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October 2, 2001

To: Policy and Finance Committee

From: Acting Chief Administrative Officer

Subject: Purchase of Electricity

**Purpose:**

This report recommends that the City enter into an electricity pricing arrangement for the supply of electricity as required by the City and its agencies, boards and commissions, that is consistent with the ongoing negotiation and development of a previously approved power purchase agreement with Toronto Hydro Energy Services Inc.

**Financial Implications and Impact Statement:**

The total annual cost of electricity for the City and its agencies, boards, and commissions (ABCs) is approximately \$135 million, given pricing for electricity in 2001. In May 2002, when the Province anticipates de-regulating the Ontario electricity market, electricity commodity prices will begin to fluctuate on an ongoing basis, and are expected to increase.

The City and its ABCs are seeking to limit the cost of electricity to approximately \$150 million in 2002, and \$165 million in 2003 (assuming the same sources of electricity generation in the City/ABC's supply mix as today) by entering into a power purchase agreement with Toronto Hydro Energy Services Inc., including locking-in related electricity pricing as soon as possible. The cost of electricity will be included in the operating budgets of the various City departments and of the ABCs. In addition, as converting a full 25% of City electricity usage to renewable sources would add an additional cost in the range of \$4 million to \$26 million (2002 figures), this report recommends limiting the premium to be paid for renewable sources.

Recommendations:

It is recommended that:

- 1) authority be given to the appropriate City Staff to negotiate and enter into an electricity pricing arrangement with Toronto Hydro Energy Services Inc. for the supply of electricity as required by the City, its agencies, boards and commissions, provided that:
  - a) the parameters of the arrangement are consistent with the City Council recommendations for the development of a power purchase agreement with Toronto Hydro Energy Services Inc. as approved on February 29, 2000,
  - b) in the opinion of the City's independent advisor, the pricing is better than or equal to comparable market pricing;
  - c) the purchase price for renewable energy sources that may be incorporated into the City's electricity supply mix does not exceed the City's average cost for other sources of electricity supply by more than 60%;
  - d) a reduction in the City's electricity consumption through demand side management initiatives be considered as a contribution towards the City's renewable energy targets as previously adopted;
  - e) contract terms are agreed to by the Acting Chief Administrative Officer, Acting Chief Financial Officer, Commissioner of Works and Emergency Services, Commissioner of Corporate Services, the Toronto Community Housing Corporation and the TTC and others as deemed necessary; and
- 2) the appropriate City officials be authorized to take any action necessary to give effect thereto, including the execution of any required agreements with Toronto Hydro Energy Services Inc., and any agencies, boards or commissions in respect of these purchase arrangements, on terms and conditions satisfactory to the Acting Chief Administrative Officer, Acting Chief Financial Officer, Commissioner of Works and Emergency Services, Commissioner of Corporate Services, the City Solicitor, as well as the relevant agencies, boards, and commissions of the City.

Background:

At its meeting of February 29, March 1 and 2, 2000, City Council by the adoption of Policy and Finance Committee Report No. 3, Clause 6, approved the execution of a long-term power purchase agreement with Toronto Hydro Energy Services Inc. prior to the opening of the deregulated electricity market in Ontario. The parameters of the agreement were to include:

- “(a) total City electricity costs do not initially exceed current costs, assuming the current supply mix;
- (b) in the opinion of an independent advisor the pricing is better than or equal to comparable market pricing;
- (c) contract terms are agreed to by the Chief Administrative Officer, Chief Financial Officer, Commissioner of Works, Commissioner of Corporate Services, the

Toronto Community Housing Corporation and the TTC and others as deemed necessary;

- (d) a periodic review and adjustment process is included in the contract to ensure that future costs of electricity are measured and adjusted to at or below market;
- (e) incentives for reduction of consumption and costs are provided;
- (f) a process for establishing and increasing City targets for purchase of energy from clean sources is articulated in the contract;
- (g) the term of the contract has a positive impact on City rates and shareholder value as determined by an independent party;
- (h) the contract provides for performance monitoring, dispute resolution, and remedies for unsatisfactory performance; and,
- (i) it is recognized that encouraging the development of a green and clean power market and reasonable prices may require longer term contractual purchase agreements (up to 20 years as in the case of the Quebec Hydro Wind Farm purchase) and the agreement should provide for this possibility; ...”

It was originally expected that the Province would open the provincial electricity market to competition in June 2000, however, by February 2000, that date had been extended to November 2000. The current indication from the Province is that the market will open in May 2002. It should be noted that the electricity commodity pricing agreed to by the City/ABCs and THESI will only become effective at market opening, even if that date is further delayed.

At its meeting of April 11, 12, 13, 2000, Council adopted Policy and Finance Committee Report No. 4, Clause 7, and in doing so, adopted in principle its “Clean, Green and Healthy – A Plan for an Environmentally Sustainable Toronto”. This plan recommends that the City support the use of Green Power, and that it should reaffirm its commitment to purchase 25 percent of its energy needs through Green Power.

Subsequently, at its meeting of July 4, 5 and 6, 2000, Council adopted Report No. 7, Clause 6 of the Planning and Transportation Committee, as amended, endorsing and authorizing the City’s participation in the Toronto Intergovernmental Clean Air Working Group, as set out in the “Toronto Intergovernmental Declaration on Clean Air”. This declaration states that the City and Toronto Hydro are committed to purchase 25% of the City’s electricity needs from green power sources by 2005.

Comments:

Up until present, the electricity market in Ontario has been regulated, with electricity generation facilities having been owned by the Province. As in other regulated electricity markets, the aging of electricity generation assets, coupled with the competing financial pressures of the government, has made it desirable to attract new investment from the private sector.

As the private sector requires certain financial returns on investment, which is limited at best in the context of regulated markets, governments have turned to deregulating their electricity industries.

The expectation is that electricity de-regulation in Ontario will cause electricity pricing to increase for the following reasons:

- the retail price of electricity has been frozen since 1993, and is insufficient to recover costs for electricity generation companies. As well, in order to attract private investment, there must be a potential to earn financial returns that are over and above cost recovery;
- under the *Electricity Act, 1998*, companies involved in the generation, distribution and transmission of electricity have, or will become, taxable entities with the ability to pass on certain of their taxes to electricity consumers; and
- de-regulated electricity markets already exist in nearby states such as New York, Michigan, Pennsylvania, New Jersey and Maryland. Electricity pricing in these states is currently greater than pricing in Ontario, offering investors the ability to achieve certain financial returns. In order to attract new investment into Ontario, therefore, it is necessary to allow investors the ability to earn similar financial returns. As a result, electricity commodity pricing levels are expected to trend upwards significantly within an open market.

A number of large purchasers have begun to negotiate and enter into power purchase agreements that will become effective upon market opening in May 2002. Should market opening be further delayed, then these agreements will not become effective until actual market opening.

City staff has been advised by its independent energy advisor (Energy Advantage), as well as by Toronto Hydro Energy Services Inc. ("THESI") that pre-market opening electricity prices have begun to increase. This is consistent with the experience in other de-regulated electricity markets. As a result, it is in the City/ABC's best interests to negotiate and lock-in electricity pricing in the near future. Any delay in approving the recommendations embodied in this report could result in a substantial increase in City/ABC electricity commodity costs.

#### Electricity Charges:

When the electricity market becomes deregulated, the electricity bill will include a commodity charge, a local distribution charge, a transmission charge, and a Debt Reduction Charge (DRC) (formerly called the Competitive Transition Charge). The DRC (implemented in June 2001) is used to pay down the "stranded debt" of \$20.9 billion that was incurred by the Province under the previous regulated electricity regime.

The commodity charge will comprise approximately 60% of the total bill, while the non-commodity portions of the bill will be more or less fixed, and will be revised from time to time by either the Ontario Energy Board, as regulator, or by the Province. Once the market is opened, the electricity commodity portion will begin to fluctuate hourly, daily, and seasonally, with the pricing set to be influenced by supply and demand. The Independent Electricity Market Operator (IMO) will be responsible for setting the standards for, administering and regulating the provincial real-time energy market in which wholesale electricity commodity pricing will be set.

City/ABC Electricity Usage:

The following table uses 1999 data to break down total City/ABC electricity usage.

<b>Department/ABC</b>	<b>% of Total kwh (est.)</b>	<b>1999 \$millions (est.)</b>
Water and Wastewater	26.6%	\$31.9
Street, Signal, Expressway Lighting	7.2%	\$8.7
Other City	16.1%	\$19.3
<b>Total City</b>	<b>49.9%</b>	<b>\$59.9</b>
TTC	23.1%	\$27.7
Housing Corp*	19.8%	\$23.8
Other ABC	7.2%	\$8.6
<b>Total ABC</b>	<b>50.1%</b>	<b>\$60.1</b>
<b>Total</b>	<b>100.00%</b>	<b>\$120.0</b>

\*MTHC and THC combined

At current electricity prices, the City and its ABCs consume electricity totaling approximately \$135 million/annum. This demonstrates an increase over the total amount of \$120 million experienced in 1999, due mainly to a distribution rate increase of 2% per annum (December 2000), and to the addition of a Provincial DRC of 10.7% per annum (June 2001).

It is expected that by market opening in May 2002, the total cost will have increased to \$150 million, assuming the same supply mix, due mainly to a projected increase in commodity pricing, ranging from 8%-12%. In fiscal 2003, electricity commodity pricing is projected to increase by a further 15%, resulting in expected total costs of \$165 million.

Purchasing strategy:

Given the significant dollars associated with the City and ABCs electricity usage, and given that the future price of electricity will no longer be fixed, it is important for the City to consider the prudent management of electricity procurement as part of its overall energy management strategy.

Unlike other types of energy, electricity is a commodity that cannot be stored, and therefore must be manufactured and distributed instantaneously to meet demand. In order to hedge pricing risk, however, it is possible to enter into financial contracts for the future delivery of electricity at a price that may either be based on a fixed rate, or on a combination of fixed or floating rates.

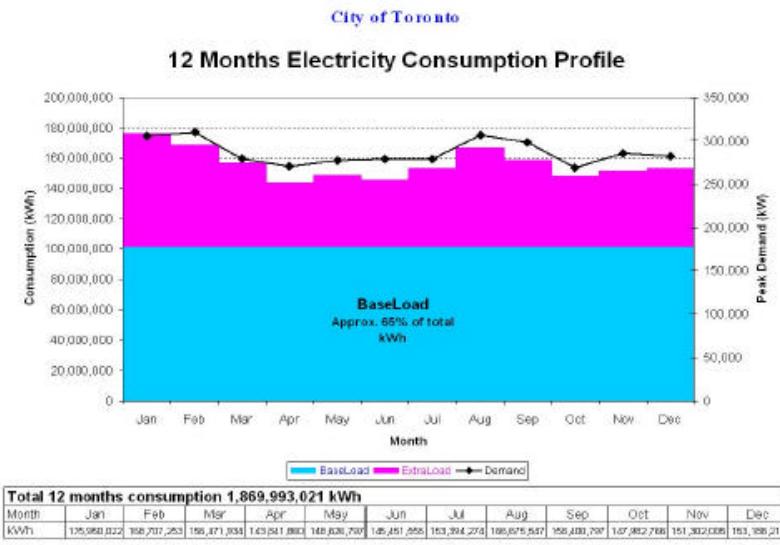
It should be noted, however, that there is a risk associated with entering into such a pricing arrangement, in that there is the potential for market prices to fall below the contract pricing. Although the City envisions a long-term arrangement with THESI for the supply of electricity, in order to mitigate this risk, pricing will be locked-in for a shorter period of time (eg. three years),

and will be revisited after that point. This is consistent with the original report to Council of February/March 2000, and also with the advice of both THESI and the City's outside energy advisor (Energy Advantage). As the pricing arrangement currently under development includes both the City and its ABCs, ABC approval will also be required.

In order to effectively manage the cost of electricity for each City department, agency, board, and commission ("ABCD"), it is important to understand how much electricity is required by each user, and when it is required. In order to do so, with the aid of THESI, electricity usage profiles have been developed for each ABCD using historical data, and analyzed for usage by days of the week, times of day, and seasonality.

The output of this analysis provides each ABCD with a "load shape", or usage pattern. The load shapes are then used in a "load driven" purchasing strategy. This means that electricity will be purchased in "blocks" that fit into the load shapes as determined for each user unit.

The basic minimum requirement of the City and ABCs for electricity, 7 days/week, 24 hours/day ("7/24"), is known as the electricity "baseload". It has been determined that the entire group would benefit through the purchase of a block of electricity that would meet aggregate baseload requirements. As the particulars of the aggregate baseload have already been determined, and given that pre-market electricity prices have already begun to rise, it is recommended that the City and ABCs lock in their baseload pricing immediately, unless advised to the contrary by their independent advisors.



The load shape for the remainder of electricity usage will be unique to each ABCD, with the requirement for additional blocks of power that vary for each unit. The purchasing strategies that will be implemented to fulfill these electricity requirements are more complex, and are currently

under development. It is recommended, however, that the pricing for the electricity to fulfill the balance of the ABCD requirements should also be locked in as soon as feasible.

It is expected that the baseload pricing will be the least expensive portion of the electricity commodity purchase in \$/kWh terms due to the consistent and unchanging nature of a 7/24 block of power, and to an earlier locking-in of pricing.

The baseload, on average, will account for approximately 65% (in kWh) of the City and ABCs' electricity requirements. Baseload pricing to be offered to the City will likely to be in the range of 4.5 to 5.5 cents per kWh (subject to available market pricing), for approximately 95 million kWh per month, resulting in an approximate cost of \$51-\$62 million per annum. The remainder of the City and ABCs' energy requirements will be locked in at pricing that is likely to be slightly higher, however, the City and THESI will work cooperatively to minimize the resultant costs based on procurement strategies that will be tailored to fit the various load profiles.

#### Renewable or “Green” Energy:

In Ontario, electricity is transmitted from generators to the ultimate end-users through an integrated power system, consisting mainly of an extensive power grid. Therefore, it is impossible to discern which generator was responsible for the production of the actual electrons that are ultimately received by each end-user. Renewable, or “green” energy sources that are currently available are already fed into the same provincial power grid. In order for a purchase of renewable energy to have a positive impact on the environment, therefore, it is required that this purchase cause new sources of renewable energy to be brought into the overall system.

There are presently few available sources of renewable energy, however, new sources are expected to become available over the next few years. Market research and current trends indicate that Ontarians consider the development of renewable energy resources a top priority for the electricity sector, and that they are willing to pay an additional amount to help support these initiatives.

Premiums paid for renewable sources of energy vary widely, depending on the type of technology involved. The following table outlines the range of price premiums to be paid over conventional on various sources of renewable energy.

<b>Source of Green Power</b>	<b>Price Premium*</b>
Solar	500-800%
Wind	60-140%
Landfill Gas	20-60%
Small Hydro	0-40%

\*over conventional sources of electricity

It should be noted that over time, as the amount of available renewable energy increases, along with the number of suppliers, related costs are expected to decline.

THESI is currently seeking external sources of renewable energy, and as well, is developing its own resources. A wind turbine is planned for the Exhibition Place grounds, and is expected to be in service by early 2002. Another source at the Thackeray Road Landfill site will employ the methane gas by-product to produce electricity by mid-2002. Currently, landfill gas technology commands premiums of 20-60% over the cost of conventional sources of electricity, while wind energy premiums range from 60-140%.

Based on de-regulated market pricing projections, it is estimated that the cost of converting a full 25% of City electricity usage to renewable sources, using expected pricing for 2002, would add an additional cost ranging from \$4 million to \$26 million. The ultimate amount of this increment would be determined by the availability of the various types of renewable energy. Therefore, it would be advisable to place a limit on the premium to be paid by the City for renewable sources of energy.

In addition, given the current state of market development, in order for the City to build a reasonable portfolio of renewable energy, THESI has recommended the setting of a multi-year target and the adoption of a staged approach. Adopting such an approach would allow the City to incorporate a green energy component into its commodity purchase, while taking advantage of expected cost reductions as green energy production grows.

The City should also consider expanding its definition of green energy to beyond the exclusive implementation of supply side options. The City should consider the environmental value of reducing its consumption of electricity, wherever possible, through further "Demand Side Management" initiatives. As a sustainable reduction in the City's demand for electricity would lead to a related decline in electricity production, this would be the optimal means of reducing the release of harmful emissions into the environment.

Given the costly nature of purchasing green energy, and that reducing the City's consumption of electricity would be an environmentally positive step, it is recommended that Council consider applying a reduction in consumption as a contribution towards the City's green energy purchase targets as previously adopted.

**Power Purchase Agreement and Outside Legal Advisors:**

The development of power purchase agreements within a de-regulated electricity market environment are a new endeavour Ontario. As well, it is likely that the City/ABC power purchase agreement with THESI will take the form of one Master Agreement, and several sub-agreements that address issues that are unique to the City or the various ABCs.

As is the case for other large electricity consumers, it was determined that it would be in the City's best interest to retain outside legal expertise, particularly in light of the risks involved, and the projected annual cost in 2002 of \$150 million. Therefore, under the authority of the CAO, the City retained the law firm of Stikeman Elliott, after a competitive review process, in order to assist with the development of its agreement with THESI. The projected cost for outside legal support for this endeavour will likely range between \$150,000 and \$250,000.

Outside legal assistance is required immediately, at an estimated cost of approximately \$50,000 in fiscal 2001, to be funded from the City's "Other Corporate Expenditures" (non-program). As completion of an agreement is required by market opening in May 2002, the remaining \$200,000 will be included in the 2002 budget in the non-program area.

**Conclusions:**

It is recommended that the City and its ABCs enter into an electricity pricing arrangement that is consistent with the negotiation and development of a power purchase agreement with Toronto Hydro Energy Services Inc., as approved by Council in February 2000.

The electricity market in Ontario is currently expected to open to competition in May 2002. As is consistent with the experience in other de-regulated markets, electricity commodity prices are expected to increase. Given that pre-market pricing has already begun to increase, it is in the City/ABC's best interests to negotiate and lock-in electricity pricing as soon as feasible. Any delay in approving the recommendations embodied in this report could result in a substantial increase in City/ABC electricity commodity costs.

In addition, given the costly nature of purchasing renewable energy, it has also been recommended that purchase price premiums for renewable energy sources that are required to fulfil Council's targets of 25% by 2005, be limited at 60% of the City's average cost of other sources of electricity supply.

Finally, the City should consider the positive environmental value of reducing its consumption of electricity on a sustainable basis, and apply such a reduction as a contribution towards the City's renewable energy targets.

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