# FINANCIAL ISSUES FACING SMALL WATER SYSTEMS IN ALBERTA

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# INTRODUCTION

# Introduction

- Increasing pressure to charge full cost recovery rates…

  …but small water systems often face cost challenges.

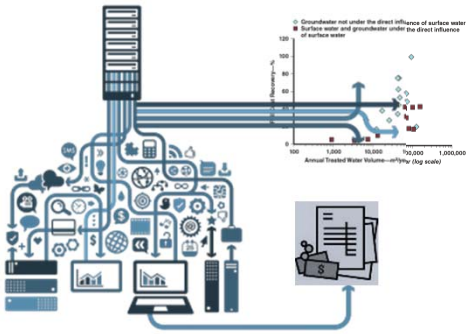
- What do you think that "cost recovery" means?

# Research Questions

1. *What is the current cost recovery situation?*
2. *How would cost recovery impact affordability of water rates?*
3. *What population would revenue shortfalls be expected to begin?*
4. *What are emerging solutions for revenue shortfalls?*

# Overview

- Methodology
  - Data Collection
  - Analysis
- Results and Discussion
- Conclusions





# METHODOLOGY

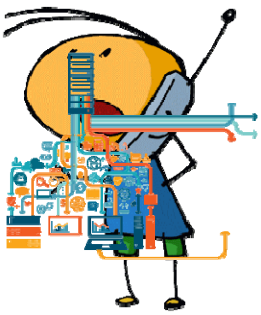
# Study Criteria

- 25 small drinking water treatment systems
- Study criteria:
  - < 1 000 people
  - Stand-alone treatment plant
  - Municipal system (town, village, hamlet)
- Studied 16% of systems (25 out of 155)



# Data Collection

- Capital costs (25 years - treatment only)
- Annual operation and maintenance (O&M) costs
  - Annual volume of water treated
  - Annual income generated by water rates
  - Water rate structure
- Local median household income (MHI)



# Cost Recovery

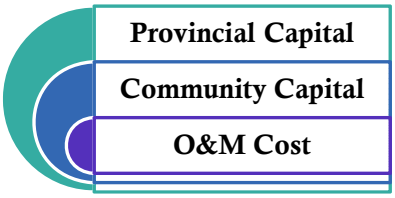
*What is the current cost recovery situation?*

- Cost compared to the current revenues.
- Three scenarios:
  - full cost recovery,
  - community cost recovery and
  - marginal cost recovery
- Each scenario is current use in the municipal sector

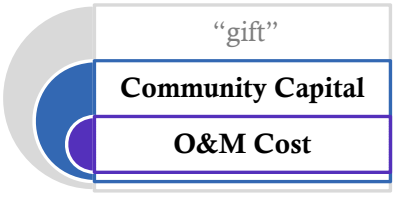


# Cost Recovery Definitions

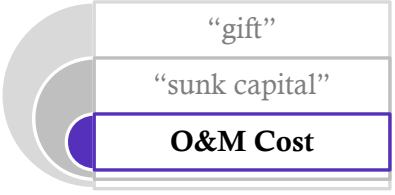
- full cost recovery




- community cost recovery




- marginal cost recovery



# RESULTS AND DISCUSSION

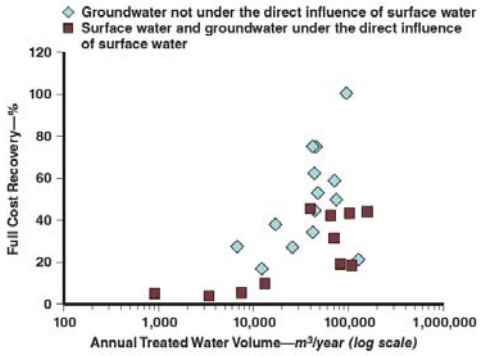
## Current Cost Recovery

Table 1: Current Cost Recovery in 25 Small Drinking Water Treatment Systems in Alberta

| Cost Recovery Scenarios | Number of Systems *(n = 25)* | |
|---|---|---|
| | Achieving | Not achieving |
| Full Cost | 1 | 24 |
| Community Cost | 2 | 23 |
| Marginal Cost | 7 | 18 |

# Current Cost Recovery

**Figure 1: Percentage recovery of the full cost of treating water plotted against the annual volume**

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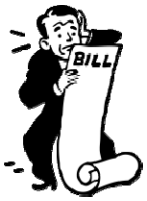
# Current Affordability

- The current water rates
  - 24 $m^3$/house/month
  - ~ $25 to $84 per month
  - This translates to 0.4% to 1.6% of the MHI.
- City of Calgary customer in 2014
  - $54 per month
  - 0.8% of MHI

# Affordability + Cost Recovery

*How would cost recovery impact affordability of water rates?*

- Evaluate: cost recovery scenarios while maintaining affordability
- Affordability defined as:
  - water rates < 2% of MHI






# Projected Affordability

**Table 2: Number of systems whose water rates would exceed an affordability threshold of 2% of the Median Household Income (MHI) if they pursed cost recovery scenarios**

| Cost Recovery Scenarios | Number of Systems *(n = 25)* | |
|---|---|---|
| | Water rates < 2% of MHI | Water rates > 2% of MHI |
| Full Cost | 13 | 12 |
| Community Cost | 17 | 8 |
| Marginal Cost | 20 | 5 |

# Affordability Discussion

- Marginal cost recovery
  - most realistic goal for small systems
  - water rates < affordable threshold
  - Risks: don't account for depreciation and capital upgrades
  - Benefit: send appropriate price signals to customers.
- Community cost recovery and full cost recovery
  - increasing number of systems with water rates > affordability threshold.


Cost Recovery and Affordability in Small Drinking Water Treatment Plants in Alberta, Canada



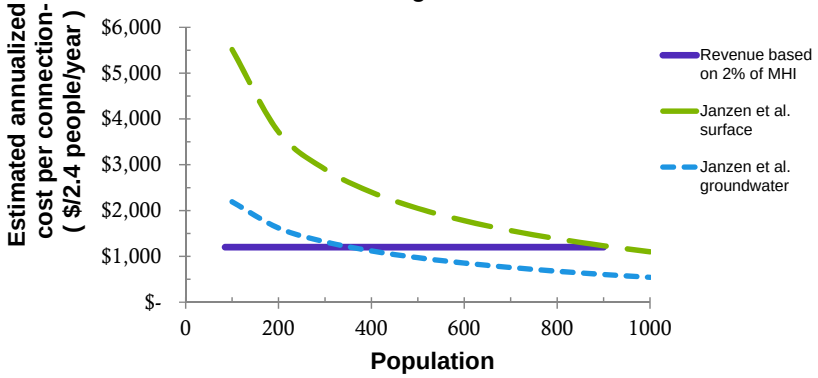
# Financial Capability

*What population would revenue shortfalls be expected to begin?*

- Two cost equations were used
  - One for groundwater and another for surface water
  - These had been previously developed using data from the 25 systems (Janzen et al. 2016)
- These cost equations were compared to the maximum expected revenue
- Revenue = 2% of a typical "rural" MHI ($60 000)

# Estimated Revenue Shortfalls

**Figure 2: Annualized per connection cost of treating drinking water**




# Revenue Shortfalls Discussion

- Revenues shortfalls are expected if affordability is considered
  - Population < 360 people for a groundwater source
  - Population < 920 for a surface water source
- Surface water treatment cost > groundwater treatment cost because Surface water quality < groundwater quality

# Emerging Solutions

- Point of Entry Treatment (POE)
  - i.e. NSF 55A UV treatment at Shunda Creek Hostel in Nordegg, AB
- Point of Use Treatment (POU)
  - i.e. kitchen tap Reverse Osmosis for flouride in Cottonwood and Ravencrest operated by MD of Foothills
- Bottle Fill Stations
  - i.e. Hamlet of Cadomin operated by Yellowhead County
- "Trickle-fill" services from a regional supply
  - i.e. Newell County (850 km), Kneehill County (240 km), Stettler County

# Emerging Solutions

- Amalgamation
  - i.e. ownership of an existing rural water co-op being assumed by a County or Municipal District
  - i.e. Churchill Water Co-op in Kneehill County (2010)
- Capacity Development Programs
  - Drinking Water Safety Plan training
  - AWWOA's *Closer to Home* initiative

# CONCLUSIONS

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- Balancing cost recovery with affordability
  - Marginal cost recovery = acceptable interim measure
    - sends appropriate price signals to customers
  - Community cost recovery: may be feasible
  - Full cost recovery: appears to be a challenge
- Revenues shortfalls are expected if affordability is considered
  - Population < 360 people for a groundwater source
  - Population < 920 for a surface water source
- The emerging solutions show promise in reducing revenue shortfalls in some situations

# Research Support


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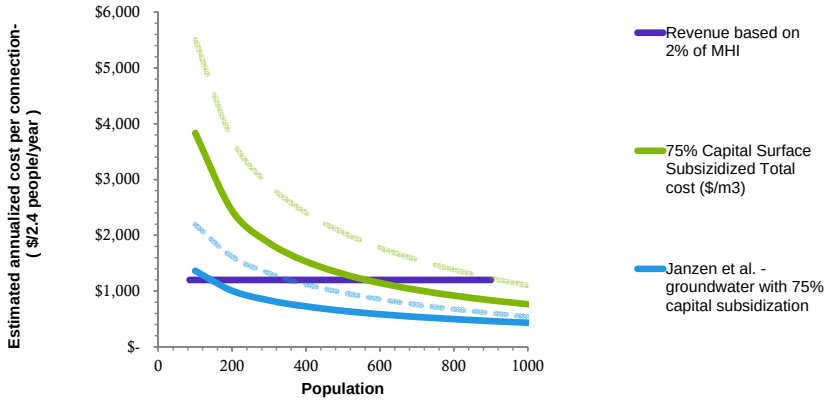
# Community Cost intersections

**Figure 3 Annualized per connection cost of treating drinking water**



# Other Full Cost Definitions: *Supply, Economic and Full*

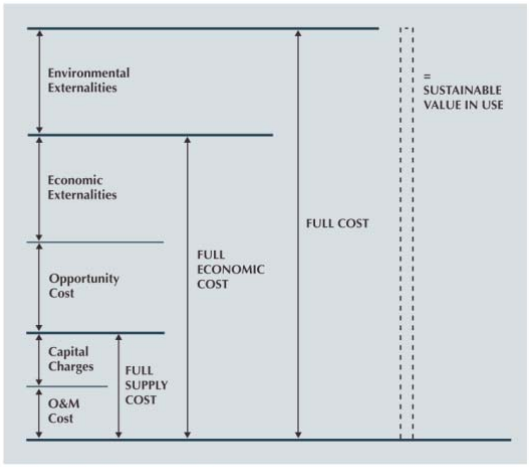



**Figure 1.** General Principles for Cost of Water.

- (source: Rogers, Bhatia, and Huber 1998)