How to Heat Your Building Without a Furnace

[BUT WITH SOME HELP FROM THE LIGHT BULBS]

Gulf Canada Square, a two-block development in downtown Calgary, which opens this fall, will be the largest, single-development office and commercial complex in western Canada with almost two million square feet of space, 1,500 parking spaces and a 20-story tower. It will probably also be the most energy efficient complex in the world.

It will incorporate a refined version of the energy conservation system pioneered by Canada Square Corporation in Hydro Place, Toronto, the headquarters of Ontario Hydro.

Conservation

Conservation may be the most effective short-term means of extending energy resources. A technique being tested by the St. Lawrence Cement Company of Mississauga, Ontario, will reduce the amount of oil needed to produce a ton of cement from a half to a third of a barrel. (The federal government will pay half of the costs of converting the St. Lawrance kiln, and the company will make the technology available to other Canadian firms.)

Hydro Place, which has no furnace, recently came through the coldest Toronto winter in forty-three years with heat to spare. The energy system is not solar; the outer "skin" of the building is designed to exclude as much solar heat as possible.

The basic premise is that any building with a million or more square feet of space generates enough waste heat from bodies, light bulbs and electric equipment to supply its own energy needs year-round without either furnace or conventional air conditioning. In winter, most large buildings cool interior space while heating the perimeter. Even during three-day weekends in winter, when all lights are turned off and only a skeleton staff is in the building, the Hydro Place storage system maintains temperatures at a comfortable 70 degrees.

The system is controlled by an operator at a central computer. Conditions throughout the building are monitored every 20 minutes by sensors, and necessary adjustments are made automatically.

Gulf Canada Square has six main features:

1. Patented environmental controls.

2. Thermal storage in heated and chilled water in four 250,000-gallon storage tanks in the basement, with patented flow controls. (The tanks in Hydro Place are larger than those designed for Calgary;

Gulf Canada Square in Calgary, Alberta, may be the most efficient complex in the world. It will use the heat given off by workers and machines. Sunlight is not part of the system; the outer skin, opposite, is designed to exclude as much solar heat as possible. Left, workmen insulate the interior of one of four 250,000-gallon water tanks that will store heat under the basement floor. Hydro Place, right, in Toronto pioneered the system.