

been installed, and when the turbine began turning, it continued to accelerate until the blades began striking support cables. When a cable turn-buckle broke, the rotor broke off. Hydro Quebec and DAF are replacing it with a model with an improved brake system and stronger supports.

The NRC also operates several small vertical axis turbines, one at the Rideau Falls in Ottawa. Its axis is 5.5 metres (18 feet) high. It provides power for some electric equipment in a small, well-insulated building, equivalent to a three-bedroom house. (The building also has solar collectors, a strip of solar cells on the roof and a large window facing south.) Newfoundland and Saskatchewan each have experimental 50-kilowatt models operated by utility companies.

A new federal demonstration project in Nova Scotia will attempt to overcome two basic windmill problems: intermittent winds and high energy storage costs. Two vertical axis windmills at the Wreck Cove hydroelectric plant, just off the Cabot Trail on Cape Breton Island, will pump water from a lake into the plant reservoir. One will be used as a direct-drive water pump; the second will generate electricity to power an electric water pump. The first will be cheaper to build but the second may be more cost-effective.

The possibilities of Canadian wind power do not end with these eggbeaters. Canada is a breezy place. High wind energy potential exists in the Maritimes, on the west coast of Hudson Bay and, to a lesser extent, in the southern prairies. British Columbia may also have a potential for wind energy, but its mountainous terrain necessitates many more measurements than have been made to date. Hydro Quebec hopes to erect a three- to four-megawatt vertical axis windmill in about five years and to eventually build windmill parks.

The United States has concentrated on horizontal axis wind turbines, which resemble airplane propellers. NASA is committed to six ex-

*John and Donna Ramsey live in a wind-powered home in Emyvale, Prince Edward Island. They store surplus energy from their 110-volt wind generator in this battery cellar.*



*This experimental vertical axis wind turbine was installed in the Magdalen Islands in May 1977. It was toppled in an accident last summer and is now being replaced.*

perimental models, and a huge two-megawatt model is under construction in North Carolina. Donald E. Carr, author of *Energy and the Earth Machine*, suggests that a wind-powered grid system could supply half the continent's electric energy by the year 2000. However, the US Department of Energy estimates it would take over 300,000 megawatt-sized windmills to supply 10 per cent of the United States' projected electric energy needs for the year 2000.

There are also windy possibilities of a more extraordinary nature. William E. Heronemus, professor of civil engineering at the University of Massachusetts, has designed a huge offshore power system that would use windmills floating on platforms in the Atlantic to supply fuel for Canada and New England. (The power would be used to electrolyse sea water producing hydrogen that would be pumped ashore and converted to fuel cells.) Russian meteorologists W. S. Lidorenko and G. F. Muchnik have proposed hanging windmills from giant balloons in order to use the steady, swift winds of the tropopause, five to seven miles up. The balloons would be anchored to the ground with electric cables.