

**Laying Down the
Infrastructure Concept
By: Joe the Investor**

Exclusive Online Article

**BENEFITS AND PENSIONS
MONITOR**

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Investment

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There is much anticipation over the money being pledged to renew aging infrastructure, and, in some cases, expanding it throughout North America. Much of the anticipation focuses on private building and/or operation. Prevalent examples include highways, airports, schools, and bridges or municipal works such as sewage and water works. So, how does this work exactly?

One possible analogy that can be used to understand how the infrastructure concept works is by using a house as the infrastructure asset. The mortgage and house expenses are the financing and operating costs of the asset respectively. The purchase price of a house is equivalent to the building cost of a highway. If cash is paid for the house, and the house lists for \$300,000, then the single payment would be \$300,000. Since it is a house, there are also expenses each year such as heat, electricity, water and taxes. Assume that these expenses amount to \$10,000 per year every year for 30 years. Thirty years is a conservative assumption since these projects can be very long term, in the neighbourhood of 50 years or more.

Even if contracts don't extend that far, they can be renewed if the asset still generates value. Not looking at inflation, or changes in these annual costs, this house would cost $\$300,000 + 30 \times \$10,000$ which is \$600,000. At this point, the house is no longer in use.

Annual Expenses

For a highway, the annual expenses would represent the paving, guard rails, lighting, bridge repairs, and any other work that is considered maintenance – it is consistent and ongoing.

What if money is borrowed to buy the house? In this case, there will be no cash up front, but principle is paid later, with interest. For this \$300,000 house, the full amount will be paid back as principle over the 30-year time horizon. The same expenses of \$10,000 per year will also exist because it is the same house. There is one additional expense – the interest. A typical mortgage today will have a rate of about five per cent. For infrastructure deals, this mortgage rate is equivalent to the rate of return demanded for the highway. This rate of return averages between 12 and 16 per cent¹ or 17 per cent according to Infrastructure Canada.² Since the financing rate for infrastructure can fluctuate due to market volatility, 10 per cent will be used as a conservative approximation for the applicable return. With a 10 per cent interest rate, the interest payment would be $\$300,000 \times 0.1 = \$30,000$ per year. If the annual expenses of \$10,000 are added to this, the total will be \$40,000 per year. Over the lifespan of the house, $\$40,000 \times 30 \text{ years} + \$300,000 = \$1,500,000$. The price of the house in cash is \$600,000. If the cash flows are discounted to the present in order to account for the time factor of the investment, the value of the project would be \$471,346 versus \$394,269 for a cash purchase example. The assumptions include a 10 per cent discount rate and an evenly distributed principle repayment over the 30-year period.

More Efficient

What about the argument that the private sector tends to be more efficient at running these projects? The model can be further refined. As an example, if the house built by a private firm now costs \$200,000; the initial cost will be cheaper. This represents a 33 per cent drop in the building costs, which is noticeable.³ If the annual expenses of \$10,000 are also assumed to be inefficient, this can be reduced by about 30 per cent per year. These costs would be \$7,000 per year instead of \$10,000 per year.³ Recalculating the total cost for this house, it would be $\$200,000 + (30 \times \$200,000) \times 0.1 + 30 \times \$7,000 = \$200,000 + \$600,000 + \$210,000 = \$1,010,000$. The original house still costs \$600,000. The discounted value for this scenario is \$411,465 using the same method and substituting lower annual expenses. Also keep in mind that these numbers are all conservative, meaning that in reality, 30 per cent in cost savings may not happen and the interest rate can be much higher, resulting in a total many times higher than this one.

This model assumes that the asset already exists and it would be transferred to a contractor. What if the house has to be built and it takes years? The concept remains the same. There would be a delay in incurring the operating costs and there may be interest built into the cost of building the infrastructure itself. The interest payments after the asset is built would be similar to the situation of an existing asset. The operating costs would also be the same once the project is built.

What if the private-public partnership did not result in cost savings, but rather higher expenses? The model results would show a different picture.

Money Flow

So, what does all this mean? The analogy of a house representing an infrastructure investment is designed to show how the composition of the money flow changes from a public-only system to a public-private system. If cash is not available upfront, the borrowing scenario is advantageous. If cash is available, the public scenario may be more attractive. There is also no assumption as to where the money will flow after it reaches the private company. This money may be shared with users of the system, the government, or other private arrangements. Perhaps there will be gains that are not quantifiable that may come into the situation, or perhaps losses? Understanding the workings of this model will create more knowledge for better decisions regarding infrastructure in the future.

Joe the Investor is Joe Barbieri, a CFA. The views expressed in the article are strictly the views of the author."

1. Alternative Investments For Institutional Investors, Mindpath, Fengate Capital Management Presentation.
2. Beauchesne, Eric. "Infrastructure Pays Off," Canwest News Service, April 15, 2008.
3. According to the Alternatives Conference, the expected cost savings for the Private Public Partnership is approximately 20 per cent which includes all costs (financing and operation) and includes a concept called risk transfer ... (Alternative Investments For Institutional Investors, Mindpath, Fengate Capital Management Presentation). This makes 33 per cent a conservative number.
4. Infrastructure Canada, Government of Canada. Research and Analysis Division, August 2006.