



Energy and Urban Innovation in the Toronto Region

Steve Dorey
Chair, Studies Committee
Energy Council of Canada
steve.dorey@energy.ca



Energy Council of Canada
Conseil canadien de l'énergie



WORLD ENERGY COUNCIL
CONSEIL MONDIAL DE L'ÉNERGIE





Toronto and the Greater Golden Horseshoe



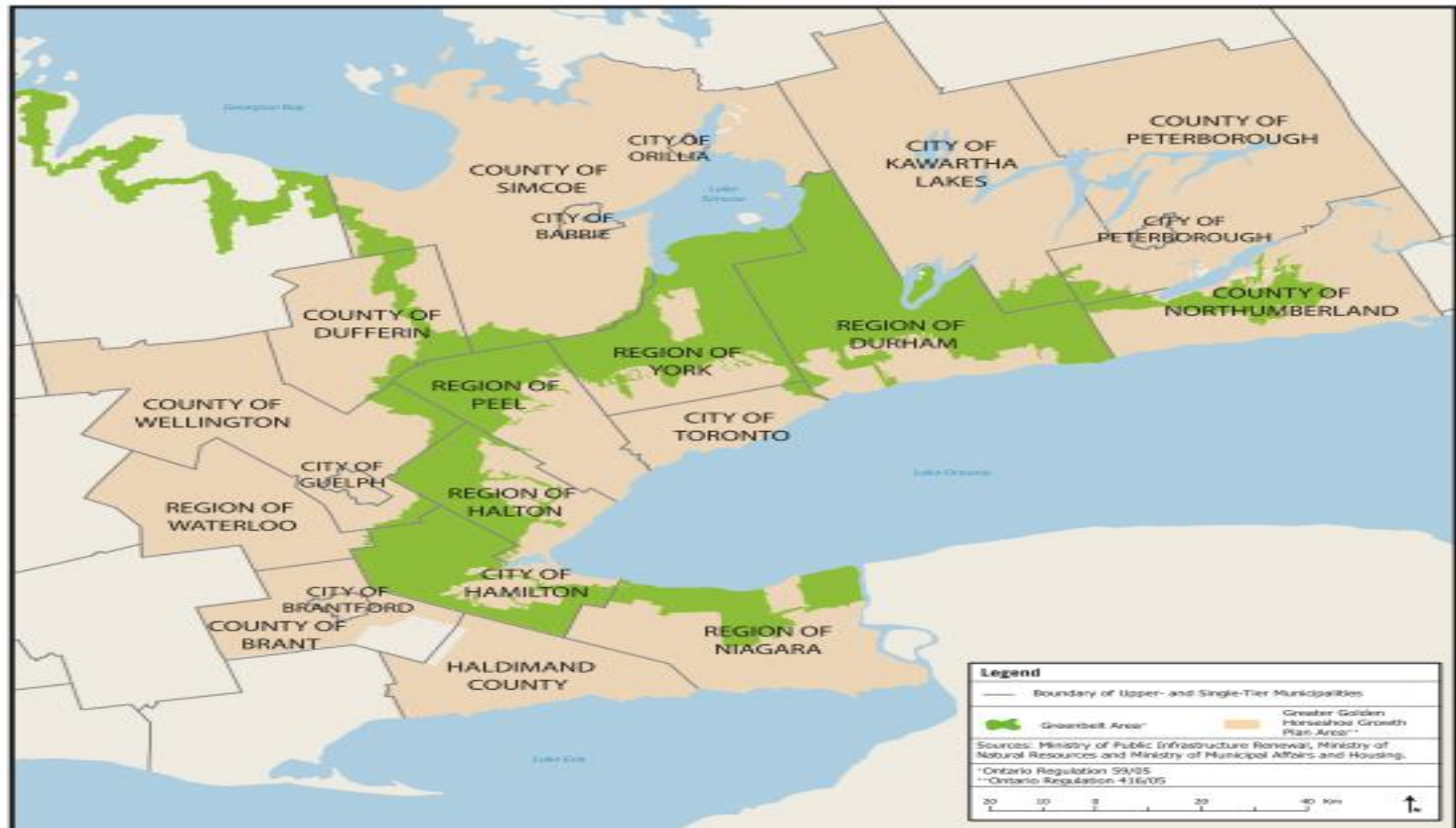


Toronto and Greater Golden Horseshoe Challenges and Opportunities

- Mature City with Growing Population
- Increasing Density for Both City Core and Suburbs
- “City of Towers”
- Multiple Growth Nodes
- Transforming Radial Transport System to Growth Pole Matrix
- Coal Phase-Out
- Clean Baseload Power Supply: Nuclear and Renewables
- Natural Gas & Hydro Peaking
- Smart Grid Leadership
- Green Belt and Urban Canopy
- Deep Water Cooling

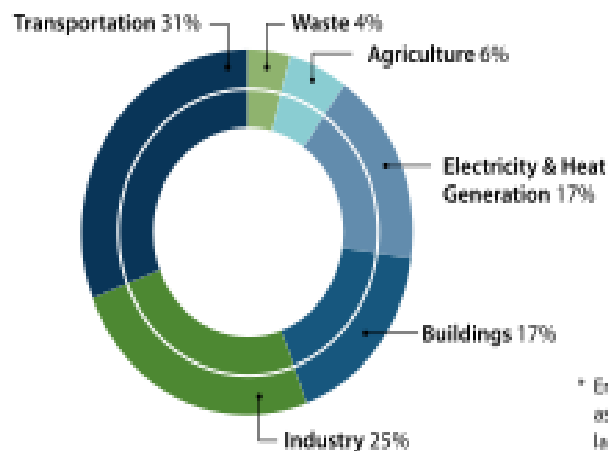
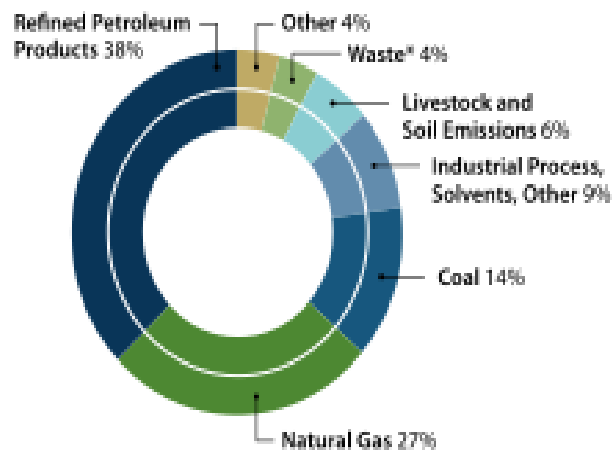


Greater Golden Horseshoe





GHG Sources in Ontario



* Emissions from waste include emissions associated with solid waste disposal on land, wastewater handling and waste incineration.

2. GHG emissions from goods and services that are imported into Ontario, including electricity, are not counted towards Ontario's emission totals. That is because those emissions are accounted for in the official reports of the jurisdictions where the goods and services originate. In the same way, Ontario counts the GHG emissions from goods and services that are produced within the province for export – such as automobiles – as part of its GHG totals, even though the goods and services are consumed elsewhere.

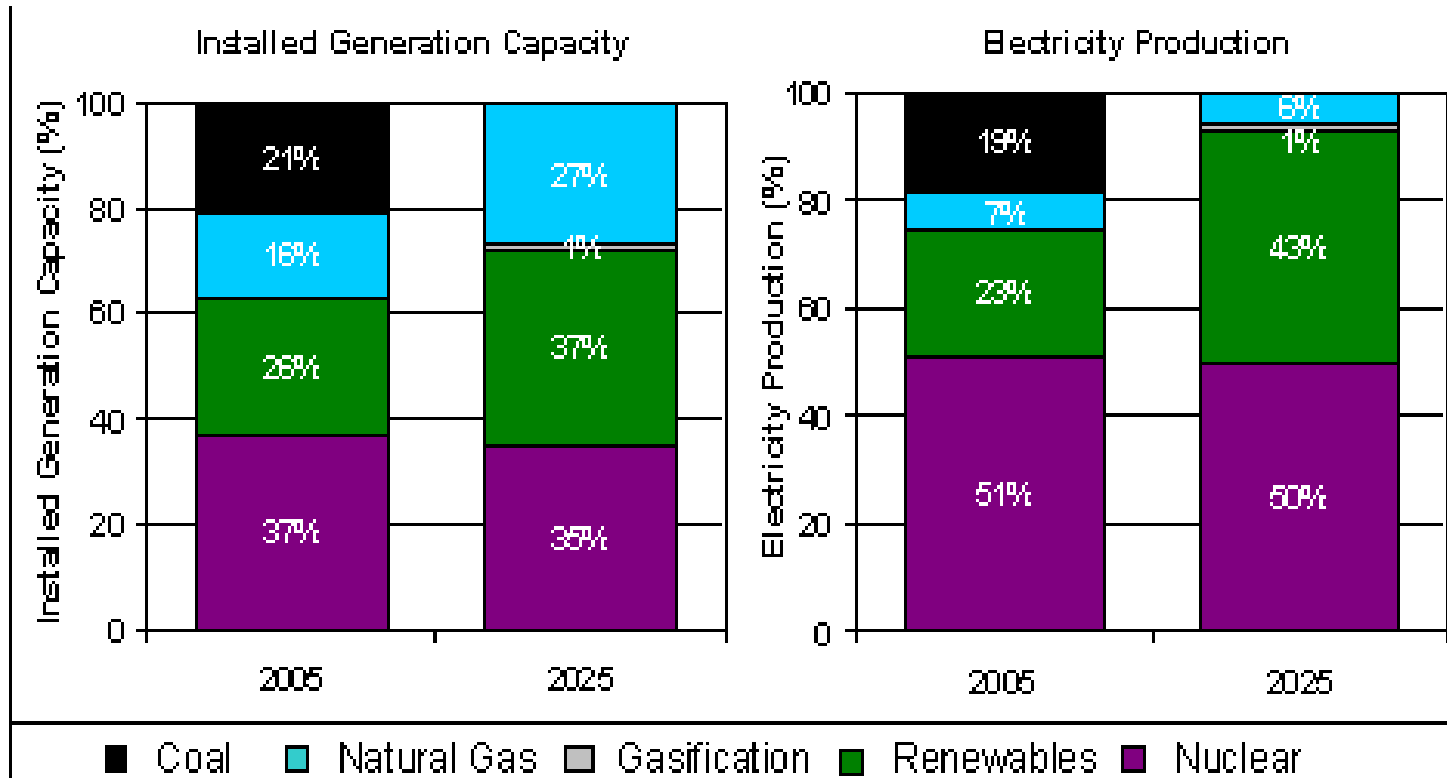


Ontario Climate Change Action Plan: Largest Initiatives

Measure	Delivery Agencies	2014 GHG Reduction (Mt CO2 eq)	2020 GHG Reduction (Mt CO2 eq)
Coal phase out and related measures	Ontario Power Authority, Ministries of Energy and Environment	26.4	29.1
Federal auto emission standards	Ministry of Environment, Canada	2.24	5.45
Energy Efficiency Standards	Ministries of Energy and Housing	1.16	1.97
Methane Landfill Capture	Ministry of Environment	2.19	2.40
Building Code	Housing	1.16	1.97



Changing Electricity Fuel Mix



Source: OPA; Note: Figures shown take into account the reduction in demand due to conservation activities

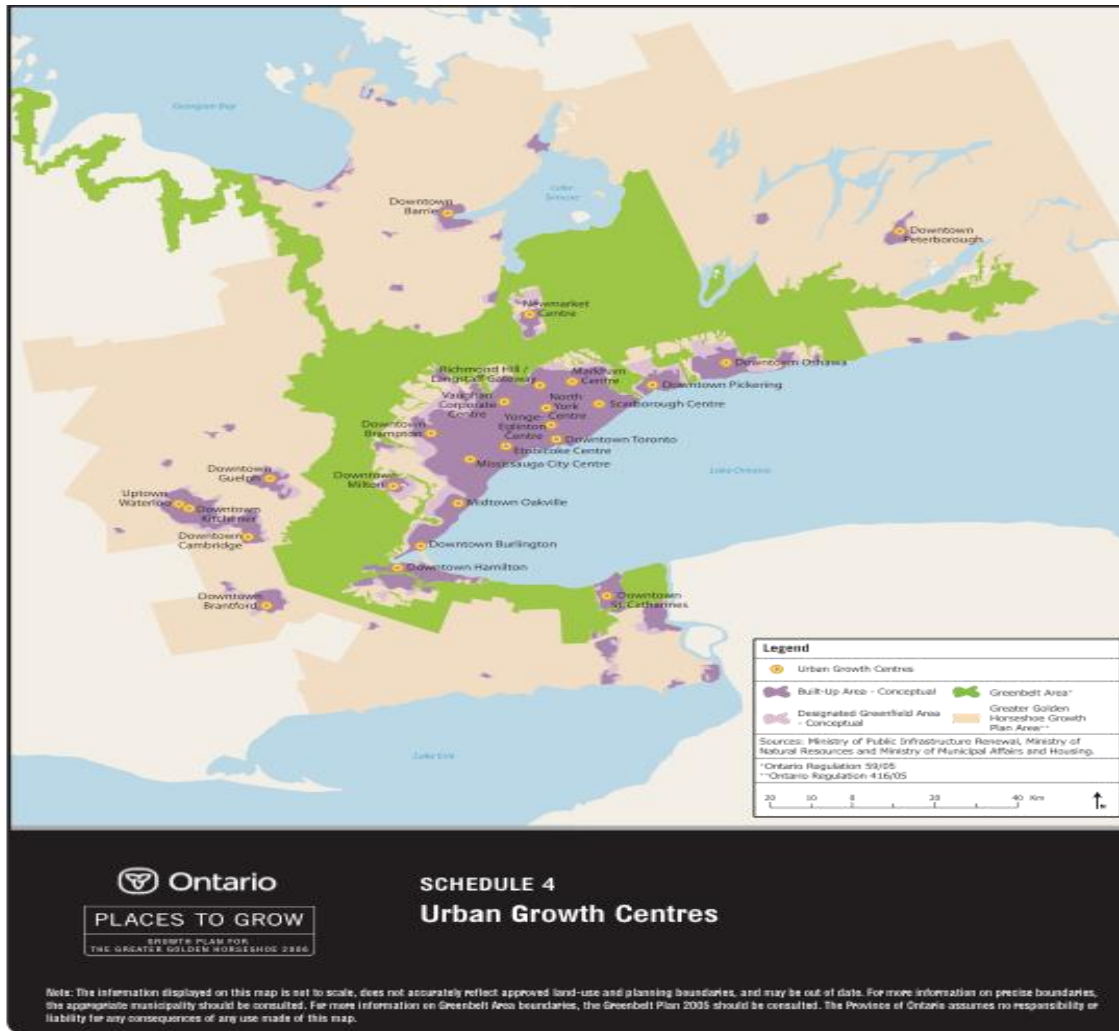


Other Major Provincial Initiatives

- Smart Grid
- Renewable Feed-in Tariffs
- Electric Vehicles: Tax Credits/Research Support/Infrastructure
- Fleet retrofits and anti-idling technology
- Electrification of mass transit and commuter rail
- Urban intensification
- Combined heat and power
- E85 fuel standards for provincial vehicles
- Reforestation and Greenbelt protection
- High speed rail feasibility



Urban Growth Centres





GHG Sources in the City of Toronto

Market Sector	Electricity		Natural Gas		Total GHG Emissions (Mt/yr)
	Consumption (GWh/yr)	GHG Emissions (Mt/yr)	Consumption (Mm ³ /yr)	GHG Emissions (Mt/yr)	
Commercial	14,806	3.61	1,303	2.63	6.24
Industrial	2,553	0.62	589	1.19	1.81
Residential	7,658	1.87	2,270	4.58	6.45
Other	511	0.12	42	0.08	0.21
Total	25,527	6.23	4,205	6.49	14.72

*GWh = Giga (10⁹) watt-hour Mt = Mega (10⁶) tonnes Mm³ = Million (10⁶) cubic metres

Figure 2: Electricity Consumption by Sector

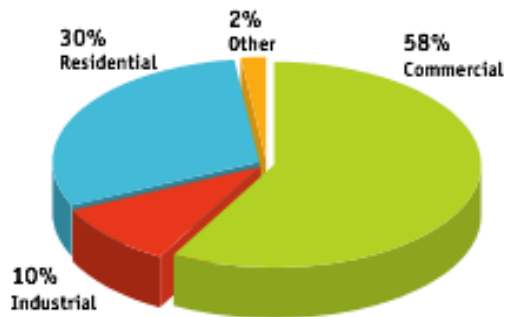
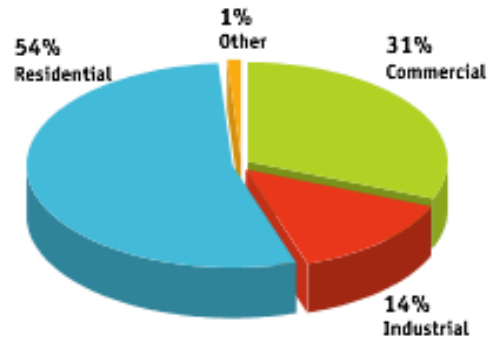


Figure 3: Natural Gas Consumption by Sector





City of Toronto Targets

(Based on 2007 levels of 5,000 Megawatts (MW) of electricity consumption and 4,200 Million cubic metres (Mm³) of natural gas consumption.)

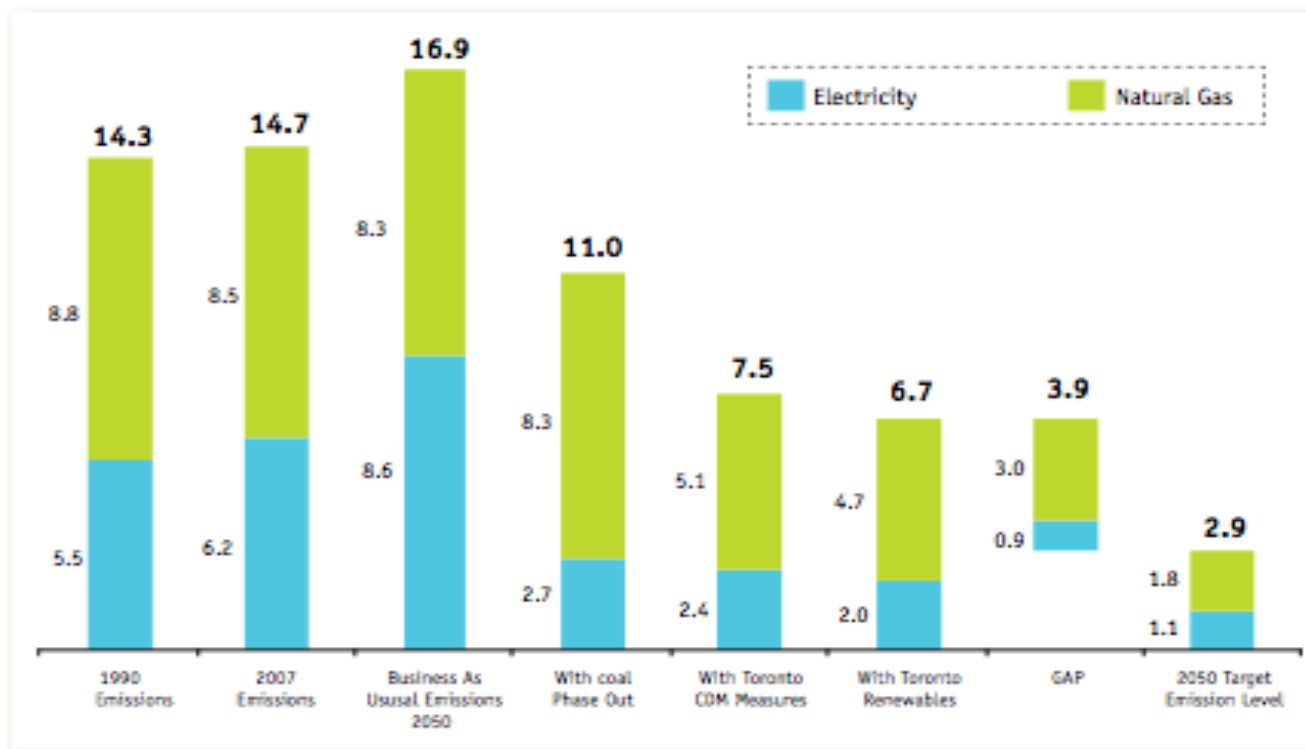
SOURCE	By 2012	By 2020	By 2050
Conservation— Electricity *	Reduce by 200 MW	Reduce by 550 MW	Reduce by 1050 MW
Conservation— Natural Gas Heat	Reduce by 240 Mm ³	Reduce by 730 Mm ³	Reduce by 1560 Mm ³
Renewable Electricity Generation	Increase by 120 MW	Increase by 550 MW	Increase by 1000 MW
Renewable Thermal Energy	Displace 20 Mm ³ of Natural Gas	Displace 90 Mm ³ of Natural Gas	Displace 200 Mm ³ of Natural Gas





City of Toronto Emission Projections

Figure 1: Greenhouse Gas Emission Projections from Electricity Generation and Natural Gas Usage Including Coal Phase Out, Conservation Measures and Renewable Energy Generation, 1990-2050 (megatonnes per year)





Municipal Initiatives

- Deep Water Cooling
- Tower Renewal
- 50% increase in urban canopy
- Eco roofs
- Greening the municipal fleet
- Integrated energy planning
- Markham Community Centre
- Guelph community energy planning
- Harbourfront Revitalization/Pan Am Games





Remaining Challenges

- Pricing carbon and congestion
- Coordination among governments
- Changing lifestyle choices
- Combined heat and power
- Climate change adaptation





Appendix:

Growth Plan for the Greater Golden Horseshoe

- Directs growth to built-up areas with the capacity to best accommodate expected population and employment growth;
- Provides strict criteria for settlement area boundary expansion;
- Preserves employment areas for future economic opportunities;
- Identifies and supports a transportation network that links urban growth centres through an extensive multi-modal system anchored by efficient public transit, together with highway systems for moving people and goods;
- Plans for community infrastructure to support growth;
- Ensures sustainable water and wastewater services to support future growth;
- Identifies natural systems and prime agricultural areas, and enhances the conservation of these resources;
- Supports the protection and conservation of water, energy, air and cultural heritage, as well as integrated approaches to waste management.