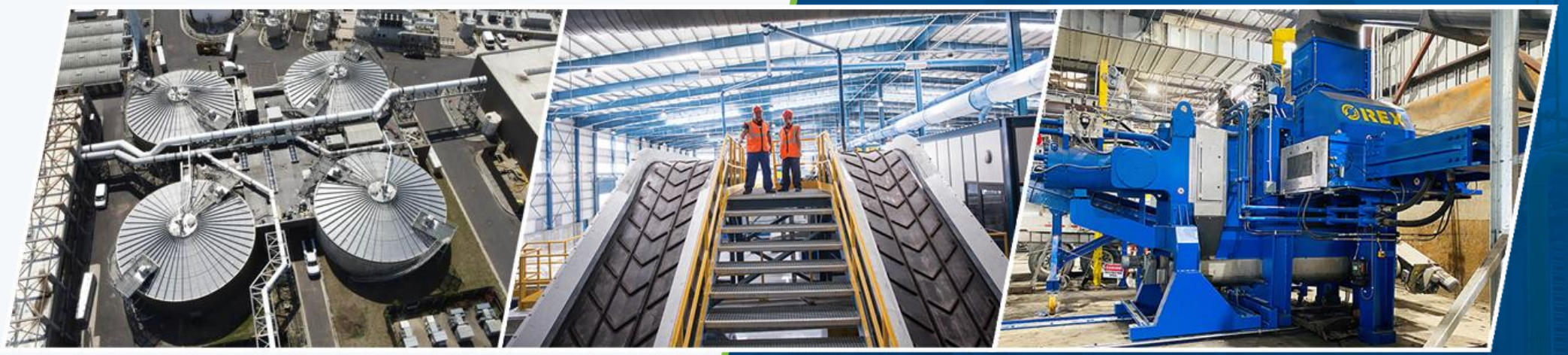
Developing Renewable Energy by Transforming Wastewater Treatment Plant

Operating experience in developing co-digestion projects and repowering existing wastewater infrastructure for renewable natural gas production



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Anaergia

Fueling a Sustainable World

UNPARALLELED EXPERIENCE, SCALE, INNOVATION

Turn food, farm and biosolid waste into renewable natural gas (RNG), clean water and fertilizer

18+	230+	1,750+	~300
COUNTRIES	TURNKEY RNG FACILITIES	TECHNOLOGY INSTALLATIONS	PATENTS & TECHNOLOGIES

End-to-End Turnkey Solutions

Integrated services covering design & engineering, construction, and operations & maintenance (O&M)

Global Track Record

Proven across 18+ countries with 230+ RNG facilities built and 1,750+ technology installations worldwide

Decades of Experience

Deep expertise developing and deploying anaerobic digestion and RNG technologies at commercial scale

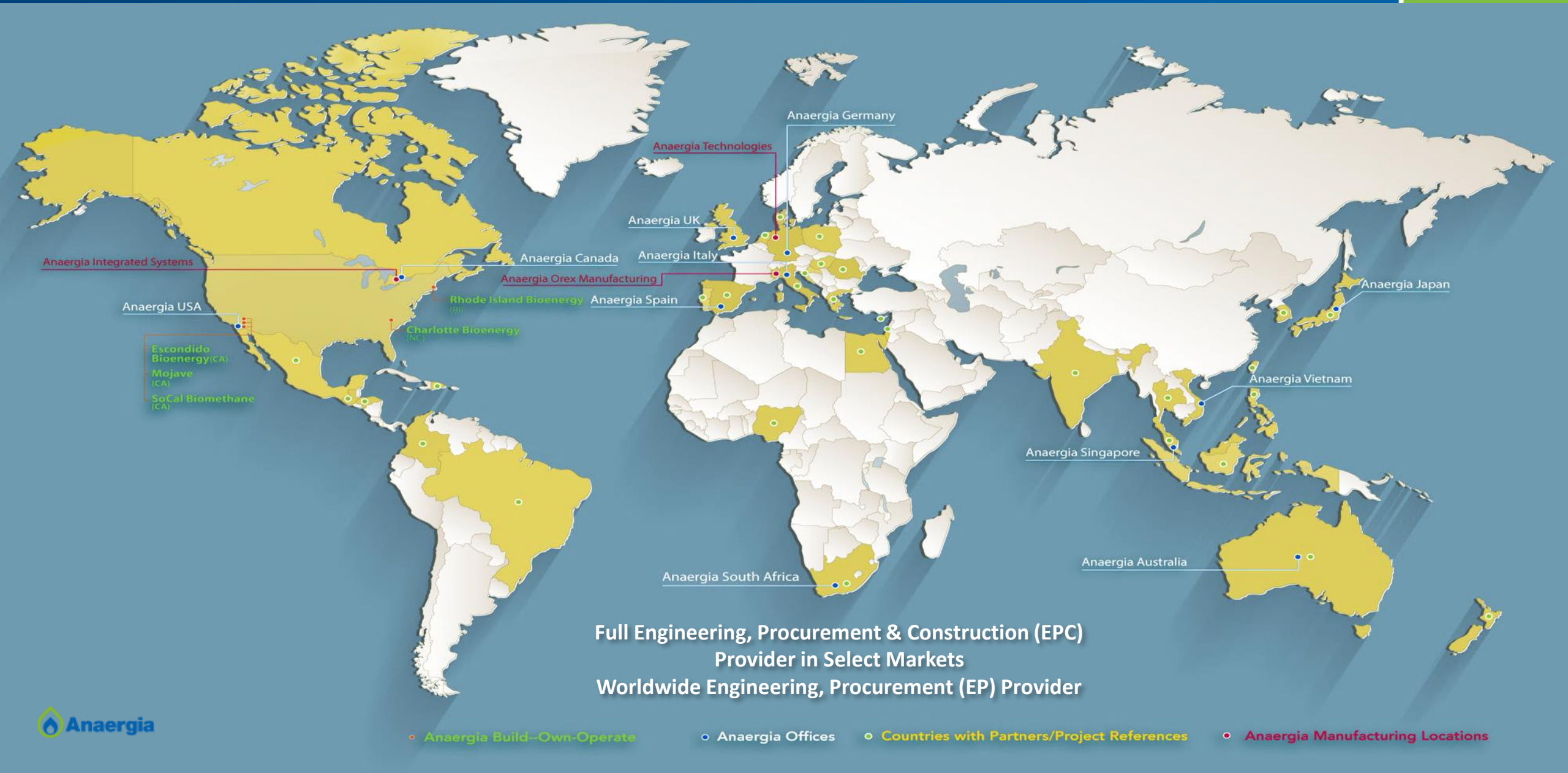
Hundreds of Patents & Proprietary Technologies

Extensive IP portfolio spanning digestion, gas upgrading, and water treatment – cementing Anaergia as the market leader in renewable technology. Equipment manufactured in Germany, Italy, and Canada

Manufacturer of Patented Equipment

In-house production in Germany, Italy, and Canada ensures consistent quality and rapid global deployment

ANAERGIA: DELIVERING CLEAN ENERGY SOLUTIONS ACROSS CONTINENTS



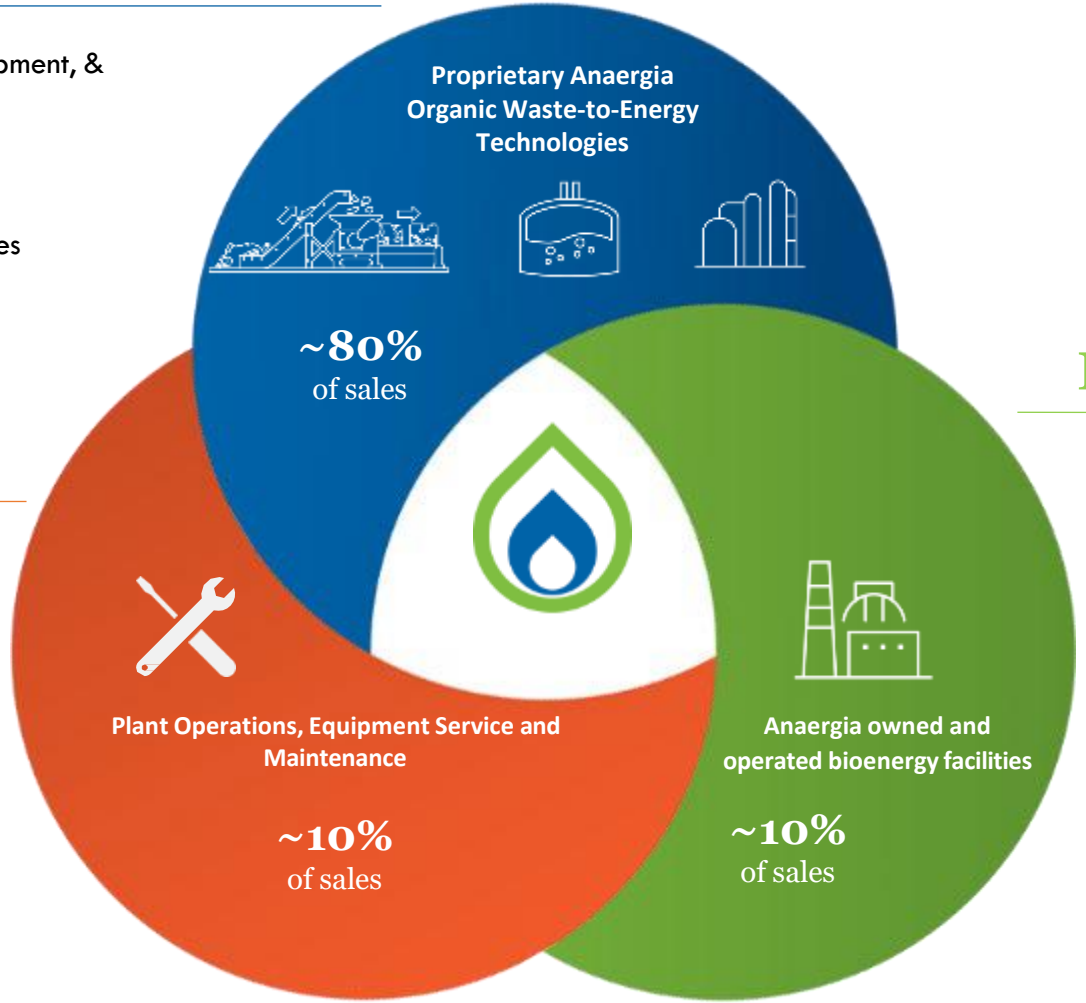
VERTICALLY INTEGRATED BUSINESS – OUR SEGMENTS WITH A CAPITAL SALES FOCUS

Capital Sales

- Proprietary technology solutions, equipment, & services sold to third parties
- Multiple delivery methods
- Short sales cycle, fast global references

Service

- Third party O&M and service contracts ~5-10 years in length
- Customers use Anaergia's technology solutions, driving recurring revenue
- Stable, predictable revenue stream



Build, Own, Operate

- Greenfield and brownfield facility development – BOO model
- Can acquire and retrofit existing sites, leveraging existing permits
- Offers significant, contracted, long- term revenue and high margins

From Wastewater Plant to Renewable Gas Producer

Developing, building and operating renewable gas projects inside infrastructure that is already built.

The largest renewable gas resource in the water sector is already built, permitted and staffed. It is the existing treatment plant.

Technology and integration

High-solids digestion, organic waste receiving and preprocessing, gas conditioning and upgrading — integrated into a plant that keeps treating wastewater throughout.

Development, investment and ownership

Where a utility prefers not to carry the capital or the market risk, Anaergia develops, finances, owns and operates the renewable gas facility itself.

Long-term operation

Feedstock procurement, digestion and energy systems run under multi-year operation and maintenance agreements, with performance carried by the operator.



Digestion complex at an existing municipal wastewater plant

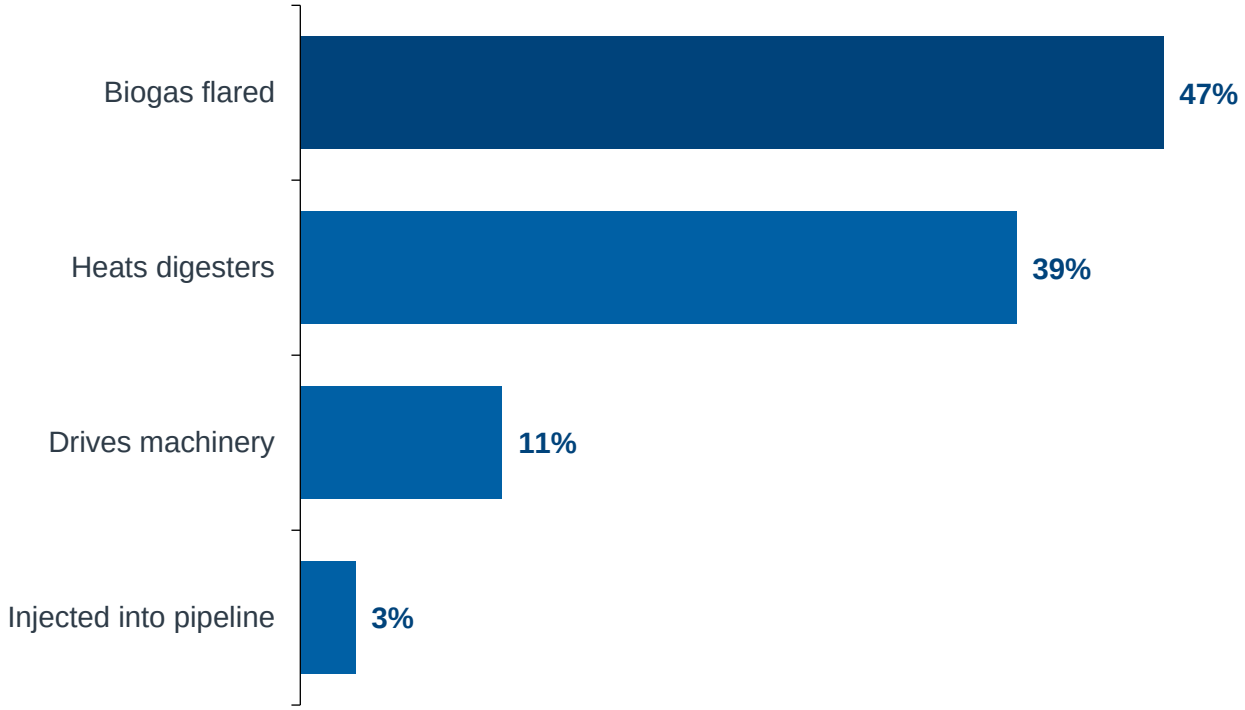
One opportunity, three ways to deliver it.

Capital supply, build-own-operate, or long-term service. The right structure follows the site, the feedstock and the route to market for the energy — not a preference.

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The Digestion Capacity Exists — the Gas Route Often Does Not

Most anaerobic digestion in the Western World treatment plants is not connected to a high-value energy route.



The scale of the installed base

Several water resource recovery facilities with anaerobic digestion flare the biogas they already produce. Only a few percentage inject it into a gas pipeline. The tanks, the permits and the operators are in place; the energy route is not.

What is changing

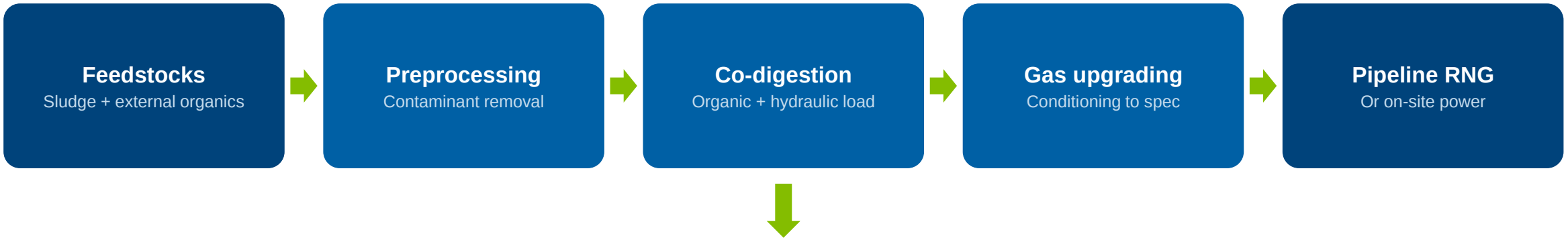
Organic-waste diversion policy is putting a second feedstock within reach of the same tanks. Policies and mandates are building pressure for diversion of food waste from landfill. That turns spare digestion volume into a place to put it.

Source: WEF (2024), Water Resource Recovery Facilities Biogas Data (resourcerecoverydata.org). Categories are reported utilisation routes and are not mutually exclusive.

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The Repowering Pathway: From Sludge to Renewable Natural Gas

RNG is the output of an integrated asset transformation, not an upgrading skid added to a plant.



Digestate

Dewatering and biosolids management — treated within an existing facility

Filtrate and nutrients

Return liquors and nutrient recovery, planned with the gas, not after it

On-site heat and power

The alternative gas route where there is no pipeline access

Each step constrains the next: feedstock quality limits digestion, digestion limits gas, and the gas route decides whether the additional load is worth carrying at all.

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What Makes an Existing Plant a Candidate for Repowering

The attractive sites are the ones where most of the expensive infrastructure is already in place.

Existing digestion volume

Tanks that are under-loaded, partly out of service, or operating well below their organic capacity.

Hydraulic and organic headroom

Capacity has to be assessed on both axes. Removing water from the feed buys organic capacity in the same tank.

Land, power and utilities

Space for receiving, preprocessing and gas plant, with electrical supply and process heat already on site.

An industrial site with operators

Existing zoning, permits, roads and a trained operating team — the hardest things to replicate on a greenfield.

Proximity to organic waste

Haulage distance drives both feedstock cost and the commercial case for the waste producer.

A route for the energy

Gas pipeline access, an on-site electrical load, or both. This is the item most often assumed rather than checked.

At VVWRA (California), digesters 1–3 were brought back into service and digesters 4 & 5 were re-mixed to raise capacity. The volume was already on the site.

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VVWRA (California) — The Starting Point

A conventional regional treatment plant with digestion capacity it was not fully using.

- **Regional authority.** Serving Victorville, Hesperia, Apple Valley and the San Bernardino County Service Area.
- **40.000 m3/d average flow.** Conventional wastewater treatment with anaerobic digestion of plant sludge.
- **Five digester tanks on site.** Not all of them in service, and those in service limited by conventional operation technology.
- **Outside waste already accepted (external sludge),** but the resulting biogas volumes were not enough to offset plant energy demand.

The Authority's stated objectives

Better utilise biogas resources, offset electricity costs, reduce exposure to energy price fluctuation, and reach zero net energy operations.



Victor Valley Wastewater Reclamation Authority, Victorville, California

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The Opportunity Was Inside the Existing Tanks

Digesting solids rather than water changes how much organic load an existing tank can carry.

Parameter	Conventional digestion	High-solids digestion
Digester feed solids	3 – 6 % TS	3 – 14 % TS
Digester operating TS	2 – 3 %	5 – 8 %
Organic loading rate	< 1.5 kg VS/m³/d	4.8 kg VS/m³/d
Hydraulic retention time	20 days	8 – 20 days
Volatile solids reduction	40 – 50 %	50 – 60 %
Volume per unit load (20-day SRT)	0.94 m³/kg VS	0.31 m³/kg VS

Design and typical operating ranges from WWTP operation.

What that meant at VVWRA

The high-solids configuration was demonstrated at the VVWRA plant to carry approximately three times the sludge load of a conventional digester of the same volume.

Why this is the pivotal point

Spare organic capacity is what makes room for an external feedstock. Without it, co-digestion at a treatment plant means new tanks — and the capital case usually stops there.

Phase 1 therefore retrofitted an existing 1,200 m³ digester rather than building new tank volume — which is what kept the capital case intact.

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VVWRA Phase 1 — Proving Co-Digestion Inside Existing Volume

An investment to retrofit that used the existing tank, brought in external feedstock and closed the site's energy balance.

- **High-solids digestion package** retrofitting an existing 1,200 m^3 digester, forgoing additional tank volume.
- **High-strength waste receiving skid** to accept trucked liquid feedstock.
- **New membrane gas storage** to buffer biogas between production and use.
- **Two containerised 800 kW dual-fuel CHP modules,** delivering heat and electricity to meet 100 % of the facility's loads.
- **Funded by Anaergia.** The Authority paid nothing up front for the upgrade.



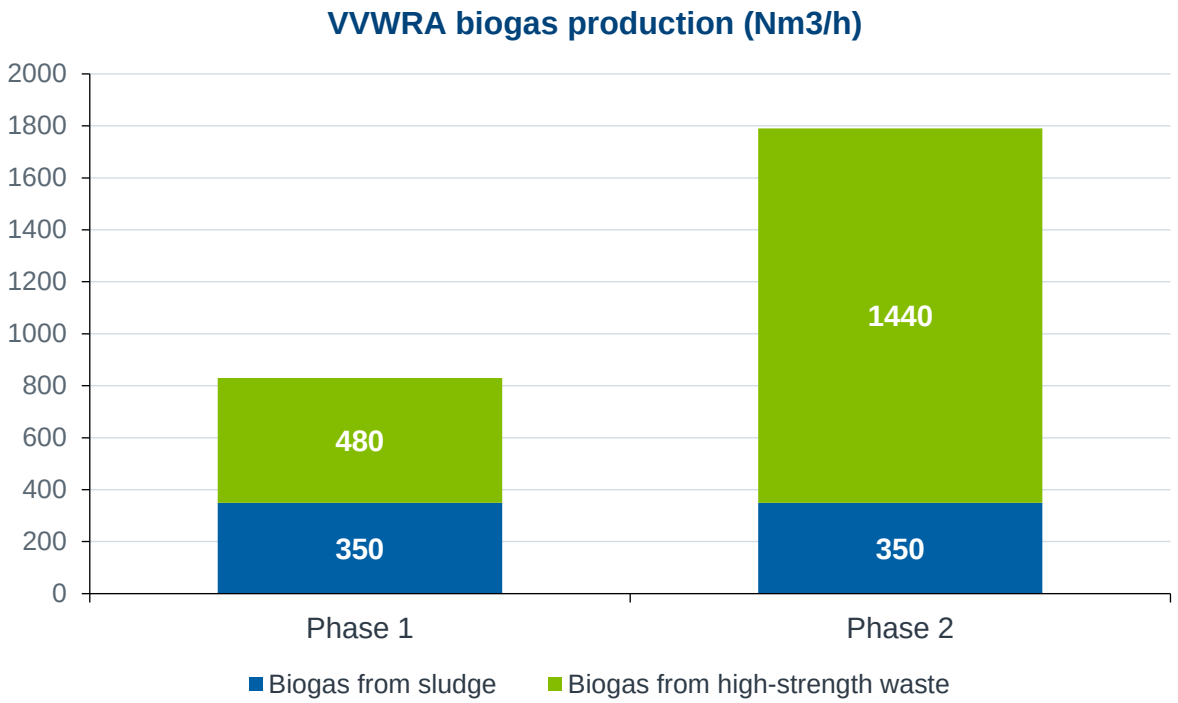
Two containerised 800 kW dual-fuel CHP modules installed under Phase 1

265 m3/d	76 ton/d	830 Nm3/h	350 / 480 Nm3/h
Sludge from the plant	Food processing waste	Biogas produced	From sludge / from food processing waste

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Adding Organic Load Outran the Site's Own Energy Demand

Once the energy-neutral target was met, further gas had nowhere to go — the constraint moved from biology to offtake.



The Phase 1 disposition of the gas

Of the 830 Nm³/h of biogas produced, only 75% was utilized on-site to meet the WWTP's energy needs. The remaining 25% was flared, as no viable option was available to export the excess energy to the grid.

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25% of the biogas flared — Phase 1

What that changed

The remaining digester capacity was worth nothing without a route to market for the gas. Phase 2 was therefore scoped around gas offtake first, and around additional organic loading second.

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VVWRA Phase 2 — Repowering the Whole Digestion Complex

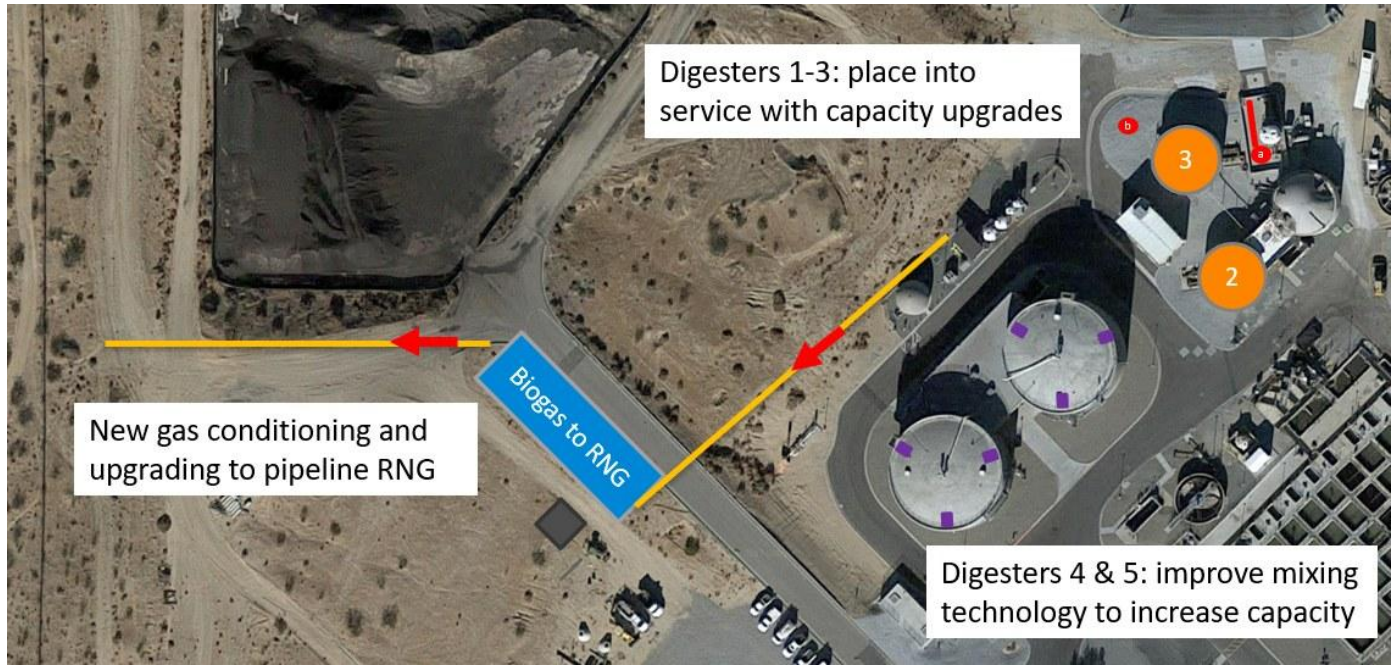
Existing tanks returned to service and re-mixed, and a new gas plant built to take every cubic meter to market.

- **Digesters 1–3** brought into service with capacity upgrades.
- **Digesters 4 & 5** fitted with high-solids submersible mixing to increase capacity.
- **New gas conditioning and upgrading plant** producing pipeline-quality RNG for injection into the Southwest Gas system.

Construction of the RNG infrastructure began in 2020 and was completed in 15 months; the facility was operational within 18 months of contract execution.

Ownership boundary

Anaergia financed, built, owns and operates the biogas utilisation facility on a parcel leased from VVWRA, receives all biogas produced at the plant, and holds permitting, interconnection and offtake risk.



Phase 2 site plan: digester upgrades and the new gas conditioning and upgrading plant

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Feedstock Reception and Preprocessing

Contaminants are removed continuously, or they arrive in the digesters — this is a daily operating task.



Direct truck offloading of trucked liquid feedstock



Organic Polishing System — plastic and grit removal



Contaminants separated from the incoming waste stream

Up to 100 tanker loads per week

High-strength industrial waste and liquid food waste delivered to the site for co-digestion.

Plastics and grit removed before digestion

The Organic Polishing System conditions the incoming stream, giving cleaner feedstock and fewer clogging problems downstream.

Roughly 5 m3 of contaminants per day

Removed from the waste stream. An integrated offloading pump allows direct unloading of septage and liquid food waste.

Every stream characterised and monitored

Anaergia works with VVWRA to characterise and monitor all outside waste streams, and provides digester process support.

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VVWRA Today — One Integrated Asset

Wastewater treatment, organic waste management and renewable gas production operating as a single facility.



Digestion complex and gas processing at the repowered VVWRA site

100,000

TONS/YEAR FOOD WASTE THROUGHPUT

8,500,000

M3/YEAR OF RNG

15,000

HOMES — EQUIVALENT GAS DEMAND

$24 M

CONSTRUCTION CAPEX

Recognition and standing

Described in project material as California's first wastewater co-digestion to pipeline-RNG facility, and awarded the Global Water Award for Wastewater Project of the Year in 2023.

Delivered with VVWRA, Anaergia, Southwest Gas and CalRecycle.

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VVWRA — Baseline, Transformation, Outcome

The same tanks, three different assets.

BASELINE
Conventional treatment

FEEDSTOCK
Plant sludge, with some outside waste already accepted

DIGESTION
Conventional; not all tanks in service

BIOGAS
Volumes insufficient to offset plant energy demand

GAS ROUTE
On-site use only

ENERGY POSITION
Energy-neutral operation as an objective

PHASE 1
Co-digestion proven in existing volume

FEEDSTOCK
265 m3/day sludge + 76 ton/day food processing waste

DIGESTION
High-solids retrofit of one existing 1,200 m3 tank

BIOGAS
830 Nm3/h

GAS ROUTE
75% to CHP; 25% flared

ENERGY POSITION
100 % of site heat and power met on site

PHASE 2
Repowered as a renewable gas asset

FEEDSTOCK
265 m3/day sludge + 230 ton/day food processing waste

DIGESTION
Digesters 1–5 in service; upgraded mixing and capacity

BIOGAS
Up to 2,000 m3/h

GAS ROUTE
Conditioned and upgraded to RNG

ENERGY POSITION
Net energy exporter

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VVWRA — What the Asset Taught Us

Five lessons that came from operating the facility, not from designing it.

1

Capacity is usually available before new tanks are

Phase 1 carried a new external feedstock on an existing tank. The capital case for co-digestion rarely survives a new-tank requirement.

2

Gas offtake becomes the binding constraint

Once the site's own energy demand was met, 25 % of Phase 1 biogas was flared. Additional organic loading has no value until there is somewhere for the gas to go.

3

Feedstock quality is an operating discipline

Roughly 5 tons a day of plastics and grit are removed at the front end. Preprocessing availability, not digester biology, is what most often limits throughput.

4

Continuous revenue raises the maintenance standard

When RNG production is a continuous revenue stream, receiving, digestion and upgrading have to be maintained as one chain with a common availability target.

5

Put each risk with the party that can price it

Anaergia carries financing, permitting, interconnection, offtake and credit registration. VVWRA keeps the wastewater plant and shares in the value of the gas.

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The Question an Asset Owner Actually Has to Answer

Not “how much biogas can this plant make?” but “what reliable asset can be built here, and who carries which risk?”

1 SCREEN THE SITE

- Existing digestion volume
- Hydraulic and organic headroom
- Land, power, permits, zoning
- Operating team and site access

2 TEST THE FEEDSTOCK CASE

- Available volumes and quality
- Haulage distance and cost
- Contract terms and continuity
- Preprocessing required

3 FIX THE ENERGY ROUTE

- On-site heat and power demand
- CHP, RNG, or both
- Interconnection and permitting
- Offtake and credit markets

4 SIZE THE OPERATING CASE

- Availability and redundancy
- Digestate and nutrient handling
- Long-term operating cost
- Who operates, who carries the risk

Repowering wastewater infrastructure is not an engineering project added to a treatment plant. It is the conversion of that plant into a renewable-resource asset that has to be financed, operated and maintained as one.

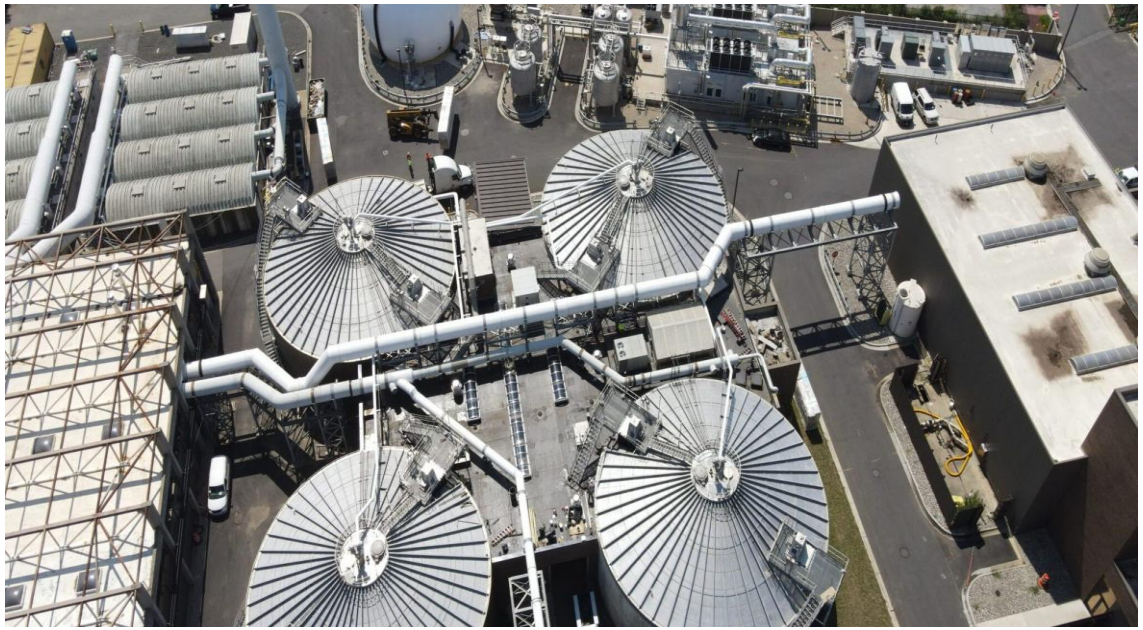
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The Same Model, Repeated Across North America

VVWRA is not a single case — comparable projects have been delivered under both ownership structures.

Various structures recur. Either Anaergia develops, finances and owns the renewable gas facility, as at VVWRA, or the utility owns the asset and Anaergia runs the organics and energy systems under a long-term operating agreement.





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Europe — The Same Logic, a Framework Still Taking Shape

The engineering case transfers directly. The permitting framework, in much of Europe, does not yet.

Co-digestion of sewage sludge with organic waste brought in from outside the plant is not yet fully covered by the legal and pemitting framework in every European country. Early projects are therefore as much a regulatory exercise as an engineering one — and several are already operating.



Terni, Italy
Anaerobic digester with gas holder



Viareggio, Italy
Organic waste pre-treatment line



Livorno, Italy
Preprocessing equipment during installation

Both ownership routes appear here too: an investment made directly by the water utility, or an operation lease offered by Anaergia to the municipality.

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Thank You

Questions?

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