

Sustainable Infrastructure



Overview

- What is Sustainability?
- What is Sustainable Infrastructure?
- EPA's "Four Pillars" Approach
- The Five Keys to Management Success
- The Ten Attributes of Effectively Managed Water Utilities

Sustainability: What is it?

The ability to meet the needs of the present generation without compromising the ability of future generations to meet their needs.

- UN World Commission on Environment and Development

Achieving a balance between human impacts and the capacity of the natural world that can be sustained indefinitely, taking into account three interdependent elements:

The Environment

The Economy

The Social System

- BC Roundtable "Towards Sustainability: Learning for Change"

Sustainable Infrastructure: What is it?

EPA 2007 Infrastructure Gap Analysis projects up to a \$334.8 Billion gap between infrastructure needs and infrastructure funding by the year 2026 if funding remains at current levels (water system infrastructure only)

The Sustainable Infrastructure Initiative seeks to promote practices that will reduce this funding gap:

Addressing current needs in a timely manner

Identifying and implementing Best Management Practices to address a variety of management challenges

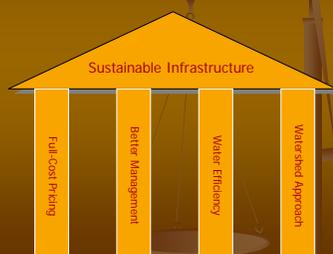
Implementing appropriate funding and investing in infrastructure

Research & Development breakthroughs

Innovative technologies

Sustainable Infrastructure: How do we get it?

EPA's "Four Pillars" Approach to Sustainable Infrastructure



Sustainable Infrastructure: Full-Cost Pricing

Burden of investing in Water System Infrastructure and O&M rests on the customer through:

Water Rates

Impact Fees

Connection Fees

Efficiency and Equity

Customers billed according to water used

Allows funding of Capital Improvement/Repair and Replacement accounts

Sustainable Infrastructure: Full-Cost Pricing

Drinking Water State Revolving Fund Program

Provides cost-effective means to fund system improvements while encouraging full-cost pricing rate structures

Allows systems the opportunity to avoid delaying needed infrastructure improvements:

- Construction Cost Index and Building Cost Index increased by more than 23% from 2003 through 2008
- Construction wages increased by ~23% from 2001 through 2008
- Delaying a project for 5 years can increase the total cost by as much as 20% or more

Sustainable infrastructure: Better Management

Focuses on implementing Best Management Practices

Strategic Planning

Consolidation/Regionalization

Asset Management

The "Five Core Questions"

Environmental Management Systems

Encourage organizations to improve compliance, pollution prevention, and environmental performance and to promote greater environmental stewardship



Five Core Questions

- 1) What is the current state of my assets?
 - 1) What do I own?
 - 2) Where is it?
 - 3) What condition is it in?
 - 4) What is its remaining useful life?
 - 5) What is its economic value?
- 2) What is my required sustained Level of Service?
 - 1) What is the demand for my services from my customers?
 - 2) What do regulators require?
 - 3) What is my actual performance?

Five Core Questions

- 3) Which assets are critical to sustained performance?
 - 1) How does it/can it fail?
 - 2) What is the likelihood of failure?
 - 3) What does it cost to repair?
 - 4) What are the consequences of failure?
- 4) What are my best minimum life-cycle cost CIP & O&M strategies?
 - 1) What alternative management options are there?
 - 2) Which of these are most feasible for my system?
- 5) What is my best long-term funding strategy?

Sustainable Infrastructure: Water Efficiency

Reduces costs

Running a faucet for 5 minutes uses about as much energy as running a 60-watt light bulb for 14 hours

2008 EPA results show WaterSense fixtures saved:
9.38 billion gallons of water and 1 billion kWh of electricity

Prolongs infrastructure life

Helps ensure continued availability of sufficient quantities of safe drinking water

US population doubled from 1950 to 2000

US water consumption tripled, to an avg of 100 gpd/person



Sustainable Infrastructure: Watershed Approach

Focus is on:

Cleaner Water Sources
Reduced Treatment Costs
Reduced Wear and Tear on Infrastructure

Look Beyond Traditional Geographic Boundaries
Partnerships based on Watershed Boundaries
Inter-Local
Inter-State



Sustainable Infrastructure: Watershed Approach

Key decision makers take the opportunity to consider watershed-based, cost-effective alternatives in addition to traditional treatment technology

Consider how water flows through the entire watershed when making infrastructure and growth decisions



Sustainable Infrastructure: Remove any of the "Four Pillars", and...



Sustainable Infrastructure: The Five Keys

1. Leadership
2. Strategic Business Planning
3. Organizational Approaches
4. Measurement
5. Continual Improvement Management



Sustainable Infrastructure: Leadership

Refers to:

Individuals
Effective champions for improvement

Teams
Provide resilient day-to-day continuity & direction

Ensures:

The utility's direction is understood and followed
Communication with customers and other stakeholders

Provides an Organizational Structure that:

Ensures the organization's excellence
Reinforces a culture that embraces positive change and continual improvement



Sustainable Infrastructure: Strategic Business Planning

Aids the utility in achieving balance and cohesion

Provides a framework for decision making by:

Assessing current conditions, strengths, and weaknesses

Assessing underlying causes and effects
Establishing vision, objectives, and strategies

Establishes specific implementation steps



Sustainable Infrastructure: Strategic Business Planning

Provides a long-term view of goals and operations

Drives and guides objectives, measurement efforts, investments and operations

Explains goals, plans, and current conditions to employees, customers and other stakeholders

Integrates progress tracking into the management framework



Sustainable Infrastructure: Organizational Approaches

Contribute to overall effective utility management

Necessary to management improvement efforts

- Actively engaging employees in improvement efforts
- Implement processes that anticipate and plan for change
- Encourages staff at all levels to embrace positive change
- Implementation strategies that recognize and celebrate all victories

Sustainable Infrastructure: Measurement

Critical to management improvement efforts

The backbone of successful continual improvement management and strategic business planning

Serves many important purposes:

- Focuses attention on key issues
- Clarifies expectations
- Facilitates decision making
- Facilitates learning and improving

Sustainable Infrastructure: Measurement

*“You can’t improve
what you don’t measure.”*

Internal Performance Measurement

- Evaluates current performance status and trends
- Compares outcomes relative to goals and objectives

Benchmarking

- Comparison of similar measures across institutions to:
 - Identify Best Practices
 - Set improvement targets
 - Measure progress within or across sectors

Sustainable Infrastructure: Continual Improvement

Includes:

- Honest/Comprehensive self-assessment to identify strengths, weaknesses, and priorities
- Frequent sessions to identify improvement opportunities
- Following up on current improvement projects
- Implementing performance measures and internal targets
- Implementing related operational requirements, practices, and procedures

Sustainable Infrastructure: Continual Improvement

Includes:

- Establishing supporting roles and responsibilities
- Implementing measurement activities through regular evaluations and audits
- Responding to evaluations, including implementing recommendations



Sustainable Infrastructure: The Ten Attributes

1. Product Quality
2. Customer Satisfaction
3. Employee and Leadership Development
4. Operational Optimization
5. Financial Viability
6. Infrastructure Stability
7. Operational Resiliency
8. Community Sustainability
9. Water Resource Adequacy
10. Stakeholder Understanding and Support



Sustainable Infrastructure: The Ten Attributes

Provide useful and concise points for performance improvement

Describe desired outcomes applicable to all water systems

A comprehensive framework relating to

- | | |
|-----------------------|-----------------------|
| Operations | Infrastructure |
| Customer Satisfaction | Community Welfare |
| Resource Stewardship | Financial Performance |



Sustainable Infrastructure: The Ten Attributes

Utilities can use the Attributes to select priorities for improvement projects

No order, no hierarchy – work on the Attributes that best meet the utility's needs

Should be viewed as opportunities for improving management and operations



Sustainable Infrastructure: Product Quality

The utility produces potable water in full compliance with regulatory requirements and consistent with customer, public health, and ecological needs.



Sustainable Infrastructure: Customer Satisfaction

The utility provides reliable, responsive, and affordable services according to customer accepted service levels.

The utility receives timely customer feedback to maintain responsiveness to customer needs and emergencies.

Sustainable Infrastructure: Employee/Leadership Development

The utility recruits and retains a competent, motivated, adaptive, safety-minded workforce.

The utility establishes a participatory, collaborative organization dedicated to continual learning and improvement.

The utility ensures employee institutional knowledge is retained and improved upon over time.

Sustainable Infrastructure: Employee/Leadership Development

The utility emphasizes opportunities for professional and leadership development.

The utility strives to create an integrated, well-coordinated senior leadership team.

Knowledge Management

- 35% of workforce is within a few years of retirement
- Explicit vs. Tacit (institutional) knowledge
- Tacit knowledge tends to leave with the employee
- Often takes 5-10 years for an employee to become a Subject Matter Expert (SME)
- Succession Planning is critical

Sustainable Infrastructure: Operational Optimization

The utility ensures performance improvements that are ongoing, timely, cost-effective, reliable, and sustainable.

The utility minimizes resource use, loss and impacts due to day-to-day operations.

The utility is aware of informational and technical developments and anticipates and supports timely adoption of improvements.

Sustainable Infrastructure: Financial Viability

The utility understands the full life-cycle cost of delivering its product.

The utility maintains a balance between long-term debt, asset value, O&M expenses, and revenue.

The utility has established rates that cover the actual cost of delivering the product.

Sustainable Infrastructure: Infrastructure Stability

The utility understands the condition and costs of critical system infrastructure.

The utility maintains/enhances the long-term condition of assets at the lowest possible life-cycle cost and acceptable risk.

The utility assures that asset replacement/repair efforts are coordinated to minimize disruptions to the community.

Sustainable Infrastructure: Operational Resiliency

The utility assures that management and staff work together to anticipate and avoid problems.

The utility proactively identifies, assesses, and establishes tolerance levels for and manages business risks.

Sustainable Infrastructure: Community Sustainability

The utility is aware of and attentive to the impacts its decisions have on current and long-term community and watershed health.

The utility manages operations, infrastructure, and investments to protect, restore, and enhance the natural environment.

The utility efficiently uses water and energy resources.



Sustainable Infrastructure: Community Sustainability

The utility promotes economic vitality and engenders overall community improvement.

The utility considers a variety of pollution prevention, watershed, and source protection approaches as part of an overall strategy to maintain and enhance ecological and community sustainability.

Sustainable Infrastructure: Water Resource Adequacy

The utility employs resource supply and demand analyses, conservation, and public education to ensure current and long-term water availability.

The utility considers its role in water availability and manages operations to provide for long-term aquifer/surface water sustainability and replenishment.

Sustainable Infrastructure: Stakeholder Understanding/Support

The utility fosters understanding and support from all stakeholders (citizens, regulators, etc.) for expected service levels, rate structures, operating budgets, capital improvement projects, and risk management decisions.

The utility actively involves stakeholders in the decisions that will affect them.

The “Current State” Nationally

- Water/wastewater utilities are facing unprecedented challenges
 - aging infrastructure and workforce
 - continuing regulatory challenges
 - unclear prospects for future federal funding
 - increasing customer and community demands for service
 - short-term perspective of elected officials
- The list goes continues . . .

The “Current State” Nationally

- More attention being paid to utility management but no common framework other than regulatory compliance
- Utility managers faced with many choices which often breeds confusion
- Question before EPA and industry: Is there a way to pull it all together and move toward sustainable utility management?

The “Current State” Nationally

- The world is changing—traditional approaches focused solely on compliance are not enough
- Collaboration is the key—challenges are too large and stakes too high to operate any differently
- Sustainability is the ultimate goal!
- EPA support and recognition can add a lot

What’s the Long-Term Vision?

- Attributes, Keys to Management Success, and Performance Measures accepted as the **norm**, not the **exception**
- Utilities, regulators, and others united around a **common management framework** for defining excellence
- Utility **excellence recognized and rewarded** by communities, regulators, and others
- Water and wastewater **operations and infrastructure are sustainable in the future**

Recommendations

- Engage and prepare staff for Cultural Change
- Involve all stakeholders early
- Look for Quick Wins
- System Size: Scale the program to fit your operation
- Improvement is a long and continuous process, get started and don’t feel overwhelmed by the task
 - He who moves a mountain, begins by moving small stones.
Chinese Proverb
- Strive for Best Practices



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