Anaerobic Digestion at Wastewater Resource Recovery Facilities

State-of-Play and Policy Accelerators

Heather Dziedzic, Vice President of Policy

13 Nov 2026 | Chesapeake Bay Commission



National Market Data: Wastewater

The U.S. Biogas Market

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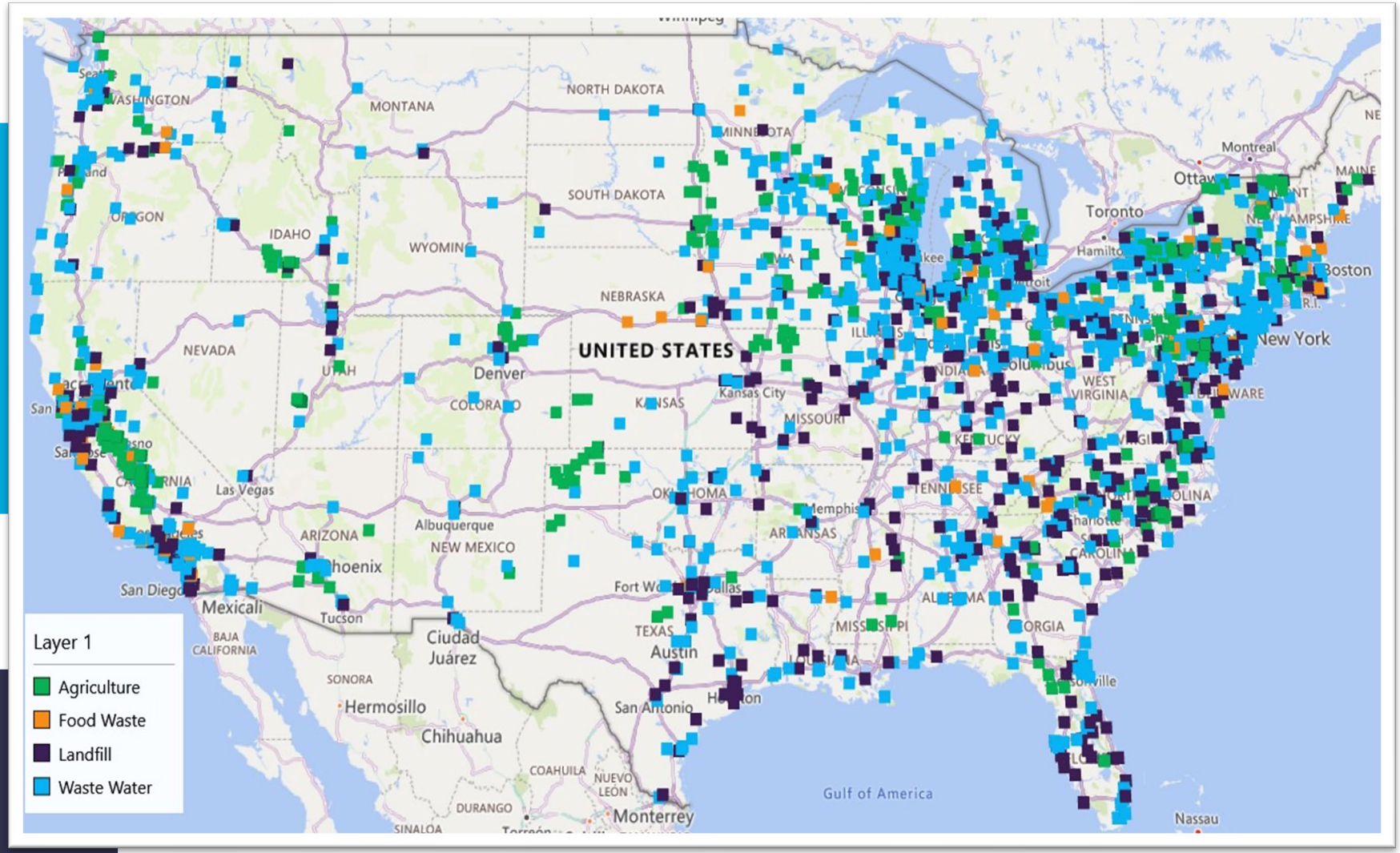
Operational Biogas Systems: 2,658

- 674 RNG
- 1,788 Electricity, Heat

- 634 on Farms
- 1,218 Wastewater
- 204 Food Waste
- 602 at Landfills

Potential New Biogas Systems: 17,000

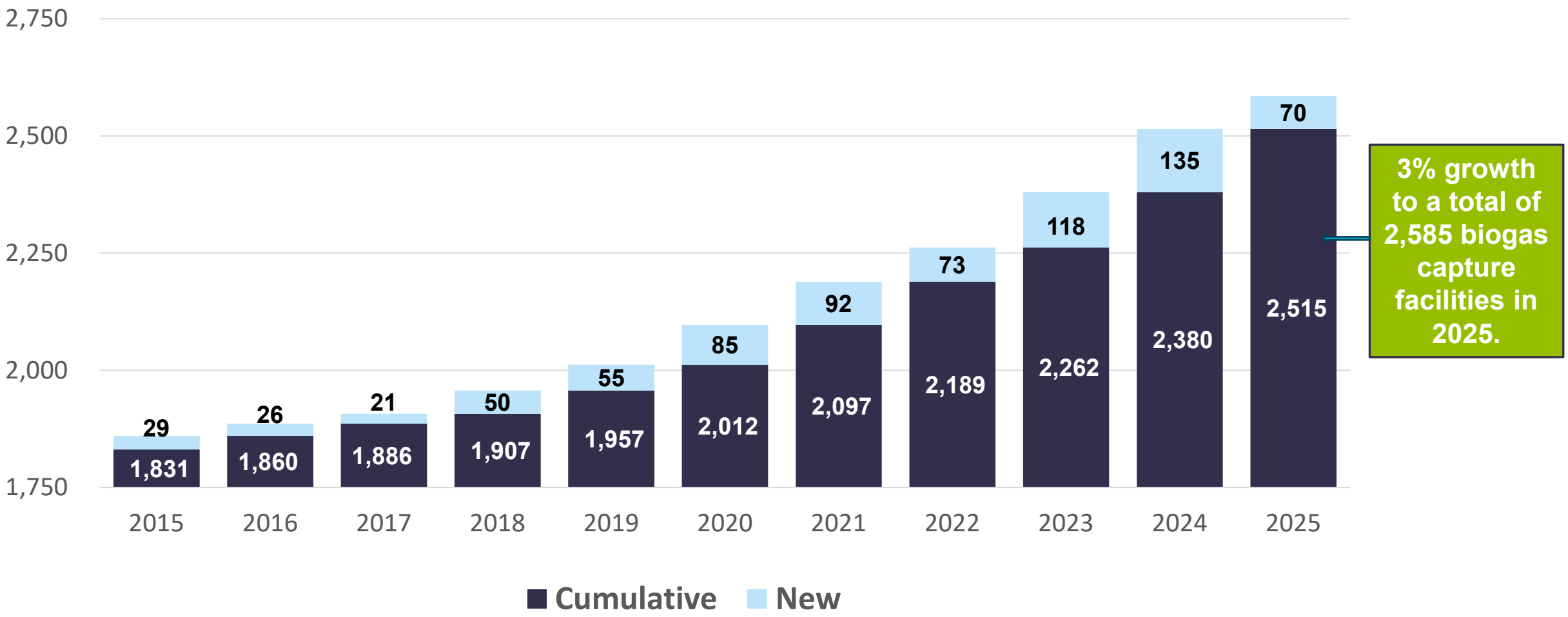
- 11,200 on Farms
- 3,750 Wastewater
- 1,370 Food Waste
- 730 at Landfills



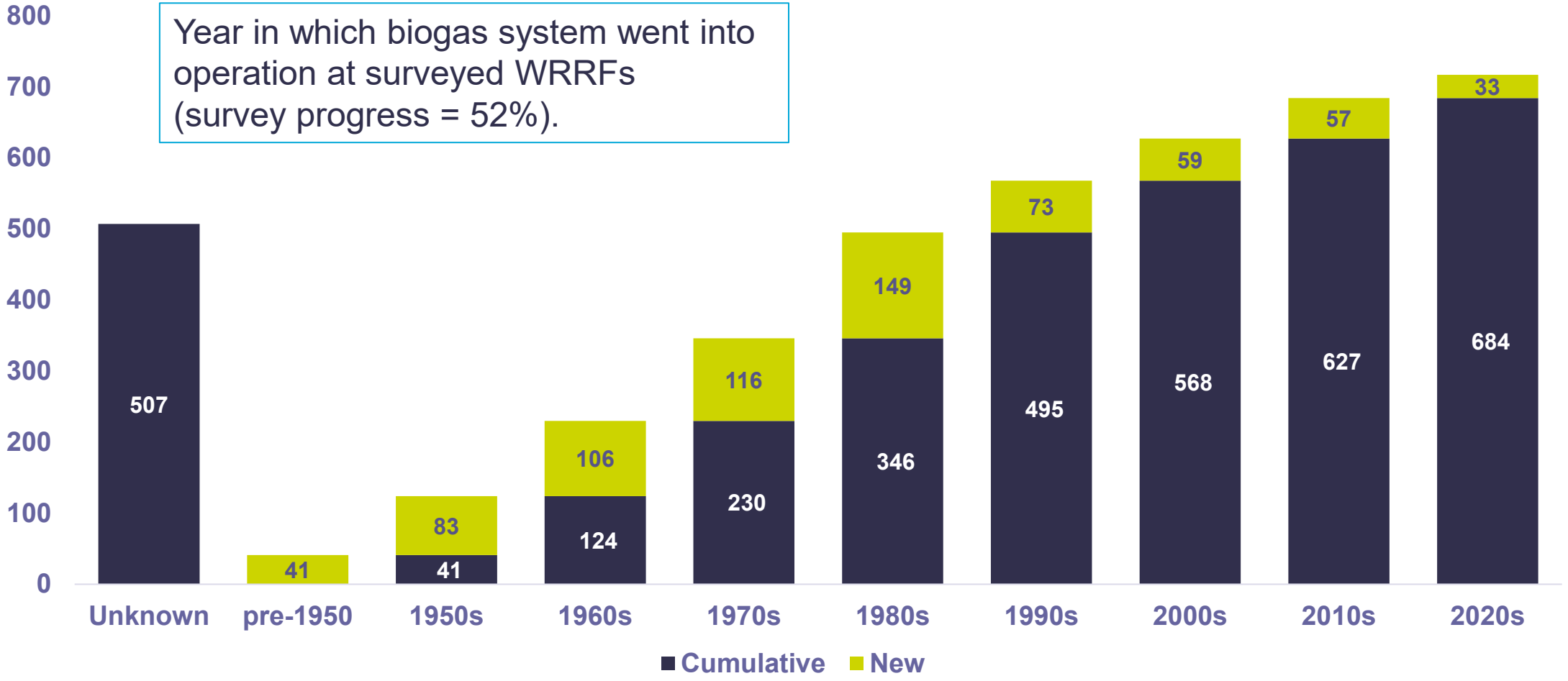
November 2026

Biogas Capture Facilities, 2015-2025

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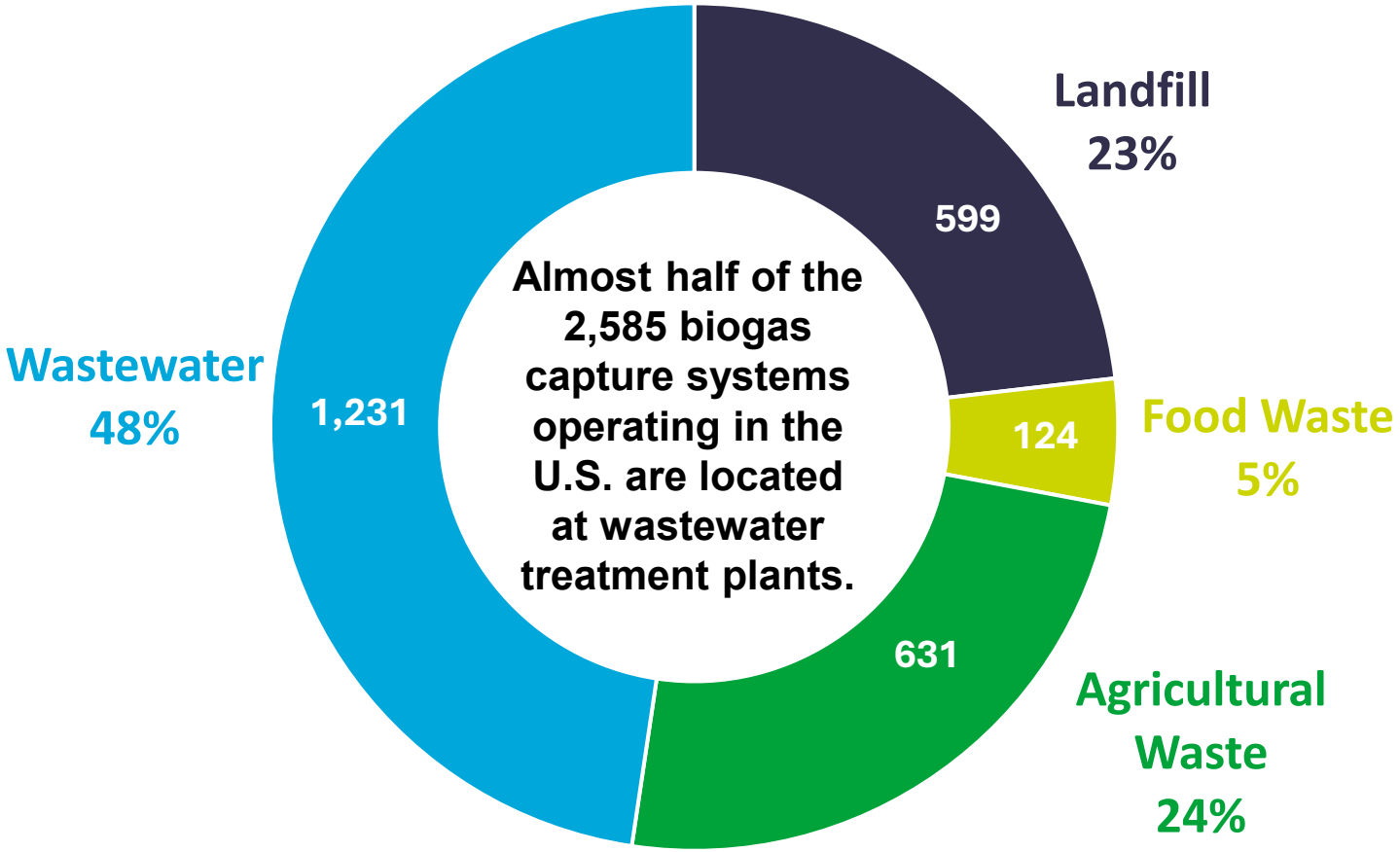
Biogas Systems at U.S. WRRFs by Opening Date



Updated October 2025

Biogas Capture Systems in the U.S. by Feedstock Source, 2025

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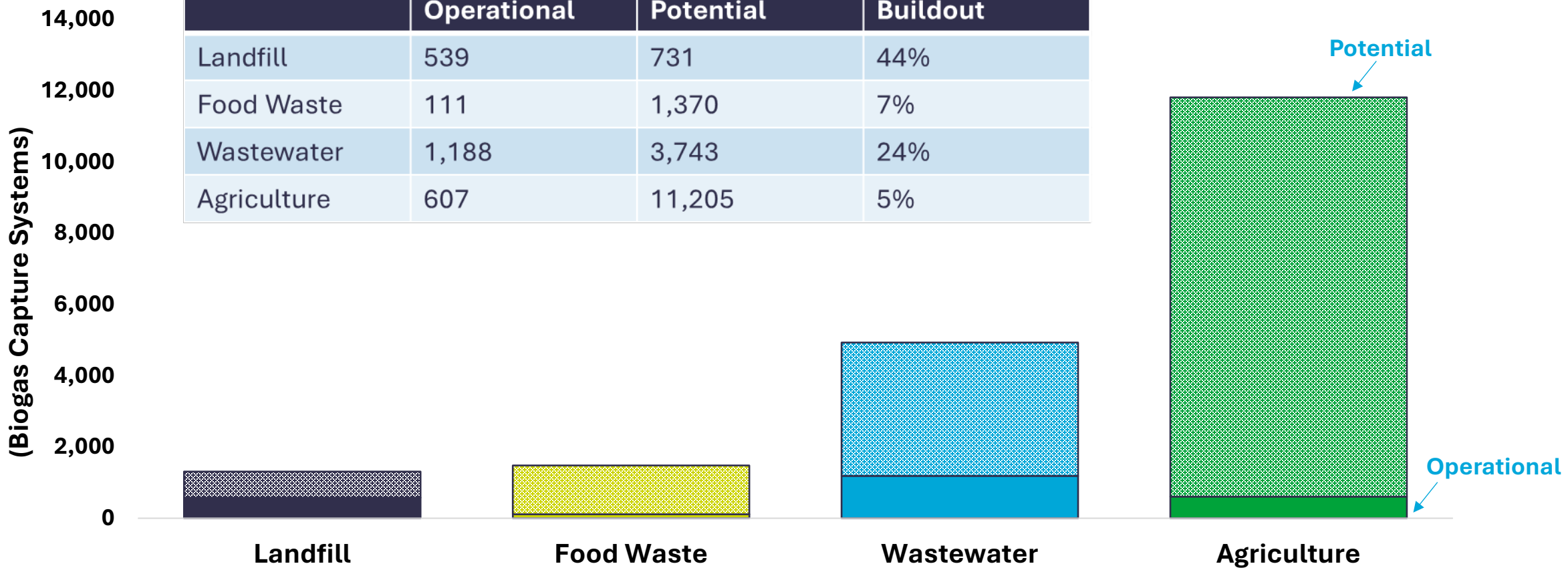


2025 Growth: 2.8%	
Landfill	+3.5%
Agriculture	+6.9%
Wastewater	+0.2%
Food Waste	+6.0%

Updated February 2026

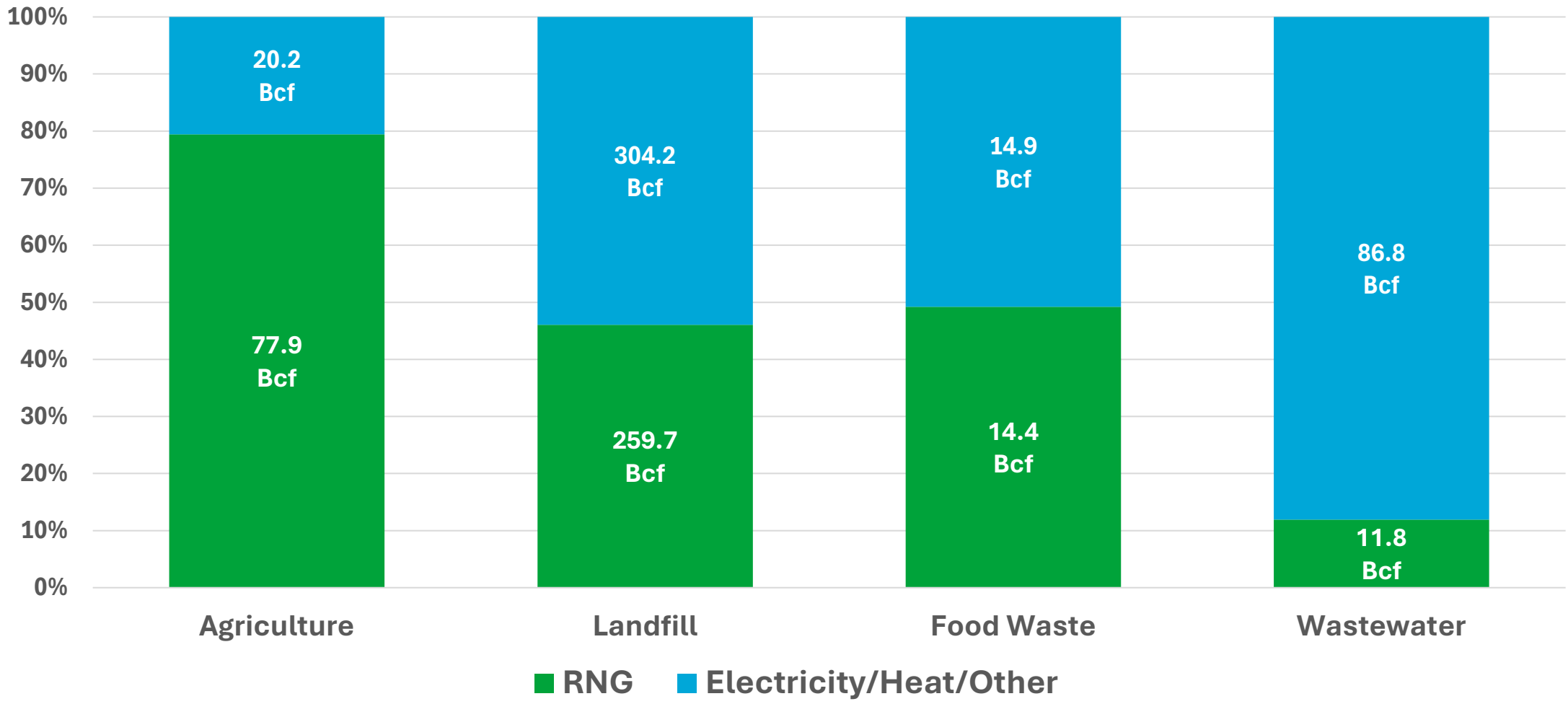
U.S. Biogas Capture Systems: Potential

	Operational	Potential	Buildout
Landfill	539	731	44%
Food Waste	111	1,370	7%
Wastewater	1,188	3,743	24%
Agriculture	607	11,205	5%



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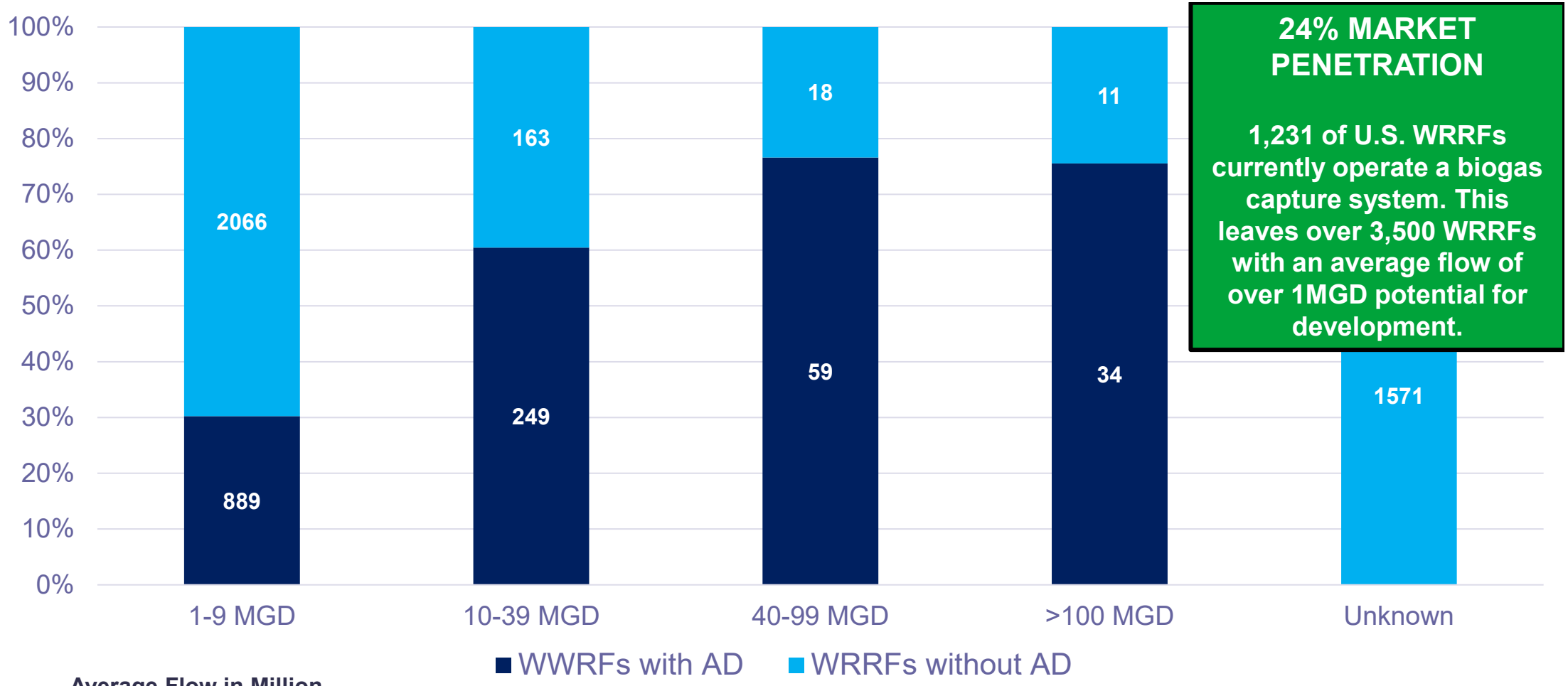
Biogas Capture Systems By Biogas Primary End-Use & Feedstock Type, August 2026



Updated August 2026

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Biogas Capture Systems at WRRFs, (December 2025)



24% MARKET PENETRATION

1,231 of U.S. WRRFs currently operate a biogas capture system. This leaves over 3,500 WRRFs with an average flow of over 1MGD potential for development.

Average Flow in Million Gallons Per Day (MGD)

Updated February 2026

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ABC's 2026 Wastewater Digestion Report



Key Findings

- **1,213 U.S. WRRFs operate anaerobic digesters.**
- **24% of U.S. WRRFs** treating at least one million gallons per day (MGD) use anaerobic digestion (AD).
- **1960–1990 was the peak period for AD adoption** at U.S. WRRFs.
- WRRFs with AD treat an **average of 15 MGD.**
- **More than 75% of U.S. WRRFs** treating more than 30 MGD use anaerobic digestion.
- Today, U.S. WRRFs have the capacity to capture more than **100 billion cubic feet (Bcf) of biogas annually.**
- U.S. WRRFs could capture an **additional 70 Bcf of biogas annually.**
- **55% of WRRFs with AD** use captured biogas to generate electricity.
- **89% of the electricity generated** from biogas at WRRFs is used on-site.
- **Land application is the primary use of digestate** produced by AD systems at U.S. WRRFs.

https://americanbiogascouncil.org/2026-wastewater-report/

Digestate Management

Digestate Management at WRRFs

Digestate Destination	No. of Facilities	% of Total
Land Application	181	53%
Commercial Sale	8	2%
Commercial Sale & Land Application	21	6%
Heat Recovery	3	1%
Heat Recovery & Land Application	13	4%
Landfill Disposal	73	22%
Land Application & Landfill Disposal	35	10%
Heat Recovery & Landfill Disposal	4	1%
Biochar	1	0%

Base: *n* = 339 (of 380 respondents)

Land application can create community concerns involving:

- Odors.
- Pathogen exposure.
- Vector attraction (such as flies and other organisms).
- Transportation and handling of untreated or insufficiently stabilized material.



Anaerobic digestion helps address these concerns by stabilizing organic material and reducing pathogens and odors.

EPA recognizes digestion as a biosolids stabilization process that can reduce pathogen levels and odor potential.

There is also a regulatory connection: under 40 CFR Part 503, volatile solids reduction through qualifying digestion processes can be used to meet vector attraction reduction requirements. However, ordinary mesophilic digestion does not automatically produce Class A biosolids. Additional treatment or a qualifying process is necessary to achieve that classification.

Digesters can help wastewater utilities produce a more stabilized residual that is easier to manage, store, transport, and beneficially use, reducing some of the externalities associated with biosolids handling and land application.

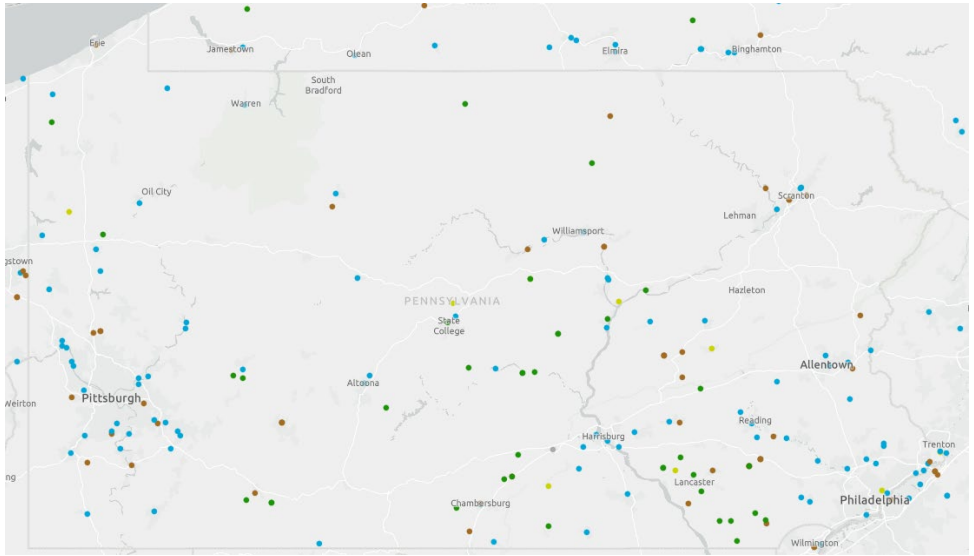
Market Data:
PA, MD, VA

Biogas Systems Operating in Pennsylvania

Pennsylvania ranks #3 out of 50 states for its biogas production potential of **258.1 billion ft³/yr.**

Biogas Capture Systems in Pennsylvania





A full build-out of Pennsylvania's biogas industry offers these benefits:

Energy Benefits

Up to **135.0 billion ft³** of methane (renewable natural gas) could be produced each year for energy, heat, fuel, and more!

or **17.7 billion kWh** equivalent to the annual electricity usage of **1,642,202 households**

or **13,834 million kWh** electricity and **5,389 million BTU/h** heat (engine)

or **23,139 million kWh** electricity and **38,564 million kWh** heat (fuel cell)

or **2.0 GW** Nameplate Capacity equivalent to **40 U.S. power stations** (avg. size)

or **139.8 million MMBtu/yr** equivalent to energy consumption of **1,820,561 homes**

or **1,163.5 million gallons** of GGE, enough to fuel **659,179 delivery trucks** for one year

Economic Benefits	Climate Benefits	Recycling Benefits
$19.2 billion in capital investment	Equivalent to the GHG emissions avoided by taking **172,397 cars off the road**	**1,915,100 tons/yr** of dairy manure, which could produce **3.1 billion ft³** of biogas each year
35,444 construction jobs to build the systems	Equivalent to the carbon sequestered by **739,583 acres of forest**	**2,091,217 tons/yr** of swine manure, which could produce **1.39 billion ft³** of biogas each year
2,060 long-term jobs to operate the systems	Equivalent emission reductions to **5,221 U.S. football fields of solar panels**	**287,690 tons/yr** of poultry manure, which could produce **13.4 billion ft³** of biogas each year
	Equivalent to the GHG emissions avoided by running **221 U.S. wind turbines** (avg. size) for a year	**2,230,000 tons/yr** of food waste, which could produce **5.8 billion ft³** of biogas each year
		1,692 million gallons/day of wastewater, which could produce **7.5 billion ft³** of biogas each year

https://americanbiogascouncil.org/resources/state-profiles/pennsylvania/

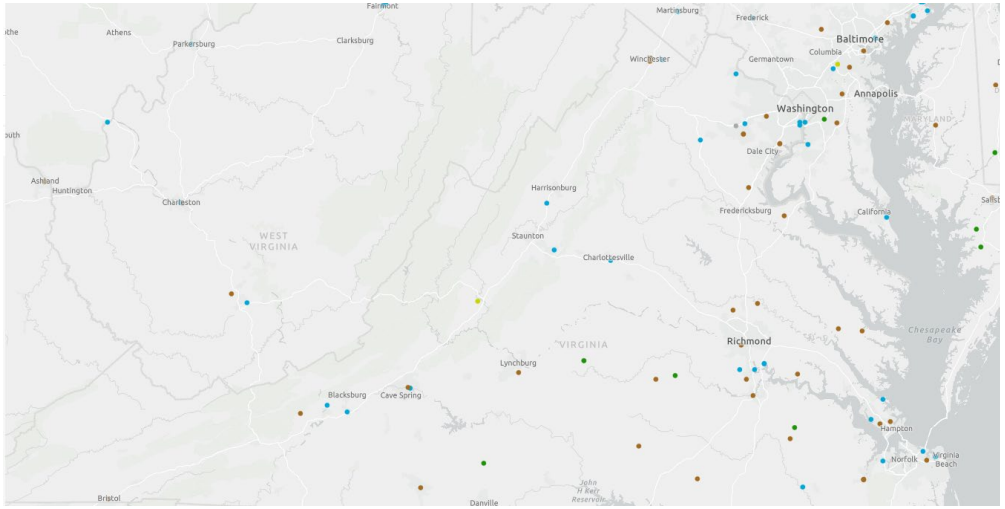
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Biogas Systems Operating in Virginia

Virginia ranks #7 out of 50 states for its biogas production potential of **145.9 billion ft³/yr.**

Biogas Capture Systems in Virginia





A full build-out of Virginia's biogas industry offers these benefits:

Energy Benefits

Up to **76.8 billion ft³** of methane (renewable natural gas) could be produced each year for energy, heat, fuel, and more!

or **10.2 billion kWh** equivalent to the annual electricity usage of **943,602 households**

or **7,821 million kWh** electricity and **3,046 million BTU/h** heat (engine)

or **13,080 million kWh** electricity and **21,801 million kWh** heat (fuel cell)

or **1.2 GW** Nameplate Capacity equivalent to **23 U.S. power stations** (avg. size)

or **79.6 million MMBtu/yr** equivalent to energy consumption of **1,036,570 homes**

or **662.4 million gallons** of GGE, enough to fuel **375,316 delivery trucks** for one year

Economic Benefits	Climate Benefits	Recycling Benefits
$7.3 billion in capital investment **13,164 construction jobs** to build the systems **776 long-term jobs** to operate the systems	Equivalent to the GHG emissions avoided by taking **98,157 cars off the road** Equivalent to the carbon sequestered by **421,095 acres of forest** Equivalent emission reductions to **2,972 U.S. football fields of solar panels** Equivalent to the GHG emissions avoided by running **126 U.S. wind turbines** (avg. size) for a year	**590,512 tons/yr** of dairy manure, which could produce **1.0 billion ft³** of biogas each year **321,590 tons/yr** of swine manure, which could produce **0.21 billion ft³** of biogas each year **399,605 tons/yr** of poultry manure, which could produce **18.6 billion ft³** of biogas each year **1,520,000 tons/yr** of food waste, which could produce **3.9 billion ft³** of biogas each year **1,224 million gallons/day** of wastewater, which could produce **3.9 billion ft³** of biogas each year

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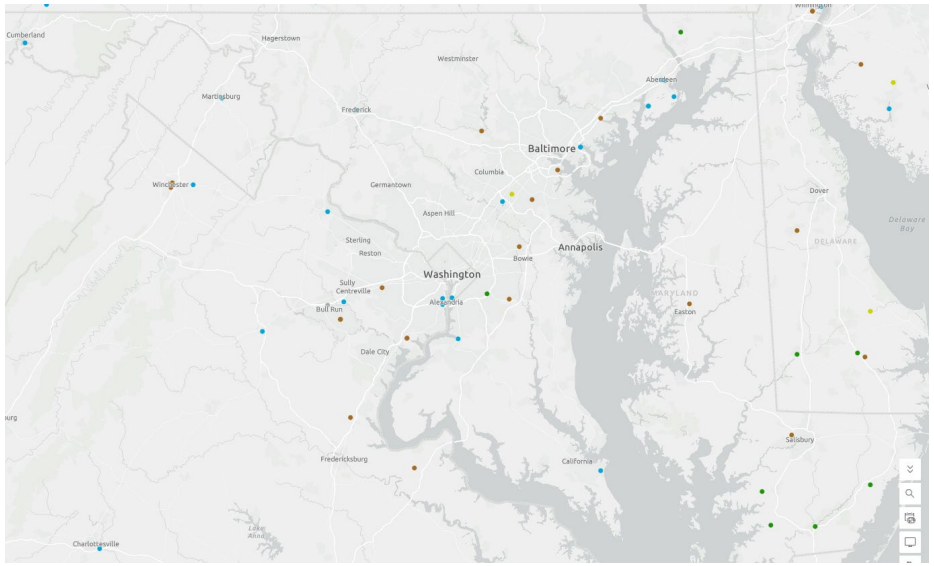
https://americanbiogascouncil.org/resources/state-profiles/virginia/

Biogas Systems Operating in Maryland

Maryland ranks **#26** out of 50 states for its biogas production potential of **42.1 billion ft³/yr.**

Biogas Capture Systems in Maryland





A full build-out of Maryland's biogas industry offers these benefits:

Energy Benefits

Up to **24.9 billion ft³** of methane (renewable natural gas) could be produced each year for energy, heat, fuel, and more!

or **3.2 billion kWh** equivalent to the annual electricity usage of **296,144 households**

or **2,258 million kWh** electricity and **880 million BTU/h** heat (engine)

or **3,777 million kWh** electricity and **6,295 million kWh** heat (fuel cell)

or **0.4 GW** Nameplate Capacity equivalent to **7 U.S. power stations** (avg. size)

or **25.8 million MMBtu/yr** equivalent to energy consumption of **335,442 homes**

or **214.4 million gallons** of GGE, enough to fuel **121,455 delivery trucks** for one year

Economic Benefits	Climate Benefits	Recycling Benefits
$4.2 billion in capital investment **7,054** **construction jobs** to build the systems **456** **long-term jobs** to operate the systems	Equivalent to the GHG emissions avoided by taking **31,764 cars off the road** Equivalent to the carbon sequestered by **136,270 acres of forest** Equivalent emission reductions to **962 U.S. football fields of solar panels** Equivalent to the GHG emissions avoided by running **41 U.S. wind turbines** (avg. size) for a year	**265,209 tons/yr** of dairy manure, which could produce **0.4 billion ft³** of biogas each year **19,203 tons/yr** of swine manure, which could produce **0.01 billion ft³** of biogas each year **435,511 tons/yr** of poultry manure, which could produce **20.3 billion ft³** of biogas each year **891,000 tons/yr** of food waste, which could produce **2.3 billion ft³** of biogas each year **1,482 million gallons/day** of wastewater, which could produce **3.7 billion ft³** of biogas each year

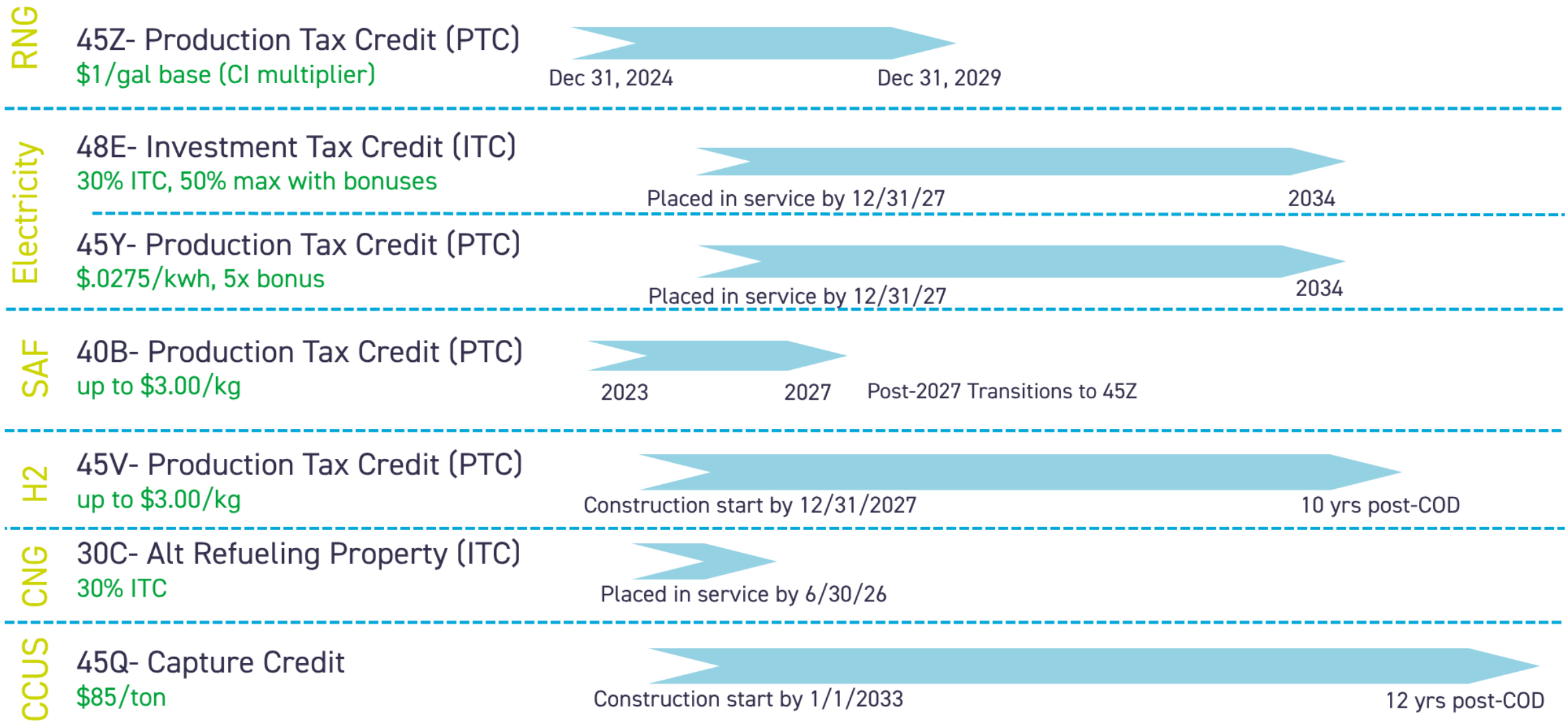
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https://americanbiogascouncil.org/resources/state-profiles/maryland/

Policies, Incentives, and Barriers

Federal Tax Credits for Biogas

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STATE-LEVEL PRECEDENTS | ANAEROBIC DIGESTION & RENEWABLE ENERGY

Specific programs illustrate how states support project capital, energy production, methane reduction and end-market access.

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CALIFORNIA | Dairy Digester R&D Program

CDFA • CAPITAL GRANTS

Competitive grants for dairy digester projects, including biogas collection and treatment. Supports project construction rather than only the energy commodity. Funding availability varies by solicitation.

CALIFORNIA | Biomethane Interconnection

CPUC • INFRASTRUCTURE

Cost-share for eligible biomethane pipeline interconnection. Program design included up to 50% of qualifying costs, with higher project caps for dairy clusters. Existing program is substantially subscribed.

CALIFORNIA | SB 1440 Biomethane Procurement

CPUC • MARKET CREATION

Utility biomethane procurement framework creates a regulated route to market for eligible biomethane from organic waste. Illustrates demand-side policy alongside capital support.

WASHINGTON | Dairy Digester Program

COMMERCE • CAPITAL GRANTS

Grants support new dairy digesters and improvements to existing systems. Recent program materials included a $10.54 million funding round, including a dedicated allocation for cover-and-flare projects.

WASHINGTON | Clean Fuel Standard

ECOLOGY • CREDIT REVENUE

Transportation-fuel credit market for lower-carbon fuels. Recent rule amendments expanded treatment of avoided methane from manure and organic waste, creating a potential value stream beyond fossil-fuel displacement.

MINNESOTA / OREGON / MICHIGAN

LOANS • PRODUCTION • TAX

Minnesota: Methane Digester Loan Program offers zero-interest financing (up to $250,000). Oregon: Clean Fuels Program recognizes qualifying RNG. Michigan: qualifying digester equipment receives a property-tax exemption.

Takeaways:

- **The most developed state models combine more than one lever—capital support + interconnection + a durable market or credit revenue.**
- **Grant programs are underfunded in nearly all cases, as the average “small” digester project costs $5-8M.**

WASTEWATER SECTOR | SPECIFIC PROGRAM PRECEDENTS & POLICY OPENINGS

The wastewater opportunity is often modernization of existing sludge digesters, plus co-digestion and beneficial use of biogas.

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NEBRASKA | Wastewater Treatment Facility Anaerobic Digestion Program

ONE RED • DEDICATED WASTEWATER / CO-DIGESTION FUNDING

Initial funding opportunity announced at $57 million, targeting publicly owned wastewater treatment facilities incorporating agricultural feedstocks through co-digestion. Eligible project concepts included new or expanded digestion, feedstock receiving, biogas upgrading, RNG, CHP and beneficial use.

MICHIGAN | Water-Energy Nexus

EGLE • SMALL PROJECT GRANTS

FY2026 program offered grants of $10,000–$100,000 for water and wastewater facilities, supporting energy efficiency and onsite renewable generation. A potential existing framework to expand toward biogas capture, CHP and RNG projects.

FEDERAL–STATE | Clean Water State Revolving Fund

CWSRF • LOW-COST MUNICIPAL FINANCING

EPA identifies energy conservation and recovery projects at publicly owned treatment works as eligible categories, including anaerobic digestion, methane capture and energy conversion. States can prioritize projects and may offer subsidized loans or principal forgiveness.

MASSACHUSETTS | Anaerobic Digestion Funding Matrix

MASSDEP / STATE PARTNERS • PROJECT DEVELOPMENT

State funding matrix identifies grants, loans and technical assistance pathways for anaerobic digestion at public wastewater facilities, including planning, feasibility and implementation support. Useful precedent for coordinating multiple funding sources.

POLICY OPTIONS TO BUILD ON THESE PRECEDENTS

Modernization grants

Gas capture, cleaning, CHP, RNG upgrading and metering at existing digesters.

Production incentive

$/MMBtu of biogas or RNG, or $/kWh of verified CHP output; keep end-use neutral.

Co-digestion support

Feedstock receiving and handling; reward incremental organics processed and verified gas output.

WASTEWATER DIGESTION | NON-ENERGY BENEFITS & MANAGEMENT FLEXIBILITY

Digesters can modernize residuals management—not just produce renewable energy—by stabilizing solids and expanding downstream management options.

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Reduce residuals volume

SOLIDS MANAGEMENT

Breaks down a portion of volatile solids, potentially reducing the quantity of residuals requiring storage, hauling and disposal.

Stabilize biosolids

HANDLING & TREATMENT

Stabilization can reduce odor potential, pathogen levels and vector attraction—supporting safer, more manageable residuals handling.

Ease capacity constraints

OPERATIONS & COST

Can help relieve pressure on onsite storage, seasonal land-application windows, hauling networks and limited disposal outlets.

Enable nutrient recovery

RESOURCE RECOVERY

Digestion changes nutrient forms and can support downstream phosphorus recovery, ammonia recovery, dewatering and nutrient concentration.

Expand beneficial-use options

PRODUCT & MARKET FLEXIBILITY

Separated or processed residuals may be easier to transport, store or use; recovered nutrients can potentially reach areas with agronomic demand.

Support regional co-digestion

WASTE DIVERSION

Facilities may accept suitable food-processing residuals, fats-oils-grease and other organics—diverting waste while increasing biogas potential.

POLICY NUANCE

- **Digestion reduces organic solids and stabilizes biosolids; it does not, by itself, remove total nitrogen or phosphorus or ensure lower nutrient discharge. Water-quality gains depend on downstream treatment, nutrient management and appropriate land application.**
- **Make eligible costs extend beyond the digester itself: solids separation, dewatering, nutrient recovery, drying / pelletization, gas capture and beneficial-use equipment.**

- EPA – Multi-Stage Anaerobic Digestion Fact Sheet — solids reduction, stabilization, odor and pathogen benefits.
- EPA – Nutrient Control Design Manual — nutrient transformations and phosphorus recovery during digestion.
- EPA – Land Application of Biosolids — land-application requirements and environmental considerations.
- EPA AgSTAR – Anaerobic Digester Operator Guidebook — digestate management and nutrient recovery.
- USDA – Soil and Air National Program — nutrient extraction, manure treatment, and regional nutrient redistribution.

Q & A

Follow-up:
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