Demand Side Management: planning for an uncertain future

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The United Nations year of freshwater has done much to raise the profile of water crises around the world. Indeed, even in 'water-rich' Canada, water resource experts and leaders at all levels of government are coming to grips with the fact that we are not insulated from concerns over the future of freshwater resources.

In short, Canadians are facing an uncertain future; many communities are, or may soon be facing significant water supply challenges. These challenges are compounded by the unknown impacts of global climate change on local water supplies. A recent report by Statistics Canada indicates that some of the country's major glaciers are shrinking to their smallest size in 10,000 years, and water levels in St. Lawrence are at their lowest in nearly a century. These water sources have been central to the health and development of the cities that are home to 80 percent of the Canadian population.

More and more communities are experiencing seasonal droughts, problems with failing infrastructure, and growing concerns for the integrity of local aquatic ecosystems. Environment Canada has reported that one in four municipalities reported water shortages between 1994 and 1999. Yet water use in Canada remains among the highest in the world.

If the progress on the Kyoto Protocol is an indication, mitigating the impacts of climate change will be a long and arduous process. Climate experts are now telling us we must be ready to adapt to these impacts. Water experts are telling us that managing our water demands is an effective way of dealing with both the current reality and future uncertainty of urban water management.

The 'supply-side' approach has been the basic paradigm of water management throughout Canada and the industrialized world. The primary focus is securing sufficient water to meet forecast demand, a function of projected population and economic growth.

Demand-side management (DSM) is now gaining recognition as both an alternative and complement to supply-side solutions. DSM entails measures that influence the efficiency and timing of water use, such as low flow toilets and fixtures, education, water reuse, or conservation-based pricing structures. By increasing the number of tools available, DSM increases the flexibility of water management to deal with changing climatic, hydrological and financial conditions.

Under a DSM approach, decisions to build supply infrastructure are contingent on first investigating opportunities to lower demand. Fundamentally, it accepts that demand can be influenced and that conservation options are often the lowest cost alternatives to meet increasing water requirements.

Water use efficiency associated with DSM can mitigate many of the challenges associated with high levels of water use. Most importantly, it is a valuable component of a long-term integrated water management strategy to balance the competing needs for water.

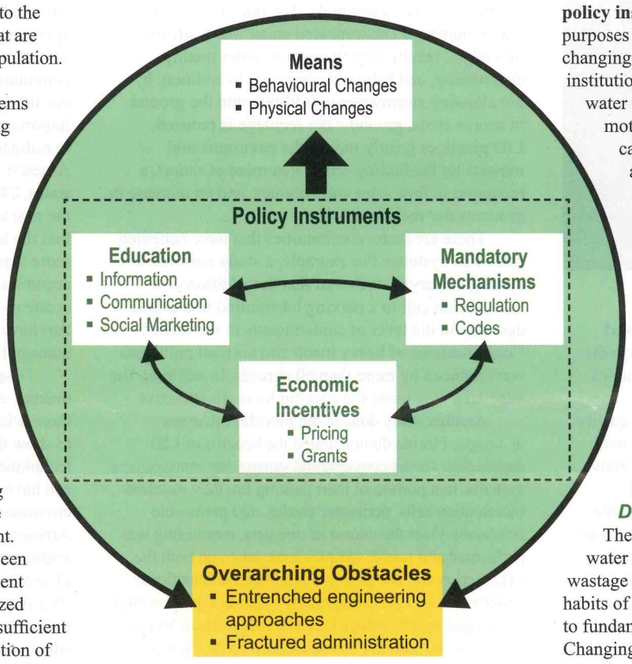

Figure 1: A conceptual model of the DSM approach

Despite this benefit, the extent to which DSM is applied to water management in Canada is limited.

The POLIS Project on Ecological Governance at the University of Victoria recently released a report entitled, *What the Experts Think: Understanding Urban Water Demand Management in Canada.* It identifies some of the reasons why DSM has not been widely adopted. It also provides background on urban water DSM in Canada, and identifies what is necessary to shift from a "water on demand" view to a more holistic approach.

Drawing on an extensive set of interviews with Canadian experts in the field of water resource management, the report synthesizes their views into a comprehensive analysis. The overarching message is clear, freshwater resources in Canadian cities are critical, and although the solutions are local by nature, they deserve national attention and serious consideration.

This study divides the process of DSM into two categories: the **means** for reducing demand, and **policy instruments** to motivate these means. For the purposes of this report, means are viewed as both changing the water use behaviour of individuals and institutions, and making physical changes to increase water use efficiency. Policy instruments for motivating these changes are grouped into three categories: education, economic incentives, and mandatory mechanisms.

The report notes that the synergistic nature of the policy instruments makes the process of implementing an effective DSM program complex. The framework presented in Figure 1 is a conceptual model of the DSM approach and illustrates the relationship among the policy instruments, and their (potential) combined influence on the means. It also points to a third and critical dimension of DSM – some of the overarching obstacles that pose major barriers to its widespread adoption.

The Means For Reducing Water Demand

The goal of behavioural change is to modify water use activities to reduce existing levels of wastage and inefficiency. Entrenched values and habits of water managers and users are major barriers to fundamentally modifying water use behaviour. Changing behaviour is difficult to achieve and may often be unreliable over the long-term.

Physical measures for reducing demand focus on technology to increase efficiency or reduce water losses.

Opportunities range in scale from individual households, institutions and industries, to municipal water and wastewater networks. Examples include water-efficient fixtures, leak repair, and water reuse. According to the experts, the technological capacity required to increase urban water use efficiency is established.

Policy Instruments For Urban Water Demand Management

Education can raise awareness of the need for, and the benefits of, water conservation. However, education alone is not considered sufficient to motivate the behaviour and physical change that will reduce water demand.

Economic incentives, particularly pricing signals, are often considered the most effective DSM policy instrument. Touted as an easy answer to our excessive water use, the issue of water pricing is contentious. Pricing reform requires consideration of broader policy issues such as social equity, long-term financing of water systems, and privatization of water utilities.

Mandatory or 'command and control' mechanisms, such as building and plumbing codes and regulations, are also used to motivate behavioural and physical change. Current building and plumbing codes fail to promote the use of water efficient fixtures, and are unclear on water reuse. Furthermore, in most provinces, regulations limit the potential for wastewater reclamation and reuse.

Water experts generally agree that the lack of a strong pricing stimulus is the prominent barrier to reducing water demand. Many note, however, that pricing is not a 'silver bullet' solution, but that integration of available policy instruments is key to success.

Overarching Obstacles

The experts noted a number of overarching administrative and institutional obstacles that pose major barriers to DSM. These include entrenched engineering approaches, fragmented administration of water management among various agencies and levels of government, and a lack of political leadership on water issues. Many of these obstacles are not specific to DSM, or even the field of water resource management, but are symptoms of broader decision-making processes, and misguided political and institutional priorities.

Future Directions

Beyond outlining and discussing some of the many challenges that limit the adoption of DSM as a central approach to urban water management, *What the Experts Think* provides future directions to overcome many of these overarching obstacles. They include:

1) Developing institutional capacity in water management to design, implement, and administer effective DSM programs. This requires diversification beyond the present engineering focus, to include social science disciplines to influence demand and create incentives to promote DSM. It also requires appropriate resources from senior levels of government.
2) Investing in long-term and more effective approaches to education to instil a lasting 'water ethic' in Canadians. This entails advancing understanding of water issues and efficiency by changing school curricula, promoting professional seminars and workshops on water efficiency, and recognizing DSM in government policy.
3) Designing and employing economic incentives that stimulate water use efficiency, and regulatory instruments that support them. For example, establishing water prices and rate structures that ensure both equitable access to potable water and water conservation.
4) Considering provincial regulatory changes, such as building and plumbing codes to mandate water-efficient fixtures, or regulatory instruments to support water reuse.
5) Linking funding transfers from federal and provincial governments to municipalities in order to incorporate conservation planning and/or directly promote DSM programs and initiatives.
6) Developing new approaches to planning that better engage the public in urban water management and requiring firm commitments to water efficiency in long-term community planning.

Where the water problem is 'shortage', the most flexible, cheapest, and most environmentally acceptable solution will not be an increase in supply, but a reallocation of existing uses and improvements in efficiency. In the same vein as energy in the 70s, water conservation must become a part of a diversified risk management portfolio.

This means acting now to develop innovative regulatory instruments and decision-making processes that integrate the environment and hydrological reality into today's policies. Conservation and managing demand will provide lasting and reliable changes to our water footprint, and therefore must become recognized as a long-term community-planning tool for growing cities in an uncertain future.

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