As the USA leader in anaerobic digestion, DVO’s patented, efficient and cost-effective systems provide:

• Renewable power generation
• Quality solid fertilizer
• Liquid fertilizer for crop application
• Odor and pathogen control
Who is DVO, INC?

- Based in Wisconsin, USA
- Founded in 1989 by Steve Dvorak, P.E.
  - Packerland digester in 1985 – still operating
- Our first digester
  - Gordondale Farms, WI in September 2001
- DVO is the USA market leader, with over 100 digesters operating at more than 80 sites in 18 U.S. states
- International operations (Serbia, Chile, Newfoundland, China)
Today’s modern digester by DVO... Where is it?
Color-coded piping:
- Yellow = biogas
- Red = hot Water
- Orange = warm water
- Blue = cool water
A DVO utility building integrates power generation, the AD heating and mixing system, controls, the nutrient recovery (NR) process and liquid/solids separation.
AD UTILITY BUILDING

©2015 DVO, Inc.
A typical DVO installation.
**Why Below Ground?**

- To more easily maintain an even temperature. By moderating temperature fluctuations bacteria growth is optimized.
- For more efficiency: Far less energy is required to maintain optimal operating temperatures in cooler seasons, than with above-ground tanks.
- Very hot days also do not raise temperatures too high.
- GHD vessels are much stronger than steel tanks, which have been known to freeze, fail and even rupture (spilling their contents).
**BIOLOGICAL SYSTEM**

- **Manure/Waste Collection System**
  - Dairies (flush & scrape), Other Animal Wastes
  - Mixed Materials: Food Processing, Biofuels, etc.

- **Digester Vessel**
  - Mixed Plug-flow
  - First In, First Out

- **Digester Mixing**
  - Biogas Recirculation

- **Digester Temperature**
  - Typically Mesophilic = 38.3° C
COMPLETE MIX / CSTR DIGESTERS

Desired Retention Time

Source: http://www.epa.gov/agstar/anaerobic/ad101/anaerobic-digesters.html
To preserve retention time, mixing occurs around the *axis of flow*. Waste slowly “corkscrews” its way through the digester.
55 - 60% Methane (CO₂ ~ 45%)

By design, GHD offers superior biological degradation and the highest gas production volume for any given waste stream. For example:

- 3.1 M³ (110 ft³) of biogas/cow/day
- 6-7 kW/cow/day (FC, manure only, NO substrates)

Lowest parasitic load (energy cost of operation)
- <10% average...over 90% of generated electricity is available.

Provides Electricity and Heat

Small Amount of H₂S (1500-6000 ppm)
Requirements for Success

- Guaranteed retention time for the entire waste stream (for higher efficiency and pathogen destruction)
- No stratification of solids in-vessel
  - Constant temperature
  - Full dispersion of bacteria population
- Ability to handle multiple waste streams
- Ability to handle a wide range of waste streams, and percent solids concentration
WHY DO WE NEED ANAEROBIC DIGESTERS?

Study: Global warming worsening watery dead zones

ELECTRICITY:
Receding Lake Mead poses challenges to Hoover Dam's power output.
Rod Kuckro, E&E reporter EnergyWire: Monday, June 30, 2014

US and China reach historic climate change deal, vow to cut emissions
By Matt Hoye and Holly Yan, CNN
updated 5:15 PM EST, Wed November 12, 2014

California Drought Is Worsened by Global Warming, Scientists Say.
By Henry Fountain, New York Times, April 1, 2015
DIGESTER CUSTOMERS

- Farmers
  - Dairy, Poultry, Swine
- Industrial / Food Processing Companies
- Municipalities / Waste Water Treatment Plants (WWTP)
- Government / Military
- Landfills
  - Organic Waste Landfill Diversion
- Composters
DEMAND FOR BIOGAS / RENEWABLES

- GE, SC Johnson, Google, Amazon, Wal-Mart, etc.
- Cow Power Program - $0.04/kWh
  - Green Mountain Power in VT
- States with Biogas Incentives
  - VT, CA, NY, NC
- International
  - Korea, Uruguay, UK, Argentina, Serbia, China, Netherlands
- Landfill Bans & Mandatory/Voluntary Organics Recycling
  - Seattle, San Francisco, Denver, Portland, Oakland, Sonoma County, NYC, Minneapolis, St. Paul, Green Bay
CH$_4$ is 25 times greater than CO$_2$ at trapping radiation.

- Some argue as high as 84x

- 40% of food in the United States goes uneaten.

WISCONSIN BIOENERGY FAST FACTS

Farm Digesters
- 35 - 40

Industrial/Food, Municipal, and Landfill Digesters
- 110+

Rough Estimate of Equivalent Homes Powered from Farm Digesters
- 25,000

Number of Wisconsin Homes using Wood Heat
- 106,000
- 4.6%

Dairy Cows
- 1,271,000

Slide courtesy of RENEW Wisconsin
36 million tons of food waste goes to landfills per year

Number of cities/states banning food waste is increasing

Curbside organic waste collection in Denver, NYC, Minneapolis, St. Paul

Ban/mandate some yard debris: Arkansas*, Delaware, Florida*, Georgia*, Illinois, Indiana, Iowa, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nebraska*, New Hampshire, New Jersey, North Carolina, Ohio, Pennsylvania, Rhode Island, South Carolina, South Dakota, Vermont, West Virginia, Wisconsin

*Allow yard debris disposal in landfills that generate energy

Ban/mandate food scraps: California, Connecticut, Massachusetts, Rhode Island, Vermont.
Also of note: New York City, Seattle

EPA: 25% of all fresh water is lost in food waste

Can we recycle the water for other uses?
Energy Values

Biogas Generation Potential of Substrates

- Cow manure: 25
- Pig manure: 30
- Potato waste: 39
- Chicken manure: 80
- Brewery waste: 120
- Green clippings: 175
- Grass silage: 185
- Corn silage: 190
- Food scraps: 265
- Bakery waste: 714
- Fats & grease: 961

Cubic Meters of Biogas Production per Ton

More Organic Substrates...

- Restaurant/Casino/Institution Kitchen Grease & Wastes
- Cheese Whey and Milk
- Brewery / Distillers Grains
- Municipal Sewer Sludge
- Cannery Waste (Vegetable and Fruit)
- Waste from a Ravioli Sauce Plant
- Silage & Silage Spoilage
- Chicken Processing Plant DAF
- Artificial Crab Meat and Fish Trimmings
- Many, many more
Waste stream(s) should contain only organic materials. Plastics, glass and other non-organic materials must be removed. Methods vary depending upon the waste stream’s characteristics, and numerous vendors provide depackaging systems. Among them:

• Atritor
• Baader
• Brand
• Bright Tech.
• Dupps
• Doda
• Ha-Di-Tec
• Komptech
• Kufferath
• Mavitec
• Puehler
• Rothenburg
• Scotts Equip.
• Sebright
• Sepamatic
DVO CO-DIGESTION DIGESTER
600 kW Genset

American Council of Engineering Companies 2015 Engineering Excellence Awards Recipient
DVO CO-DIGESTION DIGESTER

- Food: 25%
- Food Processing: 11%
- Pharmaceutical Mfg: 15%
- Packing Plant Waste: 9%
- Grease Trap: 11%
- BioDiesel Mfg waste: 9%
- Manure: 20%
6MW ELECTRICAL PRODUCTION
DIGESTER BENEFITS

- Renewable Energy
- Odor Destruction
- Pathogen Destruction
- BOD/COD Reduction
- Inorganic Liquid Fertilizer for Direct Crop Application
- Bedding in Barns
- Soil Amendment
  - Magic Dirt
- REC’s, CC’s, RIN’s
Waste can be transported by truck or tanker, or pumped directly from the source.

Gated reception pit with mixer for substrates
**Nutrient Management**

- A Continuous Plan
- Reduced Nitrogen & Phosphorus Loading By Separating Liquids From Solids
  - 40% of Phosphorus Goes With Separated Solids
- Lower Nutrient Levels Allows Increase In Application Volume Per Acre
- Helps Farmers prepare for tighter government regulations.
Valuable & Versatile
- High-quality Animal Bedding
  - Pathogen Reduction
  - Somatic Cell Count/Herd Health
  - Clean Cows
- Fertilizer
  - Peat Moss Replacement
  - Additional revenue stream
- Particle Board
Often sold for use as:

- Animal bedding
- Landscaping
- Peat moss replacement
- Fertilizers
• 97% Volatile Fatty Acid (VFA) destruction per EPA – AgSTAR study
  • Waste is collected and completely contained, then the odor is “burned” away in the biogas engines.
  • The digested liquid can be land applied without complaint.

Facilities can be designed for enhanced odor containment
Pathogens such as e-coli and salmonella are reduced in the digested waste – often to the point of undetectability.

- An answer to concerns about spreading raw, unprocessed farm wastes on fields
- This ability is partly due to DVO’s guaranteed hydraulic retention time.
- Unlike competitor designs, every unit of waste is retained in the vessel for a specific amount of time. Nothing is removed too soon, or too late.
## EPA AGSTAR PATHOGEN EVALUATION: DVO

### DIGESTER INFLUENT

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>11/3/04</th>
<th>11/16/04</th>
<th>11/30/04</th>
<th>12/28/04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fecal Streptococcus (col/g WWB)</td>
<td>380,000,000</td>
<td>110,000,000</td>
<td>64,000,000</td>
<td>480,000,000</td>
</tr>
<tr>
<td>Fecal Coliform (col/g WWB)</td>
<td>350,000,000</td>
<td>170,000,000</td>
<td>130,000,000</td>
<td>160,000,000</td>
</tr>
<tr>
<td>Total Phosphorous (mg/Kg WWB)</td>
<td>950</td>
<td>780</td>
<td>910</td>
<td>750</td>
</tr>
<tr>
<td>Total Solids (%)</td>
<td>10.9</td>
<td>9.8</td>
<td>9.3</td>
<td>9.3</td>
</tr>
<tr>
<td>Volatile Fatty Acids (mg/Kg WWB)</td>
<td>7,520</td>
<td>7,060</td>
<td>6,000</td>
<td>7,140</td>
</tr>
</tbody>
</table>

### DIGESTER EFFLUENT

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>11/3/04</th>
<th>11/16/04</th>
<th>11/30/04</th>
<th>12/28/04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fecal Streptococcus (col/g WWB)</td>
<td>8,700,000</td>
<td>6,000,000</td>
<td>1,700,000</td>
<td>34,000,000</td>
</tr>
<tr>
<td>Fecal Coliform (col/g WWB)</td>
<td>660,000</td>
<td>370,000</td>
<td>380,000</td>
<td>240,000</td>
</tr>
<tr>
<td>Total Phosphorous (mg/Kg WWB)</td>
<td>780</td>
<td>840</td>
<td>860</td>
<td>550</td>
</tr>
<tr>
<td>Total Solids (%)</td>
<td>6.4</td>
<td>6.5</td>
<td>6.4</td>
<td>6.1</td>
</tr>
<tr>
<td>Volatile Fatty Acids (mg/Kg WWB)</td>
<td>300</td>
<td>282</td>
<td>321</td>
<td>259</td>
</tr>
</tbody>
</table>

\[ \text{% DWB} = \frac{\text{mg/Kg DWB}}{10,000} \quad \text{mg/Kg} = \text{ppm} \]
**Liquid Fertilizer**, inorganic nutrients

- N, P and K are not destroyed by the digester. Instead, they are transformed to an inorganic state that is already “plant-available”. Liquid nutrients can be land-applied to a growing crop.
- By restoring these valuable nutrients to the land, less artificial fertilizers need to be employed.
- DVO owners report up to 100% increase in yield for alfalfa, using digested liquid fertilizer.
- pH Increase
- Lessened Likelihood of Runoff
- Liquid can be pivot-irrigated
Above-Ground Tank
- 500 to 9000 cubic meters capacity typical
- Good for shorter-term storage

Lagoon Storage
- Soil permeability test needed
- Clay soils may not require a lining material
- Higher capacity/seasonal
ENVIRONMENTAL BENEFITS

- Carbon Reduction / Credits
  - CH4 (methane) is a 21 times more powerful greenhouse gas than CO2. DVO digesters contain and consume the methane, *reducing greenhouse gas emissions from stored and land-distributed farm wastes by over 90%*
  - Air quality can be meaningfully improved in areas that are experiencing stress from farming or industrial operations
  - Energy is created is from a renewable resource

- Renewable Energy Certificates
  - Earns 1 REC (or TREC) for every 1MW/hr produced
The DVO anaerobic digester, even with ammonia and/or phosphorus recovery options (AD+AR+PR), operates at a NET PROFIT.

- Does not increase the cost of doing business
- Investment capital is potentially available
- A 3-7 year ROI is typical
  - depends upon how the project is funded,
  - and how the products from digestion are monetized
- Then the farmer can enjoy additional revenue stream(s) that aren’t dependent upon market prices.
BIOGAS VERSATILITY

- Electricity
- Compressed Natural Gas (CNG)
- Diesel
- Boiler Fuel
- Liquid Fuels
- Plastic
- Pyrolysis
  - Landfill Solids
  - Industrial Wastes
Renewable Energy

- Four Cows = 1 kW/Hr (without additional substrates)
- Other digester types require 5-10 cows per kW
- Reliable: GENSET Run-time average 92-98%
- Low operating cost: 5 - 9% typical
Digester Benefits:
- Renewable power
- Odor control
- Plant-ready fertilizers
- Nutrient recycling
- GHG reductions
- BOD/COD reductions
- Heat
- Revenues

NOW 6x 1.05MW GENSETS (6.3MW TOTAL)
The digester produces continuously as long as it’s fed daily (Production is not dependent upon the sun, or wind...)
**H₂S Removal**

The NR process allows us to remove up to 100% of corrosive hydrogen sulfide (H₂S) from biogas at a fraction of the cost of other methods commonly employed.

**CO₂ Removal**

Also known as “biogas sweetening,” the NR process allows us to remove a significant percentage of CO₂ from biogas – again more cost-effectively than other known processes.

Removing both are key to making effective transportation fuels/CNG, and power generation equipment operate more efficiently.
Renewable CNG
When used as a transportation fuel to replace diesel or gasoline, renewable CNG earns additional credits – an attractive revenue option.
REMOTE MONITORING

- Generation equipment can be monitored and/or controlled remotely...
EXCESS HEAT REMOVAL
BIOGAS FLARES

©2015 DVO, Inc.
LARGEST DIGESTER TO-DATE

- 16,000 cow milking dairy, 41,250 M³ capacity
- 4.5 MW generation cap.
- Commissioned 2011
DVO systems are constructed “in place” by local contractors.

- A significant portion of project costs remain with the local economy
- AD systems can provide permanent jobs for power plant maintenance and service personnel
• In the USA more agricultural wastes by volume are processed in DVO digesters than any other.
• 97% of all DVO digesters ever built are still in operation.
• We are fortunate to see repeat business.
Digestate Treatment Options
Further Phosphorus, Nitrogen and Salt Removal
Lake Erie in late summer 2011. The algae bloom was the largest in the lake’s history and spanned nearly 2,000 square miles.
Maumee River basin is the largest tributary to Lake Erie with a watershed of 6,500 square miles.

Representation of peak algae bloom on Sept. 3, 2011 from satellite images, about six weeks after its initiation in the lake's western basin.
“Dead zone:” <2 milligrams of oxygen per liter
### PHOSPHORUS LOADING

**Fox River Basin** (lbs/year)

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>251,382</td>
<td>45.7%</td>
</tr>
<tr>
<td>Industrial discharges</td>
<td>114,426</td>
<td>20.8%</td>
</tr>
<tr>
<td>Municipal discharges</td>
<td>87,160</td>
<td>15.9%</td>
</tr>
<tr>
<td>Urban (regulated)</td>
<td>65,829</td>
<td>12.0%</td>
</tr>
<tr>
<td>Urban (non-regulated)</td>
<td>15,960</td>
<td>2.9%</td>
</tr>
<tr>
<td>Runoff from construction sites</td>
<td>7,296</td>
<td>1.3%</td>
</tr>
<tr>
<td>Natural background</td>
<td>5,609</td>
<td>1.0%</td>
</tr>
<tr>
<td>General permits</td>
<td>2,041</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

**Total Phosphorus Loading:**

Agriculture, industrial and municipal discharges = 82.4% of total phosphorus loading
PHOSPHORUS RECOVERY

- Total Phosphorus removal from digested effluent is 75 - 90%
- Total suspended solids reduction 90%
- $0.0015 per-gallon treated
- Condensed secondary solids 20-26% dry matter
- Stackable/storable
- Saleable
# Nutrient Reductions

## Industrial Waste Digestate Test

<table>
<thead>
<tr>
<th>Test</th>
<th>Influent</th>
<th>Digestate</th>
<th>Screwpr Liquid</th>
<th>Pr Liquid</th>
<th>Ar Liquid</th>
<th>Avg % Total Redux</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS</td>
<td>14.0</td>
<td>6.7</td>
<td>5.5</td>
<td>1.6</td>
<td></td>
<td>88.6</td>
</tr>
<tr>
<td>TSS</td>
<td>81,000</td>
<td>41,000</td>
<td>50,000</td>
<td>2,000</td>
<td></td>
<td>97.5</td>
</tr>
<tr>
<td>TVS</td>
<td>100,000</td>
<td>41,000</td>
<td>31,000</td>
<td>8,900</td>
<td></td>
<td>91.1</td>
</tr>
<tr>
<td>BOD5</td>
<td>74,000</td>
<td>4,800</td>
<td>5,800</td>
<td>3,200</td>
<td></td>
<td>95.7</td>
</tr>
<tr>
<td>COD</td>
<td>340,000</td>
<td>98,000</td>
<td>71,000</td>
<td>15,000</td>
<td></td>
<td>95.6</td>
</tr>
<tr>
<td>Coliform</td>
<td>350,000,000</td>
<td>400,000</td>
<td>130,000</td>
<td>18,000</td>
<td>Non-D</td>
<td>99.9</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>3,300</td>
<td>1,900</td>
<td>1,800</td>
<td>510</td>
<td></td>
<td>84.5</td>
</tr>
<tr>
<td>N</td>
<td>2,700</td>
<td>2,700</td>
<td>2,600</td>
<td>1,000</td>
<td></td>
<td>63.0</td>
</tr>
<tr>
<td>NH₃</td>
<td>1,500</td>
<td>1900</td>
<td>1900</td>
<td>400</td>
<td></td>
<td>73.4</td>
</tr>
</tbody>
</table>
BIOSOLIDS SEPARATION

CentriFlo “fine solids” separator, followed by Modified Dissolved Air Floatation (M-DAF)

= 85-90% P reductions for < $0.002 USD/gal, € 0.32 per M³ processed
90% PHOSPHORUS REMOVAL

> 90% Phos removal for < $0.0007/gal processed.

©2015 DVO, Inc.
# Stage 2 - Phosphorus Recovery

## Test Results – Hog Waste

<table>
<thead>
<tr>
<th></th>
<th>TS%</th>
<th>TSS%</th>
<th>TN ppm</th>
<th>NH₃ ppm</th>
<th>P ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effluent Digester</td>
<td>2.4</td>
<td>1.6</td>
<td>4,200</td>
<td>2,500</td>
<td>590</td>
</tr>
<tr>
<td>CentriFlo Liquid</td>
<td>2.2</td>
<td>1.4</td>
<td>4,000</td>
<td>2,600</td>
<td>550</td>
</tr>
<tr>
<td>DVO “PR”</td>
<td>0.9</td>
<td>0.16</td>
<td>3,200</td>
<td>2,200</td>
<td>48</td>
</tr>
<tr>
<td><strong>Reductions by %</strong></td>
<td>59</td>
<td>89</td>
<td>20</td>
<td>15</td>
<td><strong>91</strong></td>
</tr>
<tr>
<td>CentriFlo Solids</td>
<td>10.4*</td>
<td>9.5</td>
<td>4,500</td>
<td>2,400</td>
<td>630</td>
</tr>
</tbody>
</table>

*Separated solids can be further dried (if desired) and land-applied.
Inorganic nutrients

N, P and K are not destroyed by the digester. Instead, they are transformed to an inorganic state that is already “plant-available”. These nutrients can be land-applied to a growing crop.

By restoring these valuable nutrients to the land, less artificial fertilizers need to be employed.

DVO owners report meaningful increases in crop yields using digested, plant-ready fertilizers.

pH Increase
Washington State: Jan, 14 2015. Federal Judge states manure contributes to high water nitrate levels
DVO AMMONIA RECOVERY (AR)

- Greatly reduces or eliminates land irrigation requirements of digested liquid
- Greatly reduces freshwater requirements for dilution
- Recovers the nitrogen (ammonia) that would otherwise be lost to volatization
- Produces a 38-40% Ammonium Sulfate liquid solution, 8-0-0-9s
- Phosphorus is also sequestered more efficiently
- Integrated to the DVO digester system, and made possible via guaranteed HRT from DVO’s patented Mixed Plug-Flow™ design
- “CLASS-A” BIOLIQUID & SOLID
  - enhanced pathogen elimination
  - Same standard as municipal WWTP sludge
  - more disposal options are available
- Conserves heat (via recycling) so more Btus are available
N-rich gas leaves the NR processing tank and is piped to the AR capture system...
Nitrogen is converted into a stable, commercial fertilizer, **8-0-0-9s**

- **Dried biosolids (from poultry)**
- **Crystalized from liquid form**
UPGRADED PRODUCTS: “MAGIC DIRT”

Magic Dirt is sold at Walmart and Home Depot stores in the NE (expanding nationwide) – using fiber only from DVO digesters...
Recovered Nitrogen is knifed into the soil (left) or sidedressed with very limited loss due to its high stability.
What we end up with after this system, as shown in the data, is a very economical way to achieve a Class-A liquid with substantially reduced BOD, COD, ammonia and P content.

Nitrogen is saved in the form of ammonium sulfate, $(\text{NH}_4)_2\text{SO}_4$ at a commercial concentration of 34-40%.
**Nutrient Reductions - Poultry Digestate**

What we end up with after this system, as shown in the data, is a very economical way to achieve a **Class-A liquid** with **substantially reduced BOD, COD, ammonia nitrogen and P content**.

Now this liquid can be recycled to wetten incoming drier wastes.

Nitrogen is saved in the form of ammonium sulfate, \((\text{NH}_4)_2\text{SO}_4\) at a commercial concentration of 38-40%.

<table>
<thead>
<tr>
<th></th>
<th>TS</th>
<th>TSS</th>
<th>TN</th>
<th>NH₃</th>
<th>P</th>
<th>K</th>
<th>Mag</th>
<th>Ca</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effluent of Digester</td>
<td>9.50</td>
<td>7.00</td>
<td>7,800</td>
<td>4,100</td>
<td>5,200</td>
<td>5,000</td>
<td>1,700</td>
<td>11,000</td>
</tr>
<tr>
<td>AR Liquid</td>
<td>6.30</td>
<td>3.30</td>
<td>5,300</td>
<td>2,400</td>
<td>3,100</td>
<td>5,300</td>
<td>1,000</td>
<td>6,200</td>
</tr>
<tr>
<td>PR Liquid</td>
<td>2.50</td>
<td>0.22</td>
<td>3,600</td>
<td>1,500</td>
<td>320</td>
<td>4,200</td>
<td>27</td>
<td>330</td>
</tr>
<tr>
<td><strong>TOTAL REDUCTIONS by %</strong></td>
<td><strong>74</strong></td>
<td><strong>97</strong></td>
<td><strong>54</strong></td>
<td><strong>63</strong></td>
<td><strong>94</strong></td>
<td><strong>16</strong></td>
<td><strong>98</strong></td>
<td><strong>97</strong></td>
</tr>
</tbody>
</table>

| Wet Solids (pre-drying)  | 17.10 | 8,000 | 2,400 | 12,000 | 2,500 | 4,300 | 28,000 |
What we end up with after this system, as shown in the data, is a very economical way to achieve a Class-A liquid with substantially reduced BOD, COD, ammonia nitrogen and P content.

Nitrogen is saved in the form of ammonium sulfate, \((\text{NH}_4)_2\text{SO}_4\) at a commercial concentration of 38-40%.
The DVO anaerobic digester, even with ammonia and/or phosphorus recovery options (AD+AR+PR), operates revenue-positive.

- Bankable
- Investment capital is potentially available

A 3-7 year ROI is typical

- depends upon how the project is funded,
- and how the products from digestion are monetized

Then the owner can enjoy additional revenue stream(s) that aren’t dependent upon market prices.
Thank You!