Asset Management: An Introduction and Overview and How It Can Improve Utility Management and Water Utility Operations and Maintenance

"Introduction to Asset Management"

May 12, 2010

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Agenda

- Background
- Reasons for Asset Management
- Asset Management Attributes
- State of Practice
- Research and Tools
- Implementation Challenges and Lessons Learned

Background

Managing Assets Is Nothing New For Utilities

- Master Plans
- Capital Improvement Plans
- Engineering studies
- Annual O&M planning and budgeting
- O&M manuals
- GIS, CMMS, CIS.....

Background

Asset Management Definitions

Brown & Humphrey (2005):

"Asset management is the *art of balancing performance, cost and risk*."

IIMM (2006):

"Asset management is the combination of management, economic, engineering and other practices applied to physical assets with the objective of providing the required level of service in the most cost-effective manner."

"Advanced asset management employs predictive modelling, risk management and optimised decision-making techniques to establish asset lifecycle treatment options and related long term cash flow predictions."

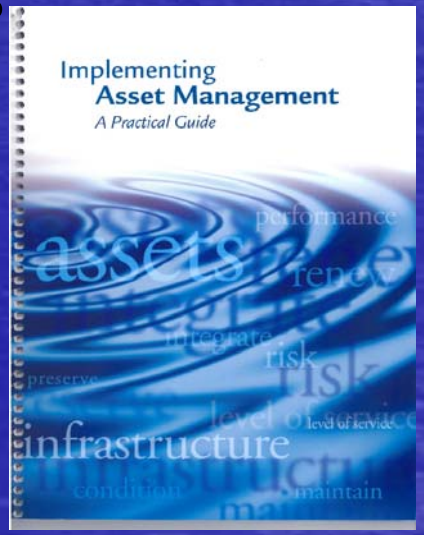
Background

Asset Management Definitions

The Publicly Available Specification (PAS) 55 (IAM/BSI, 2004):

"Asset management represents systematic and coordinated activities and practices through which an organization optimally manages its assets, and their associated performance, risks and expenditures over their lifecycle for the purpose of achieving its *organisational strategic plan."*

An integrated optimization process of "managing infrastructure assets to minimize the total cost of owning and operating them, while continuously delivering the service levels customers desire, at an acceptable level of risk."



Managing Public Infrastructure Assets, AMSA, AMWA, WEF, AWWA, 2001

Background

What is Asset Management?

- Systematic integration of advanced and sustainable management techniques into a management paradigm or *way of thinking*, with
- Primary focus on the *long-term life cycle* of the asset and its sustained performance, rather than on short-term, day-to-day aspects of the asset

Background

Key Concepts

An integrated set of processes to:

- ***Minimize the life-cycle costs*** *of owning, operating and maintaining infrastructure assets*
- ***continuously delivering established levels of service***
- ***at an acceptable level of risk***

Background

Five core questions

1. What is the current state of my assets?
   - What do I own?
   - Where is it?
   - What condition is it in?
   - What is its remaining useful life?
   - What is its remaining economic value?
2. What is my required level of service (LOS)?
   - What is the demand for my services by my stakeholders?
   - What do regulators require?
   - What is my actual performance?
3. Which assets are critical to sustained performance?
   - How does it fail? How can it fail?
   - What is the likelihood of failure?
   - What does it cost to repair?
   - What are the consequences of failure?
4. What are my best O&M and CIP investment strategies?
   - What alternative management options exist?
   - Which are the most feasible for my organization?
5. What is my best long-term funding strategy?

Reasons for Asset Management

- Everyone Else is Doing It
- My Boss Wants Me To
- My Ticket To Success
- EPA Requires It

Some Real Reasons

- **Customer**
  - Not sure what the customer wants
  - Service levels not defined; regulations are not being met
- **Financial**
  - Can't afford to pay for everything
  - Can't convince my Board to fund my programs
  - My infrastructure is failing; need to prioritize CIP
  - Not managing leading risks
- **Workforce**
  - Expertise is leaving utility; don't have the workforce or resources I need to get the job done
  - Performance not managed and no one is accountable
- **Work Process/Systems/Tools**
  - Can't decide what to Maintain vs Replace
  - Decisions not based on life cycle of assets
  - O&M and CIP not connected but should be
  - My operation not efficient or needs improvement
  - Decisions not fact based and clear
  - No idea what best practice is
  - People and Systems don't talk to each other; Planning/Engineering/Operations/Maintenance/Finance/CMMS/GIS/Customer Service operate independently

State of Practice

Program Development

Levels of Service

Risk Analysis

Condition / Performance Assessment

CMMS

Lifecycle / TBL Forecasts

SAMPs

Business Case Evaluation

Organizational Development

Reliability Management

Research and Tools

- EPA Workshops
- Water Research Foundation (WRF);Water Environment Research Foundation(WERF)
- SIMPLE
- Water Services Association of Australia (WSAA)
- Effective Utility Management

The Clean Water and Drinking Water Infrastructure Gap

Preconditions for a Utility to Gain Community Support for a Sustainable Pathway

- Customers need to understand what a utility does!
- They need to believe that it adds value!
- They need to be able to accept utility Practices as competent, if not exceptional!

The Need To Be Good

The Need To Be Transparent.

EPA Curriculum

- **Meeting Materials**
- Agenda, (PDF) (1p, 27K)
- Story Line (PDF) (21pp, 114K)
- Training Slides (new slides in PDF format, about PDF)
  - America's Pathway To Sustainable Water and Wastewater Services (73pp, 3.13MB)
  - Fundamentals of Asset Management session 0 - Executive Overview (47pp, 778K)
  - Fundamentals of Asset Management session 1- Develop Asset Registry (44pp, 911K)
  - Fundamentals of Asset Management session 2 - Assess Condition, Failure Modes (39pp, 909K)
  - Fundamentals of Asset Management session 3 - Determine Residual Life (22pp, 225K)
  - Fundamentals of Asset Management session 4 - Determine Life Cycle & Replacement Costs (27pp, 277K)
  - Fundamentals of Asset Management session 5 - Set Target Level of Service (23pp, 286K)
  - Fundamentals of Asset Management session 6 Determine Business Risk ("Criticality") (60pp, 974K)
  - Fundamentals of Asset Management session 6.5 - Develop Asset Registry (35pp, 863K)
  - Fundamentals of Asset Management session 7 - Optimize (O&M) Investment (47pp, 853K)
  - Fundamentals of Asset Management session 8 - Optimize Capital Investment (57pp, 680K)
  - Fundamentals of Asset Management session 9 - Determine Funding Strategy (19pp, 268K)
  - Fundamentals of Asset Management session 10 - Build Asset Management Plan (pdf, 22pp, 518K)
- Exercise Tables, (PDF) (2pp, 22K)
- Pump Station Drawings, (PDF) (2pp, 48K)
- Excel Spreadsheet Tool, (XLS) (xls 135K)

WRF Funded Collaborative AM Projects

- Global Water Research Coalition Project
  - Benefit Cost Analysis Tool
  - Risk Management Tool
  - AM Case Studies
  - Key Asset Data
- WERF Projects
  - SIMPLE Website and GAP Tool
- Other WRF Projects
  - AM Roadmap
  - Organizational Culture

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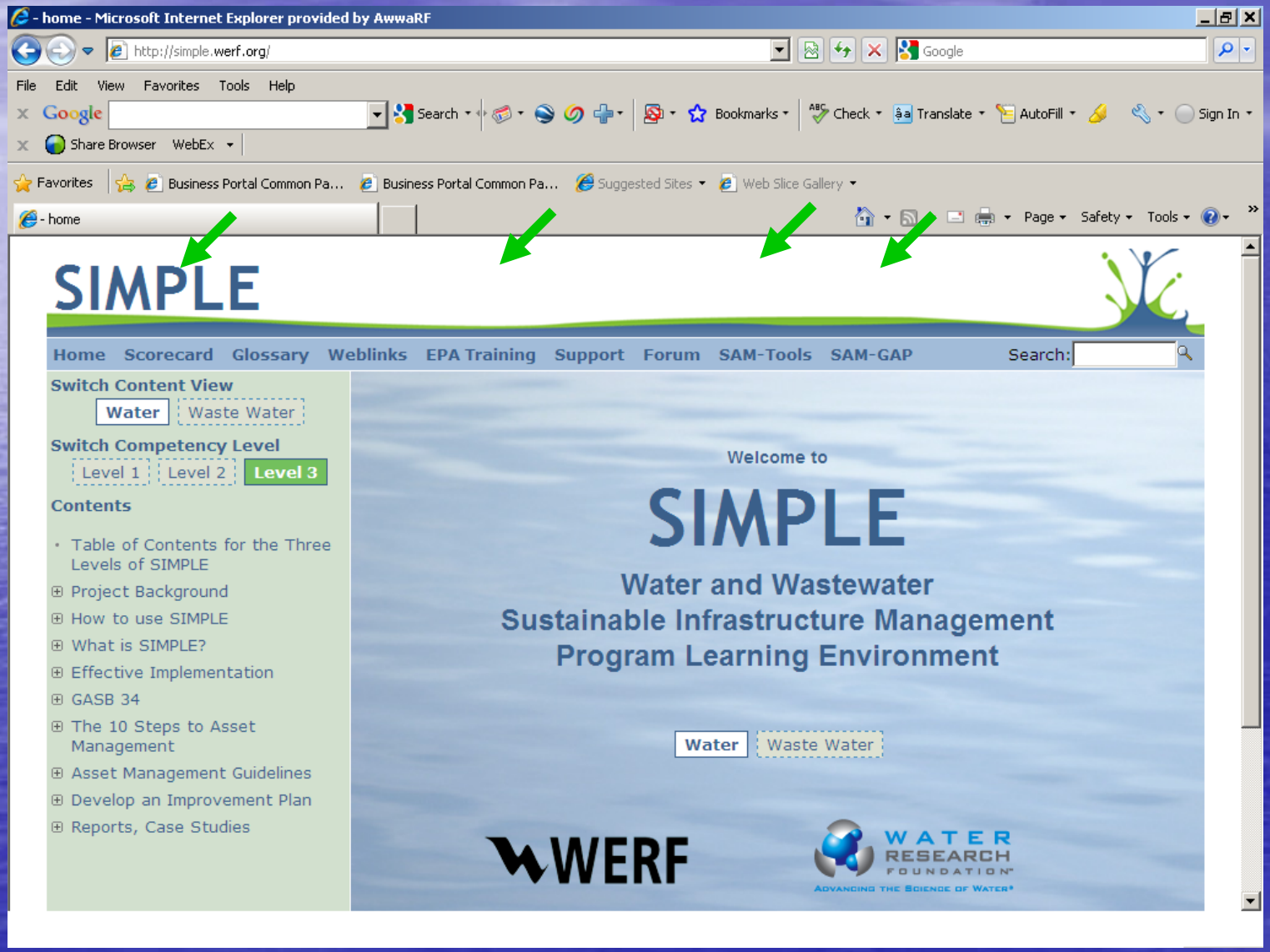
SIMPLE Home page



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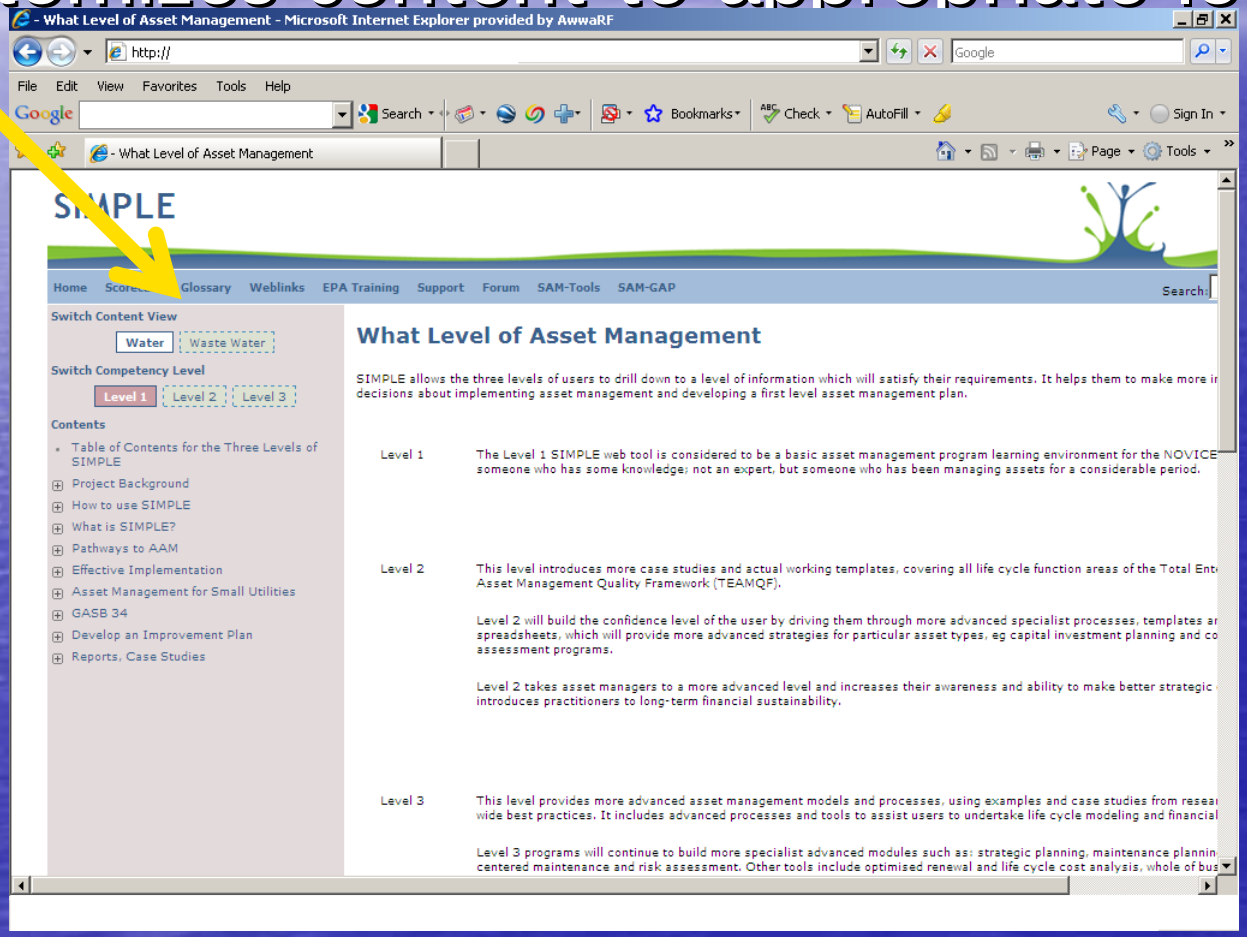
Level 1, 2, or 3?

- Click on Score card & take questionnaire. Customizes content to appropriate level.



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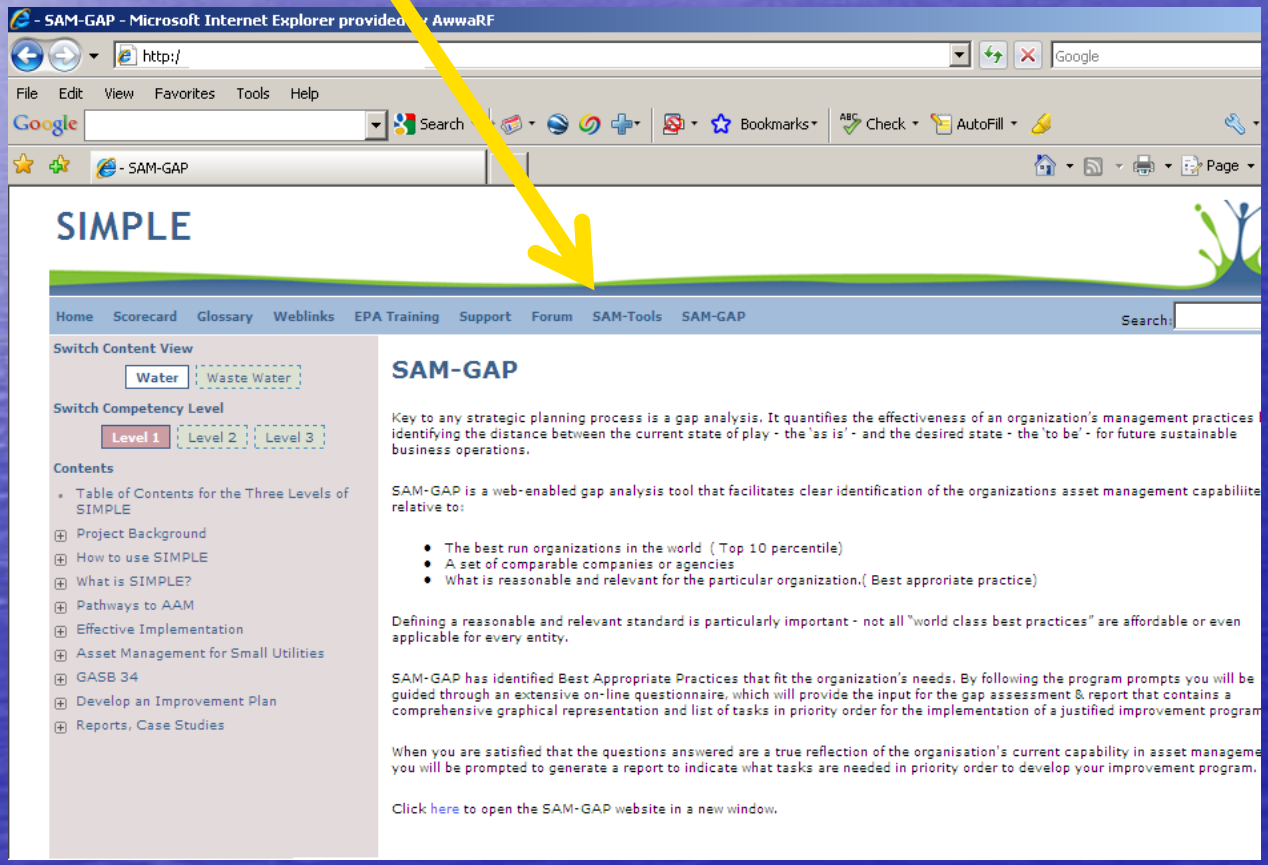
SAM GAP: Identify gaps in your organization's AM program

- Click on SAM GAP in the SIMPLE website



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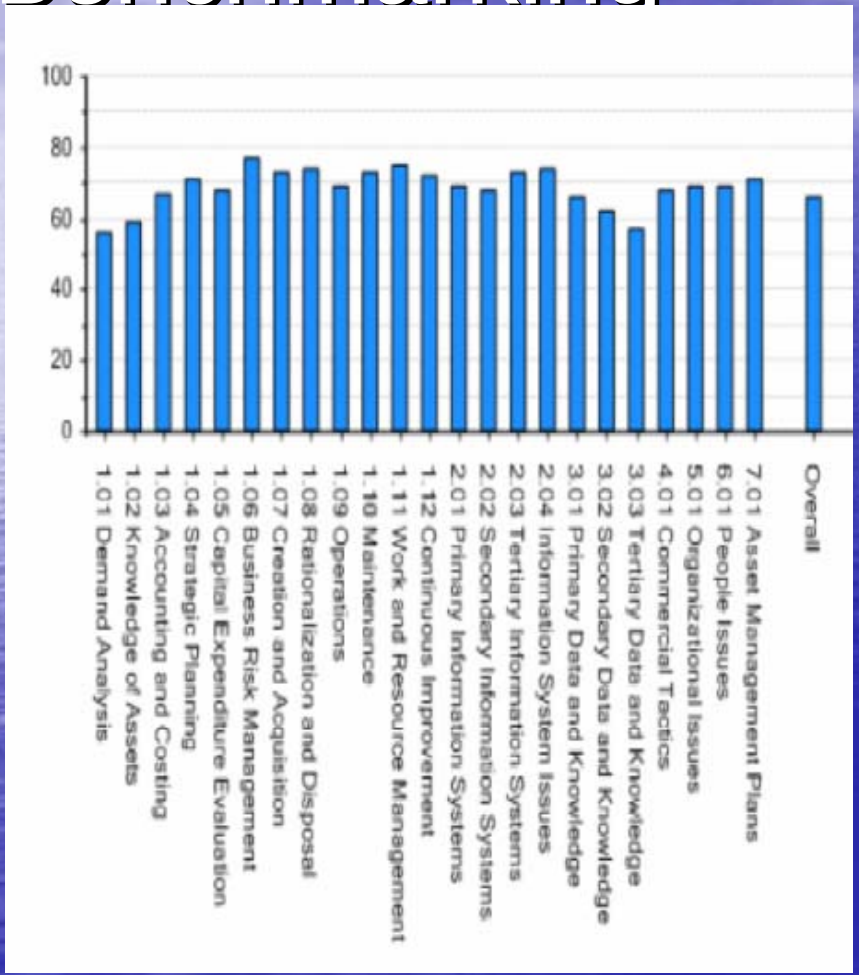
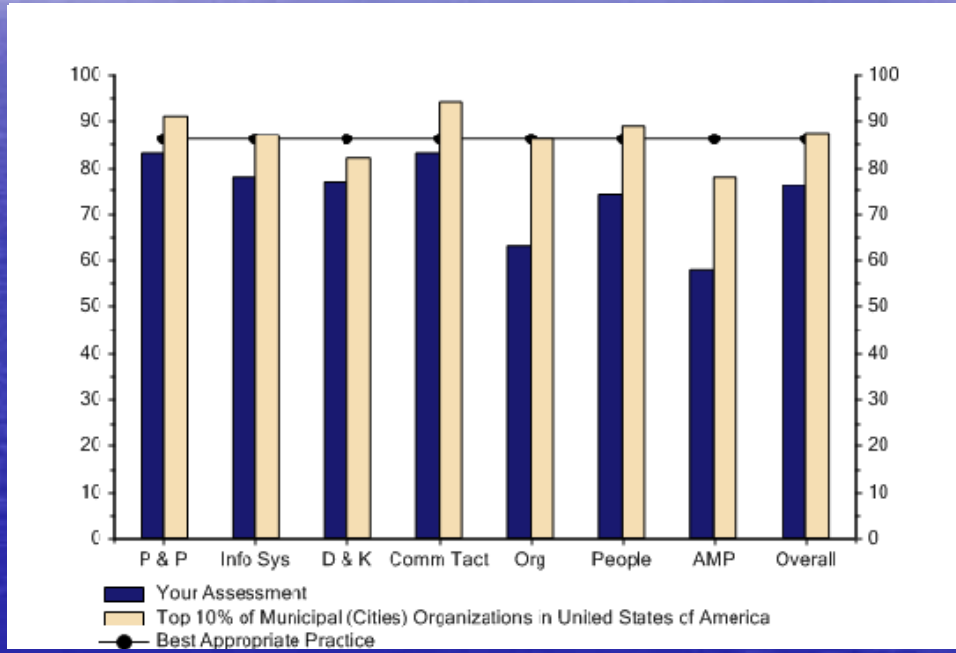
Profiling Current Practices and Benchmarking





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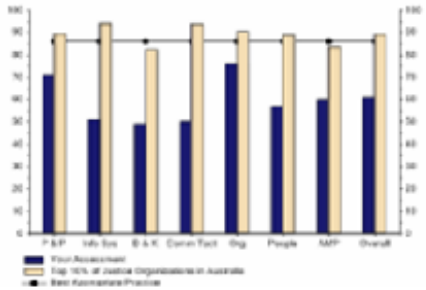
SAM GAP Report Generated for Utility

Audit Plus

ASSET MANAGEMENT GAP ANALYSIS AND BENCHMARKING

Confidential Results for Dept of Emergency Services only

Overall Benchmark



Gap Analysis

Quality Elements	Weighted Gap	Rank
Process and Practices (P&P)	15.0	6
Information Systems (Info Sys)	35.0	3
Data and Knowledge (D&K)	37.0	1
Commercial Tactics (Comm Tact)	36.0	2
Organizational (Org)	10.0	7
People Issues (People)	29.0	4
AM Plans (AMP)	26.0	5

Improvement Priorities

Based on this gap analysis, Dept of Emergency Services is equal to the top ten percentile of Justice Organizations in Australia category and 25.1% behind the best appropriate practice target level as deemed appropriate for an organization of this size and nature. Dept of Emergency Services has over $371M worth of infrastructure assets, the management of which is crucial to the organization's performance in terms of both cost and levels of service.

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This form of the benchmarking does not allow a detailed analysis, however, based on ISM's weighted gap shown above, the following items are likely areas where improvement should be considered in more detail. The improvement recommendations have been automatically generated based on the information supplied by Dept of Emergency Services in response to the questionnaire and is not intended to replace a detailed audit and improvement plan.

For the purposes of this study we have restricted this to the top 50 poorly performing quality elements in order of importance. Note that the selected quality elements are based on the *weighted gap* and not the element rating shown in the graph.

Processes and Practices

Processes and practices form the basis for all asset management activities within an organization. Therefore, without clearly defined and documented procedures the ability for your organization to conduct consistent practices are greatly reduced. These processes should cover the entire life cycle of the asset and individual practices will be required for different asset types, eg. condition assessment is a common process for all assets, however, the actual practice applied will differ for each asset type.

Improvements within this area are listed below.

Knowledge of Assets

The key improvements in this area include:

- Review, document and implement processes for determining what assets to collect utilization data on and for undertaking the collection. This should include the creation of a data standard.

Accounting and Costing

The key improvements in this area include:

- Review, document and implement processes for tracking and reporting operational costs against the asset register items at a suitable level .
- Review, document and implement processes for tracking and reporting maintenance costs.

Capital Expenditure Evaluation

The key improvements in this area include:

- Review, document and implement processes for economic evaluation of capital projects, and develop the organizations policy on the methods to be adopted, including the use Net Present Value's, Internal Rate of Return etc. type measures.

Operations

The key improvements in this area include:

- Review, document and implement processes for developing and maintaining operations manuals.
- Review, document and implement processes for handling customer and stakeholder complaints, including the way they are tracked through the business from receipt to resolution.
- Review, document and implement processes for maintaining and developing Emergency Response Plans, including for what events, against what level and criticality of asset should these be completed. These should also include how new assets are automatically included, how often are they reviewed and what triggers the need for upgrades.

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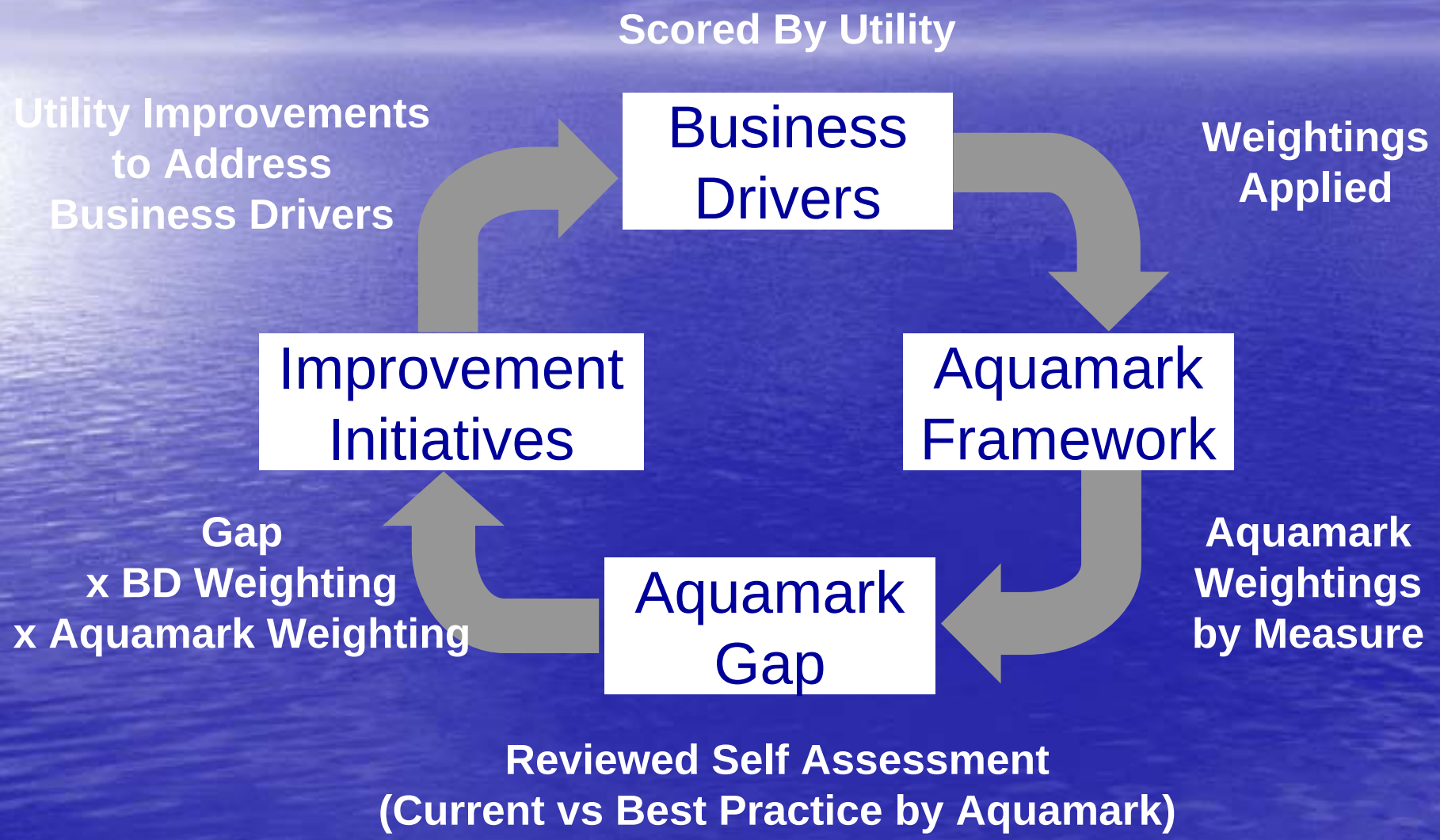
Water Services Association of Australia (WSAA 2008 Asset Management Benchmarking Project)

Key Objective: **"To improve the standard of Asset Management within the water industry; principally through the identification and promotion of "leading practice"**

WATER SERVICES ASSOCIATION OF AUSTRALIA

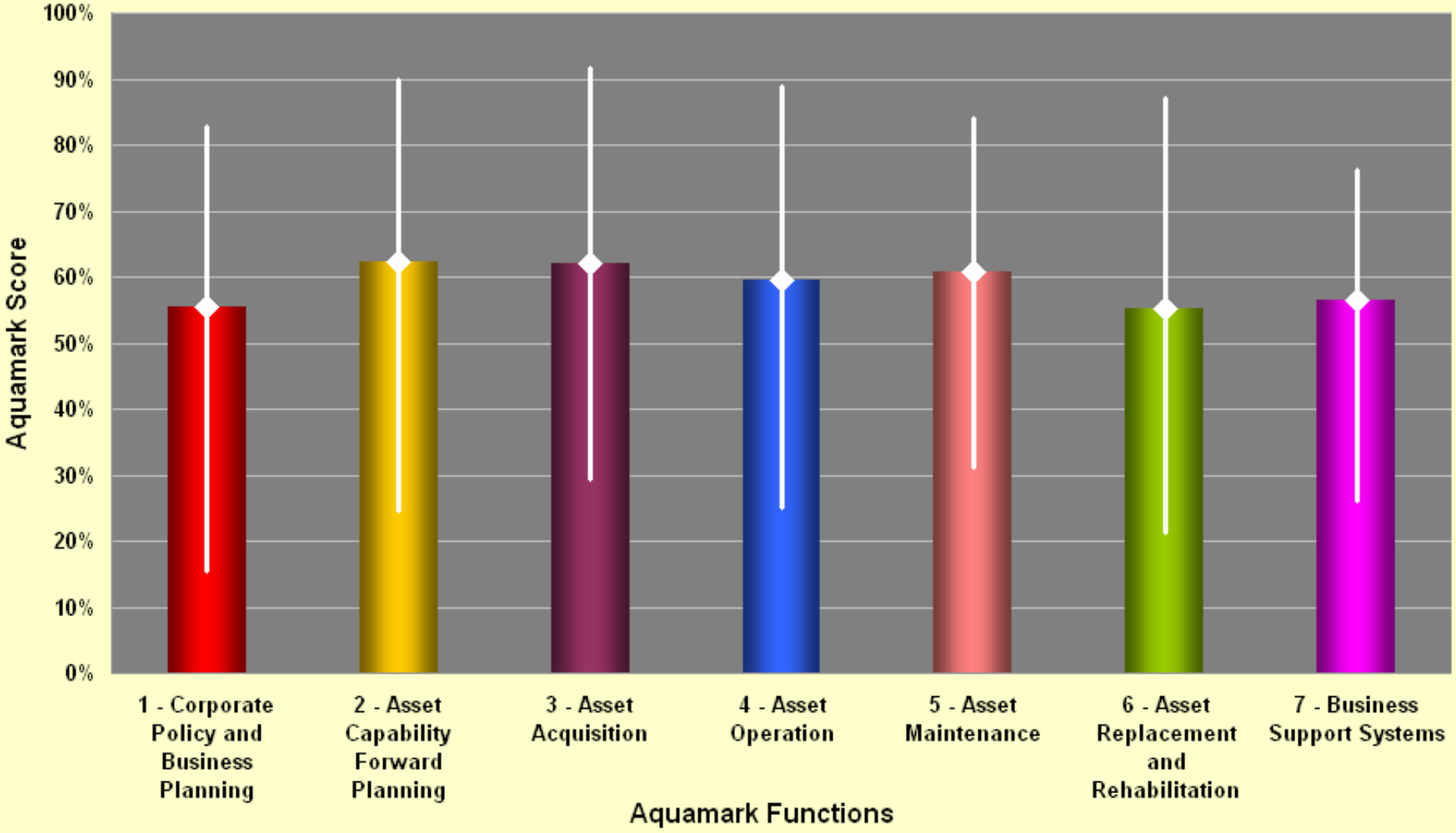
Business Drivers and Aquamark Gaps Used to Identify Improvement Initiatives



International Water Association

WATER SERVICES ASSOCIATION OF AUSTRALIA

Overall Aggregate Benchmarking Results



Effective Utility Management

Ten Attributes of Effectively Managed Utilities

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

Effective Utility Management

Five Keys to Management Success

1. Leadership (key throughout the management improvement cycle)
2. Strategic business planning
3. Organizational approaches (e.g., participatory culture, change management processes)
4. Measurement
5. Continual improvement management framework (i.e., “plan, do, check, act”)

AM Implementation Challenges/Lessons Learned

- Readiness/Commitment
- Investments (Funding and People)
- Leadership
- Organizational Culture; Employee Engagement
- Decision-making (processes, life cycle, prioritization)
- Data and systems
- Training and Industry Resources

How To Think About Moving Forward (Allbee)

- There is an extensive body of knowledge on asset management
- The practice has a fairly wide-ranging history of being implemented in many countries and the framework tends to have considerable international consistency
- Understandably, those who own and operate the asset must accept stewardship responsibility for the assets and be heavily engaged in defining the appropriate practices

Questions

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