How Scenario Planning Will Benefit Scottsdale Water Resources' Master Planning Process

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Introduction

Scottsdale Water Resources current method when creating a master plan: **Classic Decision Analysis**

Proposition: Adopt **Scenario Planning** method

- Attempts to forecasts the future
- Plans for one type of future
- Doesn't account for **uncertainty**

The scenario planning method will promote the understanding of uncertainties about the future and help the Scottsdale Water Resources to be better prepared for the future.

Methods

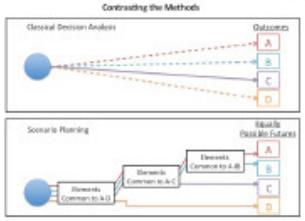
Conducted a comprehensive literary review on scenario planning

In depth interviews with two experts on scenario planning

Researched:

- Tucson Water Master Plan (2004)
- Phoenix Water Master Plan (2011)
- Scottsdale Water Master Plan (2008)
- Water Utility Climate Alliance White Paper Report

Scenario Planning vs. Classical Decision Analysis



Key differences:

How probability of a future occurring is valued

Classical decision analysis "handles uncertainty through the use of probabilities" (WUCA)

- Plans for the future with the highest probability
- Probability is based on historical data which can be problematic because "the past is not a guide to the future" (Marra).

Traditional scenario planning examines without assigning probability

- How prepared a group is for possible future outcomes
- Traditional scenario planning examines driving forces that influence the future.

Driving Forces examples: economy, population growth, water demand supply availability, new source availability and technological advances

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Tucson - 2004

One of the first in the water utility world to adopt scenario planning method

Central Question:

- How best to use City of Tucson's effluent in a manner that is accepted by its customers

Critical uncertainties:

- Potable use options
- Recharge options
- Treatment options

Three Dimensional Matrix is formed to characterize each of the eight effluent reuse possible futures

Conclusion: "No Effluent for Potable Use"

Benefits:

- Strengthened communication within department
- Better prepared for uncertainty

Recommendations:

- It was time consuming educating the department about a new method

SCENARIO PLANNING PROCESS

1. The construction of scenarios is done by two different groups:

- **Planning group** - consist of **key stakeholders**, such as operations staff, planning staff, risk management staff, and financial staff
  - Every member is committed to attending each meeting
    - Ensures communication
- **Core group** - consist of the planning staff and other members of the water department who make the final decision.
  - Facilitates planning group meetings
  - Comes to a consensus if an agreement cannot be made during the planning group meeting.
  - Consultants – if hired

2. Central question is formed:

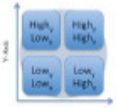
- Planning group proposes questions that the master plan should answer
- Most important questions, as deemed by the planning group, are selected.
- The central question is determined by combining the selected questions.

3. Planning Group lists driving forces

- Identify critical uncertainties related to them.
- **Critical uncertainties** focus on issues that are the **most important** and **uncertain**.
  - Ideally two critical uncertainties should be selected, (the highest importance and greatest uncertainty).

4. Form a matrix from the two most critical uncertainties

- Two uncertainties yield four scenarios



After matrix is created, planning group develops a narrative

- Narrative explains specifically how the scenario came to be

5. Identify similarities and overlaps

- **Common elements** indicate which actions will be useful under a wide range of possible futures
- **"Signposts"** are the developing conditions that signal the divergence from the chosen narrative
  - Help utilities be aware when conditions are not reflecting the common elements that are integral to the chosen narrative.

6. Governed by the decision makers

- **Common elements** are incorporated into the long-term financial plans.

Phoenix - 2011

- Central Question:
  - What is the potential for water shortages and how would it impact Phoenix
- Driving Forces:
  - Urban Heat Island Effect
  - Reduced demand due to efficiency
  - Legal access
  - Delivering methods
  - Location of distribution systems
  - Population growth
  - SRP or CAP availability
- 65 scenarios reviewed
- Created a model to estimate future water supply and demand conditions
  - Examined external and internal factors
- Conclusion: Phoenix does not expect a supply deficit before 2020, however extreme scenarios identified that substantial amounts of groundwater that exceed current supplies would be needed during times of surface water shortages.
  - Implementation of expanding facilities is in progress

Benefits:

- Better prepared for uncertainty in the future
- Better prepared for extremes

Recommendations:

- Even though developing the model was time consuming, it produced results within seconds which could easily be analyzed

Scottsdale and Benefits

Scottsdale already has the information needed to conduct a scenario plan

By using classical decision analysis, Scottsdale only analyzes each driving force individually and for one potential future.

- Neglects to analyze uncertainties and other driving forces affect each other

Future Master Plans

- Concerned with population growth and how it affects water demand
- Next master plan set to inspect 25 year horizon
  - Consultant team will be hired for 15 months
- Planning Meetings vary from every few weeks to every two months
  - Irregular meetings can negatively impact communication

City	Year	Time Span	Used Scenario Planning	Consultants Hired
Tucson	2004	24 months	Yes	No
Scottsdale	2008	18 months	No	Yes
Phoenix	2011	12 months	Yes	Yes

Benefits if Scottsdale Adopt Scenario Planning:

- Though the process is time consuming, it results in better communication within the department
- Less tangible, but extremely important factors such as political uncertainties and public sentiment are incorporated into the process
- By anticipating possible futures, and foreseeing actions required to respond to these futures, the utility is better prepared to respond as change occurs

Conclusion

Scenario planning is the technique of the future for water utility departments. Though the scenario planning technique is more time consuming than the classic decision analysis technique, it produces a plan that prepares for multiple futures which ultimately helps the utility.

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