EXECUTIVE SUMMARY

WERF

WATER ENVIRONMENT RESEARCH FOUNDATION | WASTEWATER TREATMENT AND REUSE

An Economic Framework for Evaluating the Benefits and Costs of Biosolids Management Options

This research provides a systematic framework for benefit-cost analyses or related forms of economic evaluation for biosolids management options. Since this project was initiated, the implications of global warming concerns for the wastewater sector have come into sharper focus, making this research even more timely and valuable than initially envisioned. The protocols developed through this project can address concerns about carbon footprint and sustainability, as well as evaluate energy and resource recovery opportunities at wastewater facilities.

A series of steps with accompanying guidance, resource materials, and case study illustrations, helps users through the process. Some of the key steps are:

1. Define a suitable baseline that includes a recognition of how future changes will impact a utility that adheres to its "status quo" approach.

2. Include important impacts, even if they cannot be readily quantified or monetized, so that benefits and costs are suitably identified and described qualitatively.

3. Recognize and acknowledge uncertainties and omissions, and considering how these may impact the net benefit results, using tools such as sensitivity analyses.

4. Include stakeholder involvement at all stages of the process.

5. Promote transparency and communication throughout the process, to enable replication and foster trust in the outcomes.

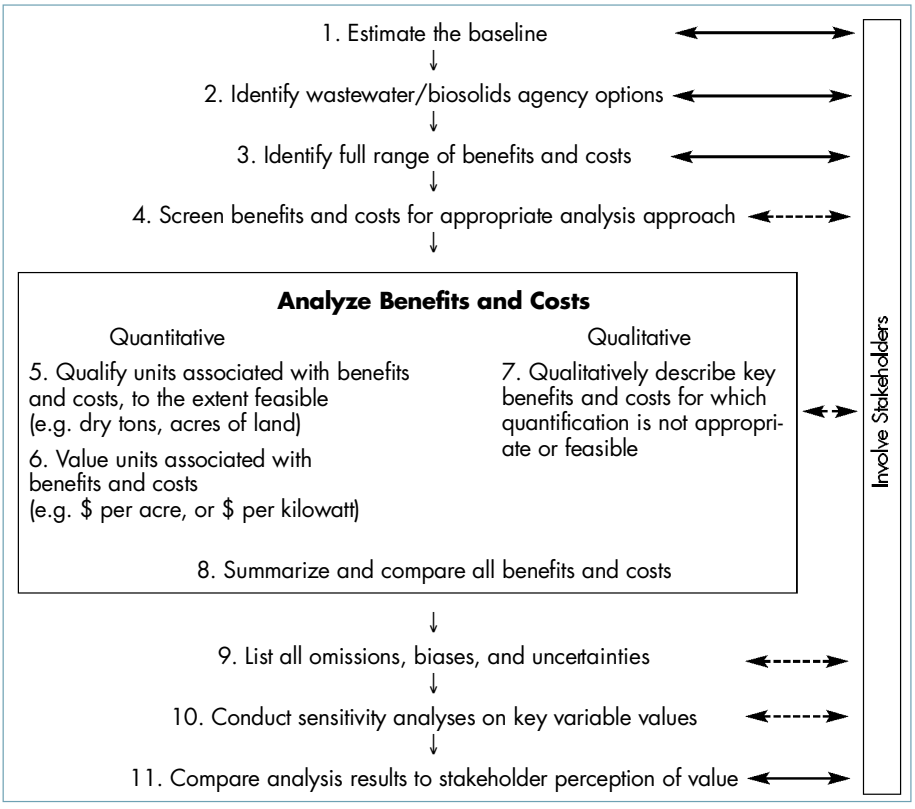

Figure 1. Steps in an Economic Analysis Framework

BENEFITS

- Assists utilities with benefit-cost analyses, including the triple bottom line approach, to address carbon footprint, sustainability, and energy and resource recovery.
- Helps agencies select and justify biosolids management options that may appear relatively expensive, but that provide important and valuable benefits.
- Helps utilities communicate more effectively with decision makers and stakeholders.
- Provides guidance, resources, and case study illustrations, on the benefits and costs of biosolids management options.

RELATED PRODUCTS

Research Digest: Evaluating Risks and Benefits of Soil Amendments Used in Agriculture (99PUM1)

Manual of Good Practice for Biosolids (99PUM5T)

State of Science Report: Energy and Resource Recovery from Sludge (0WSO3R07)

Full Cost Accounting Protocol for Biosolids Management (00PUM7)

RELATED ONGOING RESEARCH

Challenge: Optimization of Wastewater and Solids Operations (0WSO1)

AVAILABLE FORMAT

Soft cover with CD ROM and online PDF.

TO ORDER

Contact WERF at 703-684-2470 or visit www.werf.org and click on Publications.

WERF Subscribers:
Your first copy of this report is free. Additional copies are $10 each or download unlimited free PDFs at www.werf.org.

Non-Subscribers:
Hardcopy: $165 PDF: $50

Refer to: **STOCK NO. 04CTS2**

For more information, log on to **www.werf.org**

As stewards of the environment and public trust, wastewater agencies need to consider the full range of benefits and costs associated with their activities, and this research report helps wastewater agencies and other relevant entities and stakeholders understand the benefits and costs of the biosolids management options. The report assists managers who need to take into account all the impacts—good, bad, and uncertain—that their activities may impose on the broader community.

This report describes the approaches, methods, and tools available to help utilities take a broad perspective and develop benefit-cost analysis (BCA) of their biosolids management options. Agencies will understand why it is important to conduct such analyses and to adopt a broad social accounting perspective when doing so. The report provides tools and guidance to help utilities conduct BCAs or related forms of Business Case Evaluation (BCE), including the triple bottom line (TBL) approach.

Biosolids Managers Face Significant Challenges

Wastewater agencies, regulatory bodies, the research community, and others have identified and implemented practices, processes, and regulations that enable the safe and prudent management of biosolids. There are many ways biosolids can be used as a valuable resource rather than as a waste product. Still, significant challenges face wastewater agencies and other parties as they consider how to best manage biosolids:

- Biosolids management options tend to require high capital outlays and operating expenses (including energy costs). Managers need to consider whether the benefits warrant the high costs of some of the options available to them.
- Many biosolids management options tend to be controversial due to public concern over various real or perceived risks and inconveniences. These potential negative impacts may include increased local truck traffic, odors, or perceived and real risks to public health.
- Physical or other constraints may limit the viability or impact the cost of some relevant biosolids management options for some locations. Therefore, these benefit-cost comparisons are highly site- and utility-specific, and the comparison of options can be complex.

Furthermore, the landscape is changing—often rapidly—with respect to available biosolids management options. Evaluation of these new options poses an additional challenge for agencies with biosolids responsibilities.

Technological advances are making several new processes and options available, or more economically attractive, than in the past. New technological advances:

- provide an array of offerings that may help enhance energy use efficiency;
- provide ways to generate energy or other useful value-added products from biosolids; and
- reduce greenhouse gas emissions associated with global climate change concerns.

Biosolids Options Can Provide Environmental Benefits

Environmental benefits and other values are linked to some management options for biosolids. Those benefits/option "packages" include:

- Reduced traditional energy consumption and air pollution, where biosolids options provide or contribute to renewable biofuels, thermal values, and/or reduced energy use. These can reduce dependence on imported and other nonrenewable energy sources, reduce excessive demands on capacity-strained power grid systems, and reduce the carbon footprint of wastewater and biosolids agency operations.
- Improved sustainability and reliability of a biosolids program, by providing the community with a more diversified and viable longer-term set of options for addressing their biosolids needs.
- Reduced odor-related issues and concerns, by pursuing options that help control odor and address concerns from neighbors.
- Increased land productivity and/or restoration values, through soil enhancement from land application practices. Alternatively, this benefit may take the form of reduced use of agricultural chemicals to achieve the same soil nutrient conditions.

CONTRACTOR

Robert S. Raucher, Ph.D.
Stratus Consulting

Diane Garvey
Garvey Resources

PROJECT TEAM

K.C. Hallett
Jim Henderson
Carolyn Wagner
Stratus Consulting

Sally Brown
University of Washington

Ellen Harrison
Cornell University

Robert Reimers
Tulane University

Cliff Arnett
Columbus Water Works (GA)

Donna Hull
Denver Metro Wastewater Reclamation District

Kathy Hamel
Western Lake Superior Sanitation District

PROJECT SUBCOMMITTEE

Terry J. Logan (Chair)
Logan Environmental, Inc.

Steven M. Rogowski, P.E. (RC Liaison)
Denver Metro Wastewater Reclamation District

Caroline Berka
Greater Vancouver Regional District

Walter Goyzueta,
New York City Department of Environmental Protection

Alan Keller
Illinois Environmental Protection Agency

William Wheeler
U.S. Environmental Protection Agency, ORD-NCER

The research on which this report is based was funded in part by the U.S. Environmental Protection Agency (U.S. EPA) through Cooperative Agreement No. CR-83155901-1 with the Water Environment Research Foundation (WERF). Unless an U.S. EPA logo appears on the cover, this report is a publication of WERF, not U.S. EPA. Funds awarded under the agreement cited above were not used for editorial services, reproduction, printing, or distribution.

10/08