



## Future of Canada's Municipal Infrastructure

(2007 FCM-McGill Municipal Infrastructure Survey)

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In collaboration with the Federation of Canadian Municipalities



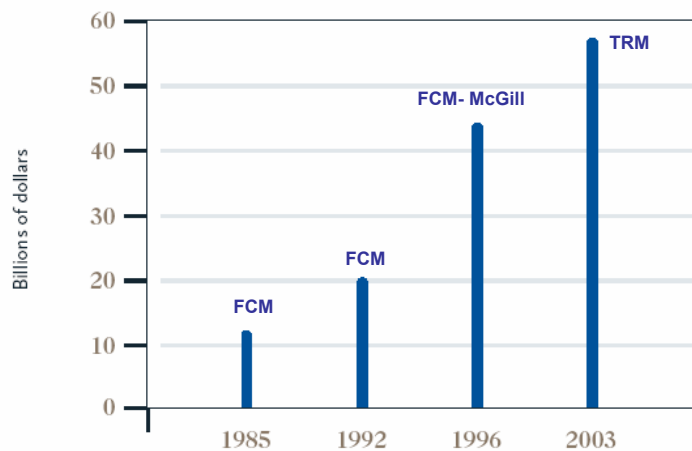
## Where Do We Stand?

- Over the past 25 years, Canada's municipal infrastructure has fallen further and further into disrepair
  - Lack of funding in the area of municipal works
  - Years of deferred maintenance
  - Lack of a detailed inventory of all assets
- This problem has been examined in a few past studies

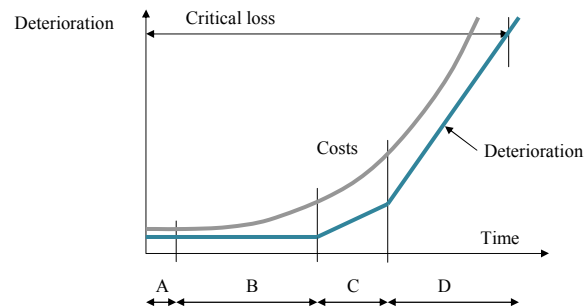
## Past Infrastructure Deficit Estimates

Year	Deficit (\$Billion)	Comments
1985	12	FCM survey
1992	20	FCM survey
1995	44	Detailed FCM- McGill survey
2003	57	Technology Road Map (TRM), Canadian Society for Civil Engineering (CSCE), Canadian Council of Professional Engineers (CCPE), Canadian Public Works Association (CPWA) and the National Research Council of Canada (NRC) - Upgrading of 1995 FCM-McGill survey.

## Canada's Municipal Infrastructure Deficit (Billions of Dollars)



## Our Deteriorating Infrastructure



Phase A – Design and Construction

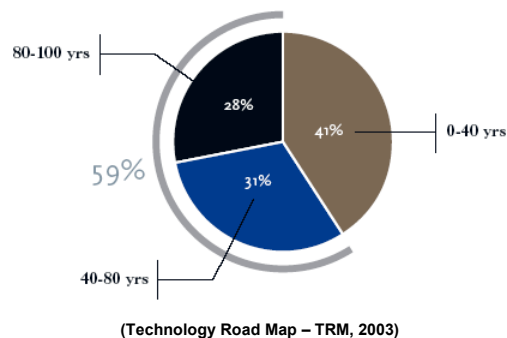
Phase B – Initiation of deterioration

Phase C – Increasing deterioration

Phase D – Accelerated deterioration requiring replacement

## The Need for a Revised Estimate

- There has been failure to account for important influencing factors in past estimates
- Rapid aging and escalating deterioration in certain categories of core infrastructure



- Demographics
- Geography
- Local Needs
- Climate Change
- Economics

...A more scientific estimate of the current municipal infrastructure deficit is urgently needed

## What is the Municipal Infrastructure Deficit?

- *The difference between the funding needed for maintenance, repair, rehabilitation and replacement of existing deteriorated infrastructure and the funding available from all sources, including taxes, government subsidies and grants, private sector contributions, etc.*
- It does not encompass infrastructure owned by other orders of government (e.g. hospitals, schools, military bases, highways)
- It does not include the cost of building new or expanded facilities to meet new needs or provide additional infrastructure capacity.

## 2007 FCM-McGill Municipal Infrastructure Survey: Methodology

### *August 2007*

- Distribution of draft survey questionnaire in English and French
  - Reviewed by a group of municipal finance, engineering, and infrastructure planning professionals across Canada

### *October 6<sup>th</sup>, 2007*

- 166 surveys were distributed

### *November 6<sup>th</sup>, 2007*

- Six broad questions answered by municipalities, dealing primarily with:
  - Current budgeting practices
  - Existing and projected upgrading needs
  - New infrastructure (capital) needs
  - Factors compounding local infrastructure deficits

## Survey Responses

- Full or partial responses from 85 local governments
- 51% response rate (85/165)
- Nearly half of the national population represented
  - Local governments in every province and territory
  - Populations ranging from less than 10,000 to 1,000,000 and above, for the largest communities
- Survey response from the Nunavut Association of Municipalities (NAM) on behalf of 24 of Nunavut's local governments.

## Findings - Water and Wastewater Systems

- 30 % of Canada's municipal infrastructure stock in 2000 (Tarek et al., 2003)
- *Rapidly approaching end of service life*

Estimates of the average cost to upgrade existing water and wastewater infrastructure:

- CWWA - \$88.5 billion (1997-2012)
- Canadian Water Network - \$39 billion (2003)
- Canadian Water Network - \$90 billion (2003-2013)

	1996	2007
Average cost to upgrade infrastructure facilities	\$21 billion	\$31 billion
Average cost of new infrastructure needs		\$56.6 billion

## Findings - Transportation

- *Transportation and public transit infrastructure comprise approx. 55% of Canada's municipal infrastructure stock in 2000 (Tarek et al., 2003)*

- Mostly built in the 1950s and 1960s – needs urgent attention and in some cases, replacement

	1996	2007
Average cost to upgrade infrastructure facilities	\$11.4 billion	\$21.7 billion
Average cost for new infrastructure needs		\$28.5 billion

- 62% for upgrading needs in larger cities (>1,000,000)
- 38% of new needs in smaller, rural and northern municipalities

## Findings - Transit

	1996	2007
Average cost to upgrade infrastructure facilities	\$3.05 billion	\$22.8 billion
New infrastructure		\$7.7 billion

- Transit infrastructure requires considerable investment
- Considerable lack of information from smaller municipalities

## Findings - Other Public Infrastructure Assets

### *Cultural, Social and Recreational Facilities*

- Canadian Parks and Recreation Association (2007) - **\$15 billion**

	1996	2007
Average cost to upgrade infrastructure facilities	\$7.55 billion	\$40.2 billion
Average cost for new infrastructure needs		\$18.1 billion

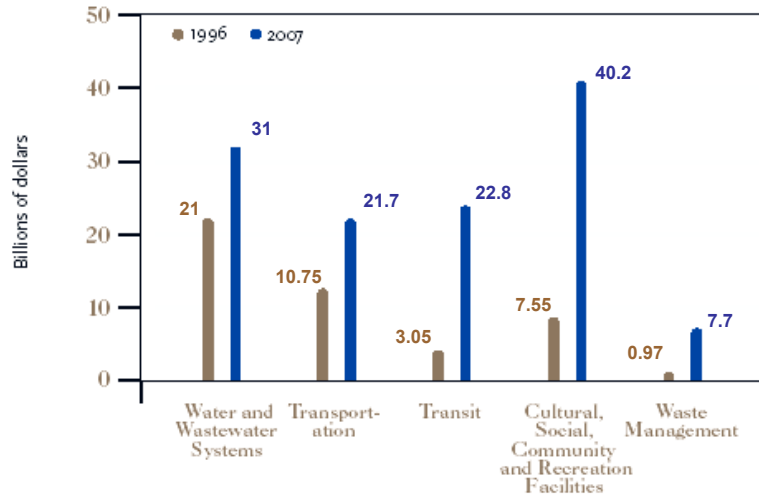
- Considerably increased funding needed to maintain and upgrade sports and recreational facilities
- Needs more prevalent in larger communities (rapid urban growth)
- New needs in smaller communities (<100,000)

## Findings - Other Public Infrastructure Assets

### *Waste Management*

	1996	2007
Average cost to upgrade infrastructure facilities	\$1 billion	\$7.7billion
Average cost for new infrastructure needs		\$4.3 billion

## Infrastructure Deficit - 1996 and 2007



- **Repair and Rehabilitation of Existing Infrastructure** \$123.6 billion
- **New Infrastructure Needs** \$115.2 billion

## Comparison with other countries

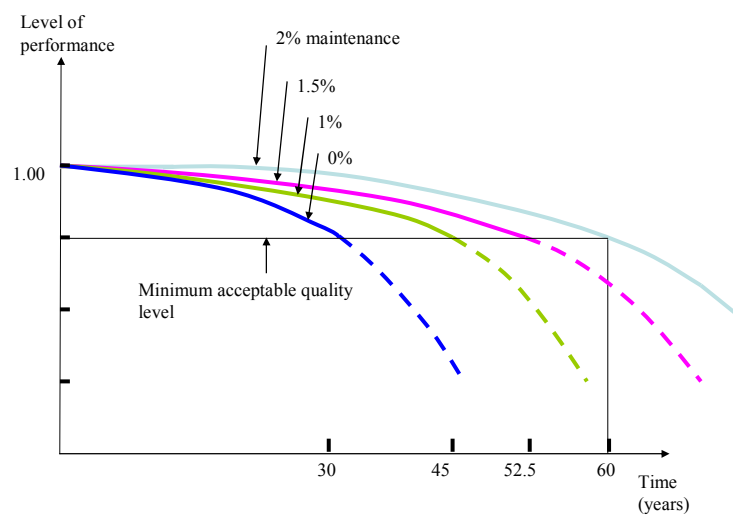
Year	Deficit (\$Billion)	Country/Region (Sources)
2000	7.7	Northern Ireland (Confederation of British Industry)
2007	90	Australia (Business Council of Australia) \$6.4B in lost production per year
2006	145	Indonesia (Asian Development Bank)
2007	500	India (Planning Commission, Government of India)
2007	600	United Nations Economic and Social Commission for Asia and the Pacific Region (UNESCAP)
2006	1,000	East Asia (Japan Bank for International Cooperation, the World Bank, the Asian Development Bank)
2005	1,600	U.S.A. (ASCE)



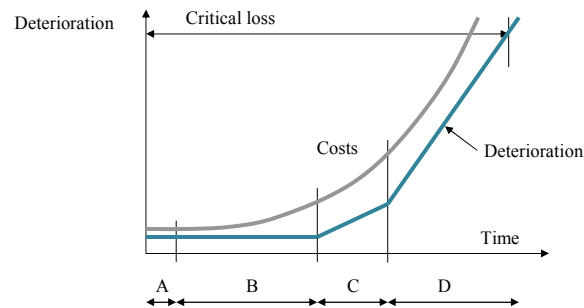
## Summary of U.S. Infrastructure Deficits

Grading Criteria	Infrastructure Categories Evaluated	1988	1998	2001	2003	2005
<b>A</b> = Exceptional (90-100%)	Aviation	B-	C-	D	→	D+
<b>B</b> = Good (80 - 89%)	Bridges	C+	C-	C	→	C
<b>C</b> = Fair (70 - 79%)	Dams	--	D	D	→	D
<b>D</b> = Poor (41 - 69%)	Drinking Water	B-	D	D	→	D-
<b>F</b> = Inadequate (< 40%)	Energy	--	--	--	--	D
	Hazardous Waste	D	D-	D+	→	D
	Navigable Waterways			D+	→	D-
	Public Parks & Recreation	D				C-
	Rail	--	--	--	--	C-
	Roads	C+	D-	D+	→	D
	Schools		F	D-	→	D
	Security	--	--	--	--	I
	Solid Waste	C-	C-	C+	→	C+
	Transit	C-	C	C-	→	D+
	Wastewater	C	D+	D	→	D-
	Energy	--	--	D+	D	--
	Water Resources	B	--	--	--	--
	Infrastructure GPA	C	D	D+	D+	D
	Total Investment Needs (Estimate 5-year Need) Trillion Dollars	\$1.0t	\$1.3t	\$1.3t	\$1.6t	\$1.6t

## Performance and Maintenance Levels



## Deterioration of Infrastructure



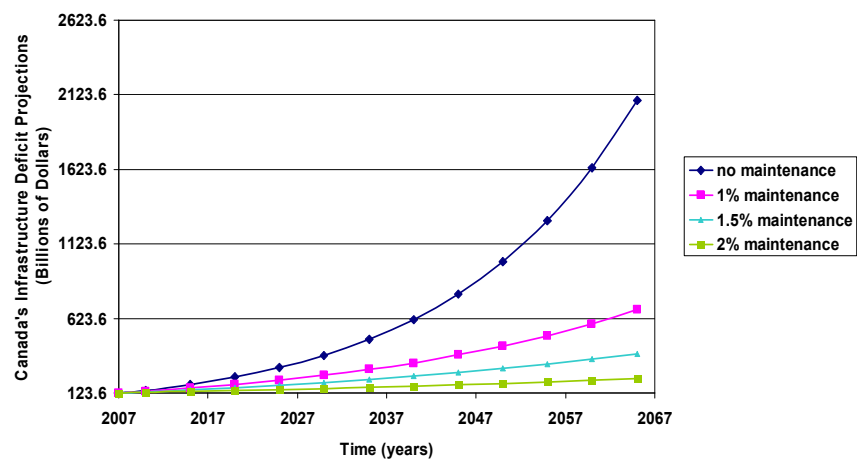
Phase A – Design and Construction

Phase B – Initiation of deterioration

Phase C – Increasing deterioration

Phase D – Accelerated deterioration requiring replacement

## Canada's Total Deficit for Existing Infrastructure (Billions of Dollars)



## Present Funding Programs

Program	\$ Billion	Comments
Municipal GST Rebate	\$5.8B	<ul style="list-style-type: none"> <li>•100% GST rebate paid by municipalities</li> <li>•Rebate increased from 57% to 100% for the next 7 years</li> </ul>
Gas Tax Fund	\$11.8B	<ul style="list-style-type: none"> <li>•3.8B for 2007-2010</li> <li>•Extended under Budget 2007 for 2010-2014 for an extra \$8B.</li> <li>•Total: 11.8B.</li> <li>•\$1.2B collected between 2005-2007</li> </ul>
Building Canada Fund	\$8.8B	<ul style="list-style-type: none"> <li>•Local and regional needs</li> <li>•Core national infrastructure systems (highways, water and wastewater, transit and green energy)</li> </ul>
Public-Private Partnerships Fund	\$1.25B	<ul style="list-style-type: none"> <li>•Specific national priorities</li> <li>•Financing initiative expansion in Canada</li> <li>•Additional \$25M committed over 5 years to establish a national P3 office</li> </ul>
Gateways and Border Crossings Fund	\$2.1B	<ul style="list-style-type: none"> <li>•Strategic gate corridors – transportation systems.</li> <li>•0.4B dedicated to construction of Windsor- Detroit crossing</li> </ul>
Asia-Pacific Gateway and Corridor Initiative	\$1.0B	<ul style="list-style-type: none"> <li>•Gateways and Border Crossings Fund built on the Asia-Pacific Gateway and Corridor Initiative</li> </ul>
Provincial-Territorial Base Funding	\$2.275B	<ul style="list-style-type: none"> <li>•\$25 M/ year for every province/territory</li> <li>•\$25 x 7years x 13 = \$2.275B</li> </ul>
<b>Total</b>	<b>\$33.0B</b>	

(Building Canada: Modern Infrastructure for a Strong Canada, 2007)

## Sunsetting Funding Programs

Program	\$ Billion	Comments
Public Transit Fund	\$ 0.4B	<ul style="list-style-type: none"> <li>•Investment in public transit</li> <li>•Cleaner air, lower GHG emissions</li> </ul>
Canada Strategic Infrastructure Fund	\$ 4.0B	<ul style="list-style-type: none"> <li>•projects of major federal and regional significance in areas that are vital to sustaining economic growth</li> </ul>
Border Infrastructure Fund	\$ 0.6B	<ul style="list-style-type: none"> <li>•reducing border congestion and expanding infrastructure capacity</li> </ul>
Municipal Rural Infrastructure Fund	\$ 1.2B	<ul style="list-style-type: none"> <li>•smaller and First Nations communities</li> <li>•water, wastewater treatment, cultural and recreation projects</li> </ul>
Infrastructure Canada Program	\$ 2.05B	<ul style="list-style-type: none"> <li>•Canada's growth and the quality of life of all Canadians</li> <li>•more than 3,500 ICP-funded projects have been announced</li> </ul>
<b>Total</b>	<b>\$ 8.25B</b>	

## Municipal Infrastructure – Investment in Amelioration and New Construction (2007-2014)

Program	\$ Billion
Municipal GST Rebate (2007 - 2014)	\$5.8B
Gas Tax Fund (2005 - 2014)	\$11.8B
Building Canada Fund (2007 - 2014)	\$8.8B
Provincial-Territorial Base Funding (2007 - 2014)	\$2.275B
<b>Total</b>	<b>\$28.675B</b>

### Questions:

- Funding Available for Amelioration of Deteriorated and Deteriorating Municipal Infrastructure (2007-2014) = ?
- Annually over the next 7 years = ?
- Is it adequate ?

## Where Do We Go From Here?

- Acknowledge the looming crisis and ACT IMMEDIATELY. Consequences of not acting – **more serious** infrastructure distress and failure
- Long-term financing based on established priorities
- New technologies, best practices and effective management
  - A complete standardized national inventory of all assets and up-to-date condition assessment
- Instead of reducing GST, empower the municipalities to raise an equivalent value of taxes
- Future prosperity – economic development, international competitiveness and overall quality of life **is at stake!** (Role of municipalities)

## Where Do We Go From Here?



Hull, 1999

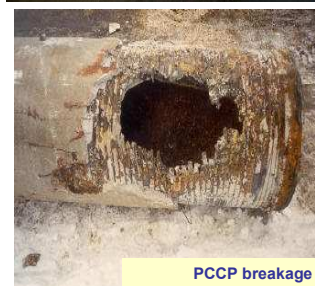
## Where Do We Go From Here?



Cast iron- longitudinal failure



Watermain- Pitting corrosion



PCCP breakage



Tubercle in a cast iron pipe



## Where Do We Go From Here?



## Recommendations

- Establish a national plan to eliminate the municipal infrastructure deficit and prepare the groundwork for effective management in the future.
- Create a special fund for amelioration of infrastructure (Canada Infrastructure Bank)
- **Infrastructure Australia:** A new initiative by the Australian Government - A statutory advisory council with members from industry, government and local government
  - Audit infrastructure shortfalls
  - Develop an Infrastructure Priority List
  - Advise governments – strategic funding, planning, management

WE NEED TO DO THIS **URGENTLY** IN CANADA

- First step - A comprehensive, national study, involving all three orders of government, to determine the size, scope and geographic characteristics of the municipal infrastructure deficit.

## Federal Commitments to Eliminate Deficit by 2021

Elements	Amount (\$ billions)	Source
<b>Federal net debt (according to the national accounts) in 2005</b>	484.6	Department of Finance Canada, <i>Fiscal Reference Tables</i> , September 2006, Table 49
<b>Net debt of provincial/territorial and local government sectors (according to the national accounts) in 2005</b>	246.9	Department of Finance Canada, <i>Fiscal Reference Tables</i> , September 2006, Table 50
<b>Less: Net value of QPP financial assets in 2005</b>	22.8	Department of Finance Canada, <i>Fiscal Reference Tables</i> , September 2006, Table 52
<b>Less: Net value of CPP financial assets in 2005</b>	87.6	Department of Finance Canada, <i>Fiscal Reference Tables</i> , September 2006, Table 51
<b>Less: Unfunded liabilities of federal pension plans in 2005</b>	131.2	Department of Finance Canada estimates
<b>Less: Unfunded liabilities of provincial/territorial and local government pension plans in 2005</b>	75.5	Department of Finance Canada estimates
<b>Subtotal: Net debt of entire government sector (OECD measure ) in 2005</b>	<b>414.4</b>	

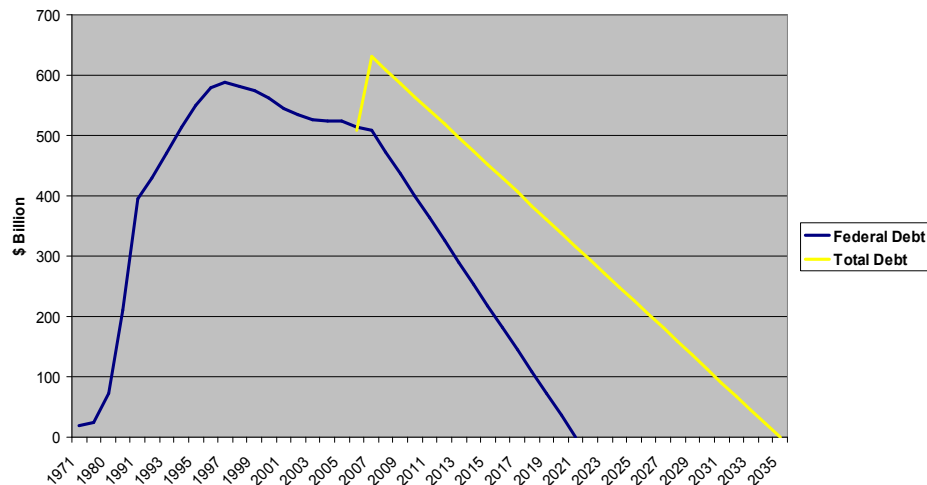
(<http://www.parl.gc.ca/information/library/PRBpubs/prb0641-e.htm>)

## Federal Commitments to Eliminate Deficit by 2021

Elements	Amount (\$ billions)	Source
<b>Less: Federal budget surpluses from 2005 to 2021 (according to the accounting methods used in the public accounts)</b>	48.0	The federal government has made a commitment to achieve budget surpluses of \$3 billion per year
<b>Less: Budget surpluses of provincial/territorial and local governments from 2005 to 2021 (according to the accounting methods used in the public accounts)</b>	0.0	Federal government assumption
<b>Less: Increase in the value of the unfunded liabilities in federal, provincial/territorial and local pension plans from 2005 to 2021</b>	49.3	Department of Finance Canada estimates
<b>Less: Increase in the net value of the financial assets in the QPP from 2005 to 2021</b>	48.7	Actuarial Report of the Quebec Pension Plan as at 31 December 2003
<b>Less: Increase in the net value of the financial assets in the CPP from 2005 to 2021</b>	268.0	Actuarial Report (21st) on the Canada Pension Plan as at 31 December 2003
<b>Total: Net debt of the entire government sector (as measured by the OECD) in 2021</b>	<b>0.4</b>	

(<http://www.parl.gc.ca/information/library/PRBpubs/prb0641-e.htm>)

## Accumulated and Infrastructure Deficit Elimination by 2035



## Summary –GDP, Federal and Infrastructure Deficit

- Estimated GDP (2004) \$978b  
(World in Figures, The Economist, 2007) = \$32,260 per capita
- Estimated federal accumulated deficit \$467b  
(does not account for all assets,  
including CPP and QPP funds) = \$15,212 per capita
- Estimated infrastructure deficit \$123b  
= \$4,007 per capita

IS IT MANAGEABLE OVER THE NEXT 28 YEARS?





THE GAZETTE | MONTREAL | SUNDAY, AUGUST 5, 2007

QUOTE OF THE WEEK

*“If we do not maintain our infrastructure, do not upgrade it,  
we’ll continue to have spectacular collapses.”*

Saeed Mirza, McGill professor of civil engineering and infrastructure expert.