

**International Council for Local Environmental Initiatives**  
*Cities for Climate Protection*

# Climate Change -- Local Action for Global Results

*Presentation Slides, March 1999*  
Ralph Torrie, Torrie Smith Associates and  
Deputy Director, ICLEI Cities for Climate Protection  
Campaign



Ralph Torrie  
Suite 302, 255 Centrum Boulevard  
Orleans, Ontario, Canada K1E 3V8  
Tel 613-824-3045 Fax 613-824-3297  
Email: rtorrie@torriesmith.com  
www.torriesmith.com



## Three Key Premises

- A deep and lasting transition to a low carbon future cannot be achieved without the active engagement of local governments. Local governments largely determine the level of greenhouse gas emissions in the society. The phrase “local government” is used in its broadest sense here -- cities, towns, school and hospital boards, universities and other large institutions, etc.
- The pursuit of emission reduction and other greenhouse gas mitigation strategies brings multiple benefits to the community and complements other community objectives for environmental improvement, economic development, public health and enhanced livability.
- There is a huge variation in the level and pattern of emissions and mitigation opportunities from one locality to the next -- LOCAL action plans for greenhouse gas mitigation are necessary for success at the national level. This in turn underscores the need for capacity at the local authority level to develop and implement such strategies.

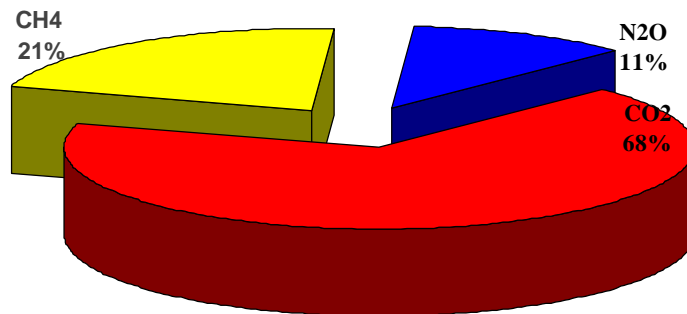


## A Quick Look at the Greenhouse

- ★ Strong Scientific Consensus We Have a Serious Problem
- ★ Large Gap Between Required Emission Reductions and Current Commitments
- ★ Energy-Related Carbon Dioxide is By Far the Most Important Anthropogenic Source of Global Warming,, Methane a Distant Second
- ★ In the Short Term, Barriers to Progress Neither Technical Nor Economic
- ★ International and National Regulatory Constraints Are Coming, Sooner or Later

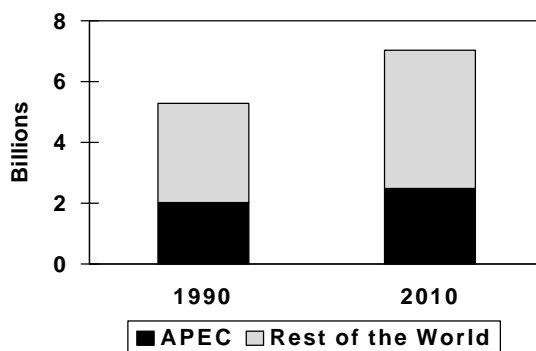


## World Emissions of Greenhouse Gases (eCO2)



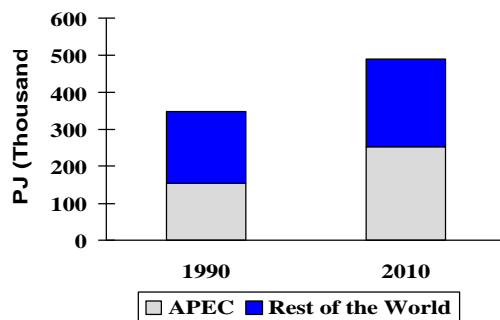
Total Emissions in 1990 approx 40,385 Megatonnes

## Population APEC and the World



APEC nations accounted for 39% of world population in 1990.  
They are projected to account for 35% of world population by the year 2010.

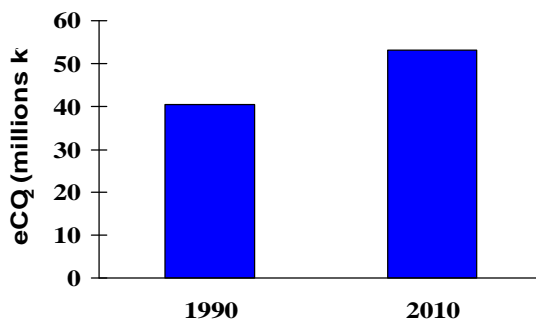
## Primary Energy APEC and the World



APEC nations accounted for 44% of world primary energy use in 1990. They are projected to account for 51% of world primary energy use by the year 2010.

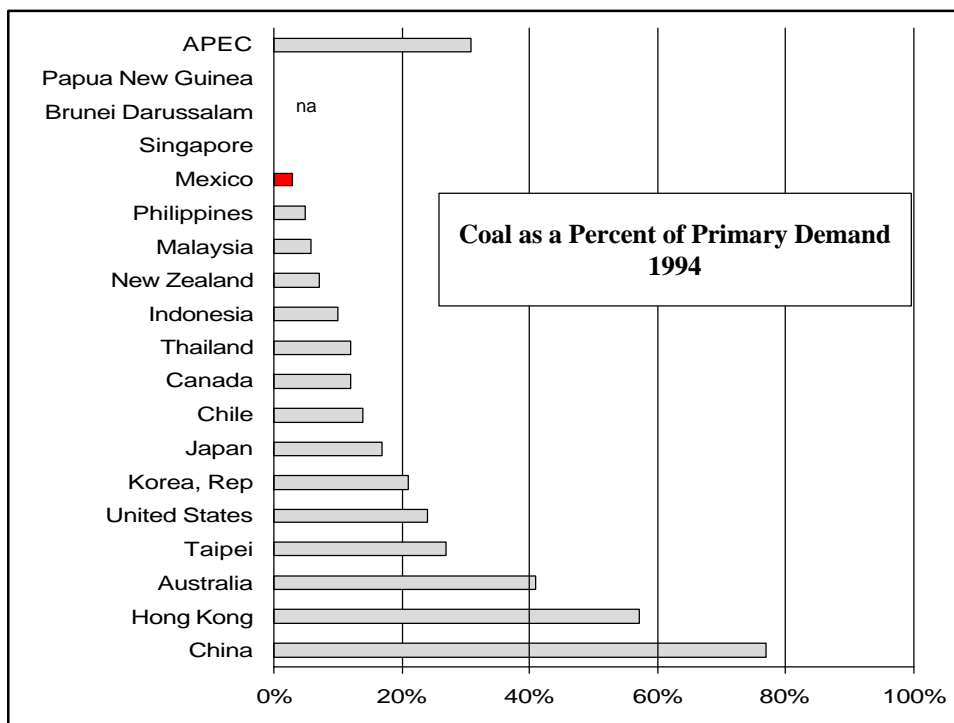
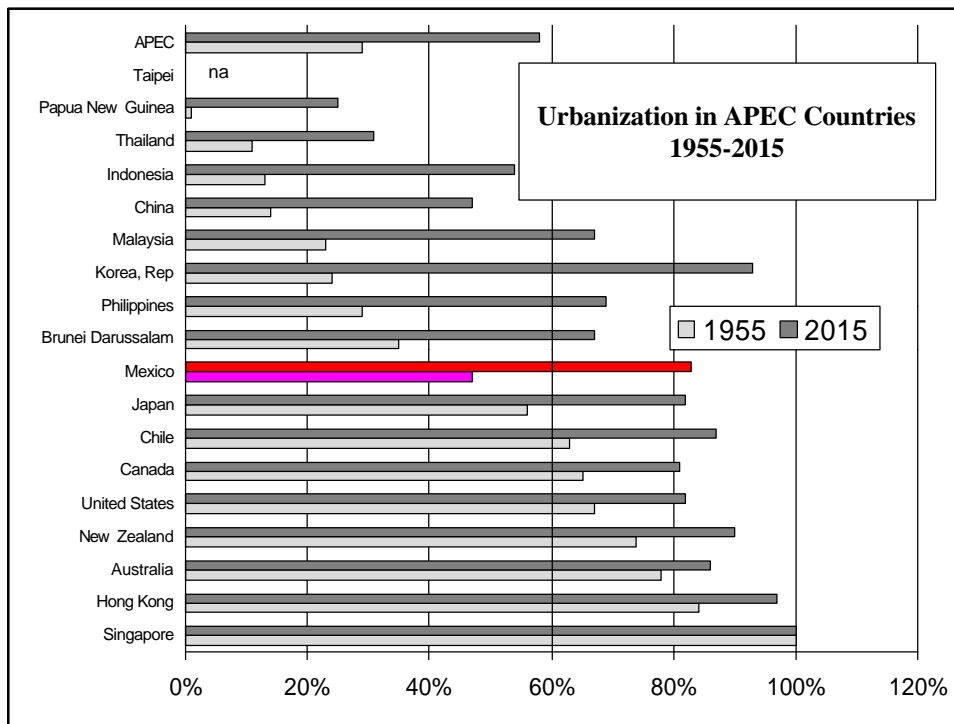


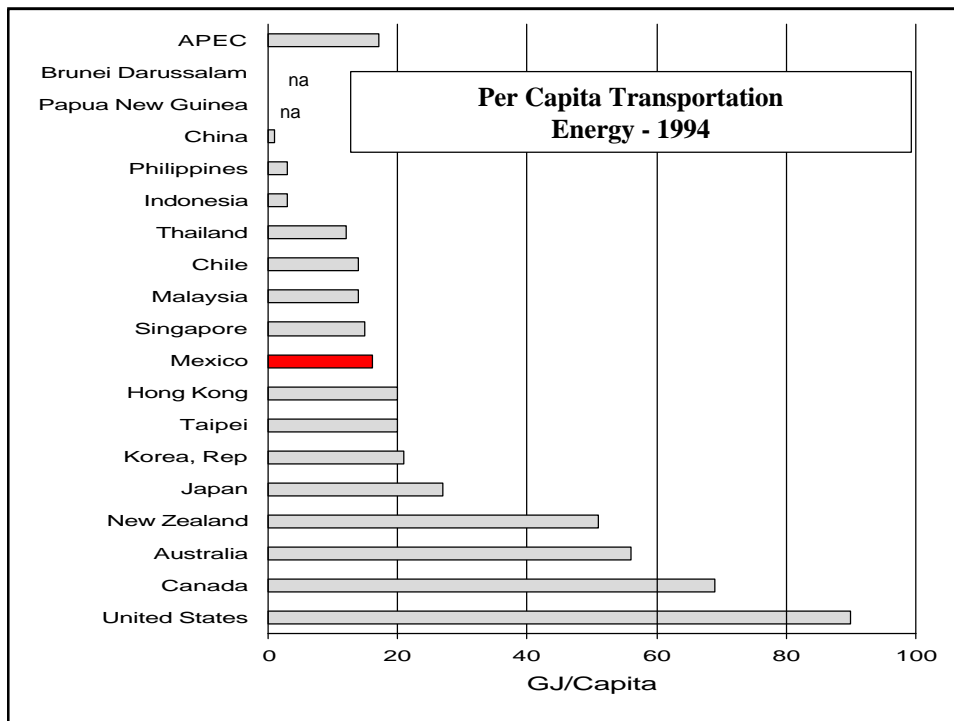
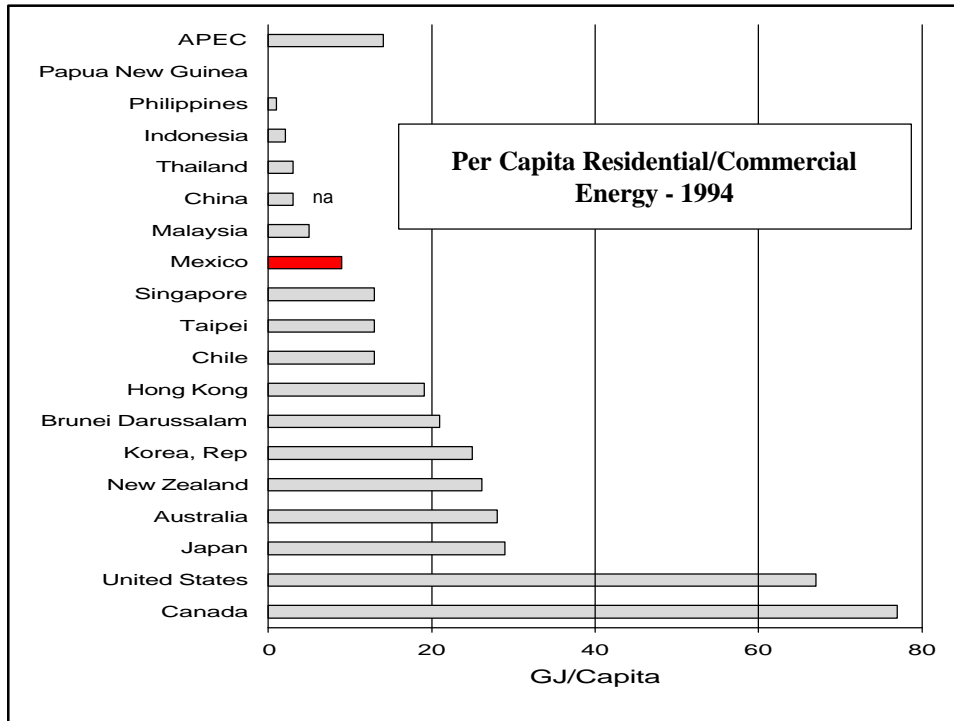
## World Anthropogenic Greenhouse Gas Emissions

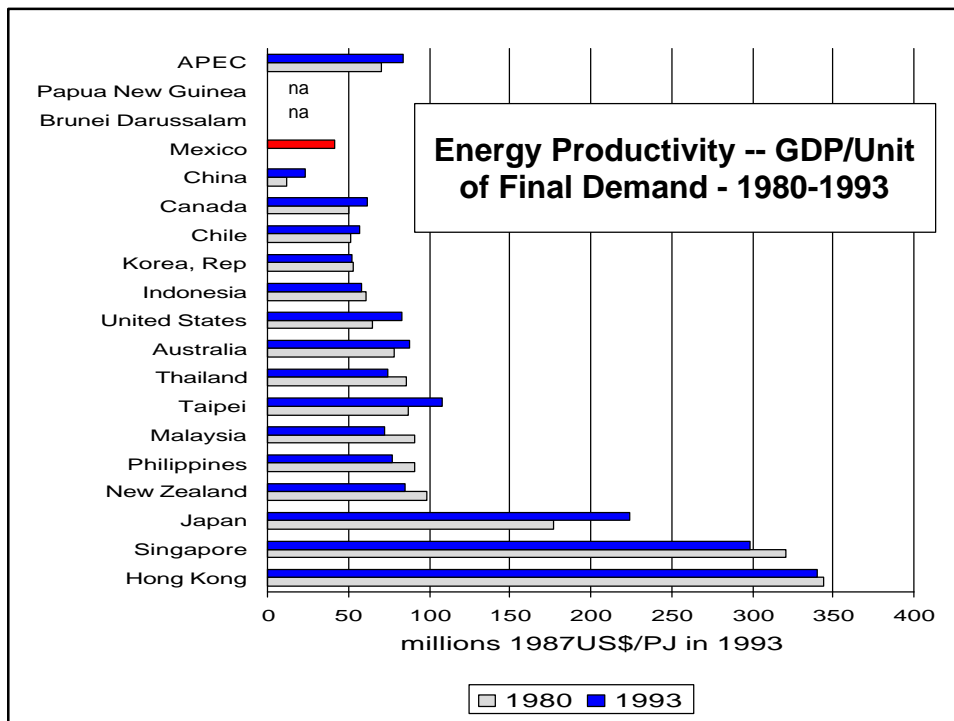
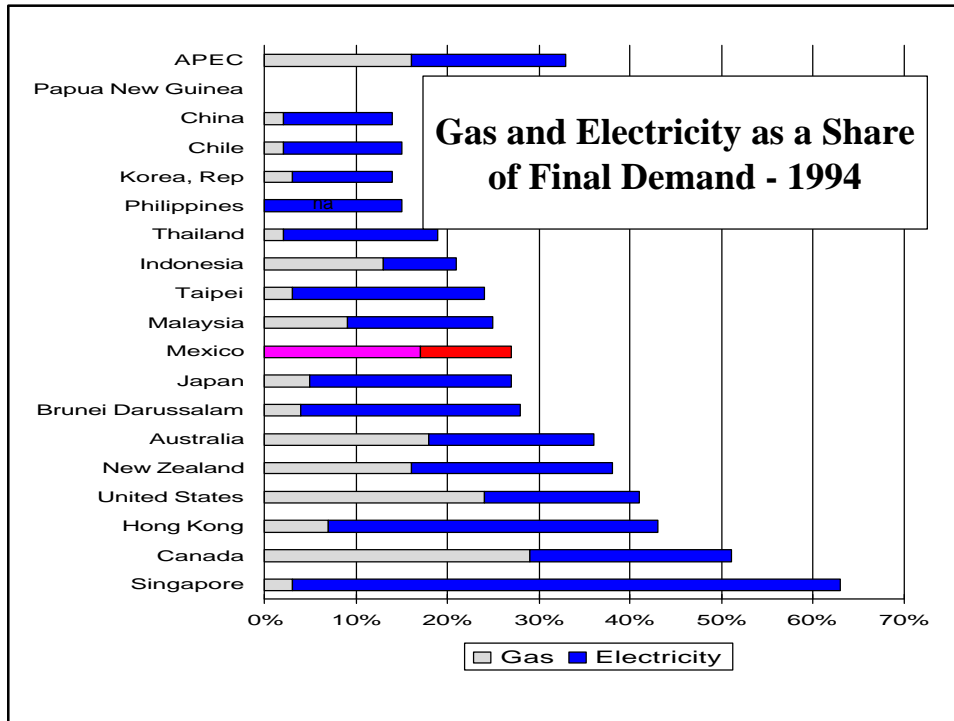


CO<sub>2</sub> emissions from fossil fuel combustion accounted for 55% of world anthropogenic greenhouse gas emissions in 1990. It is forecast to account for 59% of world greenhouse gas emissions by the year 2010.

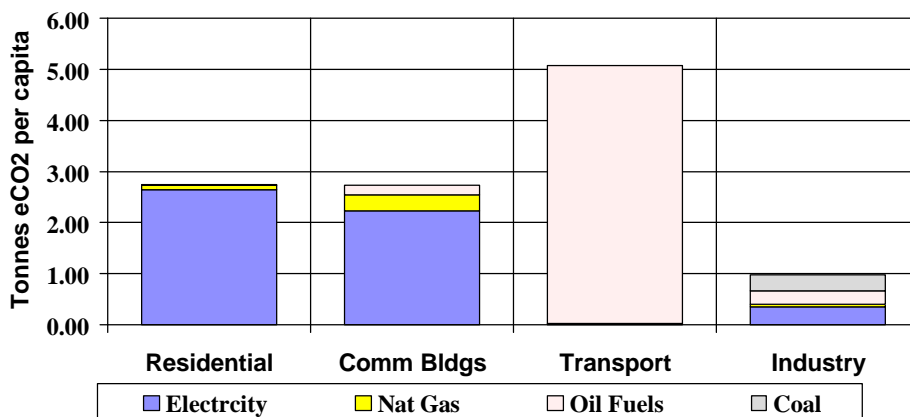




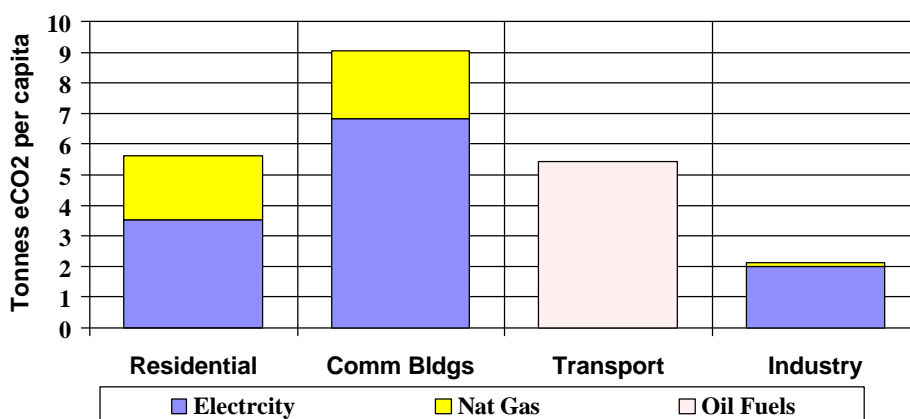


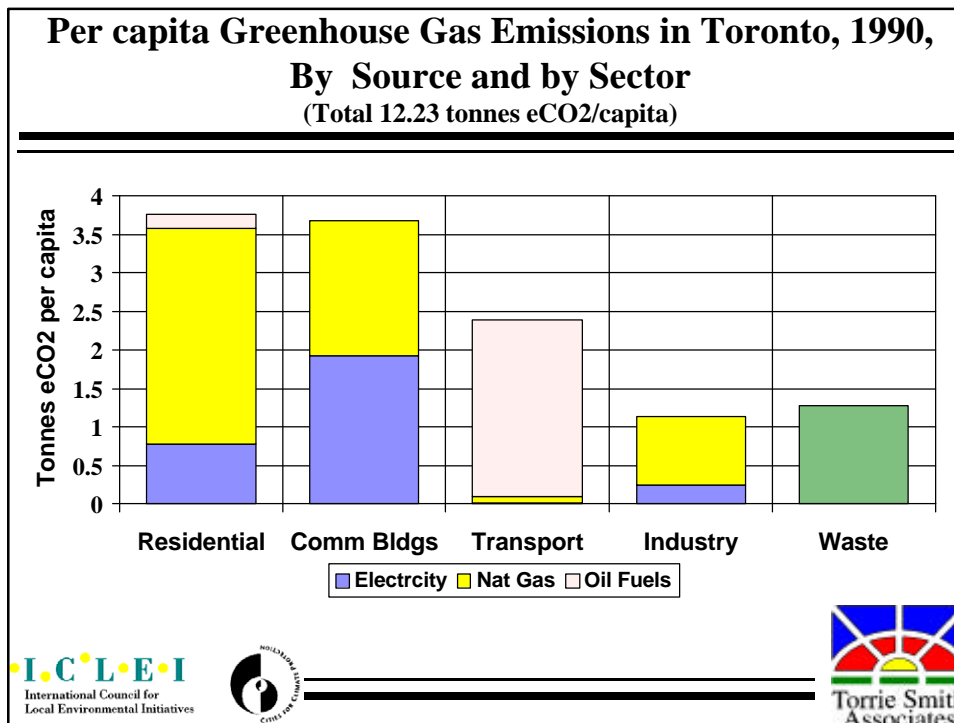
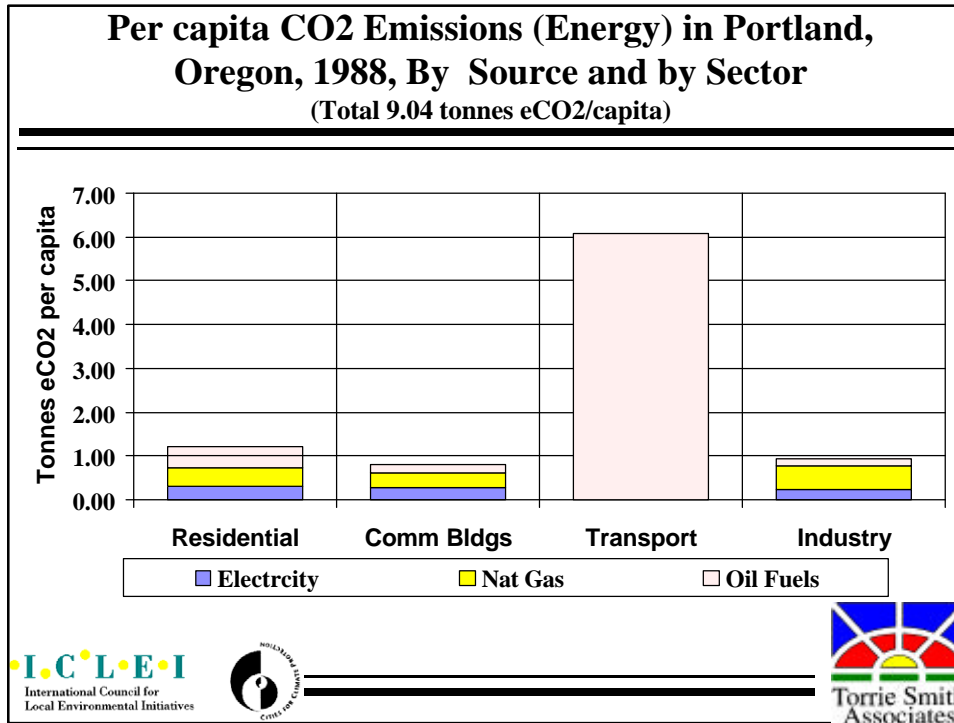


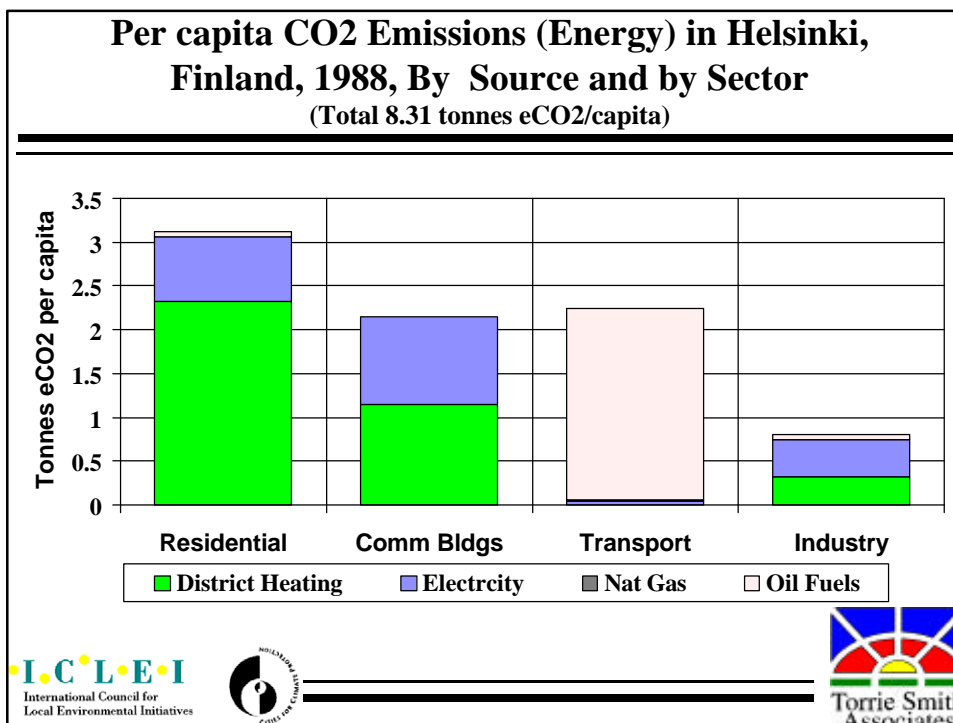
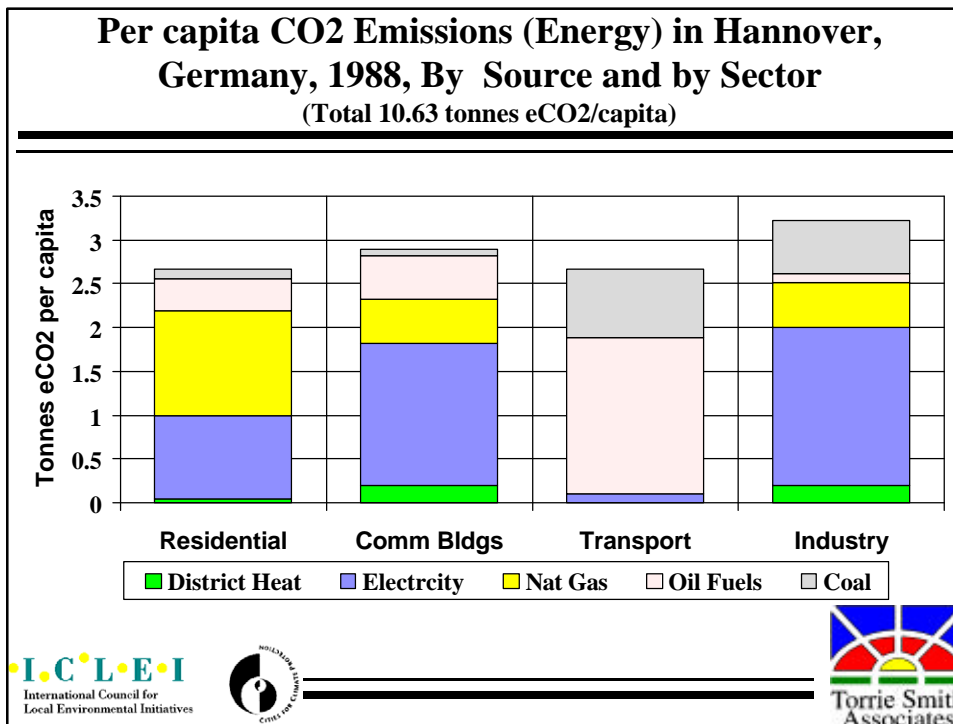
**Per capita CO2 Emissions (Energy) in Miami, Florida  
(Dade County) in 1988, By Source and by Sector**  
(Total 11.56 tonnes eCO2/capita)

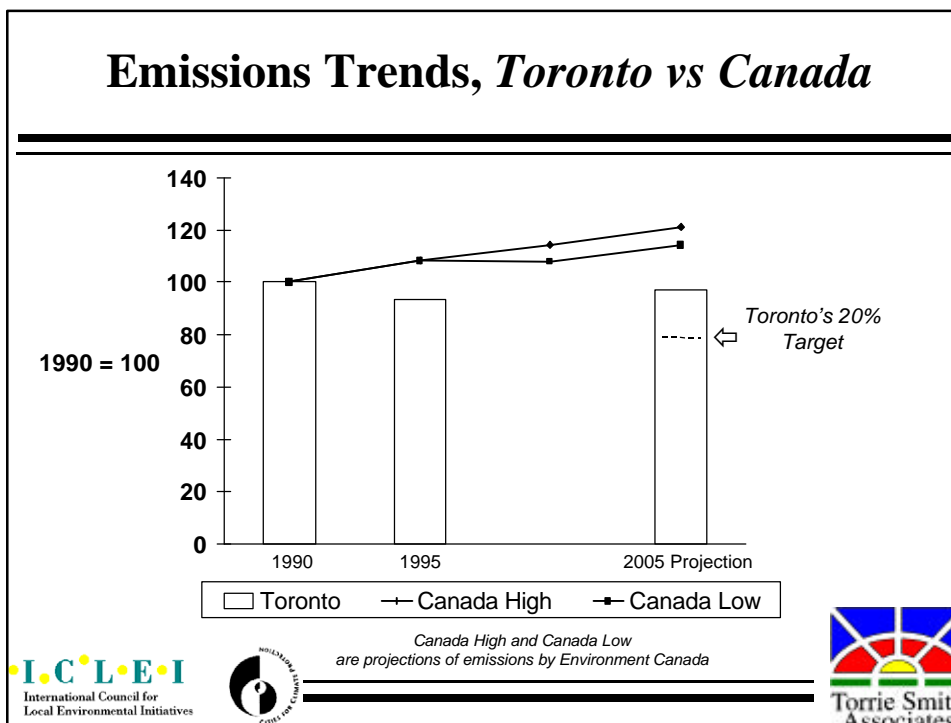
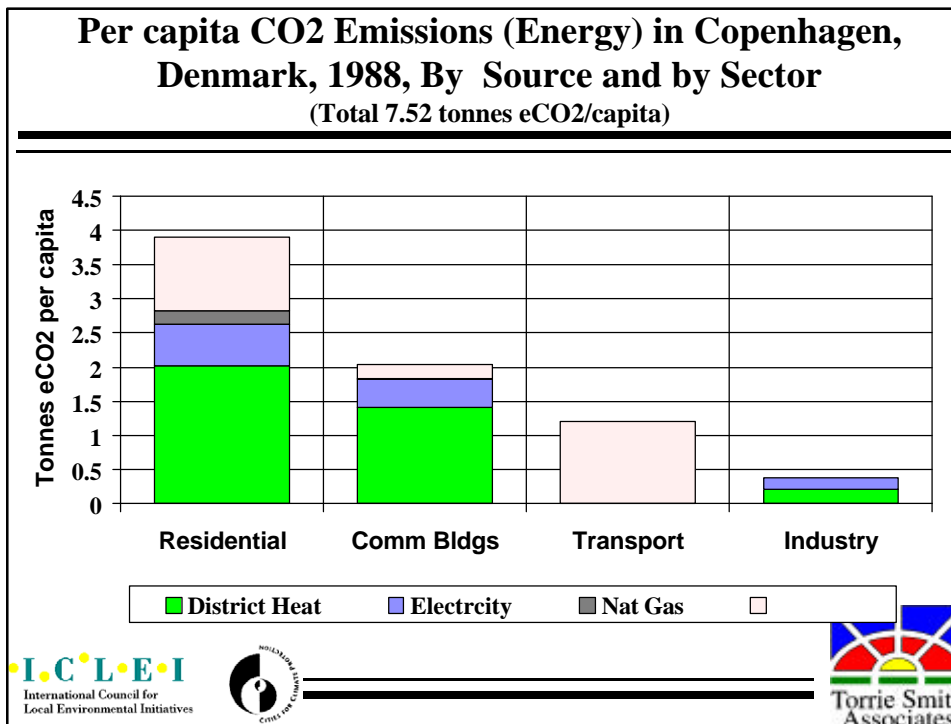


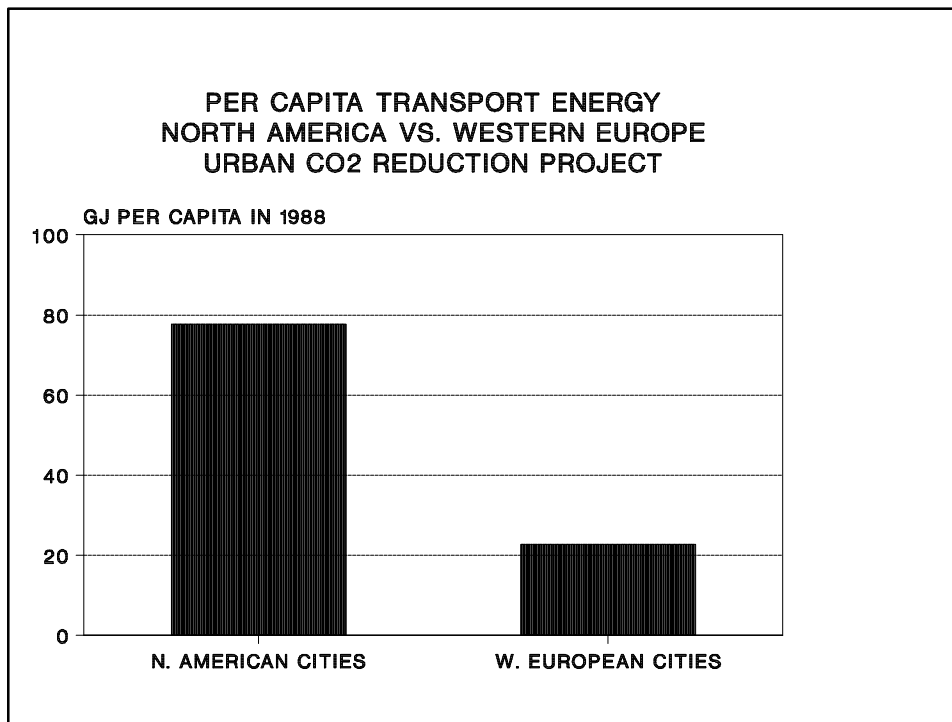
**Per capita Greenhouse Gas Emissions in Denver,  
Colorado, 1988, By Source and by Sector**  
(Total 22.26 tonnes eCO2/capita)











**Local governments influence emissions and the scope for emission reductions through their direct and indirect control and influence over such items as:**

- *Local roads, including traffic management and parking*
- *Transportation other than roads, including public transit, cycling, pedestrian infrastructure*
- *Recreational and cultural facilities, community heritage, park lands and green space*
- *Policing, the safety and protection of people and property*
- *Social welfare assistance and services*
- *Business and economic development*
- *Planning, operation, ownership and policy direction of public transit*
- *The pattern of public and private investment in the community*
- *The determination of urban form through zoning and land use regulation*

## And the list continues...

- *Regulation and planning of land use and the built environment, including residential and commercial buildings, site layout*
- *Storm sewers and drainage infrastructure*
- *Aspects of environmental and public health and safety*
- *Solid waste management, recycling and landfill facilities*
- *Firefighting and prevention capability*
- *Water supply and sewage treatment infrastructure*
- *Their own use of fuels and electricity*
- *Ownership, control of energy utilities*



## Greenhouse Gas Reduction Strategies Yield Multiple Benefits

- ★ **Local Air Quality Improvement**
- ★ **Financial Savings**
- ★ **Job Creation**
- ★ **Local Economic Development**
- ★ **Strategic Partnerships**
- ★ **Sustainable Development**



## Strategic Principles for Sustainable Cities

- ★ Ecological Integrity
- ★ Anticipate and Prevent
- ★ Human Welfare
- ★ Social Justice
- ★ Self-Determination
- ★ Negotiate “Outward”



## Design Guides for Sustainable Urban Energy

- ★ An Energy Demand Focus
- ★ Efficiency
- ★ Renewable Energy Resources
- ★ Environmentally Benign
- ★ Least Cost
- ★ Diversity, Flexibility, Resilience
- ★ Equitable
- ★ Socially Benign



## Urban Strategies for Sustainable Energy

- ★ Establish Clear, Measurable Targets
- ★ Recognize Multiple Benefits
- ★ Political Leadership, Community Involvement
- ★ Bureaucratic Support
- ★ Partnerships, Innovative Financing
- ★ Market Mechanisms
- ★ Collaboration with Other Local Governments
- ★ Monitoring and Evaluation
- ★ Integrated Program Delivery.



## Barriers

- This is an unfunded non-mandate for local governments
- Lack of technical expertise on energy and emissions issues in local government
- First cost barriers, financing constraints
- Local government requirements for quantification and evaluation are somewhat different from those of national governments; ICLEI has had to develop new methods
- In some cases, difficult to assign particular tons of emission reduction to particular programs or measures
- Some benefits of local action plan are not easily quantified
- Energy data not compiled at the local government level



## Cities for Climate Protection Campaign

- **International network of cities committed to strategic local action on climate change**
- **As of December 1998, 260 members representing over 175 million people from 41 nations, and accounting for 7% of global CO2 emissions**
- **Active national campaigns in United States, Canada, Australia; strong membership and regional activity in Europe; growing interest from developing country towns and cities**



## Cities for Climate Protection

- **Encouragement of and support for local governments working to reduce greenhouse gas emissions and air pollution through local actions**
- **Development of methods and tools to support local government action**
- **Facilitation of local government representation in national and international policy forums (series of summit meetings including Berlin, Saitama, New York)**



## CCP Membership Requirements

- A local government resolution adopted by the council or appropriate bureaucratic authority
- Commitment to meeting FIVE KEY MILESTONES
  - 1 *Emissions analysis, for both community and in-house operations for selected base year*
  - 2 *Forecast emissions for the target year*
  - 3 *Establish an emissions reduction target*
  - 4 *Evaluate measures, develop local action plan, obtain approval*
  - 5 *Implement Policies and Measures, Track Progress*



## Quantification

- CCP has been a performance based campaign, from the outset
- Quantification of emissions and emission reductions is a required element for campaign participation
- ICLEI and the member cities of CCP are developing methods and standards for local government emission reduction quantification, monitoring and evaluation



## Analytical and Data Issues

- Inventory Vs. Measure Evaluation
- Physical Boundary -- City Vs. Metro
- Which Gases? Which Emissions?
- Special Case of Electricity
- Data Trackability Vs. Data Quality
- Bottom Up Vs. Top Down
- How Much Detail is Enough?



## Quantification in the Cities for Climate Protection Campaign I

- A detailed protocol for quantification of emissions and emission reductions has been developed and is being applied in the CCP campaign
- The protocol is embedded in software that has been developed for the CCP to quantify emissions and emission reduction measures
- Scope includes both in-house emissions from local government operations and emissions from the community at large



## Quantification in the Cities for Climate Protection Campaign - II

- All Kyoto gases included, but focus is on CO2 from energy and methane from organic waste
- Electricity emissions tracked on an end use basis
- Methane commitment method used to supplement “waste in place” approach to methane emissions
- Standardized bottom-up approach to transportation sector based on simple five factor formula -- trips, trip lengths, vehicle efficiency, vehicle occupancy, emissions per unit of fuel



## Greenhouse Gas Mitigation and Quantification Framework -- Design Guidelines

- User requirements come first.
- Pragmatic -- the “so what” test rules. Stick to what matters most.
- Flexible -- diversity of users with different levels of resources and data.
- Reproducible -- tracking and evaluation. Use existing databases.
- Standardized -- common methods, protocols.
- Integrated -- co-benefits, air pollutants, paybacks.



## Greenhouse Gas Emissions Software -- the Need

- A tool for comprehensive, strategic planning
- NOT a tool for detailed analysis of building energy systems or electricity DSM measures or any other specific type of measure
- Compiles information about emissions and emission reductions from all sources in a single framework to facilitate target-oriented strategic planning for emission reductions

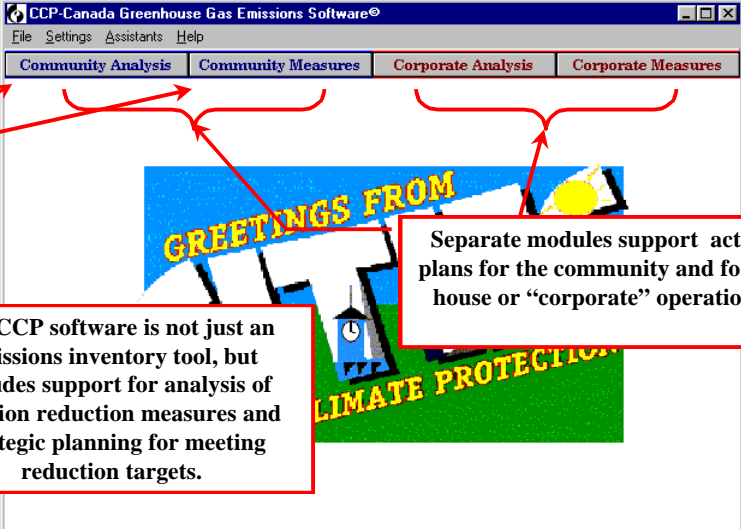


## Objectives of the CCP Software

- To help members of the Cities for Climate Protection Campaign develop their local action plans and monitor emission reduction progress. To empower local governments to contribute to national GHG emission reduction targets.
- To quantify the financial savings, criterion air pollutant reductions and other co-benefits of greenhouse gas emission reduction strategies
- By standardizing methods and conventions, to facilitate the sharing of information, expertise and resources among local governments



*Membership in the FCM/ICLEI Partners for Climate Protection Campaign includes access to the CCP Greenhouse Gas Emissions software, the world standard for local government reporting and analysis of greenhouse gas emissions....*



The screenshot shows the CCP-Canada Greenhouse Gas Emissions Software interface. The title bar reads "CCP-Canada Greenhouse Gas Emissions Software®". The menu bar includes "File", "Settings", "Assistants", and "Help". The main window has four tabs: "Community Analysis", "Community Measures", "Corporate Analysis", and "Corporate Measures". Below the tabs is a graphic with the text "GREETINGS FROM" and "CLIMATE PROTECTION".

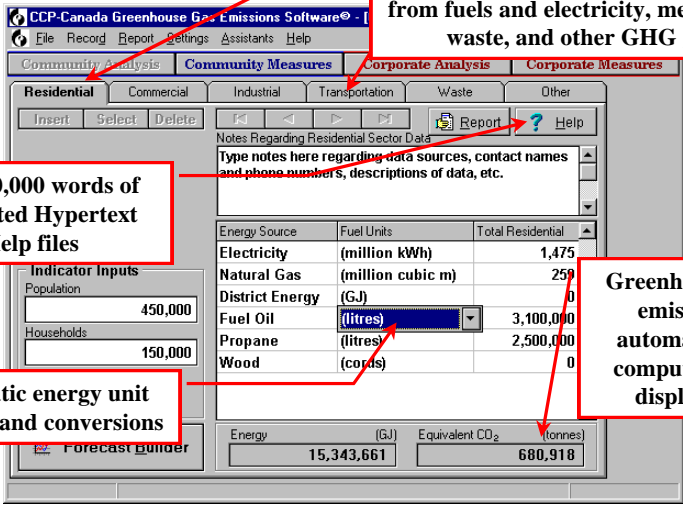
The CCP software is not just an emissions inventory tool, but includes support for analysis of emission reduction measures and strategic planning for meeting reduction targets.

Separate modules support action plans for the community and for in-house or "corporate" operations.

## The CCP Greenhouse Gas Emissions Software:

- Helps local governments -- big and small -- develop local action plans and monitor progress in the reduction of greenhouse gases, and empowers local governments to contribute to national GHG emission reduction targets.
- Quantifies the financial savings, air pollution and other co-benefits of local and in-house greenhouse gas strategies.
- Standardizes methods and conventions, and facilitates sharing of information, expertise and resources among local governments in Canada and worldwide.

*User friendly, Windows “point and click” format...*



**Quick emissions inventory organized by key sectors, including carbon dioxide from fuels and electricity, methane from waste, and other GHG gases.**


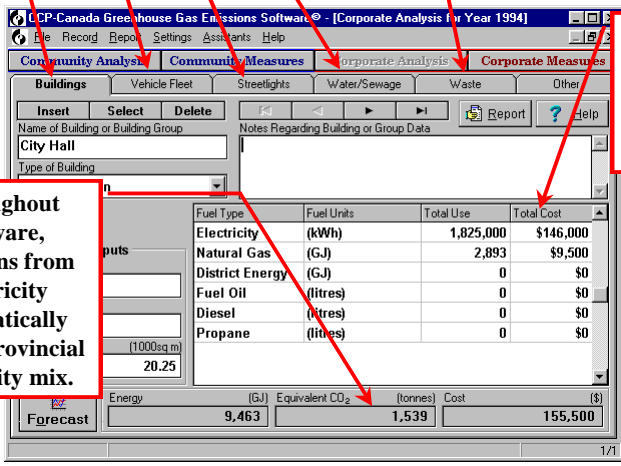
**Over 40,000 words of illustrated Hypertext Help files**

**Automatic energy unit selection and conversions**

**Greenhouse gas emissions automatically computed and displayed.**

Energy Source	Fuel Units	Total Residential
Electricity	(million kWh)	1,475
Natural Gas	(million cubic m)	259
District Energy	(GJ)	0
Fuel Oil	(litres)	3,100,000
Propane	(litres)	2,500,000
Wood	(cords)	0

Energy (GJ): 15,343,661      Equivalent CO<sub>2</sub> (tonnes): 680,918


**Corporate modules track emissions and emission reductions for key sources from local government operations -- buildings, vehicles, streetlights, water pumping and sewage treatment plants, waste, and “other”.**

**Corporate modules track energy costs.**

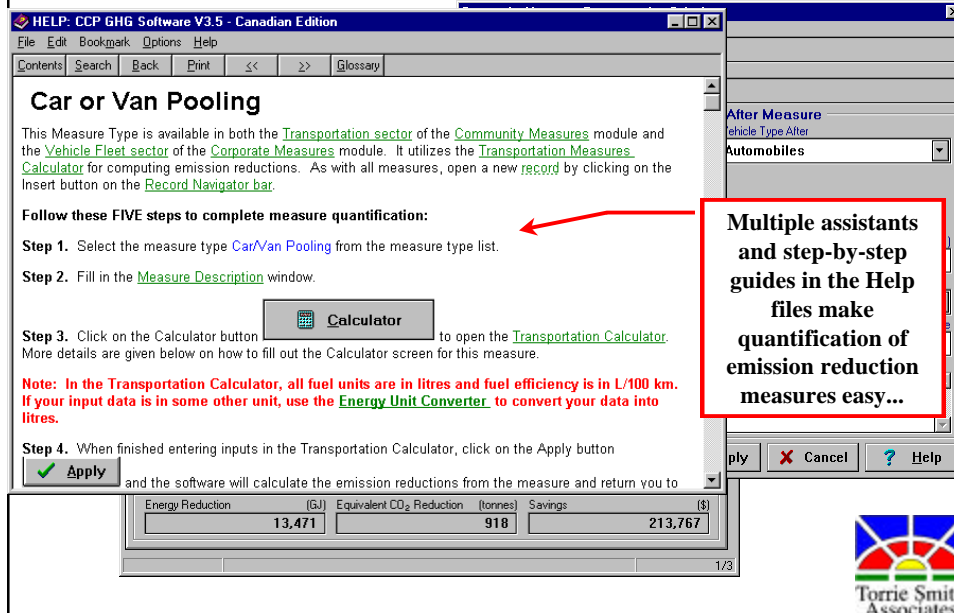
**Throughout software, emissions from electricity automatically reflect provincial electricity mix.**

Fuel Type	Fuel Units	Total Use	Total Cost
Electricity	(kWh)	1,825,000	\$146,000
Natural Gas	(GJ)	2,893	\$9,500
District Energy	(GJ)	0	\$0
Fuel Oil	(litres)	0	\$0
Diesel	(litres)	0	\$0
Propane	(litres)	0	\$0

Energy (GJ): 9,463      Equivalent CO<sub>2</sub> (tonnes): 1,539      Cost (\$): 155,500



*Generic emission reduction measures are defined, which the user customizes with local data...*



**HELP: CCP GHG Software V3.5 - Canadian Edition**

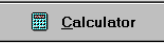
**Car or Van Pooling**

This Measure Type is available in both the [Transportation sector](#) of the [Community Measures](#) module and the [Vehicle Fleet sector](#) of the [Corporate Measures](#) module. It utilizes the [Transportation Measures Calculator](#) for computing emission reductions. As with all measures, open a new [report](#) by clicking on the [Insert](#) button on the [Record Navigator bar](#).


**Follow these FIVE steps to complete measure quantification:**

**Step 1.** Select the measure type [Car/Van Pooling](#) from the measure type list.

**Step 2.** Fill in the [Measure Description](#) window.

**Step 3.** Click on the [Calculator](#) button  to open the [Transportation Calculator](#). More details are given below on how to fill out the Calculator screen for this measure.

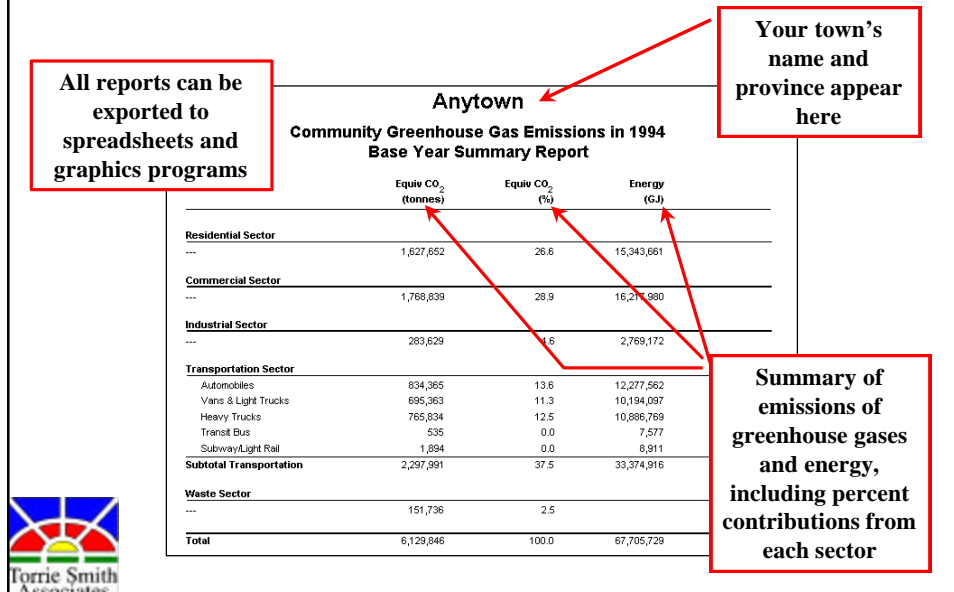
**Note:** In the [Transportation Calculator](#), all fuel units are in litres and fuel efficiency is in L/100 km. If your input data is in some other unit, use the [Energy Unit Converter](#), to convert your data into litres.

**Step 4.** When finished entering inputs in the Transportation Calculator, click on the [Apply](#) button  and the software will calculate the emission reductions from the measure and return you to

Energy Reduction (GJ)	Equivalent CO <sub>2</sub> Reduction (tonnes)	Savings (\$)
13,471	918	213,767

**Multiple assistants and step-by-step guides in the Help files make quantification of emission reduction measures easy...**

*Summary and Detailed Reports are Pre-formatted and Ready to Print...*



**Anytown**

**Community Greenhouse Gas Emissions in 1994 Base Year Summary Report**

	Equip CO <sub>2</sub> (tonnes)	Equip CO <sub>2</sub> (%)	Energy (GJ)
<b>Residential Sector</b>			
---	1,627,652	26.6	15,343,661
<b>Commercial Sector</b>			
---	1,768,839	28.9	16,211,980
<b>Industrial Sector</b>			
---	283,629	4.6	2,769,172
<b>Transportation Sector</b>			
Automobiles	834,365	13.6	12,277,562
Vans & Light Trucks	695,363	11.3	10,194,097
Heavy Trucks	765,834	12.5	10,886,769
Transit Bus	535	0.0	7,577
Subway/Light Rail	1,894	0.0	8,911
<b>Subtotal Transportation</b>	<b>2,297,991</b>	<b>37.5</b>	<b>33,374,916</b>
<b>Waste Sector</b>			
---	151,736	2.5	
<b>Total</b>	<b>6,129,846</b>	<b>100.0</b>	<b>67,705,729</b>

**All reports can be exported to spreadsheets and graphics programs**

**Your town's name and province appear here**

**Summary of emissions of greenhouse gases and energy, including percent contributions from each sector**

Community Greenhouse Gas Emissions Reductions in 2010: Measures Summary Report

Print Save Close

**Anytown**  
Community Greenhouse Gas Emissions Reductions in 2010  
Measures Summary Report

Torrie Smith Associates

One of several pre-formatted reports, this one summarizing total emission reductions and savings from all measures in the local action plan.

Measures Summary	Equip CO <sub>2</sub> (tonnes)	Equip CO <sub>2</sub> (%)	Energy (GJ)	Energy Cost Savings (\$)
Residential Sector	370,529	21.9	3,934,500	26,849,875
Commercial Sector	605,537	35.8	8,692,000	45,000,000
Industrial Sector	191,270	11.3	900,000	17,500,000
Transportation Sector	326,386	19.3	4,789,619	76,003,767
Waste Sector	198,000	11.7		3,000,000
<b>Total</b>	<b>1,691,722</b>	<b>100.0</b>	<b>18,316,119</b>	<b>170,353,642</b>

Measures Summary Reports include comparison of base year emissions, forecast emissions, target level emissions, and impact of local action plan.

Local Action Plan	(tonnes)
Base Year Emissions	6,129,846
Target Year Emissions Forecast	7,279,122
Target Emissions Level	4,903,877
Emissions Reductions Required to Meet Target	2,375,245
Emissions Reductions in Local Action Plan as of 2010	1,691,722

Page 1 of 1

## Many more features.....

- Tracks air pollution benefits from measures in local action plan
- Waste module includes the greenhouse gas benefits of waste reduction, recycling, and composting measures
- Detailed reports on measures include energy savings, emission reductions, financial payback, analysis of measure's contribution to your target
- All the elements of the Partners for Climate Protection Campaign milestone process are supported -- emissions inventories, target setting, forecasting, and quantification of emission reduction measures

## CCP Software -- Status

- In the United States, in use by more than 50 cities participating in Cities for Climate Protection Campaign.
- In Australia, selected by the Commonwealth government as official software for Australian local governments.
- In Canada, being used by Federation of Canadian Municipalities and ICLEI's Partners for Climate Protection Campaign for local government action on climate change.
- In Europe, in use by individual cities, with a U.K. and European editions under development for release in 1999.
- Pilot testing underway in Mexico and the Philippines to prepare version for application in developing country cities.



## CCP Software -- Development Plans

- To continue to establish the CCP protocol and software as an international standard for local government GHG analysis.
- To enhance the analysis of co-benefits of GHG reduction strategies, especially air pollutant reductions and job creation impacts of measures.
- To develop a version for group use that will support nested inventories in metropolitan areas where several local governments are working together.
- Enhanced reporting features.
- Expanded, Hyper-linked help files with additional default data, surrogates, technical documentation.



## A Closer Look at Transportation

- Gas consumption has been nearly steady, but its about to rise
- Transit ridership down, almost everywhere
- Origin-destination matrix has changed much faster than models and databases
- Much urban form innovation taking place, but too little tracking of environmental results
- Vehicle fuel efficiency deteriorating

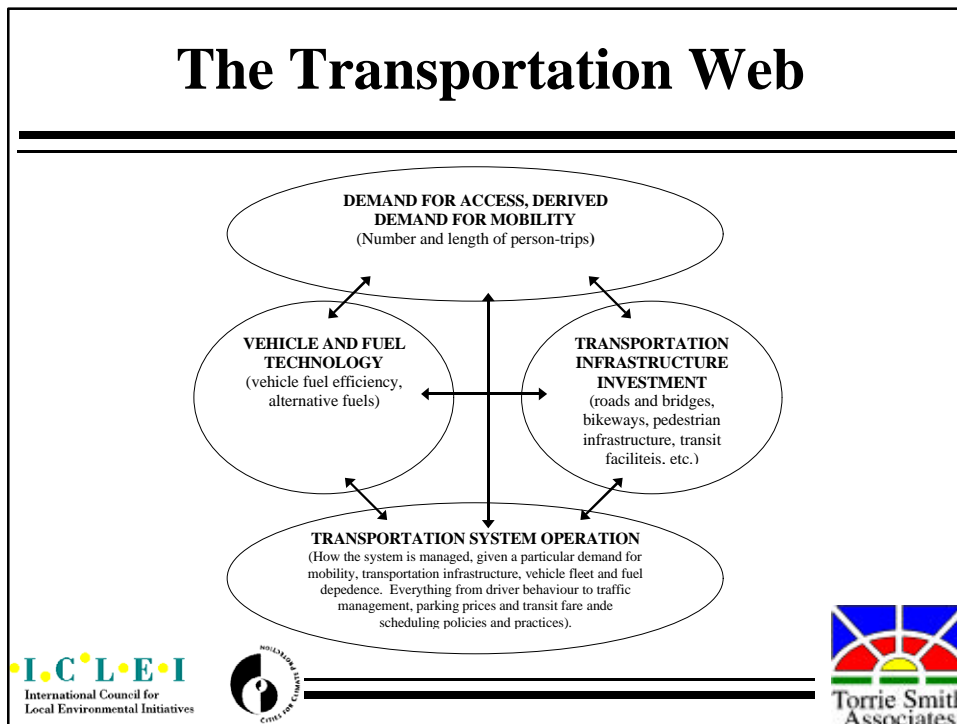


## Some More Observations

- Market mechanisms have a role, but understand behaviour
- Integrated transport planning seems inadequate response
- This is an urban design problem; the “transportation problem” cannot be solved in isolation
- Technical fix (more efficient technology, cleaner fuels) is critical in short term, but inadequate response in long term.
- Addressing the demand side is critical -- number of trips, length of trips, vehicle occupancy. Need to think in terms of “mobility efficiency” or “mobility productivity” like we think of labour or energy productivity.



## The Transportation Web



## Local Government Spheres of Influence

- Zoning and Land Use Regulations
- Trip Reduction Measures/Ordinances
- Investment in roadways, transit, pedestrian and bicycle infrastructures
- Operation of roadways, transit
- Parking policies
- Municipal fleets
- Vehicle efficiency and emission standards and programs

## Five Factors

- Number of Trips
- Length of Trips
- Number of People per Vehicle
- Fuel Efficiency of the Vehicle
- Emissions per Unit of Fuel






<i>Municipal Sphere Of Influence</i>	<i>Example Instruments</i>	<i>Target Measure Category</i>
<i>Land Use</i>	General plans, development ordinances, zoning regulations, property tax structure	<i>Demand for Mobility</i>
<i>Trip making</i>	Voluntary and mandatory employer trip reduction programs, investment in telework centres, auto-restricted areas, no-drive days, park-and-ride facilities, ride matching service, vanpool programs, goods movement management programs	<i>Demand for Mobility</i>
<i>Roadway Investment</i>	Direct investment, design capacity and specifications	<i>Transportation Infrastructure</i>
<i>Transit Investment</i>	Direct investment, design specifications of system and individual vehicles, choice of fuel, integration of transit access in all development permitting	<i>Transportation Infrastructure</i>
<i>Non-motorized vehicle and pedestrian infrastructure</i>	Direct investment, sidewalk and bicycle rights-of-way and infrastructure investment required in developments, facilitation of pedestrian and bicycle modes in investments in other modes and developments	<i>Transportation Infrastructure</i>








<i>Municipal Sphere of Influence</i>	<b>Example Instruments</b>	<b>Target Measure Category</b>
<i>Land Use</i>	General plans, development ordinances, zoning regulations, property tax structure	<i>Demand for Mobility</i>
<i>Trip making</i>	Voluntary and mandatory employer trip reduction programs, investment in telework centres, auto-restricted areas, no-drive days, park-and-ride facilities, ride matching service, vanpool programs, goods movement management programs	<i>Demand for Mobility</i>
<i>Roadway Investment</i>	Direct investment, design capacity and specifications	<i>Transportation Infrastructure</i>
<i>Transit Investment</i>	Direct investment, design specifications of system and individual vehicles, choice of fuel, integration of transit access in all development permitting	<i>Transportation Infrastructure</i>
<i>Non-motorized vehicle and pedestrian infrastructure</i>	Direct investment, sidewalk and bicycle rights-of-way and infrastructure investment required in developments, facilitation of pedestrian and bicycle modes in investments in other modes and developments	<i>Transportation Infrastructure</i>








<i>Municipal Sphere of Influence</i>	<b>Example Instruments</b>	<b>Target Measure Category</b>
<i>Roadway operations</i>	<i>Computerized traffic management for maximum average speeds, high occupancy vehicle lanes, maintenance and repair of roadways, traffic calming and smoothing, road pricing, peak pricing, ramp metering, off-peak goods delivery bylaws</i>	<i>Transportation System Operation</i>
<i>Transit system operations</i>	<i>Fare integration, schedule improvement and coordination, facilitation of intermodal transfer, transit priority lanes and rights-of-way, integrated use of taxis in transit operations</i>	<i>Transportation System Operation</i>
<i>Parking</i>	<i>Control supply and/or pricing of parking in downtown core, parking taxes and "cash out" programs</i>	<i>Demand for Mobility</i>










<i>Municipal Sphere of Influence</i>	<i>Example Instruments</i>	<i>Target Measure Category</i>
<i>Municipal Fleet Operations</i>	Coordinated scheduling of vehicle use, downsizing of fleet, matching vehicles to tasks	<i>Transportation System Operation</i>
<i>Vehicle Fuel Efficiency and Emissions</i>	Mandatory vehicle maintenance programs, specified levels of zero emission vehicles in total on-road fleet, fuel economy standards, feebate schemes, alternative fuel infrastructure investment, driver education programs, anti-idling bylaws, buybacks of older vehicles	<i>Vehicle/Fuel</i>

Spheres of Local Government Influence	Potential of Local Government Influence to Impact Factor				
	VMT Factors			Vehicle/Fuel Factors	
	No. of Trips	Length of Trips	No. of People per Vehicle	Energy per VMT	Emissions per Unit of Energy
Land Use/Zoning	Strong	Strong			
Trip Making	Strong	Weak	Strong		
Roadway Infrastructure Investment	Strong				
Traffic Management	Strong		Moderate	Weak	
Transit System Infrastructure	Strong	Weak	Strong		
Pedestrian & Bicycle Infrastructure	Strong	Strong			
Parking Policies/Pricing	Strong		Weak		
Transit System Operations, Pricing	Strong	Strong	Strong		
Vehicle Efficiency & Maintenance				Strong	Strong

## Some Observations

- Gas consumption has been nearly steady, but its about to rise
- Transit ridership down, almost everywhere
- Origin-destination matrix has changed much faster than models and databases
- Much urban form innovation taking place, but too little tracking of environmental results
- Vehicle fuel efficiency deteriorating



## Some More Observations

- Alternative fuels overemphasized
- Market mechanisms have a role, but understand behaviour
- Integrated transport planning seems inadequate response
- This is an urban design problem; the “transportation problem” cannot be solved in isolation

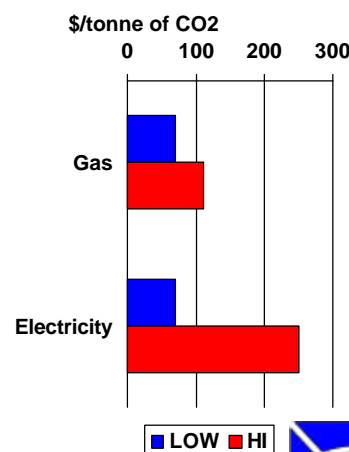


## Some Closing Observations..

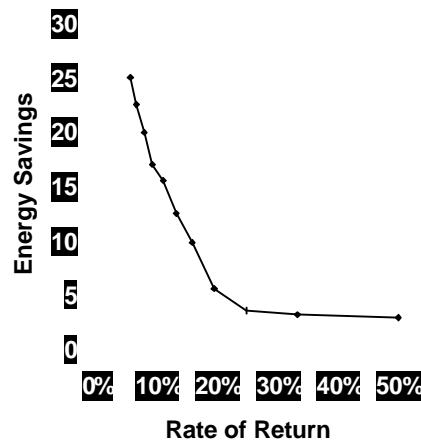


## The Energy Commodity Price Dilemma

- Expressed as dollars per tonne of CO<sub>2</sub>, fuel and electricity costs much more than likely premiums or taxes.
- A premium of \$1/tonne represents between 0.4% and 1.5% of current natural gas and electricity prices
- Costs of quantification and verification will be pivotal



## Emission Reductions Vs. Rate of Return



- Energy savings, and therefore emission reductions, rise very steeply as the discounted rate of return drops below 20%
- Public investment can be used to move the effort up the curve

## One Problem -- Two Perspectives

### Steady As She Goes

- Risk is doing too much, too soon
- Scientific evidence not strong enough yet -- "no smoking gun"
- Mitigation will reduce welfare, damage economy
- Unilateral action will damage nation's competitiveness
- Global emissions will increase if rich countries impose binding emission reduction targets

### Mitigate Now

- Risk is doing too little, too late
- Scientific consensus justifies invoking precautionary principle
- Mitigation is key to sustaining the economy
- Economies that act first will be global winners in 21st century
- Rich countries should stabilize emissions soon, absolute reductions in medium term

## One Problem, Two Perspectives

### Steady As She Goes

- No binding targets or timetables; no caps on absolute emissions
- Voluntary actions only, let the market fix it
- There is significant cost effective potential for lowering emission intensity of economy; let the market get it, playing field “works for us”
- Led by coal, petroleum and energy intensive industries, followed by government action

### Mitigate Now

- Binding targets and timetables; the cap is the whole point
- Market mechanisms yes, but voluntarism no
- 20-30% reduction in emission intensity of the economy is cost effective, even without valuing environmental externalities, but uneven playing field blocks it
- Led by environmentalists, climate scientists, followed by government rhetoric