

I/we certify that no funds beyond basic application preparation and filing costs have been expended or committed in anticipation of Joint Fiscal Committee approval of this grant, unless previous notification was made on Form AA-1PN (if applicable):	Signature: <i>Charles Ross, Jr.</i>	Date: 8-26-14
	Title: <i>Secretary of Agriculture</i>	
	Signature: _____	Date: _____
	Title: _____	

14. SECRETARY OF ADMINISTRATION

<input checked="" type="checkbox"/>	Approved:	(Secretary or designed signature) <i>[Signature]</i> Deputy	Date: 09/03/14
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15. GOVERNOR'S SIGNATURE

<input checked="" type="checkbox"/>	Check One Box: Accepted	(Governor's signature) <i>[Signature]</i>	Date: 9/5/14
<input type="checkbox"/>	Rejected		

16. DOCUMENTATION REQUIRED

Required GRANT Documentation	
<input checked="" type="checkbox"/> Request Memo <input type="checkbox"/> Dept. project approval (if applicable) <input checked="" type="checkbox"/> Notice of Award <input checked="" type="checkbox"/> Grant Agreement	<input type="checkbox"/> Notice of Donation (if any) <input checked="" type="checkbox"/> Grant (Project) Timeline (if applicable) <input type="checkbox"/> Request for Extension (if applicable) <input type="checkbox"/> Form AA-1PN attached (if applicable)

On-Farm Renewable Natural Gas Production for Transportation Fuels: A Feasibility Study

Proposed Scope of Work

1. Background

Renewable Natural Gas (RNG) is generated from organic sources such as landfill waste, manure, and food scraps. When this waste enters an anaerobic digester, biogas results and the digester captures it. This gas can be used to produce electricity, or it can be scrubbed and converted into compressed natural gas to power specially equipped, high-efficiency vehicles. The process of converting organic waste into RNG for use in vehicles is shown in Figure 1.

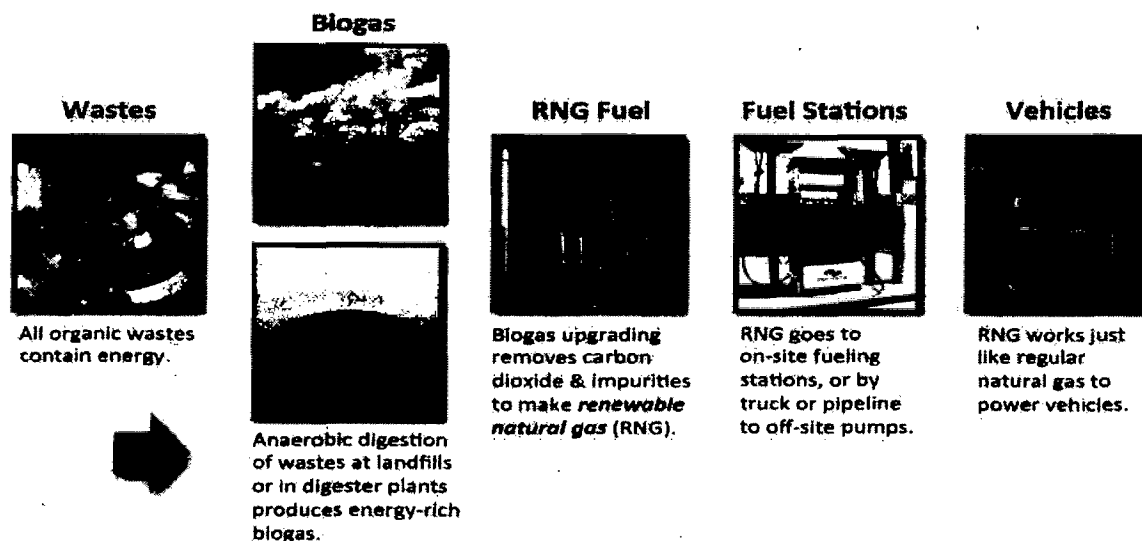


Figure 1. The pathway from organic wastes to RNG vehicle fuel.¹

RNG has five primary advantages over conventional diesel and gasoline fuels. It:

1. Is locally produced and renewable
2. Is cheaper than gasoline and diesel
3. Allows farmers to control their fuel costs across the long term
4. Supports energy security and distributed generation of vehicle fuel
5. Has far cleaner emissions than gasoline or diesel

Approximately 15 Vermont farms are already converting their organic waste to electricity through anaerobic digestion, and selling it to the regional grid through the Green Mountain Power program, CowPower. These farms generated approximately 18,040 MWh in 2012. The cost of diesel is considerably higher than that of electricity, however. The 18,040 MWh of

¹ Energy Vision, 2014, Turning Waste into Vehicle Fuel: Renewable Natural Gas (RNG): <http://energy-vision.org/publications/reports/energy-vision-publications>

electricity produced by Vermont dairy farms is worth approximately \$2.9 million, at 2013 residential electric rates. The equivalent amount of MMBtus in diesel is worth \$4.5 million, after accounting for the higher conversion efficiency of RNG relative to electricity. Similarly, studies conducted in Washington State and California show that the value of biogas for transportation is many times higher than the value of converting it to electricity. In Washington, the US Department of Energy (DOE) estimates that the profit from RNG for transportation fuel is four times higher than that generated through RNG for electricity production: \$672 per day vs. \$2,948 per day for a 1,200 head dairy farm using food waste in its digester in addition to manure.²

As described above, in addition to using anaerobic digestion to produce electricity, it can also be used to produce RNG. The Vermont Dairy Promotional Council lists nearly 250 dairy farms in the Vermont region known as the Northeast Kingdom, and many of these farms could be strong candidates for converting their organic waste to energy, specifically RNG for transportation.

The value of RNG for dairy farms is twofold. It can be seen in terms of (1) reduced fuel expenditures on diesel and gasoline through on-farm gas production, and (2) generation of renewable fuel credits (renewable identification numbers, or RINS), which can be sold under the federal Renewable Fuel Standard (RFS). The RFS requires obligated parties (refiners, importers, and component blenders of gasoline and diesel) to purchase a specified number of gallons of renewable fuel (for example, ethanol and RNG) for use in transportation. This ensures that some renewable fuel replaces petroleum-based transportation fuel, heating oil, and jet fuel. Renewable fuel producers generate the RINS credits. RNG used in transportation generates RINS that can be sold to obligated parties. The RFS mandate goes out through 2022. RNG qualifies as an “other advanced biofuel”; its role is shown in Figure 2.

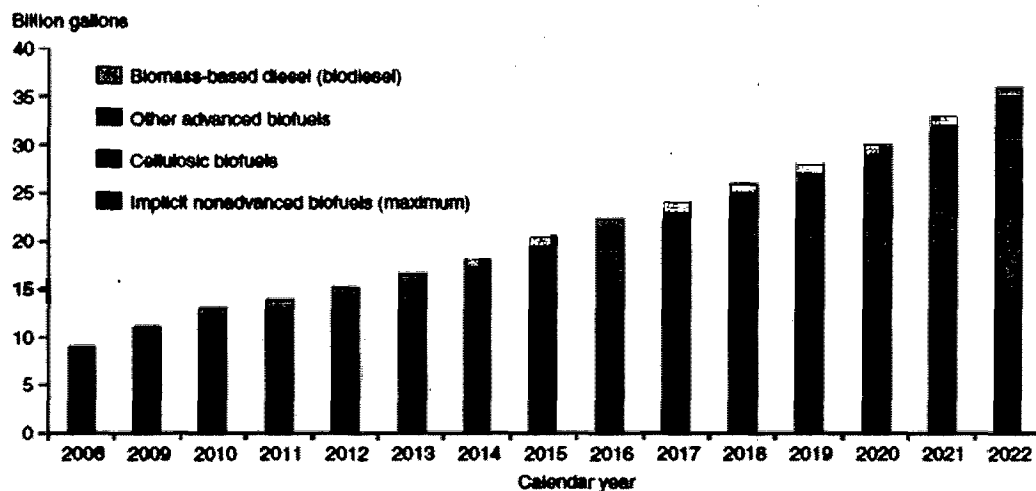


Figure 2. Renewable fuel standard (RFS) mandate by type, 2008-22.³

² Energy Efficiency and Renewable Energy Division, U.S. Department of Energy, *Finding Key Partners-Clean Cities and Biogas Projects*.

³ USDA, 2011, *The Renewable Identification Number System and U.S. Biofuel Mandate*: www.ers.usda.gov/media/138383/bio03.pdf.

As of March 2013, RINs were trading at approximately \$0.70 each. To put this into perspective: If the current participating farm energy output were used as RNG, the RIN generation value would range from almost \$800,000 (at \$0.40 per RIN) to nearly \$2 million (at \$1.00 per RIN) annually.

2. Description of Proposed Work

The Vermont Agency of Agriculture proposes an analysis of the cost effectiveness of generating RNG from on-farm activities for on- and off-farm vehicles in Vermont's Northeast Kingdom (Essex, Caledonia, and Orleans counties). We will perform a feasibility analysis of on-farm RNG production and use in farm equipment, as well as the use of RNG as a transportation fuel for milk haulers. Using RNG on the farm and for transportation will require coordination between (1) farms capable of investing, and willing to invest, in digesters and new farm equipment and (2) milk haulers. This equipment must be able to be powered by RNG rather than diesel. The milk haulers must be willing and able to switch their operations away from diesel to RNG.

Our analysis will consider the following financial aspects of potential RNG use:

1. Costs of anaerobic digesters and equipment necessary to convert biogas to RNG (cost to farms)
2. Costs of RNG fueling infrastructure and RNG-compatible farm equipment (or retrofits of existing equipment; cost to farms)
3. Cost of RNG vehicles (cost to milk haulers)
4. Value of the RNG fuel generated versus current and future transportation fuel costs
5. RIN generation income and tax and incentive opportunities

Our analysis will be informed by actual financial data from farms participating in the study. In collaboration with the Vermont Department of Agriculture, we have sent letters to 26 dairy farms in the study area to solicit participants, and have signed up one farm already. In addition, we will consider the logistical aspects of matching up candidate farms with candidate milk hauling companies.

We will also consider appropriate business models that integrate on-farm RNG production, primarily models involving:

- outright purchase of required infrastructure and equipment (digester, biogas scrubber) and purchase of natural gas vehicles and farm equipment or retrofit / conversion of existing vehicles;
- lease and lease to own models of required infrastructure and equipment;
- conventional financing, and;
- financing through Commons Energy, an energy savings company that offers a revolving loan fund for energy efficiency projects in public-purpose buildings.

Several Vermont digester companies have developed small-scale digesters (up to 200 head of cattle). The proposed effort will involve matchmaking between Vermont companies / farmers and milk haulers / processors. Of particular interest is the potential for dairy farmers to produce

enough biogas to power the daily milk truck, thus reducing what farmers must pay to their milk haulers. By reducing the hauler's diesel costs, the amount that is automatically withdrawn from the farmer's milk check for fuel costs will also be reduced or eliminated, and a positive amount added in for the value of the fuel generated. This would essentially provide farmers with a new revenue stream.

Our feasibility analysis will consider the costs and benefits of on-farm RNG production for both actors in this value stream. In addition to the digester, the farmer will also need to invest in RNG fueling infrastructure. Because this investment is anticipated to be sizable, all farms that could benefit from a digester might not necessarily produce enough gas to make RNG production feasible. It may be most cost effective for multiple farms in close proximity to pool their manure and digester material to ensure adequate RNG production, and share the resulting revenue. A major component of the proposed feasibility study will include a spatial analysis of Northeast Kingdom dairy farms, accounting for their size, proximity to one another, and local milk hauling routes. Farm location is expected to be an important factor in determining strong candidates for on-farm RNG production.

The feasibility study will use data from farms and milk haulers in Caledonia, Essex and Orleans Counties in Vermont. The final product, a report detailing estimated upfront costs and long-term financial benefits of on-farm RNG production, will be relevant to farmers throughout rural America, because of the study's dedication to common factors relevant to all farms with livestock: manure and methane production, transportation costs of getting products to market; geographic proximity to other farms; and the role of electricity and other fuels in operations. It will also serve as a model for farms of fewer than 1000 head.

3. Timeframe

We estimate that this project will take one year to complete: October 2014 through September 2015. The work is divided into four tasks:

1. Data collection
 - a. Financial information from participating farms on current energy costs and estimated milk production
 - b. Estimates of upfront capital costs and ongoing maintenance costs of on-farm RNG systems, including anaerobic digesters, biogas scrubbers, and conversion of on-farm diesel equipment. In addition, we will explore grant and low-interest loan programs that could offset the initial capital outlay for these systems
 - c. Estimates of future diesel, electricity, and natural gas costs in the region
2. Financial, spatial, and economic impact modelling
 - a. Financial modeling will estimate the profitability of on-farm RNG under several scenarios that factor in farm size and proximity to other farms and milk processing facilities
 - b. Spatial modeling will identify candidate farms and partners (milk hauling operations, milk processing facilities, other local dairy and non-dairy farms) for on-farm RNG production

- c. Economic impact modeling will estimate impacts of on-farm RNG production that will ripple out to other areas of the economy

3: Final report

- a. The final report will detail findings, methodology, and assumptions of our analysis. The objective of this report will be to provide guidance for future farm RNG projects


Task	Oct 2014	Nov 2014	Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015	May 2015	Jun 2015	Jul 2015	Aug 2015	Sep 2015	Oct 2015
Data collection													
Financial and spatial modelling													
Economic impact analysis													
Final report													



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MEMORANDUM

TO: Jeb Spaulding, Secretary, Vermont Agency of Administration

FROM: Chuck Ross, Jr., Secretary
Vermont Agency of Agriculture, Food & Markets 

DATE: August 25, 2014

SUBJECT: **On-Farm Renewable Natural Gas Production for Transportation Fuels: A Feasibility Study**

With this funding, the Agency of Agriculture, using one or more consultants and a grant agreement, will determine the economic feasibility of using gas from anaerobic digesters on farms (also called "biodigesters," or "manure digesters") as fuel for milk-hauling trucks and for farm equipment. One or more farms and milk haulers in the Northeast Kingdom will actively participate by sharing actual cost data from their operations.

The work is funded entirely by the USDA Rural Business Opportunities Grant, at \$97,443. The budget includes 34% for the Agency's indirect costs.

To complete the scope of work, in addition to hiring a consultant, VAAFM anticipates engaging and/or continuing to engage several key stakeholders:

- US EPA AgSTAR (VAAFM is the official state partner)
- The Northeast Kingdom Collaborative
- A to-be-announced farm in the Northeast Kingdom.
- Vermont's dairy cooperatives: St. Albans and Agrimark.
- Vermont Agricultural Credit Corporation

Attached:

State of Vermont Request for Grant Acceptance (Form AA-1)
USDA selection of VAAFM for funding and letter of conditions
Application for federal assistance (Standard Form 424)
Budget information – Non-construction programs (Standard Form 424A)
Grant timeframe

Grant agreement documents:

- USDA Form 1940-01, signed by VAAFM
- Attachment A to Form 1940-01, signed by VAAFM, referencing the Scope of Work
- Scope of Work

