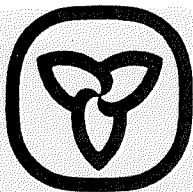


REVIEW UNDER THE ENVIRONMENTAL ASSESSMENT ACT

ONTARIO HYDRO'S DEMAND/SUPPLY PLAN

**Submitted by:
Ontario Hydro
EA File No. OH-GE-02**

**Review Prepared
Pursuant to subsection 7 (1) of the
Environmental Assessment Act**



**Province
of
Ontario**

BOOKSHELVES: ENERGY
PROVINCE OF ONTARIO.
Review under the Environmental
Assessment Act; Ontario Hydro's
demand/supply plan. ...RN7196

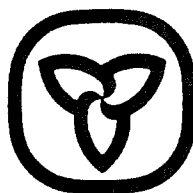
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**Province
of
Ontario**

June, 1990

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APPENDIX A

Ce document existe aussi en Français.

INTRODUCTION

This is a review, prepared pursuant to section 7 of the *Environmental Assessment Act* (EA Act), of an environmental assessment (EA) submitted by Ontario Hydro (Hydro) to the Ontario Minister of the Environment on December 19th, 1989. The EA has been submitted in support of an application for approvals under the Environmental Assessment Act (EA Act) for a program of projects within Hydro's current overall long range plan for serving Hydro's customers. That plan, known as the Demand/Supply Plan, is described in a document entitled, Demand/Supply plan Report (DSP Report), one in a series of reports issued under the title, *Providing the Balance of Power: Ontario Hydro's Plan to Serve Customers' Electricity Needs*. The DSP Report also describes the process followed and the considerations taken into account by Hydro in developing the plan.

Hydro's December 19th submission to the Minister of the Environment consisted of the DSP Report together with an "Overview" and an "Environmental Analysis." The "Overview" provides a general description of the plan. The "Environmental Analysis" identifies and compares environmental characteristics of alternative demand/supply plans, comments on significant differences, and provides a broad analysis of the comparative environmental advantages and disadvantages. Hydro has, in addition, produced a number of supplementary documents and made reference to others which have been made available since December 19th.

This review consists of three parts.

Parts I and II have been prepared by the Environmental Assessment Branch of the Ministry of the Environment (Review Coordinator - D.E. Smith). Part I looks at the approvals being requested by Hydro. Part II examines the EA against the requirements of subsection 5(3) of the EA Act.

Part III consists of the comments of ministries and agencies that have contributed to the review in response to the standard questions normally posed by the Environmental Assessment Branch in co-ordinating the preparation of EA reviews.¹

Prior to Hydro's submission to the Minister of the Environment, the Government had considered various options for reviewing Hydro's proposals for meeting electrical demand over the next twenty to twenty five years. As announced by the Minister of Energy on November 6, 1989, the Government decided that the review should be carried out under the EA Act and that there should be a hearing by the Environmental Assessment Board. In making that announcement, the Minister of Energy noted the Government's interest in public

¹ See Appendix A for questions.

participation and thoughtful analysis and in ensuring that the process would be carried out without undue delay.

While it has been normal practice for the Minister of the Environment to refer an EA to the Board after completion of the review and after receiving public submissions or requirements for a hearing, the Minister was of the opinion, in this case, that it would be advantageous to all interested parties to have the matter referred to the Board in advance of completion of the review. By doing so the Board could, without delay, conduct some of its preliminaries including the allocation of intervenor funding under the *Intervenor Funding Project Act*. Intervenors would thus be able to get started with their examination of the material and their preparations for participation at the hearing in parallel with the preparation of this review.

The Board is now required to hold a public hearing and either grant the requested approvals with or without conditions or deny the approvals. Before, however, making its decision on approval, the Board must first find that the EA provides an acceptable basis for a decision.²

This review has been prepared to assist the Board and other interested parties in their examination of Hydro's EA and to apprise the Board and others of the areas of interest, views, and comments of those ministries and agencies that have provided comments.

It is not the role of this review to determine the acceptability of the EA nor to determine whether or not the requested approvals should be granted. Those decisions will be taken by the Environmental Assessment Board in light of all the evidence put before it in the course of the hearing.

There may be comments in this review that Ontario Hydro will want to address through clarifications of its EA or by providing further information. Alternatively, Hydro may, in some cases choose to disagree with the comments.

² The Environmental Assessment Board has, in other cases taken the position that the environmental assessment consists of the documentation initially submitted to the Minister, augmented by evidence brought forward during the course of the hearing.

PART I

APPROVALS REQUESTED

Hydro has developed a long range plan, called its Demand/Supply Plan (DSP) that sets out programs and projects that could be undertaken over the next twenty five years to address the forecasted demand for electricity in Ontario. The DSP involves a number of sub-plans including a "Demand Management Plan," a "Non-Utility Generation Plan," a "Rehabilitation Plan," a "Hydraulic Plan," and a "Major Supply Plan." The latter would involve the development of major new fossil fired and nuclear powered generating facilities and the construction of transmission facilities to provide for the purchase of 1000 MW of power from Manitoba. (Additional inter-area transmission facilities have been excluded from the Demand/Supply Plan.)

Hydro is requesting approvals in respect of a program of projects from within the hydraulic and major supply plans. As described on page 19-1 of the DSP Report:

"The Undertaking...is made up of specific Demand/Supply Plan components, and constitutes a program in respect of activities associated with meeting future electricity requirements."

"The Program submitted for approval represents only a part of the results of the integrated planning which led to the identification of Candidate Demand/Supply Plans. The Plan components not included in the Program either do not require an approval, or are not being submitted for approval in this application."

The program in respect of which approvals are being requested involves: facilities for the importation of 1000 MW of power from Manitoba; eleven hydraulic projects; a number of fossil fuel fired generating facilities; two nuclear power plants; and the "radial transmission" to connect the plants to Hydro's transmission system. Hydro intends to seek approvals for inter-area transmission facilities, as necessary, through the submission of separate environmental assessments.

The approach being taken would involve two sets of approvals each requiring complete environmental assessments structured in accordance with the requirements of subsection 5(3) of the EA Act. The first set of approvals, the ones under review in this application, would approve the "requirement" and "rationale" for projects in the program. Those approvals would be followed by project environmental assessments. Hydro's expectation, as described on page 1-7 of the DSP Report, is that the project assessments:

"...will focus on ensuring that those projects are located and implemented in an environmentally acceptable manner. The project assessments will not duplicate nor

reconsider the planning issues determined by this application [the EA currently under review]."

While there is little experience in Ontario, both on the part of Hydro and others, including the ministries and agencies involved in this review, in putting this kind of two stage approach involving the separation of overall program planning from project planning, into practice, it is an approach that has been, in the past, endorsed in Ontario by the Royal Commission on Electric Power Planning. In the eighth volume of its report, the commission noted in 1980 that:

"In particular, our concern is that for some decisions the application for approval of an individual project may come too late and choice at this stage may be too confining. As a result, alternatives may be foreclosed or apparently remote issues may be crowded out by specific aspects of a proposal and urgent requirements to proceed with an undertaking. Therefore some general issues, because they are general to our energy supply, are broad and may go well beyond a specific project, and because their consideration might be long they lend themselves to independent resolution."³

The Commission goes on later to say:

"Some issues about the acceptability of a technology may be limited to a particular site (i.e., thermal discharge) but others tend to transcend the site and are common to all proposals related to that particular technology (i.e., radioactive waste disposal). Consideration of these broad issues at the time of an application for an individual facility usually comes far too late in the decision process. Evidence from the State of New York and from the State of California indicates clearly that attempts to deal with these common or generic issues at hearings concerning individual facilities have resulted in an unreasonable burden on the utilities, the staff of the regulatory bodies, government departments, and the participating public."⁴

While the DSP Report makes reference to potential sites for nuclear and fossil generating facilities, those sites, according to the report, have been identified, "...for illustrative purposes to ensure that cost estimates [for the options] are realistic and comprehensive." In granting the requested approvals, the Board would not be approving specific sites for those facilities. It would simply be approving the use of the proposed technologies to provide the specified blocks of generating capacity.

The approvals requested for the hydraulic projects appear to be more specific. The hydraulic projects are named and the project specific planned plant

³ Volume 8, Report of the Royal Commission on Electric Power Planning, pg. 33.

⁴ Volume 8, Report of the Royal Commission on Electric Power Planning, pg. 35.

capacities stipulated in the description of the requested approvals on page 19-2 of the DSP Report. The project sites are described in the supplementary Hydraulic Plan Report. The requested approvals for the hydraulic projects thus appear to be very specific as to the size and location of the facilities. If granted as requested, it would appear that the approvals would be site specific in contrast to the generic approvals for nuclear and fossil generation.

The Board needs to be mindful, in granting this kind of approval that things change over time. What appears reasonable and acceptable today for any number of reasons, may be less so as time passes. It would appear that Hydro has attempted to accommodate this by limiting its requested approvals to those projects that it feels it will have to commit within the next five years. Consideration will need to be given to how approvals granted in 1991 should be kept current and how Hydro, and indeed the government, should proceed together to ensure that result.

PART II

SUBSECTION 5(3) REQUIREMENTS

This review is premised on the understanding that subsection 5(3) has the effect of imposing two responsibilities on a proponent (in this case, Ontario Hydro) of an undertaking subject to the EA Act. In addition to requiring that the proponent submit a document containing certain types of information, subsection 5(3) has the effect of requiring that a proponent's rationale for proposed undertakings be developed in a particular way. This part of the review deals with the latter responsibility. Part III looks at the adequacy of the information in the EA document.

As noted earlier, Hydro is, in this case, seeking approvals of the "requirement" and "rationale" for various projects. Hydro recognizes a difference between these terms. The "requirement" for the projects is a function of customer demand for electricity and the assumed contribution by existing and rehabilitated facilities, demand management, non-utility generation, and new hydraulic generation. The "rationale", on the other hand, as evidenced by Hydro's use of the term on pages 14-28 through 14-35 and pages 17-5 through 17-17 of the DSP Report, reflects a consideration of likely environmental effects.

This is consistent with the Ministry of the Environment's interpretation of subsection 5(3). The ability of an undertaking or an alternative to meet a requirement or need does not, in itself, provide sufficient rationale for an approval under the EA Act. The rationale should reflect, and develop out of, the consideration of, and attention to, other factors and values. An environmental assessment should reflect an attempt, by the proponent to strike a reasonable balance between various advantages and disadvantages through a process of identifying, evaluating, and comparing alternatives in terms of their likely environmental effects ("environment" as broadly defined by the EA Act as including the social, economic, and natural environment). Meeting the requirements of subsection 5(3) of the EA Act thus becomes an integral part of the proponent's process in developing and selecting a proposal and the rationale for proposed projects can thus reflect the consideration of environmental effects.

It should be noted here that subsection 5(3) of the EA Act requires that an EA deal with both alternative methods of carrying out an undertaking and alternatives to the undertaking.

Hydro has dealt directly with alternative methods of carrying out the undertaking by assigning that label to the two alternative programs described on pages 19-3 and 19-4 of the DSP Report and developing a rationale for the third and proposed program based on a comparison of the relative advantages and disadvantages of the three. The two alternative methods of carrying out the undertaking differ from each other and the proposed program in terms of the mix of their nuclear and fossil components.

There has been no use of the label, "alternatives to the undertaking" in any of the submitted documentation. As described in Chapter 14 of the DSP Report, Hydro did consider various major supply options, some of which were rejected for inclusion in the Demand/Supply Plan for various reasons including their environmental effects. By considering those options Hydro, in effect, considered alternatives to the undertaking.

However, various parties, in view of their interests, may have critical comments and observations on Hydro's treatment of alternatives to the undertaking. Some may argue, for example, that there is potential for particular plan elements which Hydro has held constant to play a bigger role in the DSP. Such changes would amount to a consideration of additional alternatives to the undertaking if they were to alter the requirement and rationale for the undertaking.

To what extent then have the rationales, for which Hydro is now seeking approvals, been developed through a process of identifying and comparing alternatives in terms of their various environmental effects?

With regard to the purchase of power from Manitoba, Hydro is requesting an approval of the requirement and rationale for the transmission facilities necessary to incorporate the Manitoba purchase into Hydro's system. Approval is not being requested in respect of the actual purchasing of power but rather in respect of the transmission facilities necessary to carry the power. While the "Environmental Analysis" contains some general thoughts regarding the kinds of effects that could be expected to result in Ontario from the construction of the necessary transmission facilities, the specific effects are to be considered in the project environmental assessment for the transmission facilities. It would be helpful if Hydro were to provide an explicit statement of rationale for the transmission facilities that encompassed a consideration of significant environmental effects.

Looking next at the rationale for the hydraulic projects, as noted earlier in the review, the requested approvals appear to be quite project specific. Rather than asking for a general approval for the requirement and rationale for a block of hydraulic generating capacity, Hydro appears to be asking for approvals of the requirement and rationale for the specific projects. If that is Hydro's intention, project specific information would be required about the environmental effects of the projects in order for the rationale for the projects to reflect a consideration of their environmental effects.

If, on the other hand, it was Hydro's intent to simply make a case for the inclusion of a certain block of Hydraulic capacity in its plan, the requested approval should have been more clearly worded to that effect.

Hydro has put forward some general descriptions of the kinds of environmental effects one might expect hydraulic projects to have. Hydro has recognized that there are likely to be some significant effects. Although not documented in any detail, Hydro has apparently contemplated the development of hydraulic potential over and above what is now included in the DSP. For various reasons, including, according to the DSP Report and the Hydraulic Plan Report, the anticipated effects on the natural environment, Hydro has not included the development of that potential in the DSP at this time. This would imply that the decision to put forward the hydraulic projects for which approvals are now requested, was based upon an examination of the environmental effects of those developments as compared to the ones not being proposed. There has been no documentation of those effects provided and thus it is not apparent to what extent consideration of those effects played a role in the development of the rationale for the projects. There is, in fact, no explicit statement of rationale for this part of the undertaking.

That then leaves the fossil and nuclear programs and the radial transmission needed to connect the plants to Hydro's transmission system.

As noted on page 14-5 of the DSP Report, various evaluation criteria were utilized in evaluating and selecting major supply options and plans. The criteria were categorized as either primary or secondary. The primary criteria, defined as criteria which must be met in evaluating and developing recommended plans, were:

- "• *customer satisfaction*
- *reliability standards*
- *safety requirements and standards (worker and public)*
- *environmental requirements and standards*
- *low cost electricity service*
- *social acceptance*
- *technical soundness*
- *flexibility*"

Secondary criteria, defined as criteria which were to be considered and may influence the recommended plans, included:

- "• *resource preferences*
- *diversity*
- *resource smoothing*
- *environmental characteristics (in addition to requirements and standards)*
- *economic impact*
- *other social considerations*"

In discussing the evaluation criteria, Hydro notes on page 14-7 of the DSP Report that while the criteria can be applied in evaluating options, there can be no systematic calculation to determine how the criteria are weighed against each other.

Hydro's rationale for the nuclear and fossil options is presented on pages 14-28 through 14-35 of the DSP Report. Hydro's comparison of its three candidate plans is set out on pages 17-16 and 17-17 of the DSP Report. A statement of the rationale for the selected plan is on pages 17-15 through 17-17. The primary evaluation criteria apparently played a major role in the analysis and selection of options and plans. The extent to which the secondary evaluation criteria played a role is not so readily apparent.

Hydro has recognized that the viability of various options is, amongst other things, dependent on the ability to economically and technically site such facilities. In view of that, Hydro reviews certain "illustrative" sites to satisfy itself that siting is economically and technically feasible. The viability of siting the options, in view of other possible constraints has not been similarly factored into the analysis of the options. The omission of this consideration is reasonable only if one can assume that siting will not be so environmentally problematic as to call into question the rationale for the selection of the option. There is no information in the EA upon which to base such an assumption.

Regardless of how Hydro developed the rationales for which approvals are now being requested, the Board, in deliberating over whether or not to grant the requested approvals will need to decide if the purpose of the EA Act, that is, "...betterment of the people of the whole or any part of Ontario by providing for the protection, conservation, and wise management in Ontario of the environment.", will be served by the approvals. The decision would need to take account of the Act's broad definition of "environment," the various public interests involved, the acceptability of the environmental effects of the undertaking and the advantages and disadvantages of the undertaking as compared to those of the alternatives. In order to do so, the Board will require sufficient and clearly presented information to provide an acceptable basis for its decisions. This is where the obligation imposed by subsection 5(3) to provide certain types of information comes into play.

Subsection 5(3) of the EA Act prescribes, in very general terms, the types of information a proponent is required to provide in an environmental assessment. For example, it specifies that a proponent is to describe the likely environmental effects of the undertaking and alternatives. That requirement is augmented by the Act's broad definition of "environment." It is thus clear that an EA is to describe environmental effects including the effects on air, land or water; plant and animal life including man; the social, economic and cultural conditions that influence the life of man or a community; etc.

The Act is not specific as to exactly what effects are to be described within these categories nor how detailed those descriptions are to be. In the absence of any preset standards or provision for the development of specific requirements on a case by case basis, it is, initially, left to the proponent to decide what is needed. That is not to say that the information initially provided will necessarily prove to be adequate. Various ministries and agencies that have contributed to this review have spoken to the adequacy of the information in the EA from the point of view of their mandated interests and based upon their understandings of the EA. The following Part III of this review consists of their comments.

PART III

MINISTRY/AGENCY COMMENTS

While the foregoing has been prepared by the Environmental Assessment Branch of the Ministry of the Environment, this part of the review consists of the comments of others that have contributed to the review.

Reviewers were asked to, based on their mandate, provide an evaluation of:

- the technical quality and completeness of the EA which includes the soundness of the data, analysis and conclusions in the Environmental Assessment, as well as an evaluation of the appropriateness of the level of detail of this information and the range of alternatives studied; and
- how well the EA addresses their policy interests.

Their comments are included herewith in accordance with the following list:

MINISTRIES

Ministry of Agriculture & Food
Ministry of Energy
Ministry of the Environment
Ministry of Health
Ministry of Housing
Ministry of Industry, Trade and Technology
Ministry of Labour
Ministry of Municipal Affairs
Ministry of Municipal Affairs
(Office of the Greater Toronto Area)
Ministry of Natural Resources
Ministry of Northern Development and Mines
Ontario Native Affairs Directorate
Ministry of Solicitor General
Ministry of Tourism and Recreation
Ministry of Transportation
Ministry of Treasury and Economics

OTHER

Environment Canada
GO-Transit
Niagara Escarpment Commission

MINISTRIES

MINISTRY OF AGRICULTURE & FOOD



Ministry of
Agriculture
and Food

Ministère de
l'Agriculture et
de l'Alimentation

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Office of the
Deputy Minister

Bureau du
sous-ministre

May 16, 1990

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JUN 1 1990

Gary Posen
Deputy Minister
Ministry of the Environment
135 St. Clair Avenue West
Suite 100
Toronto, Ontario
M4V 1P5

DEPUTY
MINISTER'S OFFICE

Dear Mr. Posen:

The Ministry of Agriculture and Food is pleased to have participated in the Government review of the Ontario Hydro Demand Supply Plan.

Ontario Hydro has identified two issues in the Plan of particular interest to the Ontario agriculture and food industry. These include efficiency and transmission systems.

The agriculture and food system benefits from the reliable energy provided by Ontario Hydro. The industry recognizes that there are opportunities for electricity efficiency improvements. It has been determined by a study conducted by the Ministry, that there are potential efficiency savings in the magnitude of 10-15 percent on Ontario farms. Other sectors of the agriculture and food industry, such as food processing plants, are also likely to have potential savings.

Although the Ministry recognizes that the farm savings would represent a small percentage of the overall electricity use in Ontario, it is not clear from the document whether Ontario Hydro has taken the industry's potential savings into account in their load forecasting.

The Demand/Supply Plan refers to the need to construct additional transmission systems without providing comments on issues relevant to evaluating new facilities. Agricultural land has and will continue to bear much of the impact of new transmission facilities.

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Un bon goût de chez nous



The existing Environmental Assessment Act provides the mechanism for the Ministry to express its concerns over specific projects and the Ministry will continue to be active in this process. However, it would have been appropriate for Ontario Hydro to have expanded in the Plan on the criteria for identifying and evaluating alternative sites and lines and the implementation of appropriate mitigation measures for dealing with remaining/outstanding impacts on Ontario agriculture.

Ontario Hydro and the Ontario Ministry of Agriculture and Food continue to cooperate in encouraging efficient use of electricity. The Ministry looks forward to continuing this positive relationship with Ontario Hydro.

Yours very truly,



Rita Burak
Deputy Minister

c.c.: Marc Eliesen, Deputy Minister, Ministry of Energy

MINISTRY OF ENERGY



Deputy Minister
Sous-ministre

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May 16, 1990

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MAY 17 1990

MEMORANDUM TO: Gary S. Posen
Deputy Minister
Ministry of the Environment

FROM: Marc Eliesen
Deputy Minister

DEPUTY
MINISTER'S OFFICE

SUBJECT: Ontario Hydro's Demand/Supply Plan

The Ministry of Energy has now completed its review of the material submitted by Ontario Hydro to the Minister of the Environment in connection with the above Environmental Assessment. A copy of the review entitled: The Ministry of Energy Review of the Ontario Hydro Demand/Supply Plan is attached for your information.

I have also sent a copy of this review to the Government Review Co-ordinator in the Environmental Assessment Branch of the Ministry of the Environment.

Marc Eliesen

Marc Eliesen

cc: Dave Smith

Attachment

Ministry of Energy Review of
Ontario Hydro's
Demand/Supply Plan

May, 1990

Ministry of Energy Review of
Ontario Hydro's
Demand/Supply Plan

Summary

- A. Introduction
- B. The Load Forecast
- C. Demand Management and Electricity Conservation
- D. Non-Utility Generation (NUG)
- E. Costing Concepts and Avoided Costs
- F. Adequate Supplies at Low Cost
- G. New Electricity Generating Stations
- H. Inter-Provincial Electricity Purchases
- I. The Transmission System
- J. Sustainable Development
- K. Conclusions

Appendix A: The Relationship between the Government and
Ontario Hydro

Appendix B: The Ministry of Energy

Summary

The Ministry of Energy strongly supports the development of appropriate demand and supply options for maintaining adequate supplies of electricity. The decisions that are being made about these options will have important environmental and economic consequences.

After reviewing the documents entitled "Providing the Balance of Power" and the studies referred to in those reports, the Ministry has arrived at the following major conclusions:

1. Ontario Hydro's plans and proposals do not contravene any Ministry policy. These plans recognize the importance of reliable supplies of electricity and the need to maintain a high degree of flexibility in order to respond to changes in conditions such as load growth. The plans also recognize the importance that demand management and non-utility generation (NUGs) can have in the future development of the system.
2. The Ministry of Energy develops its own forecasts of the demand for energy, particularly electricity. On the basis of that forecast and the information provided in the Demand/Supply Plan (DSP), the Ministry believes that major new supply facilities are needed to meet increasing demand and to replace existing facilities as they reach the end of their useful lives.

Ontario Hydro is engaged in programs to encourage substantial load reduction through demand management, and to defer the need for new utility owned facilities by encouraging new non-utility generation. However, the amount of load reduction that will result from these programs must be considered uncertain. Ontario Hydro should accelerate the launch of demand management and NUG programs to ensure that planned results are realized. Hydro should carefully monitor the success of their demand management program, and their non-utility generation program since the results of these programs will have some impact on the timing of the need for new supply facilities.

3. The Ministry believes that an adequate range of alternatives for the future development of the system has been examined, but that further information would be useful to the Board in a number of areas listed in this report. In particular, Ontario Hydro should present further information to the Board to allow a comparison of the costs, risks and benefits of additional demand management and non-utility generation as alternatives to some of the supply facilities described in the plan.

This review describes the legislation that governs Ontario Hydro, and the Government objectives with regard to electricity. The report also describes the Ministry of Energy and its activities, responsibilities and policies that are relevant to the future development of the electricity system.

Ministry of Energy Review of
Ontario Hydro's
Demand/Supply Plan

A. INTRODUCTION

The people of Ontario use electricity widely, and its production, transmission, and distribution have become an important service. Reliable supplies of electricity are important to our everyday lives, and our businesses and industries. However, to maintain the production and delivery system and meet new demands will require a careful assessment of the options. The way in which the system is developed may affect the social, economic and environmental well-being of the province.

Ontario Hydro has been charged by the Government with providing the electricity needed by the province. Ontario Hydro operates and plans the development of the system within the policy framework provided by the Government (see Appendix A).

The Government recognizes that Ontario Hydro has to make complex and difficult choices in developing its plans. Since an assessment of the option for system development often raises a number of issues of broad public interest, the Government believes that public reviews of these issues are needed. To this end, the Government has initiated a number of reviews of issues important to system planning (see Appendix A).

In 1988 the Government directed Ontario Hydro to develop a plan, including alternatives, for the future development of the system, and that these plans would be subject to a public review. In drawing up those plans, Ontario Hydro was specifically directed to consider the Report of the Select Committee on Energy, the Report of the Electricity Planning Technical Advisory Panel, and the Review by Government Ministries of the Demand/Supply Planning Strategy (DSPS).

The Government has chosen the process required under the Environmental Assessment Act for reviewing Ontario Hydro's current plans for system development. Ontario Hydro has now submitted its plans to the Minister of the Environment. It has also carried out an assessment of the impact of its plans on the social, natural, and economic environment of the province and has looked at alternative plans and the effect these would have on the province.

In announcing the Government's decision to review the plan under the Environmental Assessment Act, the Minister of Energy stated her expectation that the Board would decide whether Ontario Hydro has chosen "the appropriate mix of demand management, conservation, and new supplies." The Minister also stated that, if the Board concludes that new generating facilities are needed "specific projects would have to undergo separate environmental assessments."

The Ministry of Energy has been asked to evaluate the assessment that Ontario Hydro has carried out, and to state how well the plans put forward address the policy interests of the Ministry of Energy.

The Ministry's comments deal with load forecasts, demand management, non-utility generation, energy security, and the type of utility-owned generating plants that Hydro has considered. The Ministry's interests flow from its mandate as defined in the Ministry of Energy Act and its responsibilities under the Power Corporation Act (see Appendices A and B).

This review:

- describes the Ministry and Government policies that are related to the questions at hand, and
- analyses areas where more information would be particularly useful.

B. THE LOAD FORECAST

During the 1980s, the growth in demand for electricity averaged 3.4 per cent a year reflecting the demands of a growing economy. Over the last seven years (1982-1989), demand growth averaged 4.6 per cent annually. This relatively high rate of growth was the result of brisk expansion in residential and commercial construction, and manufacturing output.

Ontario Hydro's Demand/Supply Plan contains a range of forecasts of electricity demand in the DSP. The Basic Demand Forecast projects the future need for electricity in the absence of any incentives from Ontario Hydro. The Primary Demand Forecast includes estimates of the impact of conservation and electrical efficiency programs, programs to encourage load shifting, and load displacement by non-utility generation. The Firm Load Forecast to be met by Hydro allows for the forecasted effect of interruptible loads.

The Median Forecast presented in the plan projects a slowing in the growth of basic peak demand to an average of 2.9 per cent a year over the 1987 to 2000 period, and 1.9 per cent from 2000 to 2014. The primary peak load forecast has even slower growth, 1.8 per cent from 1988 to 2000 and 1.5 per cent from 2000 to 2014. Hydro thus expects that the growth in electricity demand will be considerably slower than in the past, because of its expectation of slower economic growth and the substantial effect of demand management and non-utility generation programs.

Methodology

The load forecast is the fundamental outlook for total electricity sales and peak demands during the year, based on detailed analysis of end-use markets, energy prices, demographic trends and economic growth.

Ontario Hydro uses two analytical methods to produce the forecast. First, it maintains a set of sophisticated end-use models for the residential, industrial and commercial sectors. These models are used to estimate the increase in energy use resulting from growth in the stock of commercial and residential structures, additions of and new types of energy-using equipment, and changes in industrial output and production processes. Second, Hydro uses econometric models of the Ontario economy based on detailed regression analysis to project aggregate electricity demand by sector.

The Ontario Hydro Load Forecast is an amalgamation of the results from these two methods. Both methods are based on sound economic and statistical principles. Hydro has devoted significant resources to improving its forecasting methods and it consults outside experts in developing the economic and energy price outlooks and the load forecast itself.

Hydro prepares its forecasts on an "existing policy" basis i.e., on the assumption that there will be no substantial changes in economic, social or energy policies. This is an appropriate assumption; when policies are changed, such as by the introduction of energy efficiency regulations the changes are incorporated into the forecast.

Conclusion B-1

The Ministry accepts the methodology used by Ontario Hydro to produce its forecasts and recognizes that the corporation draws on outside expertise to supplement its own, internal forecasting ability.

Comparison with the Ministry of Energy Electricity Demand Forecast

The Ministry of Energy produces an electricity demand forecast, using detailed end-use models that are similar, to Ontario Hydro's but not identical. The main inputs to both forecasting models are: the outlook for economic growth, population growth and composition, and assumptions about future conservation and increases in energy efficiency. Energy prices are indirectly incorporated into the forecast by the efficiency and conservation variables. The Ministry's most recent forecast of electricity demand which was completed in mid-1989, covers the period from 1988 to 2005.

The Ministry outlook for economic growth is slightly lower than Hydro's, 3.1 per cent a year to 2000 versus 3.2 per cent. After the turn of the century both forecasts expect economic growth to slow down, primarily because the population and labour force are expected to grow more slowly. Hydro expects total GDP growth to average 2.2 per cent a year from 2000 to 2010 (2.4 per cent from 2000 to 2005), whereas the Ministry projects growth of 2.8 per cent from 2000 to 2005. Furthermore, the overall Ministry outlook is characterized by stronger growth in the goods sector than in services. This is due to the expectation that Ontario's manufactured goods will compete well in a more open international trading environment. Goods production tends to be more energy- and electricity-intensive than services.

The Ministry's population projections are based on the long-term projections developed by the Ministry of Treasury and Economics. These projections show a slightly higher rate of total population growth than Hydro assumed for its projection. By 2005, Ontario's total population is 11.4 million in the Ministry forecast, compared to 11.1 million in Hydro's outlook. Hydro cites the decline in the growth of the population and labour force as a major reason for the relatively faster fall-off in economic growth compared to the Ministry outlook.

The Ministry believes that Hydro's 1988 median load forecast may understate the long-term growth in the population and economy of Ontario beyond the year 2000.

The Ministry and Hydro both expect that real natural gas and oil prices will rise significantly over the long term. However, the time and extent of the rise are highly uncertain. Hydro's outlook is reasonable though slightly above the Ministry's 1988 projection. By 2000 the Ministry forecasts crude oil prices to reach \$21 a barrel (1988 U.S.\$) whereas Hydro projects \$23.40 for a higher grade and different market reference point. By 2000, the wholesale price of natural gas in Toronto is projected to rise to \$3.83 per gigajoule (1988 C\$) in the Ministry outlook and to \$4.47 in Hydro's forecast. Hydro's most recent energy price forecast, which is used in the December 1989 Load Forecast, lowers its projected natural gas prices. They are now more similar to the Ministry view.

In the Ministry outlook, electricity prices rise slightly faster than inflation up to 1995, and in line with inflation over the rest of the forecast period to 2005. In Hydro's 1988 projection real electricity prices declined by 0.2 per cent a year from 1988 to 2010. Subsequently, Hydro raised this forecast and incorporated it into its most recent forecast of electricity demand.

The Ministry therefore concludes that Hydro's long-term forecasts for energy prices are reasonable. The slightly higher oil and gas prices are justified by the recent strong growth in world demand for oil.

The Ministry Reference Case Forecast projects total electricity demand to grow by 2.8 per cent a year from 1988 to 2000. After 2000, growth in demand slows to 2.2 per cent a year. This forecast includes the effect of market-driven increases in efficiency and conservation but excludes the planned effects of Ontario Hydro's programs. In this respect the Ministry forecast is analogous to Hydro's Basic Load Forecast. The differences in total load growth between the Ministry and Hydro's outlooks are small. Hydro's forecast is just 0.1 percentage point a year greater than the Ministry projection.

The sectoral composition of this growth in electricity demand reflects differences in the two economic outlooks. The Ministry projects slightly slower growth than Hydro for residential electricity demand, 2.1 per cent a year compared to 2.6 per cent up to the year 2000. The differences can be attributed to two assumptions in the Ministry forecast: a greater increase than Hydro assumed in the energy efficiency of the structure of the houses, and expected improvements in appliance efficiency owing to future regulations under the Energy Efficiency Act. Hydro does not incorporate legislated improvements in efficiency into its Basic Load Forecast until the regulations are passed.

The Ministry and Hydro end-use projections for commercial and institutional sector electricity demand are exactly the same -- 2.7 per cent a year until 2000. However, the Ministry end-use model may understate the growth rate because of an inherent bias in end-use models to underestimate the penetration of new equipment and uses. Hydro's judgement in averaging the econometric and end-use outlooks is an acceptable way of reducing this bias. Hydro projects a growth rate of 3.3 per cent, making the commercial sector the fastest-growing user of electricity in the Hydro Forecast.

The Ministry foresees stronger growth in electricity demand by the industrial sector than Hydro does -- 3.4 per cent annually to 2000 compared to 2.5 per cent. This is the result of a projection for higher output in the goods-producing sector in the Ministry macroeconomic forecast. Also, the Ministry projects that an increasing market share of industrial output will be produced by electrical processes and equipment. The advantages of easy controllability, flexibility and cleanliness in many end-use applications will favour electrical technologies in a climate of greater international competition and heightened environmental awareness.

The ratio of growth in electricity demand to total economic growth is 0.9 in both the Ministry and Hydro forecasts, even though the composition of economic output and sectoral electricity growth differs. This ratio indicates that, although electricity is expected to be used more efficiently as a result of market forces, there will also be increased substitution of electricity for other fuels and new uses for electricity that will tend to offset the efficiency gains.

However, Hydro's load forecast was updated in 1989 to take account of new information, including a recent growth in demand that was higher than expected, and slightly faster forecast growth. About half the difference in electricity demand in 2000 between the 1989 forecast and the forecast in the DSP analysis can be attributed to the fact that actual demand in 1988 exceeded projections. The remainder is the result of changes in assumptions about how quickly electricity may penetrate the various economic sectors.

The Ministry urges Hydro to incorporate this new, higher median forecast into its plans.

Conclusion B-2

The Ministry accepts Hydro's Basic Load Forecast in the DSP analysis as a reasonable and prudent assessment of Ontario's future electricity needs at the time the forecast was made. The Median Load Forecast presented in the DSP is very close to the Ministry's Reference Case Forecast.

Load Forecast Uncertainty

In general, both the Ministry and Hydro's forecasts depend on the outcome of future events that cannot be foreseen with certainty. In fact, because of the volatility of economic growth and energy prices in the past, previous forecasts have at different times substantially underestimated and overestimated load growth. Technological changes that could either save or use more electricity are also a possibility and there may be changes in the composition of economic activity, such as faster rates of growth in the energy-intensive manufacturing sector than in the service sector. Furthermore, it is difficult to predict how consumers will respond to non-economic factors such as environmental quality.

To deal with this uncertainty, the forecast used in the DSP incorporates methods for deriving forecast probability bandwidths that are improvements over those in previous forecasts. The forecasts used in the Demand/Supply Planning Strategy (DSPS) documents had a 25,000 megawatt difference between the high and low forecast bands for 2005, with a 60 per cent probability that actual demand would lie within those bounds. The DSP forecast has a 12,000 megawatt spread in 2005 and an 80 per cent probability.

This improvement in estimating the uncertainty of the forecast largely satisfies the objections to Hydro's earlier analysis contained in the DSPS documents. Hydro's most recent forecast partially takes into account the possibility that longer-term economic growth may be stronger than forecast in the DSP documents.

Both the Ministry's forecast and Hydro's revised 1989 forecast lie within the uncertainty band associated with the Median Load Forecast band described in the DSP.

Conclusion B-3

The uncertainty band associated with the Median Load Forecast is reasonable. The uncertainty inherent in projecting future loads, past experience with forecasts, and the risk of electricity shortages support the use of a bandwidth forecast in planning.

C. DEMAND MANAGEMENT AND ELECTRICITY CONSERVATION

Demand management is a term that describes attempts by the utility to modify electricity loads in some manner. Demand management includes activities to encourage:

- load shifting to off-peak hours, and peak clipping;
- conservation and the more efficient use of electricity; and,
- load building where this would allow more efficient use of the electricity system.

Ontario Hydro describes current and planned activities that are intended to: reduce load through conservation and end-use efficiency improvements; shift loads by means of time-of-use rates, and; clip peaks through the use of interruptible-load contracts.

Ontario Hydro has adopted a planning strategy element (3.3) that restricts its load-building activities.

The Ministry has a major policy of reducing the use of electricity through electricity conservation and improvements in efficiency.

The Government policy is that electricity conservation and efficiency measures will be the priority in planning to meet Ontario's future needs for electrical services.

The Potential for Load Reduction

To assess the potential for peak load reduction from electrical efficiency improvements and the utility of "supply curves" for conservation, the Ministry commissioned a study by Marbek Resource Consultants and Torrie, Smith Associates in 1988. This study identified economic measures for conservation up to the year 2000 which totalled 6400 megawatts, at costs of less than 5.0 cents per kWh. This potential was calculated relative to Ontario Hydro's 1987 "frozen efficiency" forecast, and therefore included the savings that are expected to result from normal market forces without incentives that are incorporated in Hydro's load forecast.

In the DSP, Ontario Hydro has estimated that the potential for incentive induced efficiency improvements, excluding those brought on by market forces, is approximately 5,300 megawatts by the year 2000, at an avoided cost of 4.8 cents per kWh.

The results of these two studies are similar, and though the methods and objectives of the studies were different, the Ministry concludes, on the basis of these and other studies, that the potential to improve the efficiency of electricity use is large.

The precise amount of efficiency improvements that could be economic is difficult to estimate. The more important figure, in the context of the Ontario Hydro plan, is how much conservation can be induced by a given date, given the current operation of the market, possible changes to that market, the means available to Ontario Hydro, and the many substantial barriers to improving end use electricity efficiency.

Ontario Hydro has stated that it has given economic demand management top priority in its Demand/Supply Planning Strategy, and its DSP. It has developed an ambitious plan for encouraging more efficient electricity use. Through information programs and financial incentives Ontario Hydro aims to reduce demand, by the year 2000, by 3700 megawatts below what it would otherwise be. The Ministry notes that Hydro states that these planned load reductions are not being treated as ceilings.

Ontario Hydro estimates that its cost of meeting the planned load reduction will be \$3 billion (1989 \$).

Conclusion C-1

The Ministry concludes that the load reductions planned through the demand-management programs are substantial. The load reductions planned for the year 2000 and the resources being allocated to these programs indicate that Ontario Hydro has made demand management a major priority in planning the future development of the system.

The Ministry supports the broad range of programs that Ontario Hydro is planning. In developing these programs, Ontario Hydro must balance the often conflicting requirements of equity amongst customers and manufacturers, fiscal responsibility, uncertainty about the performance of the technologies involved, and uncertainty about the customer acceptance of these technologies.

Whether Ontario Hydro's ambitious load reduction plans can succeed is very uncertain. It is essential, however, to launch a variety of programs as early as possible, monitor the success of those programs, and use the findings to make future programs more effective.

Conclusion C-2

Ontario Hydro should accelerate the development of demand management programs so that more information can be made available about progress in meeting the planned load reductions from demand management activities.

In light of the efforts being made in other parts of the world to raise efficiency in electricity use, the Ministry believes that Ontario Hydro should consider whether more load reduction can be achieved through more innovative approaches for increasing energy efficiency. Possibilities for this would include bidding systems that treat conservation as a supply resource, modification to the rate structures, and programs to encourage the substitution of other fuels for electricity where this is in the customer's and the province's long-term interests.

Although Ontario Hydro has stated that generally demand management is less damaging to the natural environment than generating more electricity, that fact does not appear to have been considered explicitly in the development of the plans. Nor has Ontario Hydro explained the substantial risks that may exist if larger demand management programs were attempted.

Conclusion C-3

Ontario Hydro should present further information to the Board to allow a comparison of the costs, risks and benefits of additional conservation as an alternative to some of the supply facilities described in the plan.

D. NON-UTILITY GENERATION (NUG)

In Ontario, electricity generation was originally developed by privately owned companies. Following the formation of the Hydro-Electric Power Commission of Ontario (now called Ontario Hydro) in 1906, much of the existing private generation capacity in the province was purchased by the utility or decommissioned by the owners because of poor economic performance. Nonetheless, Ontario currently has over 1200 megawatts of privately owned generation. Most of this is in the industrial sector and consists of cogeneration and older hydro-electric plants. Between 1980 and 1988, about 25 megawatts of new NUG capacity was constructed. More recently, owing to among other things, the higher electricity purchase rates now offered by the utility, a number of new facilities have been built. Since 1988, over 200 megawatts of new capacity have been commissioned or are under construction.

In July 1989 the Minister announced in the Legislature the release of the Government's "Policy Paper on Parallel Generation." The policy was developed in consultation with Ontario Hydro and interested industry groups represented by the Non-Utility Generation Advisory Council (NUGAC).

As part of the policy formulation, the Ministry of Energy studied the market potential for parallel generation, including water power, cogeneration and energy-from-waste facilities. This study suggested that there was potential for over 4,000 megawatts of new parallel generation, excluding combined-cycle facilities. Combined-cycle facilities were not included in the analysis, because their economic attractiveness depends solely on natural gas prices and electricity purchase rates. Cogeneration, to be economically attractive, requires a purchaser of the heat energy produced, usually steam.

The major elements of the policy are as follows:

1. The government will reduce barriers to the development of economically and environmentally sound parallel generation, while protecting the interests of Ontario ratepayers.
2. A public review of Ontario Hydro's method of calculating its avoided cost will be undertaken.
3. Purchase rates should fully reflect the value of power to the electricity system.
4. Ontario Hydro should make purchase rates available on the same basis to all parallel generators, regardless of energy source or technology.
5. The Government recommends that Ontario Hydro develop a solicitation process designed to achieve 1000 megawatts of new parallel generation capacity by 1995, with flexibility to achieve an additional 1000 megawatts by the year 2000, if required.

The Potential for Non-Utility Generation

Ontario Hydro has estimated in the DSP that 1635 megawatts of non-utility generation will be in existence by the turn of the century. In May 1989, Ontario Hydro issued a Request for Proposals. Approximately 6,500 megawatts of new projects had been submitted as of January 1990. A substantial portion of these projects are co-generation using natural gas.

Conclusion D-1

Ontario Hydro should provide a more detailed description to the Board of the results of the 1989 Request for Proposals relating to parallel generation, and the effect that this new information has on the assumptions used in drawing up the plan.

The amount of NUGS "on line" by the year 2000 will be affected by a number of factors including;

- the electricity purchase rate,
- the price of natural gas, and
- contract terms and conditions.

Ontario Hydro has not provided any information on how its estimates of the amount of NUGS on line by 2000 would change if the above factors were to change.

Conclusion D-2

Ontario Hydro should provide the Board with estimates of how the total capacity of NUGS "on-line" in the future would change if a number of key factors such as the purchase rate for electricity or natural gas prices were to change.

Environmental and Social Impacts

There are social and environmental costs and benefits associated with NUGs, just as there are costs and benefits if electricity generating stations are owned by the utility. Because of the current institutional arrangements, some technologies are more amenable for development as parallel generation.

Cogeneration can make efficient use of natural gas which is a non-renewable resource. Unlike central generation facilities, which do not traditionally make use of the "waste" heat that results from electricity production, cogeneration plants have overall efficiencies of 70 to 85 per cent. By way of comparison, conventional coal-fired plants operate at about 35 per cent efficiency. Combined cycle plants operate at up to 45 per cent efficiency. Thus, for the equivalent natural gas consumption, cogeneration requires about half the fuel that a central plant would require.

Two parallel generation technologies, hydro-electric and energy from waste, make use of indigenous resources and can help to improve environmental conditions. Water power is an indigenous resource and although there may be undesirable local consequences from dam construction, there are no atmospheric emissions. Energy from waste helps to reduce the amount of waste products disposed of in landfill sites while providing a valuable source of fuel.

E. COSTING CONCEPTS AND AVOIDED COSTS

The Memorandum of Understanding between the Minister of Energy (on behalf of the Government) and Ontario Hydro states that the primary objective of Ontario Hydro is to provide a secure and reliable supply of electricity at the lowest feasible cost over the long term.

A major planning consideration of Ontario Hydro is, therefore, to decide what kind of system will provide power at the lowest long term cost. In its discussion of the Demand/Supply Plans, Ontario Hydro has given considerable importance to the use of avoided costs for assessing options and alternatives.

Ontario Hydro's avoided costs are those costs which are avoided when any demand or supply option is substituted for an equivalent part of a system plan. The avoided costs for any particular option will depend on the characteristics, including costs, performance and availability, of both the option being considered and the generating capacity in the plan that would be avoided or displaced by greater reliance on the option.

Avoided costs in utility planning are usually only considered to be those costs that the utility itself directly avoids incurring. A broader perspective would be to examine avoided costs on a provincial basis. In addition to those costs avoided by the utility, costs that the province as a whole would avoid incurring such as those arising from acid gas emissions or flooding of lands, would also be considered in planning.

The Government's Parallel Generation Policy Paper, released in July 1989, called for a public review of the methods used by Ontario Hydro to calculate avoided costs. The review was to look at the treatment of all relevant factors, including environmental and social costs, where measurable, to the extent possible. In November 1989, the Minister of Energy, the Honourable Lyn McLeod, announced that the DSP would be reviewed by the Environmental Assessment Board. At that time, the Minister stated her expectation that the review would include an examination of Hydro's methods of calculating avoided costs.

Avoided costs have a broad application in electric utility planning. They are useful in the assessment of all demand and supply options including purchases from NUGs, purchases from other provinces, development of other supply options by Ontario Hydro and demand management. The concept of avoided costs has been used especially to estimate the value of demand management and NUGs to the electricity system.

With regard to demand management, Ontario Hydro has estimated that potential induced electricity efficiency improvements of approximately 4900 megawatts are economic at avoided costs of up to 3.7 cents per kWh, the avoided costs estimated in the median growth case for the period 2000 to 2014. Hydro has estimated that the economic potential is between 4000 megawatts and approximately 5300 megawatts for a range of avoided costs from 2.6 cents to 4.8 cents per kWh.

Ontario Hydro currently purchases power from small, high load factor NUGs at a standard rate which is intended to reflect Hydro's estimates of its avoided costs. (The rate is actually set at 85 per cent of the total cost of power to the municipal utilities. Hydro has stated that it feels that this is close to their estimates of avoided cost, and that greater rate stability would result if the purchase rate for these NUGs were tied, for 1990, to the cost of power rather than the avoided cost.) For larger parallel generators Hydro negotiates rates based on project specific avoided costs.

Based on the facilities proposed in the DSP, Ontario Hydro has lowered its estimates of its avoided costs. It appears that the estimates are lower because the estimated costs of most of the options has been reduced, and the DSP contains a more optimal mix of options from a cost point of view than previous planning assumptions. Compared to previous assumptions, avoided cost estimates are now in the order of 0.5 cents per kWh lower during the DSP time frame.

Costing Issues

a) Social and Environmental Costs

Private and corporate activities frequently result in significant social and environmental costs that are not borne directly by the originator of the activity but by others or by society at large. It has been argued that these "external costs" should be incorporated into private, corporate and government decision making. Various market and other mechanisms have been proposed to "internalize" these costs.

Similarly, significant external socioeconomic benefits such as employment and investment may result from such activities. It is difficult, however, to fully quantify and attribute all such costs and benefits in an equitable way.

The National Energy Board (NEB) has required proponents to attempt to assess all identifiable social and environmental costs that may result from the generation and transmission of electricity for export. The net social and environmental costs estimated by Ontario Hydro for coal-fired exports was 0.04 cents per kWh at the 1981 export licence hearing. Hydro's estimate specifically addresses the effect of emissions on human health, building materials, and terrestrial ecosystems.

Hydro has been developing updated estimates of the social and environmental costs of electricity generated for export for its submission to the NEB for an export licence application for 1991. The actual level calculated will no doubt be controversial, as was the 1981 estimate. Nevertheless, this work does illustrate that certain external social and environmental costs and benefits can be identified and taken account of.

In the Demand/Supply Plan, Hydro states that its calculations of avoided costs do not include social and environmental costs external to Ontario Hydro. In Hydro's opinion it would not be practicable to include additional costs and benefits on an equitable basis and it would be extremely difficult to distinguish between the effects of Hydro projects and other projects.

Those costs borne directly by Hydro, such as the costs of meeting acid gas emissions regulations and radiation emissions targets are dealt with in the same manner as other costs are in planning. Similarly, comparable social costs, such as grants to municipalities in lieu of taxes and costs incurred to spread out construction activity, may be considered to be social costs borne directly by Hydro and incorporated into planning decisions. The value of the land for alternative uses can be dealt with by paying the market value for the land when it is acquired through expropriation.

The Ministry acknowledges that the treatment of social and environmental costs may be very difficult in many instances. However, there are important impacts which should be examined for each of the plans and the options. While all such impacts cannot be quantified on the same basis, the Ministry believes that to the extent possible such impacts should be considered in planning.

Conclusion E-1

The Ministry believes that the studies of social and environmental costs prepared for Ontario Hydro for the 1991 export licence application would be of use to the Board in its review of Ontario Hydro's methodology for determining its avoided costs.

b) Costs in the Baseline Plan and Uncertainty

Ontario Hydro identifies nuclear as the lowest cost option. In the proposed plan, Case 15, nuclear additions supply most of the additional generation requirements. As a result, nuclear costs dominate the avoided cost determination. Nuclear costs thereby become the benchmark against which all other baseload options must compete. Consequently, it is crucial not only that nuclear costs be based on the best estimates possible but that the range of costs and risks of each major cost components are adequately taken account of in planning.

It would be helpful in assessing the plans and options to have an indication from Ontario Hydro as to how sensitive the avoided cost for the proposed plan are to a realistic range of sensitivities for various key factors determining nuclear costs. A list of these key factors would include: capacity factor; discount rate; station life; in-service delays; pressure tube life; retubing outage; and, the date when a used fuel repository would be needed.

The issue of the range of nuclear costs is key. Hydro has, in general, concluded that consideration of a fairly narrow range of nuclear costs is appropriate for planning purposes. If sensitivity of avoided costs is examined for a wider range for key cost factors, a wider range of economic potential for other options such as demand management and non-utility generation would be identified.

Hydro states that due to uncertainties in the cost of supply options they have estimated a cost range of +20 per cent to -15 per cent for the various supply options. However, Hydro has not said whether system avoided costs were calculated for this range. Similarly, no evidence has been presented as to whether the relative ranking of various plans or the optimal configuration of the plans would be affected by varying the cost estimates.

Hydro has not shown how this range would affect the level of attainable electricity efficiency improvements or the level of NUGS. (The DSP does show an estimate of how potential energy efficiency improvements would change for a range of system avoided costs; the sensitivity shown is quite low).

Conclusion E-2

Ontario Hydro should provide more information on the sensitivity of avoided costs to changes in the costs estimated for each of the plants in the baseline plan.

c) Provincial Debt Guarantee Fee

Subsequent to the evaluation by Hydro of the demand and supply options in early 1989, the Province introduced the Provincial Debt Guarantee Fee, a 0.5 per cent annual charge on outstanding Hydro debt.

This charge reflects the benefits of the lower borrowing costs that result from the Provincial guarantee of Hydro borrowing. The fee effectively raises Hydro's cost of borrowing and its discount rate by 0.5 percentage points. Hydro has not, however, incorporated the Debt Guarantee Fee into its discount rate in developing the DSP.

Hydro has indicated in response to questions from the Ministry that this fee has been treated as a charge on Hydro's debt as a whole and is not considered to directly affect the borrowing costs when the costs of any individual project are examined.

Based on the evidence that Ontario Hydro presented to the Ontario Nuclear Cost Inquiry, a 0.5 percentage point increase in the discount rate would raise the cost of nuclear by 5 per cent.

Conclusion E-3

It would be helpful if Ontario Hydro provided an analysis to the Board of how the economics of the various options and plans are affected when the Provincial Debt Guarantee Fee is treated as directly raising Ontario Hydro's discount rate.

d) Total Customer Cost

In evaluating demand-management options, Ontario Hydro has used the concept of total customer cost. That is, an analysis of the economics of a demand management measure includes the full equipment and other costs of the measure whether such costs are incurred by Hydro or by the customer. The Ministry also supports this concept and has done so in the policy paper "Towards an Energy Efficient Ontario" as well as in the staff review of the DSPS.

Conclusion E-4

The Ministry supports Hydro's use of the Total Customer Cost test in evaluating demand management.

F. ADEQUATE SUPPLIES AT LOW COST

The Ministry of Energy is strongly of the view that any plan for the development of the electricity system must seek to maintain adequate supplies of electricity for both the short, and the longer term. The plan must recognize that there is considerable uncertainty in forecasts of future loads, in the regulatory environment, in consumer behaviour, and in the performance and cost of technology.

Because there is so much uncertainty the plan must seek to find the appropriate levels of system reliability through reserve margins for generation equipment, and redundancy in the transmission system. The plan must retain diversity in the types of plants in operation and the fuels used. The plan must also recognize the different level of risks that must be taken account of, and planned for.

Of course, not all risks can be considered, and uninterrupted electricity service cannot be guaranteed. Moreover, planning for different risks, and increasing the reliability of the system may raise the cost of providing electricity. The plan for system development should balance these conflicting requirements.

System Reliability

High system reliability can be provided by making use of redundant equipment or "equipment in reserve." Thus high levels of reliability can raise the costs of system development plans since more transmission and generation are required. On the other hand, the cost to society of inadequate supplies of electricity can be substantial.

The Ministry endorses Ontario Hydro's strategic principle that recognizes the importance of reliability, and it supports the approach whereby the generation target planning reserve margin is chosen to minimize the total costs of supply interruptions and adding to the supply.

Conclusion F-1

Ontario Hydro should make further information available to the Board on 1) the estimated costs of providing electricity with different generation reserve margins, and 2) the methods Hydro has used to estimate the costs of electricity interruptions.

Ontario Hydro should make ongoing efforts to gain a better understanding of the costs and benefits of different levels of reliability for the system as a whole.

The reliability of the service is affected by the performance of a range of equipment, including generating plants, transmission and distribution lines, and transformation stations. Ontario Hydro has focussed in the DSP analysis on the level of generating reserve. The Ministry feels that Ontario Hydro should have ongoing efforts to ensure that targets for the reliability of customer service recognize the contribution that different components of the system, and operating strategies, can make to overall system reliability.

System Diversity

Diversity in the types of technologies and fuels used for electricity generation can reduce the impact of, amongst other things, unexpected problems with a particular technology.

The Ministry suggested in its contribution to the Government Review of DSPS that Ontario Hydro should examine the extent to which it relies on CANDU technology. It is acknowledged that the performance to date of Ontario Hydro's nuclear plants has, in general, been good. However, while there have been many reactor years of experience with this technology, there is little experience with reactors that are approaching the end of their design life, and poor generation performance could substantially raise the future cost of electricity.

The Ministry notes that Hydro has presented evidence on the diversity of each plan from an energy perspective and a capacity perspective.

Conclusion F-2

Ontario Hydro should present more information on how the total expected cost of meeting future demands would change if the estimates of the future performance of technologies such as nuclear power were to change.

System Flexibility

Increased flexibility within the electrical system can be achieved by using a mix of fuels in the system, and by considering plants with different construction lead times. Flexibility may be particularly important when there are rapid changes in the relative prices of fuels, in environmental regulations that affect different fuels in different ways, or in load growth rates.

In its contribution to the Government Review of DSPS, the Ministry emphasized the importance of flexibility. It should be noted that in the final DSPS Ontario Hydro has modified and given more importance to the strategy elements related to flexibility.

The Ministry also notes the increased use in the plan of combustion turbine units and the greater flexibility that this brings to the plans.

Hydro has tried to increase its planning flexibility by seeking approval of the requirement and rationale for specific plant types based on their Upper Bound Load Forecast. The Ministry supports the use of a forecast above the median growth for planning purposes, recognizing the uncertainty in load forecasts, and the fact that only the low-cost "definition phase" preparations for the options would be carried out in advance of project commitment. The Upper Bound Forecast may be appropriate for this purpose.

The Ministry expects that, should appropriate approvals be received, the commitment of substantial resources to future projects would be made on the basis of updated load forecasts, rather than an Upper Bound Load Forecast.

Conclusion F-3

The Ministry supports the view that the requirement and rationale for new supply facilities should be considered on the basis of load growth in the upper range of the load forecasts which Hydro has submitted.

G. NEW ELECTRICITY GENERATING STATIONS

The Ministry believes that nuclear power, coal-fired generation, hydraulic generation, gas-fired generation, and oil-fired generation should all be considered when the development of the generation system is being planned.

The Ministry agrees with Ontario Hydro's conclusion that alternative generation technologies such as solar or wind powered generation cannot provide large amounts of economic electricity production in the time period relevant to the approvals being sought.

The Ministry notes that many of the existing fossil stations in the system, as well as the Pickering nuclear power station, are expected to come to the end of their designed lifetime (40 years) towards the end of the period considered in the Hydro plan (2014). Ontario Hydro has assumed that new plants will be needed to replace these stations. Decisions regarding rehabilitation of these plants, or their retirement, will not be made until closer to the scheduled retirement dates.

All options for the future development of the system have social, environmental, and economic impacts. The decisions as to which options should be developed further should be made after a thorough review of the costs, benefits and impacts.

The Ministry notes that with the completion of the evidence to the Ontario Nuclear Cost Inquiry and the Thermal Cost Review, similar methods have been used for cost assessments of nuclear, coal, and gas-fired plants. The judgements made in estimating future costs and performance can be compared, although these studies did not examine the social and environmental costs of different options.

a) Hydraulic Generation

In the DSP, Ontario Hydro indicates that it plans to rehabilitate or redevelop almost all of its existing hydraulic capacity on an ongoing basis so as to make continuing use of this renewable energy source.

The Ministry of Energy welcomes this rehabilitation plan because it will help maximize the economic use of the existing system, and because the environmental effects of rehabilitating existing hydraulic stations are likely to be localized and of short duration.

Ontario Hydro's rationale for choosing hydraulic as a preferred supply option includes the fact that it is a proven technology which uses a renewable energy source. Ontario Hydro also states that hydraulic generation provides the best match in operation with Hydro's nuclear and fossil capacity.

Development of the hydraulic option will help improve security of supply and will increase diversity in the electricity supply system.

In identifying the sites for inclusion in its Hydraulic Plan, Ontario Hydro recognizes that the lack of viable, undeveloped sites will limit the role that hydraulic generation can play in Ontario. For example, some sites on the northern rivers are not practical for development because of potentially significant social and environmental impacts. Other sites are excluded because they are in provincial parks or because they do not satisfy the technical or economic criteria.

The DSP outlines the process by which Ontario Hydro reviewed Ontario's remaining hydraulic potential and identified a total of 35 sites with a potential capacity of 3591 megawatts that are available for development by Ontario Hydro.

The Hydraulic Plan comprises 18 of these sites with a total capacity of 2935 megawatts most of which will be used as peaking capacity. Nine of these sites are new sites, four are redevelopments and five are extensions.

Ontario Hydro indicates that the remaining 17 sites totalling 656 megawatts, which do not rank as highly in terms of Ontario Hydro's environmental, technical and economic criteria, have been identified as "available for future consideration". Ontario Hydro also indicates that these sites will provide "backup resources" if some of the preferred sites are excluded from the Plan as a result of new information which might arise from subsequent detailed assessment of individual sites.

The Ministry of Energy supports the development of all economic hydraulic sites in the province giving due regard to the environmental and social impact, and alternative uses for the sites such as recreation and tourism.

The Ministry expects that if the requirement and rationale for a facility at a particular hydro-electric site is approved, the project Environmental Assessment will focus on project design, and mitigation of environmental impacts. The Ministry expects that if it is found during the project Environmental Assessment that the environmental impact of the project is unacceptable, then the project will not gain approval.

b) Nuclear Power

Safety

Under the Atomic Energy Control Act responsibility for regulating all nuclear safety matters rests with the federal government. The federal government exercises its authority through the Atomic Energy Control Board. Ontario Hydro has stated that if new nuclear stations are built, their construction and operation will meet all applicable regulations.

The Ontario Government and the Legislature have taken an active part in reviewing Ontario Hydro's nuclear program and in examining public concerns about nuclear safety. Nuclear safety has been examined by a number of committees and commissions:

- Task Force Hydro (1973);
- Royal Commission on Electric Power Planning (1975);
- Select Committee on Ontario Hydro Affairs (1980); and the
- Ontario Nuclear Safety Review (1988).

The Ontario Nuclear Safety Review is the most recent and comprehensive review of nuclear safety available. It was commissioned by the Minister of Energy as a scientific and technical review of the safety of Ontario Hydro's nuclear reactors and looked at three important nuclear safety issues:

- reactor accidents;
- health and environmental impacts of routine emissions; and
- health impact on radiation workers.

The major conclusion from the Ontario Nuclear Safety Review regarding overall safety is as follows:

"The Ontario Hydro reactors are being operated safely and at high standards of technical performance. No significant adverse impact has been detected in either the workforce or the public. The risk of accidents serious enough to affect the public adversely can never be zero, but is very remote."

Waste Disposal

The Ministry notes that the issue of the long term disposal of radioactive wastes is a public concern.

The Ontario and federal governments addressed the issue in a joint statement by Ministers of Energy on June 5, 1978, in which responsibility was taken by the federal government for the research and development of a method of radioactive waste disposal based on burial, deep within granite-like geologic formations. It was subsequently agreed in a joint statement on August 4, 1981, that no decisions would be made on the selection of a site for waste disposal until a concept of disposal had been accepted by regulatory agencies and governments, following a full public hearing under the auspices of the federal government.

After consultation with Ontario and other provinces, the federal government established a review of radioactive waste disposal under the federal Environmental Assessment Review process. An Environmental Assessment Panel was appointed in October 1989 with a mandate to review the safety and acceptability of the concept of deep geologic disposal of highly radioactive nuclear fuel waste and a wide range of related issues, including the social, economic and environmental implications of a possible waste disposal facility. No reporting date has been fixed for the review.

Economics

The Ministry notes that Ontario Hydro quotes extensively from the report of the Ontario Nuclear Cost Inquiry (ONCI) and makes extensive use of the data which Ontario Hydro submitted to the inquiry. The report and the information provided to the inquiry have been available to the public since April 1989.

The Ontario Nuclear Cost Inquiry reviewed in detail the information given to it by Ontario Hydro and in some instances "reflected on whether its judgment would be different than Hydro's." The inquiry did not undertake its own calculation of nuclear costs, nor did it examine social or environmental costs.

The panel's report, received in January 1989, concluded that the estimates made by Hydro for its next nuclear station were;

"methodologically sound, comprehensive and of high quality. These estimates, in our opinion, provide an appropriate basis for comparing options and preparing plans to meet Ontario's future electrical needs."

The panel noted that "Hydro's base cost estimates for the Future Station are intended to reflect median values ... and the 80% confidence range reflects a 10% chance that the total energy costs would be either 20% higher, or 15% lower." In the Panel's opinion, "the cost of energy from the Future Station would fall towards the high end of Hydro's 80% confidence range."

Recent experience in Ontario and around the world with nuclear power is relevant to the review of the current plans in a number of ways:

- The annual capability factors of the nuclear stations in Ontario since Ontario Nuclear Cost Inquiry have been lower than expected. This experience may cause Ontario Hydro to modify estimates of the lifetime capability factor of the future plant. This experience could also modify Ontario Hydro's estimates of the ability of existing plant in meeting future loads, thus having an effect on the estimates and timing of future system costs.
- The delays in the commissioning of the Darlington station have been substantial. This may have an impact on Ontario Hydro's estimates of the cost of future nuclear stations.
- The revision in the United Kingdom of the estimates of the costs of decommissioning nuclear plants. This may have an impact on the estimated costs of decommissioning of nuclear plants in Ontario.

Conclusion G-1

Ontario Hydro should present further information to the Board on whether their estimates of system costs and future nuclear costs in Ontario have changed as a result of recent experience.

The Ministry recognizes that substantial public concerns exist about many issues associated with nuclear power, including nuclear safety, waste disposal, and the short-term effect of new nuclear stations on rates. On the other hand, electricity generation using nuclear power produces less acid gas, and less of the greenhouse gases, than fossil fuel options. Moreover, the construction of nuclear power stations make substantial use of skills and resources within the province.

c) Coal

The Ministry recognizes the substantial impacts that coal-fired generation can have on the environment through the production and release of acid gases and greenhouse gases. Nevertheless, new coal-fired generation can provide the system with greater economic flexibility, and fuel and technology diversity. The estimated economics of coal-fired generation in Ontario will depend heavily on the forecasts of future coal prices and transportation costs. The Ministry supports greater use of Western Canadian coal, where economic, in the electricity system.

d) Natural Gas

The Ministry recognizes that use of natural gas in the electricity system may have advantages. These include the shorter lead time of combustion turbines which burn natural gas, when compared to other major generating stations, and the increased system diversity that would result from the greater use of natural gas for electricity production.

It should be noted that there are errors in several tables and figures in the DSP that show how much natural gas is projected to be needed in alternative plans. For example, the actual volumes of natural gas projected to be required in plan 15 are 3.7 Gm³ rather than the 250 Gm³ shown in figure 5.1 of the "Environmental Analysis" volume.

The Ministry notes the projected short period of high gas use, the load factor of the gas use, and the need for natural gas transportation and distribution capacity to deliver the projected volumes at peak demand periods. This could have major impacts on the price of natural gas to Ontario Hydro.

Conclusion G-2

Ontario Hydro should provide further information to the Board to correct the errors in the description of gas volumes in the DSP documents, and should provide further information about the supply arrangements it will be considering if additional natural gas fired generation is to be built.

H. INTER-PROVINCIAL ELECTRICITY PURCHASES

The Ministry has encouraged Ontario Hydro to consider the role electricity purchases can play in meeting the electricity needs of the people of Ontario, and believes that purchases should be made where there are economic, social and environmental benefits.

The Ontario Government has approved the contract between Ontario Hydro and Manitoba Hydro for the purchase of power. Transmission facilities to incorporate the purchase are subject to approvals under the Environmental Assessment Act. The contract provisions allow for cancellation if approval for transmission facilities is not received.

I. THE TRANSMISSION SYSTEM

The transmission system is a vital component of the electrical power system. A strong transmission system is necessary to optimize economic operation and to minimize the environmental impacts of the generation system. The ability to build new transmission lines to fully incorporate new generation into the electricity grid can have an important impact on the feasibility of sites which could be considered for new generating stations.

The Ministry believes that generation and transmission system planning should be integrated to the extent possible. In planning transmission facilities Hydro should take full account of provincial land use policies. Whenever it is feasible to upgrade existing transmission lines or corridors, this option should be evaluated before seeking approvals for new corridors.

The DSP contains a brief description of land use impacts that may be associated with transmission facilities. The Ministry is aware of concerns that have been expressed by members of the public about the visual impact of transmission lines, and the possible health effects of electro-magnetic fields (EMF) associated with transmission lines.

Conclusion I-1

Ontario Hydro should describe for the Board, public concerns about transmission lines and options for meeting these concerns.

J. SUSTAINABLE DEVELOPMENT

The Ministry believes that sustainable development is an important concept to be considered in planning the electricity system and that the proposals that Ontario Hydro is making should be considered from the perspective of sustainable development.

Energy policies should recognize that the factors limiting sustainability are global as well as local. Not only will the continued availability of some resources at reasonable prices be an issue, but the regional and global impacts will also be important. The combustion of fossil fuels has many adverse environmental impacts, many of which are only beginning to be understood on a global scale. Acid rain and global warming are just two examples.

K. CONCLUSIONS

Ontario Hydro's Demand/Supply Plan has built on previous studies and reviews that have assisted Ontario Hydro and the Ontario Government in better understanding the issues which arise in planning the development of the system.

The Need for Decisions

The Ministry of Energy develops its own forecasts of the demand for energy and, more specifically, electricity. On the basis of those forecasts and the information provided in the DSP, the Ministry believes that major new supply facilities are needed in the face of the increasing electricity loads and the increasing age of the existing facilities.

Ontario Hydro is engaged in programs to encourage substantial amounts of load reduction through demand management and to defer the need for utility owned facilities by encouraging new non-utility generation. The amount of load reduction that will occur from these programs must be considered uncertain. Ontario Hydro should accelerate the launch of demand management and NUG programs to ensure that planned results can be realized. Hydro should carefully monitor the success of its demand management program and its non-utility generation program since the results of these programs will have some impact on the timing of the need for new supply facilities.

Ministry Policy Interests

Ontario Hydro's plans do not contravene any Ministry policy. They recognize the importance of reliable supplies of electricity, and the need to maintain a high degree of flexibility to respond to changing conditions such as load growth.

The plans also recognize the important role that demand management and non-utility generation can play in the future development of the system.

The Technical Quality of the Environmental Assessment

The Ministry believes that an adequate range of alternatives for the future development of the system has been examined, but that further information would be useful to the Board in a number of areas listed in this report.

Appendix A

THE RELATIONSHIP BETWEEN THE GOVERNMENT AND ONTARIO HYDRO

The Power Corporation Act

Ontario Hydro was established in 1906 to meet the electricity needs of the Province. The Power Corporation Act sets out Ontario Hydro's role mandate and authority. The Act was recently amended by the Government to increase Hydro's accountability to the Government, and the amendments were given Royal Assent.

The Power Corporation Act places the responsibility for the business and affairs of Ontario Hydro under the control and direction of the Ontario Hydro Board of Directors. The purposes and business of the Corporation are described in the Power Corporation Act and include:

- the generation, transmission, distribution, supply, sale and use of electrical power and energy;
- the production, sale, supply and delivery of heat energy ("heat energy" is defined in the Act as energy that is conveyed in the form of steam, hot water or hot air and that is produced for sale);
- the provision of energy conservation programs to encourage the safe and efficient use and the conservation of all forms of energy; and,
- the encouragement of parallel generation.

The Act also requires the Corporation to provide electricity at a price determined by the cost of supplying and delivering the power. This is commonly known as "power at cost" and includes, among other things:

- the cost of operation, maintenance, depreciation, insurance and administration;
- interest and expenses of debt service;
- debt retirement provisions;
- reserve accounts (e.g. stabilization of rates and contingencies) including interest on these accounts;
- the cost of energy conservation programs;
- the cost of limiting the rural rates differential.

In carrying out its activities the Ontario Hydro Board of Directors is required to respect Government policy and to make its best efforts to ensure that its activities broadly conform to that policy. The Minister of Energy is responsible for ensuring that the Ontario Hydro Board of Directors is aware of Government energy policy.

The Power Corporation Act requires that Ontario Hydro obtain the approval of the Lieutenant Governor-in-Council (LGIC) for certain specified actions before proceeding with the action. The approvals of major importance relating to system expansion are:

- to acquire by purchase, lease or in any other manner land for the use of the corporation,
- to use or direct, rivers, lakes or any other body of water for the purpose of the corporation,
- to construct works for the generation or transmission of power,
- acquire by purchase property and assets of corporations engaged in the production of power,
- to enter into contracts for:
 - the purchase of power
 - the sale of powerfrom or to points outside of the province,
- to borrow funds for the use of the corporation.

The Power Corporation Act requires Ontario Hydro and the Minister of Energy to enter into a Memorandum of Understanding (MOU). The MOU sets out the reporting and operating relationship of the Corporation and the Government.

Government Involvement in Reviewing Ontario Hydro System Expansion Plans

Ontario Hydro is responsible for planning the development of its generating, transmission, and distribution system. However, assessing the options for system development often raises a number of issues of broad public interest. The Government has, on a number of occasions, initiated, and participated in the review of Ontario Hydro's plans, and the issues which arise.

In 1975, the Provincial Government initiated a major review of Ontario Hydro's system development plans by appointing the Royal Commission on Electric Power Planning to examine the long range planning concepts of Ontario Hydro. The Commission undertook extensive public consultation, and funded substantial research on the issues involved.

More recently the Government has caused reviews to occur of a number of aspects of the Province's current electricity demand and supply options.

In 1986 Ontario Hydro published its Demand/Supply Options Study (DSOS). Public forums were held by Hydro across the Province seeking views on supply demand options. The Select Committee on Energy (85/86) reviewed the results of the DSOS.

The Ministry of Energy commissioned and published a number of studies in related areas including: the potential for parallel generation, supply curves for conservation, the economic impacts of electricity purchases, coal combustion technologies, uranium supplies, the potential for electricity exports, and the role of natural gas as an electricity supply option.

In 1987 Hydro published its draft Demand/Supply Planning Strategy (DSPS). In considering the Strategy, the Government decided that;

- the Strategy would be reviewed in a number of forums,
- Ontario Hydro should develop plans for the future development of the system taking into account the results of these reviews, and submit these plans to Government for public review.

The mechanisms chosen for the review of Ontario Hydro's Planning Strategy were;

- o a special panel appointed by the Minister of Energy (Electricity Planning Technical Advisory Panel),
- o review by Government ministries,
- o the Select Committee on Energy.

Other inquiries have studied nuclear safety (the Ontario Nuclear Safety Review - the Hare Commission), and Ontario Hydro's nuclear costing methodology (Ontario Nuclear Cost Inquiry).

In 1989, the Minister of Energy announced that the Ontario Hydro Demand/Supply Plan would be reviewed under the Environmental Assessment Act.

Provincial Objectives for Electricity

Under the current Memorandum of Understanding (MOU), the Government and the Ontario Hydro Board of Directors have agreed that the primary objective for the supply, distribution and use of electricity in Ontario is:

"to ensure that Ontario's electricity consumers are provided with a secure and reliable supply of electricity at the lowest feasible cost over the long-term."

To achieve this primary objective the Government and Ontario Hydro have set the following sub-objectives:

- to encourage electricity conservation and promote the wise use of electricity;
- to optimize the economic use of Ontario Hydro's existing bulk electricity supply system;
- to ensure that Ontario Hydro's capacity to spur economic growth and development in Ontario is appropriately utilized;
- to ensure that Ontario Hydro's strategic procurement policy is compatible with that of the Government;
- to ensure that Ontario Hydro operates in a cost-efficient manner;
- to ensure public accountability and responsiveness on the part of Ontario Hydro particularly on major decisions affecting the planning of the electric power system;
- to ensure that electrical power policies and programs are developed in a manner compatible with Ontario's environmental goals and objectives;
- to make optimum use of Ontario's cost-effective renewable energy resources for the generation of electricity;
- to encourage the participation of the private sector in providing for a cost-effective supply of electricity;
- to promote the appropriate involvement of native communities in Hydro activities.

Appendix B

THE MINISTRY OF ENERGY

The Ministry of Energy Mandate

The Ministry's mandate is based on the Ministry of Energy Act, the Energy Efficiency Act, and subsequent Cabinet decisions authorizing initiatives in several areas.

The mandate is to;

- review energy matters on a continuing basis for both the short-term and long-term needs of Ontario;
- advise and assist the Government in dealings with other governments on energy matters;
- make recommendations for the co-ordination of all energy matters within the Government of Ontario to ensure the consistent application of policy in areas such as the adequacy of supplies, prices, franchises, and the development of energy resources indigenous to Ontario;
- make recommendations regarding research and development priorities, in particular on energy conservation and efficient technologies and the development of new energy sources; and,
- increase the availability of energy in Ontario, stimulate the search for and development of conventional and alternative sources of energy, and encourage prudence in the use of energy and regulate the energy efficiency of equipment.

The Ministry administers the Energy Efficiency Act. The Minister is responsible for the Power Corporation Act and the Ontario Energy Board Act.

The Ministry typically carries out its mandate by working through other agencies, ministries, and levels of government and by working directly with consumers and the energy supply industry.

The Ministry of Energy Policy Direction to Hydro

The Ministry of Energy has published two major policy papers which are relevant to the review of the DSP. The Ministry of Energy's Review of the DSPS also provided an interpretation of the Provincial objectives for electricity.

I. General electricity planning principles

The general electricity planning principles were as follows:

- Electricity conservation and efficiency will be the major priority in planning to meet the province's future need for electrical services;
- Planning should stress flexibility to accommodate a reasonable range of future electricity needs;
- Diversification of supply technologies should be an important consideration in planning;
- Maximum economic use should be made of existing stations;
- Maximum economic use should be made of independent generation. The Ministry's "Policy Paper on Parallel Generation" states that the rates for independent generation should be set at the full value of the power to the electricity system;
- Evaluation of technologies should recognize the benefits of shorter lead times; and,
- Purchases from other provinces should be pursued.

II. Electricity Conservation

In 1986 the Minister announced in the Legislature the release of the Ministry's Policy Paper on conservation entitled "An Energy Efficient Ontario." The Ministry's Policy direction to Ontario Hydro is that:

- electricity conservation and efficiency should be the major priority in planning to meet future electricity needs,
- a major strategic objective of demand management will be to extend the amount of time before Ontario needs new generation,
- the objective of demand management programs is that electricity services should be supplied at the least total cost to society.

In February 1988, the Government decided that Ontario Hydro should immediately implement a plan to support and encourage the early introduction of electricity conservation and efficiency measures to the extent that these are economic, and that Ontario Hydro should submit a report on the steps it is taking to meet those objectives. The report that Ontario Hydro submitted to the Minister of Energy was entitled "Plan for Electricity Conservation and Efficiency Measures".

III. Parallel Generation

In July 1989 the Minister announced in the Legislature the release of the Government's "Policy Paper on Parallel Generation." The policy was developed in consultation with Ontario Hydro, and interested industry groups represented by the Non-Utility Generation Advisory Council (NUGAC).

As part of the policy formulation exercise, the Ministry of Energy studied the market potential for parallel generation, including water power, cogeneration, and energy-from-waste. This study suggested that there was potential for over 4,000 megawatts of new parallel generation, exclusive of combined cycle facilities. Combined cycle facilities were not included in the analysis because their economic attractiveness is dependent solely on natural gas prices and electricity purchase rates. This is in contrast to cogeneration, which requires a purchaser of the heat energy produced, usually steam, to be economically attractive.

The major elements of the policy are as follows:

1. The government will reduce barriers to the development of economically and environmentally sound parallel generation, while protecting the interests on Ontario ratepayers.
2. A public review of Ontario Hydro's method for calculating its avoided cost will be undertaken.
3. Purchase rates should fully reflect the value of power to the electricity system.
4. Ontario Hydro should make purchase rates available on the same basis to all parallel generators, regardless of energy source or technology.
5. The government recommends that Ontario Hydro develop a solicitation process designed to achieve 1000 megawatts of new parallel generation capacity by 1995, with flexibility to achieve an additional 1000 megawatts by the year 2000, if required.

Ministry of Energy Activities

The Ministry of Energy maintains a close liaison with Ontario Hydro, as well as other groups, to assist the Minister in apprising the Legislature on Ontario Hydro related issues, and in advising the Government on electricity related matters.

The Ministry has a responsibility to deal with the total energy picture. The Ministry monitors developments associated with the supply and more efficient use of all energy forms. Staff maintain an up-to-date awareness of energy technology developments around the world, and provide advice to the Government and the private sector on these developments.

The Ministry has developed a number of programs to assist in developing energy related technologies, and resources, and in carrying out Government Policy. The Ministry programs also provide a focal point for discussions and liaison with energy users in the province.

The Energy Efficiency Act provides the Government with enabling authority to make regulations, and to provide penalties for noncompliance. The Act prohibits the sale or lease of certain appliances or products not meeting prescribed efficiency standards, set out in regulations. Ministry staff work with manufacturers, energy users, utilities and other levels of Government to develop appropriate standards.

MINISTRY OF THE ENVIRONMENT



Ministry
of the
Environment

Ministère
de
l'Environnement

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June 11, 1990

MEMORANDUM

TO: Dave Smith
Senior Environmental Planner
Environmental Assessment Branch

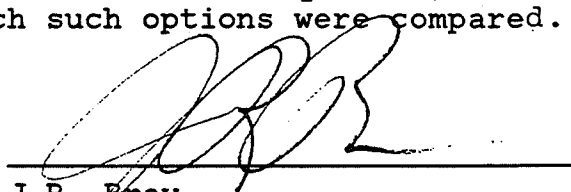
FROM: J.R. Bray
Director

RE: ONTARIO HYDRO DEMAND/SUPPLY PLAN EA

I attach the final version of the Ministry of the Environment's technical review of the above EA submitted by Ontario Hydro. Ministry staff from the Water Resources Branch, Air Resources Branch, A.P.I.O.S. Office, Waste Management Branch, Approvals Branch, Hazardous Contaminants Branch, Intergovernmental Relations Office, Policy and Planning Branch and Northeast Region were involved in the Ministry review.

Based on a review of the EA documents "Plan Report" and "Environmental Analysis", we have identified a number of outstanding concerns, as outlined in the attached set of comments. Some of these concerns relate to fundamental issues such as the formulation and comparison of alternatives, the treatment of environmental effects, the assessment of demand management, and sustainable development. Other concerns relate to the treatment of hydraulic generation and other "Common Elements", evaluation of economic and social environment factors, aquatic effluents, air emissions, etc.

Significant omissions and gaps in the EA documents have been identified. The general conclusion of this review is that the EA concentrates on describing the general technical aspects of the proposals and does not adequately describe their environmental/social and economic consequences, nor the assumptions or methods by which such options were compared.


J.R. Bray

DJB/mss

Enclosure

MINISTRY OF THE ENVIRONMENT
TECHNICAL REVIEW COMMENTS
ONTARIO HYDRO: DEMAND/SUPPLY PLAN E.A.

OVERVIEW AND CONCLUSION

The Ministry's comments are based on a review of the EA documents "Plan Report" and "Environmental Analysis" submitted by Ontario Hydro. (The "Plan Analysis" was not received in time to allow for more than a very cursory review). Although a list over of 50 "references" is appended to these two documents (some of them multi-volumed), time constraints have required us to focus on the EA volumes. In addition, the exact status accorded by Hydro to these additional documents, vis-a-vis the EA submission, is unclear.

A number of outstanding concerns are identified including, but not limited to: the treatment of environmental effects; the formulation and comparison of alternatives; the assessment of demand management; evaluation of the social and economic environment; hydraulic generation; transmission facilities, aquatic effluents; air emissions; permanent disposal of radioactive waste; opportunities for plan revision.

The general conclusion of this review is that the EA concentrates on describing the general technical aspects of the proposals and does not adequately describe their environmental/social and economic consequences, nor the assumptions or methods by which such options were compared.

TREATMENT OF ENVIRONMENTAL EFFECTS

We are pleased to note that Hydro acknowledges that its environmental obligations, both within the EA and in its regular operations, go well beyond meeting emission controls and standards. For instance the EA documents make reference to Hydro's policy of environmental leadership, to sustainable development and the Brundtland report, to Hydro's self-imposed average annual radionuclide limit being 100 times more strict than Federal regulations (AECB Derived Emission Limits), and to the need for limiting carbon dioxide emissions for which there are no standards as yet.

In describing the environmental consequences of its Plan options, Ontario Hydro does not describe the present or future effects of its emissions to the atmosphere or water, or those of its solid wastes. Instead, it estimates the quantities of emissions and wastes, and states (Env. Analysis p. A-1) that the environmental effects will be largely proportional to the quantity of the emissions and wastes (which will be handled by adherence to Regulations). Environmental assessment requires more information than simply showing the likelihood of compliance with regulated limits. An evaluation of existing impacts would provide an initial bench mark against which the incremental effects can be measured. A quantitative assessment of the environmental and health effects of the present generating system and future incremental emissions from Hydro facilities should be provided. The discussion should include the contribution by other sources.

Risk Assessment

Risk assessment is a way of analyzing significantly uncertain effects, including environmental effects. In the EA, reference is made to persons who "perceive they are exposed to risks...". However, no quantitative assessment of the risks and environmental effects of the various electricity generation options - present and planned - as well as for the selected Plans, is provided.

Air emission estimates given appear to be based on stable operation of each plant. Only limited assessment has been noted on the potential for: emergency releases, problems during start-ups and shutdowns; bypasses of control equipment; atypical operations generally. The risk associated with such emergencies is also capable of analysis, which would be valuable. A full evaluation would require a description of the consequences to the environment of such emissions.

Both treatment of trace contaminants (from fossil fuel) and radioactive emissions (from nuclear) into the air would benefit by comparison through the application of quantitative risk assessment techniques.¹

¹These techniques are particularly suitable for screening generating sites. For this purpose, both expected doses to the surrounding population and population size data are required.

PLAN OPTIONS/ALTERNATIVES

The EA states that the five major supply plans were selected from dozens of plans. The manner in which the supply plans were formulated, and how they were evaluated to reduce the number to five alternatives, is not described adequately in the EA. Further, the brief description of the evaluation process used by Ontario Hydro to compare the five alternative supply plans in the EA does not identify the relative importance of the various criteria, and the report does not indicate that any weighting procedure has been used. The assumptions and methods by which the alternatives were generated and the preferred option was chosen, including the trade-offs between the various factors - environmental, human health, technical, economic and social - should be provided in the EA.

The rationale for the inclusion of certain "Common Elements" as a constant input in each of the five major supply plans has not been explained in the EA. For the most part they have not been approved or implemented, and it is not clear whether different mixes of these "Elements" were considered. The environmental and economic trade-offs between the elements themselves, as well as between variations of the elements and other utility generation, should have been assessed.

DEMAND MANAGEMENT

As is noted in the EA, the Bruntland Commission concludes that "choosing an energy strategy inevitably means choosing an environmental strategy". It is also recognized that "less energy means fewer problems; low energy futures are more beneficial than high energy futures" (Env. Analysis: 3-3). Given the recognized relationship between energy consumption and environmental effects, the following comments are offered:

One of the fundamental questions raised by Hydro's EA is how much energy Ontario will need in the next 25 years. Hydro's estimate for electricity is an increase of 50% in generating capacity; whether this estimate is correct is certainly of great importance. Consonant with its mandate for environmental protection, the MOE is therefore naturally interested in any measures, whether of conservation or demand management, which will reduce electrical demand.

Demand forecasting, as outlined by Hydro in the EA documents, seems to indicate a basic assumption that the economic and social well-being of Ontario has a close relationship with increased electricity supply. The Ontario Roundtable on the Environment and the Economy, the Bruntland Commission and the Toronto Conference on the Changing Atmosphere, all seem to believe the electricity/development relationship is not fixed.

Hydro points out that its demand forecasts are within the range of forecasts done by other organizations, some of which predict higher demand. Further, it states that the "three key determinants" of demand growth considered are economic activity, electricity prices, and the prices of competing energy forms. The importance of these three factors in modelling demand growth is accepted. However, the social and regulatory factors that critically shape the desires and practices of customers should not be excluded from the analysis. As the EA says, forecasting demand "is essentially about people's lifestyles, values, and activities in society". Key elements include "the impacts of government policy and Hydro activities which could alter the energy choices that customers make" (Plan Report: 3-1). It is not apparent from the documentation that adequate sensitivity analysis was performed to explore the effects on demand due to such factors.

The calculation of the costs of supply options, and consequently of the avoided costs which could be applied to demand management, are also questionable. Hydro explicitly excludes "social and environmental costs and benefits external to Hydro. This reflects normal business practice. In Hydro's judgement, including additional costs and benefits would be impracticable" (Plan Report: 6-14). By not incorporating external costs in its comparative cost methodology, Ontario Hydro has understated the level of avoided costs. This means that a higher level of conservation and demand management could be possible while still providing positive economic benefits to the province, quite apart from other considerations. The EA should provide estimates of the range of costs external to Hydro, and information as to the sensitivity of the proposed options to such costs.

The alternatives of greater attention being given to conservation and improved electrical efficiency have not been sufficiently documented in the EA. Ontario Hydro acknowledges that demand management is difficult to incorporate, due to its great potential for variability. However, energy demand management, and the more efficient use of present energy supplies, provides the best hope of reducing adverse impacts on the natural and social environment. Even greater attention should be devoted to decreasing demand, making greater use of more electrically

efficient products, and conservation strategies. For example, what if \$1.3 billion, the cost of the Manitoba purchase, were instead invested in providing electrical users with energy efficient and energy saving equipment? What would be the environmental benefits and avoided capacity costs?

While discussing potential reductions in future demand, the EA is weak in the area of considering the reduction of current demands through the same methods. The Plan Report states that Hydro has no programs with the objective of building load (Plan Report: 7-12), but also states, in apparent contradiction, that some of their services may result in some load building. Programs which may result in some load building should be discussed, and an estimate of their existing and potential impact on load provided.

Rate design is an important component of demand management. Flat rates or declining block rates appear to offer little or no incentive for conservation or reduced usage, and to encourage consumption. Hydro should fully assess the environmental and economic consequences of alternative rate designs for all customer classes to estimate the maximum energy conservation potential of rate design.

The adoption of time-of-use (TOU) rates and direct load control should not entirely depend on cost-effectiveness as perceived by the municipalities acting as local distributors, but should also take into account the environmental effects of facility expansion associated with load growth.

Energy efficiency improvement (EEI) audits proposed for 1990 to 1995 would be useful in making future plans to reduce electrical energy demand.

While on one hand the EA states that natural gas is used more efficiently in space heating than in electricity generation (Environmental Analysis: 5-4), it does not describe and analyze opportunities to encourage converting electricity-based end uses to other forms of energy to reduce electrical demands (e.g. encouraging conversion to natural gas appliances and furnaces, solar water heaters, solar-powered appliances, etc.). In addition, the potential impact of alternative fuels, such as hydrogen, on electrical demand should have been analyzed and included in the report.

The demand management program impacts stated in the Plan Report point to very specific conclusions, which can be misleading. For example, stating that time of use, seasonal and interruptible rates for industry "may also result in changes to working hours" or "increased use of night shift and weekend operations would affect employees"

personal and family life", are not the only possible conclusions. It is not clear that Ontario's "lifestyle" would be adversely affected by aggressive demand management, and evidence should be provided to show that the cost of electrical power was the sole deciding factor in making claimed lifestyle changes.

In addition, there are cautionary notes in the Environmental Analysis of the potential environmental side-effects from production and use of more energy-efficient systems and materials, and the disposal of less efficient equipment. It should be noted that such side effects would have to be weighed against the environmental impacts of producing and using existing, less efficient, energy systems and materials.

To sum up, it is not apparent that the possibilities of demand management, conservation and electrical efficiency have been explored to their full potential.

SUSTAINABLE DEVELOPMENT

The EA makes reference to the Bruntland Commission and the principle of sustainable development. It states that "Ontario Hydro will develop and manage its activities and facilities in such a way as to sustain the environmental base" (Environmental Analysis: 3-2). It also states, "From a sustainable development viewpoint, long-term use of scarce, non-renewable resources is not encouraged" (Environmental Analysis: 5-4). The Ministry of the Environment supports the principle of sustainable development, while recognizing that its specific implications for public policy and regulations are still under examination by the Ontario Roundtable on Environment and Economy, and in various other forums.

As noted above, the EA takes as a basic premise the assumption that electrical demand will continue to grow. Demand management is assumed to be a mitigating measure to reduce the rate of growth. Hydro should be prepared to explain the relationship between this view of the future and that of the sustainable environmental base.

An assessment of the steps which would be necessary by Ontario Hydro to achieve Hydro's own low growth forecast, as well as an examination of a zero growth scenario, do not appear in the EA. In providing this, Hydro should include an analysis of the opportunities and constraints that currently exist for achieving these goals, and their implications for the environment.

By way of observation, it is significant that Sweden, with a population, climate and industrial structure roughly comparable to Ontario's, has decided to phase out its

nuclear component and stop all major hydraulic site development, and is considering a freeze on CO₂ emissions from fossil-fuelled plants.¹ This would imply that a substantial reduction in electrical supply from current levels is considered possible. Ontario Hydro has concluded, on the other hand, that an increase of about 50% is required in electrical generating capacity. A detailed comparison of Sweden and Ontario has not been made by us, and there are certainly underlying differences, but the fact that a reduction in supply is being considered in Sweden does raise the question of its potential in Ontario.

HYDRAULIC GENERATION

The information provided on the environmental effects of this element of the Plan is of only a generic nature. The effects of hydraulic generation are a function of the specific project and, in fact, the Hydraulic Generation Plan in the EA is quite specific in terms of plant locations and capacities. It is not, as with the thermal generating sites, just a list of representative sites set out as a means of satisfying the proponent on general siting principles. In order to establish the rationale for this part of the EA, more specific information would be needed on the environmental effects of each project; generic information would not be sufficient.

The cumulative impact of the proposed hydraulic generation in the Moose River Basin is potentially substantial. The EA makes reference to a 30-year development plan for the remaining potential in the Moose River Basin. An assessment of the entire basin as a whole would also be necessary prior to Hydro's developing individual EAs for specific sites. Unfortunately, there is very little baseline data for these northern rivers, which will increase the difficulty of such a basin-wide assessment.

The EA should clearly state that there are numerous unavoidable environmental impacts associated with the development of hydraulic sites. The social impacts of hydraulic facilities are significant for surrounding residents. Since the rivers amenable to such development have already been determined, it would have been appropriate to outline also a range of potential social impacts in the EA.

¹The Challenge of Choices: Technology Options for the Swedish Electricity Sector, Bodlund, Mills, Karlsson and Johansson, University of Lund, 1989.

The effects of hydraulic generation identified in the EA should be expanded to include impacts of the operation of hydraulic stations, such as effects of fluctuating water levels, effects of peaking downstream flows, effects of water quality in reservoirs (oxygen levels, stratification, etc.), and effects of fish passage through spillways and turbines, as well as the effects of associated transmission requirements. The effects of increased methyl mercury contamination due to flooding at hydraulic sites is mentioned but not discussed in sufficient detail. Appropriate mitigative measures should be identified. Use of "reservoir preparation plans" is identified as a major mitigative tool. It is not clear what these "plans" would consist of. The EA also does not document how Hydro would address changes to the hydrologic regime in a river basin, flooding impacts on shore-bank erosion, sustainable minimum flows at downstream locations to ensure the integrity of background water quality conditions, etc.

With respect to flooding, construction and northern transmission lines, will Hydro reforest an equivalent area? Reforestation has a relationship with Hydro's CO₂ production as well.

It is important to obtain a perspective on how Hydro's hydraulic schemes fit within the context of watersheds that are already regulated with substantial existing generating facilities. Although discussed on page 4-3 of the Plan Report, Figure 4-1 does not present the total Provincial scale of major hydro-electric stations. For example, it would be appropriate to add those existing on the watersheds of the Spanish River, Moose River, and north shore of Lake Superior.

The average capacity factors for most of the hydraulic generation facilities listed in Figure 4-20 of the Plan Report are very low and highly variable (19 to 85%). Hydro should explore the possibilities of optimizing electrical output, analyzing system benefits and environmental effects on air and water. The report should explain why the capacity factors are so variable or how these 21 stations are operated. For example, this issue is being evaluated as part of the Spanish River Water Management Study being undertaken by INCO and E.B. Eddy. Substantial improvements in average capacity can be gained by the use of real-time forecasting with models such as SAR and HYMO in favour of dated rule-curves.

To sum up, it is considered that the documentation for the hydraulic generation identified in the EA is not adequate at this time.

NON-UTILITY GENERATION (NUG)

At the outset, a difficulty arises because although NUGs are included and discussed as an integral part of the plan in the EA, and Hydro has a major role in the development of NUGs, yet approval is not being requested for this component of the plan.

Estimates of the potential contribution of NUG appear to be based on technical and economic feasibility, with limited attention to potential environmental limitations or constraints. Further, the advantages and disadvantages of NUGs have not been thoroughly examined and assessed in terms of the social environment, especially when long-term costs and impacts are considered.

From an acid gas perspective, NUG may be more advantageous than conventional steam cycle generation, provided that appropriate emission controls are installed. However the main intent of the Countdown Acid Rain regulations was to place a cap on total annual emissions, and the environmental need to do so remains.

Both Ontario Hydro and the Ministry of Energy have been encouraging the development of small-scale hydro facilities by independent proponents. The Ministry of the Environment's experience with such facilities in Northern Ontario indicates that there is a paucity of information on the environmental impacts of such facilities on small river systems. This is a major concern where several generating sites may be designated on one river. The cumulative impacts of temperature, oxygen super-saturation, habitat losses, increased mercury concentrations and siltation, have not been clearly defined. Substantial research is still necessary to address these potential impacts.

In Section 4.2.3 of the Environmental Analysis, it is suggested that many of the projects will take place at existing control structures and redevelopment of these sites is not expected to have adverse environmental effects other than some short-term localized effects on flows and sedimentation patterns. This assumption is based on the premise that the existing environmental conditions at these sites are acceptable when in fact they may not be. Impoundment of water has numerous, well-documented adverse effects on the aquatic environment. Constructing a generating facility on an "unused" impoundment may result in the perpetuation of an unacceptable environmental condition.

It should be noted that similar assumptions have been made with regard to locating thermal facilities at existing sites. If the existing air quality surrounding these sites is not taken into account, it may also result in the worsening of unacceptable environmental conditions.

The last two paragraphs in section 4.2.3 understate the long-term impacts. It is first stated that the dams can disrupt spawning and migratory patterns and other uses such as canoeing. Then it is stated that careful construction planning should minimize long-term impacts -- such as blasting during non-spawning periods. It should be pointed out that there are numerous long-term, unavoidable impacts such as permanent disruption of spawning migrations and other migrations by fish, changes in downstream water quality (temperature, turbidity, nutrients, oxygen), and accumulation of sediments behind the impoundment that may require expensive dredging and disposal.

MANITOBA PURCHASE

The EA assumes that a firm purchase of 1,000 MW of electricity from Manitoba will be in place by the year 2000, and it is included in all major supply plans. The rationale for this purchase and associated transmission facilities, through an analysis and comparison of alternatives in terms of their environmental and economic effects, is not demonstrated.

Since it appears likely that the Federal EARP process may be applied to the generating facilities, what alternatives will Hydro consider in the event of a delay or rejection, and what would be their environmental implications?

TRANSMISSION FACILITIES

The environmental effects associated with the development, construction and maintenance of very extensive transmission corridors (1,100 kms of new transmission corridor associated with the Manitoba purchase, and presumably hundreds of kms of other new transmission corridors) are described only in generic terms. The consideration of specific environmental effects is left to future project EAs. Approval for inter-area transmission is not being applied for: e.g. about 600 km would be required for links from Sault Ste. Marie to Toronto. Yet from the point of view of environmental effects, the distinction between radial and inter-area transmission means little, and there therefore seems no reason why they should not be considered at this time.

Since the general outline of the transmission network is known, and in many cases there is probably a very good idea of their location, a more specific description and evaluation of the environmental effects of the transmission options should have been provided, taking into account the difference between environmental effects in northern and southern Ontario, to allow a more educated decision to be made.

ENVIRONMENTAL ECONOMICS AND SOCIAL FACTORS

The social environment is not adequately considered in that the selection of alternatives has not specifically incorporated the social environment in any systematic way, and the social environment has not been systematically considered. The social costs and benefits (impacts) on the province as a whole are not specifically examined, although consideration of the social environment is listed as one of the primary evaluative criteria in the EA.

Although the proponent considers that social considerations can be best incorporated and assessed at the site selection stage, at that point in the planning process the range of options available on which to conduct a social impact assessment is severely limited. What is needed is a detailed social impact assessment for the Province as a whole.

Social impact analyses should be conducted at the preliminary stage to assist in the selection of alternatives, and then in more detail at the site selection stage. A more comprehensive analysis of the social environment - in terms of impacts which cannot be mitigated, costs and benefits - may affect the range of alternatives to be considered. A more comprehensive and wider range of criteria is necessary in order to evaluate alternatives.

It should be possible for the proponent to identify and quantify the economic effects of adverse and beneficial environmental consequences of each alternative, the distribution of these effects, and the costs to mitigate adverse environmental effects. The document should show the analysis of environmental effects which at each stage of the selection process helped to "narrow" the alternative options down to the final preferred Plan, rather than deferring these analyses to the individual project level.

In terms of environmental economics, the following process is suggested to consider the economic aspects of the environment:

- (a) identify the potential impacts of the alternatives on the natural environment;
- (b) define the economic effects of such impacts;
- (c) define and estimate the costs of mitigation;
- (d) estimate monetary values of economic changes; and
- (e) aggregate these costs and benefits, to determine any net impact.

Criteria - General

It is not clear why criteria were not systematically weighed against each other. In order to understand the rationale and ultimate requirement of the preferred alternative, it is important that all alternatives at each stage of the process be evaluated against the criteria, so that trade-offs may be properly determined for external review.

The weighing of social environment criteria should be made explicit, in consultation with the public.

A detailed list of criteria, factors and indicators should have been presented at this stage in order for reviewers to assess the adequacy of subsequent analytical work.

All terms in the EA, e.g. socio-economics, social environment, cost, price, customer, ratepayer, should be defined.

Economic Criteria

Economic criteria used by Hydro are limited to low cost (the primary criterion), resource preferences, and economic impact involving employment, regional development and local community impact.

The scope of these criteria should be expanded as follows:

- (a) Employment: current employment levels, by type of facility and activity. Incremental employment opportunities by type of facility and project lifecycle should be estimated.

The lifecycle of a Plan and its individual components involve several phases: development, construction,

operation/maintenance, closure, post-closure, site remediation or perpetual care. The EA tends to focus on general employment opportunities associated with construction, and this may overestimate true employment and hence economic benefits.

Some alternatives may be more capital intensive in terms of construction costs, but the level of effort involved in operating and maintaining such facilities must be evaluated.

- (b) Impact on the Natural Environment: for each alternative, and for each stage of facility and infrastructure lifecycle, the potential impacts on the natural environment should be identified.

The monetary values associated with the consequences of such environmental impacts should have been identified. For example, groundwater contamination may result in the importation of water to the community or the construction of a new water supply system. Particulate emissions may damage the marketability of local crops and livestock. The potential for health impacts from exposure to emissions or discharges may involve activities such as a continuous health monitoring program.

Mitigation measures would have to be identified and quantified. Will Hydro establish a financial assurance fund? What about biophysical and socio-economic monitoring programs?

- (c) With regard to regional development, economic and income multiplier effects should be considered, as well as the potential for industrial spin-off. They should be related to regional economic bases and to Gross Domestic Product, and areas identified where potential benefits are likely to accrue. What timeframe is likely to be involved?
- (d) Avoided cost: Hydro defines avoided cost as the trade-off between options and the components of plans. An environmental perspective, in terms of opportunity costs, is required in order to evaluate alternatives.
- (e) Cost calculations: Hydro states that it has a calculated cost of 0.04 cents/KWh to cover "social and environmental costs" which is added to the price paid on exported electricity. Can this not be calculated for the alternatives under consideration?

Other economic factors to be considered are as follows:

- i) The economic benefits to the environmental protection industry. What is the estimated level of expenditure by Hydro to meet current and future environmental standards?
- ii) The effect on Hydro's rate base, and price paid by the ultimate users of electricity.
- iii) The costs of waste disposal.

It is not clear whether the costs outlined in Figure 15-46 of The Plan Report are a representation of total costs, i.e. do they include waste disposal for both nuclear and fossil components and de-commissioning at the end of a facility's service life?

Social Criteria

Hydro has stated that: "'community' is broadly defined to include the local or regional area potentially affected by generation and transmission projects, as well as the population of the province", (Env. Analysis, p. 3-4). However, little data, either qualitative or quantitative, are supplied or referenced.

The preference for a low-cost economic source of electric power as the primary evaluation criterion appears to be a concern, considering that attitudinal data are available that confirm that consumers are willing to pay more for "environmentally friendly" services and products, and are modifying their behaviour accordingly.

Social costs or negative impacts of the alternatives have not been included. Aspects of social criteria that should be considered include:

- a) long term socio-economic impacts of nuclear fuel production, waste storage and disposal. The relevance of recent reports suggesting a more limited lifespan of nuclear generators should also be assessed.
- b) consumer patterns of the use of electricity. This has been given cursory mention. An analysis of the trade-offs individuals and businesses are willing to make with regard to electricity consumption, or have made in the past few years (e.g. interruptible power), should be included.

- c) impacts on individuals. Attention should be paid to the inclusion of individual social impacts such as: loss of enjoyment of property, lifestyle alterations, and concerns over health and safety.
- d) a definition of "local community".
- e) impacts on the Province as a whole.

As with the economic criteria, the social environment should be considered not only at the construction and operational phases, but also at monitoring, decommissioning or mothballing, and closure phases.

Hydro's mitigation and compensation strategies should be elaborated on.

In the summary tables provided in Chapter 14 of the Plan Report, socio-economic criteria are mentioned, yet the impact on the social environment is lacking. Hydro states that "social acceptance will be considered from a provincial, regional and local community perspective", but supporting data are not provided.

Similarly, conclusions are stated, without supporting rationale; for example, "conservation, through the substitution of high-efficiency equipment, will have little or no impact on the lifestyles of Ontarians". Another possible conclusion could be that the use of high efficiency equipment serves to reinforce energy conservation.

There is an absence of a logical social analysis, whether qualitative or quantitative, at the alternatives stage. In addition, while a great deal of information is presented in the DSP report, it is not always possible to follow the logic or match technical information to environmental and economic considerations. The analysis should be clearly documented and factual data supplied, whether quantitative, descriptive or qualitative. For example, the public opinion poll commissioned by Hydro may have included some statements regarding public preferences; however, since the details of this poll are not provided, it is difficult to determine what the preferences of the public are and in turn, what the impacts of these preferences will be.

In summary, Hydro should undertake a detailed social and economic impact analysis, at the provincial scale, on the component elements of the alternatives and on the complete alternative plans.

SOLID WASTE (non-nuclear)

The solid waste impact associated with the five major supply plans, excluding nuclear wastes, varies with the dependence on coal-fired stations. Coal ash and Flue Gas Desulphurization (FGD) wastes quantities projected to the year 2014 with 50% probability range from 17.3 Tg, (case 23), to 52.4 Tg, (case 26) with a preferred case value of 30.3 Tg.

Generally, the EA appears to cover the non-nuclear solid waste issue at an appropriate level of detail and investigates an appropriate range of alternatives. It notes that "high waste production in all cases reflects the continued system reliance on existing generating sources..." as well as "the addition of Flue Gas Desulphurization and increased use of low-sulphur coal..." (Environmental Analysis: 5-13). In all cases, Hydro has stated an expanded commitment to solid waste reduction, which is in line with the MOE target of 50% by the year 2000 (e.g. Environmental Analysis: 6-14).

AQUATIC EFFLUENTS

The Municipal Industrial Strategy for Abatement (MISA) Effluent Monitoring Regulations for the Electric Power Generation Sector came into effect on December 27, 1989, with twelve months of effluent monitoring commencing June 1, 1990. Following this effluent monitoring period and based on assessment of the data base generated and other relevant information, a sectoral effluent limits regulation is planned to be promulgated in 1992. The effluent limits regulation will be based on the application of Best Available Technology Economically Achievable (BATEA) and Best Management Practices (BMP).

It would be more appropriate for the last sentence under the Aquatic Effluents Section (Environmental Analysis: 3-4) to read: "Minimization by reducing, reusing and recycling of effluents will be a primary consideration in assessing the acceptability of future generation facilities. Discharge of untreated waste-water streams into once-through cooling water will be discontinued. In case of add-on retro-fit systems on existing sites, an integrated waste water discharges plan for the site will be assessed with the objective of reusing, reducing and recycling these discharges."

It is not clear how the factors in Table 5-2, Table 5-4 and Table 5-5 of the Environmental Analysis were calculated and what assumptions were made. Also, under Aquatic Effluents, the fact that suspended solids and trace heavy metals and oil (particularly in case of oil-fired stations) can be released from coal piles, oil

storage tanks/transformers, ash transport and storage systems, oily water separation systems and water treatment plant neutralization sumps, has not been referenced. Discharges from waste disposal areas for sulphite/sulphate wastes from Flue Gas Desulphurization (FGD) systems should also be considered.

In Table 5-7, under Aquatic Effluents, item 2 would be more appropriately worded as follows:

1. MISA Effluent Limits and BATEA regulation (not BACTEA as in CAP).
 - a) Virtual elimination of toxic discharges.
 - b) Best Management Practices (BMP) will play an important role; e.g. storm water management.
 - c) Zero discharge of PCB's (probably phased out)
 - d) 3 R's (reduce, reuse and recycle) of effluents increasingly applied.
 - e) Reuse boiler blowdown where economically feasible.
 - f) Mechanical cleaning of condenser tubes (like at Nuclear Generation Stations) preferred to chlorination.
 - g) Untreated effluents will not be discharged into condenser cooling water prior to proper treatment and monitoring to assess the treatment requirements.
 - h) Normally, all effluent monitoring at source prior to dilution in condenser cooling water or other effluent.

The potential considerations listed for candidate sites in Table 5-6 are not always the key concerns identified in Hydro reports or at Hydro sponsored workshops attended by representatives of regulatory agencies. For example, a recent report prepared by Ontario Hydro for the Nanticoke Environmental Committee recommended that levels of trace organics and heavy metals in water and major components of the food chain be investigated.¹ This is not listed in

¹Haynes, G.T. and T.G. Dunstall, 1989. The influence of industrialization on the aquatic environment of Long Point Bay, Lake Erie, in the vicinity of Nanticoke 1968 to 1983. Ontario Hydro Research Division.

Table 5-6. Nor are the effects of the intake cap and diffuser at Darlington on fish populations, both of which were concerns of the participants at Darlington workshops.

On page 3-4 of the Environmental Analysis it is assumed that cooling water flow rates reflect the potential for entrainment/impingement of fish and other aquatic organisms. Later, on page 6-9, it is stated there is little variation in cooling water flows. This would lead one to conclude that entrainment/impingement would differ little among the major options. However, this is unlikely to be the case. It is more likely to be true that, at a given site, entrainment/impingement will be proportional to flow, independent of whether a nuclear or coal-fired station is constructed at that site. However, it is unlikely that Ontario Hydro is considering a coal-fired or nuclear station as a viable option at every site. Site-specific characteristics are important in determining the level of entrainment/impingement. Ontario Hydro has been unable to establish a relationship between flow rate and impingement at existing stations. Wismer (1989)² found that station flow rates had no power for predicting impingement at existing stations and that the structure of fish impingement data variability was complex and unique to each station. This means that entrainment/impingement rates cannot be forecast in general terms, but depend on the specific characteristics of each site.

Although it is not stated that the thermal effects among major cases are unlikely to differ, based on little variation in cooling water flows among the major cases, this may be concluded by some, since the thermal discharge index was selected as one of the "quantitative measures of environmental effects for comparison purposes". Like entrainment/impingement, thermal effects are a site-specific consideration. The impact of a unit of heat discharged will vary with mixing conditions and local biota, etc.

The thermal index does not distinguish between peak load and base load operations. The major cases differ mainly in the mix of nuclear and coal-fired production. Both types of station can be expected to produce aquatic effects due to the intake of water and the discharge of heat as noted in Appendix C (Env. Analysis). However,

²Wismer, D.A. (1989 MSS). An approach for performance evaluation of intake fish impingement protection systems using multiple linear regression. Environmental Studies and Assessments Department, Ontario Hydro.

nuclear stations usually operate continuously, and coal-fired stations intermittently. The potential for thermal effects such as cold shock on fish and fish residency in the discharge is likely to differ between the two types of stations. This difference should be recognized and discussed relative to the choice of supply options.

The aquatic environmental effects and mitigation measures listed in Appendix C have been largely restricted to fisheries considerations and these have been presented only in general terms. Under Water Use, potential effects for fossil fuelled and nuclear stations are identified only as intake/discharge effects. Included in this heading would be entrainment/impingement, effects on fish spawning and hatch advancement, effects on timing of algal growth and macrophyte production. Macrophyte production has been a major problem near a coal-fired power plant in Lake Wabumun, Alberta, for example, and is potentially a problem in Ontario at Atikokan. That such effects can occur and cause major problems should be recognized at the outset before site selection occurs.

It is noted that the addition of cooling water to a thermal generating station discharge channel, or "tempering", is listed as a potential mitigation measure for water use. However, the environmental "benefits" of tempering are questionable given the experience at Nanticoke where it has been estimated that fish passage through tempering pumps accounts for 90% of fish loss.

Mitigation measures should include operational changes such as derating stations at times of peak abundance of major fish species impinged and during spawning periods of important fish species, as appropriate.

The potential impacts of heavy metal and trace organics emissions on aquatic communities have not been discussed. The importance of such emissions has been recognized in Ontario Hydro reports and at Hydro sponsored workshops.

In Table C-1 under Potential Mitigation for Water Emissions, appropriate additions would be:

- All yard drains and floor drains/sumps shall be separated, collected, monitored prior to discharge.
- Flue gas desulphurization (FGD) discharges shall be collected/treated prior to discharge/reuse/recycle.

Similarly, in Table C-3 under Potential Mitigation for Water Emissions, appropriate additions would be:

- All yard drains and floor drains/sumps shall be separated, collected, monitored prior to discharge.
- Radioactive Liquid Waste Management System Tanks discharges shall be monitored prior to discharge.

With regard to water use, the reuse and recycling of water should be considered whenever feasible in case of add on or retro-fit expansion of facilities at existing power generation stations or the reactivation of mothballed stations.

The potential impact of zebra mussels on the operation of nuclear and fossil fuelled plants on the Great Lakes should be considered, especially with a view to the effects of biocide treatments such as chlorine, which applied to condenser cooling water could have a devastating effect on populations of fish larvae, plankton and other organisms in the receiving aquatic environment.

AIR EMISSIONS

NO_x Control

The combined NO_x emissions from NUGs are substantial (11,000 tonnes/yr), and the report indicates use of steam injection for NO_x control. This may not be totally acceptable. NO_x control technology selected should depend on the size of the unit and its capacity factors. Annual NO_x emissions of some plants are over 40 kt including the preferred Plan #15 (for short periods) for median and upper load forecast. Therefore, the corporation will not be able to comply with the current acid gas regulation (Regulation 281/87) if a separate NO limit is established in future (it is combined with SO₂ at the moment), unless further NO_x controls are implemented. (Env. Analysis 5.38, Fig. 5-18).

Option 4 (Plan Report: Figure 14-16) with oil-fuel should not be considered for intermediate or base load purpose unless fitted with proper NO_x controls (DSP 14.22, Fig. 14-16).

Option 7 (Plan Report: Figure 14-17) with gas fuelled combined cycle should not be considered for intermediate load without NO_x controls (e.g. SCR - Selective catalytic reduction) (DSP 14.23, Fig. 14-17).

Option 8 (Plan Report: Figure 14-18) on phase IGCC should include SCR for NO_x control when using coal based gas as fuel (DSP 14.24, Fig. 14-18).

Fluidized Bed and SO₂ Control

Option 10 (Plan Report: Figure 14-18) on coal fuelled AFBC with limestone injection may not be able to achieve high SO₂ removal similar to scrubbers.

Calculation of Emissions Per KWH

It is not clear for the five cases under consideration whether air emissions of acid gases are distributed over the total energy generation or are attributed to fossil energy generation (Environmental Analysis: Figure 5-13).

CO₂ Emissions

The issue of CO₂ is mentioned, but the Clean Air Program (CAP) has not received adequate attention. Current thinking is that Hydro's SO₂ and NO_x levels would continue to be covered by the Countdown Regulation (281/87), but that other air pollutants would be covered by CAP. This might affect the cost and relative weighting of the fossil options. While CO₂ removal processes that Hydro considers to be "cost-effective" and "practical" may not be commercially available, Hydro should provide a range of estimated costs and outline how far research is progressing in this area. Hydro should state whether it has made allowances for future controls which may require such processes regardless of cost (Plan Report: 15-45).

The 20% reduction in current CO₂ levels proposed at the 1988 Conference on the Changing Atmosphere, in Toronto, is also possible to achieve in plan 15 from the year 2005. Other plan options, viz #24 and 26 which largely depend on fossil fuel, will not be able to reduce Ontario Hydro's CO₂ emissions.

It may also be pertinent for Ontario Hydro to suggest an absorption process for CO₂ emissions. It can be calculated that for every MW of fossil-fuelled generating capacity a specific area of new growth forest can absorb the CO₂ emission. This balancing of environmental pluses

and minuses falls within the concepts of sustainable development.

CAP and Fossil Pollutants

Ninety-eight percent removal of particulates from fossil-fired units may not be satisfactory if one or more of the remaining pollutants is covered under CAP criteria Class (Plan Report: 14-19).

Air Emissions From Fossil And Nuclear Plants

Emission estimates for trace organic compounds are not included in the air emission estimates in the EA. Further, the list of trace toxic emissions and emission factors in Appendix A, Table A-2 should include additional organic and inorganic contaminants.

While CO₂, NO_x, SO₂ and particulate emissions associated with CSC are addressed (Environmental Analysis: 5-1) heavy metal emissions (particularly mercury) associated with coal combustion are not addressed. A review of mercury sources by the National Research Council in 1979 indicated that coal combustion could be a significant source of mercury, while recent MOE work at Dorset has indicated that mercury input from the atmosphere can be a major part of the mercury budget of a lake.

The documents refer to BACT-EA (Best Available Control Technology - Economically Achievable) as an aim of the Clean Air Program. In fact, emissions from both Hydro and some NUG facilities may require LAER (Lowest Achievable Emission Rate) controls where significant levels of toxic air pollutants are emitted. These requirements may affect the nature of controls required at existing stations undergoing rehabilitation, and thus the cost of rehabilitation.

Existing Air Quality As A Siting Factor

In citing environmental "effects," the Plan refers to emission rates or loadings and makes no attempt to consider the ability of a region to accommodate those additions. Existing air quality information could have been used as an element in constraint mapping to avoid areas where air quality is close to capacity and cannot accommodate new major sources. This constraint would operate on top of the emission rate or loading minimization necessary to meet Ontario Regulation 281/87. This consideration might, for example, affect Hydro's intentions under the preferred option to rehabilitate or continue to develop existing sites in urbanized areas.

The analysis of potential compliance also appears to be made on the basis of emissions estimates only; existing air quality is not mentioned. There are alternatives to this approach: a "model plant" could be outlined in terms of minimum separation distances from receptors for each technology, and modelling used to predict impacts. These results could be combined with the results of constraint mapping of site areas to better assess candidate sites.

The CSC component of alternative Plans (Plan Report: 19-5) includes the North Channel area as an alternative site for a CSC plant. Although the specifics of siting plants are deferred under this EA, there are concerns about siting CSC plants. Because Hydro has a provincial 'cap' on SO₂ emissions, it retains flexibility on options for specific plants on SO₂ control strategies. The potential CSC plant on the North Channel could be proposed to operate without Flue-Gas Desulphurization (FGD) equipment (e.g. by using low-sulphur coal). However, the North Channel site is near an already heavily acidified area (Sudbury) and to an area ultrasensitive to further acidification (Algoma highlands). The possibility of even a small increase in sulphur deposition in this area is one that should be precluded if possible. The North Channel site would not be suitable for a CSC location from the point of view of SO₂ emissions.

Generally, more detailed environmental analysis and evaluation of effects is necessary, taking into account types of emissions, existing quality of air sheds, etc., in order to be satisfied that a plan based on them will result in environmentally acceptable decisions at the siting stage.

NUCLEAR GENERATION

(Note: other comments on nuclear generation appear on pages 2, 7, 14)

With regard to the nuclear fuel cycle, the EA does not evaluate in any quantitative way or describe the risks due to the mining and transportation of radioactive materials (uranium ore, fuel bundles, spent fuel bundles, tritium recovered from the heavy water and other radioactive materials), or those associated with the handling, storage and permanent disposal of nuclear waste.

Additional nuclear generation is recommended in the EA, although the disposal method or "concept" for high level radioactive wastes in Canada has not yet been approved. The EA states that public hearings as part of a Federal Environmental Assessment Review Panel process are expected to start in 1991, and that, if approved, site selection will start in the late 1990's. What is Hydro's policy to

be in the event that a decision is delayed past this date?

It is also noted that the Ontario Nuclear Safety Review recommends that Ontario Hydro do certain further severe accident analyses. It is to be hoped that these will be carried out before any decisions are made on nuclear generating station siting.

It is problematic that a large portion of the Hydro plan relies on nuclear power as a cheap source of power when the long term social costs of nuclear energy production (the full scope of the process from mining uranium, transport of fuel, to waste disposal) have yet to be determined, or incorporated in Hydro's plans. The full environmental costs of decommissioning and disposal may significantly affect the total costs associated with production of nuclear-generated electricity.

OPPORTUNITIES FOR PLAN REVISION

The EA acknowledges briefly that adjustments in the Plan "will be necessary from time-to-time" (Plan Report: 2-1). However, there are no provisions for updating or amending an approved Plan in the future. In addition, an explicit objective of the sought-after approval is to avoid having to reconsider planning issues determined by this application in subsequent project applications. Based on the accepted uncertainty inherent in a planning exercise such as this, a formal mechanism for reviewing and updating an approved Plan at regular (e.g. 5-year) intervals, and as necessary, should be developed and incorporated in the EA.

OTHER COMMENTS

Station Rehabilitation

The term station rehabilitation especially with regard to hydraulic stations needs to be clearly defined, and potential environmental implications assessed in the EA. For example, if rehabilitation includes only minor dam repairs, then the assessment of the environmental impacts in the report may be correct. However, if rehabilitation requires removal of an old dam and building of a new dam, especially one having a different sized reservoir, then the potential environmental impacts start to approach those associated with the construction of a new hydraulic generating station.

Viability of Reliance on Natural Gas

The discussion on the degree of reliance on natural gas as an energy source of fossil fuelled facilities is unclear. From an environmental perspective, burning natural gas is favoured above coal or oil. It is not clear why Ontario Hydro views the supply of natural gas, to 2014, as unreliable and potentially high cost.

Siting

The EA does not discuss the use of cooling towers or water pipe-lines as alternatives to siting thermal generation on the shores of lakes, or the environmental benefits/drawbacks of doing so. Passing mention is made of cooling-water heat, but potential sites do not appear to have been identified with this form of co-generation in mind.

Hydro's Reserve Capacity

Ontario Hydro reserve generation capacity is stated to be 24%, which appears to be considerably higher than most eastern Canadian and some U.S. utilities. The report also says that this is based on 25 min/yr interruptions. Hydro should explain what the effect on environmental quality would be of different percentages of reserve capacity.

Hydro should also state what percentage of new energy demand can be met by operating fossil fuelled generating stations at a higher capacity factor.

Exports

Ontario Hydro states that it does not have contracts for major firm sales to other utilities (Plan Report: 4-12). Are future contracts being sought, and if so, what is the potential associated capacity that would be dedicated for such a purpose, and what would be the effect on Ontario's environment if power were produced for export? In addition, the potential for artificially lower costs to Ontario users as a result of export sales to encourage electrical consumption, is not considered.

Miscellaneous

Table 5-5 (Environmental Analysis) contains an error: total wastes for Case 24 should read 81.4 Tg instead of 47.5 Tg.

MINISTRY OF HEALTH



Ontario

ENVIRONMENTAL ASSESSMENT BRANCH	
RECEIVED	
JUN 4 1990	
TO	<i>Dave</i>
FILE #	
PUBLIC RECORD	☐
FULL TEXT	☐

Ministry
of
Health

Ministère
de
la Santé

Fifth Floor
15 Overlea Boulevard
Toronto, Ontario
M4H 1A9

Telephone: (416) 963-2229
Facsimile: (416) 965-7323

June 4, 1990

MEMORANDUM TO: Dave Smith
Review Co-ordinator
Environmental Assessment Branch
Ministry of the Environment (440-3488)

FROM: Richard Schabas, M.D., M.H.Sc, F.R.C.P. (C)
Director, Public Health Branch and
Chief Medical Officer of Health

RE: Ontario Hydro's Demand/Supply Plan E.A. -
reviewer comments

In response to your memo of May 3, 1990, my branch is submitting the attached final untranslated comments on the above subject. The comments quote pieces of legislation for which this Ministry is responsible and which have been taken into consideration when preparing the comments.

We have also taken into consideration issues raised at the interministerial meetings at which the DSP has been discussed.

Should you need further public health-related input on this issue, the contact is:

Dr. Lesbia Smith
Senior Medical Consultant
Environmental Health (Toxicology)
Disease Control Service
Public Health Branch
5th Floor
15 Overlea Boulevard
Toronto, Ontario
M4H 1A9
Telephone: (416) 963-2238

Richard Schabas

JN/is

PUBLIC HEALTH BRANCH COMMENTS

RE: ONTARIO HYDRO DEMAND/SUPPLY PLAN (DSP)

Legislative Authority:

The Ministry of Health is responsible for advising the Government of Ontario with respect to the health of the people of Ontario. This authority is derived from the Ministry of Health Act. As well, the Ministry administers the Health Protection and Promotion Act, 1983, which aims at providing for the organization and delivery of public health programs and services and the promotion and protection of the health of the people of Ontario.

Comments from Public Health Branch:

The Public Health Branch would prefer an electricity-producing alternative that would result in minimal combustion products which pollute the air with sulphur, carbon and nitrogen compounds. These compounds and their by-products, such as ozone, are known to be related to adverse health effects in human populations. Since this EA is a plan for future development, it is still possible to address these health concerns and move in a future direction which recognizes the known public health reasons to further reduce outside air pollutants.

With regard to nuclear power generation, scientific information on health effects is evolving rapidly in a number of areas. Given the uncertainties of health effects based on current scientific data, this Ministry's comments in this area relate to the experience with the CANDU reactors. To date, this Ministry is not aware of any significant health threats to the Ontario population resulting from the reactors and we believe that adequate contingency planning is in place to safely deal with emergencies.

The ministry has assisted the Durham Regional Health Unit with monitoring a number of health factors in the population living near the nuclear generating stations. The variables being monitored are: birth rate, fertility rate, stillbirth rate, perinatal mortality rate, spontaneous abortions rate, selected congenital anomalies and selected cancers. The Atomic Energy Control Board conducted an exploratory study on childhood leukemia (age 0-4 years) born to mothers who resided in the vicinity of nuclear research facilities in Ontario. The study was expanded to the 5-14 year-age groups and this is near completion. Neither study has indicated significant health effects on the populations studied, although, of course, they cannot completely exclude this possibility.

The import of power from sources outside of Ontario by means of transmission lines does not appear to date to present hazards resulting in detrimental health effects.

The Environmental Analysis document does not adequately address our concerns regarding the existing adverse health effects as a result of air pollution. There are a variety of contributing factors in the air pollution/health effects equation. However, the overall major factor is the impact of combustion products from fossil fuels and the resultant rise in tropospheric ozone concentration. We believe more emphasis should be given to this aspect which may change the weight of the factors used to select the most appropriate plan.

The Environmental Analysis document does not indicate the agency's awareness of a need to set up a well defined process for reviewing issues related to public safety. An area such as health effects due to low level radiation exposure would benefit from development of a research process. The agency should also indicate its awareness of agencies with appropriate expertise which it could consult regarding health effects due to the proposed electricity generation alternatives. It is necessary to include an element of public education about health effects in the proposals.

June 4, 1990

MINISTRY OF HOUSING



Ministry
of
Housing

Ministère
du
Logement

Corporate
Policy &
Planning
Branch

10th Floor
777 Bay Street
Toronto, Ontario
M5G 2E5

May 22, 1990

David E. Smith
Review Supervisor
Environmental Assessment Branch
Ministry of the Environment
250 Davisville Avenue
Toronto, Ontario
M4S 1H2

Dear Mr. Smith,

**Re: ONTARIO HYDRO'S DEMAND/SUPPLY PLAN - ENVIRONMENTAL
ASSESSMENT: MINISTRY OF HOUSING PRELIMINARY
EVALUATION**

Staff of the Ministry of Housing have completed their review of Ontario Hydro's document package entitled "Providing the Balance of Power". The attached represents the Ministry's final comments.

As requested in your memo of May 3rd, we will be arranging for our comments to be translated into French to meet the June 8th deadline.

Yours sincerely,

Marcia Dorfman
Director

Attachment

cc: Glenn R. Thompson

**MINISTRY OF HOUSING'S EVALUATION OF
ONTARIO HYDRO'S DEMAND/SUPPLY PLAN:
ENVIRONMENTAL ASSESSMENT**

In some cases, the EA's data, analyses and conclusions could be more detailed. An example within the Ministry of Housing's purview is the EA's approach to energy conservation in buildings. The DSP favours "upgraded energy efficiency standards and building code amendments" as part of its demand management strategy. According to the EA volume, the environmental impact of this approach is that enhanced insulation levels can have negative effects on the quality of indoor air (i.e., a build-up of NOx, radon, formaldehyde, carbon monoxide etc.).

The EA document argues that the air quality problem can be mitigated, by upgrading ventilation systems (e.g. by installing air exchangers) and by restricting the use of harmful substances in new construction and renovations (the "harmful substances" at issue are not specified).

There may, however, be additional environmental costs attached to strengthening energy conservation measures in buildings. For example, there are the environmental costs of producing and running air exchangers, the environmental costs associated with products used in strengthening building envelope requirements (e.g. insulation, caulking, wider building stock), and the potential environmental costs of producing construction materials that are less noxious. The EA volume does not indicate whether an environmental cost/benefit analysis has been completed that would support strengthening energy conservation standards at this time.

Both the DSP and the EA document note that upgrading energy efficiency standards and amending the building code may affect the "type, cost, and pace of residential development." The environmental impacts of higher construction costs (in this case largely new housing) can be more far-reaching than the EA document allows. For example, higher costs and rising house prices in large urban areas forces new homebuyers to look farther afield for an affordable home, with the resultant development pressure on the rural landscape. On the positive side, higher building costs may induce builders/developers to reduce costs by building on smaller lots and by using compact urban housing forms (eg. semi-detached, townhouse) that are inherently more energy efficient as well as less damaging to the environment.

The EA volume's treatment of Socio-Economic effects is also often lacking in detail. For example, all the DSP's supply Cases are analyzed in terms of a project's effect on a given local economy.

However, very little is made of the ripple effect that such a project might have on other locations. A siting in one community will almost inevitably tend to have an impact on neighboring communities. For example, the siting of a generating station in a rural area may keep local residents from migrating to a neighboring major urban area in search of employment opportunities, or alternatively, may draw workers away from a major urban area.

A related matter is the EA's intention of limiting itself to the larger issue of supply plans, while reserving siting issues to future project-by-project EA's. This approach has the advantage of resolving the generic question of the relative merits of supply options/plans, so that later site-specific EA's will not have to revisit such questions.

However, the range of the possible environmental effects of a given supply plan and its mitigation will be very much dependent on the site ultimately chosen for the generating station. For example, the impact of siting a high employment nuclear station in a small community will be more pronounced than it would be for a low employment combustion turbine unit. Similarly, the air quality concerns that attach to combustion generation will likely be felt more keenly in a heavily populated area than they would in a sparsely populated one. The transmission requirements and their effects and mitigation would also vary depending on the type of generation chosen and where it is ultimately built.

**MINISTRY OF INDUSTRY,
TRADE AND TECHNOLOGY**

NOTE:

FROM DAVID E. SMITH
REVIEW COORDINATOR
ENVIRONMENTAL ASSESSMENT BRANCH

On May 16, 1990 the Ministry of Industry, Trade and Technology provided an addendum to its February 22, 1990 comments on the Ontario Hydro Demand/Supply Plan. The addendum states:

"We believe the only further point of clarification which should be requested from Ontario Hydro is a clarification of the Action Plan schedule and content in relationship to the use of the upper load forecast instead of the median load forecast."



Ministry of
Industry, Trade
and Technology

Ministère de
l'Industrie, du Commerce
et de la Technologie

Hearst Block
Queen's Park
Toronto, Ontario
M7A 2E1

Édifice Hearst
Queen's Park
Toronto (Ontario)
M7A 2E1

February 22, 1990

Mr. David E. Smith
Senior Environmental Planner
Ontario Ministry of the Environment
D.S.P. Unit
Environmental Assessment Branch
250 Davisville Avenue
5th Floor
Toronto, Ontario
M4S 1H2

ENVIRONMENTAL ASSESSMENT BRANCH	
RECEIVED	
FEB 26 1990	
<i>Dave S.</i>	
FILE #	
PUBLIC RECORD	☐
ALL TEXT	☐

Dear Mr. Smith:

Re: Ontario Hydro Demand/Supply Plan

We have reviewed Ontario Hydro's Demand/Supply Plan for the next 25 years, "Providing The Balance of Power", and we offer the following comments and observations.

In general, this Ministry supports the efficient use of Ontario's existing electrical power supplies and the planning for additional power supplies to meet the Province's requirements for economic growth. Ontario Hydro's adoption of a median average growth projection (2.3 %/annum) instead of a worst case or maximum growth expectation, would appear reasonable on the basis of existing general growth forecasts. Further, this Ministry supports the principal of maintaining average electricity prices to Ontario customers at reasonable cost and in-line with Hydro's record in this regard over the past 40 years.

The anticipation of a shortfall in reliable supply capability by 1993 under median demand growth projection, coupled with up to 14 years in lead time prior to new major generating stations being brought on-line, would support the need for an action plan to be implemented now. Hydro's request for a five-year action plan would appear

.../2

reasonable. This plan would require three nuclear stations and 32 gas-fired combustion turbine units and a number of hydraulic water power projects. It should be noted however, that this appears to represent 75% of the nuclear power stations required for the longer 25 year plans. Assuming a need for such development and allowing for separation in site development timing for projects, we believe further examination is needed on project timing to ensure the skilled labour, equipment and construction capabilities can be provided as required to support such a program.

Hydro proposes that the Ontario Hydro-controlled system will require 40,000 MW of supply by 2014 compared to an existing supply of 24,000 MW. The projected load meeting capability requirement for 26,200 MW by 1993 will require 6300 MW of additional planned capacity to provide a reserve margin for equipment breakdowns, labour disputes, unfavourable weather or delays in start-up of new facilities. While this Ministry cannot project the load meeting capability or the reserve margin requirements more accurately than Ontario Hydro, we believe the principal of a reserve margin should be maintained in any demand projections.

In providing for future power requirements and implementing Demand Management to reduce these requirements, this Ministry would encourage maximizing opportunities for Ontario/Canadian suppliers to provide high efficiency technologies to improve the use of supply and to provide goods and services in the building or rehabilitation of generating plants.

The use of solar, wind, wood, peat, waste and fuel cells would appear not to be included in Hydro's plans for development. This Ministry supports the provision of opportunities for non-utility producers to supplement Hydro's main capabilities and to encourage maximum employment opportunities for Ontario residents.

Ontario Hydro has selected Case 15 as its preferred option among some 40 supply options (Cases) initially proposed and reviewed to meet future power supply needs. Ontario Hydro believes Case 15 is lowest in overall "cost" of three final cases selected on the basis of meeting 15 planning criteria, including reliability and low cost of service electricity.

Case 15 claims to offer good flexibility, good diversity and good environmental characteristics. This Ministry would endorse the development of a supply plan based on these principles. In terms of benefits to the province and Canada over the lifetime of a CANDU nuclear station, Ontario and

Canadian content is projected at 90% or about twice that of a conventional steam cycle coal station. This Ministry requests Ontario Hydro to provide the Ontario portion of the overall Canadian content.

With regards to Case 15, its economic benefits appear to be less than more nuclear generation and less fossil fuel generation as provided in Case 22 and more economic benefit than Case 24 using a conventional steam cycle (CSC) coal station for one part of the major addition base load and CANDU for the remainder. Specifically, Hydro projects Case 15 as providing a \$6 billion Gross Domestic Product (GDP) impact annually or 1.1% of annual GDP in constant 1989 dollars. This impact includes an average of 58,000 person years of employment annually or 1% of the annual provincial labour force. Hydro does note that these are gross impacts, independent of the Province's general economic and employment opportunities. Hydro facility construction and operation requirements may draw from other projects, and thereby may overstate net employment gains for the province.

Case 22 provides approximately 2.4 % more GDP impact than Case 15 and 1.9% more person years of employment. These economic projections are based on an assessment period to 2009. Given that the Plan is to cover the period to the year 2014, it would be preferable that benefits be stated to coincide with the same planning horizon, though Hydro does state similar though higher benefits accrue to 2040. Specifically, these benefits for Case 22 are 2.8% more GDP impact than Case 15 taken to 2040 than taken to 2009.

While this Ministry would prefer to maximize economic and development opportunities it believes growth should bear in mind overall benefits and costs in terms of sustainable development.

Because of variations in timing for bringing major supply facilities on-stream, reserve margins are not constant under any of the growth projections. While economic growth projections are not exact it would appear that reserves will be less than the 24% targeted by Ontario Hydro desirable under the median growth rate in the 1990's and up to 2005 with the upper growth projections. This Ministry would endorse supply and demand management options which would ensure reserve capacity is maintained at desirable levels throughout the planning period.

In conclusion, this Ministry supports Ontario Hydro's 25 year development plan in principle with individual comments as noted. With regards to specific benefits and costs associated with the Cases presented, we would prefer to obtain further information on:

- 1) Ontario employment benefits and business opportunities associated with power supply options and the provision of Ontario goods and services under Case 15, Case 22 and Case 24.
- 2) Projected relative electricity costs associated with the 25 year development plan under Case 15, Case 22 and Case 24.

In supporting Hydro's overall development plan, this Ministry supports the principle of a five-year action plan to ensure adequate supply is available to meet power demands under the median growth rate projection.

While regional development benefits are to a large part specific to facility site selection, this Ministry would prefer to include regional impact comparisons prior to implementation of the selected supply option (Case 15) and the five-year action plan.

Yours very truly,

A handwritten signature in black ink, appearing to read 'D. Reid', with a large, sweeping loop at the end.

David Reid
Consultant, Environmental Industries

MINISTRY OF LABOUR



**Ontario
Ministry of
Labour**

**Ministère
du Travail
de l'Ontario**

Office of the
Deputy Minister

Bureau du
sous-ministre

400 University Avenue
Toronto, Ontario
M7A 1T7
416-965-4115

May 22, 1990

**Mr. Marc Eliesen
Deputy Minister
Ministry of Energy
12th Floor
56 Wellesley Street West
Toronto, Ontario
M7A 2B7**

Dear Mr. Eliesen:

The synopsis of the Demand/Supply Plan by Ontario Hydro has been circulated within our Division of Occupational Health and Safety and no comments arising directly from an impact on the legislative mandate of the Ministry in occupational health and safety have been received.

The Ministry does, however, respond to requests from the Ministry of the Environment for advice on the health impacts of chemical and physical agents. Our Health and Safety Studies Unit also alerts the Health and Safety Division of the Ministry of Labour to pertinent scientific concerns that may have an impact on occupational health and safety. There are a number of these concerns which are relevant to the Ontario Hydro Demand/Supply plan which I believe could usefully have been mentioned in that document.

1. It would be helpful to have health and safety considerations highlighted under each proposal, i.e. a heading clearly stating that the paragraphs that follow deal with health and safety issues.
2. All issues that have received some prominence in the scientific or lay press should be addressed (the fact that Ontario Hydro scientists don't believe they are important is not the issue). All perceived hazards to health should be at least acknowledged and a response provided, however brief.
3. More specifically, the following health related issues were raised by Ministry of Labour staff:

- a) Health effects of transmission lines. (This is certain to be an issue and the latest scientific evidence at the moment is equivocal).
- b) Health effects of acid rain due to emissions from plants using fossil fuels.
- c) Health effects of fly ash from fossil fuel plants.
- d) The recent evidence that lower levels of ionizing radiation may have adverse health effects than was previously believed.

There is also the requirement to touch upon the need for adequate emergency planning for Hydro facilities, but particularly for nuclear generating plants. It would seem wise to have these points mentioned by Ontario Hydro as they will certainly be raised by those critical of the plans.

Yours sincerely,

ORIGINAL SIGNED BY
GEORGE THOMSON

George Thomson
Deputy Minister

cc: Gary Posen

MINISTRY OF MUNICIPAL AFFAIRS



RECEIVED

MAR 15 1990

Office of the
Deputy Minister

Bureau du
Sous-ministre

Ministry of
Municipal
Affairs

Ministère des
Affaires
municipales

TO *Law*

FILE #

PUBLIC RECORD ☐

CALL TEXT ☐

777 Bay Street
Toronto, Ontario
M5G 2E5

777, rue Bay
Toronto (Ontario)
M5G 2E5

March 9, 1990

MEMORANDUM TO : Mr. George Tough
Deputy Minister (Acting)
Ministry of Energy

FROM : Deputy Minister

SUBJECT : Ontario Hydro Demand/Supply Plan
Government Agency Review

The following is this Ministry's comments from our review of the Demand/Supply Plan.

The Ministry's mandate is marginally affected by Ontario Hydro's Demand/Supply Plan.

- Since we are responsible for administering the municipal land use planning system defined in the Planning Act and provincial land use planning activities provided for in the Ontario Planning and Development Act, the Niagara Escarpment Act and the Parkway Belt Planning and Development Act, the location of new facilities is of interest to us.

A component of the Parkway Belt West Plan is the provision of a utility corridor. Hydro's transmission lines are an appropriate use for this corridor.

On the other hand, under the Niagara Escarpment Plan it is our mandate to protect and preserve the unique natural features of the Escarpment and would discourage hydro facilities within the boundaries of the Niagara Escarpment Planning Area.

During the site specific EAA process, a further phase of this planning exercise when the candidate sites are specifically sited, we will have an opportunity to comment further and may have more detailed interests at that time.

Mr. George Tough

- . It is also this Ministry's mandate to maintain a viable, strong and accountable municipal government.

We support the extensive public consultation strategy for this Plan which is providing opportunities for municipalities and the general public to have their questions answered.

I am pleased to see that Hydro has undertaken this forward looking planning exercise to determine future energy needs.

This Ministry supports the process followed to date. However, I would encourage consensus be reached concerning all Ministries responses prior to a Government Review Report on the matter being released.

Original

David G. Hobbs

c.c. David Smith, MOE

**MINISTRY OF MUNICIPAL AFFAIRS
OFFICE OF THE GREATER
TORONTO AREA**



Ontario

Ministry of
Municipal
Affairs
Ministère des
Affaires
municipales

Office for the
Greater Toronto
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Téléphone : (416) 369-1747
Télécopieur : (416) 369-1754

ENVIRONMENTAL ASSESSMENT
BRANCH

RECEIVED

March 2, 1990

MEMORANDUM TO: Dave Smith
Review Coordinator
Environmental Assessment Branch
Ministry of the Environment

SUBJECT: Comments on Ontario Hydro's Plan to
Serve Customer's Electricity Needs

MAR 6 1990

Dave S.

Staff from the GTCC and OGTA have reviewed Hydro's Supply/Demand and Environmental reports, and have the following concerns in connection with electric power supply specifically to, and within the GTA ie: the Regional Municipalities of Halton, Peel, York, Durham and Metro Toronto.

1. Population and Employment

Chapter 3 outlined demand projections and notes that the method is not simply a projection of past experience. However, we have not identified in the report the specific demands that are contributory to the forecast growth.

Recently, the planners for the five Regional Municipalities comprising the GTA, in cooperation with the Province undertook a review of population growth over the next 40 years. The basis of the forecast is the assumption of present policies. Other policy initiatives have not been considered. The median forecast is being used for our purposes in the GTA Urban Structure Options Study. Copies of the reports are available for both population and employment and area attached for your use. You will note a population growth forecast of 1.6 million by 2011. This medium growth scenario has been accepted by all, yet is considered conservative by some. A forecast to 2031 puts the GTA population at 6.5 million, a doubling of the current population.

2. Transportation

Growth such as is a forecast will have a very significant effect on transportation. We are of the opinion that public transportation will become significantly more important than it is now, both to minimise capital investment, reduce auto emissions and conserve conventional fuels.

We consider GO service will become a principal transit mode and rapid transit subway and streetcar type services will expand by a factor of 2 to 3. In addition, it is quite likely that GO Transit will be electrified to provide service levels approaching that of the current subway operation.

3. Transmission

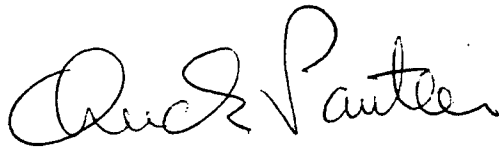
The growth anticipated, including the low density development that will occur in the fringe to the current urbanised areas will preclude the acquisition of suitable ROW unless sufficient property is acquired or optioned for this purpose. The corridors would presumably be required to accommodate transmission to and through the GTA. The latter would presumably include needs for inter-Provincial or trans-border purchase or sale.

We have identified the Clairville to Cherrywood, and Cherrywood to Bowmanville 500 kv transmission lines as constituting an impact upon GTA, but at the same time they could offer opportunities for joint or complementary use. We also understand that inter area transmission corridors or reinforcements will be addressed separately and in parallel with the approvals requested in the Demand/Supply Plan Report. We consider it important that this Office be consulted over these proposals.

Ministry of Transportation are considering east-west highway corridors; one easterly extension of the Parkway Belt beyond the Highway 48 as well as a more northerly alignment of a second corridor several miles north of Highway 407. We would recommend that the advantages of joint use corridors should be fully explored as a timely matter in view of current development trends.

4. **Environmental**

Public priorities are at present becoming strongly focused on environmental matters particularly clean air and water. We believe that this will accelerate a move to energy sources that are non polluting. While not solely directed at electrical energy we are of the opinion that there will be an increasing emphasis on this form.

A handwritten signature in cursive script, reading "Chuck Pautler". The signature is fluid and stylized, with the first name "Chuck" and last name "Pautler" clearly distinguishable.

Chuck Pautler
Cabinet Liaison and Research Coordinator
Office for the Greater Toronto Area

MINISTRY OF NATURAL RESOURCES



Ministry of
Natural
Resources

Ministère des
Richesses
naturelles

Deputy Minister

Sous-ministre

Whitney Block
Queen's Park
Toronto, Ontario
M7A 1W3

Édifce Whitney
Queen's Park
Toronto (Ontario)
M7A 1W3

May 25, 1990

MEMORANDUM TO:

Dave Smith
Review Coordinator
Environmental Assessment Branch

SUBJECT: Ministry Of Natural Resources Comments on Ontario
Ontario Hydro Demand Supply Study

Following further review of the DSP and our comments on it (submitted February 28 1990, copy attached), we feel there is a need to clarify certain aspects of our position.

On page 2 of our submission, the last sentence of the first paragraph which reads;

"This may result in the need for planning issues that have been addressed in the DSP being reconsidered during a project EA.",

may lead to misunderstanding and should be deleted.

The intent of MNR's comment is expressed in the previous sentence of the text, which indicates that approval of the DSP should not commit MNR to support or approve any particular facility which may stem from the approval of the Plan/EA. In expressing this interest, it is not necessary and it may be misleading for MNR to presume the content of subsequent project EA's.

On page 2, of our submission, the last sentence of the third paragraph reads;

"We believe that due to the complex nature of environmental and social concerns that exist in the Moose River Basin area, one condition of approval of the DSP should be that Ontario Hydro commits to the production of a Moose River Basin Development Plan prior to or in conjunction with Moose River Basin Project EA's."

MNR's original request was that a river basin development plan be required as a condition of the approval of the DSP. The concern underlying this request was that MNR would like a comprehensive

ENVIRONMENTAL ASSESSMENT BRANCH
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JUN 4 1990
TO <i>Dave S.</i>
EA FILE # _____
PUBLIC RECORD ☐
FULL TEXT ☐

approach to planning of hydro electric development in the Moose River Basin to avoid having to deal with broad watershed issues on the basis of case by case project EAs.

However, given that approval on specific individual hydro generation sites is not being sought through the DSP. The above-noted material should be modified to more accurately read as follows:

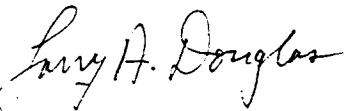
"MNR feels that complex environmental and social concerns exist in the Moose River basin area. MNR requests that Ontario Hydro commits to the preparation of a Moose River Basin Development Plan prior to or in conjunction with Moose River Basin project EA's."

These revisions are provided for purposes of clarifying MNR's position and do not alter the views and concerns expressed earlier.

MNR feels there is a need to provide greater clarity about the decision and approval which is being sought by Hydro. The precise nature of what would be provided for by an approval, as described in Chapter 19, also needs to be clarified.

This letter and the attached submission of February 28 constitutes MNR's formal input to the Ontario Hydro Demand Supply Study. Should you have any comments or questions please feel free to contact Rick Laprairie (324-7230) of this office.

Thank you for the opportunity to comment on this proposal.



L.A. Douglas
Director
Corporate Policy and Planning Secretariat

RDL:so



Ministry of Ministère des
Natural Richesses
Resources naturelles

ENVIRONMENTAL ASSESSMENT
BRANCH

RECEIVED

February 28, 1990

FEB 28 1990

David Smith

David E. Smith
Review Supervisor
Environmental Assessment Branch
Ministry of the Environment

FILE # _____
PHONE RECORD ☐
FAX TEXT ☐

Dear Mr. Smith:

The Ministry of Natural Resources (MNR) is pleased to offer our preliminary comments on the Ontario Hydro Demand Supply Plan (DSP). Our comments relate to program areas for which MNR retains responsibility.

First, it is important to establish that our understanding of the undertaking and the approval being requested by Ontario Hydro is the Program associated with Proposed Demand Supply Plan 15 as described in the DSP Report, Chapter 19 Approvals, on page 19-2. Further, as outlined on page 1 - 7, Chapter 1 Introduction, of the DSP Report we note that it states that "subsequent assessment of individual projects will focus on ensuring that projects are located and implemented in an environmentally acceptable manner. The project assessments will not duplicate nor reconsider the planning issues determined by this application". Page 2 - 6, Chapter 2, A Planning Overview, of the DSP Report also states:

"That the evaluation criteria used in planning are comprehensive. Options have been assessed and plans developed on the basis of low cost, and high flexibility, as well as their ability to meet technical and reliability standards. Environmental and social impacts have been considered in the assessment of both options and plans. Detailed local environment and siting considerations will be the subject of project environmental assessments."

Figure 1-1 Demand/Supply Evaluation Criteria on page 1 - 2, Chapter 1 Introduction of the Environmental Analysis illustrates that environmental characteristics (which is where many of MNR's program area responsibilities exist) was defined as one of a number of secondary criteria which were considered in the production of the Demand/Supply Plan as opposed to being one of the primary criteria "which must be met".

The above discussion leads to our first comment. As environmental characteristics become one of the primary criteria in subsequent project environmental assessments (EAs) approval of the DSP should not commit MNR to support or approve the development by Ontario Hydro of any particular generation site or transmission facility or alignment. This may result in the need for planning issues that have been addressed in the DSP being reconsidered during a project EA.

As we have noted, the DSP states that detailed local environment and siting considerations will be the subject of project EAs. In the case of the Moose River Basin hydraulic sites, this does not address our fundamental concern about cumulative impacts on MNR program interests.

Our Northern Regional Office has indicated in discussions with Ontario Hydro that a Moose River Basin Development Plan must form the basis for all future hydraulic development in the area. Section 4.3.1 Natural Environment of the Environmental Analysis acknowledges that discussions about Ontario Hydro's proposal to use a "river system" approach to develop sites in the Moose River Basin have been initiated with interested government and public representatives. We believe that due to the complex nature of environmental and social concerns that exist in the Moose River Basin area, one condition of approval of the DSP should be that Ontario Hydro commits to the production of a Moose River Basin Development Plan prior to or in conjunction with Moose River Basin project EAs.

As we expect that the Ontario Native Affairs Directorate will address native issues in depth we only offer the observation that Ontario Hydro has an opportunity to involve natives to a significant degree in various aspects of some of the projects associated with the DSP. As stated on page 4 - 5, Chapter 4 Evaluation of Common Elements in Alternative Plans of the Environmental Analysis "orderly development of northern hydraulic sites should provide opportunity for regional employment and development in the north. Development, redevelopment or extension of sites in the Moose River Basin could provide up to 23,500 person years of employment over 30 years. Workers could transfer from one site to the next, and economic benefits in regional centres would continue throughout the period". Potential socio-economic effects for natives of the Moose River Basin developments reinforces the need for a comprehensive Moose River Basin Development Plan.

Approval is also being requested for the requirement and rationale for the transmission facilities to incorporate electricity purchased from Manitoba as well as any radial transmission needed to connect the generation facilities listed in the Proposed Demand/Supply Plan 15 into Ontario Hydro's transmission system. We note that new required inter-area transmission to accommodate the proposed increased power flows on the existing bulk transmission system are not part of the DSP undertaking. As the inter-area transmission appears to be integral to the DSP we question why it is not included as a part of the undertaking. Transmission, especially where new rights-of-ways and construction roads are created, are of high interest to MNR. Virtually all program interests of MNR, especially in Crown land and water areas, are impacted by transmission line establishment. It would be useful for our work planning, staffing and budgeting purposes if Ontario Hydro could provide a comprehensive schedule of projected transmission EA's that will be required to implement the DSP. Again, we must restate that approval of the DSP should not commit MNR to support or approve the development by Ontario Hydro of any particular transmission facility or alignment.

MNR has a policy to assist in the development of the Province's remaining hydraulic resources by the private sector. In early 1989 MNR removed Ontario Hydro's first right of refusal for sites with a capacity greater than 20 megawatts (MW) but agreed to reserve sites within the Moose River Basin on the Mattagami, Abitibi and Moose Rivers as well as the Patten Post on the Mississagi River. All remaining sites throughout the province were made available for development by the private sector where it was determined appropriate.

In order to ensure that proposed private developments are fully reviewed with regard to environmental and social concerns MNR is coordinating a "Waterpower Planning Task Group" in order to produce consolidated and comprehensive "Waterpower Program Guidelines". The Waterpower Planning Task Group consists of field and main office staff in MNR as well as representatives from the Ministry of the Environment, Ministry of Energy (M Eny), Ministry of Northern Development and Mines, Ontario Hydro, the Independent Power Producers' Society (IPPSO) and the Waterpower Association of Ontario (WAO).

During discussions of this task group it has become apparent that WAO wishes to pursue the concept of a Class EA for private waterpower development. There have also been suggestions that such a Class EA could possibly apply to new Ontario Hydro Waterpower Developments. We note that the DSP commits Ontario

Hydro to individual EA's for their proposed hydraulic program associated with Proposed Demand/Supply Plan 15. MNR supports Ontario Hydro's DSP commitment to individual project EA's within the context of a river basin plan. MNR also supports the concept of WAO exploring the possibility of a Class EA for private waterpower development.

Although rehabilitation work at existing Ontario Hydro hydraulic stations is not part of the DSP approvals being requested MNR expects to be involved in any such modification projects through the Class EA process referenced on page 4 - 6, Chapter 4, Evaluation of Common Elements in Alternative Plans of the Environmental Analysis. Similarly, MNR is interested in knowing well in advance about potential site retirements as natural resources concerns may exist.

Energy from wood waste projects (subject to individual EAs; not part of the DSP approvals being requested) form part of the Non-Utility Generation Plan, Chapter 8 of the DSP Report. On page 8 - 7 of the Report it is stated that "the technical potential for wood waste-fueled generation is estimated to be 200 MW. Of this total, 50 MW is forecast to be attainable by the year 2000, with an annual growth rate of 6% thereafter". MNR would like to review the information and methodology used in generating these estimates in order to verify their validity.

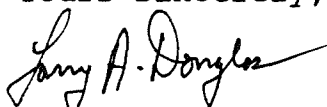
In summary, we recognize that the greatest impacts of Ontario Hydro's proposal on MNR interests will occur with any new development and extension of existing facilities on Crown lands and waters; the subject of project EA's. As the administrators of Crown land in Ontario, MNR has developed a number of policies and procedures regarding the planning and management of Crown lands and resources. It is imperative that all undertakings emanating from the DSP take into account these policies and procedures. Key legislation that must be considered under MNR Administration include the Public Lands Act, the Lakes and Rivers Improvement Act and the Federal Fisheries Act. Other MNR administered legislation and policy (eg. Aggregate Resources Act, Flood Plain Planning and Mineral Aggregate Resources Planning Act Policy Statements, Forest Production Policy, etc.) should also be considered by Ontario Hydro as project planning is undertaken.

We are pleased that Ontario Hydro has recognized (page 4 - 5, Environmental Analysis) present Provincial Government Parks Policy (MNR, 1988). Our field offices will be providing Ontario Hydro with appropriate information at the time that river basin studies and project EA's are commencing to ensure that undertakings are consistent with the government's park policy.

In conclusion, the Ministry supports Ontario Hydro in its intention to undertake activities in a manner that is socially and environmentally acceptable. MNR's role as a resource management agency is to ensure that ecological, social and economic factors will be considered comprehensively in the management of resources on a sustainable basis.

Thank you for ensuring that MNR is fully involved in DSP Review. We look forward to further participation as required.

Yours sincerely,

A handwritten signature in dark ink, appearing to read "L.A. Douglas". The signature is fluid and cursive, with the first letters of the first and last names being capitalized and prominent.

L.A. Douglas
Director
Corporate Policy and Planning Secretariat

TB:so

c.c. George Tough, Deputy Minister, MNR

MINISTRY OF NORTHERN DEVELOPMENT AND MINES



Ontario

Ministry of
Northern Development
and Mines

Ministère du
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ENVIRONMENTAL ASSESSMENT BRANCH	
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FULL TEXT ☐	

May 24, 1990

Mr. Dave Smith
Review Supervisor
Environmental Assessment Branch
Ministry of the Environment
250 Davisville Avenue - 5th Floor
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Dear Mr. Smith,

Attached is the Ministry of Northern Development and Mines' revised response to Ontario Hydro's Demand/Supply Report.

Sincerely,

Rob Milligan
Director
Corporate Planning Secretariat

MINISTRY OF NORTHERN DEVELOPMENT AND MINES

"RESPONSE TO ONTARIO HYDRO' S DEMAND/SUPPLY REPORT"

SUBMISSION TO THE MINISTRY OF THE ENVIRONMENT

MAY 24, 1990

1. SITING OF POWER STATIONS:

Should the board feel that additional power is required, the Ministry of Northern Development and Mines would strongly support the development of additional generating capacity within Northern Ontario. At present the North is a net importer of power, but may have substantial undeveloped power generation potential. In addition to the Moose River and other hydraulic sites, the possibility of a major power generating station on the North Channel appears particularly attractive as a stimulus to regional economic development.

A new power generating station in the identified area would be within commuting distance of the communities of Elliot Lake and Blind River, both of which are currently under stress as a result of the drop in world uranium market demand and prices. Layoffs at the Elliot Lake mines have created surplus housing stock and some municipal infrastructure in the area is underutilized. The jobs and income created by the construction and operation of a power generating station in the area would contribute to the efficient use of these available resources while relieving some of the development pressures on an already overheated economy in southern Ontario.

Another important factor favouring the selection of a North Channel site is the widespread public support for a major power development station, as shown by Resolutions of the Town Councils in the area. Also, additional base load generation at a central point in Northern Ontario would enhance the security of power supply to the whole region, while reducing dependence on supplies from outside the region. The permanent, highly skilled and well-paid operations and maintenance jobs created by a major power plant would mitigate to a considerable extent the "bust and boom" cycle that typifies the local resource-based economy, while providing substantial career opportunities for skilled tradespeople, such as millwrights and electricians, who stand to lose their jobs as a result of the mine downsizing in Elliot Lake.

2. NORTHERN HYDRO PROGRAM:

Chapter 12 describes an ambitious plan for the development of the hydro potential of Northern Ontario rivers:

(i) four sites on the Mattagami (Kipling, Smoky Falls, Harmon and Little Long), followed by Little Jackfish in Northwestern Ontario, all of which are presently at an advanced study stage prior to proceeding to specific environmental assessments. These stations will provide 511 MW capacity and 1.33 TWh of energy annually.

(ii) eight sites in the Moose River Basin plus Ragged Chute on the Montreal River and Patten Post on the Mississagi. These 10 sites are all undergoing preliminary technical, economic and environmental feasibility studies. These sites will provide 1859 MW capacity and well over 3 TWh of annual energy.

The report notes that "sustained activities in the Northern part of the province will help to retain a stable, highly trained work force and provide enduring economic benefits to the North over many years. " (Chap. 12, p. 15).

Subject to two major caveats associated with its implementation, which are outlined below, the Ministry welcomes the prospect of the economic development the northern hydro program can bring. Indeed, since project specific environmental assessments have already been filed for the Little Jackfish project and will be filed this year for the four-site Mattagami Complex, the Ministry would ask why these projects could not be allowed to proceed through the ordinary EA process without being subject to the possibly lengthy delays of the Demand/Supply Plan review. The added capacity from these developments would be too minor to affect the outcome of the overall system-wide needs analysis.

The Ministry's caveats associated with the northern hydro program are as follows:

(a) Native Issues:

The Report (Environmental Analysis, Chapt. 4, p. 6) recognizes that development of northern hydraulic sites will "arouse Native concerns such as land claims, impacts on traditional land uses. . . . flooding and mercury levels in fish", but goes on to say that northern communities should benefit from electrification and improved community services. It then discusses the adverse effect of hydro developments on cottagers, boaters and fishermen.

Natives may well consider this a somewhat superficial treatment of their land claim and aboriginal rights positions. Unless Hydro is prepared, in conjunction with the federal and provincial governments, to recognize these very special concerns of the Native people, resistance to the Moose River development program can be anticipated from this quarter.

The Ministry of Northern Development and Mines has found that, in relation to mining developments at Dona Lake and other "north of 50" locations, the most practical way to recognize and address these special concerns is to enter into negotiations with the Native peoples with a view to reaching an agreement, before the project is launched, on employment targets, training arrangements, mitigation and/or compensation for negative project impacts, and other issues of local concern. These agreements were specifically written in such a way as to not affect the bands existing and future aboriginal and treaty rights. The Ministry's experience is available to be shared with Hydro if requested.

(b) Maximizing the economic and social benefits:

The Ministry agrees with the comment (Chap. 4 p.6) that although northern hydro projects have the potential to adversely affect the community, "these effects may be balanced by potential employment and economic development benefits". Opportunities will arise, especially over the 30-year development of the Moose River basin, in employment and training, procurement and services, improved infrastructure - - transportation, electrification, and communication - - and local business development for both natives and non-natives.

The document speaks of a "co-operative effort by Hydro, construction trade unions, and provincial and federal governments" to achieve this. The Ministry is prepared to take a major role in assisting Ontario Hydro to ensure that, if the expected concerns in point 1 above can be met and project approval is granted, a meaningful action plan is developed to maximize the local and northern economic and social benefits of this development.

It is not clear from the text, but in the Ministry's view it is imperative, that Hydro recognize that the achievement of the above objectives will require some changes in the way the Corporation traditionally does business. Hydro will have to engage in detailed discussions with provincial and federal ministries, as well as with its unions, to develop programs which will provide hiring preference for qualified Northerners, especially those of Native ancestry. Facing a unique opportunity to have workers move from site to site over a 30 year period, Hydro should develop apprenticeship and training programs to "grow its own" skilled tradespeople in the region.

Corporate purchasing priorities, for both goods and services, should likewise give preference to regionally owned and operated businesses, giving consideration where reasonable and practical to designing project activities so as to create contract packages which are suited to local companies, both native and non-native.

3. NON-UTILITY GENERATION:

The Ministry fully supports the Hydro Plan's intention to add some 1,600 MW of additional non-utility generation capacity by the year 2000. The diverse, small, geographically dispersed nature of these projects adds resiliency and flexibility to the Hydro system, improves the overall efficiency of fossil fuel combustion through the cogeneration of steam and electricity, and uses waste products, e.g., municipal garbage and wood waste, that would otherwise add to the problem of finding landfill sites.

From a Northern Ontario perspective, the NUG program offers opportunities for northern industry to improve productivity and global competitiveness, as Boise Cascade hopes to do with its gas-fired cogeneration project at Fort Francis. Small entrepreneurs, too, have the opportunity to develop small hydro or wood waste generation projects that can provide, in aggregate, significant local stimulus with little or no government financial support. The potential for native organizations to participate, either alone or in joint ventures with established non-native companies, has hardly been touched.

Hydro recognizes (Chapter 8, p.4) that the rate of return on investment in a NUG is directly related to the purchase price, or "buy-back" rate, for the power and energy purchased. This price, which includes a return of any financial assistance provided by Hydro, is by policy to be set "equal to or less than the avoided cost to the system as a whole" (emphasis added). This, according to Hydro, will ensure that its customers will pay no more than if the utility had generated the power itself.

The NUG industry has argued that the buy back rates should be set, by policy, on the basis of full avoided cost. Laws in leading US states have encouraged NUGs for some years now by requiring that such rates be based on the receiving utility's "full decremental cost" (which we assume is what Hydro means by its term "avoided cost").

There are strong societal arguments, some of which are made in the Report or referred to above, for the encouragement of non-utility generation. As long as it can be encouraged without imposing burdens on the Hydro ratepayers, then in the Ministry's view this should be done. This suggests a policy of buy back rates set for all on the basis of full avoided cost. The Ministry of Energy has a policy that supports this view. Ontario Hydro should be asked to adhere to this policy.

4. ELECTRICITY RATES

Power rates and contract conditions do not figure prominently in the Demand/Supply Plan report except in the sense that achieving the demand management targets of Chapter 7 will require the understanding and support of Hydro's customers, not all of whom, in Northern Ontario at least, feel they have seen much sensitivity to their needs in the past.

It is probably well understood among managers of the resource industries in Northern Ontario that their power costs are going to be higher than those in neighbouring provinces with extensive indigenous hydro resources. Nor has the Government of Ontario suggested that Hydro offer industrial rate incentives as a deliberate instrument of regional development. But major industrial power contracts cover many dimensions, and the perception among resource industries is that Ontario Hydro is inflexible in contract negotiations, especially compared with their experience in Quebec. For example, Hydro's offer to assist in the financing of new thermo-mechanical pulping capacity was welcomed, but pointed to as the exception that proved the rule, since it wasn't made available to any other classes of northern industry.

Mining companies see this inflexibility in Hydro's refusal to share any financial risks in providing grid power to remote mining sites, however great the potential load (power demand) may be once the mine is in production. The requirement that it finance its own power supply to the proposed Musselwhite Mine was, in part, the cause of the recent decision by the managing partner of the project to postpone indefinitely the decision to proceed with production at this major gold find 130 km north of Pickle Lake. There are a number of such examples.

Northerners suffer from higher heating bills during their long, cold winters. Those who have installed electric heating worry that seasonal rates will be introduced as part of the load shifting program (Chapt. 7, p. 18) which will penalize their high winter consumption. Conversely, the Ministry would anticipate that time-of-use rates that allow customers so inclined to save on their hydro bills by shifting discretionary consumption to off-peak times of the day would be especially welcomed by the many northern families with incomes below the provincial average.

In the Ministry's view these points might well be registered as issues in the Environmental Assessment hearings, under such headings as rates, conditions of supply, or line extension policies.

5. NEW TRANSMISSION LINES - MINING & COMMUNITY CONCERNS

Although it is recognized that transmission line alignment is not dealt with in this phase of the Demand Supply Report, we would like to note that with regards to the Manitoba purchase and new Northern Ontario electrical sources, chosen routes for new transmission lines across must address local community concerns. New transmission lines may provide an opportunity to bring grid power to communities that currently do not have it including many Native Reserves. Consideration should be given for locating lines through or near areas of mineral potential.

6. WASTE MANAGEMENT

Action towards finding a permanent solution for the storage of high level nuclear waste is proceeding very slowly through the federal environmental assessment review process. We remind the federal authorities that, to date, two Northern Ontario communities have indicated by municipal resolutions that they are prepared to consider the development opportunities represented by a well engineered high level nuclear waste repository in their areas.

ONTARIO NATIVE AFFAIRS DIRECTORATE



Ontario

Ontario
Native Affairs
Directorate

Direction générale des
affaires autochtones
de l'Ontario

May 16, 1990

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Mr. David E. Smith
D/S Plan Project Supervisor
Environmental Assessment Branch
Ministry of the Environment
250 Davisville Avenue
Toronto, Ontario
M4S 1H2

Dear Mr. Smith:

It has come to our attention that there is an error in our comments submitted to you on February 22, 1990. The second last line of the second last paragraph on page four should read: "settlement, mining, lumbering or other purposes."

Please attach this memorandum to our comments so that the correction may be duly noted in the government review publication.

If you have any questions, please contact Jean Manore, Economic and Resource Development Unit at 326-4757.

Yours truly,

Mark Krasnick
Executive Director



ENVIRONMENTAL ASSESSMENT
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Ontario
Native Affairs
Directorate

Direction générale des
affaires autochtones
de l'Ontario

FEB 23 1990

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FILE # _____
PUBLIC RECORD ☐
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22 February 1990

Mr. David E. Smith
D/S Plan Project Supervisor
Environmental Assessment Branch
Ministry of the Environment
250 Davisville Avenue
Toronto, Ontario
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Dear Mr. Smith:

The Ontario Native Affairs Directorate is taking this opportunity to respond to Ontario Hydro's Demand/Supply (D/S) Plan because of its importance to the Native People of Ontario, because of the associated issues raised by this initiative which concern Native People, such as environmental protection and economic development and because of its potential to directly impact on the mandate of the Directorate. The Directorate's mandate is: to assist the Government of Ontario in creating opportunities and initiatives for aboriginal people, to ensure that the historical and contemporary commitments made to aboriginal people by the Crown in right of Ontario with regard to land and natural resource issues are honoured, and to resolve issues of concern within the authority, resources, and priorities of the Government of Ontario.

To quote Ontario Hydro, the D/S Plan "maximizes the use of the existing system; pursues all economic demand management and non-utility-generation opportunities; develops economic hydraulic sites; incorporates out-of-province purchases; and meets the balance of future requirements with new fossil and nuclear generating capacity." (p.1-9) This Plan operates under certain assumptions which the Directorate is reluctant to accept because of their potential to negatively impact on Native People-- on their rights, on their lifestyles, and on their economic development initiatives.

The most obvious of these assumptions by Ontario Hydro is the assumption that externalizing certain social and environmental costs represents an acceptable accounting procedure. Ontario Hydro's statements with respect to its costing policies are as follows:

Costs are incurred by Hydro to mitigate social and environmental impacts associated with the supply and delivery of power. There are other social and environmental costs and benefits for the community, which are not reflected in costs incurred directly by Hydro. ... Even when a monetary impact can be established there is an issue as to whether, and how, these cost effects should be included in comparisons of options and in the estimation of avoided costs. (p.6-12)

Some impacts can be treated in cost evaluation as either internal or external costs. For example, the effect of acid gas emissions due to increased coal burning can be accounted for: as an external cost by assuming that acid gas emissions increase with a resulting cost to society; or, as an internal cost by assuming that acid gas emissions are held level by taking additional control measures-- with a resulting cost to Hydro.

For avoided cost calculations, Hydro adopts the second approach and internalizes the costs of mitigating acid gas emissions. (p.6-15)

Apart from the costs incurred by Hydro, there are still social and environmental effects which result from Hydro's activities. These effects can be negative and thereby imply a cost. Examples might include acid gas emissions within the regulations, flooding of land for hydraulic stations, and small increases in water temperatures around nuclear and fossil fuelled stations.... (p.6-14)

It therefore seems evident that Ontario Hydro is prepared to externalize all long-term social and environmental costs, including those which impact upon Native communities and their surroundings. Marc Eliesen, in his paper "Ontario Hydro and Economic Development" prepared for the Ministry of Energy in February, 1989, also addresses this point. He states:

In outlining the areas of 'Hydro's points of Economic Leverage' at no time is the question asked whether there are additional costs to be borne and if so, where does the responsibility for these costs rest, with the utility or with the government? These queries are studiously ignored. (p.94)

By defining costs in terms of external vs. internal and then by seeking to avoid a range of external costs, such as environmental and social costs that will occur, in spite of the mitigation measures taken to meet specific legislative guidelines, Ontario Hydro is failing to acknowledge the cultural and economic importance of the land and natural resources to Native People as well as the existence of their aboriginal and treaty rights.

When considering development options for their communities, First Nations generally try to determine what effect this development will have on the community, in terms of future generations. In the case of the Moose Factory First Nation and other Native communities that may be affected by the Moose River Basin development, Ontario Hydro's offer of possible employment for Native People for thirty years may be seen by the Native People as an unacceptable trade off when balanced against the sustenance they have received, and hope to continue to receive, from the sturgeon and other fisheries for hundreds of years.

Secondly, many Native People depend upon and use the resources of the land to a much greater extent than most non-Natives. Professor Fikret Berkes, in a forthcoming article in Arctic, will show that Native People, throughout Northern Canada, on average consume six times more fish per person per annum than non-Natives.

Thirdly, because their subsistence activities are integral to their lifestyle, the negative impacts on their resource base will not only have adverse economic effects but also may have devastating social and cultural effects as well. This cause and effect relationship has been demonstrated at a variety of locales in Ontario.

Beyond the strict cultural and economic significance of the land and its resources, there must be an accounting for the aboriginal and treaty rights of Native People with respect to the use of the land and its resources. Although there are differences of opinion over the nature and extent of these rights, their existence is nonetheless recognized by both provincial and federal governments, by the courts and in the Canadian Constitution. As a result, Ontario Hydro must also recognize and respect those rights.

Examples of Native Peoples' treaty rights to the use and enjoyment of natural resources are found in Treaties #3, #5 and #9. For those Native People adhering to Treaty #3, their rights are defined as follows: full ownership of minerals on reserves, as well as rights to hunt and to fish "at places not taken up for settlement, mining, lumbering or similar purposes." (See Treaty #3)

Treaty #9 and #5 First Nations have similar clauses in their treaties. The Nishnawbe-Aski Nation (NAN), which represents the communities of Treaty #9 and those Treaty #5 communities within Ontario, has entered into negotiations with Ontario and Canada, the objective of which is to conclude agreements on a wide variety of land and natural resource issues in northern Ontario. These negotiations are envisaged as a means to empower NAN communities and involve them, to the greatest extent possible, in the process of decision-making in a wide variety of land use planning and environmental protection activities.

Court decisions reflect a general direction towards the recognition of aboriginal rights. For example, in the decision of Cheechoo vs. the Queen (Ont.), 1981, the court ruled that Treaty #9 adherents have a treaty right to trap and that right takes precedence over Ontario trapping regulations.

The Constitution of Canada recognizes and affirms existing aboriginal rights and Ontario has taken steps to recognize Native Peoples' aspirations for self-government. Ontario proposed at the last First Ministers' Conference on Aboriginal Affairs an amendment to the Canadian Constitution which read: "The aboriginal peoples of Canada have the right to self-government within the context of the Canadian federation."

Consistent with this approach, Ontario announced in December, 1989, guidelines for self-government negotiations with Native communities. These guidelines include, among other things, the potential to negotiate agreements with respect to natural resource access and co-management and economic development.

Also, the Ontario government, in recognition of First Nations' particular rights, interests, and concerns, is taking steps to insure that consultations with First Nations with respect to government policies and initiatives take place. For example, in a booklet just published by the Ministry of Natural Resources (MNR) on its Strategic Plan for Ontario's Fisheries II Project, there is an explicit acknowledgement that:

Many status Indian people are in the unique position of having a treaty right to take fish for food on unoccupied Crown land within the areas specified by their treaties. (p.5)

As a result, MNR has accepted the logic and the need to include Native communities and organizations in the development of this new strategic plan.

Further, Marc Eliesen, in his previously cited paper for the Ministry of Energy, recommends that preferential treatment be given to Northern Native and Northern and Eastern non-Native businesses. He explains that:

A number of revisions in current policy are suggested to open up opportunities for subcontractors and break down certain institutional barriers which have prevented benefits from being accrued to certain groups and regions of the province. On an overall basis, these proposed changes would not have a dramatic or major impact on current procurement trends. What they can do is provide greater opportunities for northern and eastern regional businesses and for Northern Native groups, with regard to Hydro's requirements for goods and services. (p.109)

The consequences of all these initiatives requires that government agencies and private sector industries become more sensitive to Native concerns. It means that in considering specific resource extraction projects, efforts should be made to ensure that these projects will benefit local Native People, that Native concerns for the natural and socio-economic environments surrounding Native communities are addressed and that training and employment opportunities are provided for Native People.

Certain private sector industries within Ontario have already recognized the need for direct negotiations with Native People in such circumstances. Various Resource Development Agreements that have been negotiated between First Nations and private companies, such as the Dona Lake Agreement, have made significant progress in this direction.

Outside of Ontario, public utilities such as Manitoba Hydro and Hydro Quebec have also negotiated comprehensive agreements with First Nations in the northern portions of their provinces. In Manitoba, Manitoba Hydro and the First Nations negotiated an agreement with respect to the Limestone Generating Station. This agreement created training programs for Native People, encouraged Native and Northern businesses to contract as suppliers, and established hiring preferences for Native People.

The Directorate therefore maintains that sound accounting practices on the part of Ontario Hydro must include the costs of long-term environmental and social impacts. Furthermore, it is our view that direct comprehensive negotiations with Native communities and organizations should become a practice of Ontario Hydro in order to insure that Native Peoples' interests and concerns with respect to long-term environmental and social costs are addressed and that their rights and culture are respected.

The last area of significance I want to touch on is the assumption made by Hydro that a few large generating stations controlled by Hydro are more reliable providers of power than numerous small non-utility generating stations.

The Directorate has some difficulty in accepting the rationale behind this assumption because of its failure to adequately consider Native interests and rights. The negative effects on Native communities with respect to Hydro's concentration on big generation projects tend to be twofold. First, large generation projects tend to magnify environmental impacts. Second, they generally prohibit the entrance of Native People into the power production industry as skilled workers or as entrepreneurs in joint venture opportunities.

Ontario Hydro notes in its Environmental Analysis Report that big hydraulic projects could have significant impacts on the residents of Northern Ontario:

Northern hydraulic projects could result in changes to the lifestyle of residents and to the character of communities. Traditional activities of native people may be affected by alteration of the environment and by changes to employment patterns as a result of the project. For example, flooding and concerns about mercury levels in fish may result in changes to traditional hunting, fishing and dietary patterns. The character of communities servicing Moose River Basin projects is likely to change as a result of long term development.... (p.4-6)

The alternative to large hydraulic or other large-scale generating projects is smaller non-utility generators (NUGs) which can have significantly less environmental impact and which are operated by independent power producers who contract to sell their power to Hydro. Hydro has made a commitment to include NUGs as an option in its Demand/Supply Plan. However, NUGs will be considered only if the avoided costs to Ontario Hydro in contracting NUG power are favourable, only if the demand for power hits the medium or high side of Ontario Hydro's bandwidth forecast and only if the alternative technologies can be demonstrated as reliable.

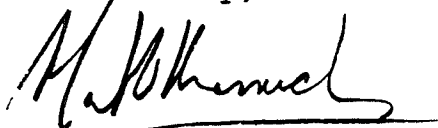
It should be pointed out that Ontario Hydro agrees that: "For the immediate future, the only options which are reasonable to consider are those based on today's proven technologies." (p.1-9) Hydraulic generation is a proven technology and MNR has identified several potential sites for possible development.

Many First Nations are willing to consider developing these water sources in an effort to encourage economic development in or near their communities and to provide employment and training opportunities for members of their communities. Ontario Hydro has a unique opportunity to co-operate with First Nations in these economic and more environmentally benign developments.

In conclusion, the Ontario Native Affairs Directorate recommends that Ontario Hydro fully address the concerns of Native People in Ontario with respect to their Aboriginal and Treaty rights, their unique lifestyles and the distinctive relationship they have to the land and its resources. To that end, the Directorate recommends that a comprehensive negotiations strategy be developed, in conjunction with Native People, to insure that their rights are respected and their concerns addressed appropriately. This negotiations strategy should include, but not be limited to, provisions for long term environmental protection, economic development, skills training, employment opportunities, and financial support for research and impact assessments.

If you have any questions with respect to the Directorate's comments, please feel free to call me or Jean Manore at 326-4740.

Yours truly,

A handwritten signature in dark ink, appearing to read 'Mark Krasnick', with a horizontal line drawn underneath the signature.

Mark Krasnick
Executive Director

cc. The Honourable Ian Scott

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MAY 16 1990

Telephone/Téléphone:
(416) 965-5325

Mr. Gary S. Posen
Deputy Minister
Ministry of the Environment
14th Floor, 135 St. Clair Avenue West
Toronto, Ontario
M4V 1P5 *Gary*

Dear Mr. Posen:

RECEIVED
ENVIRONMENT

MAY 22 1990

**DEPUTY
MINISTER'S OFFICE**

My staff have now completed the review of Ontario
Hydro's Demand/Supply Plan and Environmental Assessment
for its future power generation requirements.

I am pleased to enclose a copy of our final report.

Yours very truly,

Stien K. Lal
Deputy Solicitor General

Encl.

MINISTRY OF THE SOLICITOR GENERAL

REVIEW OF THE ONTARIO HYDRO DEMAND/SUPPLY PLAN

ENVIRONMENTAL ASSESSMENT

Aspect Reviewed

The mandate of the Ministry of the Solicitor General includes Public Safety, and it is this aspect of the Demand/Supply Plan (DSP) and its Environmental Assessment (EA) that have been reviewed by the Ministry. This aspect falls under the heading of Social Environmental Criteria considered in the EA.

The public safety issue arises mainly in connection with the nuclear sub-plan, which forms an integral part of the proposed DSP (Case 15) as well as of the two "acceptable alternatives" (Cases 22 and 24).

Ontario Hydro's Treatment of the Issue

The proposed DSP involves a substantial nuclear power supply component, whose actual composition and timing would depend on the projected (or adopted) demand for power. This nuclear program envisages:

- a total of 6 to 14 new reactors;
- the project commitment for the first 4 reactors to be made by 1993/1995/2001 with the first unit to be in service by 2002/2003/2009;
- the project commitment for the last 2 reactors to be made in 2004 with the first unit to be in service by 2012.

The DSP proposes that the 881 MW CANDU in a 4-unit station configuration be used for the DSP nuclear program. The justification provided for this choice is that, among other things, this is a well-established and proven technology which "meets all AECB requirements", while the public safety concerns regarding it have been reviewed by the Ontario Nuclear Safety Review in 1988, which held that the risk of a serious accident is "very remote".

The DSP EA, in discussing the socio-economic effects of the nuclear sub-plan, notes that there arise "additional issues associated with nuclear-related health and safety concerns" (page 5-6). In order to deal with these issues it proposes "community impact monitoring and impact agreements" (page 5-6) and, to win social acceptance of the DSP, "the Public Feedback Program, and the environmental assessment review process, both of which will provide opportunities for public input on the plans" (page 3-5).

Analysis of Ontario Hydro's Position

The DSP covers a time-frame of 25 years. The nuclear reactors to be built as part of its nuclear program will have an operational life-span of 50-60 years (the last unit will probably still be functioning in 2053 or even later).

The justification advanced in the DSP for the adoption of the existing 881 MW CANDU technology for the entire duration of the DSP nuclear program does not appear to be adequate. While it is true that stations using this reactor system have been licensed by the Atomic Energy Control Board (AECB), the AECB has identified areas where potential improvements could be made. It is very likely that, in line with the continuing evolution of nuclear regulation throughout the world, the AECB's requirements for design safety features will increase over the DSP time frame.

The DSP also supports the case for the adoption of the existing 881 MW CANDU design by relying heavily on the findings of the Ontario Nuclear Safety Review (ONSR). However, in its report the ONSR also stated:

- "CANDU is still a young technology and needs support from competent research and development laboratories ... Research is particularly necessary in the safety area". (paragraph S.63, page xxxix).
- "It is not obvious that the present configuration of CANDU and its fuel are optimal as safety features." (paragraph 38, page 165).
- "I see no reason why CANDU should be abandoned - but neither can I see why its present characteristics should be treated as sacred". (paragraph 339, page 165).

Throughout the nuclear industry world-wide, considerable effort is being put into research and development so that the next generation of nuclear reactors are a significant improvement over existing ones, especially in the area of safety. This is in recognition of the continuing public concerns in regard to this area. However, the Ontario Hydro DSP's response to such concerns is to invite public feedback, and to monitor the impact on local communities around its nuclear stations and provide them with some financial compensation. Public concerns about nuclear safety should also be dealt with by efforts designed to increase such safety. This Ontario Hydro position is in marked contrast to its commitment, in the DSP EA, to a large, ongoing program to reduce residual environmental effects (page ES-2).

Ministry Position on DSP Nuclear Program

The Ministry of the Solicitor General is of the opinion that the Public Safety issue, which arises in connection with the DSP nuclear sub-plan, is not satisfactorily dealt with in the DSP EA.

The choice of the 881 MW CANDU technology for use throughout the span of the nuclear program of the DSP may have economic justification, but is not adequately supported as far as the public safety aspect is concerned. Public concern over nuclear safety exists, and to obtain social acceptance of the DSP nuclear program requires a public commitment by Ontario Hydro to a continuing and expanded effort to improve the safety of the nuclear reactor systems to be set up under the DSP. While a continually improved 881 MW CANDU can serve as the initial choice for the DSP nuclear system, the possibility of switching to another system design during the DSP time-frame should not be ruled out.

The Ministry is of the view that significant enhancement of public safety can and should be built into the DSP's nuclear program by such measures as:

- an ongoing commitment by Ontario Hydro to incorporate into the 881 MW CANDU design improvements which would enhance public safety, including those already identified from past experience, and those identified in the future. These should include measures for reducing the risk of accidents beyond design basis, and for accident monitoring and management;
- the undertaking by Ontario Hydro of a continuing research, development and design effort focused mainly on the reduction of public risk and the enhancement of public safety, to include incorporation of advances made in other jurisdictions, and not excluding the consideration of other system designs;
- enhanced Ontario Hydro support for the main offsite mitigative measure for public hazard, i.e., emergency preparedness around nuclear sites.

May 14, 1990

MINISTRY OF TOURISM AND RECREATION



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Ministry of
Tourism and
Recreation

Ministère du
Tourisme et
des Loisirs

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Toronto, Ontario
M7A 2R9

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ENVIRONMENTAL ASSESSMENT BRANCH	
RECEIVED	
FEB 15 1990	
TO <i>David Smith</i>	
FILE #	
PUBLIC RECORD	☐
FULL TEXT	☐

February 12, 1990

To: Mr. David E. Smith
Government Review Coordinator
Ministry of the Environment

Re: **HYDRO DEMAND/SUPPLY PLAN**

Further to your request, staff of the Ministry of Tourism and Recreation have reviewed the submitted environmental assessment documentation. Ministry staff note that they have not had a prior opportunity to comment on this environmental assessment and that the Government Review is taking place within a relatively short time constraint.

**Observation: Tourism & Recreation Interests
Identified in the EA, Descriptive Discussion**

Staff observe that environmental effects related to tourism and recreation interests are identified in numerous places throughout the Environmental Analysis Report. Tourism and recreation considerations are identified in relation to the candidate sites listed in table 5-6 of the Environmental Analysis Report. Tourism and recreation considerations are also identified in the evaluation of the common elements in alternative Plans, i.e. the Non-Utility Generation Plan (canoe use of waterways), the Hydraulic Generation Plan (tourism interests relating to the Niagara development), Manitoba Purchase (commercial fly-in operations) and are also included in consideration of the supply options dealt with in Appendix C of the Environmental Analysis. However, and as Hydro states in relation to these social effects, "much of the discussion is qualitative and descriptive rather than quantitative (pages 3-4)".

Observations: Consistency of Treatment, Potential Mitigation Information

Staff also note that Table C-1 and Table C-2 of the Environmental Analysis indicates potential local community impacts on recreation and tourism, whereas the Tables summarizing typical environmental effects and mitigation for integrated gasification combined cycle (C-2), combined cycle plants (C-4), and combustion turbine units (C-5) do not indicate potential local community impacts on recreation and tourism. The reason for this differential treatment is not indicated in the Reports. Similarly, while aesthetics are identified as an environmental component/evaluation criteria within the Purchases Supply Option (Table C-7), this aspect of transmission is not indicated in relation to other potential effects relating to transmission incorporation. Again the reason for this differential treatment is not clear. Finally, staff note that under Table C-7 "bury certain lines in sensitive areas" is identified as a potential mitigation measure in relation to transmission effects in this table, but is not identified as a potential mitigation measure in relation to other transmission effects.

Staff observe that it is difficult to assess potential mitigation measures bearing on tourism and recreation related potential environmental effects without more information on the proposed mitigation measures. For example, with regard to the environmental effects relating to the Small Hydro aspects of the Non-Utility Generation Plan, Hydro identifies that "small hydro may affect recreational users" and suggests as a potential mitigation measure "requirement for environmental review of private projects". Staff of the Ministry of Tourism and Recreation are not clear about the degree of comprehensiveness that is associated with this proposed mitigation measure and the applicability to tourism and recreation interests. Similarly, little detail is provided in relation to community impact agreements and the definition of "major" in association with that mitigation measure.

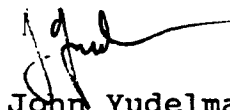
**Lack of Detailed Information, Reasons for Approach,
and Uncertainty as to Potential Mitigation Measures
Precludes Ministry Overall Comment On Plan or
Identified Tourism and Recreation Aspects**

Generally speaking, given the site-sensitive nature of the tourism and recreation interests identified by Hydro, the lack of detailed quantitative information relating to net effects and proposed mitigation measures in the environmental assessment regarding tourism and recreation impacts in relation to those sites, the Ministry is not in a position to evaluate the tourism and recreation impacts mentioned in Hydro's Demand/Supply Plan Report and Environmental Analysis documents. Nor is the Ministry able to provide an overall evaluation of the impact of the Plan on tourism and recreation interests.

**Potential Concerns Arising out of Uncertainty
Between Subject EA and Proposed Individual EAs**

The above Ministry conclusion is premised on the understanding that this environmental assessment is primarily directed at approval of the overall Demand/Supply Plan, and that this assessment will be supplemented by a series of environmental assessments dealing with site-specific aspects. If this is not the case, then the Ministry has potential concerns about site-specific aspects identified in the documents. These concerns are in relation to Hydro's particular site plans and the net effects of these plans after mitigation. The Ministry's second assumption is that the requirements of the Environmental Assessment Act would be applicable to the individual project environmental assessments, with the exception of the "rationale" and "alternative to" aspects of Section 5(3)b. If this is not correct, then the Ministry has potential concerns relating to the site-specific aspects and the adequacy of the data presented in the overall Demand/Supply Plan.

Staff of the Ministry trust that these comments are of use.



John Yudelman
Senior Policy Advisor
Corporate Planning Secretariat

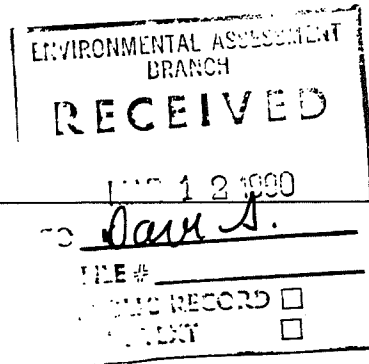
cc: D. Blair Tully

MINISTRY OF TRANSPORTATION



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Transportation

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March 2, 1990

Mr. David Smith
Senior Environmental Planner
Environmental Assessment Branch
Ministry of the Environment
250 Davisville Avenue
5th Floor
Toronto, Ontario
M4S 1H2

Dear Mr. Smith:

Re: **Ministry of Transportation**
Co-ordination of Environmental Assessment Review
Ontario Hydro Demand/Supply Plan Environmental Assessment

This Ministry has reviewed the subject environmental assessment document and our comments are outlined in the attached review prepared by Mr. R.C. Hodgins, Manager, Environmental Office.

This is to advise that I concur with the noted review.

Yours truly,

Pat Jacobsen
Deputy Minister

EJM/RCH/djm
Attachment

MINISTRY OF TRANSPORTATION

REVIEW OF ENVIRONMENTAL ASSESSMENT REPORT

Re: **Ministry of Transportation**
Co-Ordination of Environmental Assessment Review
Ontario Hydro Demand/Supply Plan Environmental Assessment

EFFECT ON MINISTRY'S PROGRAMS

The Ministry has no concerns regarding the subject environmental assessment document. There is, therefore, no objection to the approval of the undertaking.

ADDITIONAL INFORMATION/OTHER MATTERS, ETC.

Although the Ministry of Transportation has no formal concerns with the Demand/Supply Plan, the following issues should be considered when this plan is implemented:

- * Applicable legislation with respect to the transportation of dangerous goods (TDGA) and spills must be followed.
- * It is important that Ontario Hydro's implementation plans consider the transportation of heavy and long equipment. In order to move some of the equipment required for transmission and power generation facilities special circumstance regarding road beds, structures (bridges, ect) and the possible temporary closure of roads may be required.
- * The effect of a possible introduction of electric vehicles on future power demands is worthy of further consideration.
- * Ontario Hydro should co-ordinate its' access road plans with this Ministry to insure proper development of road infrastructure. This is of particular concern when Ontario Hydro implements its' Hydroelectric generating plans in the Moose River basin.

It should be noted that comments made on Ontario Hydro's Demand/Supply Plan should not limit the Ministry of Transportation in making comments on individual Environmental Assessments which result from the implementation this plan.



R.C. Hodgins
Manager
Environmental Office
Tel 235-3479

RCH/djm

MINISTRY OF TREASURY AND ECONOMICS



Ontario

Ministry of
Treasury and
Economics

Ministère du
Trésor et de
l'Économie

Queen's Park
Toronto, Ontario

Queen's Park
Toronto (Ontario)

June 19, 1990

MEMORANDUM TO: David Smith
DSP - Environmental Assessment
Review Coordinator
Ministry of the Environment
5th Floor, 250 Davisville Ave. East

FROM: Barry MacFarlane
Senior Policy Advisor
Energy and Transportation
Sectoral and Regional Policy Branch
4th Floor, Frost Building North

RE: Ontario Hydro's Demand/Supply Plan -
Environmental Assessment

Attached are Treasury's final comments on the
above, including the French translation.

Barry MacFarlane

BGM/CS/chd
attachment

MINISTRY OF TREASURY AND ECONOMICS
REVIEW OF ONTARIO HYDRO DEMAND/SUPPLY PLAN

Ministry of Treasury and Economics
June 19, 1990

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REVIEW OF ONTARIO HYDRO DEMAND/SUPPLY PLAN

1. INTRODUCTION AND OVERVIEW

The availability of secure, reliable, and cost effective electricity has been a significant contributor to the economic well-being of Ontario. Not only is electricity an essential of modern life, it has become a key factor in industrial competitiveness, both in terms of price and reliability. For these reasons Ontario Hydro's Demand/Supply Plan Report must be regarded as a major determinant of Ontario's long term economic prospects. Accordingly, Treasury's main concern is that the proposed plan ensure an adequate and reliable supply of electricity generated as cost effectively as possible within the framework of responsible environmental stewardship and that the plan can be financed at a reasonable cost.

Treasury staff have examined the following aspects of Hydro's DSP:

- Load forecast and economic growth assumptions;
- Fuel prices and availability;
- Avoided cost determination and application;
- Demand Management;
- Non Utility Generation;
- Major Supply Options; and
- Financial Implications.

The conclusion reached is that from an economic and financial standpoint Ontario Hydro's recommended mix of generation, as detailed in Plan 15, provides Hydro with flexibility to meet

Ontario's needs for secure, reliable low-cost electricity generated in a responsible manner. This view is based on the information provided by Ontario Hydro on the relative economics of the various sources of generation, the reliability and price of fuel supply, the environmental consequences of the optional power sources, and the economic benefits associated with the development of the generating technologies.

With respect to a number of factors which will influence the ability of the plan to deliver in accordance with targeted objectives, Treasury makes the following observations:

- A review of the key economic assumptions underlying the median load forecast indicates that Hydro's estimate of demand is more likely to be conservative than excessive. Thus, flexibility to accelerate system expansion in a cost effective manner is very important.
- Treasury agrees that natural gas-based generation (either by Hydro or independent producers) is attractive as a relatively quick means to provide additional supply. However, there are significant long-term uncertainties with respect to the price and availability of natural gas.
- Hydro's view of avoided cost as the maximum price Hydro should pay for non-utility generation and demand management is economically appropriate and desirable. However, a review of the methodology to determine avoided costs is critical.
- More experience with demand management programs will be needed to assess their contribution. The application of avoided cost will be a significant factor in obtaining the maximum amount of economic energy savings.
- Non-utility generation is desirable when it is obtained at costs lower than incremental self-generation or purchases. The adoption of a competitive bidding process for non-utility generation should not be delayed unnecessarily since it will permit electricity consumers to share in the benefits of independently produced power.
- While the plan can be financed, Treasury agrees with Ontario Hydro's observation that the cost of funds may be in the upper range of projections.

It is Treasury's view that from an economic perspective, a significant attribute of the DSP will be its ability to respond effectively to unanticipated future events. It is Treasury's sense that, given the tight supply situation that is expected to prevail in the Northeastern part of the continent, the economic burden of coping with lower than anticipated demand will be less than the costs associated with meeting higher than expected demand. The former can be accommodated by exporting surplus power or by postponing or stretching out major supply projects in the early stages of construction, whereas severe economic impacts could result if Hydro is unable to meet demand. Environmental assessment approval for plans designed to meet the upper load forecast will minimize the likelihood of adverse consequences to the reliability, adequacy, and cost of electricity supply. However, an analysis of the economic and environmental implications of excess versus deficient capacity should be undertaken.

2. THE MANDATE OF THE MINISTRY OF TREASURY AND ECONOMICS

The Ministry of Treasury and Economics carries responsibility for the formulation and recommendation of policies that ensure and strengthen the viability of the Ontario economy. As well, the Ministry carries responsibility for the fiduciary and budgetary affairs of the Province.

The DSP is directly relevant to the mandate of the Ministry of Treasury and Economics since the future growth and competitiveness of the Ontario economy will depend, in part, on a secure,

reliable and efficient supply of electricity at competitive prices. In that the DSP impacts Hydro's borrowing requirements and the Province guarantees Hydro's debt, the Ministry of Treasury and Economics has a responsibility to review and determine the financial implications of future plans.

3. LOAD FORECAST

The quality of any load forecast is dependent on the methodology employed and on the accuracy with which the variables that explain electricity use are predicted. Hydro utilizes econometric and end-use forecast methodologies in assessing future electricity demand. The key factors driving Hydro's econometric load forecast are GDP growth, the price of electricity, and the prices of competing fuels. The GDP forecast, in turn, is heavily dependent on projections for population and productivity growth. As for the end-use forecast, Hydro examines trends in technology and other factors which have an influence on future electricity demand.

Ontario Hydro is forecasting long-term electricity load growth of 2.3 per cent (about 700 MW) per year from 1987 to 2010 (DSP Chapter 3 and Load Forecast 881212). This is approximately equivalent to one unit of the Darlington Nuclear Station operating 80 per cent of the time. The load forecast is predicated, in large part, on an average annual growth of real GDP of 2.7 per cent to 2010, no growth in real electricity prices (-0.2 per cent) and a rise in the real average annual price of oil and natural gas by 1.0 per cent and 1.5 per cent respectively.

Based on a review of the principal economic assumptions driving the load forecast, Treasury believes that Hydro's median load forecast appears more likely to be too low than too high. This position is primarily due to differing demographic forecasts (i.e. Hydro's and Treasury's) but also due to Treasury's expectation of greater consumer response to the forecast differential between the prices of electricity and oil and gas.

KEY ECONOMIC FACTORS IN HYDRO'S LOAD FORECAST 1988-2010

	1988- 2000	2000- 2010	1988- 2010	TREASURY COMMENTS
	per cent per annum			
Real GDP	3.2	2.2	2.7	Consistent with other forecasts
- Population	--	--	0.8	Treasury's forecast is for 1.0 per cent
- Labour Force	1.5	0.7	1.1	Treasury disagrees with Hydro's assumption of saturation in the participation rates of women.
- Productivity	1.6	1.5	1.6	
Relative Prices				
- Electricity	-0.2	-0.2	-0.2	Prices may be higher on account of higher costs (e.g. fuel prices and environmental regulations).
- Natural Gas	1.8	1.2	1.5	
- Oil	1.2	0.7	1.0	

GDP Forecast

Hydro's forecast of real GDP growth of 2.7 per cent is consistent with other long-term forecasts. However, while the Ministry of Treasury and Economics does not produce estimates of future electricity demand nor forecasts of long-term growth in the Ontario economy, Hydro's GDP forecast may be conservative due to its assumptions about population and labour force growth.

Population and Labour Force Projections

- Hydro's projection for population growth of 0.8 per cent (Load Forecast 881212) is below Treasury's projection of 1.0 per cent annually over the 1988-2010 period (Demographic Bulletin, July 1989). By 2010, Hydro sees total Ontario population at "just over 11.5 million" compared to Treasury's outlook for 11.8 million. Indeed, with long-term views on immigration being revised upward, the "higher" population projection scenarios are becoming more credible; Ontario's 2010 population could easily reach 12.5 million. Since there is a close relationship between population growth and energy consumption, it is Treasury's view that Hydro's assumptions in this area could result in a conservative projection of load growth (i.e. from both an econometric forecasting and end-use analysis perspective).
- Hydro's labour force projection is for growth of 1.5 per cent for 1988-2000, 0.7 per cent between 2000 and 2010, and 1.1 per cent for 1988-2010 as a whole. A key feature of Hydro's assumption is a rapidly decelerating labour force growth caused, in part, by a saturation in the labour force participation of women.
 - Hydro's labour force projection for 1988-2000 is consistent with Treasury's forecast for 1.5 per cent average annual growth from 1987 - 2001. Although Treasury does not have a forecast beyond 2001, Hydro's projection for 2000-2010 (0.7 per cent) seems to be on the low side since Treasury does not share Hydro's view that the labour force participation of women will become saturated within this time frame.

Electricity Intensity

- A critical judgmental input to Hydro's load forecast is that the electricity intensity of economic activity will decline. This view has the effect of lowering the forecast.
 - It is possible that a reduction in the rate of growth of the supply of labour would create incentives to substitute capital (and perhaps energy) for labour, thus raising productivity and, potentially, electricity intensity.
 - It is possible that the relaxation of political tensions between East and West may result in an increase in demand by Eastern Europe for capital and consumer goods, thus boosting industrial production and therefore electricity consumption in Western economies.
- Hydro's forecast of a real rise in fossil fuel prices and a real decline in electricity prices, implies that some substitution of electricity for natural gas and oil will occur, in response to changing relative fuel prices, where technically feasible. While this has been taken into account in the load forecast, Treasury's belief that the increase in oil and natural gas prices could be higher than forecasted (see below) implies a further possibility that electricity intensity may not fall to the degree anticipated by Hydro.
 - It is noted however that interfuel competition can also be heavily impacted by possible future taxes (e.g., a carbon tax).
- In addition, there may be an increased incidence of substitution of electricity for other fuels for non-price reasons, chiefly increasing social concerns about the environmental impact of economic activity. Such socially induced substitutions could counteract the forecasted decrease in the electricity intensity of the Ontario economy. As an example, regulatory measures taken to reduce the emission of greenhouse gases and/or other air emissions could lead some firms to migrate to "clean" electricity even if its price exceeded their current source of energy on a BTU basis. (A similar move to natural gas might also occur although, as with any fossil fuel, its combustion results in the release of carbon dioxide.)

4. FUEL PRICES AND AVAILABILITY

The price and availability of fuels are significant determinants in the economic feasibility of various plans. Of the three principal fossil fuels, namely, coal, oil and natural gas, there is greatest certainty regarding the future price and availability of coal. There is relative stability in coal supply and prices due to the size and proximity of the resource base as well as the existence of a well-developed transportation infrastructure. However, as noted below, the price and availability of crude oil and natural gas should be closely scrutinized. Uranium is an indigenous fuel and a small component of the cost of nuclear power.

Oil and Natural Gas

Ontario Hydro forecasts a 1.0 per cent per annum increase in the price of oil in real terms to 2010. However, Treasury staff believe that this estimate is probably conservative in part because of the expansion of demand over the past several years and in part because the USSR and other Eastern European countries will expand their consumption of crude oil in order to accommodate economic growth. As well, the expansion of East-West trade may spur economic growth (and the demand for oil) throughout the world.

Natural gas prices are also heavily influenced by movements in international oil prices which, as noted above, may increase more than anticipated by Hydro. Deregulation and the Free Trade Agreement have unified North American markets so that adjustments in U. S. natural gas prices will be transmitted to Canadian markets. In both Canada and the U. S., natural gas may experience

new sources of demand due to its benign environmental characteristics relative to other fossil fuels. Its use as a transportation fuel (either directly as compressed natural gas or indirectly through conversion to fuel methanol) or as a fuel for electric power production (i.e., in order to avoid coal-fired generation or to take advantage of high efficiency co-generation programs) could increase significantly. Fixed-price long-term gas supply contracts are not currently the practice in the industry. In the absence of such arrangements, Hydro would be exposed to sudden increases in the cost of this fuel. Most cogenerators will also be relying on natural gas and, if not backed by firm gas contracts, will face significant financial risks.

The availability and price of natural gas for the various DSP plans should be examined in detail. The concentration of the natural gas demand volumes over a relatively short period of time, from 2008 to 2013 (figure 7-5.5, DSP Analysis Report), and during the winter peak demand period (figure 16-3, DSP Plan Report) raises significant logistical questions and has pricing implications which should be thoroughly explored.

5. AVOIDED COST

In view of the importance of avoided cost to the non-utility generation industry and in the estimation of potential energy saving from demand management, a thorough review of the methodology of calculating avoided cost, particularly with respect to short-term supply, is desirable. Ontario Hydro defines avoided

cost as "the supply costs which are avoided when any demand or supply option is substituted for an equivalent part of a demand/supply plan", where supply costs are those costs borne directly by Hydro. However, from a broader public policy perspective, environmental and social costs external to Ontario Hydro should be recognized in assessing electricity demand and supply options.

While Treasury recognizes that quantifying environmental and social costs and benefits is very difficult, not to incorporate them may result in anomalies and less than optimal solutions. For example, while Ontario Hydro has been purchasing power from utilities in the United States as part of its strategy to lower acid gas emissions, the negative environmental impacts for Ontario of U. S. coal-based generation are not taken into account. Similarly, in a longer term planning context, the failure to credit nuclear power for displacing the emissions associated with burning fossil fuels could undervalue this option.

6. DEMAND MANAGEMENT

The emphasis placed in the Demand/Supply Plan on demand management in bridging the supply-demand gap is appropriate. Treasury supports Hydro's policy that demand management proposals be pursued when their total cost of implementation is equivalent to or less than their life cycle avoided cost.

While Hydro's estimate of achievable demand management may be challenged before the Board, it should be noted that the

estimate is not a target and thus does not limit the number of megawatts that may be saved through demand management. Rather, the amount of demand management realized will be influenced by the determination and use of avoided costs, electricity pricing levels and policies, the design of programs and the interest of individuals and private businesses.

Hydro's estimate of potential demand management is relevant, however, for planning purposes. In view of the limited success of past incentive programs (e.g., high efficiency motors), caution is suggested in estimating what will be achieved, at least in the initial stages of programs. The difficulty is that key decisions on demand management rest with private businesses and individual consumers whose priorities may differ from those of Ontario Hydro and thus whose response to the utility's financial incentives may not be to the degree expected. Also, the amount of demand management will depend upon factors external to Ontario Hydro such as unanticipated price changes for electricity or competing fuels and technological changes.

7. NON-UTILITY GENERATION

Ontario Hydro's policy "to continue to promote the maximum attainable economic non-utility generation through purchase rates set at levels up to avoided costs" appears to be consistent with Hydro's mandate to provide power at cost. A policy of paying competitive prices would allow Hydro to pay less than avoided costs in some circumstances and thus ensures that a portion of the cost

savings available from non-utility generation are shared with rate-payers. If power is automatically purchased by Hydro at full avoided costs, then private generation will not lower system costs, and there will be no cost advantage over Ontario Hydro-operated generation.

The adoption of a competitive bidding process to acquire privately produced power would be appropriate to ensure that Hydro does not pay more than necessary and that savings are shared. The development of economic private generation should not be adversely impacted by a competitive bidding process. Many of the firms which will be involved in cogeneration are large sophisticated firms. They will have the cooperation and perhaps backing of the gas distribution companies.

As under demand management, it is likely that Hydro's estimate of available private (non-utility) generation will be an issue before the Board. However, Hydro's estimate is not a target and should not be interpreted as such. Rather, it is the solicitation process which will determine, to a considerable extent, the magnitude of non-utility generation. Thus it is vital that the solicitation process adopted by Hydro is "fair" and does not impede the development of economically justifiable non-utility generation.

The amount of economic non-utility generation is limited by the availability of economic alternatives, principally nuclear and clean coal technologies. Over the long run (post-2000), base-load non-utility generation is evaluated against Ontario Hydro's estimate of avoided costs for base-load generation. While non-

utility generation can be expected to expand over the interim period when there is insufficient time to construct major supply sources, over the long term, its role will be largely influenced by its ability to serve peaking or intermediate load requirements.

To repeat an earlier point, we believe that the assumptions respecting the availability and price of natural gas (the principal fuel for many potential NUG projects) are critical and need to be tested. In particular, there is a need to test the sensitivity of non-utility generation to jumps in natural gas prices, as well as to various risk sharing mechanisms and contract exit provisions.

8. MAJOR SUPPLY SOURCES

The Demand/Supply Plan Report provides adequate coverage of available supply options and the set of alternative cases retained by Ontario Hydro for more detailed consideration covers a satisfactory range of choices of system configurations. The document is well structured and the progression from general principles and objectives to detailed plans is logical and clear.

With respect to the approval requests in the DSP, the long period of time required from the initial consideration of principles to the undertaking of specific projects makes it appropriate that Ontario Hydro should seek approval of a set of projects predicated on the upper demand forecast. (Decision to proceed with specific elements of the plan would be contingent upon a review of recent load growth and other developments which impact the need for the facilities.) Hydro's request for approval is, however, limited

to those facilities for which an Environmental Assessment document is expected to be submitted before the end of 1996.

Under Plan 15, the plan recommended by Ontario Hydro, major supply additions will consist primarily of natural gas-fuelled generation over the remainder of the decade and nuclear generation over the long term (2002-2014). Existing hydraulic and coal-fired generation stations will be retained and refurbished, as appropriate. The mix of generating resources is set out below.

Total System Capacity/Energy¹

	2000 ²		2014	
	<u>Capacity</u>	<u>Energy</u>	<u>Capacity</u>	<u>Energy</u>
NUG Purchases	5%	7%	4%	5%
Manitoba Purchases	-	1%	2%	3%
Hydraulic	22%	23%	22%	19%
Nuclear	40%	57%	47%	67%
Fossil	<u>33%</u>	<u>12%</u>	<u>25%</u>	<u>6%</u>
Total	100	100	100	100
	(35.6 GW)	(165.6 Twh)	(42.6 GW)	(213.6 Twh)

1 Medium load growth forecast.

2 Treasury estimates from DSP Report, Ontario Hydro.

Natural gas-fired generation is economically attractive as an interim supply option because new capacity can be introduced relatively quickly and there are relatively few problems with

getting site approvals as compared to other major generation options. However, as noted above, uncertainties about the longer-term availability and price of natural gas bring this option under question. Given the small differential in the cost of peaking coal and gas generation options retained in the plans (Figure 15-1, DSP Report) it would be desirable to examine the implications to Hydro's recommended plan of a further escalation in natural gas prices.

The addition of a coal gasification phase to combined cycle natural gas generating units (page 14-33; DSP Report), could provide important protection against the possibility of high gas prices and, therefore, should be examined in detail. Concerns about natural gas-fired generation, as noted above, suggest consideration be given to accelerating the timing of such clean coal technologies as Integrated (Coal) Gasification Combined Cycle (IGCC).

Over the long term, Plan 15 employs nuclear as the primary source of additional base load generation. There are many positive attributes of the CANDU technology.

- The low cost of nuclear was confirmed by the Ontario Nuclear Cost Inquiry.
- The Ontario Nuclear Safety Review, conducted by Dr. F. K. Hare, found that the operation of CANDU reactors in Ontario has not had significant adverse impacts on either the workforce or the public and "though the risk of accidents serious enough to affect the public adversely can never be zero, it is very remote".
- There are no SO₂, NO_x or CO₂ emissions. Because CANDU is a closed system, there are virtually no emissions. Historically, releases have been less than 1 per cent of AECS approved levels.

- One can have a high degree of confidence respecting the supply of uranium. It is indigenous to Ontario and Canada and the economic benefits derived from its mining and processing remain largely in Canada.
- The reliability of CANDU technology has been demonstrated over many years. In general, CANDU reactors have achieved high performance records in comparison to other reactor technologies.
- Significant benefits accrue to the Ontario economy. These include the supply of competitive source of electricity, a pre-eminent research capability (AECL), as well as extensive employment and industrial spin-offs from the construction and operation of nuclear facilities.

The long-term disposal of nuclear fuel waste is an issue which has yet to be resolved. While one cannot be certain what level of expenditures for disposal will be required until a method of disposal is endorsed in Canada, Hydro's rates include a provision for the disposal of nuclear waste. The establishment of a seven-member federal Environmental Panel to review the safety and acceptability of the concept of geologic disposal of highly radioactive nuclear fuel waste should facilitate resolution of this matter.

9. FINANCIAL IMPLICATIONS

Ontario Hydro's Demand/Supply Plan contemplates high levels of gross borrowing but stable financial ratios.

Borrowing Requirements

Annual gross borrowing over the plan period ranges from \$1.2 billion (all dollar figures are in 1989 dollars) to \$6.6 billion, depending on the case and load growth forecast. Total cumulative borrowing ranges from \$51 billion to \$95 billion.

The pattern of borrowing is for a period of quite heavy borrowing around the year 2000 and a second such period around the year 2009. During these peaks, annual gross borrowing lies in the \$4.6 - \$5.9 billion range (\$2.6 - \$3.7 billion for net borrowing) for Hydro's recommended Case 15 under median load growth and the \$6.4 - \$6.6 billion range (\$3.3 - \$3.7 billion range for net borrowing) under upper load growth.

Annual borrowing as projected in the plan reflects primarily the planned timing of capital expenditures. If debt management techniques were used to smooth the timing, a pattern approximating the average annual requirements might be achieved. Although this would decrease the peaks in borrowing requirements, it still leaves high needs. Under Case 15 with median load growth, the average gross borrowing requirement for 1990-1999 is \$2.6 billion, rising to \$4.3 billion for 2000-2009. The corresponding averages for a high load growth scenario are \$3.0 billion and \$5.5 billion. The figures for the period 2000-2009 should be given some extra consideration due to Hydro's expectations that costs and financial needs in the period beyond 2014 will be similar to those of the last decade of the study.

Gross borrowing averaged \$3 billion during the period 1985-89, a period of rapid growth for the economy and for capital markets. Hydro's 1990 requirements of \$4.5 billion are considered difficult to fulfil. Further, in assessing the magnitude of Hydro's future requirements it is noteworthy that for 1990 the Demand\Supply Plan projects gross borrowing of no more than

\$4.1 billion, substantially less than currently forecast by Hydro. As well, at least one more significant borrower, the Province of Ontario, will be competing for public market funds in the future. Foreign markets and investors, for which financing opportunities are likely to appear in short windows and to be tied to expectations for the Canadian dollar, should not be expected to alleviate the situation fully. Either healthy real growth in the size of the public market or as Hydro notes in the Demand/Supply Plan Report, an increase in either or both borrowing costs or risk will likely be necessary to accommodate Hydro's requirements as projected for the latter half of the planning period.

Net Income and Financial Ratios

Hydro's financial structure remains stable. The projected amounts of net income generally exceed levels of the past five years and would appear to be reasonable given the good performance of the related financial ratios. However, net income is projected based on the present method for setting net income targets, which is currently under review. As well, movement in financial ratios is in accordance with achieving Hydro's net income targets.

Hydro's debt-to-capital ratio is expected to remain in the 0.75 - 0.81 range through the year 2009. Under most scenarios, the ratio falls during the first decade of the plan, relapsing in the final years of the plan approximately to its 1989 level. While the more intensively nuclear options tend to support the debt ratio close to its 1989 level, none of the options raises the ratio above that level.

The projected debt ratios compare favourably with the preceding twenty-year period. The debt ratio rose rapidly from 0.75 in 1971 to a peak of 0.85 in 1978 and has trended downward to 0.818 in 1989. Both the level and quality of interest coverage reflect similar patterns and comfort levels.

Sensitivity Analysis

Hydro's analysis is that the time profile of borrowing requirements is fairly robust between cases, although somewhat more sensitive to load growth.

There is rather less consideration of contingency planning for the event that Hydro might need to shift unexpectedly from one borrowing path to another quite different from the previous. Hydro's observation that, around the year 2000, a 1 percent increase in rates would be expected to increase revenues by \$100 million provides some measure of financial comfort, if little comfort for price policy.

10. CONCLUSION

Notwithstanding the concerns identified in this paper, it is Treasury's view from an economic and financial standpoint that Plan 15 provides Hydro the flexibility to meet Ontario's needs for secure, reliable low-cost electricity generated in a responsible manner.

- As in all the plans, Plan 15 indicates an intent to optimize the utilization of existing plants and Ontario's remaining economic hydraulic potential.

- Hydro's demand management strategy is consistent with government policy and the adoption of avoided cost as the maximum price to be paid for power will encourage the full development and benefit of economic non-utility generation.
- While non-utility generation is desirable, the degree of uncertainty associated with demand management and non-utility generation exposes the system to considerable risk. It is important to ensure that Hydro has the flexibility to respond in a relatively cost effective manner should load growth or natural gas prices exceed forecast values.
- An important aspect of Plan 15 is the role of CANDU technology in base generation. CANDU offers advantages over other supply options and has a history of reliability under Hydro management.
- Plan 15 will also make extensive use of low capital cost natural gas-fuelled combustion turbine units for peaking generation. However, the potential for significant escalation of gas prices is a concern.
- In light of the importance of diversity of supply and the uncertainty around future gas prices and availability, coal should not be lost as an option - and hence Ontario Hydro should continue its efforts to adopt clean coal technologies. In this regard, development of IGCC technology is very important.
- Plan 15 has a high Ontario content and thus delivers major economic benefits to the Province.
- While the plan can be financed, Treasury agrees with Ontario Hydro's observation that the cost of funds may be in the upper range of projections.

OTHER

ENVIRONMENT CANADA



Environment Canada
Conservation and Protection

Environnement Canada
Conservation et Protection

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Région de l'Ontario
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Toronto (Ontario)
M4T 1M2

Your file Votre référence

Our file Notre référence

June 1, 1990

P-89-94

Mr. D. Smith
Senior Environmental Planner
Environmental Assessment Branch
Ontario Ministry of the Environment
250 Davisville Avenue, 5th Floor
Toronto, Ontario
M4S 1H2

Dear Sir:

Re: **Ontario Hydro 25 Year Demand/Supply Plan
Environmental Assessment**

I am forwarding a copy of Environment Canada's remarks based on our review of the initial Hydro document "Providing the Balance of Power", Demand/Supply Plan Report. The comments originate within Environment Canada, and as noted in prior correspondence, do not reflect the technical review or positions of other federal agencies.

The appended remarks are generally limited to Environment Canada's technical concerns and do not attempt to address in any detail the plan's development from a context of long-term sustainable development. This broader question and the issue of Ontario's energy policies beyond the 1990's is expected to be the subject of extensive discussion by the many participants in the upcoming EA Board hearings.

The material is presently only in English language form and a French language copy will be provided shortly per your request.

I look forward to the ongoing EA review and trust that you will contact my office if additional information is desired.

Yours truly,

J.E. Smith, P.Eng.
Chairman, Environmental Assessment
Coordinating Committee
Conservation & Protection
Ontario Region

cc: D. Egar
B. Boulden
EACC members

Canada

-ENVIRONMENT CANADA
ONTARIO REGION

Technical Review of:
Providing the Balance of Power -
Ontario Hydro's Demand/Supply Plan (DSP) Report
For Ontario Environmental Assessment Review

1. CLIMATE AND ENERGY

The importance of the climate-energy connection is not adequately addressed in the DSP. From both the engineering design and the long-term DSP planning points of view, the sensitivities to weather and climate require attention. In the DSP, both the demand projections and the supply options (including supply and transmission) should consider the sensitivities to the regional climate change. There are many considerations in this regard, including the reliability of surface runoff for the hydro-electric generation, and the potential change in the demand patterns (e.g. spatial and seasonal distributions).

This DSP essentially assumes the current climate norms. Ontario Hydro's philosophy of "diversity" (Chapters 15 and 17) should accommodate both the variability of climate in general, as well as potential major shifts in the regional climate.

Projections of peak power requirements appear based on winter peak load estimates. Although it was recognized that the urban peak load occurs in summer for air conditioning, the province-wide peak load is assessed for winter heating requirements. Peak load estimates should also be based on summer requirements and an analysis would be useful in estimating the potential impact on peak load under a "climate change (warming) scenario". (As a hypothetical example, a 2 degrees C or 3 degrees C warming in the mean winter and summer temperatures can represent significant changes in the seasons' heating and cooling degree-days.)

2. ENVIRONMENTAL IMPACTS - AIR EMISSIONS

Air Quality

Increased controls on acidic gas emissions have been initiated for several years and all proposed cases appear to meet current regulations during the period of the Plan. The median and upper load forecasts for SO₂ and total acid gas emissions under Case 26 increase significantly toward the end of the study period, approaching the regulatory limit. This case will allow very little margin for variation if new regulations are introduced (e.g. beyond 1994), if equipment failures occur, or if the emissions forecasting is inaccurate.

A major air quality issue is ground level ozone. In the Report the discussion of NO_x controls focuses on their contribution to the acidification problem. The rationale should include the control of surface ozone particularly in certain populated and industrial regions. The Report notes that no specific limit of NO_x emissions exists at this time. In fact, Canada has endorsed the United Nations Economic Commission for Europe-LRTAP Convention, Protocol and NO_x by 1994, and the adoption of "Best Available Technology Economically Achievable Emission Standards" for major combustion sources.

The Canadian Council of Ministers of the Environment (CCME) is currently engaged in a public consultation process to develop a plan to manage NO_x and volatile organic compounds (VOC) in Canada. This will result in control strategies for these chemical species. Ground level ozone is an air pollution problem in the Quebec City-Windsor corridor, where Ontario Hydro has a number of facilities. The Draft Management Plan, distributed in March 1990 as part of the consultation effort, recommends "region specific new source performance standards for...the Windsor-Quebec Corridor, to be effective by 1995, and retrofit existing fossil-fuelled power plants...by 1997, to NO_x emission levels no less stringent than: for coal, 100 ng/J of heat input; for oil, 90 ng/J of heat input; and for gas, 30 ng/J of heat input". It was recommended that the actual emission limits should be determined by the Ontario government by December 31, 1992. The NO_x and VOC control strategies will be implemented to reduce the surface ozone concentrations to the 1 hour objective of 82 ppb. In view of these imminent controls, Ontario Hydro should perform additional analysis on their proposed supply options with respect to surface ozone conditions.

Greenhouse Gases - Global Warming

The DSP has included in its analysis an "illustrative target" for CO₂ reduction of 20% by 2005, as was recommended by the 1988 Toronto Changing Atmosphere Conference. The adequacy and practicality of such a target is the subject of current debate. The DSP (Chapter 17) suggests that even the 20% reduction target for Ontario Hydro would be marginally achievable in the proposed options. More stringent targets to further reduce greenhouse gas emissions are likely to be considered for the period beyond 2005. What further reductions are achievable by the various supply options, to the end of the DSP planning horizon?

Are there other greenhouse gases which Ontario Hydro could either directly or indirectly stabilize or reduce, e.g., methane releases associated with expanded hydro projects?

Environmental Baseline Data

The report should commit to establishing comprehensive baseline environmental information to support future project specific assessments, and enable monitoring of the effectiveness of mitigation measures. Broad baseline information is especially appropriate in view of the potential implications of the DSP on both Ontario and its neighbouring regions, and will be essential to evaluate, from the long term planning/monitoring perspective, cumulative impacts from the DSP's multiple projects.

3. ENERGY EFFICIENCY AND CONSERVATION

The achievement of the 20% CO₂ reduction is based on increasing the nuclear share of supply and the conversion to natural gas. Are there not more aggressive energy efficiency and conservation options which would reduce the total demand "up front" and therefore build in the reduction of adverse environmental effects e.g., air emissions?

Additional attention should be provided to renewable energy supplies, in addition to the DSP's focus on hydraulic generation.

The DSP should discuss in further detail planned investments for, and expectations from, research and development either specific to Hydro or throughout the energy sector, e.g., in areas of energy efficiency and conservation.

4. ENVIRONMENTAL STANDARDS

The DSP should state Ontario Hydro's commitment to comply with established federal guidelines, standards and Codes of Practice eg. the Environmental Codes of Practice for Steam Electric Power Generation, Siting Phase, Design Phase and Construction phase. Federal environmental standards and guidelines should be met or exceeded in all instances.

5. SUSTAINABLE DEVELOPMENT

Sustainable development is a broad goal which means directing our efforts towards a future which is both economically productive and environmentally sound. Any decisions should include a full recognition of environmental factors and the need to maintain a sound environment and resources base for future generations. In order to achieve this goal, the DSP should address and manage the supply, (including alternative forms of energy, equipment upgrading, etc.), and the demand (including the effect of energy reduction programs, new appliances' efficiency, etc.) as a whole, integrated with one another, as opposed to managing the supply in order to meet the demand. The resultant focus of such an integrated approach and a desire to maintain an environmental quality could lead to a significantly different analysis, and potentially could shift the expenditure of resources away from energy production/conversion, and towards additional incentives for conservation and energy efficiency.

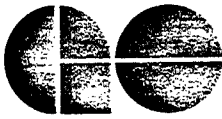
6. FUTURE CONTROL STRATEGIES

There are currently several public forums debating energy and environmental strategies. These include the Government of Canada's "Green Plan", the Ontario Government's planned "White Paper" on greenhouse gas control strategy, the federal/provincial task forces on energy and environment (including the initiatives of the federal and provincial ministers of energy and environment, and the Ontario Round Table), and the Management Plan for NOx and VOC. These will likely result in the formulation of policies, guidelines, and standards which will affect the utilities. Their implementation will place further pressure on electrical energy demand and supply, over and beyond that presented in the current Plan. The DSP, as much as possible, should anticipate the directions and consequences forthcoming from the debates.

7. WATER AVAILABILITY & USE

Consumptive water use is acknowledged in the DSP as a rising issue and should be addressed more fully in the document. In the context of "climate change", where the availability and distribution of water may change from the current condition, competitive demand for water and perhaps simply water shortages may compromise Ontario Hydro's implementation or the DSP.

GO-TRANSIT



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GO Transit

(416) 665-9211 Fax (416) 665-9006

30 March 1990

Mr. David Smith
Environmental Assessment Branch
250 Davisville Avenue, 5th Floor
Toronto, Ontario
M4S 1H2

Dear Mr. Smith,

Re: Ontario Hydro Demand Supply Plan

We have reviewed the contents of the "Balance of Power" submission for concerns affecting GO Transit.

As you may be aware, GO Transit's traction power is currently provided entirely by diesel electric locomotives. At various times in the past the possibility of electrifying the GO Transit network has been considered. Under current conditions, our priority is to expand the capacity of the system to serve the growing demand in the Greater Toronto Area. As the GO network reaches maturity, the possibility of electrifying the network may be reconsidered. This may occur 20-25 years from now, within the horizon of the "Balance of Power" projections. This power requirement would peak during the morning and evening rush hours, and reliability would be critical.

We have identified no impacts on GO Transit's activities, other than the possibility mentioned above. We appreciate the opportunity to comment on this document, and would like to be kept informed of the progress of the Environmental Assessment Review and subsequent hearings.

Yours truly,

A.P. Robinson
Manager, Project Development

NIAGARA ESCARPMENT COMMISSION



Ontario



Niagara
Escarpment
Commission

Commission de
l'escarpement
du Niagara

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26 March 1990

Mr. David Smith
Ministry of the Environment
250 Davisville Avenue
Toronto, Ontario
M4S 1H2

Dear Mr. Smith:

Re: Niagara Escarpment Commission Comments
Ontario Hydro Demand/Supply
Environmental Assessment

The Niagara Escarpment Commission, at its meeting of March 22, 1990 approved the following recommendations as its position on the Ontario Hydro Demand/Supply Plan.

Recommendation #1: That the DSP be based on clear long term energy planning direction provided by the Province. The provincial direction regarding future energy demand and supplies should be outlined in the DSP, with analysis being undertaken to ensure that the demand and supply options satisfy the provincial direction and are accountable to it.

Recommendation #2: That the Strategy form part of the documentation being examined through the environmental assessment process.

Recommendation #3: That the overall DSP approach be revised to reflect strategic sustainable development directions and to ensure that both demand and supply measures are in keeping with this.

Recommendation #4: That any approval of the DSP be made subject to an ongoing monitoring process and a five year review process.

Recommendation #5: That the DSP include an implementation section which includes a requirement for individual environmental assessments to identify and

Recommendation #6: That the approach used to determine the Basic Load Forecast be revised to reflect sustainable development directions, the implication of technological change, and the increased economic viability of energy savings through softer energy paths.

Recommendation #7: That the rational and judgements behind the projection of a bandwidth forecast be made explicit.

Recommendation #8: That the analysis of the Basic Load Forecast be re-examined to ensure that the intended approach of averaging the projections from the forecasting methodologies is consistently applied.

Recommendation #9: That the demand management component form part of the Environmental Assessment and be made mandatory, with specific demand management targets being set and forming a condition of any Environmental Assessment approval. Further, the evaluation of environmental and economic benefits of demand management should be more aggressively pursued.

Recommendation #10: That demand management be more aggressively pursued, in line with sustainable development directions.

Recommendation #11: That an optimum demand management scenario be set out and evaluated in comparison to the supply option.

Recommendation #12: That the predictions regarding energy efficiency improvement be monitored and updated periodically in order to account for technological advances.

Recommendation #13: That Ontario Hydro revise its evaluation criteria to include environmental characteristics as a primary consideration.

Recommendation #14: That the selection of a supply option be based on the following:

1. Optimization of use of existing facilities.
2. Minimization of waste. We have particular interest in cases which minimize production of fly ash in order to negate pressures for use of Escarpment areas for landfill purposes. It should be noted that we do not consider fly ash to be a suitable material for pit/quarry rehabilitation.

3. Reduction in toxic air emissions, due to general environmental impact.
4. Options which avoid the Niagara Escarpment Plan area, particularly Escarpment Natural Areas, and are sensitive to the visual environmental, and recreational features of the Escarpment environment. This includes both site and transmission facilities.

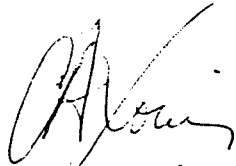
Recommendation #15: That Ontario Hydro be advised that the Commission does not accept the illustrative sitings related to the hydraulic, supply and transmission facilities as being an indication of need or any status of approval. The siting and selection of facilities will be dealt with through subsequent environmental assessments. In subsequent assessments first priority should be given to avoiding the Niagara Escarpment Plan. Beyond this, only essential utilities are permitted in Escarpment Natural Areas, being "that which is deemed necessary in the public interest after all alternatives have been considered". Consideration must also be given to the environmental, visual, recreational and agricultural emphases set out in the Plan.

Recommendation #16: That staff be authorized to present the Commission's position before the Preliminary and Main Environmental Assessment Hearings, if necessary.

A copy of the staff report is attached for your information.

Should you have any questions, please contact Deborah Ramsay, Planner or myself.

Yours very truly



C. A. Louis
Manager
Plan Administration

encl.

C15

SUB # 7015

**Ontario Hydro Demand/Supply Plan
Environmental Assessment**

**Comments of the
Niagara Escarpment Commission
to the Ministry of the Environment**

March 22, 1990

**Review of the Ontario Hydro
Demand/Supply Plan Environmental Assessment**

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March 22, 1990

Re: Ontario Hydro Demand/Supply Plan (DSP)
Environmental Assessment

Source: Ontario Hydro
Ministry of the Environment

Date Received: December 20, 1989

Summary Recommendation: The Ontario Hydro Demand/Supply Plan presents a good initiative in terms of long term energy planning and opens up the process to agency and public participation. However, the Plan requires modification to reflect sustainable development approaches, provincial direction, as well as to address specific concerns regarding demand projections and more aggressive demand management initiatives.

Overview: Ontario Hydro has prepared a Demand/Supply Plan (DSP), which sets out the basis and means by which electricity is proposed to be provided in Ontario to the year 2014.

An overview of the DSP, evaluation process, and strategic directions being put forward can be found in the attached copy of the Executive Summary (Appendix A).

More explicitly, Ontario Hydro has embarked on a strategic planning exercise which evaluates future energy demand, and the alternate supply scenario.

Demand is based on projections of energy growth which include use of demographic information, consideration of past energy use trends, and judgements regarding future growth conditions.

The effects of demand reducing options, contributions

of non-utility generation and capacity interruptible load opportunities are subtracted from the demand projections to determine future supply requirements.

Energy demands are met by thorough use of the existing system, development of additional hydraulic capabilities, out-of-province utility purchase, as well as additional fossil and nuclear generation.

Five supply scenarios are set out to meet the peak power energy demands. The option favoured by Ontario Hydro (Case 15) proposes that about two thirds of the needed capacity would be based on purchases and base load nuclear generation, with the remaining one-third being peak fossil generation. By the year 2014, this case requires 10 CANDU units at three stations, 6 CTU/CC (combustion turbine unit convertible to combined cycle operation) at one station, and 26 CTU/IGCC (Combustion turbine unit convertible to combined cycle and integrated gasification combined cycle operation) at three stations. The costs associated with this scenario, including load reducing options is \$16,111,000,000 in 1989 dollars.

Background: Development of the DSP has involved several stages, originating in 1984 with the preparation of a study of supply and demand options available to save or generate electricity.

In 1985-86 Ontario Hydro embarked on a public consultation process to determine attitudes on energy preferences and options. The Niagara Escarpment Commission was not included in the government ministries involved in consultation.

In 1986, the Select Committee on Energy, of the Ontario Legislature, held public hearings to discuss Hydro's planning options.

The above studies, consultation and analysis resulted in preparation of the Draft Demand/Supply Planning Strategy (DSPA) which set out principles, priorities and guidelines to be used in the development of Demand/Supply Plans.

In total, 15 representative plans were presented and evaluated in the DSPS, according to financial, social, community and environmental impacts, as well as sensitivity and risk analysis, Provincial economic impact assessment, discussion of resource diversity, and transmission aspects.

The Niagara Escarpment Commission was not afforded the opportunity to comment on the Strategy, which is the precursor of the Demand Supply Plan currently subject to review. Further, no preliminary (either formal or informal) consultation has occurred through the preparation of the DSP.

Proposal: Components of the DSP have been submitted to the Minister of the Environment for approval under the Environmental Assessment Act. Specifically, the DSP is being submitted under Section 3, which states that the requirements of the Environmental Assessment Act applies to "... enterprises or activities or proposals, plans or programs in respect of enterprises or activities" (emphasis added).

The DSP will, therefore, be required to comply with the requirements set out under the Environmental Assessment Act including the evaluation of alternatives and the assessment of impacts on the "environment".

The specific approvals being sought by Ontario Hydro are:

- . the requirement and rationale for:
 - . transmission facilities to incorporate electricity purchased from Manitoba;
 - . Eleven stations in the Hydraulic Plan;
 - . new fossil generation; and
 - . new nuclear generation
- . the requirement and rationale for combustion turbine units on existing sites, if required to meet electricity demand.
- . the requirement and rationale for radial transmission to connect the above generation to the Ontario Hydro transmission system.

The siting and mitigation of impacts associated with both supply and transmission facilities put forward under this undertaking are intended to be dealt with through subsequent, individual environmental assessments.

Relation to Mandate, Policies and Interests of the Niagara Escarpment Commission

The Commission's interest in the DSP is premised on the following:

1. From a legislative perspective, Section 2 of the

Niagara Escarpment Planning and Development Act states:

- "2. The purpose of this Act is to provide for the maintenance of the Niagara Escarpment and land in its vicinity substantially as a continuous natural environment, and to ensure only such development occurs as is compatible with that natural environment".
2. The Niagara Escarpment Plan contains an environmental emphasis throughout its various designations. Only "essential" utilities are permitted within Escarpment Natural Areas, being the most significant environmental areas. Essential is defined in the Plan as "that which is deemed necessary to the public interest after all alternatives have been considered."

The information and analysis associated with evaluating future demand and supplies is proposed to constitute the background planning and "justification and need" for future individual Environmental Assessments which may involve the Niagara Escarpment Plan. This background planning is stated by Ontario Hydro as not being revisited in future individual undertakings. It is, therefore, imperative that the Commission be satisfied that the information, criteria and rationale behind Ontario Hydro's strategic planning is based on acceptable principles with emphasis on current thinking on environmental and sustainable initiatives.

3. From a broader planning perspective the underlying premise of the Niagara Escarpment Plan is consistent with that of sustainable development. The Commission's experience in sustainable, strategic planning may be of benefit to Ontario Hydro in preparation of the DSP.
4. General environmental interest and concern exists regarding the future impacts of Ontario Hydro's activities on the Niagara Escarpment, including the management of waste products associated with the desulphurization process, air emissions, and the broad environmental, visual and recreational impacts that may be associated with activities envisioned in the DSP.
5. Designation of the Niagara Escarpment as an

International Biosphere Reserve warrants special consideration in any provincial scale planning activities.

Analysis:

I. GENERAL COMMENTS REGARDING OVERALL PLANNING APPROACH

First, it should be noted that Commission staff consider the DSP to present a good initiative which provides an opportunity for public and agency involvement into Ontario Hydro's long term program planning. The exercise of determining future energy demands and the alternative supply options is proactive and in keeping with a sound planning approach.

Notwithstanding this, the following concerns exist regarding the overall planning framework and its implementation.

1. Concerns Regarding Planning Objective and the Need for Provincial Direction.

The major planning thrust of the DSP lies in the stated goal of Ontario Hydro to provide low cost, reliable and flexible electricity supplies to its customers, and primarily to contribute to customer satisfaction.

Commission staff are concerned that Ontario Hydro does not have the ability to objectively plan for the province's broader public interest when its role, structure and corporate direction are biased to meeting needs, and not that of conservation or demand management.

This raises the question of the role of the Province in long term energy planning, and the need for the DSP to be based on provincial direction and leadership. We see the preparation of the DSP to be an opportunity for the Province to exercise leadership and direct the long term planning framework within which Ontario Hydro should operate.

Recommendation #1: That the DSP be based on clear long term energy planning direction provided by the Province. The provincial direction regarding future energy demand and supplies should be outlined in the

DSP, with analysis being undertaken to ensure that the demand and supply options satisfy the provincial direction and are accountable to it.

2. Relation to the DSP Strategy

Many of the strategic directions and evaluation criteria used in the DSP are contained in the Demand/Supply Planning Strategy, which was prepared and approved by Ontario Hydro in 1989.

Commissions staff consider the Strategy to be an important document since it sets out the main thrusts of Hydro's long term planning and the criteria are applied to evaluate the Demand/Supply plans and the environmental implications of the various choices.

Recommendation #2: That the Strategy form part of the documentation being examined through the environmental assessment process.

3. Concerns Regarding Sustainable Development

Provincial sustainable development initiatives are presently being prepared through the Provincial Round table on the Environment and Economy. Discussions with provincial representatives indicate that the Province's strategic directions on sustainable development are approximately 2 years away. A Public Issues Paper is due shortly which will set out objectives and direction for consideration on an interim basis.

As noted above, the DSP should be premised on long term provincial direction. Further, a strong need exists for the plan to be modified to reflect the sustainable development concept.

Within Hydro's exercise of planning for future energy needs, the Environmental Analysis briefly outlines how the environmental criteria for analysis of supply options were established in accordance with sustainable development.

There is no evidence to show that the principles of sustainable development have been applied either in Hydro's overall planning approach, or to the evaluation of BOTH the demand and supply components of the plan. While reference is made to the concept of sustainable development, examination of

the DSP and Environmental Analysis reveals that Ontario Hydro is putting forward a "business as usual approach" which does not reflect the fundamental paradigm shift that is called for.

In the Brundtland Commission Report entitled "Our Common Future" (World Commission on Environment and Development, 1987), the theory of sustainable development advocates that we are not in fixed state of harmony, but rather a dynamic process of change in which the exploitation of resources, direction of investments, orientation of technological development, and institutional change must all be made consistent with meeting future as well as present needs. Application of sustainable development requires that technological and social organizations be both managed and improved to make way for a new era of economic growth.

In the context of long term energy planning, the premise of the DSP should be based on strategies directed to demand reduction and ecologically sound supply alternatives.

While Commission staff recognize that the institutional and policy changes associated with sustainable directions have not yet been established by the Province, information on the underlying principles and implementation approaches is readily available. The DSP should be developed as working example of sustainable development.

Recommendation #3: That the overall DSP approach be revised to reflect strategic sustainable development directions and to ensure that both demand and supply measures are in keeping with this.

4. Monitoring and Re-evaluation Needs

Ontario Hydro has submitted the DSP as the long term energy planning document with a planning horizon which extends over the next 25 years. Commission staff are unaware of any other planning activity occurring in the province which provides a carte blanche approval for planned activities over this period without establishing the requirement for periodic monitoring and reexamination of objectives. This is particularly important in the context of sustainable development to ensure that the goals and implementation mechanisms are adaptive to ongoing technological

and societal value change.

Commission staff see the need for periodic monitoring and updating of the DSP to occur for the following reasons:

1. Many of the variables and factors included in identifying future energy needs are periodically reviewed and updated to reflect actual trends, as current information becomes available. For example, the use of demographic and GDP information in determining the Basic Load Forecast is updated by the Ministry of Treasury and Economics every five years based on current census data.
2. Many of the variables used in determining the avoided costs associated with demand management as well as the selection of one option over another are based on assumptions regarding our current technological capabilities and their economic viability. These factors can change significantly over the next few years, and more substantially over a 25 year period.
3. As previously mentioned, a plan which is consistent with sustainable development directions requires periodic monitoring to ensure these objectives are being realized. Periodic review of the Plan would give both provincial and private interests the opportunity to examine and reflect on the applicability and performance of the DSP in light of current thinking and changes, thereby making the process more accountable and adaptive.
4. Approval of the DSP should not result in the commitment to new supplies when the need has decreased. The flexibility should be built in through monitoring, with necessary adjustments to supply projections. Our primary concern is that an inappropriate demand projection and supply options not be locked in.

Recommendation #4: That any approval of the DSP be made subject to an ongoing monitoring process and a five year review process.

5. Relation to Individual Environmental Assessments

The DSP is intended to form the background and overall planning justification for subsequent individual environmental assessments (e.g. as evidenced through the Commission's recent review of the Niagara River Hydroelectric Development Environmental Assessment). In order to clearly identify the relationship of the DSP to individual projects, it is recommended that an implementation section be added to the DSP. This section should include a requirement that subsequent individual environmental assessments include reference to the DSP and specifically state the manner in which the project fits in with this overall planning document.

Recommendation #5: That the DSP include an implementation section which includes a requirement for individual environmental assessments to identify and evaluate the relationship of the project to the overall energy demand and supply planning as stated in the DSP.

6. Consultation Process

The DSP is an extremely important document which necessitates that agencies conduct a thorough review. The DSP is not a normal environmental assessment since it does not deal with a specific undertaking. The long term energy planning can have significant impacts on the Niagara Escarpment, e.g.. another proposed Escarpment crossing. Commission staff feel that the time provided for the review was too short in relation to the importance of the Plan.

II DETERMINING FUTURE ENERGY DEMAND

1. Evaluation of the Basic Load Forecast (BLF)

The first step involved in determining future energy needs is the Basic Load Forecast (BLF), which is based on two forecasting methodologies.

The econometric (topdown) approach utilizes statistical analysis of past energy consumption behaviour and

forecasts future energy requirements based on economic (labour force and productivity) and GDP growth. Labour force growth is derived through demographic models. Productivity is determined by applying a long term, historical trend based on the growth rate of productivity per worker. The real GDP Growth is based on the labour and productivity growth forecasts. Ontario Hydro projects that Ontario's real GDP will grow an annual rate of 3.2 percent per year, up to the year 2000. Beyond this, the GDP growth is estimated to reduce to 2.2 percent due to anticipated declines in the labour growth rates. For comparison purposes the growth rate over the past 5 years has been 5 percent, which indicates a general declining trend in the future.

The second forecasting methodology, the end use model, tends to utilize information on established uses of energy. It forecasts energy use by sector, starting with the initial stock of energy using devices, and integrates an estimate of future demand based on expert opinion.

The average if the two models are taken and projected as a "bandwidth forecast" wherein it is stated that an 80 percent probability exists of the basic load requirements actually falling in this range. This is projected on the basis of annual and peak energy demand, and attempts to deal with the uncertainty which Ontario Hydro states as being inherent in such projections.

The primary expertise and responsibility for ensuring that the information and evaluation techniques are acceptable rests with the Ministry of Energy and the Ministry of Treasury and Economics. We have interest in the information and methods used since it forms the crux of Hydro's long term energy demand projections.

Commission staff have the following general concerns:

a) Adequacy of Data and Analysis

Future sustainable energy directions should not be based on a "business as usual" approach. While the DSP states that forecasting is not based solely on an extrapolation of past trends, no information has been presented to indicate otherwise.

Projections regarding energy saving capabilities resulting from technological change have been held

constant, with the exception of those changes driven by normal economic forces.

Inherent in the application of sustainable development directions is the understanding that changes will occur in the ways economic and development directions are achieved. Concern exists that the Basic Load Forecasting does not account for the increased economic viability and energy savings through softer energy paths and technological innovations.

Recommendation #6: That the approach used to determine the Basic Load Forecast be revised to reflect sustainable development directions, the implication of technological change, and the increased economic viability of energy savings through softer energy paths.

b) Projected Bandwidth Forecast

While we can appreciate that a line projection of demand is unrealistic given uncertainties in future growth and economic conditions, questions exist as to the extent that a bandwidth forecast based on an 80% probability is justified. This results in a range of difference between the upper and lower forecasts which is equal to approximately 25% of the lower forecast. In comparison, a 60% bandwidth forecast was used in preparation of the strategy. We question the appropriateness of this broad range of flexibility.

The DSP also states that determination of bandwidth forecasts are based on judgements applied to the two forecasting models. While we recognize that qualitative interpretation of the forecasting information is necessary, the evaluation should include the rationale behind these judgements and how they are applied.

Recommendation #7: That the rational and judgements behind the projection of a bandwidth forecast be made explicit.

c) Interpretation of Model Results

The DSP states that results of the two forecasting methodologies are averaged to determine the Basic Load Forecast. Examination of the results of the Basic Load Forecast by Sector (Figure 3-16) reveals

discrepancies where in several cases the higher of the two projections is taken in terms of percent growth projections.

Staff are concerned that the interpretation of the Basic Load Forecast is inconsistent with the approach of averaging the results of the models, and appears to be biased to projecting a higher energy demand.

Recommendation # 8: That the analysis of the Basic Load Forecast be re-examined to ensure that the intended approach of averaging the projections from the forecasting methodologies is consistently applied.

2. DEMAND MANAGEMENT

One facet of Hydro's integrated planning program involves demand management. Within the DSP, demand management is set out as a "pursuit of opportunities to reduce or shift demand that is in keeping with the customer's interest, and will keep customer costs low". In the overall context of the task of meeting future energy needs, both the DSP and Environmental Analysis state that demand reduction and shifting options have not been examined and scrutinized as extensively as supply meeting options. The demand management programs are stated not to be affected by any incentive or hydro program.

The following forms of demand management have been considered: load reduction through energy efficiency improvements; load shifting in order to offset peak energy demands; peak clipping which reduces the magnitude of this form of energy demand most frequently through the application of capacity interruptible loads, valley filling which seeks to encourage the growth of customer loads during off peak times; and, load building which seeks to encourage the consumption of electricity during both peak and off-peak hours.

Demand reduction is viewed by Hydro in the context that such reductions have benefit both economically and environmentally through reduced demand for the construction of new facilities. The viability of demand management is evaluated on the basis of the concept of avoided costs. In other words, a program is considered to be economic if the sum of the customer and Hydro program costs is less than the corresponding present value of avoided supply costs, or what it would have cost Hydro to supply electricity not consumed

because of the implementation of a demand management program. This assessment of demand management based primarily on an evaluation in terms of customer costs.

The overall demand management program projects reductions of over 4,800 MW and 17 TWh by 2014. This constitutes an approximate 21 percent demand reduction when compared to the projections outlined in the Basic Load Forecast under the median load growth scenario.

The inclusion of demand management as a component of the Plan is an important first step. However, it should go further in terms of evaluating more aggressive demand management approaches.

The concerns of Commission staff are as follows.

1. Demand management forms an important component of the DSP and is a critical factor in determining future energy supplies.

While no Environmental Assessment approval is required for demand management, we consider it to form part of the undertaking to the extent that it is part of each supply option being put forward.

Also, staff recommend that demand management be made mandatory and form a condition of EA approval.

Recommendation #9: That the demand management component form part of the Environmental Assessment and be made mandatory, with specific demand management targets being set and forming a condition of any Environmental Assessment approval. Further, the evaluation of environmental and economic benefits of demand management should be more aggressively pursued.

2. Comparatively little of the DSP and related Strategy have been devoted to investigating demand management options. This aspect of the plan should be more aggressively pursued and given a higher profile in light of sustainable development directions.

Ontario Hydro commissioned a consultant to undertake an independent evaluation of their demand management projections, compared to other North American utilities. The report concluded that "Hydro's targets appear reasonable relative to sector size and contribution to peak demand".

However, examination of evidence presented by A. Lovins to the Select Committee on Energy (1986) reveals that many of the North American utilities who have promoted soft energy paths as well as economically successful, and aggressive demand management programs were not used in the comparison. We think that the potential for more active participation in demand management has been demonstrated, and should be applied to Hydro's activities.

Recommendation #10: That demand management be more aggressively pursued, in line with sustainable development directions.

3. In the evaluation of demand management options, Hydro should present the best possible scenario, being the optimum that could be pursued given economic viability. Various permutations of demand management should be examined against the supply options since avoided costs are likely to change with the different supply options. In other words, the economic viability of demand management is likely to increase relative to the more expensive and larger supply facilities.

Recommendation #11: That an optimum demand management scenario be set out and evaluated in comparison to the supply option.

4. Concern exists that the predictions of energy efficiency improvement are calculated on the basis of the existing technologies available in the marketplace. We believe that this is unrealistic given the potential for significant technological advances within the next 25 years that would further contribute to electrical energy efficiency improvements. These changes further justify the need for periodic monitoring and updating of the projections for future supply options.

Recommendation #12: That the predictions regarding energy efficiency improvement be monitored and updated periodically in order to account for technological advances.

III COMMENTS ON OPTIONS AND SUPPLY CASES

1. Evaluation Criteria

The Evaluation of the supply cases is based on primary and secondary criteria. Primary criteria are those which must be met, and appear to be the costs and calculable factors that can be internalized by Hydro. The costs of environmental requirements and standards, such as emission controls, low cost electricity, safety requirements and technical soundness are included.

Secondary criteria, which are factors to be considered and may influence recommended plans, include broader impacts such as resource preferences, environmental characteristics and public safety characteristics.

Commission staff are again concerned that the preference of options is based on economic and accounting costs, and does not balance this off with broader environmental and resource costs. If Hydro is serious about striking a balance in its planning for energy needs, environmental characteristics should be weighted as a primary criterion.

Recommendation #13: That Ontario Hydro revise its evaluation criteria to include environmental characteristics as a primary consideration.

2. Comments on Plans and Illustrative Sitings Recommended Supply Plans

In the previous sections we have recommended that Ontario Hydro pursue an aggressive and targeted demand management program. We believe that this re-evaluation will result in reduced supply requirements which are not reflected in the scenarios currently put forward by Hydro. For this reason, we are unable to state a preferred case.

However, the following are set out as preferences and "red flag" components of the supply options which reflect the Commission interests.

Recommendation #14: That the selection of a supply option be based on the following:

- 1. Optimization of use of existing facilities.**
- 2. Minimization of waste. We have particular interest in cases which minimize production of fly ash in order to negate pressures for use of Escarpment areas for landfill purposes. It should be noted that we do not consider fly ash to be a suitable material for pit/quarry**

rehabilitation.

3. Reduction in toxic air emissions, due to general environmental impact.
4. Options which avoid the Niagara Escarpment Plan area, particularly Escarpment Natural Areas, and are sensitive to the visual environmental, and recreational features of the Escarpment environment. This includes both site and transmission facilities.

3. Hydraulic and Illustrative Sitings

a) Hydraulic

The approval of eleven hydraulic and related transmission requirements is a common component for all supply cases. The sites which affect on the Niagara Escarpment are:

1. The Niagara Project, in the Niagara gorge near Queenston/Lewiston Bridge. While the facility is located outside the Plan, the transmission lines are proposed in the Shorthills area. Commission staff are presently involved in a review of the Environmental Assessment.
2. Lake Gibson. Both the facility and any transmission requirements are likely to be proposed in the Plan area.

b) Illustrative Sitings

In order to demonstrate the feasibility of the supply cases, Hydro has identified "illustrative" sitings which are intended to show that viable areas exist.

The illustrative sitings which have implications on the Niagara Escarpment Plan relate to any siting or transmission which has potential to involve the Niagara Escarpment Plan. Of particular note is the proposed additional nuclear generation at Bruce. Related to this, Hydro has illustrated transmission to the Essa area. This is the same area that was subject to a previous Environmental Assessment in which the Commission successfully argued that other viable transmission alternatives

exist which avoid the Escarpment area.

Recommendation #15: That Ontario Hydro be advised that the Commission does not accept the illustrative sitings related to the hydraulic, supply and transmission facilities as being an indication of need or any status of approval. The siting and selection of facilities will be dealt with through subsequent environmental assessments. In subsequent assessments first priority should be given to avoiding the Niagara Escarpment Plan. Beyond this, only essential utilities are permitted in Escarpment Natural Areas, being "that which is deemed necessary in the public interest after all alternatives have been considered". Consideration must also be given to the environmental, visual, recreational and agricultural emphases set out in the Plan.

Recommendations:

Recommendation #1: That the DSP be based on clear long term energy planning direction provided by the Province. The provincial direction regarding future energy demand and supplies should be outlined in the DSP, with analysis being undertaken to ensure that the demand and supply options satisfy the provincial direction and are accountable to it.

Recommendation #2: That the Strategy form part of the documentation being examined through the environmental assessment process.

Recommendation #3: That the overall DSP approach be revised to reflect strategic sustainable development directions and to ensure that both demand and supply measures are in keeping with this.

Recommendation #4: That any approval of the DSP be made subject to an ongoing monitoring process and a five year review process.

Recommendation #5: That the DSP include an implementation section which includes a requirement for individual environmental assessments to identify and evaluate the relationship of the project to the overall energy demand and supply planning as stated in the DSP.

Recommendation #6: That the approach used to determine the Basic Load Forecast be revised to reflect

sustainable development directions, the implication of technological change, and the increased economic viability of energy savings through softer energy paths.

Recommendation #7: That the rational and judgements behind the projection of a bandwidth forecast be made explicit.

Recommendation #8: That the analysis of the Basic Load Forecast be re-examined to ensure that the intended approach of averaging the projections from the forecasting methodologies is consistently applied.

Recommendation #9: That the demand management component form part of the Environmental Assessment and be made mandatory, with specific demand management targets being set and forming a condition of any Environmental Assessment approval. Further, the evaluation of environmental and economic benefits of demand management should be more aggressively pursued.

Recommendation #10: That demand management be more aggressively pursued, in line with sustainable development directions.

Recommendation #11: That an optimum demand management scenario be set out and evaluated in comparison to the supply option.

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2. Minimization of waste. We have particular interest in cases which minimize production of fly ash in order to negate pressures for use of Escarpment areas for landfill purposes. It should be noted that we do not consider fly ash to be a suitable material for pit/quarry rehabilitation.

3. Reduction in toxic air emissions, due to general environmental impact.
4. Options which avoid the Niagara Escarpment Plan area, particularly Escarpment Natural Areas, and are sensitive to the visual environmental, and recreational features of the Escarpment environment. This includes both site and transmission facilities.

Recommendation #15: That Ontario Hydro be advised that the Commission does not accept the illustrative sitings related to the hydraulic, supply and transmission facilities as being an indication of need or any status of approval. The siting and selection of facilities will be dealt with through subsequent environmental assessments. In subsequent assessments first priority should be given to avoiding the Niagara Escarpment Plan. Beyond this, only essential utilities are permitted in Escarpment Natural Areas, being "that which is deemed necessary in the public interest after all alternatives have been considered". Consideration must also be given to the environmental, visual, recreational and agricultural emphases set out in the Plan.

Recommendation #16: That staff be authorized to present the Commission's position before the Preliminary and Main Environmental Assessment Hearings, if necessary.

APPENDIX A

EXECUTIVE SUMMARY

DEMAND/SUPPLY PLAN

1

The people of Ontario depend on electricity for services that are critical to their jobs, lifestyles and well being.

2

Ontario Hydro has the major responsibility for meeting these electricity needs, and has developed a plan which covers the next 25 years.

3

Ontario Hydro's plan reflects public and customer values including safety, environmental protection, reliability and low cost. The planning process provides opportunities for public discussion and review.

4

New initiatives must be taken now to meet growing demand and the requirement to replace aging generating stations. There is an increasing urgency to make decisions and implement the plans necessary to meet these needs.

5

Year over year growth in electricity energy demand has averaged between 7% and 3% for each decade of the last 30 years, but the growth in absolute terms has averaged about 600 megawatts per year for peak power and 3.5 TWh per year for energy over the same 30 years.

6

It is not possible to forecast the demand for electricity accurately over long periods because demand depends on the growth in the economy,

the changing needs of society, changes in technology and the steps taken to use electricity more efficiently. Although load forecasts use historical information, they are not a simple extrapolation of the past.

7

To accommodate uncertainty, a bandwidth with an upper, median and lower forecast is used. Assuming no incentive programs to reduce demand, the median forecast is that the annual peak power demand will increase by an average of 2.2% per year during the period 1989 to 2014. The peak power demand is expected to increase at an annual rate of about 2.7% until the year 2000 and then fall to lower levels. The actual December 1988 primary peak power demand was 23.0 gigawatts and the firm load was 22.2 gigawatts.

8

As a result of its studies, Ontario Hydro believes that there is only a 10% probability that the actual demand will be greater than the upper forecast and a 10% probability that demand will be less than the lower forecast. Because of the difficulty in accurately forecasting demand over such a long period, the plan will permit all demand to be met which falls within the range between the upper and lower forecasts.

9

Ontario Hydro's system will have a total installed capacity of 32.5 gigawatts by January 1993 when Darlington is completed, with a load meeting capability of 26.3 GW. By January 2014, 8.7 gigawatts of capacity is expected to reach

the end of its useful life. These retirements, which include 21 major generating units in five stations, will reduce the load meeting capability by 7.0 gigawatts.

10

The requirement for new demand and supply options necessitated by the retirement of facilities and the increased demand, ranges between 15.0 gigawatts and 26.2 gigawatts, depending upon whether the lower or upper forecast is used. The median forecast is that 21.3 gigawatts will be needed by January 2014, and 1.4 gigawatts will be needed by January 1994.

11

One of the important developments in Hydro's long-term planning to meet these needs is the integration of the customer or demand side of the electricity relationship. Demand management refers to measures taken by Ontario Hydro and municipal utilities to influence the amount and timing of customer electricity demand. Both demand and supply options are important components of the integrated demand/supply plan.

12

During the five-year period 1984 to 1989, Ontario Hydro conducted a Demand/Supply Options Study. All demand and supply options were reviewed that were relevant to meeting future electricity needs of Ontario. After extensive public participation, including reviews by the Select Committee on Energy of the Ontario legislature, the study resulted in the completion of a Demand/Supply Planning Strategy in March 1989.

13

The Demand/Supply Planning Strategy contains a set of principles, guidelines and priorities for use in the development of Ontario Hydro's Demand/Supply Plans. This plan is based upon that strategy.

14

The highest priority is given to an aggressive Demand Management Plan designed to reduce demand by increasing the efficiency in the utilization of electricity and by shifting the load away from peak periods of demand. It is estimated that the demand may be reduced by 3.0 gigawatts by January 1999, and by 5.4 gigawatts in January 2014, or about 25% of the additional requirement estimated for the median load forecast.

15

This ambitious plan is based on continuing cooperation with municipal utilities, customers, governments and the electrical industry to achieve successful delivery of the demand management programs.

16

High priority is given to the maintenance, upgrading, and refurbishment of the existing generation and transmission facilities so as to improve their performance, efficiency and reliability consistent with high standards of environmental protection.

17

The potential for obtaining supply from non-utility generators on an economic basis has been carefully examined. Ontario Hydro's objective is to obtain the maximum non-utility gen-

erated electricity which can be purchased at a cost not exceeding the cost to Ontario Hydro of providing the same quantity. Planned additions of NUG capacity are 1.6 gigawatts by 2000 year end, and 2.6 gigawatts by 2014 year end.

18

Ontario Hydro has given the economic development of its hydraulic resources a high priority, planning to develop nine new sites, redevelop three and extend the capacity of six. The planned hydraulic capacity addition is 1.1 gigawatts by January 1999 and 2.8 gigawatts by January 2014. In January 2014, the contribution to increasing load meeting capability is 2.2 gigawatts.

19

The planned demand management, non-utility generation and development of hydraulic resources aggregating 9.3 gigawatts is about 12 gigawatts short of the requirement in January 2014, as estimated for the median load forecast, and 15.7 gigawatts short for the upper load forecast.

20

Ontario Hydro has examined fourteen major supply options to satisfy the remaining requirement. The major options are purchases of electricity from neighbouring utilities, generation by fossil fuels and CANDU nuclear generation.

21

Ontario Hydro agreed in 1987 to purchase 0.2 gigawatts of electricity from Manitoba, commencing in 1998, for a term of five years, and has recently negotiated a purchase of 1.0 gigawatts for a term of 20 years, commencing in 2000. The levelized unit energy cost of these

purchases is estimated to be 3.7 cents per kwh (\$1989) which compares favourably with the cost to Ontario Hydro of generating the electricity itself.

22

Ontario Hydro has negotiated for some time to purchase up to 4 gigawatts of electricity from Hydro Quebec, but so far Hydro Quebec has quoted prices which are far in excess of the cost to Ontario Hydro of generating the electricity itself. These negotiations continue, but unless there is a major change in the proposed pricing, such a purchase will be uneconomic.

23

Recently the Premiers of Newfoundland, Quebec and Ontario discussed the development of 3.6 gigawatts of electricity at the Churchill River in Labrador, and a committee of the provincial utilities has been formed to consider the generation and transmission of this power to be shared by the three provinces. This discussion is at a very early stage, and would not lead to any new supply until the year 2000 at the earliest. All the proposed plans could be adjusted to accommodate this supply if it proved attractive.

24

From the fourteen major supply options, together with the high priority options, Ontario Hydro has selected three Demand/Supply Plans which satisfy its planning criteria which include cost, safety, reliability, diversity and the environment. Each Plan has the flexibility to accommodate changes in demand. They all permit the combination of options such as major generation projects with long lead times and options with short lead times capable of meeting unan-

anticipated developments such as delays in the required approvals, changes in demand and changing fuel prices.

25

The environmental evaluations of options and plans include discussion of acid gas, greenhouse gases, radioactivity, and other relevant considerations.

26

The preferred choice, "the Proposed Plan", features the high priority options and uses CANDU nuclear generation to meet additional base load requirements, gas-fueled Combustion Turbine Units to meet peak load requirements, and existing fossil generation, modified by appropriate environmental controls, to meet intermediate load requirements. Under this plan to meet the median forecast to 2014, ten CANDU units would be installed at three stations, and thirty-two Combustion Turbine Units would be installed at four stations. All of the Combustion Turbine Units would be convertible to Combined Cycle or coal-fueled Integrated Gasification Combined Cycle as flexible fossil options.

27

A wide range of plans was studied including a plan with no new nuclear generation, and a plan with little new fossil generation. It was concluded these less diverse plans were not reasonable alternatives.

28

The acceptable Alternative Candidate Plans 22 (higher nuclear) and 24 (higher fossil) also feature maximum contributions from the

high priority options. These Plans differ from the Proposed Plan in respect to the contributions of nuclear and fossil generation.

29

Figure ES-1 illustrates the contributions of the demand and supply options to meeting the customers' electricity needs at 5-year intervals to January 2014. This figure is for the Proposed Plan and median forecast.

It should be noted that in January 2014:

- a) the required demand/supply is 21.3 gigawatts;
- b) the planned demand reduction is 5.9 gigawatts;
- c) the planned supply increase is 15.7 gigawatts, which includes 7.0 gigawatts for the replacement of the retired generation.

30

Figure ES-2 presents the capacity and energy contributions of the various types of supply used in the Proposed Plan to meet the customer demand after allowing for the demand reducing options. The existing supply (1993) is compared with the future supply in 2014 under the median forecast.

31

These figures show that the proposed plan uses a diverse mix of demand and supply options to meet Ontario's needs.

32

As the load forecast is very uncertain the Proposed Plan and the Alternative Plans provide for a wide range of possible demand for the

Figure ES-1 Proposed Demand/Supply Plan 15 – Components
Median Load Forecast (GW)

		Jan. 1989	Jan. 1994	Jan. 1999	Jan. 2004	Jan. 2009	Jan. 2014
	Basic Load Forecast (BLF)	23.2	26.9	30.2	34.5	37.0	39.8
Demand	Electrical Efficiency						
Reducing	Improvements (EEI)	0.0	0.2	1.4	2.3	2.8	3.3
Options	Load Shifting (LS)	0.0	0.6	0.9	1.1	1.2	1.3
	Non-Utility Generation –						
	Demand Displacement (NUG-DD)	0.0	0.3	0.4	0.4	0.4	0.5
	Capacity Interruptible						
	Load (CIL)	0.7	0.6	0.7	0.7	0.8	0.9
Balance	Firm Load Forecast (FLF)	22.4	25.2	26.8	30.0	31.8	33.9
	Future System –						
	Load Meeting Capability (FS-LMS)	23.2	25.8	27.1	30.0	31.8	34.2
*Supply	Fossil (FOS)	0.0	0.0	0.0	1.1	2.4	4.3
Increasing	Nuclear (NU)	0.0	0.0	0.0	0.7	2.8	7.1
Options	Utility Purchase (UP)	0.0	0.0	0.2	0.8	0.8	0.8
	Hydraulic (HY)	0.0	0.02	0.9	1.5	1.8	2.2
	Purchase Non-Utility						
	Generation (P-NUG)	0.0	0.3	0.6	0.9	1.1	1.2
	Existing System – Load Meeting						
	Capability (ES-LMC)	23.2	25.5	25.5	25.0	22.8	18.5
	*Retirements	0.0	0.0	0.0	0.6	2.3	7.0
Meeting	Required Demand/Supply (R-D/S)	0.0	1.4	4.7	9.5	14.1	21.3
Requirements	Demand Reductions in the Plans	0.7	1.7	3.4	4.5	5.2	5.9
	*Supply Increase in the Plans	0.0	0.3	1.7	4.9	9.0	15.7
	Plans Total	0.7	2.0	5.0	9.4	14.1	21.6

*All supply options expressed in Load Meeting Capability.

Figure ES-2 Supply Contribution – Capacity and Energy
Proposed Plan 15 – Median Load Forecast

Supply Capacity				Supply Energy				
Generation	Jan. 1993		Jan. 2014		1993		2014	
Type	GW	%	GW	%	TWh	%	TWh	%
Hydraulic	6.5	19.8	9.4	22.1	35.7	23.5	40.8	19.1
NUG Purchase	0.3	0.9	1.5	3.5	2.9	1.9	10.3	4.8
Manitoba Purchase	0.0	0.0	1.0	2.3	0.0	0.0	7.0	3.3
Nuclear	14.2	43.3	20.1	47.2	83.2	61.4	143.0	66.9
Fossil	11.8	36.0	10.6	24.9	20.0	13.2	12.5	5.9
Totals	32.8	100.0	42.6	100.0	151.8	100.0	213.6	100.0

year 2014, ranging from that required by the lower forecast to that required by the upper forecast:

upper 44.7 GW }
 median 39.8 GW } bandwidth = 11.2 GW
 lower 33.5 GW }

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Timely approvals are requested to permit the upper load forecast to be met. The actual commitments to build facilities will be made on the basis of actual load growth experience. The Approvals to meet the upper load forecast are required so that Ontario Hydro will have the flexibility to adjust if load growth is higher than the median forecast.

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The approvals requested are for certain of the electricity supply facilities included in the Candidate Plans, and pertain to:

- a) the requirement and rationale for transmission in Ontario to incorporate purchases from Manitoba; and
- b) the requirement and rationale for generation facilities and associated radial transmission facilities adequate to meet the requirement under the upper load forecast.

Such approvals if granted will avoid a duplication of effort when the necessary applications are made for the approval of specific generation and transmission projects.

APPENDIX B

19 APPROVALS

Ontario Hydro has a statutory responsibility to meet electricity needs in Ontario. The three Candidate Demand/Supply Plans are designed to meet these electricity needs in accordance with approved planning criteria.

- Chapter 18 identifies Action Plans associated with the three Candidate Plans. Each Action Plan includes a specific Program addressing the requirement and rationale for new electricity supply facilities.
- A flexible Program is required by Ontario Hydro because of the uncertainties associated with the various components of the Demand/Supply Plan. For example, if the load is higher than the median forecast, action must be taken now to maintain reliable supply. Similarly if the load is lower than the median forecast or contributions from demand management and non-utility generation are higher than forecast, commitment to the construction of major supply facilities can be delayed.

General Purpose

- The General Purpose of the Program is to ensure that a continuing reliable electricity supply is provided in Ontario in a manner consistent with the Demand/Supply Planning Strategy approved by Ontario Hydro's Board of Directors in March, 1989.

▪ **Specific Purposes**

The Specific Purposes associated with the Program are:

- to obtain approval of the requirement and

rationale for transmission facilities to incorporate electricity purchased outside Ontario;

- to obtain approval of the requirement and rationale for the installation in Ontario of specific generation facilities in specific amounts – together with incorporating radial transmission – on a timetable relating to the electricity demand required to be served by Ontario Hydro;
- to address the overall approvals process for generation and radial transmission in a logical, comprehensive and consistent way; and
- to obtain approvals which will avoid duplication of the consideration of planning issues in subsequent project applications.

The Undertaking

The Undertaking, as described in this environmental assessment document, is made up of specific Demand/Supply Plan components, and constitutes a Program in respect of activities associated with meeting future electricity requirements.

The Program submitted for approval represents only a part of the results of the integrated planning which led to the identification of Candidate Demand/Supply Plans. The Plan components not included in the Program either do not require approval, or are not being submitted for approval in this application.

**Approval Requested – Program
Associated with Proposed
Demand/Supply Plan 15**

In specific terms, Ontario Hydro is recommending that approval be granted for the following:

1. The requirement and rationale for the transmission facilities to incorporate electricity purchased from Manitoba.

2. The requirement and rationale for the installation in Ontario of the following generating facilities associated with Plan 15 – the Proposed Plan:

Facilities	Planned Capacity (MW)
<i>Hydraulic Program</i>	
Lake Gibson	5
Big Chute	10
Kipling	68
Smoky Falls	182
Harmon	68
Little Long	61
Little Jackfish	132
Niagara	550
Abitibi Canyon	463
Otter Rapids	174
Nine Mile Rapids	295

To avoid duplication, co-ordination will be required between this application and the project approvals for individual hydraulic projects.

Fossil Program

CTU/CC – A	
Phase 1 – Gas/Oil – CTU	1008
Phase 2 – Gas/Oil – Combined Cycle	1442
(Includes Phase 1)	
CTU/IGCC – A	
Phase 1 – Gas/Oil – CTU	2016
Phase 2 – Gas/Oil – Combined Cycle	2882
(Includes Phase 1)	
Phase 3 – Coal – Integrated Gasification	
Combined Cycle	2824
(Includes Phases 1 and 2)	

Nuclear Program

CANDU A	3524
CANDU B	3524

3. The requirement and rationale for combustion turbines, not intended for conversion to Combined Cycle or IGCC operation, on existing sites, to be committed as short lead time generating capacity if required to meet electricity demand.

CTU/NC – A	672
CTU/NC – B	672

4. The requirement and rationale for any radial transmission needed to connect the generation facilities listed above into Ontario Hydro's transmission system.

Program Associated with Alternative Demand/Supply Plan 22

One alternative method of carrying out the undertaking is the Program associated with Candidate Plan 22. In specific terms, this Alternative Program includes:

1. The requirement and rationale for the transmission facilities to incorporate electricity purchased from Manitoba.

2. The requirement and rationale for the installation in Ontario of the following generating facilities associated with this alternative method of carrying out the undertaking:

Facilities	Planned Capacity (MW)
<i>Hydraulic Program</i>	
Lake Gibson	5
Big Chute	10
Kipling	68
Smoky Falls	182
Harmon	68
Little Long	61
Little Jackfish	132
Niagara	550
Abitibi Canyon	463
Otter Rapids	174
Nine Mile Rapids	295

To avoid duplication, co-ordination will be required between this application and the project approvals for individual hydraulic projects.

Fossil Program

CTU/IGCC – A

Phase 1 – Gas/Oil – CTU 2016

Phase 2 – Gas/Oil – Combined Cycle 2882

(Includes Phase 1)

Phase 3 – Coal – Integrated Gasification

Combined Cycle 2824

(Includes Phases 1 and 2)

Nuclear Program

CANDU A 3524

CANDU B 3524

3. The requirement and rationale for combustion turbines, not intended for conversion to Combined Cycle or IGCC operation, on existing sites, to be committed as short lead time generating capacity if required to meet electricity demand.

CTU/NC – A 672

CTU/NC – B 672

4. The requirement and rationale for any radial transmission needed to connect the generation facilities listed above into Ontario Hydro's transmission system.

Program Associated with Alternative Demand/Supply Plan 24

Another alternative method of carrying out the undertaking is the Program associated with Candidate Plan 24. In specific terms, this Alternative Program includes:

1. The requirement and rationale for the transmission facilities to incorporate electricity purchased from Manitoba.

2. The requirement and rationale for the installation in Ontario of the following generating facilities associated with this alternative method of carrying out the undertaking:

Facilities	Planned Capacity (MW)
<i>Hydraulic Program</i>	
Lake Gibson	5
Big Chute	10
Kipling	68
Smoky Falls	182
Harmon	68
Little Long	61
Little Jackfish	132
Niagara	550
Abitibi Canyon	463
Otter Rapids	174
Nine Mile Rapids	295

To avoid duplication, co-ordination will be required between this application and the project approvals for individual hydraulic projects.

Fossil Program

CTU/IGCC - A	-
Phase 1 - Gas/Oil - CTU	2016
Phase 2 - Gas/Oil - Combined Cycle	2882
(Includes Phase 1)	
Phase 3 - Coal - Integrated Gasification Combined Cycle	2824
(Includes Phases 1 and 2)	
CTU/IGCC - B	-
Phase 1 - Gas/Oil - CTU	1008
Phase 2 - Gas/Oil - Combined Cycle	1441
(Includes Phase 1)	
Phase 3 - Coal - Integrated Gasification Combined Cycle	1412
(Includes Phases 1 and 2)	

Conventional Steam Cycle (CSC-Coal)-A 2964

Nuclear Program

CANDU A 3524

3. The requirement and rationale for combustion turbines, not intended for conversion to Combined Cycle or IGCC operation, on existing sites, to be committed as short lead time generating capacity if required to meet electricity demand.

CTU/NC - A	672
CTU/NC - B	672

4. The requirement and rationale for any radial transmission needed to connect the generation facilities listed above into Ontario Hydro's transmission system.

Project Approval Process

In keeping with the Purposes of the Program, Ontario Hydro has initiated work on the studies required to support the necessary applications for approvals to locate, on specific sites and rights-of-way, the facilities associated with the approvals requested in this application. In order to prepare and file project specific assessments in a timely way, field studies relating to the identification, evaluation and selection of sites and rights-of-way are now underway. Locations to be considered for the various fossil and nuclear projects will include at least the following:

For CTU/NC

Non-convertible gas/oil fueled CTUs

- Hearn
- Keith
- Lakeview
- Lambton
- Lennox A
- Nanticoke

For CTU/CC

Gas/oil fueled CTUs capable of conversion to Combined Cycle

- Hearn
- Keith

For CTU/IGCC

Gas/oil fueled CTUs capable of conversion to Combined Cycle and further conversion to coal fueled Integrated Gasification Combined Cycle operation

- Lennox B
- Wesleyville
- North Channel Area
- Keith Redevelopment
- Lakeview Redevelopment
- Lambton Redevelopment

For Conventional Steam Cycle - Coal

- Lennox B
- Wesleyville
- North Channel Area
- Lakeview Redevelopment
- Lambton Redevelopment

For CANDU

- Darlington B
- Bruce C
- Wesleyville
- North Channel Area

The project assessments will focus on ensuring that the components included in the approved Program are located and implemented in an environmentally acceptable manner. The project assessments will not duplicate nor reconsider the planning issues determined by this application.

APPENDIX A

APPENDIX A

The questions listed below are designed to obtain advice from reviewers on the quality of the environmental assessment and if necessary, how to improve it.

The Ministry of the Environment Review Co-ordinator evaluates whether the EA contains all the components of subsection 5(3) of the EA Act. Answers to questions 1 through 4 address the analysis of the technical quality and completeness of those components. If an EA contains the proper components and reviewers are satisfied with their quality and completeness, the Review Co-ordinator will conclude that the EA meets the requirements of subsection 5(3) of the Act. If the EA is deficient in meeting either criterion, the EA Branch will conclude that the EA does not meet the requirements of subsection 5(3).

Question 5 aims to ensure that the actions necessary to meet reviewers' requirements are specified in the EA and will be carried out to the reviewer's satisfaction.

Question 6 provides advice on how well the undertaking addresses the policy interests of a particular Ministry. Question 7 provides information on the roles reviewers played during pre-submission consultation as well as the quality of the consultation process.

Please address the following questions in your evaluation of the EA from the perspective of your Ministry's or agency's mandate. If strengths or weaknesses are identified, please indicate their *significance*. If weaknesses are significant, please indicate what changes and/or research is required to obtain a satisfactory EA document.

1. Are the data, analyses and conclusion in the EA satisfactory, i.e., are these relevant and substantiated?
 - Does the information in the EA cover all relevant issues at an appropriate level of detail?
 - Are you satisfied with the methods and techniques described in the EA to predict environmental effects and any mitigation measures necessary to reduce those effects?
 - Is the analysis logical and easy to follow?
2. Do you feel that the proponent has chosen an appropriate range of alternatives to investigate in the EA?
3. Are the monitoring and contingency plans specified by the proponent in the EA adequate?
4. Is the way in which the proponent intends to implement the undertaking satisfactory?
 - Does the undertaking comply with your Ministry's or agency's legislative requirements?
5. Has the proponent clearly indicated how compliance reporting regarding commitments in the EA related to your mandate will be fulfilled?

