fired equipment banned in some areas; and, according to Braaten, brought an important Canadian fuel source to the brink of social unacceptability. However, the Canadian Standards Association is about to release a new standard for wood-fired appliances (CSA B415), which should help clear the air.

"Simply stated," says Braaten, "CSA B415 provides a uniform method of determining the emissions and efficiency of a wide range of domestic wood-fired appliances (including wood stoves, pellet stoves and fireplace inserts), and sets minimum performance requirements that those appliances must meet."

In addition to higher efficiencies and reduced emissions, the new standard should also help reduce indoor air pollution and reduce the incidence of creosote chimney fires. For manufacturers, the new standard gives them a tool to help demonstrate the quality of their product.

For builders, the standard gives them a tool to compare and choose between equipment on the basis of efficiency and environmental performance. That in turn allows builders to demonstrate the quality of equipment in their own product - houses.

As with other CSA wood-fired appliance requirements, CANMET played a large role in the development of the standard. CANMET funding paid for the time of CSA staff engaged in activities related to the standard. CANMET's Combustion and carbonization Research Laboratory prepared the first draft of the standard as well as draft modifications.

CCRL's laboratory resources were used for testing of the standard to verify the appropriateness of some of the proposed requirements. For the time being, testing to the new standard will be carried out on a volunteer basis only, but Braaten sees the day, in the not-too-distant future, when meeting the standard will be a requirement. "Wood is simply too important an energy source," he says. "And the more we use, the better off we'll be." It is rumoured that three provincial jurisdictions are already set to introduce the new standard as mandatory.

ADVANCED HOUSES PROGRAM
PROGRAMME DE MAISONS PERFORMANTES

The Advanced Houses Program Update

We are about to embark on a very exciting adventure in this country, with the construction of a series of advanced technology houses each demonstrating innovations in housing.

Why bother? Aren't houses complex enough already? Some may think that we've already made them too complex, and difficult to handle - too high-tech, so why encourage more research and development? The fact is we still can't build them properly. We still manage to screw things up, so there is lots of room to improve.

The Advanced Houses program, spearheaded by EMR's CANMET Buildings Group, is a unique opportunity in that a series of houses in varying regions and climates will be built. Each will have a unique local flavour while meeting goals common to all.

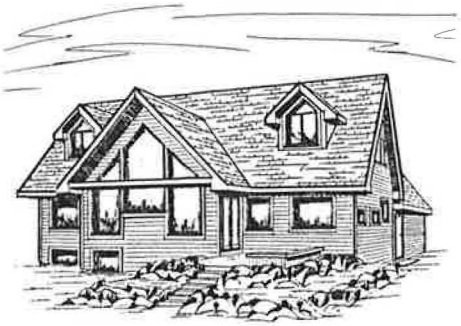
Energy efficiency and environmental concerns are the driving forces, as the program is part of EMR's Green Plan initiatives.

The goals of the program are for energy consumption to be less than 50% that of the current R-2000 targets. Special attention is also being paid to total energy consumption in the house, not just for space heating but also for household appliances. Appliance energy consumption becomes significant as the building envelope is tightened and space heating energy consumption is decreased.

Environmental concerns

Energy and resource conservation is very much related with environmental friendly construction. The energy consumption that is to be used is not only the energy to maintain the building in operation and habitable, but also in the processes that bring the materials to the site.

Materials that have a high recycled content may have a lower impact on the environment. The Advanced houses will use a range of products that could thus be classed as "environmentally friendly".



B.C. Advanced House

The **B.C. Advanced house** to be located in Langley, B.C. will make use of non-chemically treated wood for the foundation, cement based materials with low-grade or recycled wood fibres for cladding, roofing and floors. The products are chemically inert, fireproof, inexpensive to produce and durable.

The basic structure will use stressed skin panels. These offer high insulating values in a thinner panel (thus saving on space in the house) and reduce construction waste produced on-site. It will use an integrated home automation system using the CEBus system, which is an open automation standard being developed in North America.

All the household appliances (refrigerator, stove, washer, dishwasher, dryer) will be energy misers compared to conventional appliances now on the market.

Each will be tied into the home automation system, so that it will be able to "talk" to each other to avoid simultaneous power draws that could overload the electrical system and blow fuses.

Because of the integrated nature of the electrical system, the electrical system proposed will be a 60 amp service (compared to the standard 100 or 200 amp service that would be the norm for this size of house).

The **Saskatchewan Advanced House** in Saskatoon will feature an integrated heating, cooling and ventilation system. It will include a prototype heat recovery ventilator, heat recovery from waste water, and solar domestic hot water system.

Prince Edward Island Advanced House

The **Prince Edward Island Advanced House**, located outside Charlottetown, stresses the use of renewable energy resources for space heating. Most of the home's energy will be generated by a windmill and a photovoltaic system (converting sunlight directly into electricity). A ground source heat pump will be incorporated.

Hamilton Advanced House will feature a gas powered integrated system for space, water and ventilation, as well as a complete home automation system. The most interesting feature will be a removable granny flat that will be installed inside the garage.

The **maison performante** to be built in Longueil, Quebec, combines passive solar energy with a ground source heat pump using radiant floor heating, insulating glass blocks and wall board containing recycled newspaper.

The **Nova Scotia Advanced House** in Bedford, N.S. is a two storey home compatible with its neighbours that incorporates passive solar design, a prototype ground source heat pump, CO_2 controlled ventilation system, and photovoltaic powered hot water system.

The **Manitoba Advanced House** in Winnipeg will include a prototype air filtration system, power meters to help residents monitor their power use, a split stud wall system and domestic hot water preheat system.

The **Innova House** in Ottawa will be a showcase for environmentally friendly building components, CFC free foam insulation and an integrated heating, cooling, ventilating and hot water system.

The **Waterloo Green House** in Waterloo, Ont. explores a range of environmentally responsible approaches to construction from extensive use of components made from recycled materials to elimination of waste products going to landfill sites during construction.

The **New Brunswick Advanced House** in Fredericton demonstrates ways of minimizing the impact of housing on the environment through the use of a shallow foundation, domestic sewage treatment plant and environmentally sensitive landscaping. It incorporates a ground source heat pump, in-floor radiant heating and high performance windows.

Each of the teams includes many participants from the housing industry in their area. To contact any of the Advanced House teams:

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Solar Heating in Antarctica?

For those who still doubt the viability of solar energy for heating, the following should give pause for thought.

The U.S. Research Program has three stations in Antarctica, one at the South Pole where the mean annual temperature is -49°C, while summer temperatures may reach a balmy -18°C.

The South Pole Station is only occupied during the six months of sunlight. With 24 hours of sunlight and all walls facing north towards the sun, solar heating is a natural to consider.

Designing a solar heating panel to work under these conditions is not simple as there's little practical experience in Antarctica. **Conserval Systems Inc.** of Toronto has had projects in Canada's north, so it was awarded a contract to supply 20 air solar panels for a new residence being built at the South Pole.

Their panel design was modified to increase efficiencies and to produce heat even when ambient temperatures dropped below -51°C. The panels are scheduled to be installed in late 1992.

It's expected that future Antarctic buildings will also be solar heated, confirming what the penguins knew all along, that the colour black absorbs the sun's heat and provides warmth.

If solar works in Antarctica, why aren't we doing more with it here?