

Conversion of Low-Grade Waste Heat to Electricity

Pyroelectric R&D Consortium

Natural Resources Canada is offering organizations an opportunity to join the CANMET Energy Technology Centre's Pyroelectric R&D Consortium to investigate the conversion of low-grade waste heat to electricity. The successful commercialization of this technology could result in significant energy savings and reductions in greenhouse gas emissions for producers of electricity and new product lines for manufacturers.

Canadian industry discharges over 100 PJ/a of low-grade waste heat (25°C to 250°C) from electric power stations, pulp and paper mills, steel works and petrochemical plants. A technology to recover or convert this low-grade waste heat to usable, high voltage electricity could save industrial sectors tens of millions of dollars annually, through increased process efficiencies and reduced fuel costs, while substantially reducing greenhouse gas emissions.

The CANMET Energy Technology Centre (CETC), a research arm of Natural Resources Canada, filed a patent application for a pyroelectric conversion process that converts

low-grade waste heat to electricity. Since public disclosure in Chemical Engineering (July 1998), many inquiries have been received from European and North American industry interested in commercializing this technology.

CETC, in co-operation with NEDO (New Energy and Industrial Technology Development Organization, Japan), has been conducting bench-scale work since November 1997. To-date, CETC scientists and engineers have estimated that conversion efficiencies between 15% and 28% (of Carnot Cycle efficiency) are possible even after deducting for various losses.

Benefits of Pyroelectric Conversion

- 3 to 5% of a waste heat stream can be converted to electricity;
- electricity could be generated at between 3-5 ¢/kWh using pyroelectric conversion, with capital cost amortized over 20 years;
- pyroelectric conversion units could be installed at between \$1200 and \$1300/kW;
- reduced cost of cooling the low-grade heat waste streams before discharging;
- substantial CO₂ reductions in emissions are expected.

CETC is seeking private sector partnerships (minimum three year commitment) to co-finance on a 50/50 basis, Phase 1 of a seven-year R&D program to scale-up units from bench-scale (1 W) to pilot-scale (10-100 W). Annual membership fee per participant is thirty thousand dollars (\$30 000.00 Cdn).

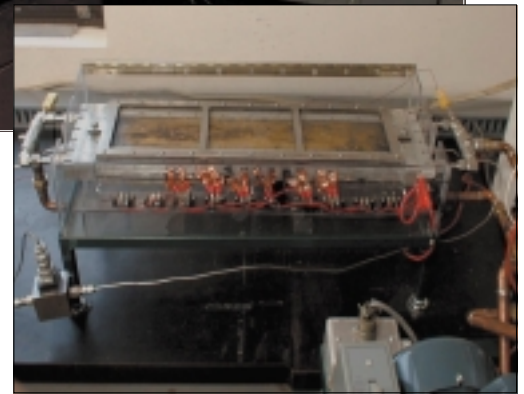
The CETC consortium will accelerate research and increase the likelihood of technology commercialization. Membership in the CETC consortium will benefit manufacturers of heat exchangers and polymeric films and users and producers of electricity.

When industrial field trials are successfully completed, CETC will either issue licences on a preferential commercial basis to consortium co-



Voltage control and data-logging section

sponsors to use the technology, or grant licensing and sub-licensing rights to licensors, ensuring preferential treatment is given to co-sponsors.



Pyroelectric convertor main

To join the consortium, or for further information, please contact:

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