

Water Consumption

This topic discusses consumption of water in people's daily life and in the economy.

Introduction to Water Use

Water has always played unique roles in the development of what has become Canada. The fur trade, which stimulated the exploration of Canada's vast interior, was totally dependent on water for its functioning. Waterways were long used for long-distance transport of logs, too, as these went down rivers to sawmills, and then by ship to export markets. The harnessing of water to power mills of all kinds along many rivers in Central and Eastern Canada made possible the production of many locally-consumed or exported materials such as grain and cloth. As Canadian industry developed, the ready presence of water made certain types of industry uniquely feasible such as pulp and paper production or the production of Hydroelectricity. Even today, Canada's economy (and life-style) is unusually dependent on the use of water.

However, many Canadian uses of water degrade it in some way. Effluent water can harm both humans and the natural environment if the water is not treated to clean it. Water contamination has always been a problem in Canada, but perhaps more so in recent years as both the economy and the activities of Canadians have expanded enormously and have put increased pressures on water supplies.

Where We Use Water

The most obvious and immediate uses of water occur in water's natural setting. These are called "instream uses". Human activities that are instream uses include hydro-electric power generation, shipping, and water-based recreation. The ultimate example of an instream use of water might be concern over the habitat of fish and other life-forms that live mainly in water bodies.

Most instream uses do not consume water, but they can damage its quality. For example, oil leaking from freighters or outboard motors can cause localized pollution. Similarly, the reservoirs created for hydro-electric power generation and for other uses can have effects on the quality of water through their changes in water flow patterns.

The other types of water use are called "withdrawal uses". The water is withdrawn from the water body, piped to a use on land, then the effluent is disposed of, possibly by going back into the source body of water. There are a large number of

withdrawal uses - examples include household and industrial uses of water, irrigation, livestock watering, and water uses for cooling in thermal-electricity plants.

Most withdrawal uses consume some of the water, meaning less is returned to the source than was taken out. The water might also be degraded in some way, with wastes that are only partly treated if at all.

Figure 1 shows the main uses of water where these uses can be measured. The largest use is thermal power generation (which includes nuclear power generation). The water it consumes is almost entirely as an instream use. There is relatively little loss of water, and the water is comparatively undamaged: the main impact on it is thermal pollution, meaning that the returned water is somewhat warmer than the intake water.

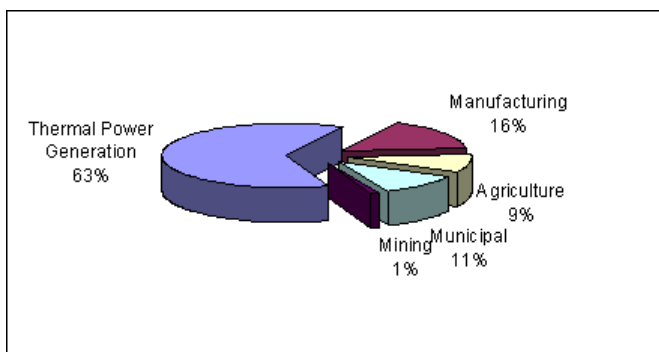


Figure 1. Principal Water Uses in Canada, 2000

Source: Environment Canada's Water Site - "Water Works for Us"

All other uses shown in Figure 1 are withdrawal uses. The impact of manufacturing is understated, as the entity shown here is for manufacturers who have their own water systems. Those manufacturing plants that use municipal water are listed in the municipal category.

Water Use Issues

- Availability of water:** Canada's overall water supply is generous by any standard, but water is often not plentiful where it is needed most. Ninety percent of Canadians live in a narrow band along the extreme southern edge of the country. On the other hand, 60% of the water supply is found to the north of this settlement band. Not only is it north, but also most of the water supply also flows north, going away from the zone of population. Even within the settled area, most of the population is concentrated in relatively small areas. This concentration of people puts high and competing demands on some local water supplies. There are also problems of moderate to severe seasonal water shortages in many parts of Canada. In 1999, 26% of all

Canadian municipalities having water distribution systems reported they had had problems with water availability during part of the preceding five years.

- **Dependence on groundwater:** Approximately one in four Canadians (a total of eight million people) rely exclusively on groundwater for their water needs. Municipalities dependent on groundwater are more vulnerable than those using lakes or rivers to water shortages. Groundwater is also vulnerable to contamination from runoff.
- **Excessive water use:** Nevertheless, because most parts of Canada have ready access to seemingly unlimited amounts of freshwater, Canadians consume more water per capita than do people of any other country, other than the United States. The result, in an ever-growing economy, is that municipal water use strains the capacity of surface water and groundwater supplies. In drought-prone areas, there is little margin for handling water shortages. Water shortages can lead to rationing or simply to activities being abandoned if they can't afford to bring water in from elsewhere.
- **Infrastructure construction and maintenance:** The growth in both the population and in the economy has meant the need for new water and wastewater infrastructure. The existing infrastructure is crumbling, too, as a result of budget cutbacks in the 1990s. Therefore, even the costs of maintaining the existing infrastructure to maintain adequate service levels has been estimated to total \$40-70 billion over the next 10 years.
- **Water conservation trends:** For the main user category that can be monitored, municipal water use, there was a decrease in daily use from 694 litres per capita in 1989 to 628 litres per capita in 1996. Since then, consumption has gone up (to 638 litres per capita in 1999), but this has been partly due to building new water supply systems for places that formerly had unreliable access to clean water. The use of water meters in some Canadian municipalities has helped to reduce water consumption. Figure 2 shows that households paying for water by the volume used (i.e. metered use) consumed 288 litres per day. This rate was much less than the 433 litres of water per day consumed by households paying a flat rate for water.
- **Federal government roles:** The federal government has been heavily involved in improving water use patterns. For example, it has provided the funding for a \$100 million Green Municipal Investment Fund, a permanent revolving fund to support implementation of environmental projects. (In a revolving fund, users borrow money from the fund to implement an improvement then pay the fund back from some of the resulting savings). The federal government has also created a five-year, \$25 million Green Municipal Enabling Fund which will provide cost-shared grants for environmental feasibility studies. Both funds are administered by the Federation of Canadian Municipalities.

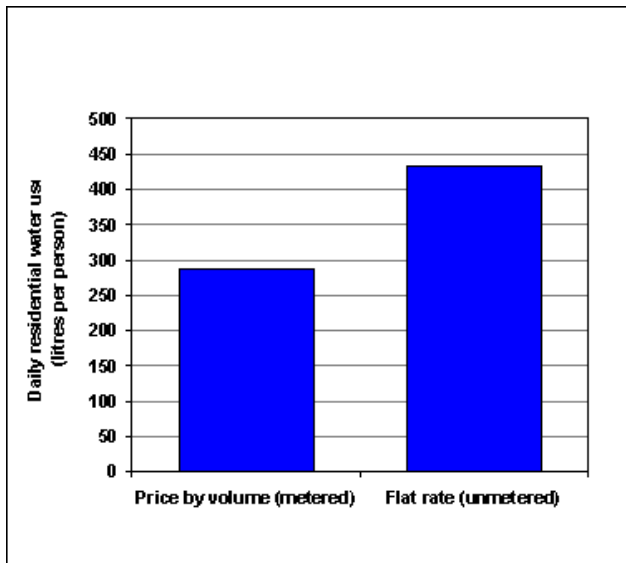


Figure 2. Comparison of Daily Residential Water Use between Metered and Flat Rate Users, 1999

Source: National Environmental Indicator Series, SOE Bulletin No. 2001-1. Ottawa, 2001