Economic Impact of the Community Climate Change Action Plan City of Hamilton

ECONOMETRIC RESEARCH LIMITED

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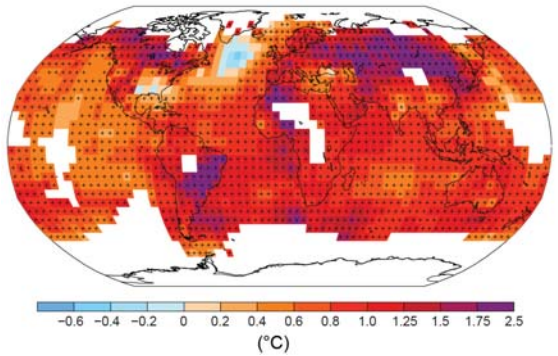
Hamilton

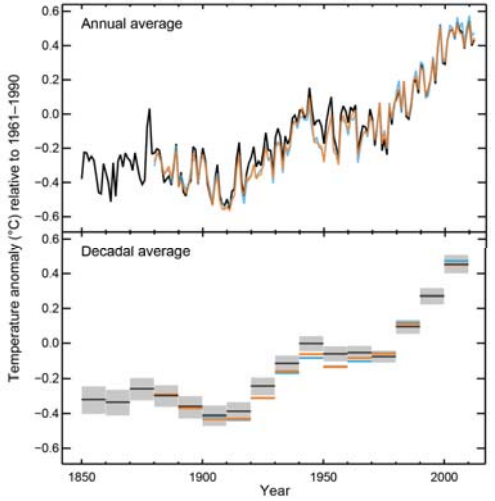
CLIMATE CHANGE CHAMPIONS

Past Climate Trends

- The Earth's climate is warming and this trend has accelerated during the last few decades (IPCC 2007, 2013).
- Increase in the frequency and severity of extreme weather events, such as floods, thunderstorms, ice storms, droughts and heat waves (IPCC 2012).



Observed change in surface temperature (1901-2012)



Global mean temperature anomaly (1850-2012)

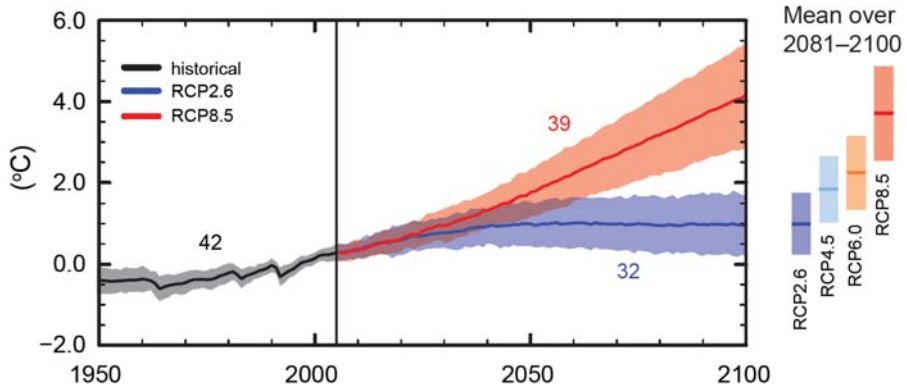
(Source IPCC 2013)

Future Climate Predictions

Climate change will have direct and indirect impacts on communities:

- Infrastructure
- Air and water quality
- Economy
- Social well-begin and
- Health

(Berry et al. 2014; IPCC 2013, WHO, 2012)



Future climate trend under various emission scenarios (IPCC, 2013)

Local Climate Related Impacts

(Toronto, Picture AP)

- In Hamilton 12 hot days (Ta > 30 ^{o}C) per year during 1961 - 1990.
- Hot days (Ta > 30 ^{o}C) will increase to 23 & 37 days/year during 2021-2040 and 2041 – 2070 period (Casati & Yagouti, 2010).
- Heat-related mortality will be higher than mortality reductions due to less severe cold weather (Ebi and Mills (2013).
- 1800 cases of West Nile virus with 46 deaths in Canada from 2000-2005 (Seguin, 2008).
- There may be 30% increase in West Nile incidents in Hamilton by 2050 (Gough, 2015).
- Flooding incidents in Southern Ontario are expected to increase by 10-35% during 2046-2065, and by 35-50% during 2081-2100 (Cheng et al. 2011).

(Hamilton, www.directoryofhamilton.com)

Past Successes & Future Targets of GHG Emissions by Hamilton Community

- In 2006 Hamilton community GHG emissions were 23,351,712 tonnes CO_2.
- In 2012, they have been reduced to 16,500,000 tonnes of CO_2 (29% reduction).

Future Community Emissions Targets

20% reduction in GHG emissions from 2006 levels by 2020

50% reduction in GHG emissions from 2006 levels by 2030

80% reduction in GHG emissions from 2006 levels by 2050

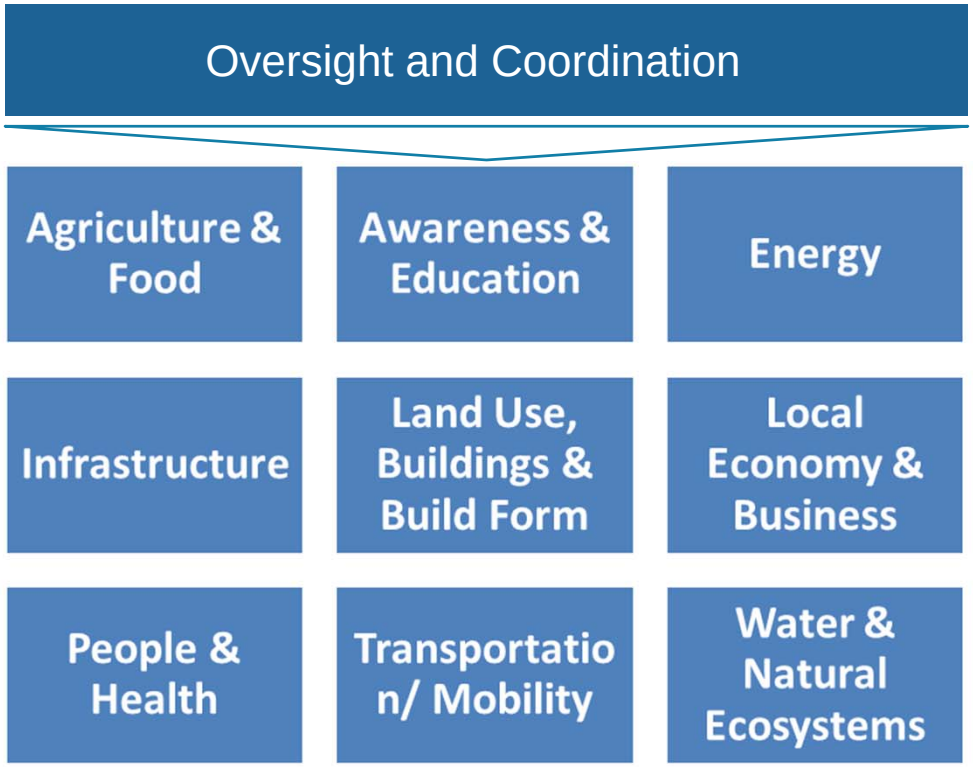
Community Climate Change Action Plan

The City of Hamilton initiated the development of a Climate Action Plan to focus on:

1) How the City and community will respond to future climate changes?
2) What actions can be taken to reduce Greenhouse Gas (GHG) emissions?
3) How to enhance adaptive capabilities of individuals and the community as a whole?

The City of Hamilton's Climate Action Plan suggests: Ten Climate Action Priorities (CAPs).

Climate Action Priorities (CAPs)



Key Features of Climate Change Action Plan

1) Primarily focused on mitigation and adaptation measures.
2) Actions will have numerous co-benefits:
   - Improving quality of life
   - Positive effects on local & regional economy
   - Well prepared community for adverse climate impacts

Co-benefits of Climate Change Action Plan

- Reduced air pollution emissions and improved air quality
- Increased transit ridership
- Reduced household transportation budgets
- Support for local business community to prepare for climate change impacts
- Support for local farming community and agricultural/food business
- Reduced costs for flooding and other extreme weather impacts
- Reduced cost of infrastructure maintenance
- Preservation of green spaces and wetlands
- Avoided costs of health care and loss of productivity

Objectives of Economic Analysis of CAPs

1) Quantify the input profiles of each action item:
   - Labour cost, equipment cost and other expenditures.
2) Determine the source of the inputs:
   - Local, Ontario, Canada and International sourcing.
3) Quantify direct economic impacts:
   - Value added, employment, labour income, type of taxes, collection.
4) Quantify indirect economic impacts:
   - Indirect and induced costs at local, regional and provincial level.

Methodology

Economic analysis uses standard economic impact methodology.

Based on a hybrid integration of:

(i) input-output analysis
(ii) location theory
(iii) relevant segments of typical macroeconomic models.

The model (RIM of ERL Ltd.) utilizes economic and technical data for local communities, provinces and Canada (from Statistics Canada)

A dollar spent on a local program such as on local food production or renewable energy circulates and re-circulates within the economy, multiplying the effects of the original expenditures on overall economic activity.

CAP #1: Expanding Local Food Production

- Ontario food imports are $20 billion per year.
- Over 50% of $20 billion food imports can be produced locally.

- Only 10% increase in top 10 LOCAL fruit and vegetables:
  - Can save $0.25 billion dollars in Gross Domestic Product (GDP)
  - Can add 3,400 full-time jobs (FTE)

CAP #1: Expanding Local Food Production

Local Food Deficits

Table 2
Food Surplus/Deficit, Hamilton, 2011
Field Crops, Fruits and Vegetables

Crop	Marketed Production ('000 tonnes)	Marketed Production kg/capita	Consumption kg/capita	Food Surplus/Deficit kg/capita	Total Food Deficit/Surplus ('000 tonnes)
Flour	10.612	20.41	60.28	-39.87	-20.73
Oats	0.88	1.69	2.12	-0.43	-0.22
Barley	0.85	1.63	0.07	1.56	0.81
Soy Bean Oil	6.944	13.36	5.50	7.86	4.08
	('000) lbs	lbs / capita	lbs / capita	lbs / capita	('000) lbs
Apples	12011.2	23.10	51.70	-28.60	-14870.16
Grapes	5374	10.34	10.36	-0.03	-13.71
Peaches	122	0.23	4.74	-4.51	-2342.56
Strawberries	605.6	1.16	9.99	-8.83	-4588.69
Cabbage	5915	11.38	11.77	-0.39	-204.80
Green & Wax Beans	2366.4	4.55	4.23	0.32	167.02
Potatoes	18875	36.30	125.82	-89.52	-46544.98
Carrots	0	0.00	24.27	-24.27	-12619.16
Sweet Corn	4172.2	8.02	16.84	-8.82	-4583.74
Tomatoes	18278.5	35.15	69.00	-33.85	-17597.98
Peppers	4113	7.91	9.02	-1.11	-576.94
Dry Onions	0	0.00	18.55	-18.55	-9642.97

Source: Statistics Canada: Field Crop Reporting Series; Census of Agriculture 2011

Table 3
Food Surplus/Deficit, Hamilton, 2011
Meat and Eggs

Item	Count number	Production lbs	Production lbs/capita	Consumption lbs/capita	Food Surplus/Deficit lb/capita	Total Food Deficit/Surplus lbs
Beef	3,753	2,627,146	5.05	63.4	-58.3	-30,316,822
Sheep & Lambs	8,299	622,403	1.20	2.44	-1.2	-646,273
Pigs	15,519	2,234,772	4.30	49.24	-44.9	-23,367,517
Chicken		20,978,233	40.35	72.36	-32.0	-16.6
Turkey		213,434	0.41	10.36	-10.0	-5.2
	Count		Production	Consumption	Food Surplus/Deficit	Total Food Deficit/Surplus
	dozens		dozens/capita	dozens/capita	dozens/capita	dozens
Table Eggs	296,245		0.6	16.1	-15.5	-8,074,934

Source: Statistical Services, OMAFRA and Statistics Canada, Census of Agriculture 2011

CAP #1: Expanding Local Food Production
Assumptions

Two scenarios of local food production expansions:

- 10% increase
- 20% increase

Selected fruits for expansion:

- Apples, Potatoes, tomatoes and Strawberries

Selected meat for expansion:

- Chicken

  In Hamilton potential for expansion is high.

  Chicken production need less water and high value/cost ratio

CAP #1: Expanding Local Food Production

Market Share of Key Local Foods

Table 5
Food Surplus/Deficit, Hamilton, 2011
Import Replacement

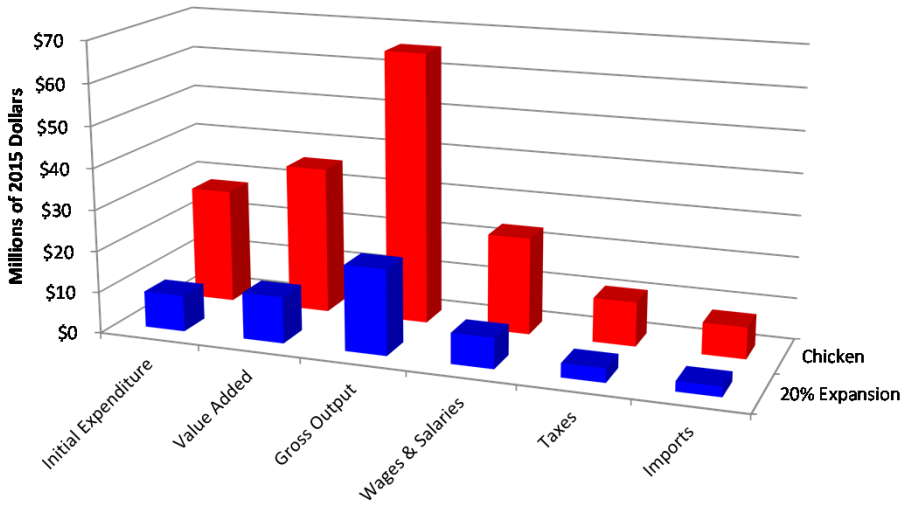
Selected Commodities	Deficit Reduction (tonnes)	Value	Share in Current Production
Apples 10%	675.92	$817,859	12.38%
Apples 20%	1351.83	$1,635,718	24.76%
Potatoes 10%	2115.68	$2,614,311	24.66%
Potatoes 20%	4231.36	$5,228,621	49.32%
Tomatoes 10%	399.95	$687,921	4.66%
Tomatoes 20%	799.91	$1,375,842	9.32%
Strawberries 10%	104.29	$271,150	1.26%
Strawberries 20%	208.58	$542,300	2.51%
Total @ 10%		$4,391,241	
Total @ 20%		$8,782,481	

Source: Econometric Research Limited

CAP #1: Expanding Local Food Production:
Local- and Ontario-Wide Impacts

- Total income of Ontario increased by ~$47 million
- Hamilton's share is about $44.6 million
- Wages/salaries augmented by ~$30.9 million. Net wage >$43,165 and total wage ~$52,618
- Over 842 FTEs of employment are generated in Ontario, with 604 FTEs in Hamilton.
- $10.7 million taxes collected by all governments
- $1.7 million taxes collected by City of Hamilton

Figure 1
Province-Wide Impacts of Local Food Expansion



CAP #1: Expanding Local Food Production: Environmental benefits

- Savings in water use
- Reduction of air pollutants
- Improvements in air quality
- Energy savings

- Increase of 16,072 tones of CO_2 emissions
- Less transportation of imported foods will save 3,541 tones of CO_2

Table 7
The Environmental Impacts of Local Food Expansion

	Ontario				Hamilton			
	Agriculture	20%	Chicken	Total (2+3)	Agriculture	20%	Chicken	Total (2+3)
Demand for Water (MCM)								
Intake	201.2	5.93	18.80	24.73	157.3	4.63	14.70	19.33
Discharge	199.0	5.86	18.59	24.45	155.7	4.59	14.55	19.14
Net Usage	2.3	0.07	0.21	0.28	1.6	0.04	0.15	0.19
Air Emissions (Tonnes)								
Particulates	193.1	5.7	18.0	23.7	39.7	1.2	3.7	4.9
Sulphur Oxides	553.0	16.3	51.7	68.0	48.1	1.4	4.5	5.9
Nitrogen Oxide	166.1	4.9	15.5	20.4	48.0	1.4	4.5	5.9
Volatile Organic C	956.0	28.2	89.3	117.5	101.4	3.0	9.5	12.5
Carbon Monixide	581.6	17.1	54.3	71.5	289.1	8.5	27.0	35.5
Energy Used (terajoules)								
Coal	1,029.4	30.3	96.2	126.5	778.1	22.9	72.7	95.6
Crude Oil	2,699.0	79.5	252.2	331.7	547.5	16.1	51.2	67.3
Natural Gas	1,565.5	46.1	146.3	192.4	1,303.7	38.4	121.8	160.2
Electricity	631.9	18.6	59.0	77.7	537.5	15.8	50.2	66.1
Nuclear Steam	216.2	6.4	20.2	26.6	111.1	3.3	10.4	13.7
Total	6,141.9	181.0	573.9	754.9	3,277.9	96.6	306.3	402.8
Greenhouse Gases (Tonnes)								
Carbon Dioxide	325,927.3	9,601.8	30,454.6	40,056.4	130,775.6	3,852.6	12,219.7	16,072.3
Methane	354.0	10.4	33.1	43.5	161.7	4.8	15.1	19.9
Nitrous Oxide	465.7	13.7	43.5	57.2	219.6	6.5	20.5	27.0
Green GDP ('000 Dollars)								
GDP	$381,821	$11,248	$35,677	$46,925	$362,672	$10,684	$33,888	$44,572
Green Cost	$22,673	$668	$2,119	$2,787	$7,738	$228	$723	$951
Green GDP	$359,148	$10,580	$33,559	$44,139	$354,934	$10,456	$33,165	$43,621
Percent of GDP	94.1%	94.1%	94.1%	94.1%	97.9%	97.9%	97.9%	97.9%

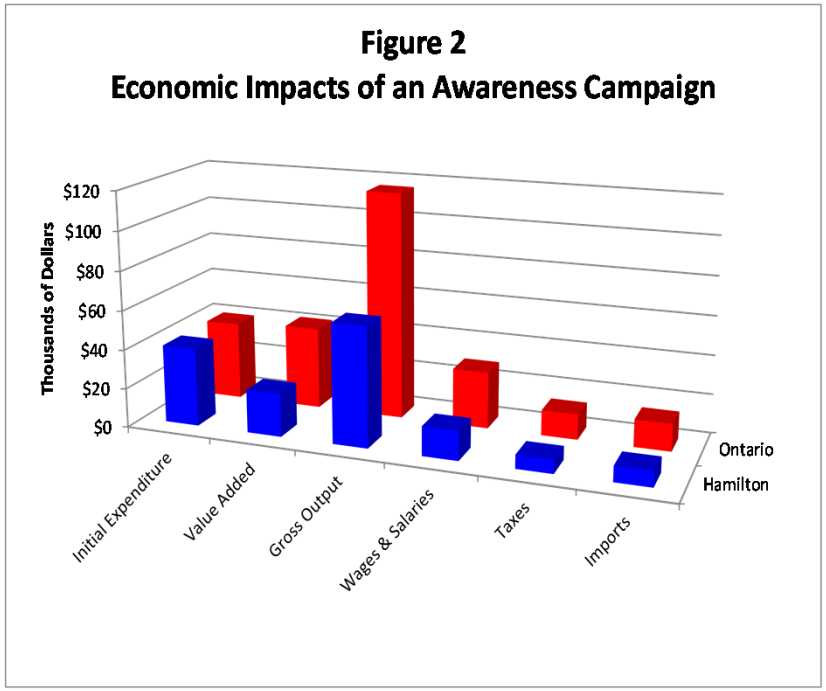
Source: Econometric Research Limited

CAP #2: Education and Awareness Program

"Let's Talk About the Weather" conversations held across Hamilton at 35 locations including:

Coffee shops, Libraries, McMaster University, Mohawk College, Ancaster Agricultural Fair, the Rockton World's Fair, Saturday's at the Creek and James North Art Crawl and at local workshops.

The City has earmarked $40,000 (1/2 FTE) to engagement public in climate adaptation and mitigation actions.



CAP #3: Community Energy Plan

Community energy mapping was done in 2011.

In 2104, reduce energy consumed by City departments showed large savings:

Utility Rates and Cost Avoidance:	**$2,705,777**
Cost Recovery:	**$302,615**
Energy Conservation and Incentives:	**$2,883,862**

CAP #3: Community Energy Plan

- Total income of Ontario increased by ~$7.4 million
- Hamilton's share is about $4.5 million
- Wages/salaries augmented by ~$4.9 million. Net wage >$82,472 and total wage ~$77,789
- Over 68 FTEs of employment are generated in Ontario, with 45 FTEs in Hamilton.
- $2.3 million taxes collected by all governments
- $0.142 million taxes collected by City of Hamilton

Table 9
Economic Impacts of Annual Energy Savings
Hamilton, Ontario
(Thousands of dollars)

	Ontario	Hamilton
Initial Expenditure	$5,892	$5,892
Value Added		
Direct	$3,478	$3,255
Indirect & Induced	$3,881	$1,223
Total	$7,359	$4,478
Multiplier	1.25	0.76
Gross Output		
Direct	$5,892	$5,892
Indirect & Induced	$8,752	$4,537
Total	$14,644	$10,429
Multiplier	2.49	1.77
Wages & Salaries		
Direct	$2,371	$2,235
Indirect & Induced	$2,575	$1,227
Total	$4,946	$3,462
Employment		
Direct	28.8	27.1
Indirect & Induced	39.6	17.4
Total	68.4	44.5
Multiplier	2.38	1.64
Taxes		
Federal	$1,108	$540
Provincial	$876	$427
Local	$291	$142
Total	$2,275	$1,109
Imports		
From Other Provinces	$1,038	$495
From Other Countries	$571	$276
Total	$1,609	$771

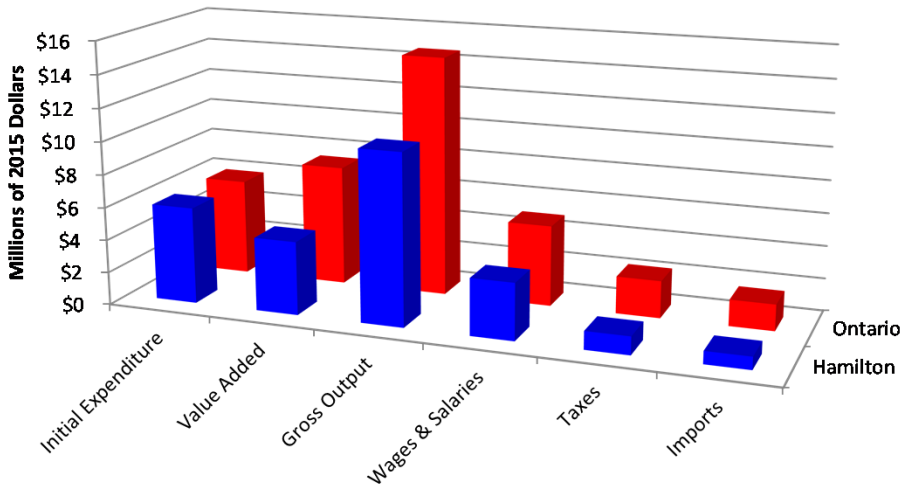
Source: Econometric Research Limited

CAP #3: Community Energy Plan

Environmental Impacts

- The CO_2 generated by these re-spent impacts is over 5,467 tonnes/year
- Otherwise, production of energy could have produced 8,585 tonnes of CO_2 /year
- Net savings of 3,118 tonnes of CO_2 /year

Figure 3
Economic Impacts of Annual Energy Savings



CAP #4: Low Impact Development

- Low Impact Development (LID) and designing built areas with absorbent green or hard spaces can reduce the impacts of extreme weather events.

- The City of Hamilton Public Works Department in partnership with Planning and Economic Development, the Building Division and the Hamilton Conservation Authority may work to develop guidelines for LID.

Table 10
City of Hamilton
Residential Growth Forecast Summary

	Units	Share
As of 2006:		
Single & Semi-detached units	118,410	61%
Multiple Dwellings	25,095	13%
Apartments	50,155	26%
Others	795	
Total units	194,455	
As of 2011:		
Single & Semi-detached units	124,257	61%
Multiple Dwellings	28,240	14%
Apartments	51,118	25%
Others	795	0%
Total units	204,410	
Projected As of 2021:		
Single & Semi-detached units	136,060	59%
Multiple Dwellings	35,672	16%
Apartments	56,633	25%
Others	795	
Total units	229,160	
Projected As of 2031:		
Single & Semi-detached units	148,481	54%
Multiple Dwellings	45,062	16%
Apartments	81,859	30%
Others	795	
Total units	276,197	

Source: Watson & Associates Economists Ltd., May, 2011

CAP #4: Low Impact Development

- Total income of Ontario increased by ~$31.2 million
- Hamilton's share is about $140.3 million
- Wages/salaries augmented by ~$154 million. Net wage >$82,817 and total wage ~$78,336
- Over 2,117 FTEs of employment are generated in Ontario, with 1376 FTEs in Hamilton.
- $71 million taxes collected by all governments
- $4.2 million taxes collected by City of Hamilton

Table 11
Development Charge Savings Arising from Low Intensity Development

	Development Charges	Forecast Units	Forecast Charges ('000)	Units Using 2011 Shares	Forecast Charges ('000)	Difference ('000)
Single & Semi-detached units	$28,095	148,481	4,171,574	167895	4,717,010	545,436
Multiple Dwellings	$20,138	45,062	907,459	38158	768,426	-139,033
Apartments	$17,346	81,859	1,419,926	69070	1,198,088	-221,838
Others		795		1074		
Total units		276,197		276197		184,566

Source: Table 8 and Econometric Research Limited

Environmental Impacts

Net reduction of 12,280 tonnes of CO_2 per year

CAP #5: Real Costs of Water and Wastewater Charges

Assumptions:

For household use, it follows that:

- 10% increase in water and wastewater charges will lead to a 5% quantity decrease with average water use of 285 litres per capita per day (i.e. 15 litres per day per person saving).

- 20% increase in water and wastewater charges will lead to a 10% quantity decrease with average water use of 270 litres per capita per day use (i.e. 30 litres per day per person saving).

For employment, it follows that:

- 10% increase in water and wastewater charges will lead to a 6% quantity decrease, or to a consumption level of 244.4 litres per employee per day.

- 20% increase in water and wastewater charges will lead to a 13% quantity decrease, or to a consumption level of 228.8 litres per employee per day

CAP #5: Real Costs of Water and Wastewater Charges

Table 13
Water and Wastewater Consumption Level at Different Water Rates

Population in 2031		660,000	
employment 2031		300,000	
water consumption households		300	litres per capita per day
water cosumption ICI		260	litres per employee per day
water Price structure			
fixed	$	0.30	dollars per m3
variable block1	$	0.66	dollars per m3
variable block2	$	1.32	dollars per m3
wastewater			
fixed	$	0.30	dollars per m3
variable block1	$	0.71	dollars per m3
varaible block2	$	1.41	dollars per m3
price eladticity households		-0.5	
price elasticity ICI		-0.6	
block 1 share		25%	
block2 share		75%	
composite price			
fixed	$	0.30	dollars per m3
variable	$	2.39	dollars per m3
total	$	2.69	dollars per m3
10% price incresae	$	2.96	dollars per m3
20%price increase	$	3.23	dollars per m3

Source: KMK Water Design Criteria, Water and Wastewater Master Plan, City of Hamilton.
H. Allen Klaiber, V. Kerry Smith, Michael Kaminsky, Aaron Strong, Measuring Price Elasticities for Residential Water Demand with Limited Information, National Bureau of Economic Research, Working Paper 18293, 2012, http://www.nber.org/papers/w18293

Figure 5
Economic Impacts of Water Savings Due to a 10% Price Increase

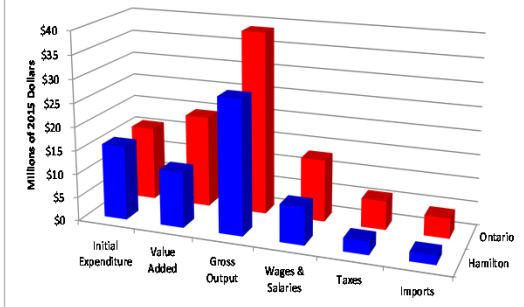
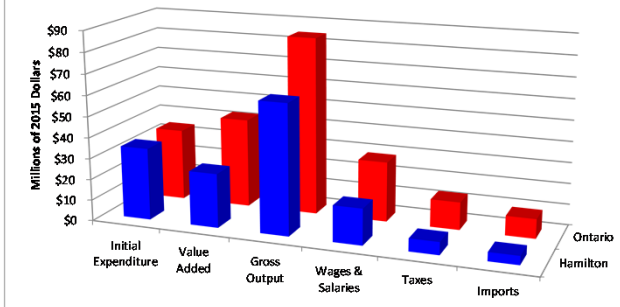


Figure 6
Economic Impacts of Water Savings Due to a 20% Price Increase



CAP #5: Real Costs of Water and Wastewater Charges

- Total income of Ontario increased by ~$42.7 million
- Hamilton's share is about $25.8 million
- Wages/salaries augmented by ~$28.7 million. Net wage >$82,665 and total wage ~$67,184
- Over 394 FTEs of employment are generated in Ontario, with 256 FTEs in Hamilton
- $13.2 million taxes collected by all governments
- $0.775 million taxes collected by City of Hamilton

Environmental Impacts

Reduction in water use and treatment will save 8,336 tonnes of CO_2/year

CAP #6 Business Impact Analysis Tool Kit

Climate change and extreme weather events will impact businesses directly or indirectly resulting in damages or costs due to:

- Weather events
- Increased regulations
- Stringent requirements for compliance
- Legal liability related costs

Toolkit will help them to evaluate climate change mitigation, impact analysis and future planning.

CAP #7: Public Health Impacts of Climate Change

- Climate change has many direct and indirect impacts on the human health (Berry et al, 2014)

- **Direct health impacts** may include increased illnesses, injuries, and deaths from extreme weather events, or respiratory illnesses caused by changes in air quality.

- **Indirect health impacts** may include illnesses and deaths linked to climate-related changes in ecosystems, living environment, infectious agents, and agricultural production.

- Vulnerable people and communities will likely experience more frequent and severe health problems due to climate change.

Key factors for Hamilton

- Heat and Cold Alerts
- Air Quality
- Infectious Disease (West Nile/Lyme)
- Water-borne Diseases
- Food Quality and Supply
- Infrastructure Failure Related Impacts

CAP #7: Public Health Impacts of Climate Change

Air quality & related hospitalization rates & costs

Table 17
Health Costs Due to Poor Air Quality

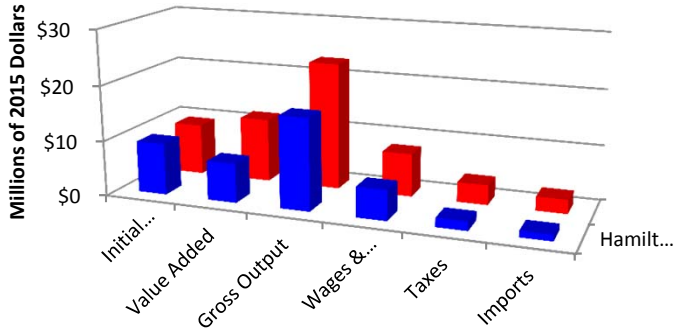
35,540,400	Population of Canada in 2014
$2,200,000,000	Total cost of hospitalization due to air quality in Canada in 2014
$61.90	Per capita cost of hospitalization due to air quality
547,519	Population of Hamilton 2015
$33,892,185	Total cost of hospitalization due to air quality in Hamilton
660,000	Hamilton population expected in 2031
1.175%	Population implicit growth rate
$40,854,914	Expected hospitalization costs in 2031
$37,373,550	Average cost between 2015 and 2031
$9,343,387	Hospitalization cost savings due to the elimination of 50% of emissions by 2031

CAP #7: Public Health Impacts of Climate Change

Air quality & related hospitalization rates & costs

- Total income of Ontario increased by ~$11.6 million
- Hamilton's share is about $7.1 million
- Wages/salaries augmented by ~$7.8 million. Net wage >$82,854 and total wage ~$72,715
- Over 107 FTEs of employment are generated in Ontario, with 70 FTEs in Hamilton
- $3.6 million taxes collected by all governments
- $0.211 million taxes collected by City of Hamilton

Figure 8
Economic Impacts of Annual Health Cost Savings



Environmental Impacts

Net CO_2 emission reduction of 1589 tonnes/year

CAP #8: Public Transit & Rapid Transit Lanes

a) Transportation contributes 33% of total GHG emissions in Hamilton.

b) Residents make approximately 1 million trips per day.

c) Automobiles handle 85% of daily trips.

d) Local transit now handling 6% of morning peak trips rather 12% in 1986.

CAP #8: Public Transit & Rapid Transit Lanes

a) Assumed that Hamilton's population would increase to 660,000 in 2031.

b) Share of transit riders would increase to 456,000 km per day in 2031 as compared to is 387,000 km per day in 2015.

Table 18
Transit Economic Benefits and Assumptions

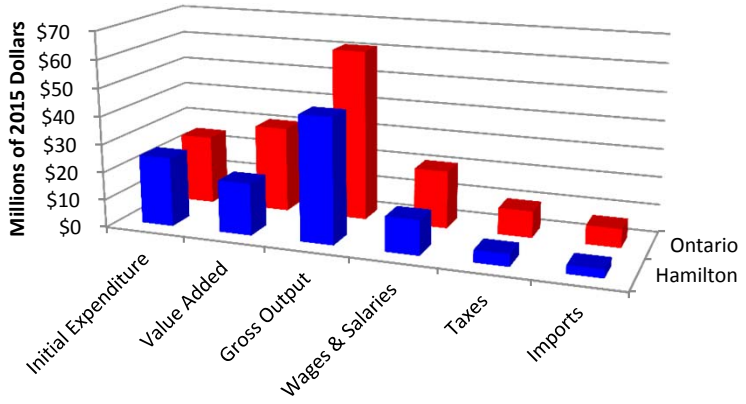
population 2011	519,950
population 2015	547,519
km by car 2015 per day	2,494,000
km by Transit 2015 per day	387,000
population in 2031	660,000
km by car 2031 per day	1,976,000
km by transit 2031 per day	456,000
net increase in transit km per day	69,000
net reduction in km by car per day	518,000
cost per km (1)	$0.1012
Daily saving to consumers	$52,404
Annual gross savings	$19,127,582
Increase in Transit Ridership Cost (2)	$18,400
Annual transit Cost increase	$6,716,000
Net annual saving	$12,411,582
Total car km saved per year	189,070,000
avg km per litre	10
total litres	18,907,000
litres per US gallon	3.787
total US gallons saved	4,992,606.28
CO2 per US gallon (tonnes)	0.00887
Emissions saved tonnes of CO2 per year	44,284.42
Fuel Cost Saved	$12,411,582
Total Costs Saved (3)	$24,823,163

Notes:
(1) Camary driven on average 18,000km /y and cost of litre is $1.23
(2) People travel between 0 and 15 km a day, on average 7.5 km/day, and $2 per ride
(3) We assume other costs (insurance, etc) to be another 10 cents per km Transportation Costs and Benefit Analysis, Table 7, Appendix D, VTPI, 2007, http:/www.vtpi.org/tca

CAP #8: Public Transit & Rapid Transit Lanes

- Total income of Ontario increased by ~$30.8 million
- Hamilton's share is about $18.6 million
- Wages/salaries augmented by ~$20.7 million. Net wage >$82,991 and total wage ~$72,667
- Over 285 FTEs of employment are generated in Ontario, with 185 FTEs in Hamilton
- $9.6 million taxes collected by all governments
- $0.56 million taxes collected by City of Hamilton

Figure 9
Economic Impacts of Transit Savings



Environmental Impacts

Net emission reductions of 208,714 tonnes of CO_2 /year

CAP #9: Green Spaces

- Greenspaces and parks improve property value
- Help in decreasing energy costs
- Planting 3 trees will save $100-$250/year/household in energy costs
- Landscaping renews business districts & draw more business
- Increase in employment and tourisms
- Trees/greenspace intercepts rainfall, increase infiltration & reduce runoff

- Annual tree planting - 12,000 trees
- Current urban forest cover – 18.76%
- Expected urban forest cover in 2030 – 35%

1% increase in green spaces reduces system health costs by 1%.

CAP #9: Green Spaces

- Total income of Ontario increased by ~$1.3 million
- Hamilton's share is about $0.86 million
- Wages/salaries augmented by ~$0.92 million. Net wage >$72,478 and total wage ~$68,699
- Over 13.4 FTEs of employment are generated in Ontario, with 7.3 FTEs in Hamilton
- $0.417 million taxes collected by all governments
- $0.27 million taxes collected by City of Hamilton

Table 20
Green Spaces Related Savings and Costs

Number of Trees	12,000
Labour per tree	$3.50
Materials per tree	$1.50
Total Labour	$42,000
Total Materials	$18,000
Household Energy Savings per Tree	$83
Total Energy Savings	$1,000,000

Source: Econometric Research Limited and U.S. Department of Energy

CAP #10: Oversight & Coordination Body

- The City and community partners will work together to implement CAPs.
- The City and community will be in shared partnership to act as a facilitator and process stewards.
- A new **Hamilton Climate Action Coordinating Committee** will be established to monitor activities and to provide strategic direction to the Climate Action Coordinator and partnership.

Summary of Total Impacts of all CAPs

Table 23
Estimated Annual Impacts of the Climate Action Plan Priorities in Hamilton

	Climate Action Plan	A. Environmental Impacts			B. Province Wide Economic Impacts					C. Regional Economic Impacts in Hamilton				
		GHG Emissions (tonnes CO2/year)			$000's	$000's	$000's	$000's		$000's	$000's	$000's	$000's	
		Gross	Reduction	Net	Total Investment and Incremental Expenditures	Gross Economic Activity	Value Added to Provincial Economy	Tax Revenue to all Levels of Government	Provincial Employment (FTEs)	Avoided Cost	Gross Local Economic Activity	Value Added to Local Economy	Tax Revenue to Local Government	Local Employment (FTEs)
1	Support Local Food Production and Consumption	16,072	3,541	12,531	$36,638	$86,268	$46,925	$14,052	842.0		$76,489	$44,572	$1,737	604.0
2	Establish On-Going Education and Awareness Program Campaign	34		34	$40	$116	$42	$13	0.5		$61	$22	$1	0.3
3	Develop a Community Energy Plan to Guide Hamilton's Energy Future	5,467	8,585	-3,118	$5,892	$14,644	$7,359	$2,275	68.4	$5,892	$10,429	$4,478	$142	44.5
4	Revise/Update Infrastructure Guidelines (annualized)	11,412	23,692	-12,280	$12,304	$30,310	$15,280	$4,734	141.1	$12,304	$22,394	$9,351	$278	91.7
5	Establish Variable Development Charges and Water Rates set to reflect real cost (10%).	14,606	8,336	6,270	$15,747	$38,791	$19,555	$6,059	181.0	$15,747	$28,345	$11,810	$355	118.0
6	Create an Accessible Tool Kit for SMEs to assist with impact analysis and Business Community Planning (one-time cost)	209		209	$250	$639	$334	$106	3.2		$488	$251	$7	2.1
7	Conduct a Local Community Vulnerability assessment of Public Health Impacts from Climate Change	8,634	7,045	1,589	$9,343	$23,015	$11,602	$3,595	107.2	$9,343	$16,537	$7,101	$211	69.7
8	Expand Local Transit Services to include a dedicated Rapid transit Lanes	23,024	231,738	-208,714	$24,823	$61,149	$30,827	$9,551	285.0	$24,823	$44,681	$18,617	$560	185.0
9	Protect and preserve green spaces	972	529	443	$1,060	$2,652	$1,349	$417	13.4	$1,000	$2,000	$860	$27	7.3
10	Establish an Ongoing Oversight and Coordination body to Guide and report on Hamilton's Climate Change Action Plan.	115		115	$147	$377	$208	$66	1.8		$182	$129	$4	0.9
	TOTAL	**80,546**	**283,467**	**-202,920**	**$106,244**	**$257,961**	**$133,481**	**$40,868**	**1,643.6**	**$69,109**	**$201,606**	**$97,191**	**$3,321**	**1,123.5**

Source: Econometric Research Limited

Summary of Total Impacts of all CAPs

1) Net reduction of 202,920 tonnes of CO_2/year from the implementation of the CAPs.
2) 1,643.6 FTEs - full-time jobs in Ontario, with 1,123.5 FTEs located in Hamilton.
3) $133.5 million/year increase in income for Ontario, with $97.2 million/year increase for the City of Hamilton.
4) $40.9 million/year increase in tax revenues, with $3.3 million for the city of Hamilton.
5) $69.1 million/year avoided costs for households, businesses and governments.
6) Improved air quality and expansion of greenspace. Their impacts are not fully quantifiable.

Thanks for your attention

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