

# The Power of Prices and the Failure of Markets

## *Addressing Edmonton's Environmental and Fiscal Challenges*

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### About David Thompson

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### Abstract

Edmonton is addressing many environmental issues, but is failing to rein in sprawl and its significant health, environmental and economic costs. Like other environmental problems, sprawl results from rational economic decisions. Attempts to rein in sprawl will continue to fail as long as market prices encourage it. Fortunately, prices can be adjusted to provide an incentive to denser urban development. Environmental pricing reform policies, some of which are briefly outlined in this paper, can be employed by Edmonton to recruit the power of the market to rein in sprawl and address other environmental issues.

# Discussion Paper

## Introduction: Key Challenges for Edmonton

Like any city, Edmonton faces environmental challenges related to land, water, air quality, energy use, and more. Edmonton is managing well in many of these areas, e.g. good sewage treatment, recycling and composting systems.

However, a very serious environmental challenge that Edmonton is not managing well is suburban sprawl.<sup>2</sup> Edmonton is among the most sprawling cities in North America, and sprawl creates a number of related problems:<sup>3</sup>

- Sprawl locks in automobile dependency, with resulting higher levels of emissions, traffic congestion and crashes, and environmental, economic and health costs.
- Sprawl makes transit less feasible, as it hinders efficient and cost-effective movement of riders.
- In the long run, sprawl commits government to expanded “legacy” costs of maintenance, repair and replacement of infrastructure – roads, utilities, schools, etc.
- Sprawl causes a hollowing-out of established neighbourhoods, resulting in school closures, an underperforming urban core, and derelict central lands.
- Sprawl eats up agricultural land, making residents more dependent on imported food.
- Sprawl encourages sedentary lifestyles, which contribute to obesity, diabetes, heart disease and higher health-care costs.
- As the age of cheap oil passes, sprawl creates financial risks for suburban homeowners, whose motoring costs go up while properties lose value.

In addition, the City of Edmonton faces fiscal challenges. Like other cities, it is heavily dependent on property taxes, which are not responsive to income (revenues don't automatically increase with a growing economy, the way income taxes do) and are regressive at the low end of the income scale. Furthermore, as other orders of government now face deficits, city governments could be facing constrained or even reduced fiscal support, and perhaps a return to downloading of unfunded program responsibilities. And although Edmontonians strongly prefer tax increases over cuts to services in order to balance the budget, property taxes are the least supported option for generating additional revenues.<sup>4</sup>

While this document uses the example of sprawl, its larger intent is to suggest a way of analyzing environmental and fiscal challenges: consider the economic incentives that drive behaviour, and how those incentives might be changed.

## The Power of Prices and the Failure of Markets

Sprawl, like other environmental problems, is the result of countless economic decisions made over time by firms and individuals. The firms and individuals involved don't want to cause environmental harm;<sup>5</sup> they are simply responding rationally to existing price signals. Prices often are lower for goods and services that cause environmental harm, and higher for green options. This price discount is often artificially created by externalities (see Externalities, below). This artificial discount results in excessive consumption of those goods and activities, and thus excessive environmental harm.

Housing is no exception; living on the edge of town is often cheaper per square foot of housing than living within town. And as long as that is the case - as long as financial incentives pull people to the edges - the suburbs will continue to sprawl. And thus municipal planning, education and other efforts to reduce sprawl will continue to fail.

### Externalities

In a 'normal' exchange in the marketplace, the full costs of producing a good or service are included in the price.

The problem is that for some goods and services, the market price doesn't tell the full truth; it omits the environmental costs. An example is a factory producing widgets or thneeds,<sup>6</sup> and also releasing smoke that causes illness to neighbours. The costs of ill health are not included in the price of the widgets, but those costs are real. Such costs are externalized from the market transaction, and termed "externalities." Such market failures create economic inefficiency and reduce real wealth.

Governments should and do take steps to reduce and eliminate externalities. Often they do so by regulation (e.g. limits on emissions). Another way governments address externalities is by adjusting market prices to take externalities into account - through a charge, user fee, or tax. This provides a financial incentive on the producer to clean up the externality.

Pollution is a negative externality, but some externalities are positive, e.g. education and health care, which provide benefits not only to the individual involved but also to others, like employers. In such cases, the appropriate pricing adjustment is subsidy (i.e. publicly-funded education and health care).

The fact that existing price structures contribute to sprawl is not all bad news. Indeed, it holds the key to reducing sprawl: by changing the pricing structures that contribute to sprawl, we can help rein it in.

Prices are powerful motivators for both profit-maximizing firms and expense-minimizing individuals. The economics are simple: when the price of a thing goes up, less of it is purchased; when the price goes down, more is purchased. Simply put, prices steer behaviour.

Prices can be changed by government in order to boost or reduce the purchase of various things. This is quite common - e.g. RSP tax incentives that boost retirement savings, or tobacco taxes that (very effectively) reduce teen smoking. In addition to retirement planning and health promotion, price adjustments can be carried out in order to reward and incentivize decisions that benefit the environment.

If we actually want to *achieve* our green goals, like reining in sprawl, then it makes a lot of sense to align market prices with those goals. When prices are pulling in the same direction as municipal planning and other efforts to reduce sprawl, those efforts are far more likely to succeed. It's also fairer; after all why should those who want to do the right thing be financially penalized for it?

*"Where people choose to live (in the city core, existing suburbs or new greenfield suburbs), the types of buildings they live in, where businesspeople choose to locate their businesses ... [these decisions] are all highly influenced by price."*  
- National Round Table on the Environment and the Economy<sup>7</sup>

This process of orienting market incentives in a green direction is termed Environmental Pricing Reform (EPR).<sup>8</sup> Municipal governments can employ EPR tools to alter the pricing structure in a wide range of areas, such as:

- Waste disposal - sewage and solid waste charges
- Transportation - road user fees, parking fees, transit subsidies
- Land use - development, construction and ownership cost adjustments
- Utilities - time-of-use billing for water and electricity

If Edmonton adopts comprehensive EPR, it can turn a powerful force - market prices - toward achieving its environmental goals, including the goal of reining in sprawl. EPR can also, incidentally, help Edmonton diversify its revenue streams and reduce its heavy reliance on property taxes.

EPR policy instruments need to be designed wisely, of course. They need to be effective (benefit the environment), efficient (cost-effective), and equitable (progressive, and not harmful to those of modest incomes).

## EPR Incentives to Address Sprawl

Sprawl can be reduced by adjusting a number of financial incentives. Some such adjustments require regional or provincial co-operation, and others can be undertaken unilaterally by the City (see Regional and Provincial Co-operation, below). This paper briefly discusses some of these incentives in two areas: land use and transportation.

### Land Use Incentives

As noted earlier, on a per-square-foot basis, it's cheaper to build and live in the suburbs. This pricing disparity provides a powerful incentive for sprawl. There are several EPR tools that municipalities can employ to adjust these incentives and help rein in sprawl. This section quickly considers two - property development charges and property tax rates.

#### *Property Development*

Development cost charges are fees levied on new developments to help fund the costs that those developments impose on a city. These costs (e.g. costs of roads and utilities) can vary significantly depending on the location of the development and the distance to the nearest point of connection to existing infrastructure. Typically, development within a serviced area will cost less than development on a "greenfield" site where no services previously existed.

Some cities charge flat rates based on number of residential units or square footage, irrespective of location or costs of servicing. Clearly this does not reflect the financial costs that the city faces, let alone the environmental costs of sprawl noted earlier.

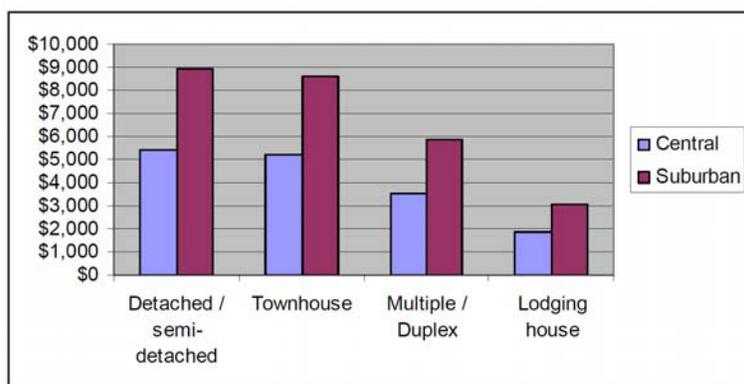
Just as a city can re-structure its rates to serve other objectives (e.g. development of affordable housing<sup>9</sup>), it can do so to reward denser development, re-development of brownfield<sup>10</sup> and greyfield sites, and development closer to the City centre and transit. Currently, some of Edmonton's rates are simply flat or based on square footage,<sup>11</sup> or are per-

hectare,<sup>12</sup> or per-dwelling<sup>13</sup> rates that don't vary according to proximity to the city centre or existing infrastructure. Other cities do vary rates by location (see below).

### Kitchener's Development Cost Charges

The City of Kitchener has set lower development cost charges for denser development, and also for development in central neighbourhoods as compared to suburban neighbourhoods. Compared to central charges, suburban charges are 66% higher across all building types. This provides an incentive to build more densely and in the central part of town.

**Figure: Kitchener residential DCC rates by type and location**



Data: City of Kitchener. Figure: Thompson and Bevan, "Smart Budget".<sup>14</sup>

### Property Ownership

Edmonton's residential property taxes are based on market values. Because city-fringe land is cheap compared to central land, this results in lower property taxes in the suburbs, and thus another incentive for sprawl. Adjusting the rates to increase taxes in far-flung areas, and reduce them in the city centre, would encourage re-development of brownfield and greyfield sites, help revitalize Edmonton's underused central areas, and reduce sprawl.

Similarly, adding a density-based component to property taxes would allow the property tax to be higher for low-density developments, and lower for high-density developments. Currently, Edmonton's property tax rate for multi-family dwellings is 15% higher than the rate for single-family dwellings.<sup>15</sup> Adjusting tax rates downward for denser, multi-family dwellings, and upwards for single-family dwellings would help reduce sprawl.

### Transportation Incentives

While land-use prices directly affect the incentive to sprawl, transportation prices can also provide a strong incentive. Unfortunately, current transportation prices are distorted by a range of subsidies that make it artificially cheap to drive automobiles to and from the suburbs, thus contributing to sprawl.

This section<sup>16</sup> quickly considers a few of the many options available to change the overall suite of incentives: road pricing; fuel taxes; and transit subsidies.

### Road Pricing

Drivers pay nothing to use roads in Edmonton. Being able to drive from the suburban fringes to the downtown core, without paying for the use of the roads along the way, constitutes a significant subsidy to suburban road users. This subsidy artificially encourages businesses and homes to relocate to the suburbs.

#### The true costs of roads: fuel taxes don't cover them

There are two elements of road costs. First are the financial costs - the costs of building and maintaining roads. Fuel taxes generally fail to cover even these costs. When added to other "user pay" taxes for transportation, the whole basket of road user taxes covers only 60%-70% of road costs, with the remainder covered by subsidies from other tax sources.<sup>17</sup>

Moreover, the existing basket of fuel and other road user taxes fails to cover the substantial environmental and health costs of road use, which include costs arising from air pollution and CO2 emissions, traffic congestion and lost productivity, and health care costs from vehicle crashes. According to Transport Canada figures, the cost of collisions alone in the metropolitan Edmonton area are upwards of \$500 million per year.<sup>18</sup>

Some of the costs of road use can be covered by - and reduced - by road pricing. There are several forms of road pricing, e.g.

- Road tolls and area tolls, often collected by electronic means (no toll booths);
- Dynamic congestion pricing, in which the toll rate varies in order to reduce traffic at peak hours; and,
- HOT lanes (High occupancy - toll lanes), which are carpool lanes that allow low occupancy use upon payment of tolls.

Charging for the use of roads reduces the incentive to sprawl. It also provides transparency about road construction costs, reduces economic losses caused by traffic congestion, generates transit financing, reallocates the tax burden more fairly, and reduces motor vehicle use and thus road maintenance and capital costs.

#### London's Congestion Charge

The London (U.K.) Congestion Charge reduced traffic entering the central London zone by 21%, and raised £137m for investment into transit expansion in 2007/2008 alone. Tolls are common in other countries (see table below).

Country	Toll roads (km)	Country	Toll roads (km)
Argentina	9,800	Japan	9,219
Brazil	856	Korea (Republic)	1,880
Canada	344	Malaysia	1,127
Chile	3	Mexico	5,683
France	6,305	South Africa	825
Hungary	57	Spain	2,255
Indonesia	530	United States	7,589
Italy	5,550		

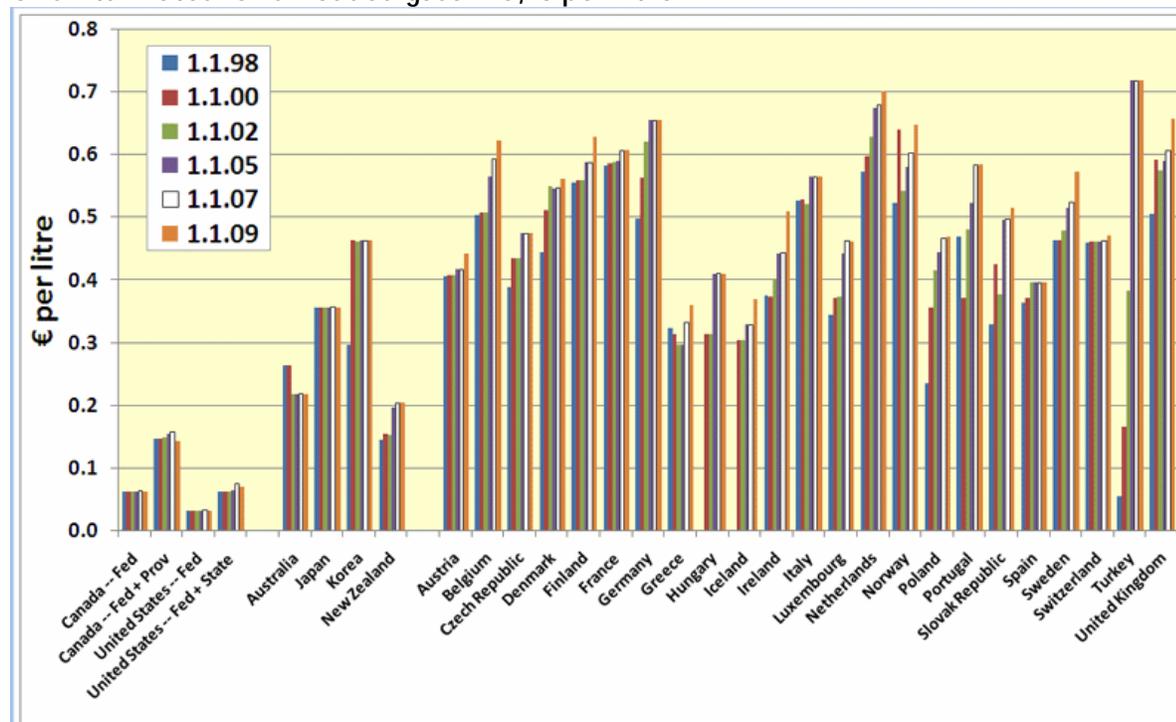
- Brown, Hoover, Howatson, Schulman, "Canada's Transportation Infrastructure Challenge"<sup>19</sup>

### Fuel Taxes

Fuel taxes in North America are the lowest in all of the OECD countries (see figure below). Clearly there is significant “tax room” to increase fuel taxes.

The provincial government shares a portion of fuel taxes with Calgary and Edmonton. Higher fuel taxes would provide an incentive to drive less, and thus to reduce sprawl. In addition, a fuel tax increase of one cent per litre could reduce property taxes by roughly 1%-3%<sup>20</sup>.

OECD tax rates for unleaded gasoline, € per litre<sup>21</sup>



### Transit Subsidies

Transit networks can increase the vitality of the city core, and boost infill and brownfield development. Transit builds ribbons of higher urban density along routes with frequent stops, and nodes of higher density at major stations. Thus transit can help reduce demand for sprawling greenfield development.

On the other hand, providing LRT stations to the edge of a city, and large park-and-ride lots on ring roads, makes moving to the edge more attractive. If the area around a suburban station is already filled with new, low-density residential development, then increasing density near those stations will be slow. Extending LRT to the edge also drains resources away from other parts of the system, thus making it more challenging to build a dense, urban-style network. Creating an LRT system that is focussed on the suburbs can contribute to sprawl.

On the other hand, simply absorbing some of the suburban vehicle commuter traffic that flows through established neighbourhoods will improve the quality of life in those neighbourhoods, as will access to an urban-style LRT technology (streetcar-style, with low floors, frequent stops,

integrated with roadways). This will aid in neighbourhood renewal, strengthen commercial and retail uses along the route, and help to mitigate sprawl.

It is also important to expand bus coverage, which provides essential service away from LRT arteries, and also feed the LRT system. In addition, rapid bus transit (RBT) can be built at a fraction of the cost of LRT, and can take substantial passenger loads. RBT, such as that in Ottawa, can be established by creating dedicated higher-speed, bus-only lanes on key routes.

Clearly, just having transit isn't enough; the design of a transit system is vital to addressing sprawl. It should be designed with a view to reducing sprawl, and not increasing it (the "do no harm" principle).

Assuming that the transit system is well-designed, it needs to have user characteristics that will encourage ridership. A dense network of clean, fast transit is important to attracting drivers out of their cars, as is keeping the cost low (Calgary offers free access to its LRT system at the city centre<sup>22</sup>). Considering the enormous subsidies to automobile transportation (both financial subsidies and environmental externalities) there is a need to have healthy transit subsidies in order to provide a quality of service that will attract drivers out of their cars.

## Regional and Provincial Co-operation

Implementing some EPR tools will require amendments to provincial legislation to provide the necessary legal powers to the City. However, some will not require legislative changes. Also, where one specific instrument cannot be used (e.g. a specific tax), it is sometimes possible to use another type of instrument that addresses the same issue (e.g. a user fee or subsidy).

Similarly, the City can only directly effect change within its boundaries. However, it can work with other governments to reduce sprawl; its ability to control its own infrastructure growth and connections is a powerful negotiating tool. The Capital Region Board,<sup>23</sup> established in 2008, may prove effective at managing growth region-wide or it may be that the City of Edmonton needs to work with the provincial government to establish an effective mechanism. In any event, again it is possible for the City to take some steps on its own.

Delineating the changes that are within the current capacity of the City and those that require provincial or regional co-operation is fairly straightforward, though beyond the scope of this paper. However, some EPR changes - whether in the area of sprawl or other environmental challenges - are within the City's capacity; the city can begin to move forward in some areas, and to make strong and concerted efforts to achieve needed cooperation in the others.

## Conclusions

We need to understand that prices have a significant impact on decisions, including the decisions that cause sprawl and other environmental problems. And we need to acknowledge that if we leave prices as they are now, our environmental policies will be undermined, and we will fail to achieve important goals.

Prices are a powerful opponent. If we don't change them so they are on our side as we address environmental challenges, then we will constantly be pulling against them. It is a tug of war that we are not going to win.

*“Urban planning ... has failed to achieve significant results on the ground in the form of more sustainable transportation systems, travel patterns and urban development patterns. One important yet commonly overlooked cause of this failure is the inadvertent undermining of urban planning by the fiscal policies of all three levels of government.”*

- *National Round Table on the Environment and the Economy*

Fortunately, we can adjust prices - those related to sprawl and those related to other environmental issues. We can recruit them onto our side. They can go from being a powerful opponent, to being a powerful ally.

When we do that, we will begin to see real progress on achieving our environmental goals.

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<sup>2</sup> The author was asked to select what, in his opinion, is Edmonton's greatest environmental challenge. This opinion is supported by "The Fourth Annual Sustainable Cities Ranking" (Corporate Knights, April 2010) at p.34 [http://static.corporateknights.ca/Sustainable\\_Cities\\_2010.pdf](http://static.corporateknights.ca/Sustainable_Cities_2010.pdf), which lauds Edmonton's sustainability, with the exception of low urban density.

<sup>3</sup> For more on the costs of sprawl, see: R. Burchell et al, "Costs of Sprawl – 2000" (Transportation Research Board, National Research Council) [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_rpt\\_74-a.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_74-a.pdf).

<sup>4</sup> Survey results in City of Edmonton, "2010 Tax Bill at a Glance" at p.10 [http://www.edmonton.ca/city\\_government/documents/2010\\_proposed\\_budget\\_budget\\_at\\_a\\_glance.pdf](http://www.edmonton.ca/city_government/documents/2010_proposed_budget_budget_at_a_glance.pdf).

<sup>5</sup> And suburban homeowners certainly don't want sprawl to continue; those quiet new homes locations overlooking scenic farmland and forests are soon are engulfed by other sprawling subdivisions.

<sup>6</sup> Thneeds: In the children's book *The Lorax*, the Once-ler character builds an enormous factory to produce thneeds. This damages the environment, undermining the economic foundations of the business, which collapses. Dr. Seuss, *The Lorax* (Random House: Toronto 1971).

<sup>7</sup> "Environmental Quality in Canadian Cities: The Federal Role" (NRTEE, 2003) p.6 <http://www.nrtee-trnee.com/eng/publications/environmental-quality-canadian-cities/NRTEE-environmental-quality-canadian-cities.pdf>.

<sup>8</sup> See generally Thompson and Bevan, "Smart Budget: A Background Paper on Environmental Pricing Reform for Local Governments" (Sustainable Prosperity, University of Ottawa, January 2010) [http://www.sustainableprosperity.ca/files/Smart\\_Budget.pdf](http://www.sustainableprosperity.ca/files/Smart_Budget.pdf).

<sup>9</sup> E.g. see City of Edmonton Asset Management and Public Works Department, "Rent Increases" (May 31, 2007) pp.2-3: <http://webdocs.edmonton.ca/OcctopusDocs/Public/Complete/Reports/UP/CSAM/2007-09-04/2007PW5360.doc>.

<sup>10</sup> Edmonton did have a subsidy scheme in place: The Brownfield Redevelopment Grant Program <http://www.edmonton.ca/environmental/programs/brownfield-redevelopment-grant-program.aspx>.

- <sup>11</sup> Edmonton Planning and Development, "2010 Combined Fees Schedule for Single Detached Houses" [http://www.edmonton.ca/bylaws\\_licences/House\\_Combio\\_Fees\\_Chart\\_2010.pdf](http://www.edmonton.ca/bylaws_licences/House_Combio_Fees_Chart_2010.pdf); The Edmonton Building Permit Bylaw No. 8664, Schedule A, Building Permit Fees [http://www.edmonton.ca/bylaws\\_licences/Building\\_Permit\\_Bylaw\\_Fees.pdf](http://www.edmonton.ca/bylaws_licences/Building_Permit_Bylaw_Fees.pdf).
- <sup>12</sup> Sewer trunk rates: City of Edmonton, "Expansion Assessment Charge" [http://www.edmonton.ca/city\\_government/planning\\_development/expansion-assessment-charge-ea.aspx](http://www.edmonton.ca/city_government/planning_development/expansion-assessment-charge-ea.aspx).
- <sup>13</sup> City of Edmonton, "Sanitary Sewer Trunk Charge" [http://www.edmonton.ca/city\\_government/planning\\_development/sanitary-sewer-trunk-charge-sstc.aspx](http://www.edmonton.ca/city_government/planning_development/sanitary-sewer-trunk-charge-sstc.aspx).
- <sup>14</sup> Thompson and Bevan, "Smart Budget" Op.cit.
- <sup>15</sup> City of Edmonton, "Bylaw 15387 – 2010 Property Tax and Supplementary Property Tax Bylaw, Schedule A – 2010 Municipal Tax Rates" available at <http://sirepub.edmonton.ca/sirepub/agdocs.aspx?doctype=minutes&itemid=11107>.
- <sup>16</sup> Several others, with revenue potential of more than \$130 million for Edmonton, are noted in Vander Ploeg "Delivering the Goods: Infrastructure and Alternative Revenue Sources for the City of Edmonton" (Canada West Foundation, June 2008) p.31-32 [http://www.cwf.ca/V2/files/Delivering\\_goods.pdf](http://www.cwf.ca/V2/files/Delivering_goods.pdf).
- <sup>17</sup> Vander Ploeg "Delivering the Goods" op.cit. p.31.
- <sup>18</sup> For a city of 1 million people, approximately \$450 million to \$750 million: Thompson and Bevan, "Smart Budget" op.cit. at pp.54-55. Edmonton's metro area population is around 1.1 million: City of Edmonton [http://www.edmonton.ca/business/economic\\_demographic/economic\\_information/population-and-employment-fore.aspx](http://www.edmonton.ca/business/economic_demographic/economic_information/population-and-employment-fore.aspx).
- <sup>19</sup> See also D. Brown, G. Hoover, A. Howatson, J. Schulman, "Canada's Transportation Infrastructure Challenge: Strengthening the Foundations - Distance Based Pricing" (Conference Board of Canada, January 2005) p. 15 <http://sso.conferenceboard.ca/e-Library/temp/BoardWise2LFILICHCFAFMFDNCMLLOIP2008121105730/686-04%20Transportation%20Infrastructure%20RPT.pdf>.
- <sup>20</sup> Thompson and Bevan, "Smart Budget" op.cit. p.31.
- <sup>21</sup> Figure: Organization for Economic Cooperation and Development, "Comparisons of developments in tax rates over time" <http://www2.oecd.org/eoicst/queries/TaxRateInfo.htm>
- <sup>22</sup> Calgary Transit, "Calgary's Light Rail Transit Line" [http://www.calgarytransit.com/route\\_maps/lrt\\_stop.html](http://www.calgarytransit.com/route_maps/lrt_stop.html).
- <sup>23</sup> <http://capitalregionboard.ab.ca/>.