

AgSTAR Resources



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AgSTAR

- Voluntary effort of the USEPA jointly sponsored by USDA – since 1993.
- The program encourages the use of methane capture and use from agro-industrial sources – work with producers, developers, industry, policy makers, federal agencies, NGOs, utilities.
- Five-year interagency agreement with USDA to advance digester systems (signed 2010).
- Collaboration with Dairy Power, American Biogas Council, and many state/local stakeholders.
- Hub for digester information nationally and internationally (Global Methane Initiative).

Current Digester Project Status

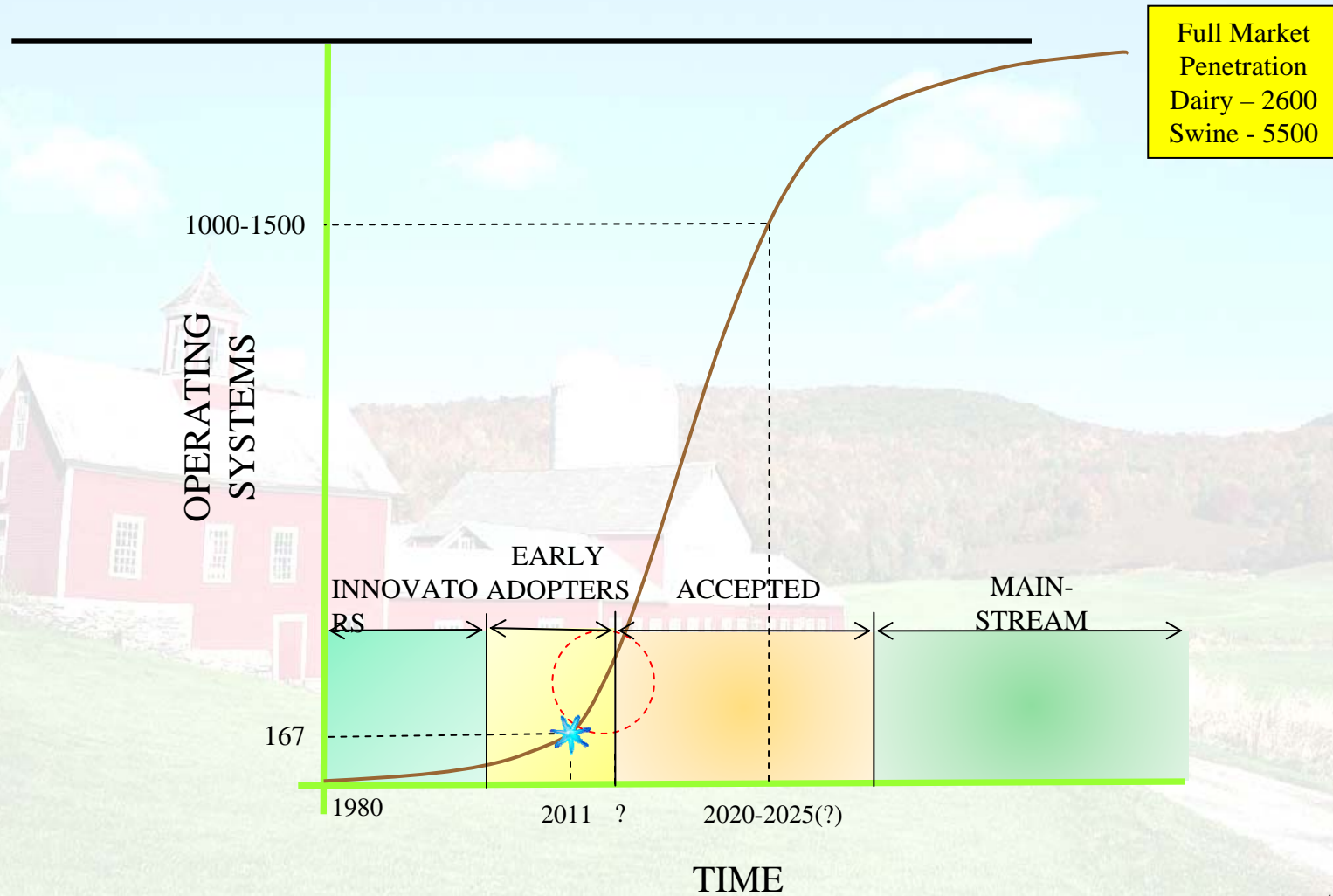
- 167 operating manure-based digesters
 - 137 dairy, 23 swine, 5 poultry, 2 beef
 - 2010 Reductions and Generation
 - 51,000 metric tons direct methane reductions
 - 450,000 MWh equivalent from electricity generation and other biogas use
 - Top five digester system states – WI(26), NY(23), PA(19), CA(14), VT(10) – 55% of total projects
 - Typical 1000-cow dairy manure only project
 - Reduce about 56,000 cubic feet methane/day
 - Enough to heat about 300 homes or power 250 homes
- Less than 2% of livestock manure market tapped
 - Even less if you consider other organic wastes

US Operating Digester Overview

Digester Technology		Digesters by Animal Type	
Plug Flow/Modified PF	94	Dairy	137
Complete Mix	40	Swine	21
Covered Lagoon	30	Layers	3
Other		Beef	2
- Induced Blanket Reactor	2	Duck	2
- Fixed Film	1	Beef and Poultry	1
		Broiler	1
Biogas Use			
Co-generation (electricity and heat)	107		
Electricity	27		
Boiler/Furnace Fuel	20		
Flare Only	6		
Pipeline Upgrade	1		
Vehicle Fuel	1		
- 12 projects have a combination of uses			
- Five projects do not have a use identified			

Digester System Adoption Curve

(a typical product development/acceptance curve)



Adapted from
A.W. Wedel, P.E.
McLanahan Corp., 2011

Digester Market Opportunity

- Candidate Dairy/Hog Farms
 - ~4,000,000 dairy cows on 2,600 farms
 - ~48,000,000 hogs on 5,500 farms
- Energy Potential*
 - 13,000,000 MWh/yr OR 150 billion cubic feet methane per year
 - Enough electricity to power 870,000 households
 - Enough methane to heat 3 million households

* Estimates just for dairy and hog manure. Does not include beef, poultry or co-digestion.

* Based on EPA AgSTAR Market Opportunities Report (2010)

Introduction

AgSTAR Program Components

- Farm Bill and USDA Collaboration
- State programs coordination
- Informational Products
 - General Outreach
 - Technical Analysis
 - Supported by measurement and evaluation program
 - Compares economic and environmental performance of various waste management options
 - Project Development Tools
- Outreach and Extension
 - Conferences, workshops, field days, and tradeshow events
 - **Website - www.epa.gov/agstar**

General Informational Products

- **AgSTAR Digest** - Annual report
 - Highlights the year in animal waste digestion
 - Technologies, funding, national project listings
 - Quarterly
- **Managing Manure with Biogas Recovery Systems**
 - Introductory brochure on digester technology, costs, and environmental performance

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EPA AgSTAR Digest

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AgSTAR 2002 Highlights

Development of anaerobic digesters for livestock manure treatment and energy production has accelerated at a very fast pace over the past few years. In the last two years, the number of operating digesters has increased by nearly 30 percent, from 31 to 46, with an additional seven currently in start-up or under construction. Most of these digesters are farm-scale systems, however, centralized digester applications for dairy operations are also emerging. One centralized system is already operating in California, and another is being developed in Oregon. To help support these activities, the AgSTAR Program is developing the second edition of the *Industry Directory for On-Farm Biogas Recovery Systems*, which provides information on system designers and developers and equipment manufacturers and distributors responsible for expanding the use of digestion technology in the livestock industry. Look for this publication on the AgSTAR Web site (www.epa.gov/agstar).

State anaerobic digestion programs also play a significant role in this expansion as they continue to grow and support digester projects in a number of innovative ways. For example, a \$10 million cost-share program for commercially demonstrated anaerobic digestion technologies is available to dairy farms through the California Energy Commission (CEC). In addition, the CEC administers a sister program that provides funding for the demonstration of emerging technologies at commercial scale. The New York State Energy and Research Development Authority (NYSERDA) and the Wisconsin Energy Board have similar programs available to assist livestock producers in establishing digester technologies at their farms.

Some states are addressing key energy policy issues in order to foster further expansion of biogas energy technologies. For example, California and New York have recently enacted net metering laws that enable utility customers to use their own electricity generation to offset their consumption over monthly billing periods.


Federal funding opportunities will also be playing a larger role in supporting the development of anaerobic digestion systems. The Federal Farm Security and Rural Reclamation Act of 2002 will provide funding under the Environmental Quality Incentives Program (EQIP) and the Renewable

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EPA United States Environmental Protection Agency

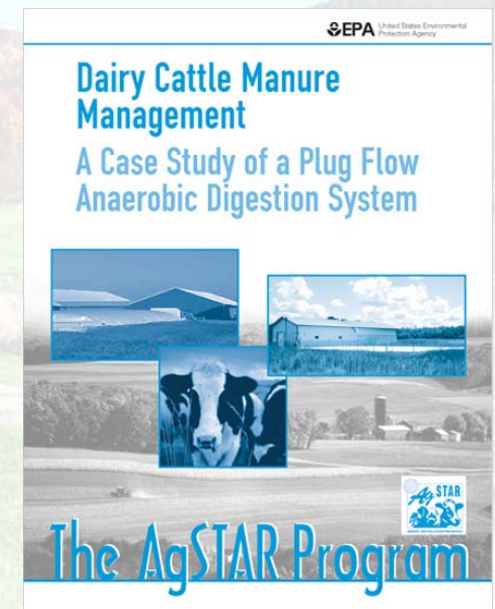
Managing Manure with Biogas Recovery Systems
 Improved Performance at Competitive Costs



The AgSTAR Program

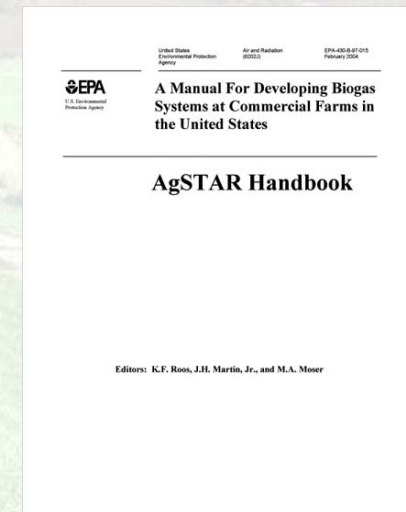
Technical Products

- ***A Protocol for Quantifying and Reporting the Performance of Anaerobic Digestion Systems for Livestock Manures***
 - Help standardize the process used to evaluate the performance of anaerobic digestion systems used to produce and capture methane (biogas) emissions from livestock manure
- ***Mass Balance Waste Management Evaluations***
 - Economic and environmental process comparisons for pigs and dairy



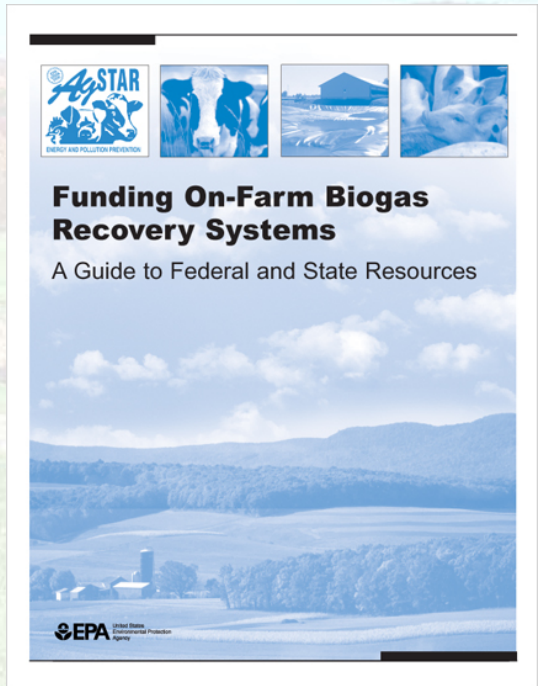
Project Development Tools

- **Industry Directory**
 - Lists and provides description of designers, equipment suppliers, and consultant services.
- **AgSTAR Handbook** - *A Manual for Developing Biogas Systems at Commercial Farms in the United States*
- **FarmWare** - develops project specific feasibility assessments
 - technology type, energy, environmental, and cost/benefit.



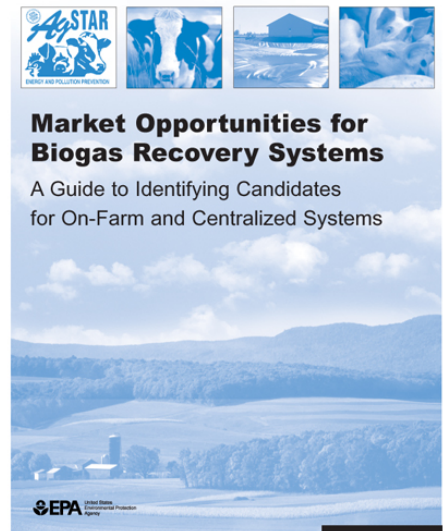
Project Development Tools

- ***Funding Guide for Federal and State Resources***
 - Summarizes federal and state animal waste digestion funding assistance
 - Grants, loans, energy production incentives
 - For each program type provides:
 - Program description
 - Eligibility requirements
 - Contacts



Project Development Tools

- *Market Opportunities for Biogas Recovery Systems*
 - Provides state-by-state profiles of numbers of farm candidates, renewable energy potential, and methane emission reductions.
 - Provides a summary of the national energy and digestion market potential



North Carolina

SWINE

Swine Population by County (2002)



Farm Size and Manure Management Distributions



For more information

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