NACWA Summer Meeting 2011, Chicago, IL

July 22, 2011

Learning from the Best: *Strategic Asset Management at MWRD of Greater Chicago*

Manju Prakash Sharma, P.E,
Director, Maintenance & Operations,
MWRD Greater Chicago

Terry Brueck, P.E,
President & CEO,
EMA, Inc.

METROPOLITAN WATER RECLAMATION DISTRICT OF GREATER CHICAGO

EMA

MWRD Joined WERF's Strategic Asset Management to "Learn from the Best"

- Conducted Assessment Using the WERF SAM GAP Tool
- Participated in SAM Benchmarking Forum with Leading Practice Utilities
- Selected Practice Areas to Focus on Improving Within MWRD
- Developed Plan and Prioritized Recommendations with MWRD Asset Management Team

Agenda

1. Overview of MWRD Assets and Learning Process
2. WERF's Strategic Asset Management Research
3. MWRD's Focus On Strategic Asset Management
4. Opportunities to Learn From Other Leaders

SECTION 1

Overview of MWRD Assets and Learning Process

Mission Statement for MWRD Maintenance and Operations

"Protect the quality of water in Lake Michigan and the Chicago area waterway system by collecting and treating waste water and maintaining the waterways in the most economically and environmentally sustainable manner and in full compliance with regulatory requirements"

MWRD Key Assets

- 7 Wastewater Treatment Plants
- 23 Remote Pumping Stations
- 3 Biosolids Handling Facilities
- 554 Miles of Intercepting Sewers
- 109 Miles of Tunnels
- 1 CSO Reservoir (so far)
- 32 Flood Control Reservoirs
- 456 Miles of Small Streams
- 5 SEPA Stations
- 2 In-stream Aeration Stations

Calument WRP

- September 11, 1922
- Service Area 305 Sq. Miles
- Population Served 1 Million
- 354 MGD DAF / 430 MGD DMF

Northside WRP

- October 3, 1928
- Service Area 143 Sq. Miles
- Population Served 1.3 Million
- 333 MGD DAF / 450 MGD DMF

Stickney WRP

- West Side
  June 2, 1930
- Southwest side
  May 23, 1939
- Service Area 260 Sq. Miles
- Population Served 2.3 Million
- 1,200 MGD DAF / 1,440 MGD DMF

Lemont WRP

- November 1961
- Service Area 21 Sq. Miles
- Population Served 17,000
- 2.3 MGD DAF / 4 MGD DMF

Hanover Park WRP

- July 19, 1963
- Service Area 11.2 Sq Mils
- Population Served 67,000
- 12 MGD DAF/22 MGD DMF

North Branch Pumping Station

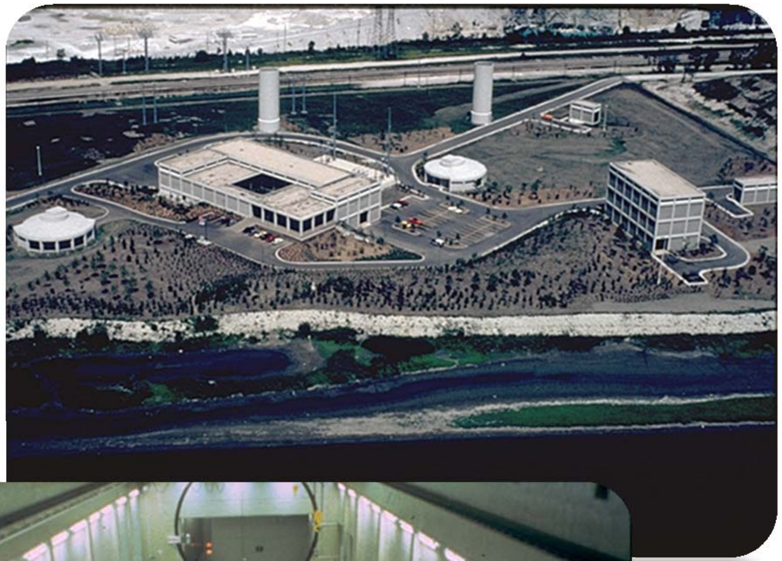
- Startup 1929
- 8 Centrifugal Pumps (1,725 cfs)

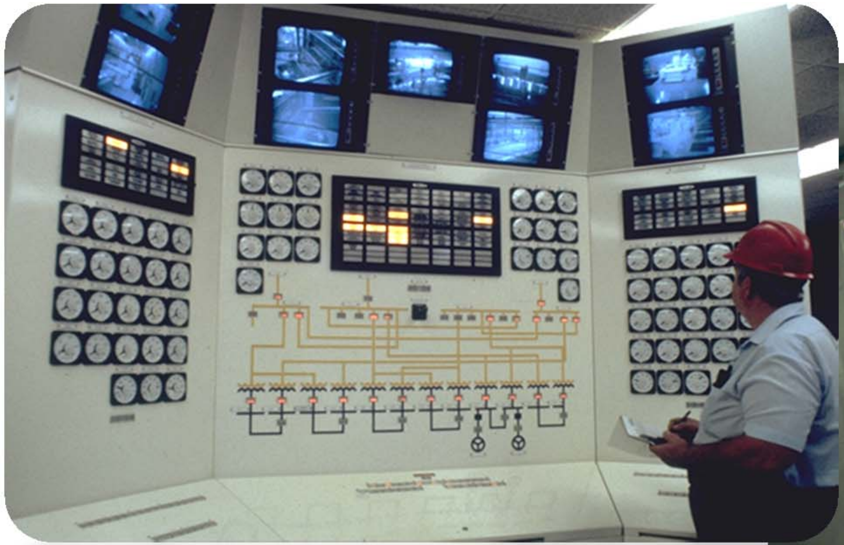
Racine Ave. Pumping Station

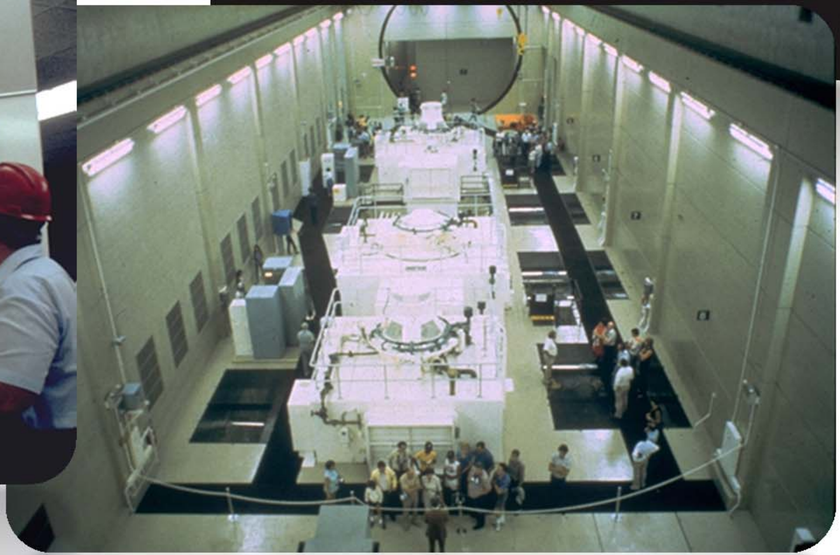
- Startup 1923
- 14 Centrifugal Pumps (6,050 cfs)

Mainstream Pumping Station

- Startup 1985
- 8 Centrifugal Pumps (2,250 cfs)







Biosolids Production

- Stickney WRP – 150,000 DT/YR
- Calumet WRP – 30,000 DT/YR
- Egan WRP – 4,500 DT/YR
- Hanover Park WRP – 1,600 DT/YR

Biosolids Usage

- Controlled Solids Distribution (10%)
- Farmland Application (50%)
- Pelletizer Facility(30%)
- Landfill Application (<5%)
- Unsuitable(<5%)
- Fulton County (0%)

MWRD Has A History of Asset Management Using GASB 34 "Modified Approach"

- MWRD adopted the Modified Approach in 2002 for all assets (except TARP tunnels and drop shaft)
- Condition Assessments conducted every 3 years:
  - 8 Networks (starting 2002-2006)
  - System, subsystem, and component (AMU) levels
  - Rating (6 levels) for each AMU: mechanical, electrical and civil
- Codified process between M&O and Engineering:
  - highlight assets for repair/rehabilitation
  - coordinate construction projects
- Documents asset management for reporting to taxpayers and Bonding Companies

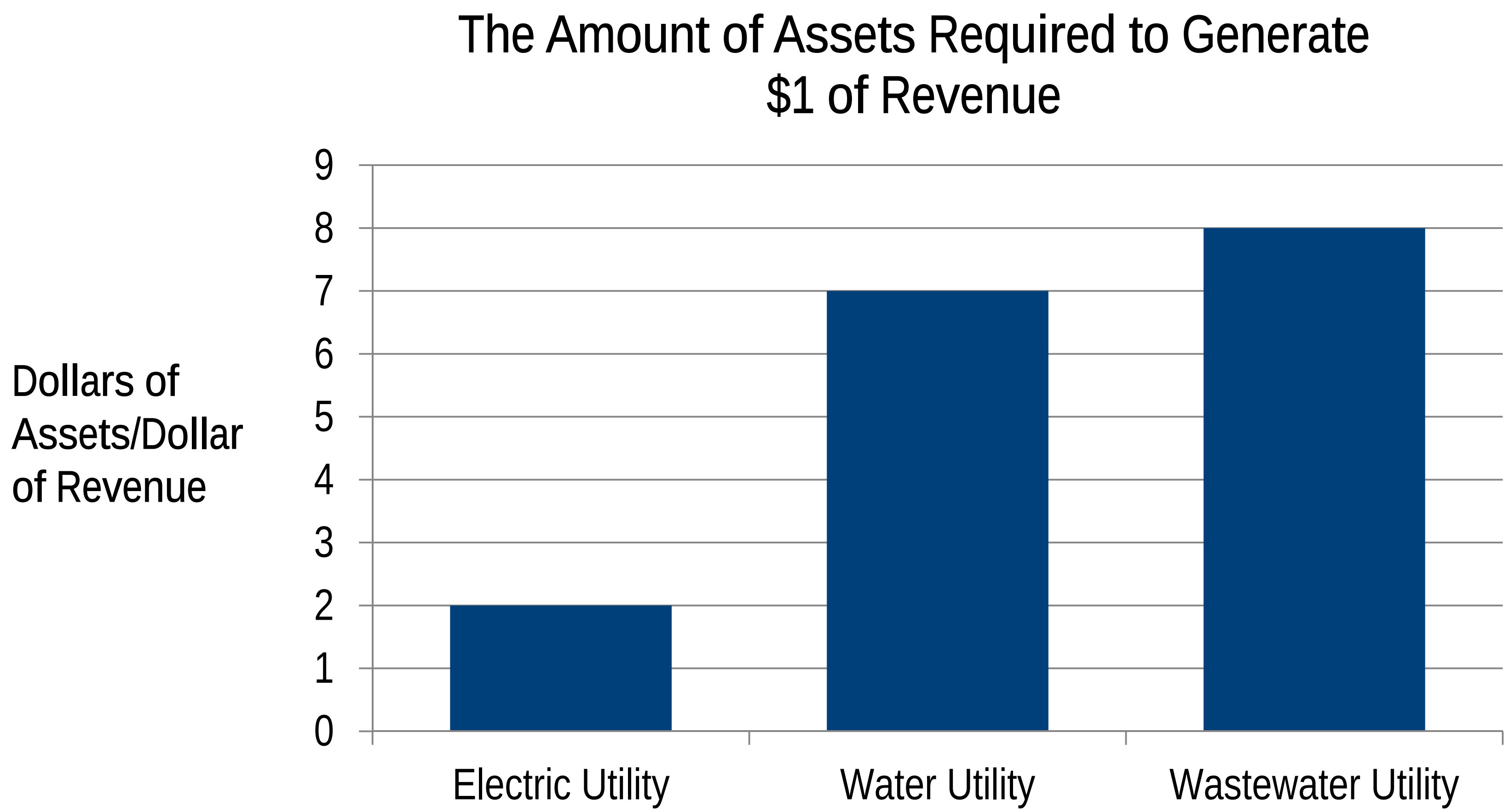
Goals For MWRD Asset Management Project Based on WERF Research

- Build on insights gained at the WERF Research Forum on leading practices
- Understand the opportunities identified in the SAM GAP report
- Focus on two selected practice areas – Strategic Asset Planning and Maintenance
- Develop plan and prioritized recommendations with MWRD Asset Management Team

SECTION 2

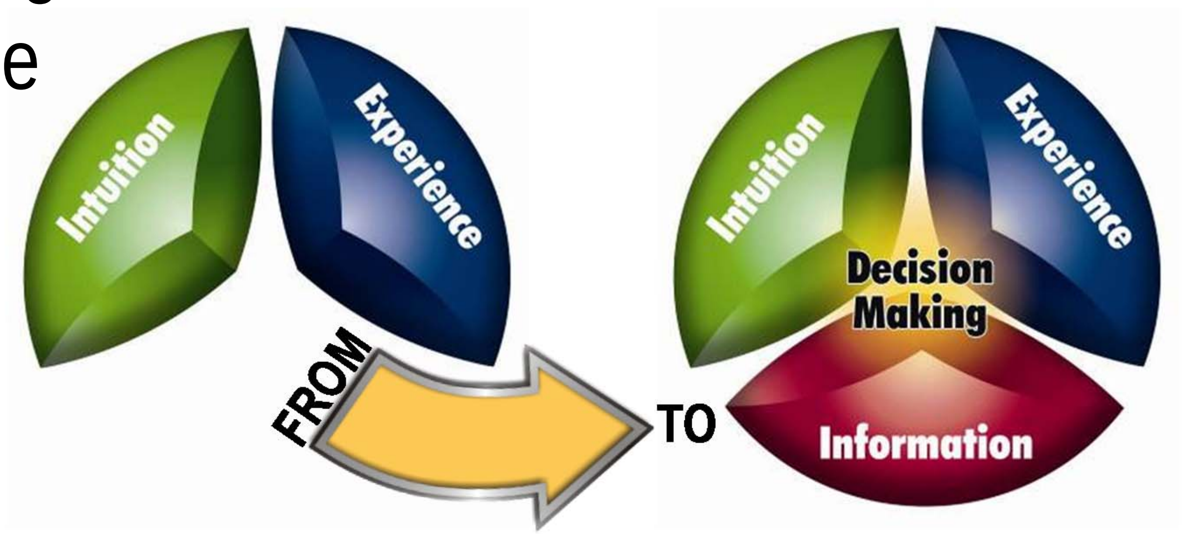
WERF's Strategic Asset Management Research Challenge

Asset Management Matters: Water Infrastructure Is More Capital Intensive



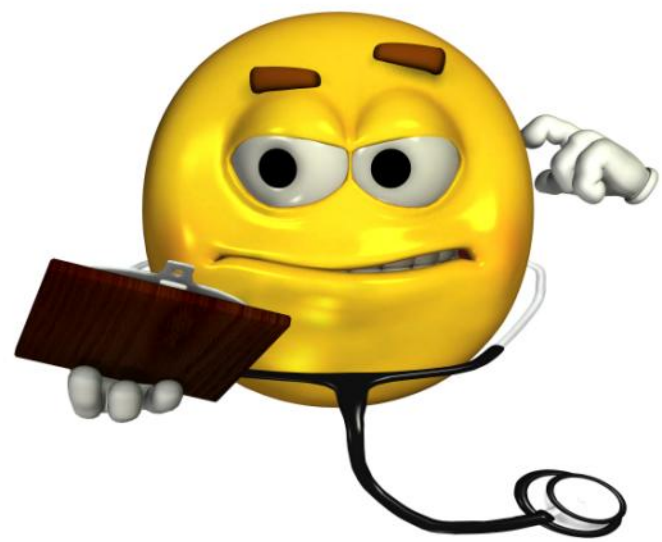
Asset Management is All About Meeting Service Levels While Optimizing Life-Cycle Costs and Risks

- Asset management decisions are made every day by utility staff
- AM program brings structure, standards and better information to the decision process



Symptoms of Poor Asset Management

- Poor maintenance and deteriorating assets
- Challenges in funding critical CIP projects
- Struggles to justify investment to governance
- Emergency projects to fix problems
- Track record of poor service
- Numerous violations
- Funding issues between departments & business units (O&M, CIP, rates, financing, etc.)

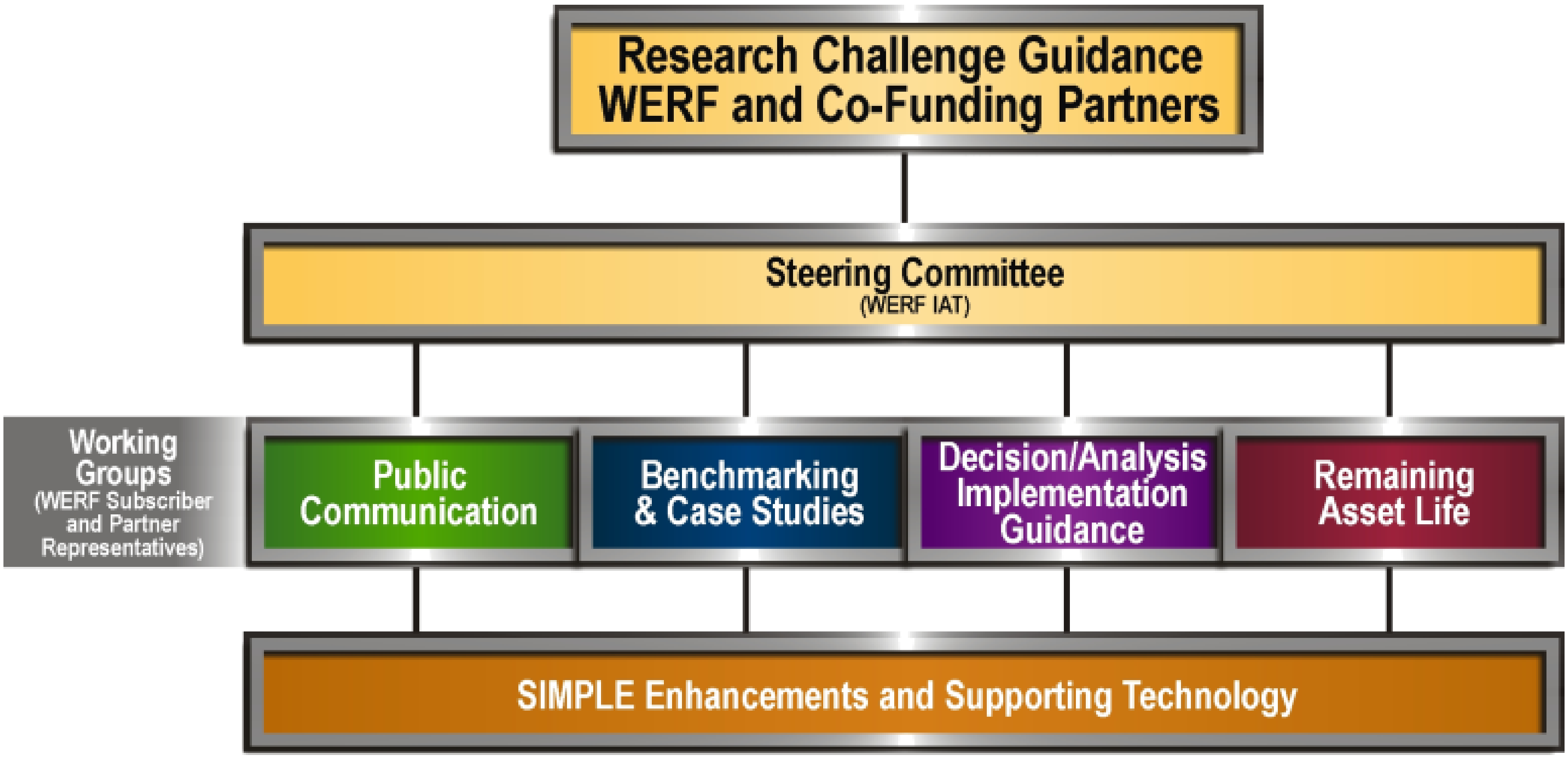


WERF SAM Research Challenge Had Numerous Goals

- Improve communication and awareness among the key stakeholders
- Help better understand the barriers and obstacles
- Help develop a utility-friendly, step-by-step SAM implementation program
- Establish a web-based database for compiling case studies
- Develop analytic tools
- Forecast and proactively plan for asset failures
- Increase accuracy in predicting economic life of assets
- Help utilities to extend current CIP
- Help realize cost savings or make improved decisions
- Help forge strong partnerships with agencies (national and global financial decisions

L_B1

WERF Strategic Asset Management Research Challenge Overview

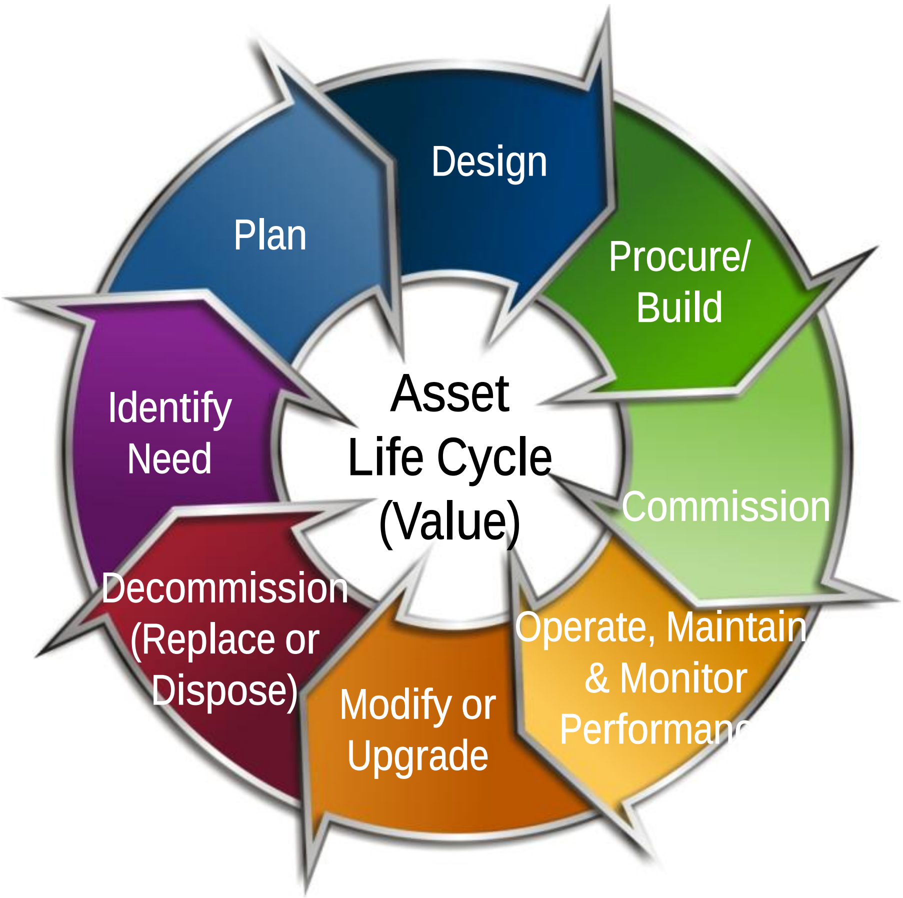


Slide 24

L_B1 Add a bar underneath the four colored bars that shows "SIMPLE Enhancements and Supporting Technology"

Linda Blankenship, 11/1/2007

Asset Management Is All About Answering Five Key Dynamic Questions

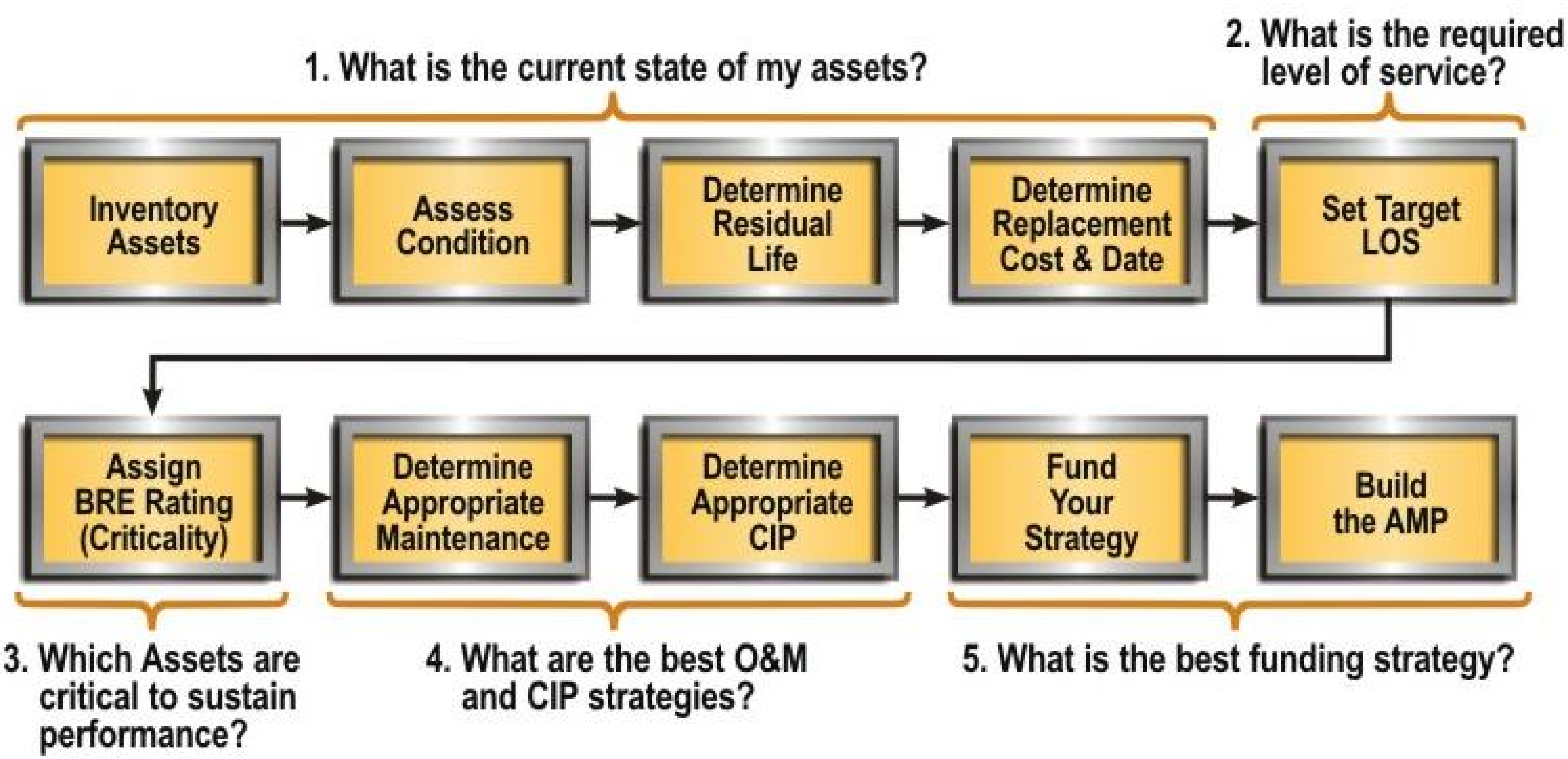


Key Questions:

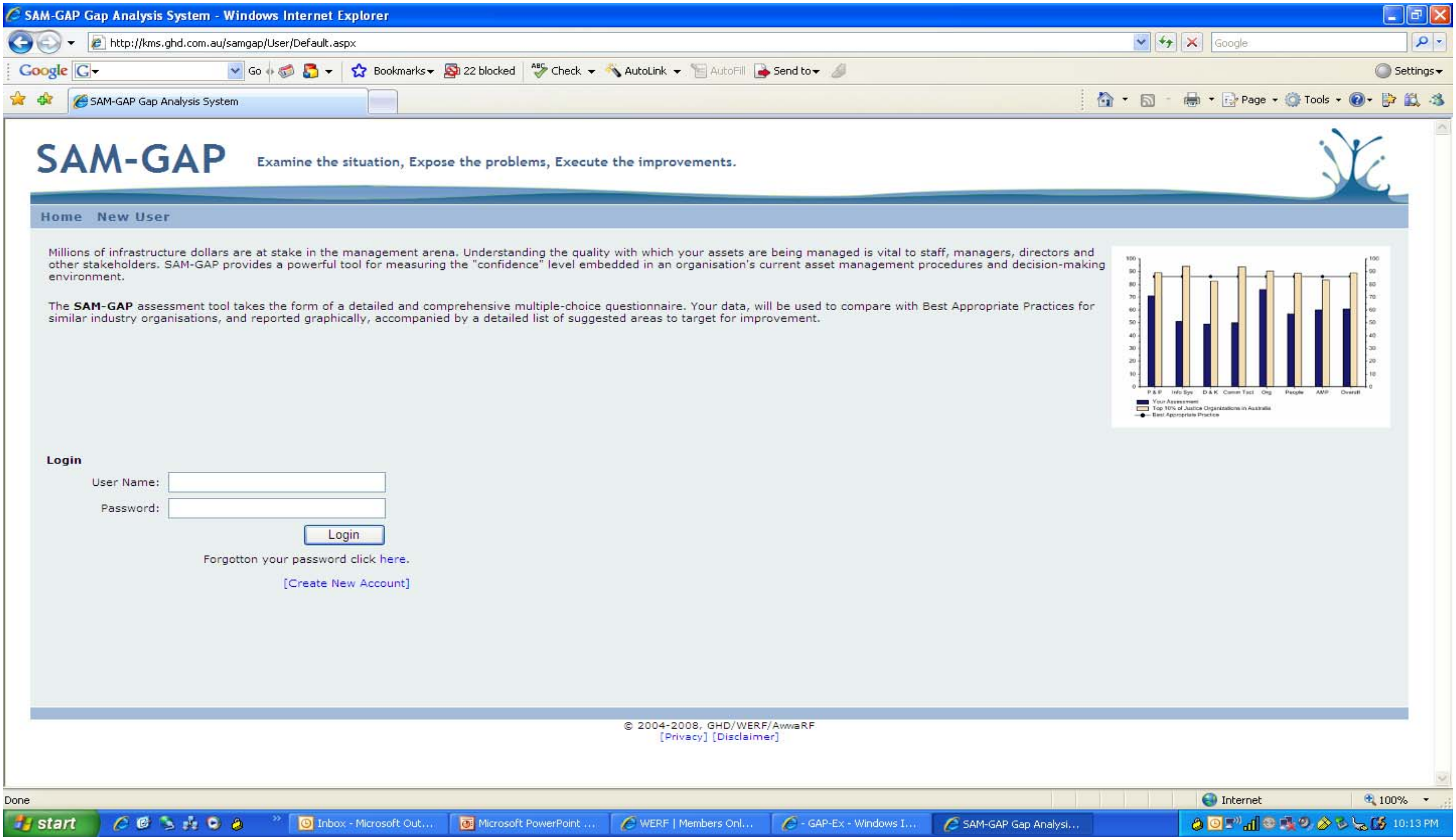
1. Current Asset State?
2. Required Level of Service?
3. Critical Assets to Sustain Performance?
4. Minimum Life-Cycle Cost? (CIP & O&M)
5. Best Funding Strategy?

Strategic Asset Management Provides The Answers To The 5 Core Questions

SAM Core Process (SIMPLE Steps)

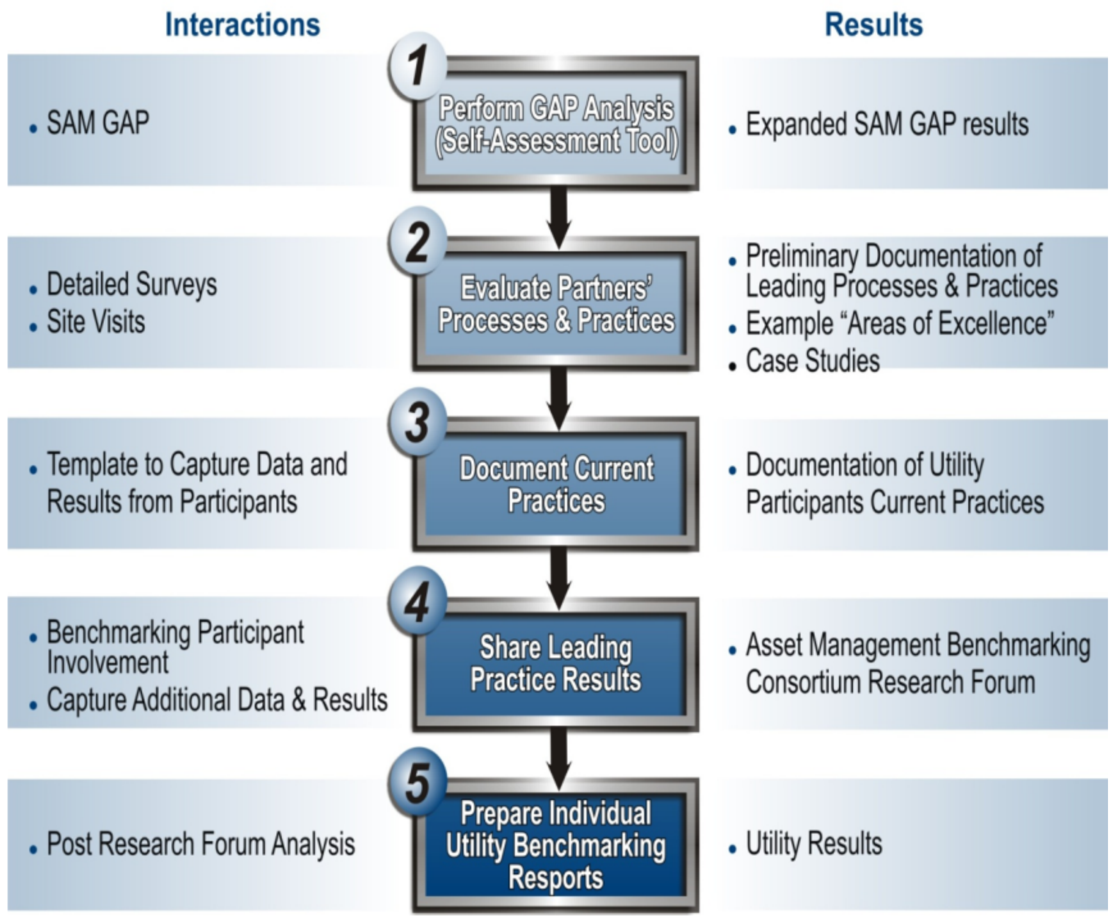


35 Utilities Completed the Detailed SAM GAP Self-Assessment Tool



Leading Practices Were Identified With Utility Participants Via Benchmarking

Benchmarking Process



Leading Practices Benchmarking

- Developed Benchmarking Protocol, Conducted Initial Survey
- Obtained Utility Commitments, Conducted SAM GAP and Analyzed Results
- Conducted Benchmarking Site Visits to Define & Document Leading Practices
- Shared Leading Practices With Utility Participants in Benchmarking Forum

Practice Areas Analyzed for Largest Needs and Leading Practice Utilities

SAM-Gap Results	Utility 1	Utility 2	Utility 3	Utility 4	Utility 5	Utility 6	Utility 7
Processes and Practices							
Demand Analysis	0.76	0.63	0.90	0.83	0.87	0.83	0.74
Knowledge of Assets	0.77	0.59	0.87	0.80	0.74	0.77	0.72
Accounting and Costing	0.70	0.49	0.82	0.75	0.67	0.72	0.77
Strategic Planning	0.57	0.58	0.89	0.75	0.58	0.72	0.73
Capital Expenditure Evaluation	0.71	0.65	0.95	0.73	0.64	0.72	0.80
Business Risk Management	0.52	0.52	0.95	0.70	0.48	0.77	0.48
Creation and Acquisition	0.82	0.77	0.96	0.87	0.84	0.77	0.81
Rationalization and Disposal	0.80	0.67	0.87	0.87	0.74	0.74	0.83
Operations	0.67	0.71	0.85	0.82	0.82	0.77	0.80
Maintenance	0.70	0.68	0.80	0.81	0.76	0.69	0.72
Work and Resource Management	0.62	0.69	0.78	0.86	0.74	0.70	0.78
Continuous Improvement	0.47	0.49	0.85	0.70	0.53	0.67	0.62
Information Systems							

Analysis of Data Showed Largest Needs/Opportunities in These Areas

- Accounting and Costing
- Strategic (Asset) Planning, combined with Asset Management Plans
- Business Risk Management
- Secondary Data and Knowledge (relates to asset condition data)
- Maintenance
- Organization and People

Utilities With Leading Practices Were Identified and Site Visits Conducted

- North America
  - EPCOR Water Services
  - DuPage Water Commission
  - Orange County Sanitation District
  - Seattle Public Utilities
- International
  - United Utilities (UK)
  - Sydney Water (Australia)

Site Visits Focused on Practice Areas Selected Based on SAM GAP Analysis

🔴 *Selected on SAM GAP*

🟡 *Identified in Site Visit*

	Accounting and Costing	Strategic (Asset) Management Planning	Business Risk Management	Maintenance	Secondary Data and Knowledge	Organization and People
EPCOR Water Services	🟡	🔴	🔴	🟡	🔴	🟡
DuPage Water Commission			🔴			
Orange County Sanitation District	🔴	🔴	🔴	🔴	🟡	🔴
Seattle Public Utilities	🟡	🟡		🟡	🟡	🔴
United Utilities (UK)	🟡	🔴	🔴	🟡	🟡	🔴
Sydney Water (Australia)	🟡	🔴	🔴	🔴	🟡	🟡

Benchmarking Forum Shared Example Leading Practices

- Six Leading Practice Utilities Presented Example Practices as Documented in Site Visits
- Over 20 Additional Utility Participants Learned About the Leading Practices
- Break-Out Groups Provided Q&A and Additional Example Practices From All Participants
- Summary Session Confirmed “Take Away” Learning and Actions by All Participants

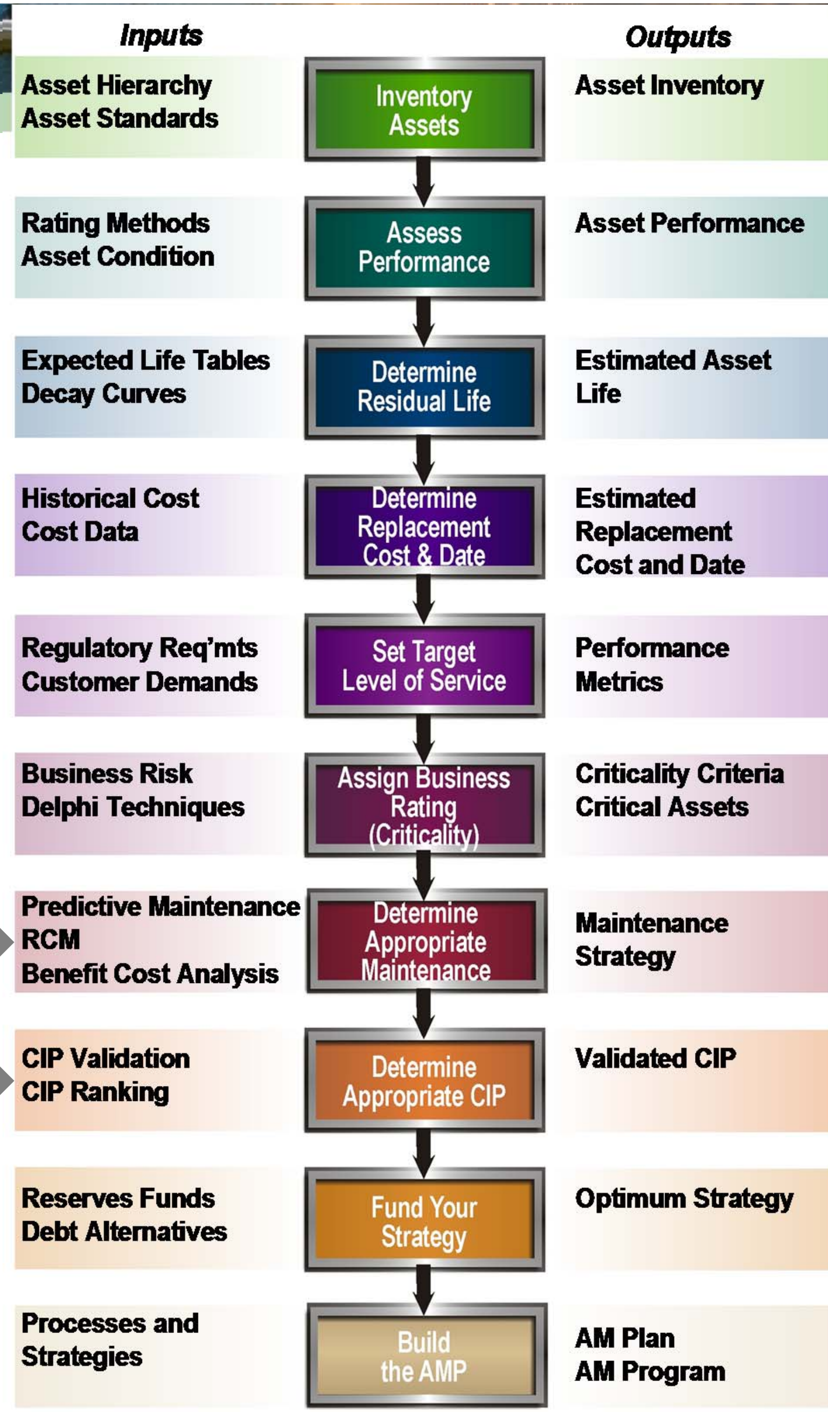
SECTION 3

MWRD's Focus on Strategic Asset Management

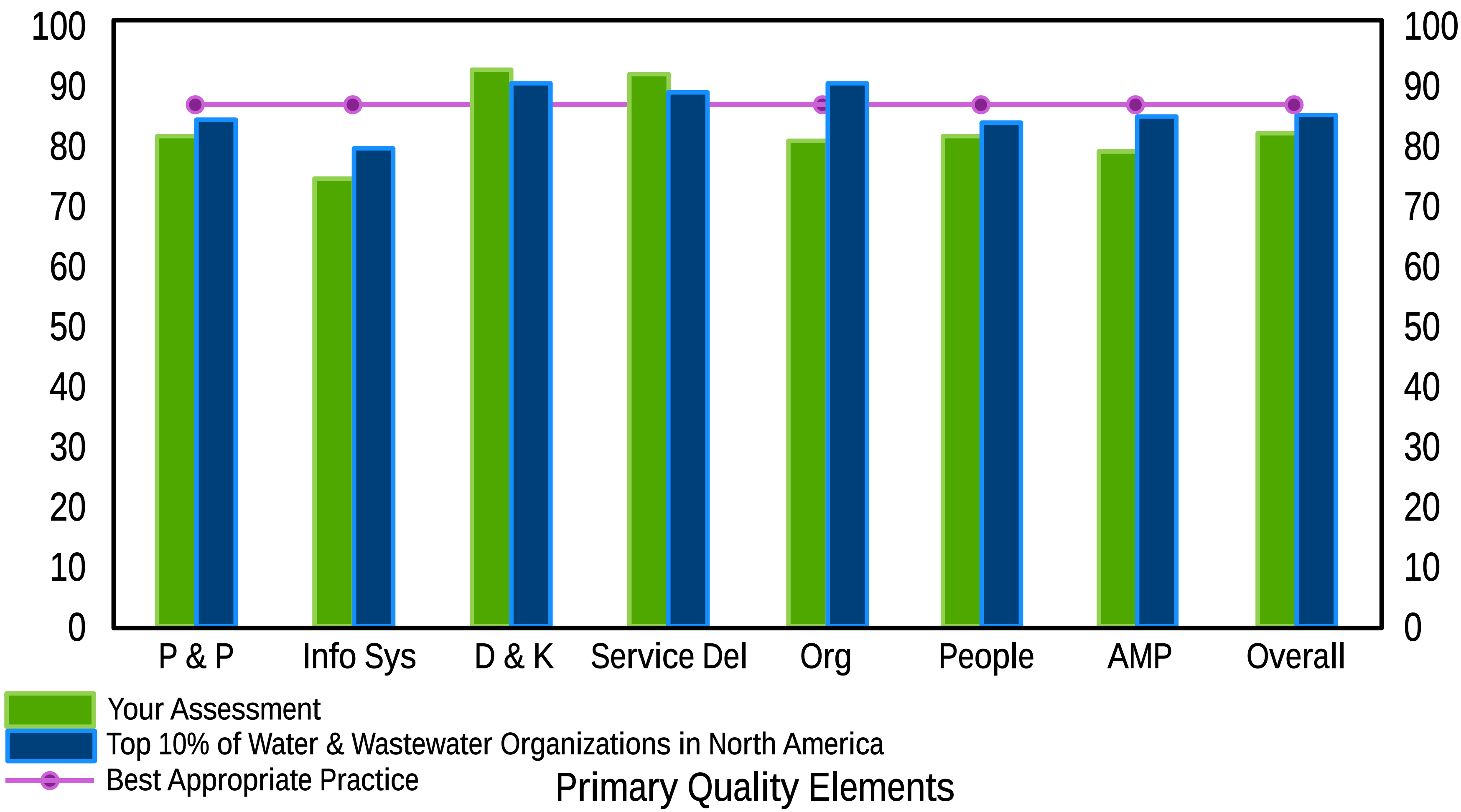
Focus Is On Two Steps In The SAM Process…But Some Previous Steps Are Important to Get There!

Maintenance

Strategic Asset Planning



SAM GAP Results Show Opportunity for Improvement (example)



MWRD Senior Management Chartered the Asset Management Team

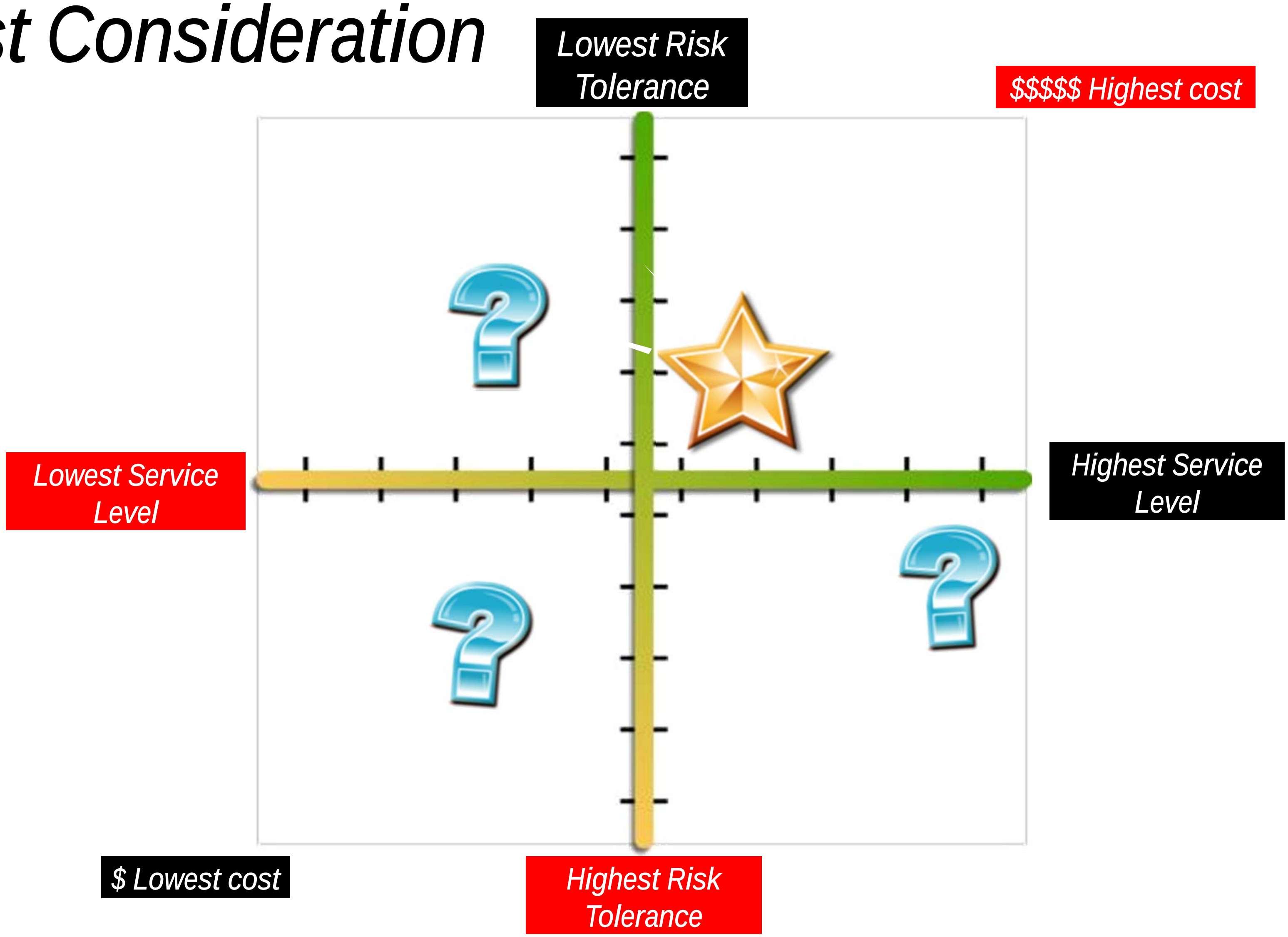
Using input from all departments, develop collaborative strategic asset planning and maintenance processes to provide optimal use of capital and maintenance resources

- How to identify needs
- How to prioritize needs
- How to develop alternatives
- How to justify investment decisions

Drivers and Issues Were Defined (example)

- Standardize – definition of "asset" and associated information
  - Capital asset, "operational" asset, GASB-34 definition, etc.
  - Asset classifications, location groupings, "operational process/system" views, etc.
  - (age, depreciation, current value, replacement cost, condition, life expectancy, maintenance history/cost, links to related assets/parts/systems, etc.)
- Formalize – ways to evaluate assets
  - Consistent rating system, ways to prioritize (ability to audit)
  - Risk-based approach – criticality (likelihood of failure, consequence of failure)
  - Life-cycle view (total cost of capital and O&M)
  - Remaining asset useful life (to better forecast future investment needs)
  - Business-case based decisions (cost-benefit or triple bottom line analysis of alternatives)
  - Vetting process for decision-making across departments (M&O, Engineering, Finance, IT, Purchasing, Admin, etc.)

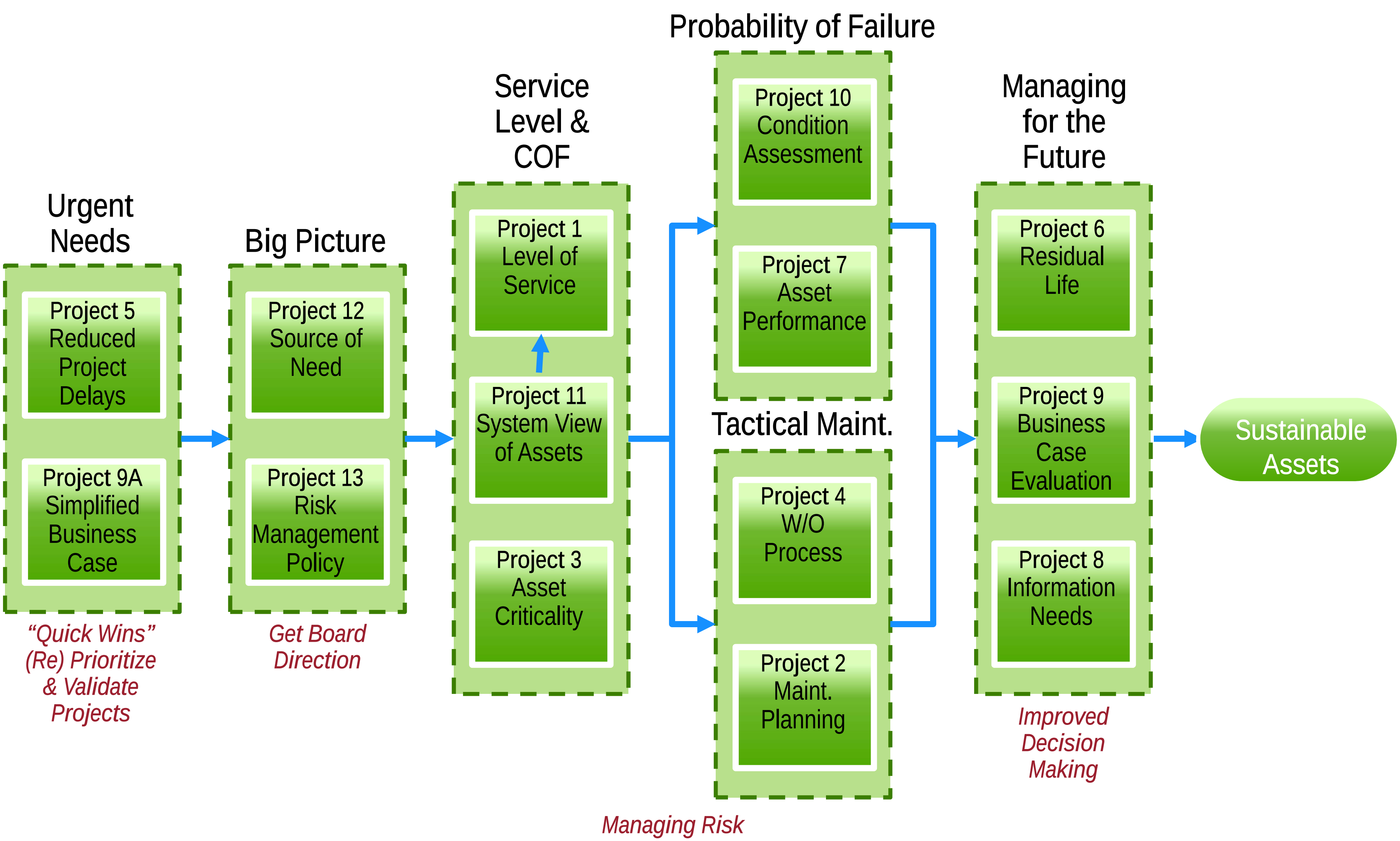
Risk Management Is Recognized As A Key Cost Consideration



Asset Management Results In Financial Benefits

- Better management of asset condition and performance
  - Reduce expensive/reactive repairs
  - Improve service (minimize interruptions and secondary failures)
  - Reduce collateral damage (flooding, traffic disruptions)
  - Improve safety performance
- Better deployment of maintenance resources
  - Maintenance matched to level of service
  - Increased “wrench-on-bolt” time
- Fully analyzed and prioritized CIP
  - Right projects at right time
  - Based on life-cycle cost principles

MWRD's Asset Management Plan Defined Priorities To Optimize Capital and Maintenance Resources

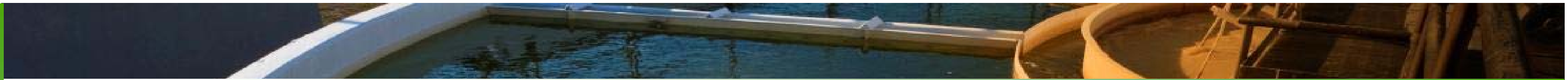


MWRD Benefits of Improved Asset Management

- Better asset reliability (manage risk, improve service)
- Verifiable/justifiable investments (no “pet projects”)
- Deliver projects on time/budget (reduce delays, scope creep)
- Improve process efficiencies (save time, effort)
- Better decisions (justifiable, District-wide)
- Aligned prioritization (agreement on investment priorities)
- Reduce emergency budget requests (Board confidence)
- Improved long-term funding forecast based on future investment needs
- Drives commitment to integrated technology

SECTION 4

Opportunities to Learn From Other Leaders



Asset Management Requires A Culture Change For Most Organizations

FROM	TO
Zero Risk!	Managed, Acceptable Risk
Worst First!	Monitored condition
Decisions based on “gut”	Decisions based on data and information
Lowest capital cost solution	Best life cycle cost value
“We need it!”	Business case demonstration
Spend $	Invest $

Learning From Other Leaders Can Be Based on WERF Research

1. Understand Your Own Utility's Drivers and Issues For Asset Management
2. Conduct SAM GAP Assessment to Identify Opportunities For Improvement
3. Select Appropriate Leading Practices To Adapt and Apply – Use WERF SAM Example Leading Practices
4. Develop Prioritized Plan With An Organization-Wide Asset Management Team

Upcoming Opportunities To Learn From WERF SAM Research

- Case Studies on Use of WERF SAM Tools for Analysis and Decision-Making
  - Select area for using a SAM tool to help your utility
  - Get assistance in tool use and apply results
- Maintenance Practices Performance Indicators
  - Contribute your example indicators by survey
  - Share your practices for maintenance performance management (for possible case study)

Questions

To learn more,
please contact Terry Brueck
at tbrueck@ema-inc.com