

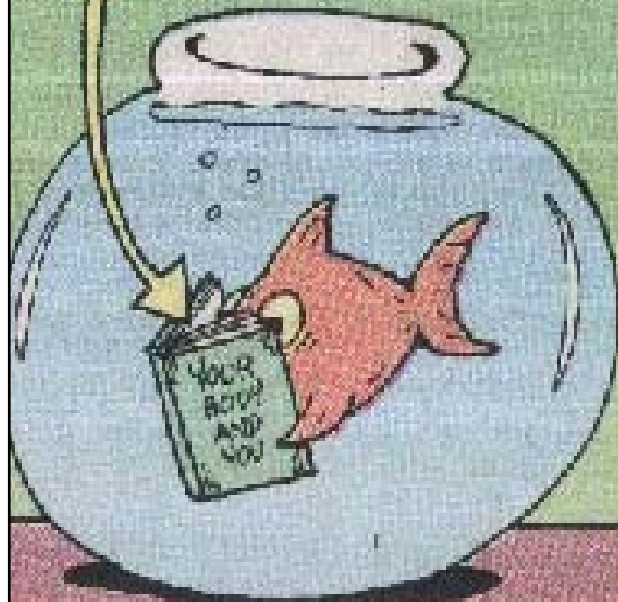
**Economic and/or Market-Based
Instruments to Allocate Water and
Promote Conservation: Water Pricing**

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*AWRI Symposium
WATER: How Alberta Can Do More With Less!
March, 2009*

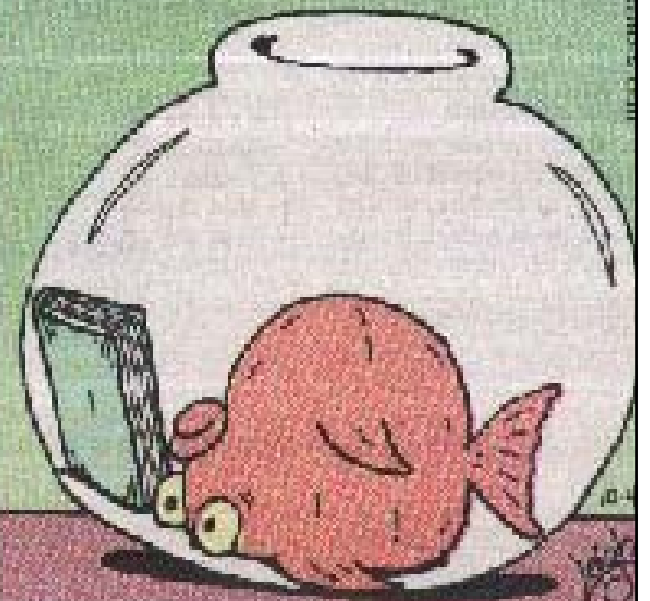
First, a word of warning about taking the
advice of water experts...

TO MAINTAIN A HEALTHY BODY, YOU MUST DRINK AT LEAST 8-10 GLASSES OF WATER PER DAY.



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Outline

1. Background
2. Water pricing at municipal level
3. Water pricing at provincial level
4. Implications for water markets

1. Background

- Historically, relatively little use of economic instruments or economic analysis in Canadian water management
- Emphasis has been on equitable sharing, certainty of supply in allocations and promoting water use

1. Background

Implications:

- Inefficiency and over-use
- Reduced water quality and ecosystem functioning
- Lack of innovation

1. Background

EI's have an important potential part to play in improved water management:

- Signal scarcity
- Reveal valuations
- Decentralized allocation
- Promote conservation and innovation

1. Background

Design of EI's follows one of two routes:

1. Choose P and let market choose Q
2. Choose Q and let market reveal P

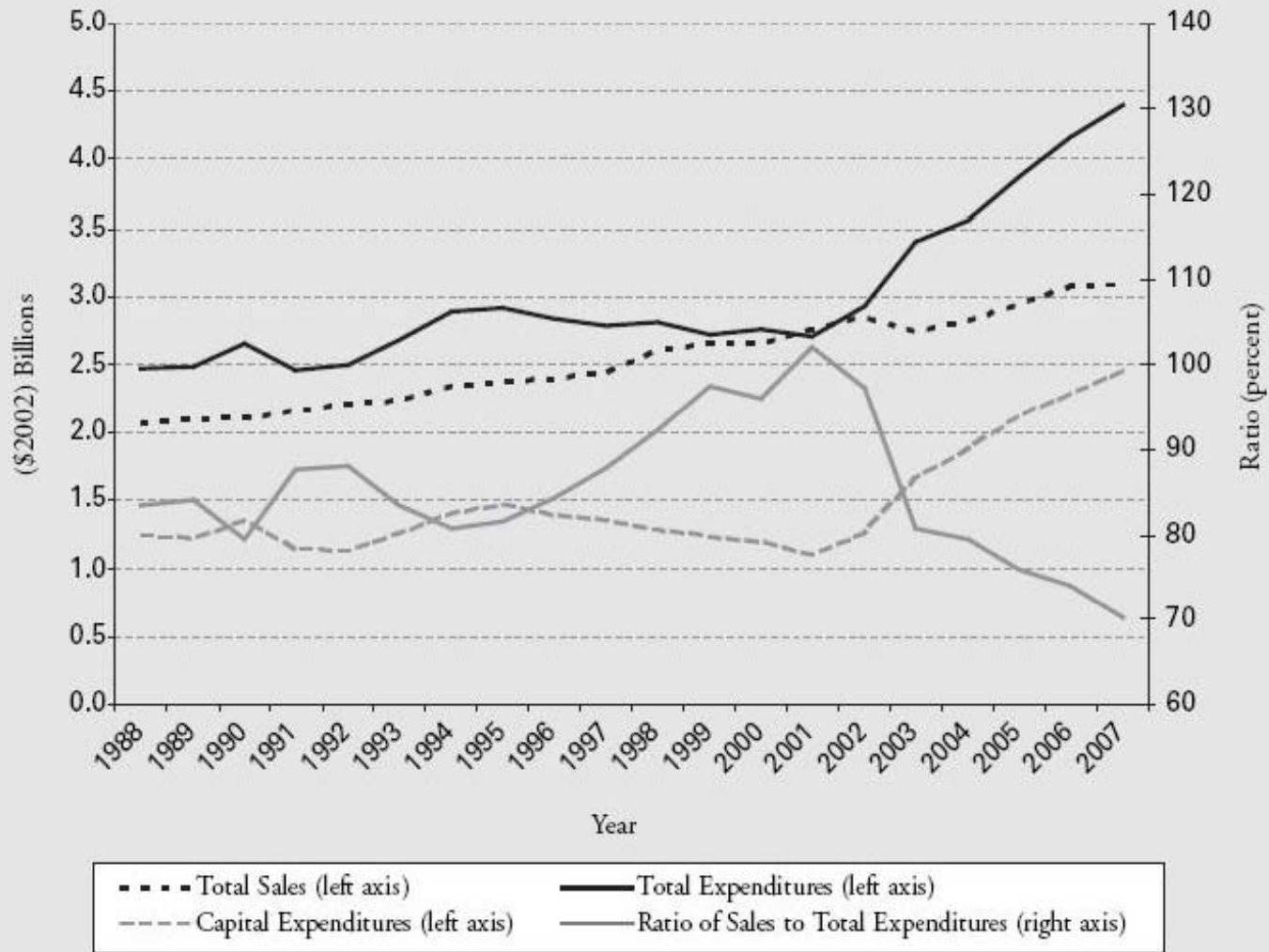
I'll briefly examine water pricing at municipal and provincial level and examine their 'legacy' and implications for water markets

2. Municipal Water Prices

Why they matter:

- Source of revenue
- Signal to consumers
- Signal to innovators
- Signal to suppliers

Figure 1: Revenues and Expenditures of Canadian Municipal Water Agencies, 1988 to 2007



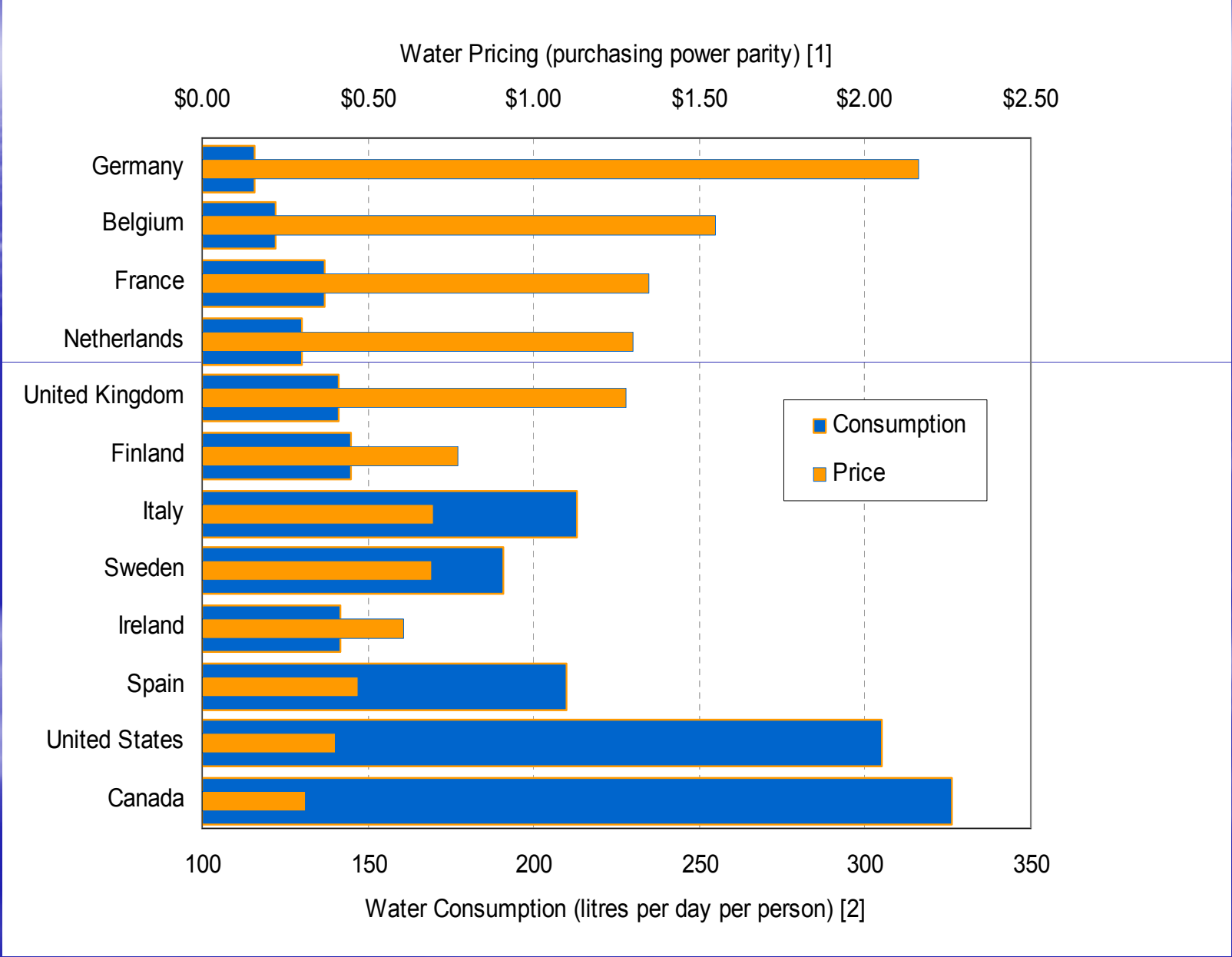
Source: Statistics Canada (2008).

Distribution Residential Prices

Price Structure	# cities	% population
Flat Rate	489	23.4
Volumetric	427	76.6
Constant	304	45.4
Increasing	84	7.9
Decreasing	39	23.3

Ontario water prices and costs

	Residential	Non Residential	Sewage
MC (\$/m ³)	0.873	1.49	0.521
P (\$/m ³)	0.323	0.734	0.128
DEV (%)	47.52	62.87	13.44
DWL (\$)	0.252	0.312	0.818



2. Municipal Water Prices

Current pricing rules perform poorly:

- Based on incomplete cost accounting
- Inefficient as $p \neq mc$
- Promote overconsumption
- Fail to cover even recorded costs
- Do little for environmental protection
- Unfair: poorly understood cross subsidies
- Do little to promote innovation

3. Provincial Water Prices

- Ownership of water vested in the Crown (except Ontario)
- Withdrawal requires permit
- Sum of many small and large decisions re: individual applications makes up most provinces' allocation framework

Prov'l Grdnwater Withdrawal fees

Province	Public ownership?	Fee
BC, AB, ON, QC, NB, PEI, NL	Yes (except ON)	\$0
SK	Yes	\$0-\$12.53 per 1000 m ³
NS	Yes	\$117-\$143 per 1000 m ³
MB	Yes	\$0.02 per 1000 m ³

3. Provincial Water Prices

Current licencing has many shortcomings:

- Non-transferable (except Alberta)
- Exemptions
- Allocation not based on value
- Not integrated with water quality leg'n
- Lack of security (drought)
- Little or no revenue to government (except power production)

3. Provincial Water Prices

- Some provinces raising fees while retaining control over issuance and allocation
- Likely provides some benefits (revenues, conservation)
- Simulations done for Ontario show impact of two-part fee

A = \$2500 or \$300

t = \$3/1000 m³

Impacts of Prov Water Use Charge

Table 3: Sectoral Impacts of the PWC under Simulation 1
($t=0.003$ and $A=2500/300$)

Sector	% Change Intake Quantity	% Change Costs	Government Revenue ^a
Manufacturing	- 7.04	0.08	10.10
Ontario Hydro (Thermal Generation)	- 10.67	1.50	56.73
Agriculture (Crop)	- 0.27	0.28	7.77
Agriculture (Livestock)	- 1.27	0.39	7.93
Mining	- 10.40	0.08	0.29
Municipal Water Utilities	-2.30	0.53	5.59

^a Revenue is measured in millions of 1991 Canadian dollars.

3. Provincial Water Prices

- Fees may look like tax grab rather than royalty for use of scarce resource
- Raising fees without transferability likely to yield relatively small gains
- Strange to be setting both P and Q
- Governments lack ability to change fees to reflect supply & demand

Legacy of past practices

- Canada doesn't have much of a record in getting the economics of water 'right'
- This is an important legacy that has implications for reforming Alberta's water allocation system

4. Implications for Water Markets

In principle, introduction of water markets (in combination with other management reforms) has potential to:

- Allocate efficiently
- Promote conservation and innovation
- Reveal value of water

However, significant challenges exist

4. Implications for Water Markets

(a) Water markets in an imperfect world

- Unpriced externalities
- Trade barriers/subsidies
- Thin markets
- Imperfect information

Allowing trade in water may lower welfare rather than improve it

4. Implications for Water Markets

(b) Estimating demands

- Past pricing has inflated water use and reforms could curtail it: freeing water for other needs
- May be discontinuities due to capital investments by large water users

4. Implications for Water Markets

(c) Instream flow needs and other public goods

- Difficult to establish economic value
- No consensus in science or legislation

Thus, strong reasons for avoiding market-based allocations.

Are govt-imposed constraints better?

4. Implications for Water Markets

(d) Institutional capacity

- Shouldn't be underestimated
- Example of USEPA and SO₂ market
- Supply and demand forecasting?

4. Implications for Water Markets

(e) Markets and water management

- Markets are only one part of package
- Irreversibility
- Conference Board report: don't introduce markets and then fix other parts of water management

To conclude

Water markets may fulfill some tasks well:

- Promote efficient use, conservation and innovation
- Reveal (private) values
- Provide flexibility to cope with future

To conclude

Water markets have significant limitations:

- They will likely do a poor job protecting the environment
- They aren't about what's fair
- They don't protect third parties

To conclude

In combination with water markets, consider:

- Price municipal water correctly
- Price externalities (water pollution, carbon)
- Instream flow needs
- Capacity and 'right' level of regulation

“Thus we see that, in estimating a nation’s wealth, mistakes are likely to be made—firstly, because many of Nature’s best gifts to man are not included at all in the inventory; and, secondly, because the inventory underrates the importance of anything which is so plentiful as to have a low market value”

(Alfred Marshall, 1925)