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Fabian Papa M.A.Sc., M.B.A., P.Eng.
CEO/Director of Vatten Infrastructure Inc.
fpapa@boswellcapital.com
T: +1 416 238 7691 (Direct)
T: +1 416 962 0080
C: +1 416 565 0158

Barry J. Adams Ph.D., P.Eng.
Research Advisor to Vatten Infrastructure Inc.
adams@ecf.utoronto.ca
T: +1 416 946 0164

Jan G. Janssens D.Ing., M.B.A.
Senior Advisor to Vatten Infrastructure Inc.
jangjanssens@gmail.com
C: +41 79 2716967 (Switzerland)
C: +1 571 338 6979 (Washington)

Investing in Water Infrastructure Projects

Installment 1: Satisfying a thirsty world…

November 2008

This is the first in a series of notes titled *Investing in Water Infrastructure Projects* to be published by Vatten Infrastructure Inc. The purpose of this note is to provide a high level overview of the status of the market forces at play in this arena and future notes will delve into specific aspects of this general topic.

Summary

The world's population is increasing and the wealth of more populous and less developed nations has been generally growing. With increased wealth comes increased consumption on a per capita basis. The result is that demand for water is increasing at a continually greater rate than the population alone.

Concurrently, climate change and the pollution of water resources as a result of industrialization in developing countries is resulting in a continually decreasing supply of water available to serve the population demanding it. A similar impact on the supply side is that, in many parts of the developed world, existing water infrastructure has deteriorated and is thus compromising the delivery of water to consumers accustomed to higher levels of service.

The net effect of these patterns is that there is significant pressure to produce and deliver water to the people of the world, accompanied by the need for investment. The forms of investment needed are, and will continue to be, wide and varied and include companies that produce technologies (e.g., water treatment, leak detection and repair, etc.), construction companies, utility operators, engineering firms, manufacturers of system components (e.g., valves, meters, etc.), among others.

In addition, there are opportunities related to infrastructure itself. The following are broad categories of investment opportunities in the universe of water infrastructure:

- Renewal of existing aged or aging infrastructure in developed countries (e.g., North America, Europe);
- Rehabilitation and Creation of new infrastructure in developing countries (e.g., Latin America, Africa, Asia); and
- Extensions of water infrastructure systems in the developed world.

The paradigm for the delivery of these services is shifting away from the traditional methods of public procurement. Alternative financing schemes have emerged to accommodate the paradigm shift in the appetite for risk and to take advantage of the comparative strengths that each party, public and private, brings to the infrastructure finance market.

Concurrently, there is increasing demand by investors for assets that provide steady, reliable and predictable cashflows with inflation adjusted returns, all of which are fundamental characteristics of infrastructure assets.

Boswell Capital Corporation
104 Avenue Road, 2nd Floor
Toronto, Ontario, M5R 2H3 CANADA
T: +1 416 962 0080
F: +1 416 962 0020
URL: www.boswellcapital.com

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"Water is an extremely rich investment theme. There is an increasing demand for water worldwide, but globally the water infrastructure is completely outdated.

Investors have largely overlooked the demand characteristics of water. Demand for water continues to increase at the rate of about 2 to 3 per cent per annum, or twice as fast as the world's population.

Water services are being privatized around the world. About 8 per cent of the World's water companies are currently in the private sector, a proportion that could double by 2015."[i]

Renewal of Aged and Rehabilitation of Badly Maintained Water Infrastructure

As is the case with other forms of infrastructure such as roads and bridges, water infrastructure systems in developed countries have generally been allowed to age with insufficient capital reinvestment to maintain their effectiveness and are deteriorating rapidly.

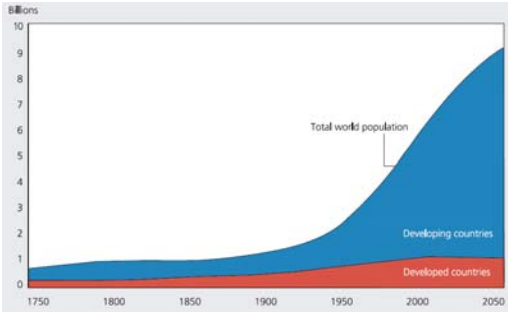
Readers are directed to http://watermainbreakclock.com which provides news and statistics for Canada and the United States with respect to the reactive efforts required to deal with, as the name suggests, watermain breaks; the frequency of breaks is directly linked to the age of the pipes, of course. This site estimates that there are 700 such breaks per day in these countries with an average repair bill of $4,000 per break; the resulting total is in excess of $2.8 million per day for watermain breaks alone.

Observations similar to the above can be made for allied components of water infrastructure systems as well as for public infrastructure systems in general.

Development of New Water Infrastructure

That the world's population has, and continues to, dramatically increase is old news.

However, with increasing population comes increasing demand for water and this unto itself makes a compelling case for a respectable business plan, but perhaps not a very exciting one in terms of investment gains. This assumes a constant relationship between population and demand rate of consumption per capita.



Source: The World Bank[ii]

Layer on the fact that there is a huge discrepancy between consumption patterns between more developed countries and the less developed countries with the former often consuming orders of magnitude more water than the latter. The rate of development of these less developed countries, particularly China and India, is increasing dramatically and along with improved economic conditions are shifts in consumption patterns. Greater industrialization and higher standards of living demand more water. The relationship between demand and population is therefore not constant but rather continually increasing at an increasing rate.

The demand side is thus illustrated. The supply side is concurrently compromised as a result of climate change and the pollution of water resources.

While the factors contributing to climate change continue to be debated, the fact remains that the average global temperature has been steadily increasing for the past century and weather patterns are becoming increasingly severe. The result is that centres such as Barcelona, a world-class city in a developed country, resorted to importing water via seaborne tankers to supplement its water supply this year. A similar and more pronounced effect of this increasing aridity is taking its toll on Cyprus whose reservoirs are all but empty and are also importing water by the same method.

With industrialization comes the generation of environmental pollutants which, if not properly managed, despoil water resources. China serves as such an example.

In summary, the demand for water is increasing while available supplies are decreasing. The business plan for water infrastructure investment takes on a

"Already, 2.8 billion people – or 44% of the world's population – live in areas of high water stress, according to a March report by the OECD. This figure is expected to rise to 3.9 billion by 2030 unless major new water-use policies are implemented. Much of the stress will occur in India, China, and other parts of the developing world, but water stress will also rise in more developed nations."[iii]

new light. New infrastructure will be required in both developing countries to satisfy the thirst of growing populations and changing consumption patterns, as well as in developed countries whose supplies, relative to their population, are in decline.

In response to the growing need for usable water, there have been significant improvements in water treatment technologies and, in particular, those used for desalination and water reuse. Organizations such as Global Water Intelligence (http://www.globalwaterintel.com) track desalination projects around the world, both planned and underway. They estimate that there are currently 13,000 desalination plants around the world and that this market will grow by 12% a year, and then accelerate.[iv]

Singapore is an excellent example of innovation in securing its water supply. Faced with a single supply source at the time of its independence from Malaysia, combined with often strained relations, it has embarked on an ambitious plan to diversify and augment its water supply sources to support its independent water status. This has been accomplished through desalination of sea water, the capture and treatment of urban runoff (in addition to protecting a large natural catchment area), as well as the treatment and reuse of wastewater (i.e., domestic sewage), some of which intentionally makes its way into the municipal supply for human consumption.

Israel is another example of where "necessity was the mother of invention." Companies from these nations are now very well positioned to address the world's water needs and to capitalize on the current market conditions that are expected to last for decades.

In addition to technological innovations relating to the production of potable water, other measures include demand management and leakage reduction.

With respect to demand management, in many jurisdictions around the world (including Canada), water has been under-priced. That is, the cost to the consumer has not historically reflected the full-cost pricing of the effort required to source, treat, transmit and distribute water using life-cycle economic analysis. The result is that the artificially low tariff encourages the excessive use of water; pricing should rather be used to provide the necessary signals that promote a more judicious use of this resource. The most effective pricing systems are those based on the volume consumed and, in order to measure such volumes, the necessary institutional and physical (e.g., meters) infrastructure is required. Many jurisdictions around the world are poorly metered if at all, and as the need to control demand increases, so will the projects in order to implement these systems. Education is also an important component in the battle against wasteful use.

Leakage, whether it be physical or administrative (e.g., illegal connections or faulty meters), is detrimental to the economic viability of any water utility. Furthermore, such problems are often the result of inappropriately low pricing (which limits resources available for operations and maintenance) as well as other inappropriate incentive structures amongst the parties involved.

Public-Private Partnerships

Following decades of implementation commencing largely under the influence of the Thatcher government in the United Kingdom, the provision of public water services has seen a progression from the public to the private domain, both representing far ends of the spectrum, and appear to be reaching an equilibrium in the form of public-private partnerships (PPPs or P3s).

Under this model, as the name suggests, an agreement is entered into between the public sector (e.g., a municipality) and a private sector consortium with the requisite technical and financial competencies to implement and operate such projects, while the public sector's involvement is appropriately shifted to

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Public-Private Partnerships are

"A contractual arrangement between a government entity (central or sub-national) and a private entity established for the purpose of providing an essential service or facility to the public…

(with the) Allocation of risks between the private and government entities based on each entity's ability to manage these risks and to provide rewards to each party based on the risks they have assumed."[v]

safeguarding the public interest.

In fact, such delivery models are hardly novel in Canada and other developed countries. For decades, Canada's population and industrial growth has been accommodated through the development of new housing, largely in new residential neighbourhoods (subdivisions). In such instances, private land developers subdivide land to create new communities including housing, parks, commercial and industrial land uses, all of which require new municipal infrastructure systems including, amongst others, water supply and sewage collection systems.

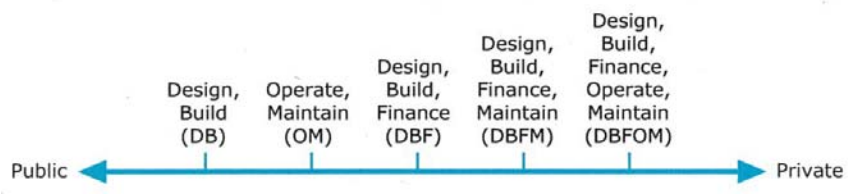
The arrangement works as follows:

- A developer builds roads complete with watermains and sewers ("municipal services") necessary for functioning in an urban or sub-urban environment.
- These municipal services are transferred to the municipality, subject to meeting design and performance specifications in addition to warranty periods.
- In exchange, the developer creates an "inventory" of building lots or blocks that can then be sold for profit.
- It's simple, and it has worked for many decades.

Larger scale systems, such as treatment plants, can fit a similar mould with the exception that the revenue stream required to make the project financially viable is tied into the tariffs charged for the water it produces. Furthermore, these models can and are expanded to include, in addition to capital construction, the operations and maintenance of these systems for relatively long time periods.

The above example is basically a form of a PPP approach which is commonly referred to as the DBF (Design-Build-Finance) model. In fact there are a number of variants of PPPs which can be applied and which depend on the characteristics surrounding the project to be delivered. The general principle guiding this process is that of best allocating risk to the relevant parties who are in the best position to accept and handle such risks.

A schematic representation of the spectrum of PPP project models is provided in the image below[vi]. The range reflects the varying degrees of risk assumed by either public and private sector.

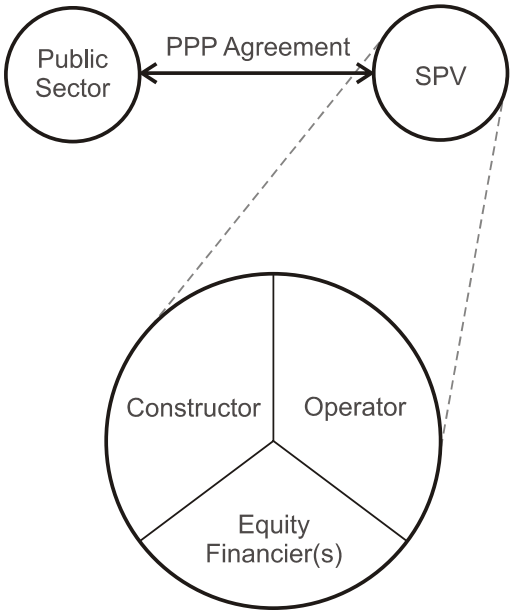


Typical PPP Model

In its simplest form, a public-private partnership consists of an agreement between a public sector agency responsible for the infrastructure service in question and a private sector entity, typically a consortium of private sector participants with the combined competencies necessary to deliver the service. Further, this consortium would formalize its existence through the creation of a Special Purpose Company or Special Purpose Vehicle (SPV) intended to deliver, as its sole *raison d'être*, the specific project.

In the case of a new infrastructure project, such as a desalination plant, a simple consortium might consist of:

- A construction contractor capable of building the plant.
- An operator to perform the ongoing operations and maintenance of the facility during the contract life.
- An equity financier (or syndicate of financiers) to provide at least a portion of the equity finance required.



It is noted that these lines should be perceived as "fuzzy" as the specific structuring of the SPV is customized to best suit the project needs. Moreover, it is conceivable that a single entity, depending on its size and competencies, may act as both contractor and operator. In fact, the contractor and operator may be provide some or all of the equity financing required for a particular project.

The balance of the financing is typically in the form of debt, however, the debt arrangements may differ from traditional construction financing in several respects. Perhaps the most important differentiating characteristic is that the debt is retired over a long duration, often matching the life of the PPP contract, rather than being the first money "out" of the project. In this manner, equity distributions are possible to the shareholders in the SPV, thus providing the necessary incentive to motivate these private sector participants.

The division between debt and equity varies and, generally speaking, is dependent on the perceived risk of the project, accounting for such factors as jurisdiction and political climate, among others. For instance, Canada is a relatively safe place to conduct business from the perspective of being able to rely on the government for payments accompanied by the legal framework to protect the participants and enforcement of contract provisions; in addition, the economy is very stable. As a result, PPP projects in Canada are often able to attract 90% or more of the financing required in the form of debt. Other jurisdictions in less stable parts of the world may see this number reduced to as low as 70% or 60%.

Aligning Incentives

The PPP model works to align the incentives of the parties required to deliver the necessary services, including the allocation of risks to the parties best suited to bear them.

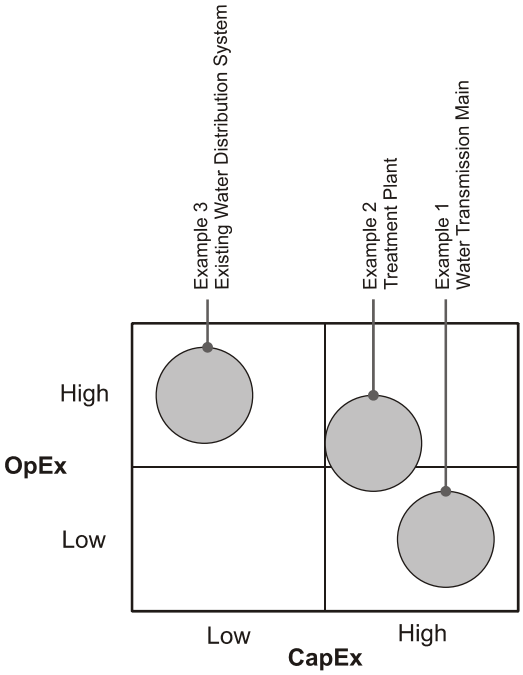
This is illustrated by way of the examples below.

Example 1 – Water Transmission Main (Piping) System

This example can be characterized as one whose investment profile consists of:

- High capital expenditure
- Low operations and maintenance costs

In such instances, it is important to have the contractor who builds the pipe do so in a manner that optimizes the life-cycle cost of the system. Furthermore, construction techniques and the quality of installation have a significant impact on the longevity of the piping system. In order to promote such behaviour, it is appropriate to ensure that the contractor is provided the appropriate incentives to install a pipeline to perform adequately during the design life (e.g., 25+ years). In a PPP model, this can be accomplished by ensuring that the contractor has an equity interest in the SPV such that its profits are generated, at least in part, during the life of the PPP contract which is set for a duration reflecting the nature of the project (e.g., 25 years). A contractor would thus be less inclined to "cut corners" as it would be detrimental to its investment



return.

In contrast, traditional public procurement methods generally require that the lowest bidder be awarded the contract and that the contractor's obligations expire following completion of the capital works in question plus a short warranty period of often one or two years. Despite inspection controls and penalties that might exist under these arrangements, there is an incentive on the part of the contractor to maximize profits by "cutting corners" and, in many cases, the resulting workmanship is such that the obligations are indeed met and the contractor is "off the hook" before more serious problems manifest themselves.

The operations and maintenance requirements of a transmission main are relatively small and, although important, demand less of a long term commitment (in terms of equity participation) from the operator.

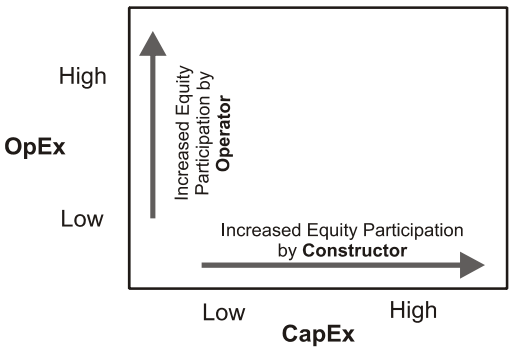
In summary, a PPP arrangement for this type of infrastructure should have a higher equity participation rate on the part of the construction contractor relative to the operator.

Example 2 – Treatment Plant

Whether it be a treatment plant to produce potable water from a freshwater source (as in Toronto), a desalination plant for similar purposes, a wastewater treatment plant or a water reuse facility, the characteristics of the investment profiles are generally similar and consist of:

- High capital expenditure
- High operations and maintenance costs

Following the rationale above (see Example 1), it can be said that the relative importance of the construction contractor and the facility operator are roughly similar and, as such, it would be appropriate for each of these participants to both hold significant equity stakes in the SPV to ensure that incentives are aligned with the public sector.



Example 3 – Existing Water Distribution System

The previous two examples are related to the development of new infrastructure, whereas this example focuses on assuming an existing system. Water distribution systems are typically very complicated and, given the varying ages of system elements (pipes, pumps, valves, etc.), varying materials and construction techniques, varying degrees of documentation and the spatially distributed nature of the system, are very difficult to package simply.

In general, it would be expected to encounter the following characteristics of the investment profile:

- Low capital expenditure, relative to
- Very high operations and maintenance costs

Clearly, the efficient delivery of service over a long term contract is closely and directly related to the quality of the asset and its management practices. This places significant emphasis on the operations and maintenance components and a lesser need for new construction. Accordingly, in order to align the interests of the private sector with that of the public sector, the equity interest of the operator should be relatively high. Such an arrangement prevents complacency and, more importantly, reduces political influence on the important decisions that need to be made to ensure that problems are not permitted to be deferred to future generations – such has been the case in North America for the past half-century or more and which has led to the current "infrastructure crisis" or "infrastructure deficit".

The point about mitigating political influence is an important one. Given that

politicians are typically elected on a 3-5 year cycle, and that votes can be attracted through the implementation of socially prominent and visible projects (e.g., parks, community centres, etc.), rather than the pipes, plants, pumps and valves that provide clean water and mitigate disease-causing sewage, it is clear how decision making with respect to infrastructure systems may be influenced. Out of sight, out of mind.

International funding agencies such as development banks and sophisticated private equity funds (e.g., pension funds, infrastructure funds) naturally place a higher risk premium on projects that do not have adequate mechanisms in place to minimize this political influence. It is therefore obvious that jurisdictions wishing to seriously improve their infrastructure should embrace structures that are appealing to funding institutions while fair to the public served by this infrastructure.

Where to Seek Investment Opportunities

Although the legal and regulatory frameworks are evolving in Canada and the U.S., adoption of PPP-type delivery models has been slow, likely due to the political sensitivity of private sector involvement in the provision of such essential services as potable water supply. Such political sensitivity is related to the health aspects of water supply, as well as issues related to the employment base (often in a union environment) which is currently responsible for the services. This market will likely grow out of necessity in the coming decades. The opportunities that exist now and in the near term are relatively few in relation to the number of potential private sector participants, thereby resulting in increased competition for these projects.

Also related to the impact of competitive forces on project economics for private sector participants, markets such as western Europe and the U.K. may be closer to saturation and are dominated by well-established large players who have ready access to secure equity and debt financing.

As well, the larger the projects, the more suitable they are to such larger players resulting in the crowding-out of capable, but smaller firms. This, however, may become less constraining if and as delivery models which include private sector participation (e.g., PPPs) become more widely accepted and quasi-standardized so as to permit smaller projects to be delivered in this manner. This would result in the opportunity for more contractors, operators and financiers to participate in this arena.

In terms of near-term opportunities, players should seek out developing countries whose water infrastructure is in more desperate need of either repair, assuming sufficient systems are already in place, or construction of new systems where the growing populations are vastly underserviced.

In fact, some countries are experiencing water losses which not uncommonly range from 30% to 60%. This is often referred to as non-revenue water or NRW and affects a utility's bottom line on two fronts: (i) it is costly to source, treat, transmit and distribute the water which becomes "lost"; and (ii) the utility is unable to generate revenues from tariffs on this "lost" water. Clearly, there is a win-win potential here for improving the level of water service to the population in question while providing sufficient incentive to the private sector to effect these improvements.

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"…governments will have to temper their value-added expectations somewhat, and will have to adapt their procurement processes to the current situation…

There is also a sense among central banks now that recession is a greater risk than inflation, which means core rates may be cut further. And central banks are intervening heavily to stimulate inter-bank lending, which should help keep down the rates that underpin P3 lending rates.

…some observers predict that once the worst of the liquidity crisis is over, debt capital flows to P3s may increase as part of a 'flight to quality' with investors attracted to the government-backed and tangible infrastructure assets."[vii]

Current Financial Situation

In light of the problems in the current financial markets, it is timely to discuss the potential impact they might have on investments in water infrastructure projects (and infrastructure projects in general) going forward.

The "credit crisis" has already led, and will likely continue to lead, to the restricted availability of capital in general and, in particular, debt financing. The result is that the cost of obtaining debt capital will increase through several forces, such as increased lending rates, decreased debt-to-equity ratios, or more restrictive conditions/covenants on the loans provided. As a result, a larger degree of equity will likely be required to fill any funding gaps. This speaks to the increased use of private sector participation in the delivery of projects.

Government treasuries are becoming increasingly strained and, in order to improve their competitive positioning on the global stage, will become leaner and more restrictive on their funding commitments. No government should see infrastructure deteriorate such that it impedes its country's growth through productivity. It may not have the resources to fully fund its infrastructure programs and accordingly will shift its political and regulatory framework to leverage its resources against those which are available in the private sector, sharing some of the benefits in exchange for some of the risk.

Concluding Remarks

It is evident that water is, and will continue to be for coming decades, an important sector which will demand investment. We expect to see increasing use of new and innovative technologies which will improve efficiencies in this sector. Moreover, we expect to see increased use of private sector resources, in terms of technology, expertise and finance.

Investors seeking to actively participate in this area must make investment decisions and, in order to do so, must access the requisite expertise, either internally or through external specialists. Furthermore, the required expertise that is much more than purely financial, but also includes the technical and operational aspects fundamental to these projects. The required networks include relationships with engineers, contractors and operators as well as with technical agencies of governments (e.g., Ministries of Public Works or equivalent) of the jurisdictions in which their projects lie.

Future notes will delve more deeply into several of the topics broadly touched upon in this report, including matters such as public-private partnership arrangements, performance based contracts, regional and/or country-specific opportunities and analyses, and other subjects of related interest.

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References

[i] Hans Peter Portner (Pictet Asset Management) in "New fund targets 'overlooked' water sector", Infrastructure Journal (IJ Online), 23 April 2008.

[ii] The World Bank, "Beyond Economic Growth: An Introduction to Sustainable Development", Second Edition, 2004.

[iii] Scully, V., "Desalination, for a World Short of Water", Business Week, 21 May 2008.

[iv] "Desalination the solution?", The Age, 17 May 2008.

[v] Jan G. Janssens, "Experiences in Public-Private Partnerships (PPP) and Build-Operate-Transfer (BOT) in the Water Sector", Presentation to the Ministry of Energy, National Water and Wastewater Engineering Company (NWWEC), Islamic Republic of Iran, December 2008.

[vi] DBRS, "Methodology: Rating Canadian Public-Private Partnerships", January 2007

[vii] The Canadian Council for Public-Private Partnerships, "A Matter of Time: Will the Credit Crisis Impact Canadian P3s?", November 2008.

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