The Governance Brief

Infrastructure Asset Management: Can the Canadian Municipal Experience Help Inform Better Practices in Southeast Asia?

By Murray Jamer

The Infrastructure Deficit: A Municipal Perspective

Local government units (LGUs) everywhere are struggling with how to meet increasing demands for municipal services ranging from policing to recreation to the maintenance of roads, often with budgets that are not keeping pace with these demands. With the tough competition for the available funding from taxes and other fees, it is sometimes difficult for LGUs to allocate enough resources for proper management of their infrastructure assets. In Canada, this issue is exacerbated because a significant portion of the LGU infrastructure has deteriorated so much that it needs to be replaced. Since Canada is a relatively “young” country, its LGUs have been allocating a large portion of their budgets for building new infrastructure and maintaining existing infrastructure, and not for its replacement. Finding additional funding to meet replacement needs is difficult.

The Government of Canada has recognized the existence of a funding deficit and the importance of LGU infrastructure. In recent years, the government has identified programs to address the funding shortfall. The Building Canada Fund was established for LGU infrastructure, providing funding with one third coming from the Government of Canada, one third from the provinces, and one third from LGUs. The federal government has also agreed to make a portion of the federal Gas Tax Fund (GTF) available for LGUs to help their infrastructure funding. The Building Canada program will see an investment of Can$14 billion for LGU infrastructure over a 10-year period. The current GTF that has been allocated to LGUs for municipal infrastructure totals Can$2 billion per year. The funding is a long-term commitment.

While the municipalities and the Federation of Canadian Municipalities are not entirely satisfied with the federal government steps to improve municipal infrastructure and help close the funding gap, the funding from the GTF and the Building Canada Fund are important investments. LGUs should and do provide the majority of the funding for local infrastructure. The federal government contributions to local infrastructure are in recognition of the fact that local government revenues have not kept pace with infrastructure costs. Although most LGUs have accepted that government subsidies are necessary as a means to “catch up” on infrastructure deficits, LGUs are still in the best position to know where and how the

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infrastructure funding should be spent. In this regard, LGUs typically prefer the principles associated with the GTF, compared with other funding programs, since LGUs are given more authority to identify the projects under the GTF program.

The Federation of Canadian Municipalities has identified that, although LGUs receive only 8% of Canada’s total government revenue (with the remaining revenue going to the provinces or the federal government), LGUs are responsible for more than 52% of the infrastructure assets resulting in what is known as a sizable vertical imbalance. The 2012 Canadian Infrastructure Report Card identified that 30% of municipal infrastructure is in fair or very poor condition. According to the assessment, the replacement value of the infrastructure in these categories (fair to very poor) is estimated to be Can$172 billion. Additionally, Canada is experiencing the same urbanization trend as other LGUs in the world, so the pressure on local infrastructure, to serve this growing population, is increasing.

It may seem that managing the local government infrastructure is a daunting, almost impossible task. However, there have been some positive developments recently, and those may offer some lessons to LGUs across emerging economies in Southeast Asia.

The Foundation for Asset Management

In Canada, a significant development in managing infrastructure assets in LGUs has been the Public Sector Accounting Board (PSAB) regulation 3150. This regulation stipulates that, after 1 January 2009, LGUs must account for their tangible capital assets on their financial statements. LGUs following PSAB 3150 find it an excellent foundation for a comprehensive asset management program. To be PSAB 3150 compliant, LGUs must know their assets, the value of the assets, and the remaining life of the assets. This knowledge makes it possible to identify an overall infrastructure deficit, if any, and to develop long-range plans to address that deficit.

LGUs typically own a significant and diverse number of assets. Improved geographic information systems and asset management tracking software are making it easier for LGUs to manage them. Put simply, LGUs that know their assets well generally have better asset management programs.

Governments at the national, provincial, and local levels in Canada are beginning to recognize the role of public–private partnerships (PPPs) in addressing LGU infrastructure issues. PPPs can often bring innovation and efficiency not usually seen in traditional contracting arrangements. PPPs are not the answer in every case, but they are being considered as an option. The Government of Canada is encouraging PPPs through incentive programs and requiring PPP “screening” for federal government funding beyond established thresholds. Any project with eligible costs in excess of Can$100 million must undergo a PPP screening, and, if the screening indicates that a PPP would produce better value for money, then the federal government funding is contingent on a PPP solution. In these cases, funding of up to 25% is available from the government.

The Experience of the City of Fredericton with Asset Management

The city of Fredericton, the capital of the province of New Brunswick in the eastern part of Canada, is an example of a municipality or LGU that focuses on asset management as a key component of a long-term financial plan for sustainability. Fredericton has a population of 56,000 (with more than 100,000 in the Greater Fredericton region). It is known as a “smart” city because of its two universities and its thriving engineering and technology sectors. In recent years, it has taken significant steps to improve its asset management program as an important tool for the city’s decision makers.

For decades, the city of Fredericton has had a reputation of paying attention to its infrastructure. Its water system produces safe, reliable water, and the wastewater system meets all standards established by the regulators. Its road systems, municipal buildings, and recreational infrastructure are all in relatively good shape compared with other LGUs in New Brunswick. However, the Fredericton City Council and staff recognized that the city had no comprehensive system for accounting for capital assets or for prioritizing capital investments in infrastructure. While Fredericton had an infrastructure renewal program for replacing worn assets, there was no information about the total value of the infrastructure assets or the extent of the deficit (the value of the assets that still existed after they should have been replaced).

The city of Fredericton began to put together its formal asset management system in 2005. At that time, it was implementing ISO 9001 as a way to provide a quality management framework for the municipal organization. It became ISO-certified
in 2007 and again in 2010. While it has chosen not to retain its ISO certification (preferring to move ahead with other management tools such as Lean Six Sigma), the ISO exercise created discipline in city staff, as it was necessary to document all the city’s work processes according to the strict ISO standards. This documentation became a good foundation for a more formal asset management system.

Perhaps the most significant step in overall asset management came with the city’s adoption of PSAB 3150 in 2009. Becoming compliant with PSAB 3150 was not easy and required considerable time commitment from the staff in all departments. The first task was to do an initial valuation of all of the city’s tangible capital assets, such as water and sewer piping, water treatment plants, wastewater treatment plants, water and sewer pumping stations, municipal buildings including police and fire stations, recreational buildings, roads, and other municipal assets.

The initial valuation required the staff to determine the size and location of all assets, the year the assets were built, and the initial capital cost. Because some infrastructure assets were old (more than 100 years old), costing and other information was not always available. In cases where there were gaps in cost information, it was sometimes necessary to “work backward” by establishing what it would cost if a particular asset were built today, and by estimating what the cost would have been 50 years ago, for example. In some instances where records did not exist, it was also necessary to estimate the date that a particular asset was built. After the initial valuation of all assets, the staff determined the life cycles for each asset group.

Whereas some water pipes, for example, may last for 80 years, concrete sidewalks generally last for 40 years only.

With the initial valuation and the life cycles of each asset, it was possible to arrive at the current residual value of each asset. With this data, the city’s financial statements could now include the value of all of the city’s tangible capital assets. Prior to this, the city might have estimated the value of its capital assets, but the assets had never been shown on the financial statements. In 2009, The city of Fredericton became the first “PSAB–compliant” LGU in New Brunswick.

It was possible for the city of Fredericton to migrate to a proper asset management program using internal staff resources supplemented with consultant expertise as necessary. For instance, a consultant was hired to help in identifying the initial valuation and life cycle of each asset. Different departments may manage various assets, but the Department of Finance has taken the lead for a more formal asset management program by creating the comprehensive database of all municipal assets. The department is responsible for updating the database as assets are replaced or eliminated. It also identifies an overall capital replacement budget based on assets that are at the end of their life cycle. The department then allocates, upon the approval of the city council, the available funding to the various departments, based on assets that must be replaced and on the rules for allocating a portion of the overall capital budget for asset replacement (as opposed to the construction of new assets). All departments review the capital budget and reach consensus before the budget is taken to the
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The Benefits of Better Asset Management

There were many benefits of having a complete understanding of all infrastructure assets and having these assets shown in the city’s financial plans. First, the city was able to identify the total value of its infrastructure assets, as well as its deficit. With assets totaling more than Can$1 billion, the deficit was estimated to be Can$180 million in 2009 (Can$130 million for water and sewer assets and Can$50 million for all other assets). This did not necessarily mean that the assets were completely worn out or that they could no longer be considered safe; it meant that the city needed a more aggressive infrastructure investment plan to lower the deficit.

With knowledge of its infrastructure deficit, the city’s Department of Finance created a long-term financial plan, with asset management as a key part of this plan. The rationale was that, to be sustainable in the long term, the city must spend enough to address the deficit and to keep the infrastructure from failing. The long-term financial plan recommended a strategy for increasing infrastructure spending and decreasing the infrastructure deficit. The Fredericton City Council approved the long-term financial plan for non water and sewer assets in 2010 and a similar long-term plan for water and sewer infrastructure in 2013. Included in these plans were provisions to allocate a significant portion of capital spending for infrastructure renewal as opposed to the creation of new infrastructure. The plans called for 90% of water and sewer funding and 75% of all other infrastructure funding to be allocated for renewal.

The long-term plans recognized that an LGU would want to create new infrastructure, either to enable economic development or to improve the quality of life of residents. The long-term plans identified when it would be possible to fund new infrastructure and prioritized new infrastructure investments based on master plans.

Another benefit of the move to a more formal system of asset management in Fredericton has been the improved communication with the public about infrastructure spending. The public seems willing to accept higher user rates (in the case of water and sewer spending) if they understand why the spending is necessary and if dramatic rate increases (“rate shock”) can be avoided in the future by properly addressing infrastructure asset issues. The city can communicate to the public the reason why a major new investment, for example, is not currently possible. The public can also take comfort in the knowledge that the municipal infrastructure will be well maintained and that they can rely on safe, quality infrastructure.

The city of Fredericton has been able to take advantage of the government’s funding programs. Recognizing that the infrastructure deficit is greater with water and sewer assets than with streets and recreation assets, the city council voted to allocate all of the GTF received for the next 10 years (approximately Can$40 million) for water and sewer infrastructure renewal. The city will also be making application for significant funding from the Building Canada Fund. To justify funding requests, the city will use the information from the asset management system.

Asset management means that decisions in the LGU can be fact-based. The city council can make funding allocation decisions based on hard facts. The staff can evaluate competing priorities and make better recommendations to the city council on where infrastructure funding should be spent. Also, by having a clear understanding of asset condition, it is often possible to save significant money. Rehabilitating a street, for instance, may cost 5-7 times more than building a new one if the deterioration is such that a simple paving job is not enough to restore it to an acceptable condition. The city now plans to pave streets at the right time to prevent further deterioration and to save money.

With an asset management system, infrastructure expenditures can be established according to the life cycle of a particular asset. By knowing the total value of assets and their life cycles, an LGU is able to set an overall capital requirement for infrastructure renewal. An LGU has a sustainable asset management program if there is sufficient funding to maintain the assets throughout their life cycles and then replace them as they reach the end of their useful life. All infrastructure assets have a life cycle, and they are targeted for replacement at the end of that life cycle. However, replacement can be done before or after the end of the life cycle if required, based on inspection. Each asset is inspected on a regular basis to determine its ongoing serviceability.
The formal asset management plan in the city of Fredericton has also resulted in better planning of asset maintenance and better project coordination among various departments. Asset management has resulted in cost savings and will play a big role in achieving a sustainable future at an affordable cost.

Managing assets in LGUs is not a one-time event but an ongoing process. Assets must be maintained and eventually replaced as they age. As noted in the introduction to this article, there has recently been more focus on infrastructure assets in the local government, and there have been positive steps in addressing infrastructure needs. It is difficult to predict the future, but it seems very likely that asset management will become even more important for LGUs as existing infrastructures continue to age. Will asset management become a prerequisite for municipalities to receive infrastructure funding from the provinces and the Government of Canada? Will there be even more recognition of the role of PPPs in providing municipal infrastructure? These questions remain to be answered, but it is clear that smart LGUs will continue to improve their infrastructure asset management systems.

It should also be noted that an asset management program is not the only program an LGU needs to properly manage its assets. An LGU must also have design specifications and standards for infrastructure. Sometimes an LGU develops its own specifications and standards, and sometimes it refers to the best practices established by regulators or professional bodies. There are various links among asset management, service provision, and resilience of infrastructure. Assets that are properly designed and built can be assigned longer life cycles. For example, the city of Fredericton has some water pipes that, due to the poor quality of piping material, have not lasted as long as the good-quality pipes installed many years before. Also, sustainable funding established by an asset management system can ensure that assets are replaced at the appropriate time and are able to perform as intended even under stress.

The regulatory agencies, specifically the Government of Canada and the provinces, establish the adequacy of various municipal infrastructure elements. Regulations include the National Building Code of Canada (buildings), the Guidelines for Canadian Drinking Water Quality (water), and the Canada-wide Strategy for the Management of Municipal Wastewater (wastewater). Two factors that contribute to the infrastructure asset performing as intended during construction are the level of maintenance and whether the asset was replaced at the end of its life cycle. The assets of LGUs with a proper asset management program would provide better service and be more resilient during a disaster.

The city of Fredericton carries out a “Citizen Attitude Survey” every 2 years to determine public satisfaction with service provision. In terms of the city’s physical assets, the survey has found that public satisfaction is usually related to whether the assets are properly maintained, whether they are replaced at the end of their life cycle, and whether they meet the standards established by the regulators.

Asset Management in Southeast Asia

Field observations in Southeast Asia (Indonesia, the Philippines, and Viet Nam) in 2014 indicate that their LGUs are experiencing many of the same issues as their counterparts in Canada. Comprehensive asset management systems and overall long-term plans to address infrastructure deficits do not seem to be in place, particularly in small and medium-sized LGUs. Without a clear plan for managing infrastructure assets, it is difficult to prioritize investments and identify “bankable” infrastructure projects that would attract funding from the government or the private sector. Governments that recognize the importance of LGUs as economic “engines” will have to begin addressing infrastructure issues at the local level.

With the rapid urbanization in Southeast Asia, coupled with a rising infrastructure deficit, the time is right for LGUs to move to a comprehensive asset management system.

LGUs in Southeast Asia would experience many of the same benefits as LGUs in Canada if they were to adopt comprehensive asset management systems. The principles underlying asset management are always the same, and the systems and approaches can be scaled to suit different realities and needs. LGUs in Asia will face the same infrastructure deficit crisis that LGUs in North America are currently facing and will continue to face. In some aspects, the challenge across many municipalities in Asia is deeper because of a continuing net flow of migration from the rural to urban centers, placing further pressure on stretched infrastructure. If LGUs implement proper asset management programs, they will be able to avoid higher costs and unsustainable futures. They will also be able to better address quality of life issues for their residents and create economic development opportunities.
Like many LGUs in Canada, LGUs in Southeast Asia in 2014 are more focused on creating new infrastructure than on replacing existing infrastructure that is beyond its useful life. This is probably because politicians often want to be seen as creating something new rather than just maintaining what already exists. Knowledge is the key to overcoming this enthusiasm for new infrastructure. If an LGU has a complete understanding of its assets and their condition, then it becomes clear where the available resources should be directed. Before the city of Fredericton knew the extent of its assets, there were no rules about the portion of the city’s capital funding going to new versus old infrastructure. Now, these rules are in place. In the city’s Water and Sewer Fund, 90% of the capital program must be directed to renewal; in the General Fund (roads, buildings, etc.), 75% of the funding must be directed to renewal. The knowledge of its assets led the city to establish rules to lessen the infrastructure deficit; without that knowledge, the city would be more likely to invest in new infrastructure at the expense of the existing infrastructure.

Asset management provides a balancing reference point, helping LGUs to prioritize infrastructure investments and determine funding shortfalls. Through proper asset management of infrastructure, LGUs would become more transparent in making major funding decisions. The ability to articulate funding shortfalls and identify funding priorities will also make them better able to attract funding from external sources. They will be in a better position to attract investment in LGU infrastructure through PPPs. By making the right decisions, they would save significant money.

A major weakness in LGUs in Indonesia, the Philippines, and Viet Nam is the lack of coordination in the construction and maintenance of municipal infrastructure assets. This lack of coordination may be within various departments of one LGU or between an LGU and another level of government (for example, a provincial or national government). Asset management clarifies the true costs of infrastructure assets and identifies the agency responsible for a particular asset.

While there are similarities between LGUs in Canada and Southeast Asia, there are also differences when it comes to implementing asset management. LGUs in Southeast Asia appear to be not as advanced in geographic information systems as their counterparts in Canada, and their infrastructure records are not as good. Estimating the initial valuation of infrastructure assets would be more difficult without good records and record-keeping tools. Initially, it may be necessary to make some educated “guesses,” but eventually the information in the asset management system would become more accurate. Moreover, LGUs in Canada usually have significantly more financial resources for asset management and more capacity at the staff level to implement an appropriate asset management system.

Another difference is that LGUs in Canada appear to be more advanced in the development of water and wastewater treatment systems. In Canada, it is expected that LGUs have safe drinking water (even from the tap) and that wastewater receives at least secondary treatment. Provinces, as regulators for water and wastewater, have adopted the Guidelines for Canadian Drinking Water Quality and the Canada-wide Strategy for the Management of Municipal Wastewater Effluent. Although not all LGUs in Canada currently meet the national guidelines for wastewater treatment, dates are set for compliance with this regulation.

The province of New Brunswick (as regulator) establishes a certificate of approval to operate for both water and wastewater operations in LGUs. The city of Fredericton must receive a certificate of approval for both. The main reason that Canadian cities generally have more advanced water and wastewater systems than Southeast Asian cities is because the national government and the provincial governments of Canada have taken a leadership role in this regard. As LGUs in Southeast Asia spend resources to develop more advanced municipal systems, their infrastructure budgets will become further strained. This is another reason why it is beneficial to move ahead with asset management.

Canada and Southeast Asian countries are both experiencing severe weather conditions as a result of climate change. To mitigate the impacts of climate change, it will be necessary to make changes to infrastructure design standards and improve existing infrastructure to meet these standards. It will also be necessary to know the location and the condition of key infrastructure. This is another reason why asset management is so important. Finally, LGUs must also have a solid plan for maintaining existing infrastructure and creating new infrastructure that will respond to the needs of their citizens.
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