In the National Research Council's Division of Electrical Engineering, Mr. George Evans believes that a more subtle attack on the problem would be to cut down on our energy NEEDS.

"It is certainly important to investigate and develop alternative energy sources," explains Mr. Evans, "but we should also be attempting to use energy in a more efficient fashion. Rather than supplying more energy to a city, we should be thinking of ways of using the available energy in a more efficient manner."

Office blocks provide a good example of energy waste. In winter, the outer rooms of these buildings are supplied with heat to maintain a comfortable temperature. On the other hand, rooms in the core of the structure have air conditioners operating! This apparently paradoxical situation arises from the heating effect of lights, elevators and other electrical services concentrated in the centre of the building.

A better-planned heating system would extract heat from the building's core and supply it to the outer rooms. Such a circulation system could be controlled by a central microprocessor — a miniature computer. The device would measure the temperature in each room, and calculate heat losses through exterior walls and windows by taking into account external temperature, wind speed and humidity.

The system could also be used to utilize the heat extracted from the building in summer by air conditioners. Long-term storage chambers would store heat for use the following winter.

The use of microprocessors and planned energy systems in individual homes is just around the corner. "The energy saved by such a device in private households may only be minimal," says Mr. Evans. "However, in future, microprocessor-controlled heating systems will be installed in houses at the design and construction stages. In these cases significant energy savings are possible. The house of the future will no longer have an individual furnace in its basement but will use a combination of solar panels and community heating."

In such houses the main heating will come from roof-mounted panels which collect and store the sun's heat. Additional heating will be provided on a community basis, rather than from less efficient oil or gas-fired private furnaces. It is also probable that communities will decide to store the energy of excess summer heat for general use in winter.

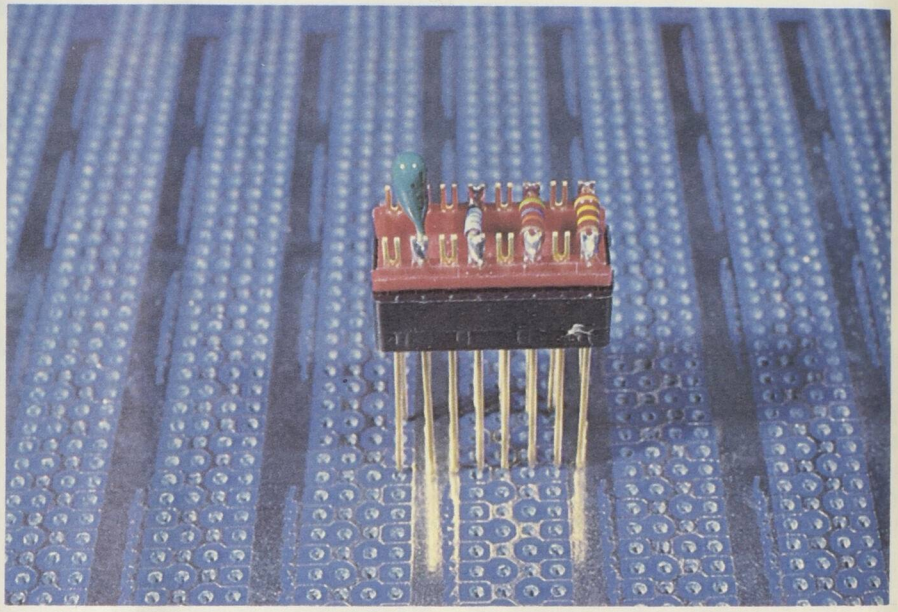
Mr. Evans feels that a combination of careful building design with microprocessors controlling energy use makes it feasible to obtain the same degree of comfort with reduced energy consumption. Through research and planning like this, it may be possible to balance the energy equation of the twenty-first century.

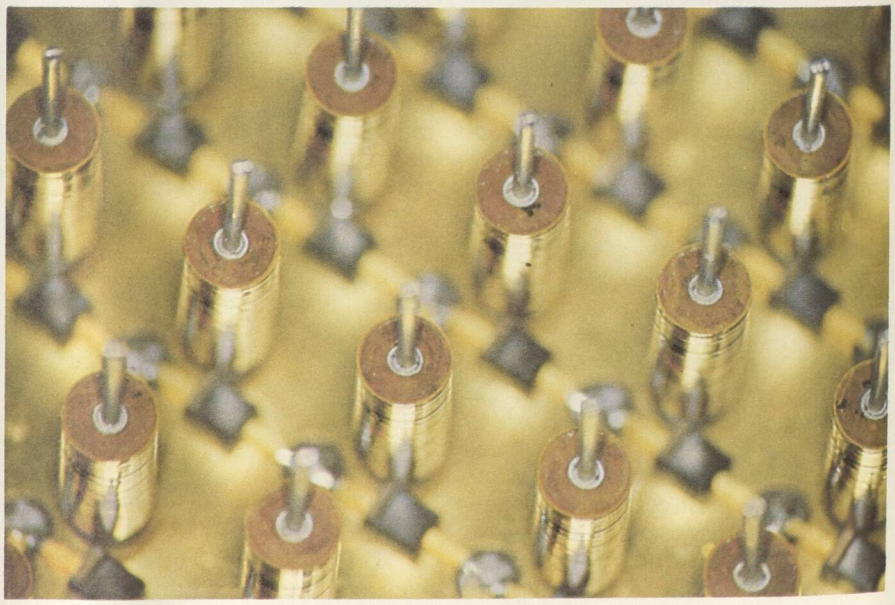
Electronic energy control systems for buildings show promise of being efficient, economical and flexible. They cannot, however, substitute for good building design or the use of common sense.

The possible benefits in a well designed building are:

1. The size of the energy supply system can be reduced, cutting down capital costs.
2. Energy strategies (e.g. the optimum use of stored energy) are easy to implement.
3. The system can be part of the overall building control system, further reducing capital costs.
4. Remote control is easily implemented. □

David Peat





Bruce Kane, NRC/CNRC

Modern electronics has a beauty of its own. A microprocessor can compress capacities previously handled by such circuits as these to within a fraction of an inch.

L'électronique moderne a une beauté qui lui est propre. Les microprocesseurs réunissent sur une plaquette dont la dimension est inférieure à une fraction de pouce des circuits remplissant les mêmes fonctions que celles qui étaient jusqu'alors dévolues à des circuits semblables à ceux-ci.