

## News of the arts

### Waste used to grow vegetables in greenhouses

Turning waste into energy primarily for use in greenhouses has become a focus for some Canadian firms and federal researchers.

Waste heat from thermal or nuclear power plants, oil refineries, chemical plants and natural gas pipeline compressor stations may become important heat sources for greenhouses, says Agriculture Canada.



*Tomatoes and cucumbers are the crops most likely to be grown in waste-heated greenhouses.*

A recent study prepared by consultants for Agriculture Canada identified 82 potential waste-heat sites in Canada.

The best sites for greenhouse production offer a steady flow of 37 degrees Celsius heat, and have open land nearby for greenhouse sites.

Theoretically, the 82 sites could provide heat for 1,100 hectares of greenhouse production, assuming current technology was used, the study indicates.

Developing these heat sources for greenhouse production will, however, depend on economic factors such as competition from imports, availability of skilled labour and management, and new investment capital.

Ontario now has the greatest potential for waste-heat greenhouse production, followed by Alberta.

Crops most likely to be produced in waste-heat greenhouses are tomatoes and cucumbers. They could replace imports, and also enjoy strong market demand.

The study predicts that half of

Canada's greenhouse vegetable production of tomatoes and cucumbers might be grown in new waste-heat greenhouses in the next decade.

The study concludes that the existing industry should be able to retain its cost competitiveness and market share for at least 15 years, with growers reducing fossil fuel consumption through improved insulation and solar energy applications.

In Ontario, joint government-industry projects are examining how warm water from the Bruce and Pickering nuclear power stations could be used for greenhouse production and also fish farming.

The United States and some West European countries are also engaged in similar activities.

#### Ontario fuel project

A \$100,000 feasibility study conducted at a closed landfill site at St. Thomas, in Ontario has shown that methane, a gas by-product of decaying garbage, can be extracted and used as fuel.

In the project, a greenhouse was heated with methane over a period of several months, said Robert McCaig, co-owner of the landfill site.

He said methane gas was being extracted from landfill sites in California, purified and used for home heating.

Mr. McCaig said the study had shown it was commercially feasible to use unrefined methane as a source of fuel for high-energy users if they were located

adjacent to a landfill site.

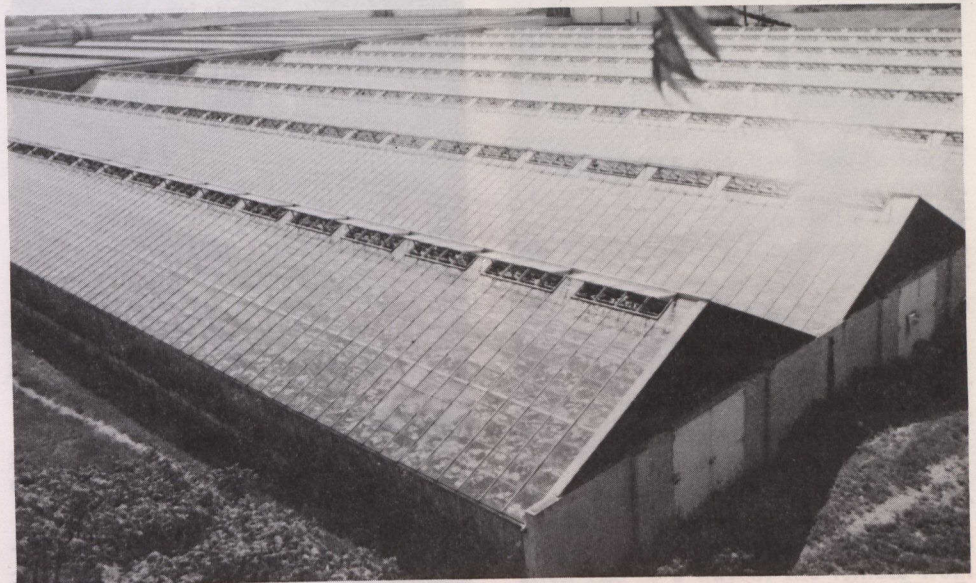
Gas probes to determine the methane concentration in the St. Thomas site were sunk in November and a greenhouse built in December. The research team began extracting methane gas, which was 40 to 50 percent pure, on a continuous basis in January and used it to heat the building. Tomatoes were planted as six-inch seedlings in February and have since grown to seven feet.

Landfill sites begin producing methane one to two years after being closed and may continue to produce the gas in sufficient quantities and concentrations to support a commercial operation for 15 to 20 years.

Using methane as a source of fuel would be feasible only for high-energy users, such as greenhouses, because of the capital cost involved in building an extraction and pumping system.

A system for a one-acre greenhouse would cost about \$60,000 whereas heating by conventional sources costs about \$25,000 annually, he said. However, the cost of installing a methane system would be recovered in less than three years, meaning the greenhouse operator would have an inexpensive source of fuel for 12 to 15 years.

Hans Mooij, a senior engineer with the waste management branch of the Environment Department, said using methane gas as fuel "appears to be very technically feasible. Whether it's economically feasible, that's something the consultants will have to show, but we're certainly excited about the possibilities."



*Greenhouses may be heated in the future by waste heat from thermal or nuclear power plants, oil refineries and chemical plants.*