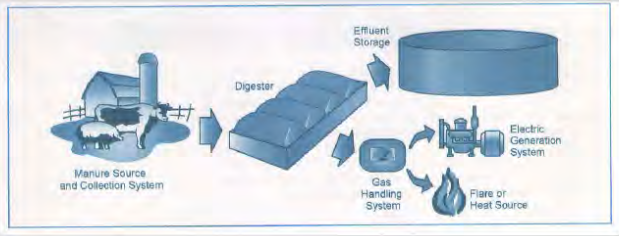
A Protocol for Quantifying and Reporting the Performance of Anaerobic Digestion Systems for Livestock Manures

January 2007 release



USDA Rural Development ASERTTI AgSTAR

Financial support for the development of this protocol was provided by the organizations listed below through the Association of State Energy Research and Technology Transfer Institutions (ASERTTI), the U.S. Environmental Protection Agency AgSTAR Program, and the U.S. Department of Agriculture Rural Development.

ASERTTI Supporters

- California Energy Commission
- Energy Center of Wisconsin
- Energy Resources Center, University of Illinois at Chicago
- Hydro-Québec
- Iowa Energy Center
- Mississippi Technology Alliance
- New York State Energy Research and Development Authority
- North Carolina State University
- Sacramento Municipal Utility District
- Washington State University Energy Program

National Protocol is designed to allow for

- A greater database of useful information
- A standard method for system developers to establish claims for their systems' performance

3 Protocol Evaluation Areas

- Waste Stabilization
- Biogas Production and Utilization
- Economic Analysis

Some Next Steps

- Protocol evaluations need to be done
- Database needs to be set up and managed
- Participants roles need to be agreed on

Possible Activities of Individual States

- Apply the Protocol to AD within States
- Use resulting data from all States
- Maintain own websites for reports and data

Anaerobic Digesters in NYS with funds approved for Protocol Evaluation

Farm	~kW	Engine	Digester Design	Inputs	~Milking Cows	System Developer
AA Dairy	130	ICE	Plug	CM	500	RCM
EL-VI	NA	boiler	Plug	CM	600	Farmer
Emerling	200	ICE	Plug	CM	700	RCM
Morrisville	200	ICE	Plug - parallel	CM	300	Cow Power
New Hope View	75	MT	Plug	CM	800	RCM
Noblehurst	130	ICE	Plug - parallel	CM	1100	Cow Power
Patterson	200	ICE	Mixed	CM & food waste	1000	RCM
Ridgeline	140	ICE	Mixed	CM & food waste	300	RCM
Sheland	100	ICE	Mixed	CM liquids	500	Siemens
Sunny Knoll	200	ICE	Plug	CM	700	RCM
Twin Birch	140	MT	Plug	CM	1200	Farmer


HOULE

DG/CHP Integrated Data System

Return to Facility Listing

Patterson Farms

1131 Aurelius/Springport Townline Road
Auburn, NY 13021 Map It

DG/CHP Developed by

RCM Digesters™
The Standard for Manure Digesters

Category: Dairy Farm
SIC: 2 - Agricultural Production Livestock and Animal Specialties
ISO Zone: C - Central
Electric Utility: New York State Electric & Gas
Gas Utility: New York State Elec & Gas Corp
Primary Fuel: Digester Gas
Number of Power Units: 1
Total Installed Capacity: 200 kW

Unit	Installation	Fuel	Prime Mover	Heat Recovery	Use	Technology Group	Installed Capacity (kW)
1		Natural Gas	Reciprocating Engine	Hot Water	Other	100-800 Reciprocating Engine (Lean Burn)	200

Facility Details
Show Complete Details

Facility Documentation
Patterson Farms NYSERDA CHP Details
Patterson Farms Online Database Notes

Project Webpages
Connected Energy Website

Related Webpages
None

Online Monitored Data Reports
Monitored Data - Plots and Graphs
Monitored Data - Download (CSV file)
Utility Rate Calculation

Standardized Monitored Data Reports
Generator, Facility, and Meter Power
Generator Status, Gas Use, and Heat Recovery
Generator Power Quality
Facility Meter Power Quality

Operational/Reliability Reports
Outage Report
Operational Reliability Report

Emissions Reports
None

http://chp.nyserda.org/reports/pdfprompt.cfm?Type=pdf1&Units=160

Report Prompt

NEW YORK STATE

NYSERDA New York State Energy Research and Development Authority

DG/CHP Integrated Data System

Home | Facilities | Reports | Links | Help | Login

Report Selection -> Site Selection -> Standardized Report Selection
Generator, Facility, and Meter Power

Report Selected:
Generator, Facility, and Meter Power

Facility Selected:
Patterson Farms - Auburn, NY

The following reports are available. They can be downloaded or viewed by selecting the appropriate link below (reports will be opened in a new window).

Reports for 2006: Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Annual Report

Reports for 2007: Jan Feb Mar Apr May Jun Jul Aug Sep Oct
Annual Report

17 Columbia Circle, Albany, NY 12203-6399 Toll-Free: 1-866-NYSERDA or Local: 518-862-1090 Fax: 518-862-1091
New York City and Buffalo Regional Offices

GENERATOR, FACILITY AND METER POWER SUMMARY

Patterson Farms, Auburn, NY
01/01/07 to 11/30/07

Date	Good Data (%)	Utility Purchased Electricity (kWh)	Utility Exported Electricity (kWh)	Total Generator Electricity (kWh)	Total Facility Electricity (kWh)	Utility Purchased Demand (Peak kW)	Utility Exported Demand (kW)	Net Facility Demand (Peak kW)
Jan 2007	99.76	2815.09	54513.94	138696.00	88544.45	156.74	139.22	261.67
Feb 2007	95.24	4111.81	43109.38	120185.00	81098.78	158.26	135.63	212.97
Mar 2007	99.16	5225.41	56391.44	133914.00	82389.30	177.63	140.73	181.43
Apr 2007	99.34	1479.13	37808.91	134649.00	97193.41	188.77	129.52	211.33
May 2007	99.83	8372.52	28008.60	134726.00	115328.30	213.53	134.73	297.47
Jun 2007	89.41	22109.48	4317.80	112733.00	132613.08	251.36	116.37	406.60
Jul 2007	23.59	4814.52	494.60	32014.00	38080.08	160.45	39.64	350.66
Aug 2007	93.04	39305.59	211.10	117930.00	160297.19	285.90	35.37	314.75
Sep 2007	96.74	24418.41	7517.20	122272.00	141143.89	329.54	113.89	297.18
Oct 2007	44.15	13159.66	6170.11	58814.00	68474.72	268.71	117.24	293.33
Nov 2007	0.00	-	-	-	-	-	-	-
Total	76.28	125811.61	238543.08	1105933.00	1005163.20	329.54	140.73	406.60

Monitored Data Report - Windows Internet Explorer

http://chp.nyserda.org/reports/monitoredreport.cfm

Monitored Data Report

Report Parameters

Starting Date: 10/01/2007

Ending Date: 10/31/2007

Horizontal Axis: Date/Time

Data Quality: Data Passes Relational Checks

Plot Stacking:

Data Channels: *(select one or more)*

- DG/CHP Generator Output (kWh)
- DG/CHP Generator Output Demand (kW)
- DG/CHP Generator Gas Input (cf)
- Total Facility Purchased Energy (kWh)
- Total Facility Purchased Demand (kW)
- Other Facility Gas Use (cf)
- Total Facility Energy (kWh)
- Total Facility Demand (kW)
- Useful Heat Recovery (MBtu)
- Unused Heat Recovery (MBtu)

AgSTAR Database Fields

Farm/Project Name
Site Address
Mailing Address
City
State
Zip
County
Farm/Project Phone
Farm/Project Email
Farm Type (Dairy; Swine; Poultry)
Manure Management System Prior to Digester Installation (Storage Tank or Pond or Pit; Anaerobic Lagoon; Storage Stack)

Number of Animals Feeding the Digester
Lactating Cows - Design
Lactating Cows - Actual
Dry Cows - Design
Dry Cows - Actual
Heifers - Design
Heifers - Actual
Manure Collection Process (Drylot Scrape/Vacuum; Drylot Flush; Drylot Feedlane Scrape/Vacuum; Drylot Feedlane Flush; Freestall Barn Scrape/Vacuum; Freestall Barn Flush)
Digester Type (Covered Lagoon; Plug Flow; Complete Mix; or Attached Media)
Digester System Designer Name

Current Status (Planned; Design; Construction; Startup; Steady State; Shutdown; or Cancelled)
Year Digester Startup (projected or actual year)
Year Digester Shutdown
Reason for Shutdown (e.g., technical issues, economic, design failure)
If other wastes added to system, provide type and quantity:
Biogas Production (cubic ft/day)
Generator Set Type (Engine or Microturbine)
Generator Set Manufacturer
Generator Set Size (kW)
Electricity Generated (kWh/yr)
Boiler/Furnace Size (Btu/hr)
Total Cost ($)
Farm Bill Amount Approved ($)

AgSTAR Activities

- Finalizing a national digester database
- Will review database for Protocol focus
- Exploring a Protocol addition for emissions
- Will prepare some multi-project analyses

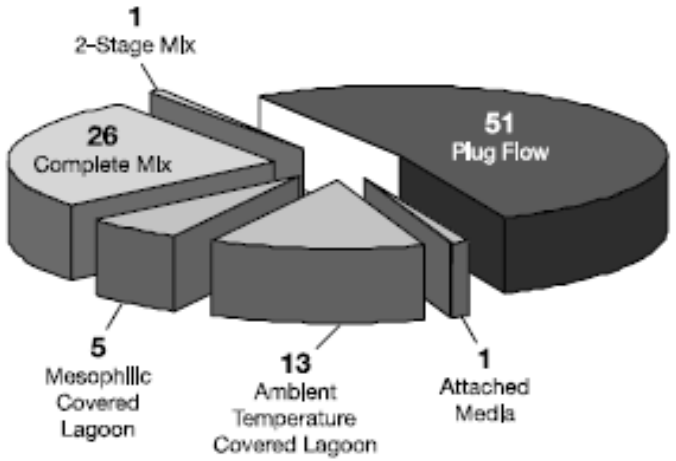
EPA

AgSTAR Digest

AgSTAR

Inside the Winter 2006 Issue

Figure 2. Operating anaerobic digesters by technology*.



*Includes digesters in start-up and construction stage.

EPA AgSTAR Digest

Inside the Winter 2006 Issue

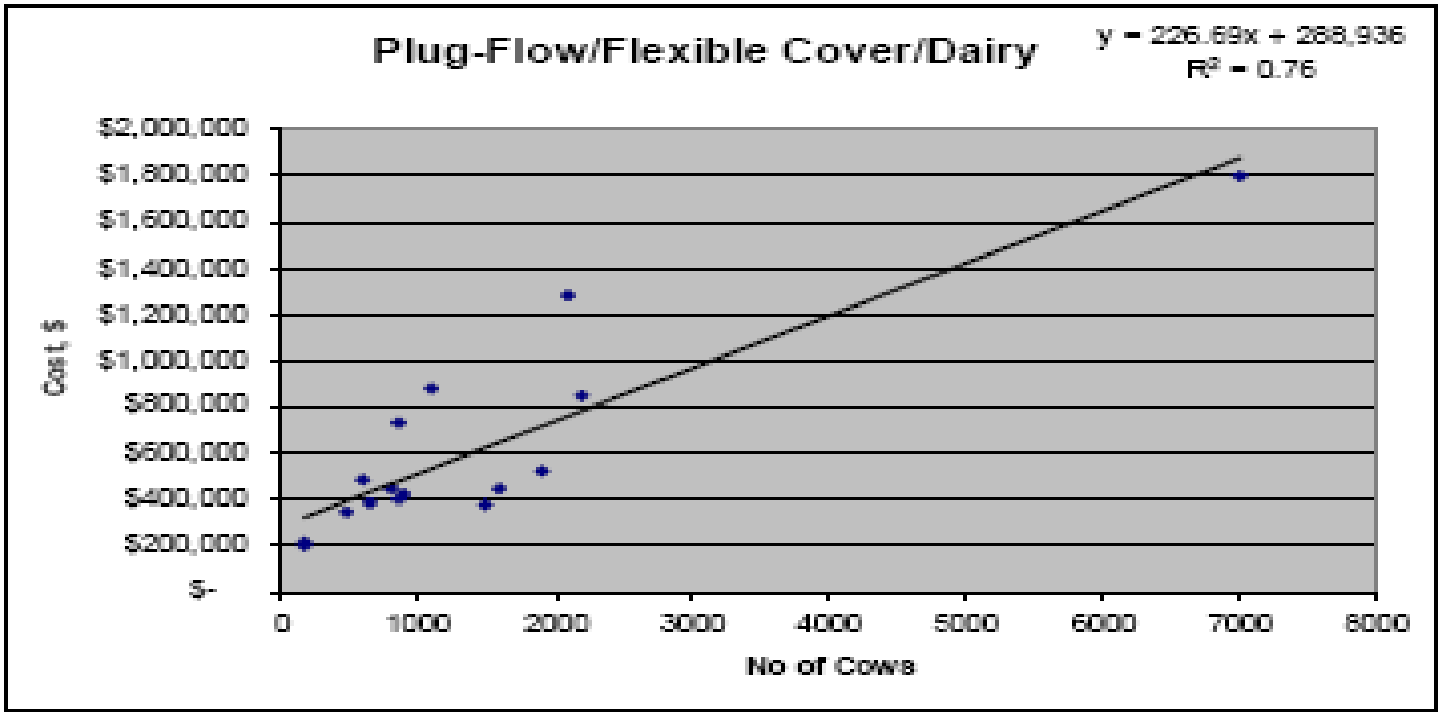


Figure 7. Plug flow/flexible cover digester system cost relationship to dairy herd size.

US EPA - AgSTAR - Documents, Tools and Resources - Windows Internet Explorer

http://www.epa.gov/agstar/resources.html

US EPA - AgSTAR - Documents, Tools and Resources

U.S. Environmental Protection Agency

The AgSTAR Program

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- Newsroom
- Workshops/ Conferences
- Frequent Questions
- Guide to Operational Systems

Documents, Tools and Resources

You will need Adobe Acrobat Reader, available as a free download, to view some of the files on this page. See EPA's PDF page to learn more about PDF, and for a link to the free Acrobat Reader.

Below is an array of information related to manure management systems. All products and documents are downloadable. Articles and news are added as they become available. We also welcome submissions from others who might come across information of interest.

General Information

Managing Manure with Biogas Recovery Systems: Improved Performance at Competitive Costs (PDF, 8 pp., 4.3 MB) This brochure provides background information about anaerobic digestion, and explains how the methane produced from this process can be captured and used to generate heat, hot water, and electricity. It also includes information for dairy and swine farmers to help them determine if a biogas recovery system is right for their farm and describes the environmental benefits of anaerobic digestion systems and provides a table that compares the cost and environmental effectiveness of conventional animal waste systems to anaerobic digester systems.

AgSTAR Digest contains all editions of the program's annual newsletter.

AgSTAR Press contains news and media articles on digester systems.

Project Development Resources

AgSTAR Handbook and Software is a comprehensive manual developed to provide guidance on developing biogas technology at commercial farms. The Handbook also contains FarmWare, an expert decision support software package that can be used to conduct prefeasability assessments.

Market Opportunities Report (PDF, 40 pp., 3,125 KB) assesses the market potential for biogas energy projects at swine and dairy farms in

- AgSTAR Goal for Protocols
  - Is a step designers will need to take for eventual certification of their designs
- Limitations
  - Using the protocol is expensive – may require funding
  - Database expected to be designed for researchers and evaluators – not those doing technical outreach
  - EPA may restrict access to data or make modifications to the protocol
  - Key business and management innovations may not be represented in protocol data

Possible ASERTTI Activities

- Help ASERTTI members obtain performance information in useful and understandable form
- Promote and track use of Protocol – perform outreach to organizations funding digester projects suggesting they include protocol adherence
- Manage a small peer review group
  - To review Reports for Protocol conformance
  - Assist with applying Protocol
  - Review and manage potential Protocol revisions (working with AgSTAR and ASERTTI)

Possible ASERTTI Activities (cont.)

- Manage website postings including
  - Protocol reports with searchable data fields
  - Links to State websites and national ASERTTI DG/CHP Protocol database
- Perform tech transfer using database in coordination with ASERTTI States, AgSTAR, and others

Comments on…

- ASERTTI role in database and Protocol work
- Interest in funding the effort
- Other databases to coordinate with
- What information would be most helpful
- Can your organization support Protocol evaluations of in-state projects
- have they considered doing some lobbying for Farm Bill funding