



The
Centre for
Sustainable
Transportation

Le
Centre pour
un transport
durable

SUSTAINABLE TRANSPORTATION PERFORMANCE INDICATORS

UNDERLYING DATA AND CALCULATIONS

March 2003

This document presents the underlying data and calculations required to produce the initial set of 14 Sustainable Transportation Performance Indicators (STPI) developed by the Centre for Sustainable Transportation in cooperation with the IBI Group and Metropole Consultants. Several reports on the STPI project are available at the Centre's Web site at www.cstctd.org.

Each of the 14 indicators is treated in order on one of the pages that follow, except Indicators 13 and 14, which require two pages. The treatments of each of the 14 indicators can be considered separately from those of the other indicators, except Indicator 14. To reduce the space required to describe the calculations required for Indicator 14, there is reliance on the description of the calculations for Indicator 3.

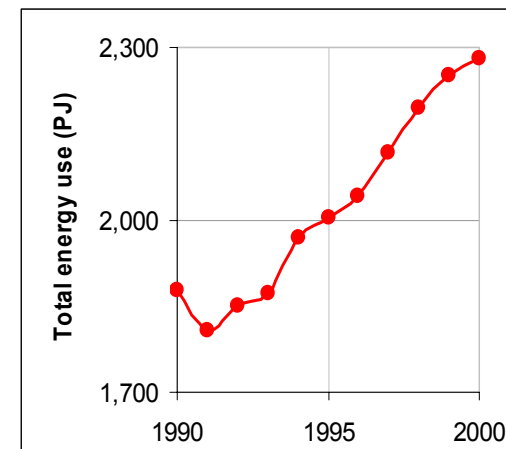
For further information contact Richard Gilbert at richardgilbert1@csi.com.

Indicator 1: Energy use for transport

This indicator represents the consumption of non-renewable fossil fuel resources for transport. It shows yearly consumption of energy for transport in Canada from 1990 to 2000 in petajoules. About 99 per cent of this energy came from gasoline or diesel fuel. Energy use for transport in Canada increased by 21.5 per cent between 1990 and 2000 (from 1,878 to 2,282 petajoules), despite a brief reduction in energy use for transport between 1990 and 1991. Overall, the increase indicates a movement away from sustainable transportation.

The data for this indicator are total energy use by all transport in Canada for each of the years 1990-2000. The source of this information is the table on Pages 76-77 of *End-Use Energy Data Handbook–1990 to 2000*, Natural Resources Canada, June 2002. The table is available at the URL below. The data are expressed in petajoules (pJ), and are set out in the following table.

<http://oee.nrcan.gc.ca/neud/dpa/tables/6b.xls>. Accessed March 12, 2003.



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Energy use (pJ)	1,878	1,807	1,850	1,873	1,968	2,005	2,043	2,117	2,195	2,253	2,282

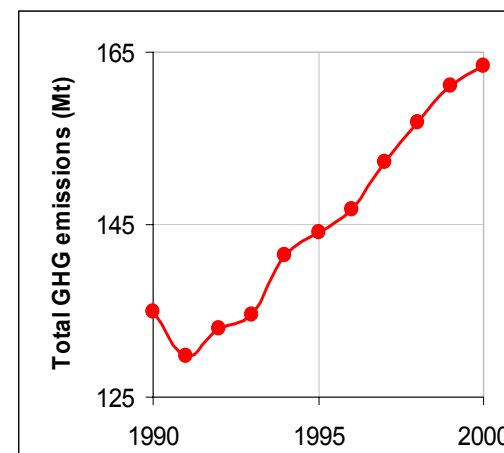
These data comprise Indicator 1 as portrayed in the above chart.

Indicator 2: Greenhouse gas emissions

This indicator represents greenhouse gas (GHG) emissions from transport in Canada. The most important GHG emitted by transport is carbon dioxide (CO₂), which in 2000 accounted for more than 90 per cent of transport's contribution to the greenhouse effect. Emission of GHGs from transport increased by 21.0 per cent between 1990 and 2000, from 135.0 to 163.4 megatonnes of CO₂ equivalent, despite a reduction in GHG emissions between 1990 and 1991. Overall it indicates a movement away from sustainable transportation.

The data for this indicator are total energy use by all transport in Canada for each of the years 1990-2000. The source of this information is the table on Pages 78-79 of *End-Use Energy Data Handbook-1990 to 2000*, Natural Resources Canada, June 2002. The table is available at the URL below. The data are expressed in megatonnes (mt) and are set out the following table.

<http://oee.nrcan.gc.ca/neud/dpa/tables/6c.xls>. Accessed March 12, 2003.



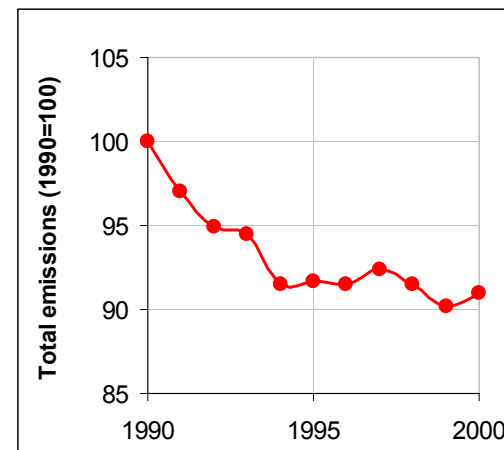
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
GHG emissions (mt)	135.0	129.8	132.9	134.6	141.5	144.1	146.8	152.2	156.9	161.1	163.4

These data comprise Indicator 2 as portrayed in the above chart.

Indicator 3: Other transport emissions

This indicator is an index that represents emissions of four locally acting pollutants for each year of the period 1990-2000: carbon monoxide (CO), sulphur dioxide (SO₂), nitrogen oxides (NO_x) and volatile organic compounds (VOCs). The index fell by 91 per cent between 1990 and 2000, with almost all of the decrease occurring at the beginning of the decade. Overall the change indicates movement towards sustainable transportation.

The basic data used to create this indicator did not come from a published source. They came from time series submitted in January 2002 by the Government of Canada to the United Nations Economic Commission for Europe (UN ECE) in fulfillment of international reporting requirements. They were provided to the STPI project in a file attached to an e-mail from Kathleen Nadeau of Environment Canada to Richard Gilbert dated May 23, 2002 (file name CA_MAIN_SNAP_1_20021.rtf). The data are expressed in kilotonnes (kt), and are set out in the following table.



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
CO (kt)	5,562	5,329	5,173	5,170	5,116	5,067	5,036	4,973	4,882	4,947	4,998
SO₂ (kt)	62	62	60	58	51	52	52	53	53	48	49
NO_x (kt)	735	700	698	701	708	710	703	723	717	719	720
VOCs (kt)	609	591	578	585	582	580	584	586	579	587	590

The index was constructed from the basic data in the following way: Each value of each pollutant was divided by the value for that pollutant for 1990. The sum of the four results for each year was then multiplied by 25 to give the index for each year.

The following table provides the results of these calculations. They comprise Indicator 3 as portrayed in the above chart.

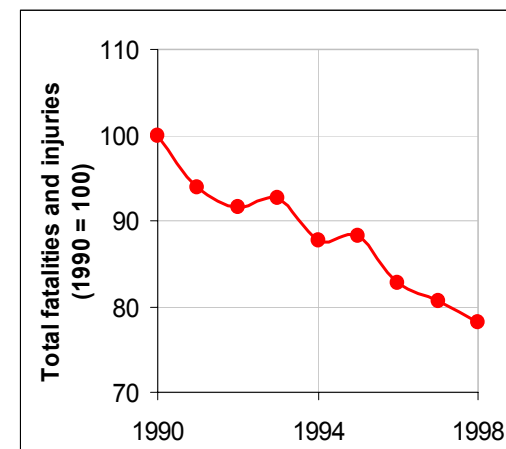
1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
100.0	97.0	94.9	94.5	91.5	91.7	91.5	92.4	91.5	90.1	90.9

Indicator 4: Injuries and fatalities

This indicator is an index that represents injuries and fatalities arising from road transport activity. The index fell more or less steadily throughout the 1990s with a total decline of 21.8 per cent between 1990 and 2000. Overall, the change indicates movement towards sustainable transportation.

The basic data used to create this indicator come from the safety section of Transport Canada's *T-Facts* database, available at the URL below. The data comprise persons injured and fatalities arising from collisions involving one or more road vehicles. They are set out in the following table.

<http://www.tc.gc.ca/pol/en/t-facts3/xlstats.htm>. Accessed March 12, 2003.



	1990	1991	1992	1993	1994	1995	1996	1997	1998
Injuries	262,680	249,217	249,821	247,588	245,110	241,935	230,890	221,349	217,614
Fatalities	3,963	3,690	3,501	3,615	3,263	3,351	3,091	3,064	2,927

The index was constructed from the basic data in the following way: The ratio of total injuries to total fatalities for the period 1990-1998 was calculated. For each year, the sum of (i) injuries divided by the ratio and (ii) fatalities was calculated, and then this sum was divided by the sum of these two values for 1990. The result was multiplied by 100 to provide the index for each of the years.

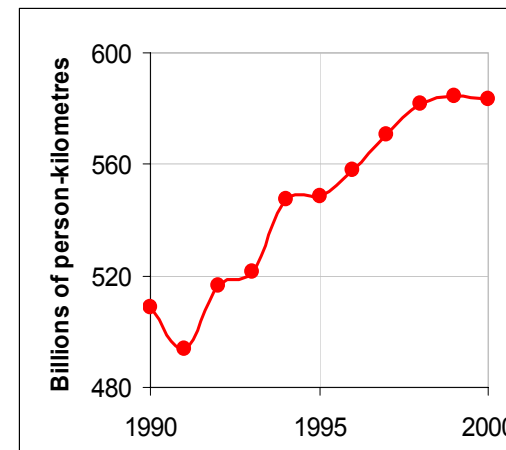
The following table provides the results of these calculations. They comprise Indicator 4 as portrayed in the above chart.

1990	1991	1992	1993	1994	1995	1996	1997	1998
100.0	94.0	91.6	92.7	87.7	88.2	82.8	80.7	78.2

Indicator 5: Movement of people

This indicator represents the total motorized movement of people within Canada in person-kilometres. Motorized movement of people increased by 14.7 per cent between 1990 and 2000, from 509 to 583 billion person-kilometres, despite a reduction in the amount of movement of people between 1990 and 1991. There was little growth in travel after 1998. This change represents movement away from sustainable transportation.

The data for this indicator are total passenger kilometres (billions) by all passenger transport in Canada for each of the years 1990 to 2000. The source of this information is the table on Pages 80-81 of *End-Use Energy Data Handbook—1990 to 2000*, Natural Resources Canada, June 2002. The table is available at the URL below. The data are expressed in billions of passenger kilometres and set out in the table.
<http://oee.nrcan.gc.ca/neud/dpa/tables/6d.xls>. Accessed March 12, 2003.



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Movement of people	508.7	493.8	516.6	521.7	547.3	548.6	558.0	571.0	582.0	584.4	583.3

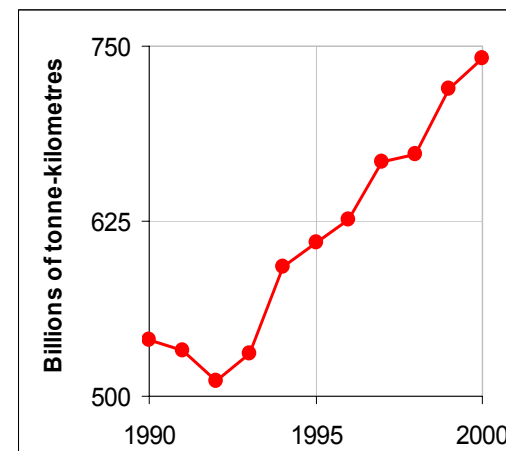
These data comprise Indicator 5 as portrayed in the above chart.

Indicator 6: Movement of freight

This indicator represents the total motorized movement of freight within Canada in tonne-kilometres. (Movement of freight in passenger vehicles is not included.) Movement of freight increased by 37.1 per cent between 1990 and 2000, from 541 to 741 billion tonne-kilometres. Such a large increase represents considerable growth in the adverse effects of transport on the environment and therefore movement away from sustainable transportation.

The data for this indicator are tonne-kilometres (billions) by all freight transport in Canada for each of the years 1990 to 2000. The source of this information is the table on Pages 84-85 of *End-Use Energy Data Handbook—1990 to 2000*, Natural Resources Canada, June 2002. The table is available at the URL below. The data are expressed in billions of tonne-kilometres and are set out in the table.

<http://oee.nrcan.gc.ca/neud/dpa/tables/6e.xls>. Accessed March 12, 2003.



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Movement of freight	540.5	532.7	511.3	530.1	591.9	610.1	625.7	667.2	672.5	720.0	741.2

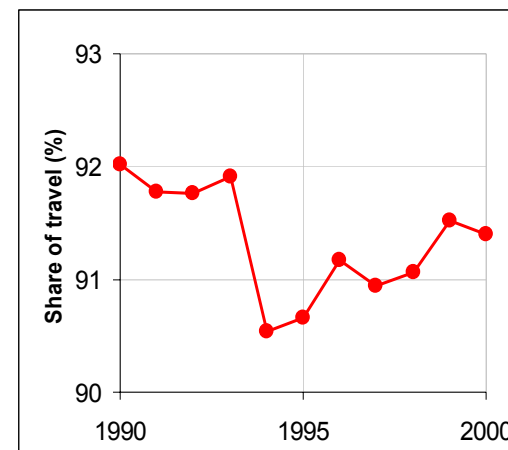
These data comprise Indicator 6 as portrayed in the above chart.

Indicator 7: Travel by cars and planes

Indicator 7 is a refinement of Indicator 5, which concerns overall movement of people in Canada. It represents the share of travel by more polluting motorized modes: aircraft and personal vehicles. The share of this travel remained high during the 1990s but there was no clear upward or downward trend (note the small range of the scale in the graph). Thus, there has been no evident trend towards or away from sustainability.

The data for this indicator are passenger-kilometres in Canada by various modes for each of the years 1990 to 2000. The source of this information is the table on Pages 80-81 of *End-Use Energy Data Handbook-1990 to 2000*, Natural Resources Canada, June 2002, available at the URL below. The data are expressed in billions of passenger-kilometres and are set out in the following table.

<http://oee.nrcan.gc.ca/neud/dpa/tables/6d.xls>. Accessed March 12, 2003.



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Small cars (A)	202.7	200.7	207.6	209.2	211.0	204.1	203.5	201.2	200.3	198.3	195.5
Large cars (B)	132.8	130.8	134.0	132.0	132.1	128.0	126.1	124.0	122.7	121.0	118.7
Light trucks (C)	64.80	62.80	69.27	76.15	85.53	90.72	96.01	101.2	111.4	115.4	117.9
Air (D)	66.78	58.01	62.18	61.10	65.74	73.5	82.12	91.86	94.47	98.98	99.79
Total for all modes (E)	508.7	493.8	516.6	521.7	547.3	548.6	558.0	571.0	582.0	584.4	583.3

Indicator 7 required calculations based on the above data, but the extent of the conversion of the data was not enough to describe the result as an index. **The indicator was constructed** for each year from the basic data by using the following formula: $\text{Index} = 100 * (A+B+C+D)/E$.

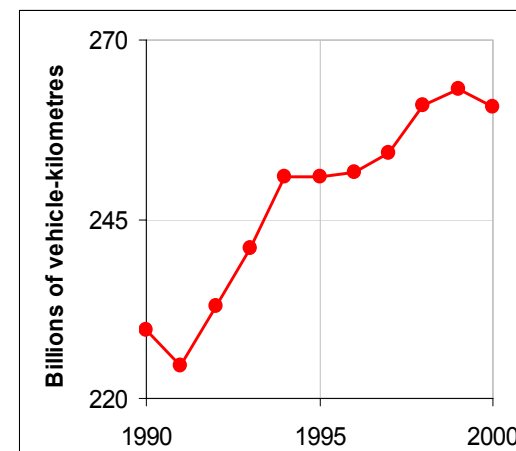
The following table provides the results of these calculations. They comprise Indicator 7 as portrayed in the above chart.

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
92.01	91.77	91.76	91.91	90.54	90.66	91.17	90.95	91.06	91.52	91.39

Indicator 8: Movement of personal vehicles

This indicator represents the total distance travelled by personal vehicles in vehicle-kilometres. Between 1990 and 2000, the number of vehicle-kilometres performed increased by 13.6 per cent, from 230 to 261 billion. There was a reduction in the movement of personal vehicles between 1990 and 1991 and little increase after 1998. Overall, the growth in the movement of personal vehicles represents movement away from sustainability.

The basic data used to create this indicator are estimates of annual distance travelled per vehicle and total vehicle stock. The data were provided in an Excel file (adjDistpass.xls) attached to an e-mail from Nathalie Trudeau of Natural Resources Canada to Richard Gilbert dated August 6, 2002. They are set out in the following table.



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Distance travelled in thousands of kilometres											
Small cars (A)	16.9	16.4	16.8	17.1	17.6	17.3	17.4	17.3	17.7	17.6	17.4
Large cars (B)	16.6	16.2	16.9	17.0	17.4	17.3	17.3	17.2	17.5	17.4	17.2
Light trucks (C)	19.8	19.3	19.9	19.9	20.3	19.7	19.6	19.7	19.9	19.9	19.7
Vehicle stock in millions											
Small cars (D)	6.65	6.77	6.76	6.80	6.76	6.73	6.62	6.63	6.46	6.47	6.43
Large cars (E)	4.45	4.45	4.34	4.32	4.27	4.21	4.13	4.11	4.00	3.99	3.94
Light trucks (F)	2.18	2.15	2.29	2.56	2.85	3.14	3.33	3.51	3.83	3.99	4.10

The indicator is not strictly an index because there is no conversion of the basic data used. However, because of the way the above estimates were provided, calculation was required to secure the estimate of total vehicle-kilometres performed. Thus, **the indicator was constructed** by calculating the total of $A*D + B*E + C*F$ for each year.

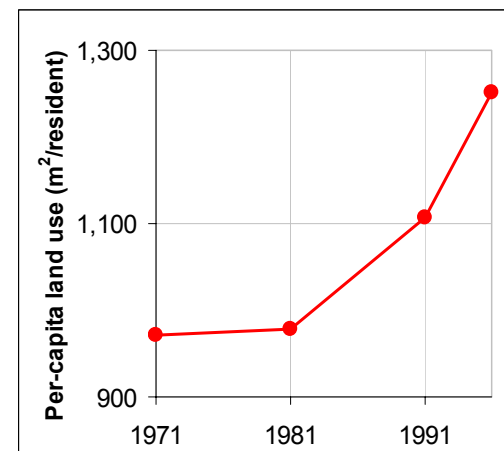
The following table provides the results of these calculations. They comprise Indicator 8 as portrayed in the above chart.

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
229.60	224.48	232.78	241.03	250.95	250.84	251.63	254.27	260.83	263.21	260.72

Indicator 9: Urban land use

This indicator represents the use of urban land by urban residents. Between 1971 and 1996, the amount of developed land per urban resident increased by 28.9 per cent, from 971 to 1,251 square metres (m²). Almost none of the increase occurred between 1971 and 1981. The largest increase was between 1991 and 1996. Because of the strong links between increased land use per capita and increased transport activity, this growth indicates movement away from sustainable transportation.

The basic data used to create this indicator come from *Econnections: Linking the Environment and the Economy—Indicators and Detailed Statistics*. Statistics Canada Catalogue No. 16-200-XKE, Ottawa, Ontario, Canada, 2000. The data are expressed in persons per square kilometre of developed land and are set out in the following table.



	1971	1981	1991	1996
Urban population density	1030	1022	903.3	799.3

The indicator was constructed from the basic data by multiplying the inverse of the above data by one million, thereby providing estimates of land use per capita in square metres per person.

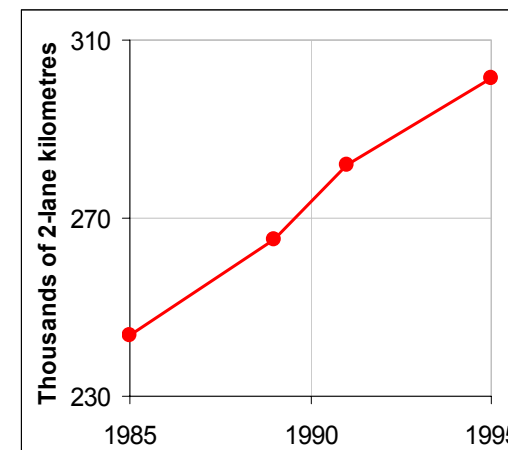
The following table provides the results of these calculations. They comprise Indicator 9 as portrayed in the above chart.

	1971	1981	1991	1996
	970.7	979.0	1107	1251

Indicator 10: Length of paved roads

This indicator represents the length of paved roads in Canada. The basic unit of measurement is the two-lane kilometre, e.g., a kilometre of road with one lane in each direction. Length of paved roads in Canada increased by 23.6 per cent between 1985 and 1995, from 243,800 to 301,300 two-lane-kilometre equivalents. Because road length is related to use of land, extent of urban sprawl, traffic generation, and energy use, this increase indicates movement away from sustainability.

The basic data used to create this indicator come from the highway section of Transport Canada's *T-Facts* database available at the URL below. The data are expressed in thousands of two-lane kilometres and are set out in the following table. <http://www.tc.gc.ca/pol/en/t-facts3/xlstats.htm>. Accessed March 12, 2003.



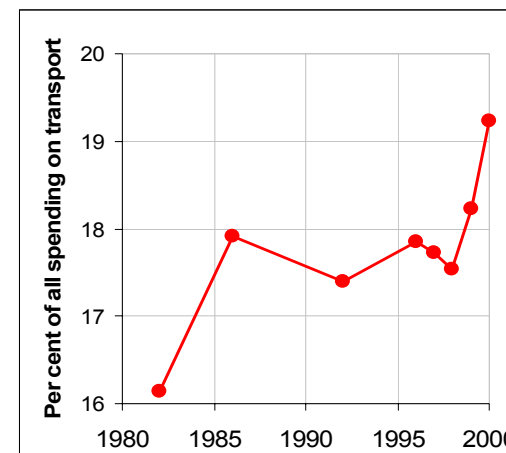
	1985	1989	1991	1995
Length of paved roads	243.8	265.1	281.9	301.4

These data comprise Indicator 10 as portrayed in the above chart.

Indicator 11: Household spending

This indicator represents household spending on transport in relation to total after-tax spending. It shows that the share of household spending on transport increased from 16.1 per cent to 19.2 per cent between 1982 and 2000. The increase involved two steep rises: between 1982 and 1986, and between 1998 and 2000. Transport was therefore becoming less affordable and less sustainable.

The basic data used for 1982, 1986, 1992, and 1996 are from Statistics Canada's *Family Expenditure Survey*. They were provided in the Excel file 'Richard Gilbert_Sust transport_FAMEX1982-1986-1992-1996.xls' attached to e-mail from Willa Rea of Statistics Canada to Richard Gilbert dated November 11, 2002. The data for 1997-2000 are from Statistics Canada's *Household Expenditure Survey* as reported in CANSIM II (Series V3310381 for total after-tax household spending, and Series V13879582 for household spending on transportation). The data are set out in the following table in dollars of the day.



	1982	1986	1992	1996	1997	1998	1999	2000
Total expenditures (\$)	20,253	25,994	32,416	33,891	35,426	36,465	37,713	39,385
Expenditures on transport (\$)	3,271	4,656	5,640	6,051	6,279	6,394	6,877	7,576

Indicator 11 required calculations based on the above data, but the extent of the conversion of the data was not enough to describe the result as an index. **The indicator was constructed** for each year from the basic data by dividing expenditures on transport by total expenditures and multiplying the result by 100.

The following table provides the results of these calculations. They comprise Indicator 11 as portrayed in the above chart.

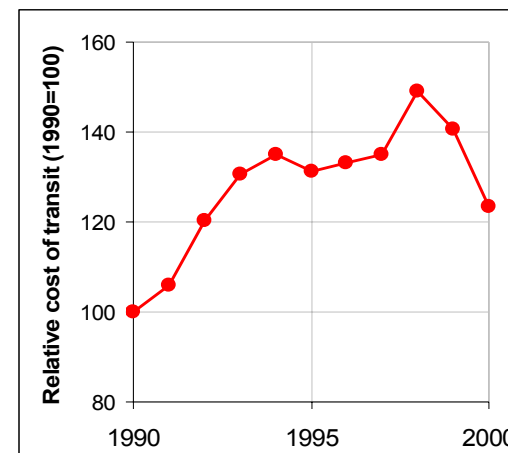
1982	1986	1992	1996	1997	1998	1999	2000
16.1	17.9	17.4	17.9	17.7	17.5	18.2	19.2

Indicator 12: Relative transit costs

This indicator is an index that represents the cost of urban transit fares relative to the main variable cost of operating an automobile, namely fuel cost. The index rose by 23.2 per cent between 1990 and 2000. The increase in the index between 1990 and 1998 was even larger (49.1 per cent), but it then fell steeply between 1998 and 2000. The indicator shows an increase and then a decrease in relative transit costs, indicating movement away from and then towards sustainable transportation.

The basic data used to construct the indicator are average transit fare and average gasoline price. The transit fare data are from the relevant issues of the annual publication *Summary of Canadian Transit Statistics*, Canadian Urban Transit Association, Toronto. The gasoline price data are from the energy section Transport Canada's *T-facts*, available at the URL below. The relevant data are expressed in dollars of the day, and are set out in the following table.

<http://www.tc.gc.ca/pol/en/t-facts3/xlstats.htm>. Accessed March 12, 2003.



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Transit cost (\$ per fare)	0.86	0.89	0.97	1.03	1.05	1.07	1.14	1.18	1.19	1.23	1.26
Fuel price (\$ per litre)	0.58	0.57	0.55	0.54	0.53	0.55	0.58	0.59	0.54	0.59	0.69

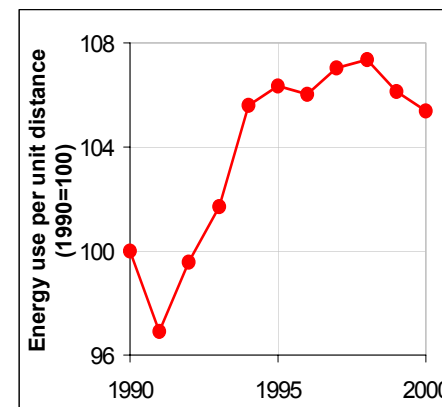
The index was constructed from the basic data by calculating for each year the ratio of the transit ride and the fuel cost, setting the 1990 value to 100, and adjusting the other values accordingly.

The following table provides the results of these calculations. They comprise Indicator 12 as portrayed in the above chart.

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
100.0	106.0	120.4	130.5	135.0	131.2	133.2	135.1	149.1	140.6	123.3

Indicator 13: Energy intensity of cars and trucks

This indicator is an index that represents the amount of fuel used per kilometre by cars and trucks of all sizes, i.e., the average energy intensity of the major kinds of road vehicle. It provides detail about an aspect of Indicator 1, which represents total energy use for all transport activity. Indicator 13 shows that the energy intensity of cars and trucks increased by 6.3 per cent between 1990 and 1995 (with a dip in 1991). It then declined to 5.4 per cent above the 1990 level in 2000. The increase in energy intensity in the earlier part of the decade represents movement away from sustainable transportation.



The basic data used to create this indicator are energy use by transportation mode and vehicle-kilometres performed by each mode, both for each year between 1990 and 2000. The source of the energy use data is the table on Pages 76-77 of *End-Use Energy Data Handbook—1990 to 2000*, Natural Resources Canada, June 2002, available at the first URL below. The source of the data on distance traveled is the table on Pages 90-93, available at the second URL below. The following table presents estimates of vehicle stock and distance travelled per vehicle, from which total vehicle-kilometres performed can be estimated.

<http://oee.nrcan.gc.ca/neud/dpa/tables/6b.xls>. Accessed March 12, 2003.

<http://oee.nrcan.gc.ca/neud/dpa/tables/6g.xls>. Accessed March 12, 2003.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	Total energy use in petajoules										
Small Cars	352.8	347.4	352.8	359.1	362.1	351.5	345.8	342.5	338.0	334.5	324.3
Large Cars	327.5	311.8	307.9	301.2	297.8	286.6	277.9	272.0	265.7	261.4	251.5
Light Trucks	351.5	345.4	370.2	390.9	421.9	441.3	462.0	489.4	539.0	560.1	564.8
Medium Trucks	101.3	98.40	103.4	107.5	114.9	119.8	126.0	135.0	136.6	149.7	158.1
Heavy Trucks	248.2	228.3	225.0	242.5	270.9	298.3	308.5	344.0	347.8	371.0	389.0

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Vehicle stock in millions of vehicles											
Small Cars	6,652	6,772	6,759	6,802	6,759	6,726	6,621	6,625	6,462	6,473	6,425
Large Cars	4,449	4,450	4,340	4,323	4,270	4,210	4,131	4,115	4,002	3,991	3,938
Light Trucks	3,444	3,494	3,623	3,923	4,186	4,476	4,730	4,984	5,422	5,636	5,779
Medium Trucks	619	625	640	645	650	657	692	728	722	803	839
Heavy Trucks	257	256	259	258	260	265	284	303	304	330	329
Average distance travelled per vehicle in thousands of kilometres											
Small Cars	16.22	16.04	15.92	15.71	15.57	15.39	15.24	15.13	15.13	15.11	15.14
Large Cars	15.88	15.79	15.79	15.58	15.45	15.35	15.16	15.01	15.00	14.98	15.01
Light Trucks	19.00	18.94	18.66	18.33	17.95	17.45	17.14	17.18	17.01	17.08	17.15
Medium Trucks	18.95	18.78	18.84	18.93	19.22	19.68	19.92	20.13	20.74	20.62	20.86
Heavy Trucks)	74.02	70.77	67.65	67.10	68.50	71.31	71.33	72.52	75.43	76.20	78.04

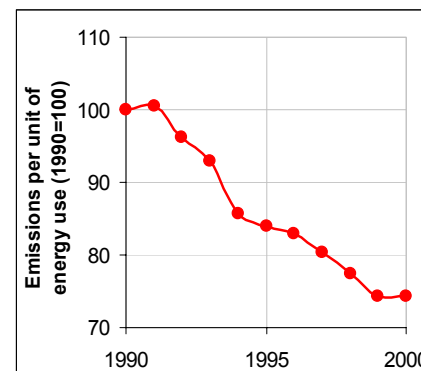
The indicator was constructed from the basic data in the following way: First, the total number of vehicle-kilometres performed by each vehicle type for each year was calculated by multiplying the corresponding value for the vehicle stock by the corresponding value for the average distance travelled per vehicle. Second, the resulting total was divided into the corresponding value for energy use to give the energy intensity for each vehicle type for each year (in megajoules per kilometre). Third, the fuel intensity values were then normalized by dividing each value by the corresponding value for 1990 and multiplying the result by 100. Fourth, these normalized values were then weighted by the share held by this vehicle type of each year's energy use by all these vehicle types. This was done by multiplying the normalized value by the corresponding value for energy use and dividing the total by the total energy use for the corresponding year.

The following table provides the results of these calculations. They comprise Indicator 13 as portrayed in the chart on the previous page.

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
100.0	96.92	99.55	101.7	105.4	105.7	105.4	106.0	106.4	105.1	104.0

Indicator 14: Emissions intensity

This indicator is an index that represents the rates at which road vehicles produce locally acting pollution, i.e., the emissions intensity, for the years 1990-2000. It thus provides detail about Indicator 3, which shows total emissions of locally acting pollutants. What the index shows specifically is emissions of the four pollutants represented by Indicator 3 for each unit of energy that is consumed. (Energy consumption is used as the denominator because it provides a means of making comparisons between large and small vehicles.) The index fell by 25.7 per cent between 1990 and 2000. This represents a substantial improvement in the performance of road vehicles.



The basic data used to construct this indicator are from two sources. One source is the value of Indicator 3 for each year, and all that goes into deriving these values (see Page 4 of this document). The other source is the estimates of energy use by each type of road vehicle provided in the table on Pages 76-77 of *End-Use Energy Data Handbook—1990 to 2000*, Natural Resources Canada, June 2002. The table is also available at the URL below. The data are expressed in petajoules, and are set out in the following table.

<http://oee.nrcan.gc.ca/neud/dpa/tables/6g.xls>. Accessed March 12, 2003.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total energy use in petajoules											
Small Cars	352.8	347.4	352.8	359.1	362.1	351.5	345.8	342.5	338.0	334.5	324.3
Large Cars	327.5	311.8	307.9	301.2	297.8	286.6	277.9	272.0	265.7	261.4	251.5
Light Trucks	351.5	345.4	370.2	390.9	421.9	441.3	462.0	489.4	539.0	560.1	564.8
Medium Trucks	101.3	98.4	103.4	107.5	114.9	119.8	126.0	135.0	136.6	149.7	158.1
Heavy Trucks	248.2	228.3	225.0	242.5	270.9	298.3	308.5	344.0	347.8	371.0	389.0
Motorcycles	1.7	1.6	1.7	1.8	2.0	1.8	1.8	1.9	2.0	2.1	2.3
School Bus	13.0	12.8	12.5	12.7	16.8	16.8	14.2	13.2	16.0	14.8	15.1
Urban Transit	35.9	35.6	40.0	41.3	45.1	49.0	47.1	50.5	48.9	46.5	50.3
Inter-City Bus	9.0	8.6	9.0	7.9	8.3	7.5	7.4	6.9	8.0	7.4	7.8

The indicator was constructed by calculating the total energy use by road transport for each year and normalizing it by dividing it by the value for 1990. This normalized value was then divided into the respective value for Indicator 3 to provide an indication of emissions per unit energy use.

The following table provides the results of these calculations. They comprise Indicator 14 as portrayed in the chart on the previous page.

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
100.0	100.6	96.1	92.9	85.7	84.0	82.9	80.4	77.4	74.3	74.3