

Article

EnviroStats

Uptake and disposal of compact fluorescent lights by Canadian households

by *Gordon Dewis*

Environment Accounts and Statistics Division

March 2014



How to obtain more information

For information about this product or the wide range of services and data available from Statistics Canada, visit our website, www.statcan.gc.ca.

You can also contact us by

email at infostats@statcan.gc.ca,

telephone, from Monday to Friday, 8:30 a.m. to 4:30 p.m., at the following toll-free numbers:

- | | |
|---|----------------|
| • Statistical Information Service | 1-800-263-1136 |
| • National telecommunications device for the hearing impaired | 1-800-363-7629 |
| • Fax line | 1-877-287-4369 |

Depository Services Program

- | | |
|------------------|----------------|
| • Inquiries line | 1-800-635-7943 |
| • Fax line | 1-800-565-7757 |

To access this product

This product, Catalogue no. 16-002-X, is available free in electronic format. To obtain a single issue, visit our website, www.statcan.gc.ca, and browse by “Key resource” > “Publications.”

Standards of service to the public

Statistics Canada is committed to serving its clients in a prompt, reliable and courteous manner. To this end, Statistics Canada has developed standards of service that its employees observe. To obtain a copy of these service standards, please contact Statistics Canada toll-free at 1-800-263-1136. The service standards are also published on www.statcan.gc.ca under “About us” > “The agency” > “Providing services to Canadians.”

Published by authority of the Minister responsible for
Statistics Canada

© Minister of Industry, 2014

All rights reserved. Use of this publication is governed by the
Statistics Canada Open Licence Agreement ([http://www.
statcan.gc.ca/reference/copyright-droit-auteur-eng.htm](http://www.statcan.gc.ca/reference/copyright-droit-auteur-eng.htm)).

Cette publication est aussi disponible en français.

Note of appreciation

Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued co-operation and goodwill.

Standard symbols

The following symbols are used in Statistics Canada publications:

- | | |
|----------------|--|
| . | not available for any reference period |
| .. | not available for a specific reference period |
| ... | not applicable |
| 0 | true zero or a value rounded to zero |
| 0 ^s | value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded |
| P | preliminary |
| r | revised |
| X | suppressed to meet the confidentiality requirements of the <i>Statistics Act</i> |
| E | use with caution |
| F | too unreliable to be published |
| * | significantly different from reference category ($p < 0.05$) |

Uptake and disposal of compact fluorescent lights by Canadian households

by Gordon Dewis, *Environment Accounts and Statistics Division*

Using more energy-efficient lights is one way households can reduce the amount of electricity they consume and their energy costs. Halogen lights, compact fluorescent lights (CFLs) and light-emitting diode (LED) lights, have been developed as more energy-efficient alternatives to traditional incandescent lights.

- In 2011, slightly less than one-third (32%) of Canadian households used a “controlled” method to dispose of dead or unwanted CFLs, with 24% using a depot or drop-off centre, and 8% returning the bulb(s) to the supplier or retailer. Half of the households disposing a CFL used an “uncontrolled” method (i.e., throwing them in the garbage), or still had them at the time of interview (12%).
- In 2011, almost 9 out of 10 households (87%) in Canadian census metropolitan areas (CMAs) had at least one type of energy-saving light. The majority of CMA households (75%) had at least one CFL.

Energy-efficient lights in Canada

The *Energy Efficiency Act* and the related *Energy Efficiency Regulations* set out the standards for various products that use electricity, including lighting products. 100 W and 75 W light bulbs manufactured on or after January 1, 2014 must meet minimum energy performance standards (MEPS), and MEPS will apply to 60 W and 40 W light bulbs manufactured on or after December 31, 2014.¹ These MEPS require standard light bulbs to consume at least 28% less energy than traditional incandescent light bulbs available on the market today.

In implementing these performance standards, the Government of Canada anticipates a reduction in annual energy consumption of between 37.1 and 51.5 petajoules, and a reduction in annual greenhouse gas (GHG) emissions of between 5.17 and 7.5 megatonnes by the year 2025.

The need to conserve

Canadian households used 547,096 terajoules (TJ) of electricity in 2011, or 40 gigajoules (GJ) per household.² The average household expended \$1,255 on electricity costs during the same period.³ There are many things in the typical Canadian home that consume electricity, including televisions, computers, household appliances (e.g., refrigerators, washing machines, dryers and air conditioners), charging devices for cell phones and tablets, lights and electric heating. Advancements in technology have resulted in the development of more energy-efficient versions of many types of these devices. The incandescent light bulb, however, is one common household item that remains fairly inefficient with respect to electricity.

Between 4% and 6% of the electricity consumed by a typical incandescent light produces light, while the balance is emitted as heat.⁴ As a result, more energy-efficient lights, such as halogen lights, compact fluorescent lights (CFLs) and light-emitting diode (LED) lights, have been developed as alternatives to traditional incandescent lights. These energy-efficient lights consume less energy to produce the same amount of light that would be emitted by an incandescent bulb, however they tend to be more expensive to buy compared to traditional incandescent lights. They also tend to have longer lives, meaning that the energy costs in terms of production and disposal tend to be less.

1. Canada Gazette Part I, 2013, *Regulations Amending the Energy Efficiency Regulations*, Vol. 147, no. 40, pages 2305 to 2325.

2. Statistics Canada, 2013, *Households and the Environment: Energy Use, 2011*, Catalogue no. 11-526-S.

3. Statistics Canada, CANSIM table 203-0021 (accessed January 16, 2014).

4. Natural Resources Canada, 2008, *Basic Facts about Residential Lighting*, Catalogue no. M144-146/2008E.

Uptake and disposal of compact fluorescent lights by Canadian households

While a traditional incandescent light is made from a glass bulb and a small amount of tungsten and other metals that do not pose significant environmental impacts, some energy-efficient lights, such as CFLs and fluorescent tubes, contain

mercury, which can have significant impacts on both human health and the environment. Thus, special care must be taken when disposing of these types of lights at the end of their lives to avoid negative health and environmental impacts.⁵

Uptake of compact fluorescent lights

In 2011, almost 9 out of 10 households (87%) in Canadian census metropolitan areas (CMAs) had at least one type of energy-saving light (Table 1). The majority

Table 1 Energy-saving lights, 2011

	At least one type of energy-saving light ¹	Compact fluorescent lights	Fluorescent tubes	Halogen lights	Light emitting diode (LED) lights ¹
	percent				
Canada	87	76	40	34	9
All CMA households	87	75	39	35	10
St. John's	82	75	31	18 ^E	F
Halifax	87	74	42	23 ^E	F
Moncton	69	61	24 ^E	F	F
Saint John	82	64	40	F	F
Saguenay	79	68	33	41	F
Québec	86	69	45	50	7 ^E
Sherbrooke	90	74	38	41	F
Trois-Rivières	83	67	29 ^E	42	F
Montréal	83	67	25	48	7 ^E
Ottawa - Gatineau	91	80	35	40	10 ^E
Ottawa - Gatineau (Quebec part)	91	80	34	39	F
Ottawa - Gatineau (Ontario part)	90	80	35	40	9 ^E
Kingston	91	85	44	27	F
Peterborough	92	81	55	18 ^E	F
Oshawa	88	78	37	30	F
Toronto	90	81	43	31	10
Hamilton	87	75	41	32	9 ^E
St. Catharines-Niagara	87	79	54	25	F
Kitchener-Cambridge-Waterloo	84	78	41	24	F
Brantford	94	83	57	26 ^E	F
Guelph	95	79	58	31 ^E	F
London	90	81	47	31	10 ^E
Windsor	84	77	42 ^E	25 ^E	F
Barrie	88	76	48	30 ^E	F
Greater Sudbury	91	82	54	23 ^E	F
Thunder Bay	89	85	47	27	F
Winnipeg	90	76	51	35	9 ^E
Regina	87	77	41 ^E	24 ^E	F
Saskatoon	84	69	47 ^E	19 ^E	F
Calgary	87	75	35	32	11 ^E
Edmonton	83	74	40	32	13 ^E
Kelowna	85	74	45 ^E	49	F
Abbotsford-Mission	84	73	43 ^E	29 ^E	F
Vancouver	86	74	41	34	11 ^E
Victoria	93	79	45	37	18 ^E
Non-CMA households	88	78	43	31	9

1. Excluding LED holiday lights.

Note: As a percentage of all households.

Source: Statistics Canada, Environment Accounts and Statistics Division, Households and the Environment Survey (survey number 3881), 2011.

5. Environment Canada, 2012, *Pollution and Waste – Fluorescent Lamps*, www.ec.gc.ca/mercure-mercury/default.asp?lang=En&n=2486B388-1 (accessed January 16, 2014).

Uptake and disposal of compact fluorescent lights by Canadian households

of CMA households (75%) had at least one CFL. Households in the Kingston and Thunder Bay CMAs were most likely (85%) to report having one. All CMAs in Quebec, which is the province where the cost per kilowatt-hour (kWh) tends to be the lowest in Canada,⁶ reported uptake rates for CFLs lower than the CMA average of 75%, with the exception of the Quebec part of the Ottawa-Gatineau CMA (80%).

Disposal of compact fluorescent lights

Although CFLs are designed to last longer than conventional incandescent lights, like all lights they will eventually die and need to be disposed of. Because they contain mercury they need to be treated as hazardous waste and should not be put in the garbage, but rather disposed of in a safe manner. Safe or “controlled” disposal methods include use of “take back” programs run by retailers, and household hazardous waste depots or drop-off centres. However, while the

availability of these programs has been increasing in recent years, they are not yet universally available in Canada. This, combined with factors such as the perceived inconvenience of taking dead or unwanted bulbs to a special location, or a lack of awareness of the availability of special disposal programs, has led to a large number of these bulbs being disposed of in regular household garbage.

Nationally

In almost every case, households used only one method to dispose of their dead or unwanted CFLs. In 2011, slightly less than one-third (32%) used a “controlled” method of disposal, with 24% using a depot or drop-off centre, and 8% returning the bulb(s) to the supplier or retailer (Table 2). Half of the households disposing a CFL used an “uncontrolled” method (i.e., throwing them in the garbage), or still had them at the time of interview (12%). The remainder used an unknown method to dispose of them.

Census metropolitan area level

Comparisons between CMAs take into consideration only those values for the variable that were releasable under Statistics Canada’s data quality guidelines.

Kingston and Thunder Bay led the country in uptake of CFLs in 2011, with 85% of households in these CMAs reporting that they used these lights. In comparison, households in Moncton were the least likely to have used CFLs (61%). In terms of disposal, households in Guelph were the most likely to have reported having dead or unwanted CFLs (41%), followed by those in Sherbrooke (about 29%) and Québec (28%).

Households in Halifax were most likely to have disposed of their dead or unwanted CFLs in the garbage, with 84% that had dead or unwanted CFLs doing this. Households in Hamilton were the least likely to have reported this disposal method (about 27%).

What is mercury?

Mercury is a heavy metal that can be present in the environment in many different forms. Elemental mercury is naturally present in the Earth’s crust, in raw materials such as coal, crude oil and other fossil fuels, and in minerals such as limestone, soils and metal ores (including zinc, copper and gold). In addition to natural processes, mercury can be released into the environment as a result of human activity, such as the combustion of coal and refined petroleum products, the extraction of metals from ore, and the use and disposal of consumer products containing mercury such as batteries and light bulbs.

Once in the environment, mercury can be converted to various forms, including a highly toxic compound known as methyl mercury, a potent neurotoxin that is readily absorbed, distributed and passed through the protective blood-brain barrier, affecting the central nervous system. It can accumulate in living organisms and biomagnify (i.e., increase in concentration) as it moves up the food chain. Depending on the level of exposure, effects on humans, fish and wildlife can include slower growth, reproductive failure, and the development of abnormal behaviours that can affect survival. Methyl mercury is particularly damaging to the development of infants and young children, who are especially vulnerable given their nervous systems are still developing. In pregnant women, it can cross the placenta into the fetus, accumulating in the fetal brain and other tissues, and it can also be passed to infants through breast milk.

Adapted from: Environment Canada and Health Canada, 2010, *Risk Management Strategy for Mercury*, www.ec.gc.ca/doc/mercure-mercury/1241/index_e.htm (accessed January 16, 2014).

6. Statistics Canada, Consumer Prices Division, 2011, special tabulation.

Uptake and disposal of compact fluorescent lights by Canadian households

Table 2 Uptake and disposal of compact fluorescent lights, by census metropolitan area, 2009 and 2011

	2011						2009			
	Uptake of compact fluorescent lights ¹	Had dead or unwanted compact fluorescent lights to dispose of ¹	Had dead or unwanted compact fluorescent lights to dispose of ²				Uptake of compact fluorescent lights ¹	Had dead or unwanted compact fluorescent lights to dispose of ¹	Had dead or unwanted compact fluorescent lights to dispose of ²	
			Put them in the garbage	Took or sent them to a depot or drop-off centre	Returned them to a supplier or retailer	Still had them			Put them in the garbage	Took or sent them to a depot or drop-off centre
percent										
Canada	76	23	50	24	8	12	75	22	56	24
All CMA households	75	23	47	25	10	13	74	22	55	24
St. John's	75	22 ^E	78	F	F	F	68	19	73	F
Halifax	74	17 ^E	84	F	F	F	84	21 ^E	61 ^E	F
Moncton	61	22 ^E	F	F	F	F	71	F	F	F
Saint John	64	14 ^E	F	F	F	F	82	22 ^E	F	F
Saguenay	68	26 ^E	56 ^E	F	F	F	71	24	78	F
Québec	69	28	79	13 ^E	F	F	68	22	81	F
Sherbrooke	74	29 ^E	44 ^E	42 ^E	F	F	80	28 ^E	F	F
Trois-Rivières	67	25 ^E	F	F	F	F	74	17 ^E	78	F
Montréal	67	25	55	16 ^E	9 ^E	16 ^E	67	23	57	13 ^E
Ottawa - Gatineau	80	23	51	15 ^E	F	16 ^E	78	26	59	21 ^E
Ottawa - Gatineau (Quebec part)	80	27	F	F	F	F	70	23 ^E	49 ^E	F
Ottawa - Gatineau (Ontario part)	80	21	54	F	F	F	81	28	62	F
Kingston	85	25	F	F	F	F	82	28	58	F
Peterborough	81	17 ^E	F	F	F	F	88	20 ^E	F	F
Oshawa	78	21	47 ^E	F	F	F	78	18	50	F
Toronto	81	25	29 ^E	42	12 ^E	F	74	23	48	34
Hamilton	75	18 ^E	27 ^E	28 ^E	F	F	79	23	50 ^E	24 ^E
St. Catharines-Niagara	79	20 ^E	45 ^E	F	F	F	85	17	F	F
Kitchener-Cambridge-Waterloo	78	12 ^E	F	F	F	F	81	20	59	F
Brantford	83	19 ^E	F	F	F	F	80	15 ^E	F	F
Guelph	79	41	F	56	F	F	86	25 ^E	F	51 ^E
London	81	20	33 ^E	27 ^E	F	F	84	23	60	F
Windsor	77	21 ^E	46	F	F	F	80	20 ^E	53	F
Barrie	76	15 ^E	F	F	F	F	91	23 ^E	69	F
Greater Sudbury	82	21 ^E	F	F	F	F	86	26	F	F
Thunder Bay	85	17 ^E	F	F	F	F	87	28	41 ^E	39 ^E
Winnipeg	76	17	63	F	F	F	68	15 ^E	64	F
Regina	77	21 ^E	71	F	F	F	83	22	77	F
Saskatoon	69	F	70	F	F	F	77	15 ^E	68	F
Calgary	75	19	50	F	F	F	81	21	65	F
Edmonton	74	20	44 ^E	43 ^E	F	F	75	20 ^E	32 ^E	53 ^E
Kelowna	74	F	F	F	F	F	65	F	F	F
Abbotsford-Mission	73	19 ^E	67	F	F	F	81	15 ^E	F	F
Vancouver	74	24	49	17 ^E	11 ^E	21 ^E	68	21	50	31 ^E
Victoria	79	23	F	F	F	F	76	20	74	F
Non-CMA households	78	24	57	21	6^E	12	78	21	58	23

1. As a percentage of all households.

2. As a percentage of households that had dead or unwanted compact fluorescent lights to dispose of.

Source: Statistics Canada, Environment Accounts and Statistics Division, Households and the Environment Survey (survey number 3881), 2009 and 2011.

Uptake and disposal of compact fluorescent lights by Canadian households

Disposal via a depot or drop-off centre was most commonly reported by households in Guelph (56%), while households in the CMA of Québec were the least likely to have made use of one (about 13%).

The use of retailer take back programs was reported infrequently, with only three CMAs having releasable numbers: Toronto (about 12%), Vancouver (about 11%) and Montréal (about 9%).

Changes from 2009

Though just two years passed from the last time Canadian households were asked about their use and disposal of CFLs, some CMAs exhibited relatively large changes in one or both of these practices. The largest changes tended to be related to the rates of disposal of CFLs in the garbage as opposed to the rates of uptake.

The proportion of households that disposed of their dead or unwanted CFLs in the garbage in London, for example, decreased from 60% in 2009 to about 33% in 2011, while the rate of uptake of these bulbs was relatively unchanged from 84% in 2009 to 81% in 2011 (Table 2). Similarly, Hamilton saw a decrease in the rate of disposal in the garbage from about 50% in 2009 to about 27% in 2011, Saguenay saw a decrease from 78% to about 56%, Toronto saw a decrease from 48% to about 29%, and Calgary saw a decrease from 65% to 50%. Smaller decreases in the rate of disposal in the garbage were seen in Windsor (53% in 2009 to 46% in 2011), Ottawa-Gatineau (59% to 51%) and Regina (77% to 71%).

While most rates of disposal of dead or unwanted CFLs in the garbage decreased, a few CMAs showed

an increase from 2009 to 2011. The rate in Halifax increased from about 61% in 2009 to 84% in 2011, in Edmonton from about 32% to about 44%, and in St. John's from 73% to 78%.

Changes in rates of uptake of CFLs tended to be smaller than changes in the rates of disposal in the garbage. Winnipeg, for example, saw an increase in the rate of uptake of CFLs of 8 percentage points, (from 68% in 2009 to 76% in 2011), while the rate of disposal of CFLs in the garbage was stable (64% in 2009 and 63% in 2011). On the other hand, Halifax, which saw a large increase in the rate of disposal in the garbage, saw a large decrease in the rate of uptake of CFLs, from 84% in 2009 to 74% in 2011.

What you should know about this study

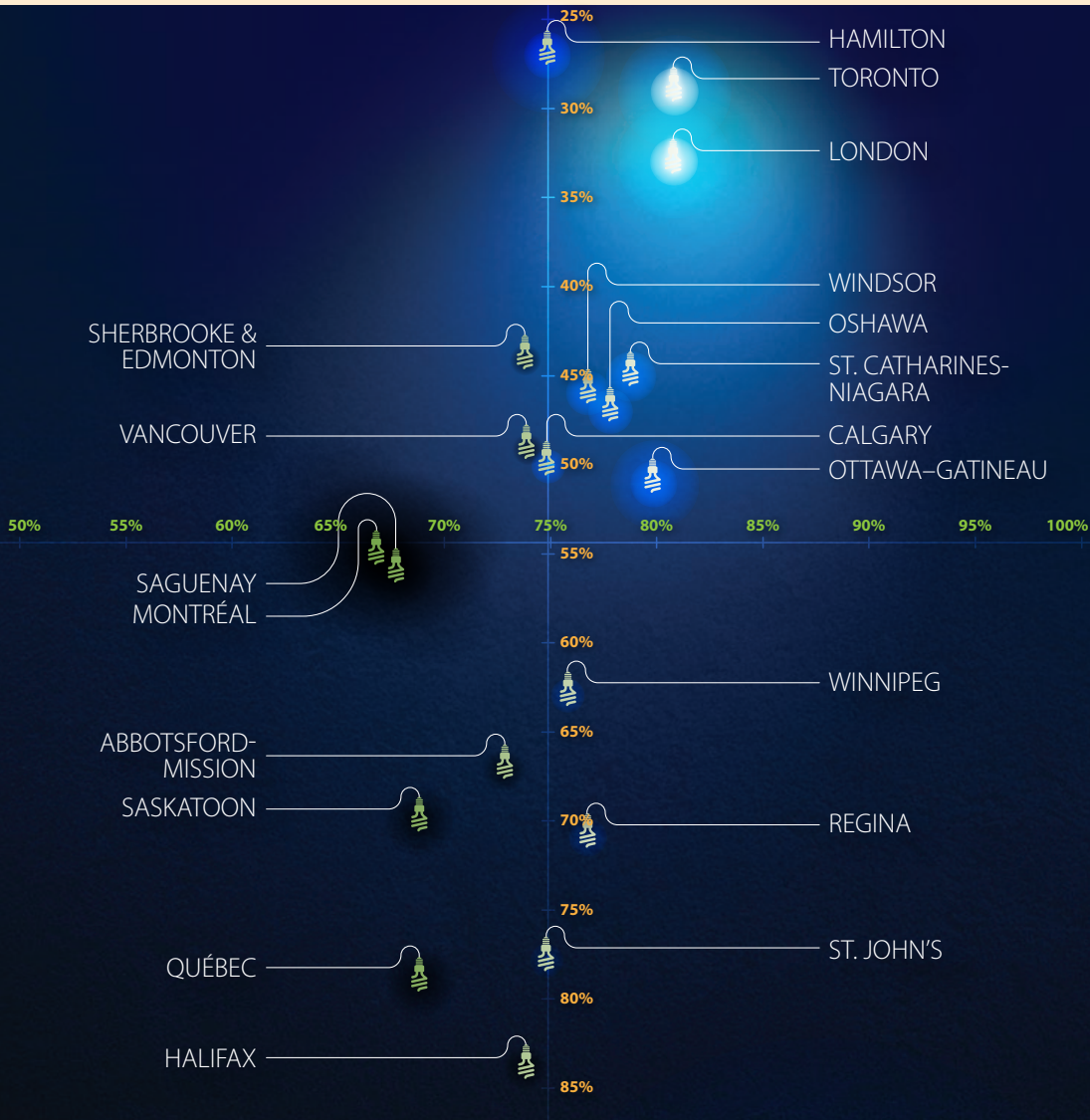
This study is based on data from the 2009 and 2011 Households and the Environment Survey (HES), which were conducted as part of the Canadian Environmental Sustainability Indicators initiative. Respondents were asked to indicate whether they had any compact fluorescent lights (CFLs), fluorescent tubes, halogen lights or light-emitting diode (LED) lights. As well, they were asked if they had had any dead or unwanted CFLs to dispose of in the past year and how they disposed of them if they did.

Not all census metropolitan areas (CMAs) are represented in the analysis of all variables in this study as some results were suppressed for data quality reasons. The criteria for inclusion of a CMA were that the result had to have a coefficient of variation (CV) no higher than 33.3 and at least 20 records had to have contributed to the result. In cases where fewer than 20 records contributed to a result, the value was deemed "too unreliable to be published," regardless of the CV and indicated as an F in the data table. Values that had a CV between 16.5 and 33.3 (and at least 20 records contributing) are to be used with caution, which is indicated with an ^E in the data table.

LOW DISPOSAL IN GARBAGE

LOW UPTAKE

HIGH UPTAKE



HIGH DISPOSAL IN GARBAGE

COMPACT FLUORESCENT LIGHTS UPTAKE PER CITY

Source: Statistics Canada, Environment Accounts and Statistics Division, Households and the Environment Survey, 2011 (survey number 3881).



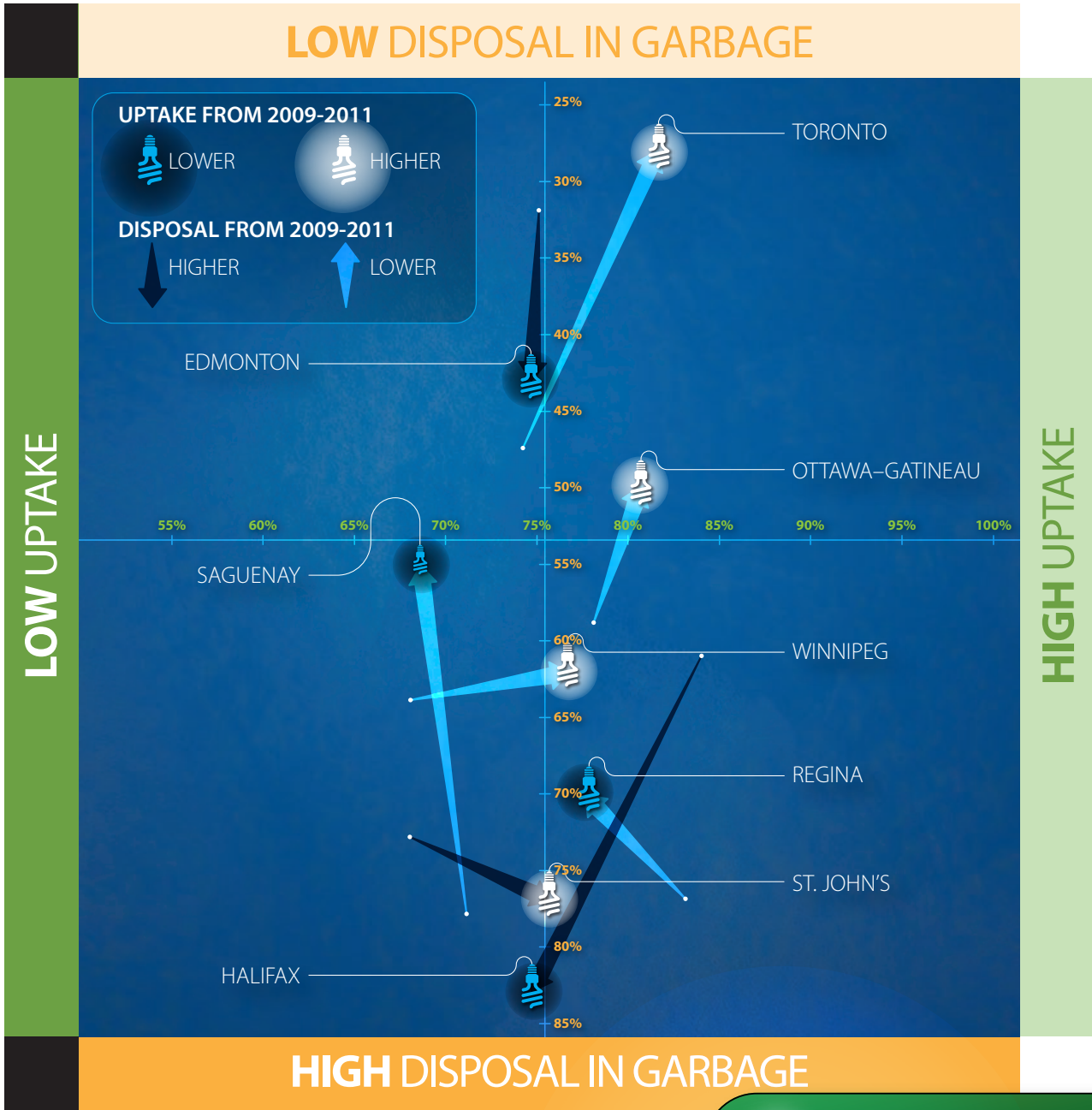
81%

Highest Uptake of Compact Fluorescent Lights TORONTO & LONDON



Statistics Canada / Statistique Canada

Canada



2009-2011 COMPACT FLUORESCENT LIGHTS UPTAKE COMPARISON

Source: Statistics Canada, Environment Accounts and Statistics Division, Households and the Environment Survey, 2011 (survey number 3881).



TORONTO

From 2009-2011 households in Toronto increased their uptake of compact fluorescent lights while also decreasing their disposal in the garbage.