

ARPA-E Energy from Wastewater

Breakout Group #4 - Translation into Practice: Metrics, outcomes, piloting, barriers and solutions

Group 1: Metrics and outcomes needed for pilot demonstrations and implementation of technologies developed in program

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General discussion

- Identify projects based on ideal technology attributes / criteria
- Meet larger program objectives
- Needs to reach beyond DOE
 - Public-private partnerships
 - Integration with end users and water community
- Proposals need to speak to both a technical and social / industry audience
- Enables development of tools to assess, design, and monitor energy and water recovery
- Provide energy and water services at lowest materials input, environmental impact, and financial cost (energy, water, nutrients, chemicals, etc.) while optimizing recovery
- Need to penetrate water sector
 - outreach program as part of procurement
- How to select a project: metrics, minimum needs
 - Phase 1 project has the ability to progress to Phase 2 and 3

If you could envision the ideal technology to meet your challenges, what attributes would it have?

- Low O&M requirements
 - Ease of operation
- Sustainable
 - Health and sustainable
- Low CAPEX, OPEX
- Improvement above currently-available technology
- Zero or net positive energy production
- Scalable and portable
- Reliable (95% if an energy recovery technology)
- Fits within existing facility footprint
- Integration with solid waste, agricultural, other sectors (multi-sector / cross-cutting application)
- Addresses current and anticipated regulations (or can be adapted to meet future requirements as needed)
- Capability for resource recovery (energy, water nutrients, carbon, metals, etc.)
- Integration of social aspects
- US-based (local) economic impact / benefits
- Championed by a utility (proposal sponsor)
- “solutions” rather than “widgets”
- Based on sound science

What demonstrations (testing/documentation) would be required for you to be convinced that ARPA-E developed technologies that have achieved acceptable performance levels?

- Includes systems design and thinking as part of demonstration
- Lab-scale data
 - On real wastewater (not just synthetic)
- Run parallel to a conventional technology
- Peer-review panel / publication
- Preliminary economic analysis
- Preliminary social acceptance analysis – summarize social impacts
 - Partners:
 - advocacy organizations / enviros
 - Power utilities
- Vision of full-scale application
 - Describe path to get there and users (market)
- Requirements for operators (advanced? Basic?)
- Identify energy markets as well as user market (gas, electricity, etc.)
- Identify competing technologies
- Tools for implementation / application to specific situation

What smaller scale demonstrations could be done in the prototype/development process that would allow you to assess/prepare for the eventual full scale technologies?

- Multiple locations / regions / climates / water qualities
- Scale-up challenges

Who should likely pilot participants be?

- End user / stakeholder
- Consultant engineers
- Advocacy groups / enviros
- Technology vendors
- Regulators (feds, state, others)
- Academics
- Education / outreach player
- Players in green building movement

What kind of arrangements might facilitate an agreement on a pilot or demonstration?

- Matching funds by utility that will use technology
- Prototype (tier 1) may facilitate utility funding / involvement (tier 2)
- Tax credits
- Regulatory waivers