

City of Ottawa: Increasing revenues and reducing costs

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A business plan has been prepared for a system, called a **HEAT network**, that will heat and cool 4000 homes in Ottawa, using seasonal storage of heat and cold. Hot summer air is used to heat the ground deep under our feet. The heat is stored to heat homes in the winter, and the process is reversed to provide air conditioning. Such systems can be designed so that no heat is lost in the interim seasons. The technology is described in two of the attached notes so this summary covers just the potential revenues, risks and costs, and the action recommended to Council.

Revenues The projected before tax net revenue from this project is \$17 million per year. There are at least four suitable sites in Kanata, plus many others in Orleans, South Ottawa, and in urban areas that are being redeveloped, such as LeBreton Flats and the Rockcliffe air base. Large office buildings like City Hall are prime candidates for retrofitting **HEAT networks** to replace the electrically driven heat pumps that are currently used for air conditioning. There is a potential to reduce Ontario's peak electric power load by up to 12,000 megawatts by this application alone. The use of natural gas and fuel oil can likewise be drastically reduced if **HEAT networks** are widely used.

Canadians spent about ten billion dollars per year on natural gas in 1998. Ottawa's share at 3% is about \$300 million. The current cost of electric power for air conditioning in Ottawa is roughly \$80 million. **HEAT networks** could meet both of those demands, plus the demands of homes heated by furnace oil and electricity. The costs of natural gas and electricity have risen rapidly, and if that continues at 5% per year for the coming ten years the potential target revenues for the proposed service will amount to over \$600 million, or 32 times greater than the gross revenues of this initial project.

Cost reduction The City is a major consumer of energy for heating and cooling its own buildings. Moreover, energy from this source would quickly lead to lower electricity prices because it eliminates the summer power peak, and would trim natural gas prices by reducing demand. The potential for the reduction of carbon dioxide is about 250 million tonnes per year for all of Canada, or about 7.5 million tonnes for Ottawa.

Risks Unlike massive undertakings like nuclear power stations, **HEAT networks** can be installed on a small scale. The systems will grow by duplicating storage sites designed to serve 56 homes each, a number that is primarily determined by physical considerations. This ability to “start small” and to utilize existing technologies ensures that the risk is minuscule in comparison with the potential benefits.

Costs The 4000 home project assumes an investment of \$2.8 million to come from the provincial and federal governments. The business plan has been designed to ensure that the ratio of assets to debt is substantial at all times, with the intent that ordinary bank financing will cover the construction costs. The project could be completed in a much shorter time if government funding were made available for the capital costs. The costs to the City of Ottawa are just the initial incidental expenses, most notably the \$30,000 that is needed to assemble a suitable team to get the project started (i.e., what is being suggested today).

The Team Before a project like that proposed in the business plan can get started there is some preparatory work to be done. First and foremost is the selection of the organization that will manage the business. The proposal was made to Energy Ottawa, a subsidiary of Hydro Ottawa, and they are currently considering the plan but have not yet made a commitment. Such a service would be very similar (and simpler) than the water supply service that is currently operated directly by the City of Ottawa, so the City might operate this service directly. There are other possibilities, like having a developer operate the service – but this would entail a commitment lasting for many decades – or passing it on to an energy company like a natural gas company – although the usual reason for that approach does not apply since the plan does not require investment capital.

One or more developers will be needed to participate in the project. It is proposed to work with a home developer, primarily because there is less risk in installing such a system for a few homes than for a large building, and more opportunity to improve the designs.

The project planners will need to find expert advisers on the key technologies: borehole heat exchangers, air heat exchangers and heat pumps in this case. Conventional designs, just like those used in ground source heat pumps would be used. The next step is to prepare a more thorough business plan and to determine who should carry it out. The project does not require any significant R&D for the hardware that is required.

Source of funds (see pg 274 of Operating Budget pdf file) (page 29 of P&G) Department: Planning and Growth Management Services, Branch: Planning, Environment & Infrastructure Policy: \$580 K “*for building energy conservation. Council has approved targets of 20% reductions in Greenhouse Gas Emissions for both the corporation and the community. Buildings are responsible for 40% of emissions.*”

Recommendation It is proposed that Council should ask staff to allocate \$30,000 to assemble a temporary team of experts who can take the draft business plan to the next stage: the preparation of a statement of objectives and a design specification for a **HEAT network** that would serve a whole community.