



Innovative financing options

VAMWA-MWCOG-MAMWA BIOSOLIDS MEETING
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The need for innovative financing

- Drivers for new technologies
 - Rising energy costs
 - Depleting fossil fuel supplies
 - Climate change
- Capital costs for implementing new technologies is often the greatest barrier

Financing Options

- Low interest loans
- Partial funding via grants
- Revenue generation
- Partnerships with developers

Not all are DMV specific and may require adapting to this area

Energy Incentive Programs

- Database of state funding for energy incentive programs
 - <https://www.energy.gov/eere/femp/state-energy-offices-and-organizations>
- Maryland – Maryland Energy Administration
 - promote affordable, reliable, and cleaner energy that benefit all Marylanders. The programs and policies help lower energy bills, support business energy upgrades, support a cleaner environment, and promote energy independence for Maryland.
- Virginia – Virginia Division of Energy
 - advance sustainable energy practices and behaviours.
- DC –Department of Energy and Environment
 - leading authority on energy and environmental issues affecting the District of Columbia.

Performance Contracting

- Energy Service Performance Contracting (ESPC, or PC for short) provides a turn-key procurement mechanism to achieve these projects with marginal risk to the Owner/Municipality by providing a performance guarantee and a positive cashflow.
- Each state has its own PC legislation
 - <https://www.ncsl.org/research/energy/state-energy-savings-performance-contracting.aspx>
- ESCOs act as a qualified provider offering performance contracting to achieve needed improvements serving as a design-build contractor that guarantees that the costs of the improvements (capital, operations & maintenance, loan interest costs, etc.) will be paid through energy savings and/or other operational savings, typically between 10 to 20 years

Public Private Partnerships

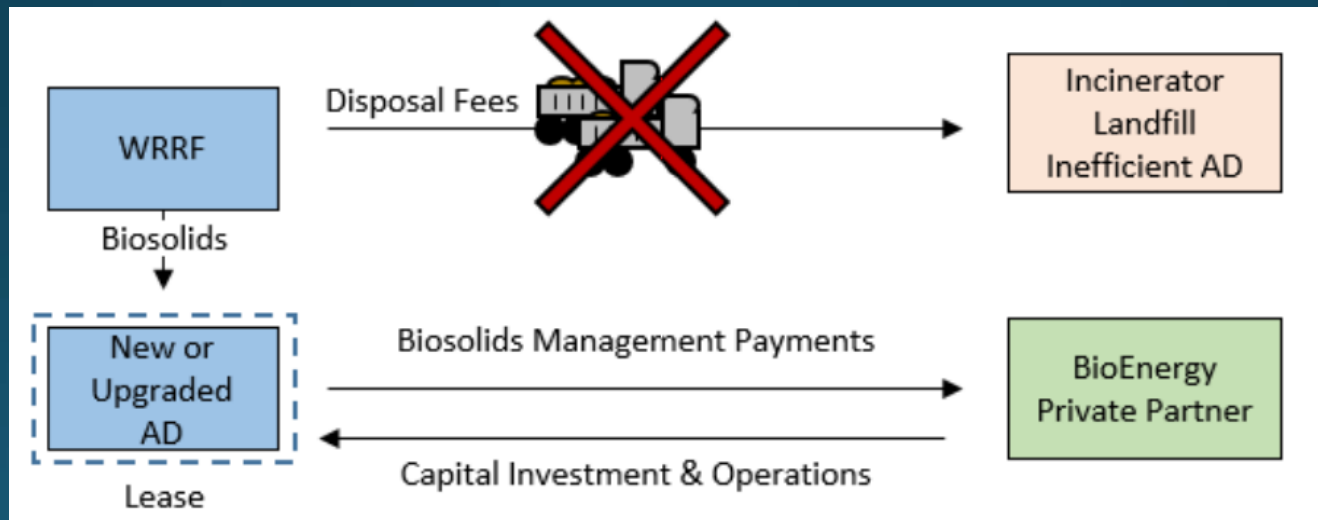
- A government service or private business venture that is funded and operated through a partnership of government and one or more private sector companies. In a P3, the private partner provides a public service or project and assumes substantial financial, technical and operational risk in the project.
- Contractual or institutional arrangements between public and private party sectors for the private delivery of public infrastructure
- Private partner funds, in whole or in part, the project infrastructure and related components
- Risks are strategically distributed between the public and private partners (the greater the risk accepted by the private partner, the greater return on investment the private partner should expect to receive)
- P3s typically involve “bundled” services (i.e. design, finance, construct, operate, maintain) in order to maximize synergies and discourage low-capital/high operating cost proposals
- In infrastructure P3s, payment is contingent on private service providers delivering services to an agreed upon performance standard.
- The private partner:
 - Maintains ownership of the assets
 - Controls management of the assets
 - Establishes user rates

Public Private Partnerships

- The term P3 is a broad categorization that includes numerous types of contractual arrangements such as Management Contracts; Performance Contracts; Concessions; Design-Build-Finance-Operate (DBFO); Build, Lease, Transfer (BLT); Divestiture; Power Purchase Agreements, etc.
- Some benefits of P3s include:
 - Shorter infrastructure project implementation schedule
 - Optimal risk sharing
 - Higher energy efficiency and cost savings
 - Investment opportunities and private sector development
 - Budget leveraging/additional capital
 - High level of customer service
 - Generation of additional revenues
- While results vary, a common driver behind P3 is the reduction in rates to consumers. It is important to understand that P3s are different than privatization, in that the assets shift ownership from public to the private party in the case of privatization.

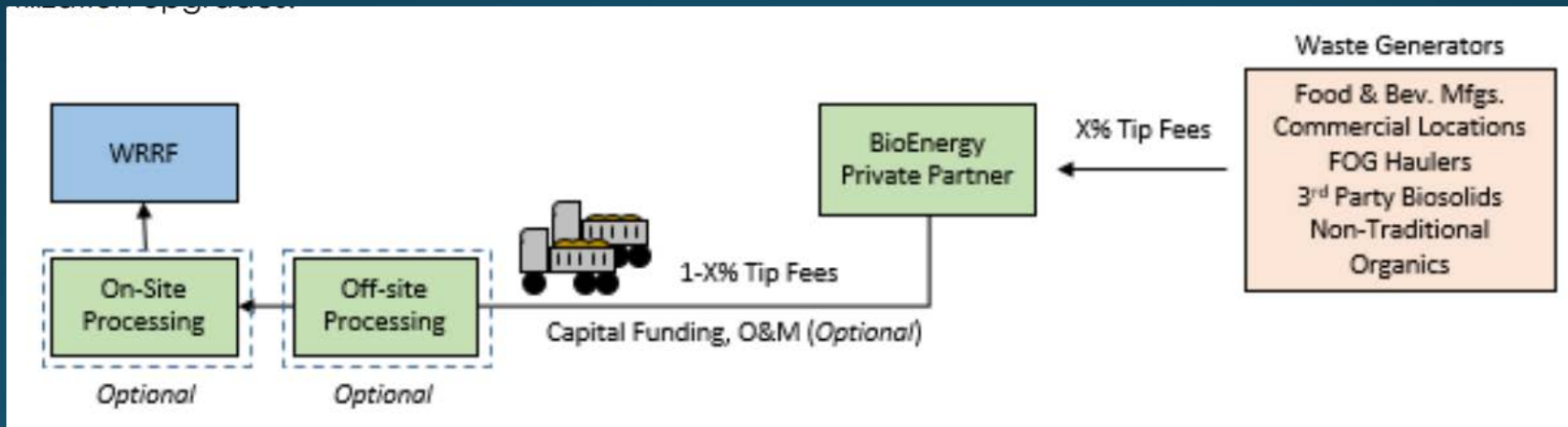
Biosolids Management Services

- Bioenergy investments that benefit WRRF operations in exchange for long term contracts to manage the facility's biosolids
- Allows for municipalities to realize a project without a capital expenditure, to shift responsibility and risk to a third party, and to stabilize biosolids management costs over the long term



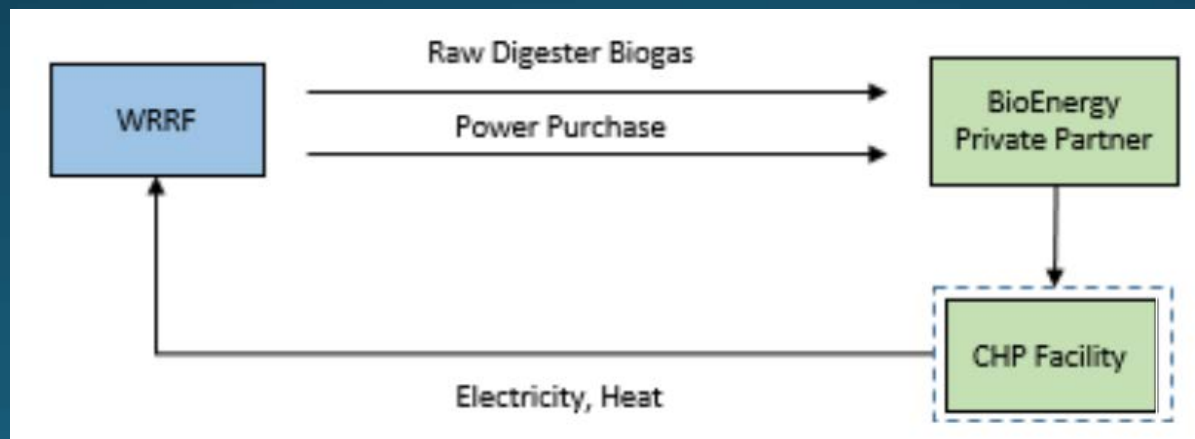
Feedstock Sourcing

- Many municipalities are not interested in the marketing, sales, and accounting resources needed to secure these feedstock sources and implement a successful program.
- Certain WRRFs are restricted in the activities they can pursue outside of their core function of treating wastewater given their charter, bylaws and fiduciary responsibility to rate payers.
 - Other municipal actors may not have full knowledge of how to price the services being offered.
- Private entities can supply feedstock sourcing services, sharing the value of tip fees and increased biogas production value with the municipalities



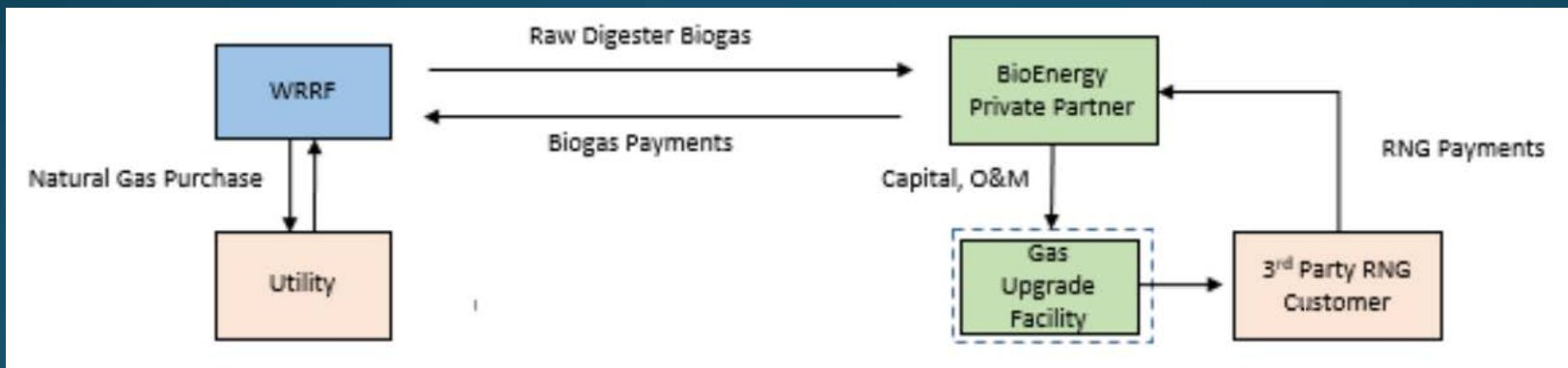
Biogas Use-Power Purchase Agreements

- WRRFs with anaerobic digestion assets often have excess biogas which is flared or used only for digester heating.
 - Opportunity to create electricity and heat through CHP
- In the event of not having the funding or staff competency to manage a complex CHP system, a private entity can make an investment in, and/or operate the CHP system in exchange for a long-term contractual arrangement
 - often a minimum of 10-20 years in length



Biogas Monetization- Renewable Natural Gas

- Wastewater biogas derived RNG has significant value as a transportation fuel by generating valuable renewable attributes through programs such as RFS and LCFS
- Monetizing the economic benefits of these programs can be challenging for a municipality to navigate and represent risk
- Private entities will enter into a long-term contract to buy biogas from a WRRF and invest in the infrastructure needed to monetize it



Lease Purchase Agreements

- Commonly used as a funding mechanism to lower upfront costs by leveraging future savings.
- Typically, a long-term lease agreement will be signed which will provide the funds for renewable energy or energy efficient equipment.
- Once the contract expires, the entity assumes ownership of the equipment.

Green Project Reserve Guidance

- Developed for Clean Water State Revolving Funds
- Using a combination of federal and state funds, state CWSRF programs provide loans to eligible recipients to:
 - construct municipal wastewater facilities,
 - control nonpoint sources of pollution,
 - build decentralized wastewater treatment systems,
 - create green infrastructure projects,
 - protect estuaries, and
 - fund other water quality projects.
- The Green Project Reserve, or GPR, requires all Clean Water State Revolving Fund (CWSRF) programs to direct a portion of their capitalization grant toward projects that address green infrastructure, water efficiency, energy efficiency, or other environmentally innovative activities.

Renewable Fuel Standard

Renewable Identification Numbers

- The EPA's RFS program allows digester biogas from municipal WRRF digesters to be used as a transportation fuel feedstock.
- In order for a fuel to qualify as a renewable fuel under the RFS program, the fuel must achieve a reduction in GHG emissions as compared to a 2005 petroleum baseline and must be determined by the EPA as meeting statute requirements.

| Category | Code | Description of Process / Fuel |
|-------------------------------|------|--|
| Cellulosic Biofuel | D3 | Any process that converts cellulosic biomass to fuel: ethanol, renewable gasoline, biogas-derived CNG and LNG |
| Biomass-Derived Diesel | D4 | Biodiesel, renewable diesel, jet fuel, heating oil |
| Advanced Biofuels | D5 | Biodiesel, renewable diesel, sugarcane ethanol, heating oil, waste digester-derived CNG and LNG |
| Renewable Fuel | D6 | Corn ethanol |
| Cellulosic Diesel | D7 | Cellulosic diesel, jet fuel heating oil |

Weekly D3, D4, D5 and D6 RINs Prices



Renewable Energy Credits (Certificates)

- Tradable, non-tangible energy commodities in the United States that represent proof that 1 megawatt-hour (MWh) of electricity was generated from an eligible renewable energy resource
 - RECs are certificates that transfer the “renewable” aspects of renewable energy to the owner. In other words, renewable energy credits, paired with electricity from the grid, are renewable energy that is being generated on your behalf.
- Selling RECs
 - Voluntary REC buyers are typically environmentally conscious organizations focused on reducing their greenhouse gas emissions.
 - Compliance buyers are electrical utilities that are obligated to have a certain percent of their electricity generation come from renewable resources.

State and Local Programs

California Edition

- Energy Conservation Assistance Act
 - low interest loan program for cities and schools to implement energy efficiency and renewable energy projects.
- Self-Generation Incentive Program
 - incentives to support existing, new, and emerging distributed energy resources. Qualifying technologies include wind turbines, waste heat to power technologies, pressure reduction turbines, internal combustion engines, microturbines, gas turbines, fuel cells, and advanced energy storage systems.
- Air Quality Improvement Program
 - fund clean vehicle and equipment projects, research on biofuels production and the air quality impacts of alternative fuels, and workforce training.
- Low Carbon Fuel Standard Program
 - includes biomethane from mesophilic anaerobic digestion of wastewater sludge; fats, oils and grease (FOG), food waste and other high strength substrates at a wastewater treatment plant.

Ithaca, NY

- Through the implementation of the performance contract, the facility has been transformed from an energy consuming facility to one of energy reduction through employing a mix of traditional energy efficient measures and new industry leading energy technologies
- P3 through the Performance Contract approach with an ESCO, enabling legislation of New York State Energy Law Article 9
- efficiency measures were installed and paid for over time from contractually guaranteed energy savings. Ithaca's performance contract for the facility included \$8.2 M in projects and guarantees of \$9 M in savings over 20 years.
- Components of the Performance Contract scope included some of the following:
 - Anaerobic digester cleaning
 - Anaerobic digester linear motion mixers
 - Modification of the two (2) digester floating covers to fixed covers for the 1.4-million-gallon capacity digesters
 - High efficiency aeration blower upgrades with Dissolved Oxygen (DO) control
 - Fine bubble diffusers

| | |
|---------------------|---|
| Wastewater utility | City of Ithaca |
| Wastewater facility | Ithaca Area Wastewater Treatment Facility |
| Location | Ithaca, NY |
| Population served | 50,000+ |
| Average flow | 7 MGD |
| Funding source | ESCO Johnson Controls, Inc. |
| Funding program | Performance Contract |
| Project type | Energy savings from increased efficiency |
| Total project cost | \$8.2 million |
| Funding obtained | \$8.2 million |
| Project date | 2012 |

Charlotte-Mecklenburg Utilities Charlotte, NC

| | |
|---------------------|---|
| Wastewater utility | Charlotte Water (CLTW) |
| Wastewater facility | McAlpine Wastewater Management Facility |
| Location | Charlotte, NC |
| Population served | 246,000+ households |
| Average flow | 64 MGD |
| Funding source | Federal Clean Water Act Program |
| Funding program | State Revolving Fund Loan |
| Project type | Combined heat and power (CHP) |
| Total project cost | \$4.6 million |
| Funding obtained | \$4.6 million (20 year loan) |
| Project date | 2017 |

- In 2011, CLTW considered a combined heat and power (CHP) system at the McAlpine Wastewater Management Facility (WWMF)
 - The McAlpine plant is a tertiary treatment facility with a treatment capacity of 64 MGD. The plant provides biological and chemical nutrient removal and produces approximately 70,000 wet tons of Class B biosolids per year. The biogas is used for process heating and excess gas is flared.
- Delayed the project for a few years to search for financing options.
- Finally pre-procured an engine at a discounted rate and got a 0% State Revolving Fund Loan from the state.

Biosolids National Convening

“Biosolids practitioners today are at a critical juncture and face an array of pressures that are both challenging and potentially advantageous. While decades of studies have shown that biosolids can be safely used for the production of agricultural crops, news headlines and some local and state government action shows a body of growing concern. How can biosolids practitioners prepare for the future, positioning their programs to address current and emerging challenges while also preparing to leverage opportunities? To explore these areas, the Water Environment Federation (WEF) is convening a gathering of biosolids practitioners and experts from across North America to contribute their knowledge to a strategic conversation.”

Overall issues

Section 1: Gaps and Disinvestment in Oversight

Section 2: Contaminants of Emerging Concern

Section 3: Collaboration and Communication

Section 4: Research Needs

Section 5: Market Pressures and Trends

Section 6: Workforce Pressures

Key Elements

- Elevate biosolids product and management program quality
- Update 503 Regulations
- CECs (Establish more sound science basis, source control and pretreatment)
- Bolster oversight and technical assistance capabilities and capacities
- Elevate societal acceptance/endorsement
- Next generation of management options and market pressures

Key Elements - Communication

- Cross cutting theme throughout the convening
- Need to better promote the value of biosolids
 - Promote research in easy to digest way
 - Messaging for utilities
- Social science research to learn how to best communicate
- Link with other industries
 - Find allies
 - Build relationships with influencers
- Improve public communication and public understanding about biosolids benefits

Key Elements - Research

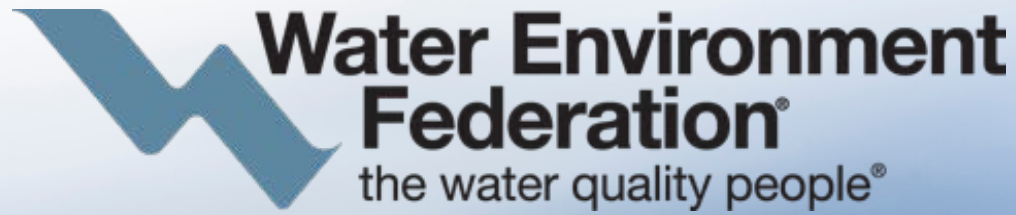
| Benefits | Emerging Technologies | Source control on biosolids products |
|---|------------------------------|--------------------------------------|
| Nontraditional end uses | Barriers to beneficial reuse | CECs |
| Climate change impacts on mgmt. options | Odors | Nutrients |
| Biogas yield and composition | Co-digestion | Urban use |
| Biological effects | Anaerobic liquid treatment | Resource recovery |
| | Social and Comms Research | |

- **WEF Biosolids National Convening Background Issues Memo and Discussion Document**

- This document was distributed to convening participants before the meeting to help prepare for participation in the conversation as it outlines the challenges and opportunities facing biosolids practitioners. It was developed during 10 subject matter expert interviews, 8 facilitated listening sessions with experts in the field around the United States and Canada and a background desk analysis of current issues facing biosolids management.

- **WEF Biosolids National Convening Meeting Synthesis**

- The main output of the convening, this document contains brief descriptions of meeting presentations, summaries of the meeting participants' discussions around needs and gaps and attachments that summarize three content areas of discussion, and four attachments that provide more detail on the discussion, including a suggested model for biosolids leadership going forward.



THANK YOU!

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