

applications, although the Brace Research Institute has designed and operated wind turbines appropriate for rural tasks. However industrial capability for component production is good and could expand to meet the needs of foreign markets. Considerable expertise is available in wind monitoring, in planning and site selection, and in maintenance.

## 2.9 Solar Heating Applications

Despite its latitude and its harsh climate, there is considerable technical potential for solar thermal applications in Canada. Some applications however, although technically feasible, are not cost-effective at this time and will require a continuation of technological improvement and also higher prices of competitive fuels or technologies to make their implementation economically attractive.

Space heating provides the largest single requirement for energy in Canada: approximately 30% of the total annual energy requirement is for heating of homes, commercial buildings, factories etc. The use of so-called "passive" solar energy - i.e. solar gain through windows - is difficult to document, but it is virtually the only present contribution of solar energy to the national energy budget. Solar energy contributes perhaps 1.5% of annual household heating requirements. "Passive" solar heating is beginning to be an important aspect of building design. This is of course closely linked with energy conservation strategies for buildings. Because of its climate, and high space heating requirements, Canada has concentrated on the design and construction of extremely energy-efficient buildings, some using as little as 10% of the average consumption in existing conventional building.

Active solar heating is the most commonly recognised solar thermal application, including space and service water heating and industrial process heat. Active solar heating employs specific collectors (flat plate, evacuated tube, concentrators) incorporating a heat transfer medium (air water or other fluid) and possibly a storage system. Most of Canada's effort has been in the area of flat plate collectors using a liquid transfer medium, although there are a few manufacturers of other components. Several firms produce complete packaged systems.

Solar heating systems are not generally economic anywhere in Canada at present. Space heating has the great disadvantage of peaking during the period of lowest insolation, and this plus competing conservation measures, may severely limit future markets for solar space heating. For the provision of domestic hot water, solar systems may be cost-effective in areas where electricity is oil-generated (hence more costly). if they are owner-installed.