

# Evaluation & Prioritization

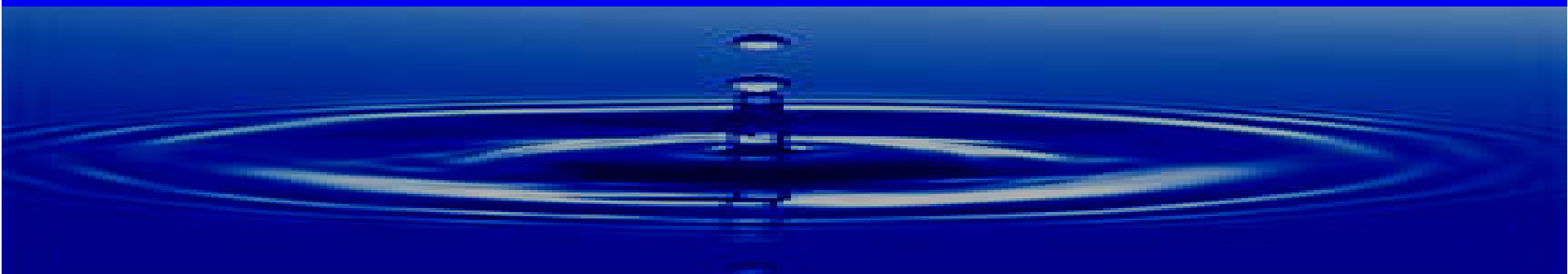
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## Presentation to the Metropolitan Area Water Supply Advisory Committee

Scott Harder, President

ENVIRONMENTAL FINANCIAL GROUP - **EFG**|Carbon

**November 15, 2007**



# Presentation Objectives

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- The need to evaluate and prioritize
- Survey global best practices
- Set forth a recommended approach

# ***Planning Process***

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- **Conduct availability analysis**
- **Identify problem areas, assess urgency**
- **Evaluate competing solutions**
- **Prioritize selected projects and policies**

# ***Evaluating Water Supply Options***

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- Question of economics, not finance
- Determine relative cost effectiveness over planning period
- Assess sustainability

# ***Prioritizing Water Supply Investments***



- Maximize benefits to the region
- Improve overall sustainability
- Assess urgency
- Encourage innovation
- Allocate limited capital
- Involve stakeholders

# Global Best Practices

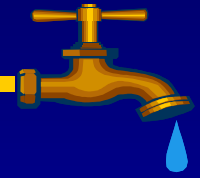
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- Business case evaluation
- Risk assessment
- Sustainability - life cycle assessment
- Climate change
- Consider multiple and innovative sources

# ***Global Best Practices:*** **Business Case Evaluation**

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- Quantitative support for a business judgment
- Identifies lowest life cycle cost
- Address risks
- Applies “triple bottom line” criteria: economic, environmental, social

# ***Global Best Practices:*** **Business Case Evaluation**



|   | RO Plant | Bulk Water Purchase |
|---|----------|---------------------|
| <b>Plant Cost, \$M</b>                    | \$37.1   | \$0.0               |
| <b>Pipeline &amp; Capacity Costs, \$M</b> | \$0      | \$46.3              |
| <b>Annual Membrane Replacement, \$M</b>   | \$0.3    | \$0.0               |
| <b>Plant O&amp;M, \$M</b>                 | \$3.8    | \$0.0               |
| <b>Bulk Water, \$M</b>                    | \$0.0    | \$3.8               |
| <b>Inflation rate</b>                     | 4%       | 3%                  |
| <b>Subtotal Net Present Value, \$M</b>    | \$104    | \$107               |
| <b>Regulatory Risk</b>                    | \$25     | \$0                 |
| <b>Construction Risk</b>                  | \$15     | \$0                 |
| <b>Total Net Present Value, \$M</b>       | \$144    | \$107               |

# ***Global Best Practices:*** **Risk Assessment**

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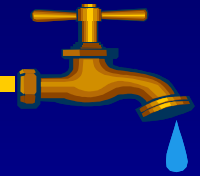


- Quantitative and qualitative components
- Risk cost concept:

$$\begin{aligned} & \textit{Consequence} \times \textit{Probability} \\ & = \textit{Risk cost} \end{aligned}$$

- Supply, regulatory, asset failure, monetary
- Identify both retained and avoided risks

# ***Global Best Practices:*** **Risk Template**



|                               | CONSEQUENCE                                   | ANNUAL PROBABILITY                         |
|-------------------------------|---|--|
| <b>Infrastructure failure</b> | Replace in kind                               | Service life                               |
| <b>Supply failure</b>         | Cost of next cheapest (supplemental) source   | Availability analysis                      |
| <b>Regulatory</b>             | Cost of next cheapest source                  | Policy analysis                            |
| <b>Climate change</b>         | Higher energy cost and/or lower supply yields | Availability analysis and climate modeling |
| <b>Contamination</b>          | Treatment or cost of next cheapest source     | Availability analysis                      |

# ***Global Best Practices:*** **Sustainability**

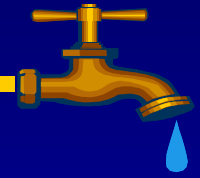
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- Emerging standard in utility planning and corporate reporting
- Climate change
- Ecological “footprint”
- Triple bottom line decision criteria: economic, environmental, social
- Establish metrics to track progress

# ***Global Best Practices:*** **Life Cycle Assessment**

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- ISO 14040 methodology
- Inventory, impacts, and interpretation
- Cradle-to-grave focus
- Examine water operations supply chain
- Examine infrastructure construction
- Assesses human health, ecosystem quality, resource utilization

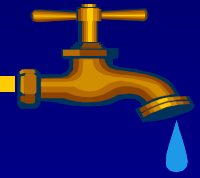
# Life Cycle Assessment: Arizona Water Supply Case Study



|                                     | Importation | Reclamation | Desalination |
|-------------------------------------|-------------|-------------|--------------|
| <b>Carcinogens</b>                  | 0.448       | 0.401       | 2.3          |
| <b>Respiratory organics</b>         | 0.0293      | 0.0204      | 0.118        |
| <b>Respiratory inorganics</b>       | 12.1        | 9.04        | 48.7         |
| <b>Climate change</b>               | 2.65        | 2.50        | 11.0         |
| <b>Radiation</b>                    | 0.0343      | 0.0152      | 0.00932      |
| <b>Ozone layer</b>                  | 0.000289    | 0.000641    | 0.000758     |
| <b>Ecotoxicity</b>                  | 0.0507      | 0.0764      | 0.564        |
| <b>Acidification/Eutrophication</b> | 1.16        | 0.854       | 4.59         |
| <b>Land use</b>                     | 0.0206      | 0.0864      | 0.105        |
| <b>Minerals</b>                     | 0.0181      | 0.0117      | 0.757        |
| <b>Fossil fuels</b>                 | 17.1        | 12.7        | 67.6         |
| <b>TOTAL</b>                        | <b>33.6</b> | <b>25.7</b> | <b>135</b>   |

# ***Global Best Practices:*** **Climate Change**

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- ***Mitigation* response: cap and reduce greenhouse gas emissions**
  - A focus on energy efficiency and renewable energy
  - Establish GHG emissions as a sustainability “metric”
  - Include carbon costs in business case evaluation
  - Potential to finance projects through GHG emissions reduction credits
  
- ***Adaptation* response: plan for future resource risk**
  - Integrate climate model output into long-term water supply projections

# ***Global Best Practices:*** **Capital Allocation**

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- **Prioritizing capital investments**
- **Capital Efficiency Index:**

$$\text{Net Present Value} \div \text{Capital Cost} =$$

**Capital Efficiency Index**

- **Ability to “cut-off” based on available funding**

# ***Global Best Practices:*** **Multiple and Innovative Sources**

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- Reclaimed wastewater and conservation considered sources of supply
- Shift from wastewater effluent disposal to resource reuse
- Selling reclaimed wastewater rather than giving it away: a “third utility”
- Currently not enough drivers in metro area
- Water short areas have worked to resolve regulatory and liability issues

# Proposed Approach



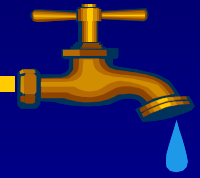
- **Make a business case for a solution to problem areas, to include the following elements:**
  - Life cycle cost
  - Regulatory, supply, climate, and monetary risks
  - Tangible and intangible regional benefits (economies and avoided costs)
  
- **Demonstrate enhancement of overall regional water supply sustainability:**
  - Climate change
  - Human health
  - Ecosystem quality
  - Resource utilization

# Proposed Approach



- Use profitability index to prioritize projects
- Encourage alternative supply development
- Encourage greater energy efficiency
- Address both mitigation and adaptation responses to climate change

# Next Steps



- Keep overall methodology flexible until Availability Analysis is completed
- Solicit committee and stakeholder input at workshops
- Develop detailed spreadsheet model, risk templates and sustainability protocols
- Conduct Planning Area analyses

# **Evaluation & Prioritization Criteria**

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