



Ontario

Ministry of Energy

THE RESPONSE OF THE
GOVERNMENT OF ONTARIO
TO THE FINAL REPORT OF
THE ROYAL COMMISSION
CN
ELECTRIC POWER PLANNING

MAY 1981

STORAGE: AUSTI
MINISTRY OF ENERGY.

The response of the Government of
Ontario to the final report of
the Royal Commission on... 3115477

TABLE OF CONTENTS

	Page
1. Introduction	i
2. Compendium of the Royal Commission's Recommendations	iii
3. Responses to Specific Recommendations	1
- Ontario's Electric Power Requirements	1
- The Technology of Power Generation and Alternative Energy Sources	9
- Nuclear Power	21
- Bulk Power Transmission	54
- The Total Electric Power System	64
- Land Use	70
- Environmental Concerns	79
- Energy Conservation	82
- Economic & Financial Factors	92
- Decision Making	104

INTRODUCTION

In March, 1980 the Royal Commission on Electric Power Planning submitted Volume 1 of its final report to the Government of Ontario. Volumes 2-9 were submitted in April, 1980.

The nine volumes of the Commission's report represent the fruit of nearly 5 years of hearings and research. They provide a wealth of ideas and information that will be useful for years to come to all those interested in Ontario's energy future.

Of primary interest to the Government are the Royal Commission's 88 recommendations, all of which are contained in Volume 1 of the report. These recommendations show how the Commission believes that its views and concerns on a diverse range of technical, operational and policy issues should be translated into action. It is these recommendations which provide the focus for the Government's response to the Commission's report.

The present document sets out the Government's response to the recommendations. The Government is implementing or plans to implement directly, or through its agencies, the 77 recommendations it accepts, wholly, in part, or in principle subject to further study. Nine of these 77 recommendations are being referred to the Federal Government, with a recommendation for their acceptance, since they address matters for which the Federal Government and the AECS are responsible. One recommendation is being referred to the Federal Government without acceptance in principle by the province. Four of the Royal Commission's recommendations require further study before the Government can make a decision regarding acceptance and implementation. Six recommendations have been rejected.

Several of the recommendations address operational matters for which Ontario Hydro, through its Board of Directors, is responsible. The Government's response to these recommendations indicates how Ontario Hydro is implementing or plans to implement them.

The Government takes this opportunity to acknowledge the important contribution made by the Royal Commission on Electric Power Planning to energy policy making in Ontario. It successfully involved a large number of Ontario's citizens representing a wide range of interests on Ontario's energy future. Unquestionably, the Commission had a major impact on electric power planning in Ontario even before it submitted its final report. It achieved this through public discussion and debate and through the preparation of issue papers, research studies and the submission of several interim reports.

The challenge now is to ensure that the Commission's efforts continue to be reflected in electric power planning in Ontario.

Compendium of Recommendations*

The Royal Commission on Electric Power Planning, having been empowered and instructed under Order-in-Council 2005B/75 dated the 17th day of July 1975, Order-in-Council 3489/77 dated the 14th day of December 1977, and Order-in-Council 2065/78 dated the 12th day of July 1978 to examine the long-range planning concepts of Ontario Hydro for the period of 1983-1993 and beyond, and matters related thereto, reports its recommendations below, taken from the appropriate chapters in this volume.

Ontario's Electric Power Requirements

- 3.1 Through the development of demand scenarios based on end-use data, future planning philosophy should be reoriented to emphasize demand management increasingly rather than maintain the focus on supply expansion, as is traditional.
- 3.2 A comprehensive energy end-use data base for the province should be developed as soon as possible, and Ontario Hydro, in addition to macro-economic or "top down" forecasting models, should develop complementary models based on the detailed building up of electricity demand on an end-use basis. Ontario and federal government ministries and agencies should support Ontario Hydro's efforts to fill the remaining data gaps.
- 3.3 Ontario Hydro should employ, as a useful analytical device for load-forecasting purposes, the distinction between "captive" and "competitive" end uses of electricity.
- 3.4 Because of increasing emphasis on end-use forecasting, the role of the public utility commissions in developing load growth patterns should be enhanced to provide opportunities for more input than hitherto by the public.
- 3.5 As part of a larger objective of planning for an improved annual load shape and higher load factors and as a means of increasing the resiliency of the electric power system and reducing Ontario's dependence on crude oil, Ontario Hydro should give high priority to demonstrating the technical and economic feasibility of new and retrofit hybrid electric/fossil space-heating systems.
- 3.6 For system planning purposes, Ontario Hydro should base its system expansion plan on a growth range for peak capacity to the year 2000 of 2.5 to 4.0 per cent per annum.

The Technology of Power Generation and Alternative Energy Sources

- 4.1 During the next decade the Ontario government and Ontario Hydro should actively support the demonstration of fluidized-bed combustion with special reference to its future role in the generation of electric power.
- 4.2 The Ontario government should support the demonstration of biomass energy projects, including gasification of forest and agricultural residues, testing methanol technologies, evaluating ethanol potential, and generation of biogas.
- 4.3 During the next decade the Ontario government should continue its programme to demonstrate the suitability of solar space heating and water heating in the Ontario context with special reference to its potential role in energy conservation.
- 4.4 The Ontario government and Ontario Hydro should make every effort to convert the "moth-balled" gas-fired boilers at the R.L. Hearn Generating Station to burn refuse or refuse-derived fuels.
- 4.5 The Ontario government and Ontario Hydro should assign high priority to the demonstration of industrial co-generation.
- 4.6 The Ontario government should expand its efforts to put in place a low-temperature hot-water district-heating system, to demonstrate its energy efficiency under Ontario conditions, and to test the use of conventional as well as renewable or non-conventional fuels, for the combined generation of heat and electricity.

*From The Final Report of the Royal Commission on Electric Power Planning, Volume 1, March, 1980.

Nuclear Power

5.1 Ontario Hydro should publish a report as soon as possible on the expected exposure levels resulting from any reactor re-tubing operation, addressing, in particular, the following questions:

- How many workers (Ontario Hydro employees and others) will be subjected to the 5 rem annual dose limit in connection with the re-tubing of a single reactor?
- Will workers be subject to high dose levels on a continuing basis when the re-tubing of the Pickering A and Bruce A reactors begins on a sequential basis?
- A worker could receive an aggregated dose of 50 rems over, say, a 15-year period. Is this medically acceptable? Should these exposures be age-dependent?
- What is the total number of workers required, on a continuing basis, to undertake re-tubing operations? Are that many adequately skilled workers at present available?
- To what extent can the re-tubing operation be undertaken by "remote control", thereby minimizing the aggregated exposures of workers?
- Will workers who may be subjected to higher-than-normal radiation doses, and their unions, be fully informed of the nature of the risk?

5.2 A new division devoted exclusively to nuclear power safety, reporting directly to the Executive Vice-President (Operations) of Ontario Hydro, should be established.

5.3 The new safety division recommended for Ontario Hydro should establish a small emergency task force, available 24 hours a day on an "on call" basis. This force should be one that could be transported expeditiously in an emergency, by road or helicopter or both, to any nuclear generating station in the province.

5.4 A systematic attempt should be made by Ontario Hydro to look for patterns in operating and accident experience available from both CANDU and other reactor systems. These patterns should be fed back into the process of setting design, operating, and safety criteria.

5.5 Operational procedures and especially the reporting systems at CANDU stations should be critically assessed to improve communication.

5.6 The current CANDU control room and indicator design should be reviewed and assessed from a human factors perspective to ensure that the equipment will display clear signals on reactor status to the operator under both normal and accident conditions.

5.7 The educational requirements and training programmes for all nuclear supervisory, operational, and maintenance personnel should be critically reviewed.

5.8 Provision should be made for the continuous updating and monitoring of the performance of all reactor operators and maintenance personnel; there should be much more imaginative use of simulators in this regard.

5.9 The Atomic Energy Control Board should establish a human factors group to ensure that human factors concepts and engineering become central elements in the safe design, construction, operation, and maintenance of Ontario's nuclear stations. Further, human factors concepts should be reflected in the licensing requirements for both nuclear stations and key operating personnel.

5.10 All aspects of contingency planning should be assessed in the light of the experience at Three Mile Island, and a comprehensive plan for each nuclear facility should be made publicly available. The public must be aware of these plans, which must be rehearsed regularly if they are to be credible. Special attention should be paid to preparing in advance for the sensitive and accurate handling of information during an accident.

5.11 Continuing epidemiologic evaluation of Elliot Lake miners and uranium mill workers should be undertaken. The public should be informed of the progress of these studies.

5.12 Ontario should contribute its share to any national programme for uranium mine and mill waste research.

5.13 Measures should be taken to ensure that the costs of long-term tailings monitoring, management, and R&D are reflected in the cost of uranium fuel rather than becoming a general charge to the Ontario taxpayer, not least because most of the uranium is currently being exported (over 90 per cent).

5.14 The future expansion of the nuclear power programme in Ontario, and in particular the uranium mining and milling portion of the fuel cycle, should be contingent on demonstrated progress in research and development with respect to both the short- and the long-term aspects of the low-level uranium tailings waste disposal problem, as judged by the provincial and federal regulatory agencies and the people of Ontario, especially those who would be most directly affected by uranium mining operations. It would be unacceptable to continue to generate these wastes in the absence of clear progress to minimize their impact on future generations.

5.15 All existing and planned Ontario Hydro nuclear stations should be retrofitted or designed for the interim storage on site of their spent fuel for the next 30 years by which time a disposal facility should be available.

5.16 An independent "nuclear waste social advisory committee" should be established to ensure that broad social, political, and ethical issues are addressed. This committee should be chaired by an eminent Canadian social scientist.

5.17 If progress in high-level nuclear waste disposal R&D, in both the technical sense and the social sense, is not satisfactory by at least 1990, as judged by the technical and social advisory committees, the provincial and federal regulatory agencies, and the people of Ontario – especially in those communities that would be directly affected by a nuclear waste disposal facility – a moratorium should be declared on additional nuclear power stations.

5.18 No further development of the 1,250 MW CANDU reactor, even in the concept stage, should be undertaken by Ontario Hydro. Any additional nuclear base-load power stations in the post-Darlington period should be based on 850 MW CANDU reactors. We believe that such standardization will facilitate reactor safety as well as optimizing the average capacity factors of these stations.

5.19 The Ontario government should advise the federal government that Ontario's requirements will be insufficient to ensure an order level of one reactor per year and, therefore, that the maintaining of CANDU as a viable option for the future suggests a need for urgent federal initiatives to fill the order gap. Our estimate of the likely total installed nuclear capacity in Ontario to the year 2000 is in the order of 17,500 MW; this means one additional 3,400 MW four-reactor nuclear station after Darlington, and it could be a high estimate, depending on, for example, actual load growth, success with conservation, co-generation, and potential imports of hydroelectric energy from Manitoba or Quebec. If the industry wishes to survive, it must begin to search for opportunities to diversify.

5.20 Although it is important to keep open the thorium fuel cycle option by engaging in an R&D programme, a firm decision to go ahead with a major demonstration and/or commercial programme should be delayed at least until 1990, and then made only if it is acceptable to the public after appropriate dialogue and study concerning the full implications and impacts of such a project.

5.21 Nuclear power should no longer receive the lion's share of energy R&D funding, and R&D priorities in the nuclear field should be focused primarily on the human factor in reactor safety, on the management and disposal of wastes at the front and back ends of the fuel cycle, and on the decommissioning of nuclear facilities.

5.22 Procedures should be established to ensure fair handling of *bona fide* cases of professional dissent. Procedures should include the following concepts:

- Concerns should be expressed in writing and considered by a special review group consisting of representatives of management, professional engineering staff, and at least one outside expert.
- The review group should obtain evidence from the dissenting staff member's colleagues.
- The review group should assess management's response to the concerns.

5.23 Standard-setting for the nuclear fuel cycle should be done in an open manner, including opportunities for public participation in the process.

5.24 The role of the Atomic Energy Control Board on-site resident inspector should be strengthened and the reports of the inspector should be made public.

5.25 Advisory committees based on the social sciences should be established by the Atomic Energy Control Board.

5.26 Appropriate steps should be taken to guarantee that the Atomic Energy Control Board has adequate human and financial resources. The Atomic Energy Control Board, or its eventual successor, must not become a victim of government spending restraints.

5.27 The Government of Canada should ensure the separation of the promotional and regulatory aspects of nuclear power by drafting appropriate legislation to replace the Atomic Energy Control Act as a matter of the highest priority. This would ensure that the Atomic Energy Control Board and Atomic Energy of Canada Limited would report to separate ministers, reflecting their very different roles, thereby avoiding public confusion and possible conflicts of interest of the sort that have in the past strained public confidence in the regulatory process.

5.28 The Atomic Energy Control Board should expand its membership to include a broad representation of the general public as well as members of the scientific and technical community.

Bulk Power Transmission

6.1 Ontario Hydro should continue to undertake research and explore all alternatives that will permit the upgrading of existing transmission facilities and lead to optimizing the use of existing rights of way. Evidence of this research should routinely form part of Ontario Hydro's submission for approval of the acquisition of a new transmission corridor and/or the siting of a new transmission line.

6.2 Given the advances in converter technology that suggest that high-voltage direct current (HVDC) transmission has now become economically attractive for distances in excess of 650-800 km, Ontario Hydro should carefully re-examine the advantages of HVDC for the proposed east-west interconnection and study its application for the line connecting the proposed Onakawana generating station with load centres in southern Ontario.

6.3 Ontario Hydro should utilize even more imaginative approaches to public involvement in transmission routing. In particular, we believe the utility should leave more of the initiative in the public participation process to affected citizens, permitting those who will be most immediately impacted and involved to select alternate routes and to designate the preferred route; independence will be essential. The chairman of an appropriate citizens study committee should be selected by the citizens. Ontario Hydro should clearly state its criteria for routing, and this information with any other required by the committee should be readily provided by the utility. While the time period for study should be established by the utility, the procedures should be established by the study committee.

6.4 Ontario Hydro should take all possible steps to ensure the safety and convenience of all persons working in the vicinity of extra-high-voltage transmission lines.

6.5 Ontario Hydro should continue to plan the integrated electric power system on the basis of 500 kV and 230 kV transmission lines.

6.6 Ontario Hydro should work with the appropriate farm organizations and the Ministry of Agriculture on the design of an appropriate single-pole and/or lattice tower for use in cultivated fields.

6.7 The farming community with the collaboration of Ontario Hydro should develop, as soon as possible, alternative routes for a second 500 kV transmission line from the Bruce Generating Station that will have minimal and acceptable impact on Class 1 and Class 2 agricultural land. Ontario Hydro should provide the necessary funding.

6.8 In order to facilitate the co-operation of the farming communities, Ontario Hydro should not site a thermal generating station in the vicinity of Goderich or Kincardine, or indeed on the eastern shoreline of Lake Huron south of the Bruce Generating Station, before the year 2000. Ontario Hydro should make a public statement to this effect as soon as possible.

The Total Electric Power System

7.1 Ontario Hydro, working with the municipal electricity utilities, should give high priority to completing the load-management experiments now under way so that the technical problems, cost, and public acceptability of alternate systems can be assessed.

7.2 An in-depth study of the Commission's supply scenarios should be undertaken and the findings should be used as a basis for future planning of the electric power system.

7.3 The studies aimed at strengthening the electricity interchange capability with Quebec should be expedited, and in particular they should be extended to ensure close collaboration between Ontario Hydro and Hydro-Québec in the future planning of their respective systems for the mutual benefit of both provinces.

7.4 Ontario Hydro should co-operate with Manitoba Hydro in studies aimed at strengthening electricity interconnections and the purchase of substantial blocks of hydraulic power from the lower Nelson River; there should be closer collaboration between the two utilities in the future planning of their respective systems for the mutual benefit of the two provinces.

7.5 The interconnections between Ontario Hydro and neighbouring utilities in the United States should be strengthened.

Land Use

8.1 Ontario Hydro and the Ontario government should build on developments already taking place at the Bruce site to test further the concept of a combined energy centre as described in the Ministry of Industry and Tourism's 1976 report.

8.2 Ontario Hydro should accept financial responsibility for the debenture debt load of municipalities in the vicinity of the Bruce Generating Station that is over and above what would have been incurred in the absence of the Ontario Hydro projects.

8.3 Ontario Hydro should not proceed with land-banking programmes for at least the next 10 years.

8.4 Ontario Hydro's planning concepts should reflect the primary objective of conserving Ontario's foodlands, particularly in southwestern Ontario.

8.5 The potential of Ontario's forest lands, especially in northern and eastern Ontario, as sources of energy should be the subject of an in-depth feasibility study; and, if the social, environmental, and economic indications are favourable for methanol or ethanol production, a demonstration plant should be built and tested as soon as possible.

8.6 The existing research and development programmes relating to energy plantations, especially the potential of the hybrid poplar in eastern Ontario, with emphasis on abandoned low-quality farmlands, should be expedited.

8.7 On strictly power-systems-planning and economic grounds, the Onakawana lignite deposits should be developed; and an electric power station of 800 MW-1,000 MW capacity should be built at the mine site. However, we recognize that the Royal Commission on the Northern Environment, on social and environmental grounds, with respect to both the power station and the associated transmission corridor, may not support this recommendation, and we believe that their views should have precedence.

Environmental Concerns

9.1 Ontario Hydro should not install sulphur scrubbers at its fossil-fuelled electric power stations as long as the existing policy of utilizing low-sulphur fuels is maintained.

9.2 Ontario Hydro and the Ministry of the Environment should strengthen existing air and water pollution monitoring systems, especially, although not exclusively, in the vicinity of thermal power stations, and environmental impact maps should be prepared for the benefit of the public.

9.3 Interdisciplinary institutes for environmental research in Ontario universities should be involved more actively in the environmental assessment process.

Energy Conservation

10.1 Over a period of 10-20 years, efficiency goals for all energy-intensive industrial processing equipment, machines, and systems should be established by the Ministry of Energy. In setting these goals, efficiency standards already being achieved in several foreign countries, notably Sweden and West Germany, should be taken into account. Efficiency goals should be applied in the first place to the pulp and paper industry, the iron and steel industry, the chemicals industry, the petroleum refining industry, and all heat-treating operations.

10.2 Mandatory heating, insulation, and lighting standards should be enacted for new residential and commercial construction, and these standards should take into account the optimum utilization of passive solar energy measures.

10.3 Progressively stricter efficiency standards for all major energy-consuming appliances, such as water heaters, refrigerators, home furnaces, and air-conditioners, should be put into effect through legislation.

10.4 Direct government loans and other economic incentives should be made available to finance the retrofitting of houses, multi-unit residences, and some commercial buildings with conservation equipment, including insulation and, where appropriate, storm windows and shutters.

Economic and Financial Factors

11.1 In formulating its industrial policy, Ontario should recognize the need for an adequate and competitively priced supply of electricity, but Ontario should not attempt to compete aggressively for power-intensive industry with provinces with large remaining hydraulic resources.

11.2 The Ontario government should continue to support Ontario Hydro's efforts to utilize its surplus generating capacity by undertaking interruptible or firm sales to neighbouring utilities that are both profitable and in the best interests of the people of Ontario. No firm-sale commitments should be made that might jeopardize the generation reserves required to meet Ontario requirements or tie up needed transmission capacity.

11.3 Ontario Hydro should perform system simulations to estimate more accurately the incremental costs of encouraging the substitution of electricity for fossil fuels, especially oil.

The Ministry of Energy should develop comparable cost estimates of alternative means to supply, or save, the same energy at point-of-end-use.

11.4 Time-differentiated electricity rates (seasonal and time-of-day) should be introduced as soon as possible to as many classes of customers as practicable. Seasonal rates should be introduced first, to ensure that the higher long-run costs of supplying low-load-factor space-heating loads are properly recovered. Time-of-day rates should be phased in as day-night electricity supply-cost differentials become significant and obstacles to metering small customers are overcome.

11.5 Means should be sought to ensure that all customers are made aware of the likely future trend in the costs of providing electricity service in each of the rating periods and end uses selected.

11.6 For rate-making purposes, Ontario Hydro should calculate marginal electricity supply costs in each "rating period" on the basis of the current system expansion plan, for comparison with the expected near-future accounting costs proposed by the Ontario Energy Board.

11.7 Ontario Hydro should include, in its tests of time-of-use rates, not only assessments of customer response concerning willingness to change personal energy habits, but also the required technology.

11.8 To encourage the prudent and efficient use of electricity, such features as declining block rates, uncontrolled flat-rate water heaters, and bulk metering of new electrically heated apartment buildings should be modified or eliminated.

11.9 Ontario Hydro should pursue vigorously the potential of the miniaturized solid-state (silicon chip) meter for mass application and include such meters in its current tests of load-management systems and time-of-use rates. A demonstration project involving perhaps 100 residential consumers should be set up during the next few years.

11.10 In analysing the options for increasing the province's capacity for energy self-sufficiency, a systems approach should be adopted in which the incremental costs of conventional electricity generation are compared with the unit costs of conservation or renewable energy technologies, taking into account the load characteristics of each end use.

11.11 Because of institutional and financial obstacles facing decentralized, heavily "front-ended", alternative energy and conservation programmes, and in view of the redeeming social importance of reducing Ontario's oil dependency, provincial loan guarantees, tax and fiscal incentives, and direct financial support should be made available to promote industrial co-generation, heat-loss and building-design standards aimed at optimizing energy-conservation investments, solar water heating, and passive solar systems. The setting up of a mini-utility, backed by the Ontario Energy Corporation, should be considered, to support industrial co-generation initiatives.

Decision-Making

12.1 Ontario Hydro should be encouraged to continue and, where necessary, to expand its public participation programme to ensure that the public is fully involved. Ontario Hydro should adopt joint planning processes whereby real decision-making authority is shared with, and in some cases (see recommendation 6.3) left to the initiative of, citizen representatives.

12.2 Ontario Hydro should ensure that the participants in the utility's participation programme have access to independent expertise whether the expertise is supportive of or opposed to Ontario Hydro's planning concepts.

12.3 In order to enhance the optimum utilization of electricity, both public utility commissions and the Regional Offices of Ontario Hydro should be adequately financed and encouraged to sponsor, in their areas, educational programmes, seminars, and workshops in energy utilization and conservation.

12.4 Ontario Hydro should find practical means to give effect to its commitment to greater openness by commencing to publish a technical-papers series, containing accounts of technical, scientific, and socio-economic research in language understandable to the layman. These publications should be made widely available to libraries across the province.

12.5 A clear statement of the objectives and responsibilities of the utility, especially as they relate to the social objectives as endorsed by government, should be issued by the Ministry of Energy.

12.6 The status of the existing Ontario Energy Board should be enhanced through expanded membership, representing a broad range of interests and disciplines, and the agency should be renamed the Ontario Energy Commission. It should be an authoritative and independent body.

12.7 The chairman of the recommended Ontario Energy Commission should be a person well known to the public and not associated with any of the special interests that should be represented.

12.8 As well as providing a vehicle for the consideration and examination of rate structures for both electricity and natural gas, the Ontario Energy Commission should be responsible for advising the government and people of Ontario on energy policy in general and on electric power planning in particular. The Ontario Energy Commission should be strongly future-oriented and just as strongly people-oriented.

12.9 The Ontario Energy Commission should be provided with a modest increment in staff and consulting budget over and above that of the existing Ontario Energy Board. The designation "Commission" as against "Board" was selected not only to suggest a break from the past but also to provide a broader umbrella to embrace a policy advisory function as well as the traditional regulatory function. The indications are that the additional staff requirements would be small.

12.10 The principle of funding of public interest groups from the public purse should be adopted in connection with energy and environmental hearings in the future. Only in this way will it be possible for disparate views to be aired adequately in public hearings.

The public interest funding programme should be improved in two areas:

- The requirement of adequate accounting practices should be written into contracts between the groups and the funding body.
- Wherever appropriate, an essentially inquisitorial rather than adversarial approach should be adopted in order to reduce the expenses incurred by participating groups.

ONTARIO'S ELECTRIC POWER REQUIREMENTS

RECOMMENDATION 3.1 Through the development of demand scenarios based on end-use data, future planning philosophy should be reoriented to emphasize demand management increasingly rather than maintain the focus on supply expansion, as is traditional.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Increased emphasis on demand management rather than only on supply expansion, has been occurring for sometime both at the government and the utility level. This has manifested itself in the following ways:

1. The significant increase over the past few years in the share of the Ministry of Energy's budget devoted to energy conservation (rising from \$.7 million out of \$3.5 million in 1975-76 to an estimated \$17.5 million out of \$30.7 million in 1980-81);
2. The development by the Ministry of Energy of an energy demand forecasting model that projects energy demand over a 20 to 25 year time horizon (see the Ontario Energy Review, - second edition, March, 1981). The projection of energy demand by fuel type is built up from projections of end-use demand within each of the major sectors: residential, commercial, industrial, and transportation (the Ministry of Energy reviewed this end-use model with the Legislature's Select Committee on Hydro Affairs in February, 1979).

3. Ontario Hydro has established a Load Management Department within its Conservation Division. As a matter of policy, planning of the system is now based upon a forecast of primary demand, with an allowance made for interruptible load and load management activities.

In accepting this recommendation, the Government does not believe that an entirely normative approach to energy demand planning is the only or best approach. Further, in establishing objectives for demand management, no value judgements have been made with respect to what is a wise or unwise use of energy. Those decisions are best left to the individual.

RECOMMENDATION 3.2

A comprehensive energy end-use data base for the province should be developed as soon as possible, and Ontario Hydro, in addition to macro-economic or "top down" forecasting models, should develop complementary models based on the detailed building up of electricity demand on an end-use basis. Ontario and Federal Government Ministries and agencies should support Ontario Hydro's efforts to fill the remaining data gaps.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Since early in 1979 the Ministry of Energy has made it's energy end-use model available to Ontario Hydro which is refining it for its own particular needs in order to project energy demand. This will complement Hydro's use of macro-economic forecasting models.

Hydro has accumulated end-use data by activity for the province, and it has co-operated with Statistics Canada in creating a detailed data base for 4,000 households from 1974 to 1976. In all this activity by Ontario Hydro the emphasis has been placed upon the use of electricity.

An energy data base has been prepared by the Ministry of Energy. The Ministry currently is developing a more comprehensive end-use energy data base for the province.

The outcome of this work will be to provide an end-use energy data base that will be useful for the modelling and forecasting activities recommended by the Royal Commission.

RECOMMENDATION 3.3 Ontario Hydro should employ, as a useful analytical device for load-forecasting purposes, the distinction between "captive" and "competitive" end uses of electricity.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

In the end-use models that are being developed by Ontario Hydro, end-uses will be studied in terms of captive and competitive uses. It is to be expected that the further development of an end-use data base in Ontario will help clarify the particular end-uses in which electricity can compete with other forms of energy.

It should be noted that the sort of distinction between end-uses of electricity recommended by the Commission has been made by Ontario Hydro in the past few years. An example of this is contained in Energy Utilization and the Role of Electricity which was submitted by Hydro to the Royal Commission in 1976 and has been updated biannually.

RECOMMENDATION 3.4

Because of increasing emphasis on end-use forecasting, the role of the public utility commissions in developing load growth patterns should be enhanced to provide opportunities for more input than hitherto by the public.

GOVERNMENT POSITION: Accept.

IMPLEMENTATION:

The public utilities commissions (i.e. municipal hydro commissions) have been involved for many years in the development by Ontario Hydro of its load forecasts. This involvement will be enhanced as Ontario Hydro makes the results of its modelling activities available to the local commissions.

Furthermore, the commissions are being encouraged to work more closely with groups, such as developers, operators of commercial and industrial establishments, and various municipal organizations, in order to determine as accurately as possible, the likely electrical load growth for the community.

To this end, Ontario Hydro is giving load forecasting seminars to the public utility commissions to help them identify information from their customers that will be useful in load forecasting.

RECOMMENDATION 3.5

As part of a larger objective for planning for an improved annual load shape and higher load factors and as a means of increasing the resiliency of the electric power system and reducing Ontario's dependence on crude oil, Ontario Hydro should give high priority to demonstrating the technical and economic feasibility of new and retrofit hybrid electric/fossil space-heating systems.

GOVERNMENT POSITION: Accept.

IMPLEMENTATION:

Ontario Hydro has been actively engaged in a number of initiatives with respect to the development and demonstration of hybrid and dual energy systems.

In field trials, several combinations of heating technologies are being tested: electric baseboard plus an oil furnace; electric furnace plus an oil furnace; heat storage systems with both these combinations; and hot water dual-energy systems.

Twelve oil/electric baseboard installations are being tested in Oshawa. Tests are being conducted by AECL on 50 homes in which electric heaters have been installed in the plenums of existing oil fired furnaces. Fifty additional systems have been installed by Ontario Hydro in other locations, and other individual dual energy systems are being tested. Canadian Standards Association approval of several models of plenum heaters is being obtained. One model has been approved.

A billing insert has been circulated to customers by the municipal hydro commissions, and by Ontario Hydro to its retail customers, inviting them to send for information on electric heating systems, including dual heating systems.

Ontario Hydro is also working with contractors and manufacturers to develop an information program to inform its customers of the economic and technical aspects of installing various hybrid and dual electric-fossil space heating systems.

RECOMMENDATION 3.6 For system planning purposes, Ontario Hydro should base its system expansion plan on a growth range for peak capacity to the year 2000 of 2.5 to 4.0 per cent per annum.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

In accepting this recommendation, the Government is not dictating a load forecast to Ontario Hydro. It is Ontario Hydro's responsibility to prepare a load forecast that takes into account the effects on electrical demand of Government policy. Accordingly, the range of growth of peak capacity of 2.5 to 4.0 per cent per annum recommended by the Royal Commission, encompasses Ontario Hydro's 1981 load forecast of 3.1 per cent per annum to the year 2000.

The Royal Commission emphasized that the load forecast for the next 20 years must be reviewed and updated continuously to reflect world and local events. It is Ontario Hydro's practice to publish new, long term load forecasts early each year.

THE TECHNOLOGY OF POWER GENERATION AND ALTERNATIVE ENERGY SOURCES

RECOMMENDATION 4.1 During the next decade the Ontario government and Ontario Hydro should actively support the demonstration of fluidized-bed combustion with special reference to its future role in the generation of electric power.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

The potential role of fluidized-bed combustion in the generation of electric power is not confined to coal but could also apply to other fuels such as wood and fuel derived from municipal, agricultural and wood wastes. Furthermore, fluidized-bed combustion appears to offer a promising method of substantially reducing emissions of sulphur oxides and nitrogen oxides in the combustion process.

The Ministry of Energy has embarked upon the following program with respect to fluidized bed combustion of waste and biomass:

1. Support of a demonstration project of a fluidized-bed fuel gas producer using sawmill waste.
2. Development of a demonstration project to produce fuel gas suitable for gas engine generators in remote communities.
3. Monitoring of progress at Idaho Falls, Idaho where a fluidized-bed will be used to combust municipal solid waste.

4. Monitoring of progress at Duluth, Minnesota, where a fluidized-bed unit will be used to combust refuse derived fuel and sewage sludge. This system is currently undergoing startup and commissioning.
5. Development of a plan for the demonstration of a fluidized-bed unit to produce energy from municipal solid waste and from agricultural waste, if feasible.

In addition to these activities by the Ministry of Energy, Ontario Hydro is maintaining close contact with existing demonstration plants and projects and will consider contributing to the support of a Canadian (Ontario) demonstration of a coal-fired fluidized-bed combustion unit on a utility scale if the concept shows promise.

Also, the Canadian Electrical Association Generation Subcommittee is undertaking work which may lead to the location of a coal-fired fluidized bed combustion unit in Canada, possibly in Ontario. This work is being undertaken in the hope that it will lead to utility applications of fluidized-bed combustion technology.

RECOMMENDATION 4.2

The Ontario government should support the demonstration of biomass energy projects, including gasification of forest and agricultural residues, testing methanol technologies, evaluating ethanol potential, and generation of biogas.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

In March, 1980, the Ministry of Energy released a policy document entitled Energy from Waste: A Program for Ontario which describes opportunities in the areas referred to by the Commission, and outlines the role of the Ontario Government in furthering their development.

There are numerous activities currently underway as part of the subprogram for Energy from Waste on the utilization of wood wastes. These include the construction of a fluidized-bed fuel gas unit using wood waste as a fuel in Hearst that is scheduled for start-up in December 1980. The province is also developing a project for the gasification of wood waste to produce a fuel suitable for diesel generators and is considering a gasification unit for the production of synthesis gas suitable as a methanol feedstock.

An inventory of wood wastes that are available in the wood processing industry has been completed and site specific utilization studies will now be undertaken.

A study for the use of wood wastes as a heat source at the Monteith Correctional Institute is currently being completed and several other government facilities in the province are being examined for their suitability for conversion to use wood as a fuel.

The Edwardsburgh study described later in the response to recommendation 4.5., is examining the availability of feedstocks in Eastern Ontario and the markets for wood used as fuel wood or methanol feedstock.

In North Bay initial studies have indicated the viability of a facility to produce steam from garbage and wood wastes for use in the Nordfibre plant. The province and the company are currently confirming this conclusion prior to undertaking detailed engineering design, and are examining financing and ownership arrangements.

A study started in July 1980, involving agencies of all levels of government, is examining the possibility of producing steam and/or electricity from municipal waste and wood waste in the Region of Ottawa - Carleton.

In agriculture the Energy Management Committee of the Ministry of Agriculture and Food and the Ministry of Energy is developing a program and priorities for the next five years.

Some projects currently underway are the preparation of an inventory of biomass crops suitable for ethanol production, and the implementation of a program to build and operate up to six ethanol production facilities on farms or co-operatives throughout the province as demonstration facilities.

In the area of biogas generation and utilization there is a substantial program ongoing at the Arkell Research Station of the University of Guelph that includes the installation of a farm scale digester and the installation of a digester research unit containing two full scale digesters. A program of digester gas utilization in farm appliances and equipment is an integral part of the program.

The subject of alternative transportation fuels is of major interest to the province. In October 1980 the Minister of Energy announced a \$75 million Alternative Transportation Fuels Program. The 1978 report of the Ministry of Energy's Advisory Group on Synthetic Liquid Fuel is currently being examined and updated by an interministerial task force.

There are numerous studies completed and ongoing that are concerned with the technology and economics of producing and marketing alternative transportation fuels from feedstocks such as garbage, wood, lignite, and agricultural crops and wastes. The task force is examining all these factors, and their report, currently in the final stages of preparation, is expected shortly.

RECOMMENDATION 4.3 During the next decade the Ontario government should continue its programme to demonstrate the suitability of solar space heating and water heating in the Ontario context with special reference to its potential role in energy conservation.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

The Government believes that a somewhat more ambitious goal for developing solar potential in Ontario than that indicated by the Royal Commission's recommendation is warranted. The Ministry of Energy recently announced a revised solar energy program. The principal aim of the program is the establishment of a healthy solar energy industry in Ontario capable of supplying competitive products in both domestic and foreign markets.

The \$50 million, 5 year program includes four major strategies:

- 1- Develop a healthy solar industry in Ontario,
- 2 - Pre-build the market for solar energy equipment,
- 3 - Reduce barriers to solar energy use,
- 4 - Provide marketing assistance through effective communications.

This new program developed by the Ministry of Energy is based on the experience gained from previous development and demonstration activities.

In fiscal year 1981/82 the first major initiative under the strategy to prebuild the market for solar energy equipment will begin with the announcement of Ontario's Commercial Industrial Solar Demonstration Program which will cost share the installation of solar hot water systems in commercial and industrial establishments.

Early active solar demonstration projects include: four domestic hot water heating systems located in Ontario Housing Corporation single family homes; a packaged space heating system, called "a backyard solar furnace," designed to provide part of the heat for a Toronto bungalow; a senior citizens's residence in Aylmer, the first Canadian apartment building to be substantially solar heated; West Humber Collegiate in Etobicoke which has a solar system that provides about half of the school's hot water needs; and Applewood Public School in St. Catherines, Canada's first solar heated school.

More recently solar energy systems have been or will be installed at Confederation College, Thunder Bay; Ontario Correctional Institute, Brampton; Cambrian College, Sudbury; four park comfort stations in northern Ontario and nine park comfort stations in southern Ontario; Oakville - Trafalgar Hospital, Oakville; Mohawk Linen Services, Hamilton; a low rise apartment in Toronto, and the Arkell Research Center near Guelph.

Efforts have been made to ensure that solar systems are installed in all regions of Ontario. For example, the Ministry of Northern Affairs has been working in conjunction with the Ministry of Energy on the various solar projects noted above that are located in northern Ontario. Progress reports in all of the demonstration projects will be issued during the present fiscal year.

In the area of passive solar heating the Ministry of Energy participated in the production of A Builder's Guide to Energy Efficiency in New Housing, March, 1980. This publication deals with methods of reducing heat loss from building shells and introduces builders to the concept of passive solar heating.

The Ministry of Energy and the Housing and Urban Development Association of Canada (HUDAC) have also commissioned the development and analysis of 21 passive solar heated building designs prepared by 14 builders. The construction of the house is completed. Ontario Hydro and the gas utilities will monitor the heating costs next winter. This is a prelude to a larger program that Hydro will be implementing involving 50 passive solar home demonstrations across the province in 1981.

A more detailed review of passive solar heating techniques, including a design aid for home designers, was also prepared by the Ministry of Energy.

With respect to solar water heating, Ontario Hydro is testing units to develop installation instructions and maintenance standards. In 1980 five solar water heaters were installed in Toronto. An additional 50 will be installed in 1981.

Other activities of the Ministry of Energy designed to improve the prospects for solar energy use in Ontario include the completion of a standardized method for collecting data which will be used in all future government solar demonstrations at both the federal and provincial levels. As well as reducing the cost of monitoring systems and producing data at a faster rate, this method will increase the quality and reliability of the data collected.

Information on the past activities of the Ministry of Energy and a brief description of the revised solar energy strategies are contained in the Ministry's October, 1980, publication entitled Solar Energy; A Status Report. Detailed implementation plans for the various strategies will be announced as they are completed over the next few months.

RECOMMENDATION 4.4

The Ontario government and Ontario Hydro should make every effort to convert the "mothballed" gas-fired boilers at the R.L. Hearn Generating Station to burn refuse or refuse-derived fuels.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Ontario Hydro is currently investigating the feasibility and cost of installing refuse fuelled boilers at the R.L. Hearn Generating Station to produce steam for the Toronto District Heating System and generate electricity with any surplus steam.

One third of the funding for this work has been provided by the Ministry of Energy. Detailed capital and operating costs have been developed based on the concept of installing two 1,000 ton/day refuse burning boilers in a new building located to the west of the existing generating station. These costs are presently being compared with an alternative scheme proposed by the City of Toronto.

If the Hydro scheme proceeds to the design and construction phase, it could be operational by about 1987. Due to the large steam demand, the electrical energy production would be relatively small, of the order of 30 GWh per annum, but the total energy produced will be equivalent to 700,000 barrels of oil annually.

RECOMMENDATION 4.5 The Ontario government and Ontario Hydro should assign high priority to the demonstration of industrial co-generation.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Co-generation facilities already existing in Ontario provide approximately 500 MW of electric power generation. A recent study on industrial co-generation funded by the Ministry of Energy found that the highest potential for additional co-generation involves the use of gas turbines and waste heat recovery boilers. With this technology the maximum technical potential for additional capacity is estimated at more than 4000 MW, primarily in the pulp and paper and chemical industries.

When economic considerations are introduced and it is recognized that industry commonly seeks a five year pay-back period on investment in co-generation, the potential for new capacity is estimated at just less than 2000 MW. To achieve even this, some form of subsidy may be required.

It should be clear from the foregoing that it is the implementation of co-generation by industry rather than its demonstration that provides the appropriate goal for government policy. The Government recognizes this and the Ministry of Energy is taking the lead in this regard.

In the past few years Ontario Hydro has taken a more active role in the development of industrial co-generation. Several studies have been performed in this area, while new site specific programs are now being developed to identify candidates for cogeneration projects in the near future.

Although it is not widely appreciated, one of the largest combined energy or co-generation systems in the world exists at the Bruce nuclear power development. The heavy water plant at this site is supplied with steam from what is called the bulk steam system of Bruce Generating Station. The heavy water plants were originally supplied from oil-fired boilers but to realize the benefits of low-cost steam produced from reactor heat, arrangements were made to integrate steam supplies from the nuclear units as they came on line.

The system is designed to supply an amount of heat that is equivalent to the space heating needs of nearly half a million houses. (Electricity is not generated from the steam and so this facility is not included in the 500 MW of cogeneration capacity mentioned above).

This project has provided Ontario Hydro with valuable experience in the integration of modular units to provide process-quality steam as well as the extremely high quality steam used in generating plants. Finally, and most importantly, it has significantly raised the overall thermal efficiency of the nuclear station.

A number of projects relating to the identification of the most promising industrial co-generation applications, and the preparation of operating manuals and the training of staff may be undertaken by Ontario Hydro following analysis and identification of the resources required to support such a program.

RECOMMENDATION 4.6

The Ontario government should expand its efforts to put in place a low-temperature hot-water district heating system, to demonstrate its energy efficiency under Ontario conditions, and to test the use of conventional as well as renewable or non-conventional fuels, for the combined generation of heat and electricity.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

The Ministry of Energy has been assessing the feasibility of district heating in several cities across Ontario. Several engineering studies of possible district heating applications, including St. Lawrence in Toronto, North Pickering and Sarnia, have been completed by the Ministry.

In co-operation with the City of Ottawa and the Federal Government; the Ministry is installing a physical demonstration of district heating in the LeBreton Flats Community in Ottawa. This is the first hot water district heating system for residences in Canada.

The LeBreton Flats district heating system serves 200 residential units and uses natural gas as a fuel. At the same time, an investigation of the feasibility of cogeneration and waste incineration in the neighbourhood is under way. Thus, the LeBreton Flats district heating system may be supplied with heat from cogeneration in the future.

The Ministry of Energy and Ontario Hydro intend to pursue work in district heating, building on what has been learned from the studies referred to above, and from the experiences of other countries.

NUCLEAR POWER

RECOMMENDATION 5.1

Ontario Hydro should publish a report as soon as possible on the expected exposure levels resulting from any reactor re-tubing operation, addressing, in particular, the following questions:

- . How many workers (Ontario Hydro employees and others) will be subjected to the five rem annual dose limit in connection with the re-tubing of a single reactor?
- . Will workers be subject to high dose levels on a continuing basis when the re-tubing of the Pickering A and Bruce A reactors begins on a sequential basis?
- . A worker could receive an aggregated dose of 50 rems over, say, a 15-year period. Is this medically acceptable? Should these exposures be age dependent?
- . What is the total number of workers required, on a continuing basis, to undertake re-tubing operations? Are that many adequately skilled workers at present available?
- . To what extent can the re-tubing operation be undertaken by "remote control", thereby minimizing aggregated exposure of workers?
- . Will workers who may be subject to higher than normal radiation doses, and their unions, be fully informed of the nature of the risk?

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Ontario Hydro is preparing a report similar to that recommended by the Commission, which is due for completion by the end of 1981. Such a report is required by the Atomic Energy Control Board (AECB) in support of proposals for re-tubing that must be submitted for AECB approval. The report will be available to the public.

Exposures of workers to radiation will be controlled within regulatory limits which are considered medically acceptable. Ontario Hydro believes that sufficient manpower is available and will be trained as necessary to undertake the re-tubing operations. "Remote control" will be employed as far as possible. All Ontario Hydro workers are already fully informed as to the nature of all occupational risks including radiation as part of their normal training program.

RECOMMENDATION 5.2

A new division devoted exclusively to nuclear power safety, reporting directly to the Executive Vice-President (Operations) of Ontario Hydro, should be established.

GOVERNMENT RESPONSE: Further study by Ontario Hydro is required.

IMPLEMENTATION

Independent groups already exist within Ontario Hydro to audit nuclear safety. In addition, a multi-disciplinary Nuclear Integrity Review Panel, consisting of senior management staff, has been established to ensure that nuclear systems meet all safety requirements.

The establishment of a nuclear power safety division is being carefully considered by Ontario Hydro and the Minister of Energy will be advised of the results of this consideration in due course.

RECOMMENDATION 5.3

The new safety division recommended for Ontario Hydro should establish a small emergency task force, available 24 hours a day on an "oncall" basis. This force should be one that could be transported expeditiously in an emergency, by road or helicopter or both, to any nuclear generating station in the province.

GOVERNMENT RESPONSE: Further study by Ontario Hydro is required.

IMPLEMENTATION

This recommendation which is concerned with in-plant, operational safety considerations will be studied by Ontario Hydro in conjunction with the studies referred to in relation to Recommendation 5.2.

Senior station personnel are already formally on call to provide additional resources should a need arise. These emergency procedures, which are tested periodically, are being reviewed to ensure that analytical and design advice are available. However, it must be recognized that the plant operators are the most knowledgeable group to handle any in-plant emergency. Consequently, an "emergency task force" could prove useful, but only if limited to an advisory function.

The contingency plans agreed to between Ontario Hydro and the responsible government agencies and approved by the ACEB, require specified personnel to be contacted. They can be brought together quickly should an emergency arise. Details of these procedures were provided to the Legislature's Select Committee on Ontario Hydro affairs in April 1979.

RECOMMENDATION 5.4

A systematic attempt should be made by Ontario Hydro to look for patterns in operating and accident experience available from both CANDU and other reactor systems. These patterns should be fed back into the process of setting design, operating, and safety criteria.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

The analysis of operating and accident experience recommended by the Royal Commission is already an ongoing process within Ontario Hydro.

The Nuclear Generating Division and the Design and Development Division of Ontario Hydro are taking action to improve the method and procedures of the feedback of operating experience following the recommendations of the Ontario Select Committee on Hydro affairs.

A system has been established for the evaluation and distribution of Ontario's significant event reports and event reports from stations in other countries. A task group has been established to review lessons learned from the Three Mile Island accident, and to assess implications for Ontario's CANDU stations.

The Nuclear Integrity Review Panel ensures that necessary changes are implemented, and will continue to do so in the future.

The Electric Power Research Institute has set up a Nuclear Safety Analysis Centre concerned with equipment performance, and an Institute for Nuclear Power Operations concerned with human factors in operations. Ontario Hydro is considering subscribing and participating in these programs.

RECOMMENDATION 5.5 Operational procedures and especially the reporting systems at CANDU stations should be critically assessed to improve communication.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

The critical assessment of operational procedures, including reporting systems at the CANDU stations, is an ongoing process within Ontario Hydro. A revised procedure for reporting significant events is being implemented.

An Operational Information Feedback Task Force has been formed of representatives of operating and engineering divisions. Its purpose is to review the present feedback systems and their uses, to establish criteria which have to be satisfied by the feedback systems, and to recommend the necessary improvements in the data collection and dissemination systems to promote effective flow and use of information.

These activities will be audited to ensure the review process is effective.

RECOMMENDATION 5.6

The current CANDU control room and indicator design should be reviewed and assessed from a human factors perspective to ensure that the equipment will display clear signals on reactor status to the operator under both normal and accident conditions.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

The Government endorses the emphasis given by the Commission to human factor considerations and agrees that the CANDU control room and indicator design should be continuously reviewed by Ontario Hydro from this perspective.

"Human factors" have been considered in the development of all control room panel designs from the start of the CANDU program. Ontario Hydro nuclear station control rooms have all been designed with operator responses as a major consideration. Full scale panel mock-ups have been built and all proposed instrument and control arrangements on these panels have been reviewed with experienced operation staff. Verification of results can be obtained only through the feedback of operating experience; in fact, many improvements have been made as a result of this process.

For the less likely events (those which have never happened), analytical predictions are made of system response. Training simulators are valuable for testing operator's response; Hydro has one simulator in operation and three more committed for construction.

Nuclear Studies and Safety Department staff are assisting with the set of abnormal events to be displayed on all of these simulators.

RECOMMENDATION 5.7 The educational requirements and training programmes for all nuclear supervisory, operational, and maintenance personnel should be critically reviewed.

GOVERNMENT RESPONSE: Accept in principle. Refer to the Federal Government.

IMPLEMENTATION:

Ontario Hydro's training programs meet all the requirements of the AECB. Nonetheless, a useful purpose could be served by a review of these requirements and training programs beyond the normal, ongoing process of evaluation and updating. The AECB may therefore wish to conduct a critical review of educational requirements and programs in conjunction with university specialists in nuclear engineering, human factors engineering, and the physical sciences.

The Ministry of Energy will refer this recommendation to the Federal Government.

RECOMMENDATION 5.8 Provision should be made for the continuous updating and monitoring of the performance of all reactor operators and maintenance personnel; there should be much more imaginative use of simulators in this regard.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

There is already in place, within Ontario Hydro, a comprehensive program for evaluating operator performance and records of operator performance are continuously maintained. Operators undertake refresher and update training on a regular basis, including the use of simulator training and retraining. Additional simulators have already been approved for Pickering B, the Bruce Stations and Darlington and these will provide a useful addition to Ontario Hydro's training capability.

RECOMMENDATION 5.9

The Atomic Energy Control Board should establish a human factors group to ensure that human factors concepts and engineering become central elements in the safe design, construction, operation, and maintenance of Ontario's nuclear stations. Further, human factors concepts should be reflected in the licensing requirements of both nuclear stations and key operating personnel.

GOVERNMENT RESPONSE: Accept in principle. Refer to the Federal Government.

IMPLEMENTATION:

The Government of Ontario endorses the emphasis given by the Royal Commission to human factor considerations and the Ministry of Energy will refer this recommendation to the Federal Government.

RECOMMENDATION 5.10 All aspects of contingency planning should be assessed in the light of the experience at Three Mile Island, and a comprehensive plan for each nuclear facility should be made publicly available. The public must be aware of these plans, which must be rehearsed regularly if they are to be credible. Special attention should be paid to preparing in advance for the sensitive and accurate handling of information during an accident.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Following the incident at the Three Mile Island nuclear generating facility a rearrangement of responsibilities within the Ontario Government for nuclear reactor off-site contingency planning was made. An emergency planning co-ordinator was appointed by the Ministry of the Solicitor General. Much preliminary planning was carried out in co-operation with the various ministries and agencies, both federal and provincial, most likely to become involved in the event of an emergency. The regional and municipal governments within the province have also been involved in the planning process. The main function of the emergency planning co-ordinator is contingency planning, not only for incidents at nuclear generating stations, but also for other types of emergencies.

In regard to nuclear generating stations, a contingency plan for each facility has been prepared and these plans are being updated as new information comes to hand. The Legislature's Select Committee on Ontario Hydro Affairs reviewed contingency plan procedures in April 1979. As part of the effort to increase the public awareness of these contingency plans, rehearsals for emergency situations have been conducted. These rehearsals have been and will be orchestrated to avoid as much

disruption as possible. No large scale evacuation is intended as part of a rehearsal.

It is important to avoid confusion and conflicting reports among the authorities involved, and between the authorities and the public, in the event of an incident. For this reason an operations centre for the Provincial Control (Technical) Group has been established within the headquarters of the Ontario Provincial Police to provide an access to the police radio network. A second Centre, a combined Province of Ontario/Ontario Hydro Public Information Centre, will be located in the Auditorium at Ontario Hydro's head office building. It will be equipped to provide communications with all necessary authorities, the public media and the general public. It will be the main source of public information regarding any actions taken by authorities and has been planned to ensure that all such information to be relayed to the public is accurate, timely and consistent.

RECOMMENDATION 5.11 Continuing epidemiologic evaluation of Elliot Lake miners and uranium mill workers should be undertaken. The public should be informed of the progress of these studies.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION

As an extension of a pilot of study of mortality in Ontario uranium miners published in 1974, and the report of the Royal Commission on the Health and Safety of Mine Workers in 1976, an enlarged study of mortality from all causes in 50,000 Ontario miners is underway. The study population includes 18,000 Ontario uranium miners. The work is being done jointly by the Ministry of Labour and the Workmen's Compensation Board. The results will be published in the open literature and made available to the unions concerned as soon as each stage is completed.

In addition the Legislature's Select Committee on Ontario Hydro Affairs examined uranium mining, including health aspects, at Elliot Lake extensively during July and August of 1980.

RECOMMENDATION 5.12 Ontario should contribute its share to any national programme for uranium mine and mill waste research.

GOVERNMENT RESPONSE: Accept in principle.

IMPLEMENTATION

On the initiation of the Federal Minister of State for Mines, a working group of experts from all sectors of uranium mine waste research and development in Canada has been formed, known as the National Technical Planning Group on Uranium Mine Waste Research. This working group reports to a Federal Provincial Steering Committee which is responsible for approving the terms of reference of the planning group and the group's reports so that the provincial and federal interests related to uranium mine waste management are assured. The Ontario Government is represented on the steering committee and the planning group.

The activities of the planning group, which are leading to a research program on tailings management, include:

- reviewing present activities and sources of funding;
- proposing a research program structure with priorities on objectives defined;
- estimating a program schedule, cost and cash flow;
- proposing a program management structure.

The findings of this group are expected to be released shortly and will be subject to study by the Ontario Government at that time.

RECOMMENDATION 5.13 Measures should be taken to ensure that the costs of long-term tailings monitoring, management, and R & D are reflected in the cost of uranium fuel rather than becoming a general charge to the Ontario taxpayer, not least because most of the uranium is being exported (over 90 percent).

GOVERNMENT RESPONSE: Accept in part.

IMPLEMENTATION:

The Government is considering this recommendation in the context of recommendations on uranium mine tailings made by the Environmental Assessment Board in the report entitled Uranium Mine Expansion of Elliot Lake and published in May 1979 (recommendation 10-40). This work is expected to be completed shortly.

In its review of uranium mine tailings the Government is noting that over the next several years the proportion of uranium produced in Ontario that is purchased by Ontario Hydro will increase significantly. It is concerned that care be taken to ensure that the Ontario consumer of electricity is not burdened with the cost of long-term management of uranium tailings which resulted from the previous export of uranium to other countries.

It has also been noted that Ontario Hydro's current contractual obligations with respect to uranium purchases ensure that the cost associated with meeting existing environmental regulations relating to long-term tailings monitoring, management and R & D are reflected in the cost of the uranium fuel purchased by Ontario Hydro.

Ontario Hydro and its customers should not, therefore, be asked to pay for the cost of long-term tailings monitoring, management and R & D which are related to the past or future exports of uranium.

For the Government one of the priorities at Elliot Lake and other uranium mining communities is the need to establish a long-term management strategy governing current and future operations of tailings and their abandonment. A consideration of the fomulation of the strategy is the concept of perpetual care; i.e. whether or not the government should levy a fee against mining companies to ensure the availability of funds in the future to deal with potential problems. The AECSB is investigating a similar mechanism.

RECOMMENDATION 5.14

The future expansion of the nuclear power programme in Ontario, and in particular, the uranium mining and milling portion of the fuel cycle, should be contingent on demonstrated progress in research and development with respect to both the short- and the long-term aspects of the low-level uranium tailings waste disposal problem, as judged by the provincial and federal regulatory agencies and the people of Ontario, especially those who would be most directly affected by uranium mining operations. It would be unacceptable to continue to generate these wastes in the absence of clear progress to minimize their impact on future generations.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

The Government of Ontario and the AECS agree that it would be unacceptable to generate radioactive mill tailings waste in the absence of clear progress towards management practices that will minimize the impact on future generations. However, the Government is also confident that the cooperative research programs referred to in response to Recommendation 5.12, the efforts underway to implement Recommendation 5.13, and the effective regulatory measures presently in force will ensure that such progress is achieved.

The one remaining problem is the abandoned tailings areas (a problem not unique to uranium mining) which is being addressed by provincial and federal agencies in response to the recommendations of the Environmental Assessment Board contained in its report on Uranium Mine Expansion of Elliot Lake.

RECOMMENDATION 5.15

All existing and planned Ontario Hydro nuclear stations should be retrofitted or designed for the interim storage on site of their spent fuel for the next 30 years by which time a disposal facility should be available.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION

An Ontario Hydro study Management of Irradiated Fuel Storage Siting Options by the Design and Development Division, December 1979 was tabled with the Select Committee on Ontario Hydro Affairs in January 1980. It recommended that Hydro's irradiated fuel be stored at the site of the nuclear generating stations until a decision has been made to reuse or dispose of this fuel, or until a disposal facility is available. A planned program is underway to implement this recommendation.

RECOMMENDATION 5.16 An independent "nuclear waste social advisory committee" should be established to ensure that broad social, political, and ethical issues are addressed. This committee should be chaired by an eminent Canadian social scientist.

GOVERNMENT RESPONSE: Accept in principle for the site selection/acquisition phase of the nuclear fuel waste management program. Refer to the Federal Government.

IMPLEMENTATION:

The context in which this recommendation by the Royal Commission is presented in its report makes it clear that the Commission had in mind a committee which would parallel the Committee on the Technical Aspects of the Waste Disposal Problem: a committee established by and reporting to Atomic Energy of Canada Ltd. (AECL). The Ontario Government is generally supportive of the Royal Commission's recommendation but recognizes that the issues raised in this recommendation apply at the site selection/acquisition stage of the nuclear fuel waste management program, which is not expected to occur for several years, towards the end of this decade or later. The Ministry of Energy will be forwarding this view to the Federal Government.

RECOMMENDATION 5.17

If progress in high-level nuclear waste disposal R & D, in both the technical sense and the social sense, is not satisfactory by at least 1990, as judged by the technical and social advisory committees, the provincial and federal regulatory agencies, and the people of Ontario - especially in those communities that would be directly affected by a nuclear waste disposal facility - a moratorium should be declared on additional nuclear power stations.

GOVERNMENT RESPONSE: Accept in part.

IMPLEMENTATION:

The Government agrees that a method must be developed of disposing of the highly radioactive wastes which arise from nuclear power reactors. The method must be both technically sound and socially acceptable to the people of Ontario.

It should be stressed that the Government believes that current progress in the research program is satisfactory and that the method of interim storage of high level waste currently used by Ontario Hydro is adequate for a very long time. Furthermore, the Government is confident that progress will continue to be satisfactory through the next decade. No immediate time pressures exist for an early proven long term disposal method, at least in technical terms, though this would, of course, be desirable.

Currently research and development work is being done by AECL. This work is aimed at assessing the feasibility of burying nuclear waste in corrosion-proof containers, deep underground in what is essentially, a hard rock mine.

Ontario Hydro and the Ontario Government are associated with this program through the Canada/Ontario agreement of June 5, 1978. The program was reviewed and reported on by the Select Committee of the Ontario Legislature on Ontario Hydro Affairs. (The Management of Nuclear Fuel Waste Final Report, June 1980).

The Government recognizes the need for review by experts competent in technical and social fields. The views of the people of Ontario will also be an important influence in determining what constitutes adequate progress in the program.

Taking account of all these factors, the Government believes that it would be inappropriate to make a commitment now to call a moratorium on additional nuclear power stations, unless satisfactory progress in higher level waste disposal is achieved by at least 1990.

RECOMMENDATION 5.18

No further development of the 1,250 MW CANDU reactor, even in the concept stage, should be undertaken by Ontario Hydro. Any additional nuclear base-load power stations in the post-Darlington period should be based on 850 MW CANDU reactors. We believe that such standardization will facilitate reactor safety as well as optimizing the average capacity factors of these stations.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION

Ontario Hydro reports that development work on the 1,250 MW CANDU reactor has been terminated and no further work is contemplated in the foreseeable future.

RECOMMENDATION 5.19

The Ontario government should advise the federal government that Ontario's requirements will be insufficient to ensure an order level of one reactor per year and, therefore, that the maintaining of CANDU as a viable option for the future suggests a need for urgent federal initiatives to fill the order gap. Our estimate of the likely total installed nuclear capacity in Ontario to the year 2000 is in the order of 17,500 MW; this means one additional 3,400 MW four-reactor nuclear station after Darlington, and it could be a high estimate, depending on, for example, actual load growth, success with conservation, co-generation, and potential imports of hydro-electric energy from Manitoba or Quebec. If the industry wishes to survive, it must begin to search for opportunities to diversify.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION

In January 1981, the Government of Ontario announced that it will adopt an accelerated 20-year electrical generation program. A specific objective of this program will be to reduce Ontario's use of coal for power generation and thereby reduce both costs and pollution. As a first step, the completion of the Darlington nuclear generating station is being accelerated.

In conjunction with the Province, Hydro will determine the appropriate level of additional generating capacity from nuclear, hydraulic and other indigenous sources to meet Ontario's future needs over this period.

Further, the Federal Government is routinely kept informed of Ontario Hydro's planned generation expansion program. The Government of Ontario has in the past, and will continue in the future, conveyed the message to the Federal Government that

Ontario's own requirements for additional CANDU capacity is unlikely to be sufficient to maintain the current industry in a healthy state during the rest of this century. Accordingly the Ministry of Energy will convey the content of this recommendation to the Federal Government.

RECOMMENDATION 5.20

Although it is important to keep open the thorium fuel cycle option by engaging in an R & D programme, a firm decision to go ahead with a major demonstration and/or commercial program should be delayed at least until 1990, and then made only if it is acceptable to the public after appropriate dialogue and study concerning the full implications and impacts of such a project.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

The Federal Government has already announced that it does not intend to pursue a major demonstration and/or commercial program utilizing the thorium fuel cycle during the next few years. The Ontario Government agrees with this position and will continue to maintain a dialogue on this issue with the Federal Government.

RECOMMENDATION 5.21 Nuclear power should no longer receive the lion's share of energy R & D funding, and R & D priorities in the nuclear field should be focused primarily on the human factor in reactor safety, on the management and disposal of wastes at the front and back ends of the fuel cycle, and on the decommissioning of nuclear facilities.

GOVERNMENT RESPONSE: Refer to the Federal Government.

IMPLEMENTATION:

The Government remains strongly convinced of the importance of nuclear power in Ontario's energy future. Accordingly, while the Government believes that the expenditure of funds on other energy forms should increase, it feels that such increases should not be at the expense of expenditures for nuclear development. Furthermore, funding should be assessed on the need and potential in each energy field.

With respect to nuclear energy, the development of decommissioning processes is essentially a design engineering task rather than an R & D activity. It does not have a high priority since it is difficult to justify substantial expenditures when it is not expected that a plant will be decommissioned until well into the next century. Furthermore, without wishing to detract from the importance of further funding with respect to the human factor in reactor safety, there are other areas of safety related research that are equal candidates for additional funds.

Most of the funding for nuclear R & D has been provided by the Federal Government through AECL.

This recommendation will therefore be referred to the Federal Government.

RECOMMENDATION 5.22

Procedures should be established to ensure fair handling of bonafide cases of professional dissent. Procedures should include the following concepts:

- . Concerns should be expressed in writing and considered by a special review group consisting of representatives of management, professional engineering staff, and at least one outside expert.
 - . The review group should obtain evidence from the dissenting staff member's colleagues.
 - . The review group should assess management's response to the concerns.
-

GOVERNMENT RESPONSE: Accept in part.

IMPLEMENTATION:

Provision for and response to professional dissent exists in Ontario Hydro by ready access to senior management. Freedom of expression and opinion are encouraged, and the Professional Engineers' Code of Ethics is respected.

Employees are encouraged by Ontario Hydro to bring views on conformance with safety reports, guides, codes and standards to the proper authority for resolution.

Ontario Hydro has recently decided that matters of professional dissent relating specifically to nuclear safety, which cannot be resolved at the local level, can be referred to the Nuclear Integrity Review Panel for resolution, (see response to Recommendation 5.2).

RECOMMENDATION 5.23 Standard-setting for the nuclear fuel cycle should be done in an open manner, including opportunities for public participation in the process.

GOVERNMENT RESPONSE: Accept in principle. Refer to the Federal Government.

IMPLEMENTATION:

The Ministry of Energy will communicate the Government's support of this recommendation to the Federal Government, which, through the AECS, has the responsibility for setting standards for the nuclear fuel cycle. Current AECS practice is to make public all proposed regulatory documents and to allow 60 days for comment.

RECOMMENDATION 5.24 The role of the Atomic Energy Control Board on-site resident inspector should be strengthened and the reports of the inspector should be made public.

GOVERNMENT RESPONSE: Accept in principle. Refer to the Federal Government.

IMPLEMENTATION:

This recommendation deals with an issue that is the responsibility of the AECB and will be referred to the Federal Government by the Ministry of Energy.

The AECB's "Policy on Public Access to Licensing Information" currently in effect requires that the AECB report to the public on significant hazards and any significant occurrences where corrective measures have been ordered. In addition, licensee reports required pursuant to AECB regulations or license conditions are also made public.

RECOMMENDATION 5.25 Advisory committees based on the social sciences should be established by the Atomic Energy Control Board.

GOVERNMENT RESPONSE: Accept in principle. Refer to the Federal Government.

IMPLEMENTATION:

This recommendation is directed to the AECB which has indicated its awareness of the need to take social factors into account in its work and decisions. The Ministry of Energy will refer the recommendation to the Federal Government.

RECOMMENDATION 5.26

Appropriate steps should be taken to guarantee that the Atomic Energy Control Board has adequate human and financial resources. The Atomic Energy Control Board, or its eventual successor, must not become a victim of government spending restraints.

GOVERNMENT RESPONSE: Accept in principle. Refer to the Federal Government.

IMPLEMENTATION:

Responsibility for funding the AECS rests with the Federal Government. However, the Ontario Government considers it important to ensure the continued effectiveness of the AECS with respect to its responsibilities relating to nuclear reactor safety and has previously informed the Federal Government.

The Ministry of Energy will refer the recommendation to the Federal Government.

RECOMMENDATION 5.27

The Government of Canada should ensure separation of the promotional and regulatory aspects of nuclear power by drafting appropriate legislation to replace the Atomic Energy Control Act as a matter of the highest priority. This would ensure that the Atomic Energy Control Board and Atomic Energy of Canada Limited would report to separate ministers, reflecting their very different roles, thereby avoiding public confusion and possible conflicts of interest of the sort that have in the past strained public confidence in the regulatory process.

GOVERNMENT RESPONSE: Accept in principle. Refer to the Federal Government.

IMPLEMENTATION:

This matter is the responsibility of the Federal government.

The Ministry of Energy will refer this recommendation to the Federal Government.

RECOMMENDATION 5.28

The Atomic Energy Control Board should expand its membership to include a broad representation of the general public as well as members of the scientific and technical community.

GOVERNMENT RESPONSE:

Accept in principle. Refer to the Federal Government.

IMPLEMENTATION

The Federal Government decides upon the membership of the AECS.

The Ministry of Energy will refer this recommendation to the Federal Government.

BULK POWER TRANSMISSION

RECOMMENDATION 6.1 Ontario Hydro should continue to undertake research and explore all alternatives that will permit the upgrading of existing transmission facilities and lead to optimizing the use of existing rights of way. Evidence of this research should routinely form part of Ontario Hydro's submission for approval of the acquisition of a new transmission corridor and/or the siting of a new transmission line.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

It is Ontario Hydro's practice to make use of existing rights of way wherever possible, by adding circuits to the tower lines or by restringing the conductors. Currently, Ontario Hydro is actively upgrading transmission capability over the existing bulk power transmission systems in southwestern and eastern Ontario.

It is also Ontario Hydro's practice in preparing environmental assessments for additional transmission facilities to address upgrading as an alternative way of meeting the identified transmission system requirements.

RECOMMENDATION 6.2

Given the advances in converter technology that suggest that high-voltage direct current (HVDC) transmission has now become economically attractive for distances in excess of 650 - 800 km, Ontario Hydro should carefully re-examine the advantages of HVDC for the proposed east-west interconnection and study its application for the line connecting the proposed Onakawana generating station with load centres in southern Ontario.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Advances in HVDC transmission will be included by Ontario Hydro when studying alternatives for the projects mentioned in the recommendation. In addition, Ontario Hydro is considering an HVDC line as one alternative for increasing the inter-connections between Hydro Quebec and Ontario Hydro systems. (See Eastern Ontario Plan Stage Environment Assessment, Ontario Hydro, July, 1980.)

RECOMMENDATION 6.3

Ontario Hydro should utilize even more imaginative approaches to public involvement in transmission routing. In particular, we believe the utility should leave more of the initiative in the public participation process to affected citizens, permitting those who will be most immediately impacted and involved to select alternate routes and to designate the preferred route; independence will be essential. The chairman of an appropriate citizens study committee should be selected by the citizens. Ontario Hydro should clearly state its criteria for routing, and this information with any other required by the committee should be readily provided by the utility. While the time period for study should be established by the utility, the procedures should be established by the study committee.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

The Government agrees that more of the initiative in the public participation process should be left to affected citizens and that the mechanism recommended by the Commission for achieving this appears useful. Whereas Ontario Hydro has a responsibility to undertake studies and recommend transmission line routes, it would be quite appropriate for Citizens' Study Committees to designate, within a predefined time period, the route for a transmission line which they prefer. The final choice, based upon a consideration of immediate and long-term, local and province-wide impacts, would of course remain the responsibility of the Government.

The Government believes that the combination of Ontario Hydro's public involvement program (for example, see Eastern Ontario Plan Stage Environment Assessment, Public Involvement and Environmental Process Support Document, July, 1980) which is continuing to evolve, and the provision for public hearings under The Environmental Assessment Act will satisfy the intent of this recommendation. When more experience has been gained, the procedures for public involvement will be reviewed and revised as necessary.

RECOMENDATION 6.4

Ontario Hydro should take all possible steps to ensure the safety and convenience of all persons working in the vicinity of extra-high-voltage transmission lines.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

As with all efforts to ensure safety and convenience, some judgment must be exercised as to what steps are reasonable in light of the expected costs and benefits. Therefore, this recommendation is accepted on the understanding that 'all possible steps' means 'all reasonable steps' i.e., those that do not require an inordinate expenditure of resources to achieve very minor improvements in safety and convenience.

In response to concerns expressed, especially in the farming community, about the effects of extra high voltage (EHV) transmission lines on people working in the vicinity, Ontario Hydro established, in 1976, a public demonstration centre directly under the 500 KV line at Essa near Barrie. At the centre, Hydro demonstrates conditions that could be encountered by people working under EHV lines. These demonstrations cover such topics as electric fields under EHV lines, effective ways of grounding vehicles, television and radio reception and vehicle clearances.

Ontario Hydro is conducting a portable EHV effect demonstration under the Lennox-Oshawa 500 KV transmission line just west of Bowmanville. Another possible demonstration is being considered in the Belleville area.

As part of its efforts to inform people, who live and work near EHV transmission lines, of the effects of these lines, Ontario Hydro has prepared a comprehensive information package which is available to the public.

RECOMMENDATION 6.5 Ontario Hydro should continue to plan the integrated electric power system on the basis of 500 kV and 230 kV transmission lines.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

It is Ontario Hydro's policy to continue to plan the integrated electric power system on the basis of 500 kV and 230 kV transmission lines.

RECOMMENDATION 6.6 Ontario Hydro should work with the appropriate farm organizations and the Ministry of Agriculture on the design of an appropriate single-pole and/or lattice tower for use in cultivated fields.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Representatives from Ontario Hydro and farm organizations are currently meeting to consider the design of single poles and lattice towers for use in cultivated fields. Two possibilities are being considered: to heighten and widen the legs of lattice towers to allow cultivation under the towers, and single shaft lattice towers.

Recently an Ontario Hydro proposal for a 230 kV single-base, lattice tower design, was well received by the farming community. The towers are being proposed for a transmission line which would traverse intensively cultivated land in the Leamington area of Essex County.

RECOMMENDATION 6.7

The farming community with the collaboration of Ontario Hydro should develop, as soon as possible, alternative routes for a second 500 kV transmission line from the Bruce Generating Station that will have minimal and acceptable impact on Class 1 and Class 2 agricultural land. Ontario Hydro should provide the necessary funding.

GOVERNMENT RESPONSE: Accept

On the basis of the Commission's endorsement of the need for a second 500 kV transmission line from the Bruce Nuclear Power Development, the Government is requesting Ontario Hydro to proceed with the next stages of the planning and approvals process.

To meet the intent of this recommendation Ontario Hydro has proposed that the planning process be carried out in two stages under The Environmental Assessment Act. During this process, Ontario Hydro will request that public hearings be held under the proposed Consolidated Hearings Act, 1981.

The program submitted for review in the first, or "plan stage", will involve the selection of a system plan and associated route-stage study areas. Studies to be conducted during the second stage, referred to as the "route stage" will identify alternative routes for the facilities required to implement the approved system plan. Interested individuals and groups will be invited to collaborate with Ontario Hydro in these studies, and will have the opportunity to participate in the environmental assessment process under The Consolidated Hearings Act, 1981.

Further, Ontario Hydro has proposed that in keeping with the commitment made to a number of interested public groups, these groups will have an opportunity to comment on the alternative plans before Hydro recommends its preferred alternative for "plan stage" approval under The Environmental Assessment Act. To this end Ontario Hydro has prepared an evaluation report, entitled Southwestern Ontario Evaluation of Alternative Transmission System Expansion Programs, in which alternative transmission system expansion programs for southwestern Ontario have been evaluated.

Each of the alternative programs includes, as one component, additional 500 kV transmission from the Bruce Nuclear Power Development. The evaluation report reflects the results of many years of public involvement activities sponsored by Ontario Hydro in southwestern Ontario.

IMPLEMENTATION

Following the release of this Government response to the Royal Commission's Report, Ontario Hydro's evaluation report will be made available immediately to the interested public and Ontario Hydro will be seeking public comment before recommending one of the alternative plans this fall.

Further, to facilitate the farming community's full participation in the public process, the Government is proposing that the public hearings under the proposed Consolidated Hearings Act, 1981 be held commencing in January 1982. This timing, of course, avoids the interested farming groups having to take time off during the Spring 1982 planting season.

Government Ministries as well as the Joint Board established under The Consolidated Hearings Act and Ontario Hydro will be taking all necessary steps to ensure that this scheduled hearing date is met while ensuring full public participation in the planning of new transmission facilities in southwestern Ontario.

RECOMMENDATION 6.8

In order to facilitate the co-operation of the farming communities, Ontario Hydro should not site a thermal generating station in the vicinity of Goderich or Kincardine, or indeed on the eastern shoreline of Lake Huron south of the Bruce Generating Station, before the year 2000. Ontario Hydro should make a public statement to this effect as soon as possible.

GOVERNMENT RESPONSE: Accept

IMPLEMENTATION:

Ontario Hydro has no plans to site a thermal generating station on the easter shore of Lake Huron south of the Bruce Generating Station before the year 2000, and will be making a public statement to this effect in the near future.

THE TOTAL ELECTRIC POWER SYSTEM

RECOMMENDATION 7.1 Ontario Hydro, working with the municipal electricity utilities, should give high priority to completing the load-management experiments now underway so that the technical problems, costs, and public acceptability of alternate systems can be assessed.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Ontario Hydro has given and will continue to give, high priority to load management experiments. Ontario Hydro has various load management activities underway in the industrial, commercial and residential market areas. These programs are considered a learning experience required before load management can be implemented on a large scale across Ontario.

In co-operation with the Scarborough and Oshawa municipal hydro commissions, Ontario Hydro is testing the potential for thermal storage equipment and other load management techniques in selected customer homes during a three year experimental period.

Also, experimental equipment capable of monitoring the power use of existing water heaters, baseboard heaters, washers and dryers, and other appliances will be installed in the customers' homes. In some cases, this equipment will actually inhibit the power consumption of some of these appliances at certain periods of the day when the demand for electricity is high. This will be done through telephone lines or AM radio wave signals from special computers installed by Ontario Hydro in each of the Scaborough and Oshawa utilities.

These load management experiments have two main objectives. The first is to obtain information on customers daily energy use habits as they relate to certain household appliances. The second objective is to manage the electricity consumption of some of these appliances so that their electricity demands are shifted to off-peak periods.

Ontario Hydro also has a program underway to test the use of storage furnaces for space heating purposes in fifty residential installations.

The commercial sector is being examined to gather information which will assist Ontario Hydro in preparing a load management program for this market. In the industrial sector, studies are being done to identify the potential for, and the associated incremental costs of shifting production operations to take advantage of any special rates that could be made available if the shifted load provides long term benefits to the electric power system.

RECOMMENDATION 7.2

An in-depth study of the Commission's supply scenarios should be undertaken and the findings should be used as a basis for future planning of the electric power system.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

In planning the future electrical system in the province, the Government and Ontario Hydro will give full consideration to the Commission's supply scenarios.

Ontario Hydro is conducting a review of its uncommitted program and this review encompasses the Commission's supply scenarios. The Ministry of Energy is studying the Commission's supply scenarios in terms of Ontario's overall energy policy.

RECOMMENDATION 7.3

The studies aimed at strengthening the electricity interchange capability with Quebec should be expedited, and in particular, they should be extended to ensure close collaboration between Ontario Hydro and Hydro-Quebec in the future planning of their respective systems for the mutual benefit of both provinces.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Ontario Hydro and Hydro-Quebec have been interconnected at several points since the 1920s. Technical problems prevent Ontario Hydro from tying directly into Hydro-Quebec's main power system. However, work is underway to examine the benefits of increasing the capacity of the Ontario-Quebec interconnection.

The strengthening of inter-connections between the two systems has been addressed as part of the Plan Stage Environmental Assessment for Additional Bulk Power Facilities in Eastern Ontario which has been submitted to the Minister of the Environment for review. The Environmental Assessment document refers to a joint report by Ontario Hydro and Hydro-Quebec on the question of inter-connections which was released in November, 1980.

RECOMMENDATION 7.4

Ontario Hydro should co-operate with Manitoba Hydro in studies aimed at strengthening electricity interconnections and the purchase of substantial blocks of hydraulic power from the lower Nelson River; there should be closer collaboration between the two utilities in the future planning of their respective systems for the mutual benefit of the two provinces.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Ontario Hydro and Manitoba Hydro have been interconnected since 1956. Both utilities provide emergency and economy assistance to each other under the terms of an interconnection agreement. Ontario Hydro also has an agreement with Manitoba to purchase a modest amount of firm power through to April 1982.

The two utilities conduct joint planning meetings periodically where consideration is given to their respective system development plans. When a need to strengthen the interconnections between Manitoba and Ontario is identified a full study will be undertaken.

RECOMMENDATION 7.5

The interconnections between Ontario Hydro and neighbouring utilities in the United States should be strengthened.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Ontario Hydro is examining alternative ways in which the interconnections with U.S. utilities can be strengthened. This is an ongoing activity of Ontario Hydro. Studies are underway to help Hydro and General Public Utilities, which services parts of Pennsylvania and New Jersey, determine the economic, environmental and engineering feasibility of a submarine cable under Lake Erie. If the utilities agree to proceed with the project, approval by the Provincial Government and by the National Energy Board (NEB) would be required.

Ontario Hydro is also considering strengthening its U.S. interconnection at Niagara. As part of license applications presently before the NEB, Ontario Hydro is seeking approval for two additional 345 kV line interconnections.

LAND USE

RECOMMENDATION 8.1 Ontario Hydro and the Ontario government should build on developments already taking place at the Bruce site to test further the concept of a combined Energy Centre as described in the Ministry of Industry and Tourism's 1976 Report.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

The Ontario Energy Corporation is the primary energy investment vehicle for the Province of Ontario. The role of the Corporation is to encourage private sector investment in energy-related projects in support of the Provincial energy policy.

In 1979, a group of private investors and the Ontario Energy Corporation initiated the AgriPark concept to use low temperature heat from the Bruce reactors for green houses and fish farms. A one-acre experimental greenhouse is now in production and eventual plans call for 150 acres of greenhouses to be sustained year round by low grade heat.

A survey to identify potential users of steam and/or hot water from the Bruce Station was conducted for the Bruce County Economic Development Committee by Atomic Energy of Canada Limited with the financial support of the Ontario Energy Corporation and the full co-operation of Ontario Hydro, the Ontario Ministry of Industry and Tourism and the Bruce AgriPark Joint Venture. Over 100 energy-intensive industries were surveyed over a six-months period. The survey was followed by in-person interviews with those Companies expressing the greatest interest.

Ontario Hydro would supply energy in the form of steam and/or hot water from its Bruce Nuclear Power Development for industrial and other uses and has designated the Ontario Energy Corporation to be its exclusive agent for the sale of this thermal energy. The Bruce Thermal Utility has been formed by the members of the Bruce AgriPark to undertake the transportation of thermal energy from the Bruce Nuclear Power Development and to support the development of an industrial load.

The Government will introduce in the near future legislation clarifying the authority of Ontario Hydro to produce and sell thermal energy as a primary product.

Other nuclear power stations in Ontario offer a similar potential for thermal energy use. The Ontario Energy Corporation has been involved in the commercial promotion of a proposed 8 acre waste heated greenhouse complex at the Pickering Generating Station. Commercial uses of effluent water have also been proposed at the Darlington Generation station scheduled to be in service in the late 1980s. The same kind of provisions for the utilization of thermal energy as exist at the Bruce Station will also be incorporated at the Darlington Generation station.

RECOMMENDATION 8.2 Ontario Hydro should accept financial responsibility for the debenture debt load of the municipalities in the vicinity of the Bruce Generating Station that is over and above what would have been incurred in the absence of the Ontario Hydro Projects.

GOVERNMENT RESPONSE: Reject.

DISCUSSION:

The Government agrees that municipalities should not have to bear any additional costs due to Ontario Hydro activities. However, it does not think that the mechanism proposed in this recommendation is necessarily the best one for achieving this nor should it be applied retroactively.

Ontario Hydro's policy is to ensure that municipalities do not suffer financially as a result of Hydro facilities. In following this policy Ontario Hydro takes care neither to interfere with nor assume the responsibilities of municipalities. To accomplish this, Ontario Hydro negotiates agreements with the affected municipalities whereby Ontario Hydro makes payments to the municipalities in lieu of property taxes and to cover any other additional expenses the municipalities have to incur because of Hydro's activities in the area.

This approach is more satisfactory than that proposed by the Royal Commission for two reasons. First, it may be difficult to establish what portion of a municipality's debenture debt load represents the excess over and above what would have been incurred in the absence of Ontario Hydro project.

Second, the recommendation would penalize those municipalities which met unusual expenditures related to Ontario Hydro's activities by making capital expenditures financed by current revenues rather than from debt financing.

RECOMMENDATION 8.3

Ontario Hydro should not proceed with land-banking programmes for at least the next 10 years.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Ontario Hydro perceives no need within the next 10 years to proceed with a program to land-bank sites - i.e., to acquire sites for future thermal stations prior to proof of need. Land-banking of transmission station sites and transmission rights-of-way is essential to good planning in certain urban situations.

RECOMMENDATION 8.4 Ontario Hydro's planning concepts should reflect the primary objective of conserving Ontario's food lands, particularly in southwestern Ontario.

GOVERNMENT RESPONSE: Accept in part.

IMPLEMENTATION:

The Government considers it extremely important for food land, particularly in southwestern Ontario, to be conserved. However, many considerations, including food land conservation, must be reflected in Ontario Hydro's planning concepts and addressed in environmental assessments of new facilities so that informed judgement can be exercised.

RECOMMENDATION 8.5

The potential of Ontario's forest lands, especially in northern and eastern Ontario, as sources of energy should be the subject of an in-depth feasibility study; and, if the social, environmental, and economic indications are favourable for methanol or ethanol production, a demonstration plant should be built and tested as soon as possible.

GOVERNMENT RESPONSE: Accept

IMPLEMENTATION

A biomass study of the Edwardsburgh area in eastern Ontario was commenced in July, 1980, and is examining the issues referred to in the recommendation for that locale. The Ministry of Energy in co-operation with the Ministry of Natural Resources plans to foster increased development of bush residue harvesting techniques to the point of commercial viability. Once this is achieved, direct conversion to heat, or even to steam for electric power generation, using technology similar to that for mill residues might be feasible.

RECOMMENDATION 8.6 The existing research and development programmes relating to energy plantations, especially the potential of the hybrid poplar in eastern Ontario, with emphasis on abandoned low-quality farm lands, should be expedited.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Ontario's hybrid poplar program is being conducted by the Ministry of Natural Resources. It encompasses some 3,000 acres of poplar forest. A program to substantially increase this acreage is about to begin, putting Ontario ahead of most of the world in this activity.

Enough is already known to enable the "development" aspect of "research and development" to be emphasized. However, there may be problems of net energy balance, land availability, specialized technology, and the possible conflict with food production, that need to be resolved.

In this regard, the government notes Dr. Porter's statement to the House of Commons Special Committee on Alternative Energy and Oil Substitution, September 6, 1980 to the effect that the Government's support of biomass energy projects "should not embrace the demonstration of biomass energy projects based on energy plantations." However, the Government believes that it would not be wise for Ontario to cease activity in this area since it offers considerable potential as a renewable energy source based on Ontario's indigenous resources.

Recently under the BILD Program the Ministries of Energy and Natural Resources announced the establishment of the Ontario Institute for Forest Biomass Research to coordinate world research and development work on trees for rapid biomass growth and production

RECOMMENDATION 8.7

On strictly power-systems-planning and economic grounds, the Onakawana lignite deposits should be developed; and an electric power station of 800 MW-1,000 MW capacity should be built at the mine site. However, we recognize that the Royal Commission on the Northern Environment, on social and environmental grounds, with respect to both the power station and the associated transmission corridor, may not support this recommendation, and we believe that their views should have precedence.

GOVERNMENT RESPONSE: Further study required.

IMPLEMENTATION:

In Energy Security for the Eighties: A Policy for Ontario (September, 1979) the Government included a generating station at Onakawana as a possible energy project to be undertaken over the next 15 years. It presents an important opportunity for Ontario to increase its energy self-sufficiency.

The Onakawana project has been designated under The Environmental Assessment Act and, if a proposal is advanced to proceed with a generation station at Onakawana, a decision will emerge from the environmental assessment process. The Environmental Assessment Act requires that an environmental assessment document be prepared by the proponent of a project, and that the assessment document be reviewed by the Government. Both the assessment and the Government review become public documents and a public hearing before the Environmental Assessment Board may be held.

An Environmental Assessment is currently being prepared by Onakawana Development Limited and Ontario Hydro and it will examine alternative uses of the lignite deposits including, as one possibility, their development as a fuel source for an electric power station. The study is expected to be complete about September, 1981.

ENVIRONMENTAL CONCERNS

RECOMMENDATION 9.1 Ontario Hydro should not install sulphur scrubbers at its fossil-fuelled electric power stations as long as the existing policy of utilizing low-sulphur fuels is maintained.

GOVERNMENT RESPONSE: Reject.

IMPLEMENTATION

The use of washed, low sulphur coal is an advance in practice over uncontrolled emissions from high sulphur coal. This practise, as well as other control measures introduced by Ontario Hydro, has made Hydro a leader in reducing the emissions contributing to acid rain.

On January 26, 1981, the Honourable Harry C. Parrott, Ontario Minister of the Environment and Hugh Macaulay, Chairman of Ontario Hydro, announced a commitment to reduce sulphur dioxide and nitrogen oxide emissions from coal-fired generating stations to 300,000 metric tons by 1990 compared to the 560,000 to 609,000 metric tons estimated for 1981.

In order to achieve the 1990 target, Ontario Hydro will install sulphur dioxide scrubbers at two 500 MW coal-fired units, install special low nitrogen oxide burners, expand the use of low-sulphur and washed coal, and accelerate the completion of the Darlington nuclear generating station to permit earlier displacement of coal-fired capacity.

In addition, Hydro is assessing other options, such as hydraulic generation and strengthened transmission, to ensure they meet the 1990 target.

RECOMMENDATION 9.2

Ontario Hydro and the Ministry of the Environment should strengthen existing air and water pollution monitoring systems, especially, although not exclusively, in the vicinity of thermal power stations, and environmental impact maps should be prepared for the benefit of the public.

GOVERNMENT RESPONSE:

Accept in part.

IMPLEMENTATION:

The existing air quality monitoring system in the vicinity of the Ontario Hydro's thermal stations is already one of the most sophisticated in North America. It is likely that additional monitoring will show only very marginal returns for the cost involved.

With respect to water quality monitoring and Ontario Hydro's discharges, the Ministry of the Environment will require Ontario Hydro to do general year-round monitoring of its thermal plumes.

The environmental impact maps recommended by the Commission may be useful for informing the public of the likely effects of Ontario Hydro's operations, and could be included in future environmental assessments. The Ministry of The Environment and Ontario Hydro will give further consideration to the process, scope, content and potential usefulness of these maps before a decision is made regarding their production.

RECOMMENDATION 9.3 Interdisciplinary institutes for environmental research in Ontario universities should be involved more actively in the environmental assessment process.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Ontario's universities are already involved in the environmental assessment process. Research of a multi-disciplinary nature has been and is being conducted for specific projects. In the preparation of environmental assessments by Ontario Hydro, consultants are retained based on expertise, experience, facilities, service and project management. Contracts have been, and undoubtedly more will be, placed with environmental specialists in Ontario and Canadian universities, but all bids for specific work will be fully evaluated regardless of source.

It should also be noted that other groups besides the proponent who may wish to participate in the environmental assessment process can retain the services of members of interdisciplinary institutes for environmental studies. The Ministry of the Environment maintains an open file on individuals and organizations, including institutes for environmental research, that offer services relevant to the conduct and review of environmental assessments.

ENERGY CONSERVATION

RECOMMENDATION 10.1 Over a period of 10-20 years, efficiency goals for all energy-intensive industrial processing equipment, machines, and systems should be established by the Ministry of Energy. In setting these goals, efficiency standards already being achieved in several foreign countries, notably Sweden and West Germany, should be taken into account. Efficiency goals should be applied in the first place to the pulp and paper industry, the iron and steel industry, the chemicals industry, the petroleum refining industry, and all heat-treating operations.

GOVERNMENT RESPONSE: Accept in part.

IMPLEMENTATION:

The Government has adopted energy conservation as a primary objective of Ontario's energy policy, and has initiated a broad range of programs to contribute to the achievement of ambitious energy conservation goals. Ontario's approach to conservation in the industrial sector has been, and will continue to be, one which relies on the voluntary cooperation of industry.

Since 1976 industry has set goals for itself in energy conservation (particularly through the Industry Energy Conservation Task Forces) and has been able to achieve or exceed them. Recently, new goals set by these task forces have been presented to the Federal Government and these set rigorous targets for 1985 and the years intervening.

A new awareness of the issues and the commitment now evident in senior management towards energy conservation is further evidence that mandatory standards are not likely to be necessary.

The Government will continue to help industries to achieve their own energy conservation goals. One way in which this is currently being done is with computer equipped bus operated by the Ministry of Industry and Tourism which make on the spot analyses of energy consumption and identifies potential savings at industrial sites. The Ministry of Energy is also taking steps to encourage other industries that have not yet done so to establish their own energy efficiency goals, and the Ministry will help in publicizing these goals and the means of achieving them.

In October, 1980, the Minister of Energy announced a \$10 million, three-year program to help industry convert from oil and to conserve energy generally.

RECOMMENDATION 10.2 Mandatory heating, insulation, and lighting standards should be enacted for new residential and commercial construction, and these standards should take into account the optimum utilization of passive solar energy measures.

GOVERNMENT RESPONSE: Accept in part.

IMPLEMENTATION:

It is already the case that some standards, such as those recommended by the Commission, already exist. For example, the Ontario Building Code prescribes minimum levels of insulation for residential construction, and in other cases, guidelines have been published, e.g., for heating and lighting in the Builder's Guide to Energy Efficiency in New Housing, prepared by the Ministry of Energy and the Housing and Urban Development Association of Canada. The guide offers methods for improving the thermal performance of building shells and heating systems. It also indicates the capital costs and the payback periods of the various improvement options.

The existing Ontario Building Code sets minimum standards for insulation in all new light construction in Ontario. First proclaimed in 1976, it has been successively revised and now incorporates the higher insulation standards previously used for all new electrically-heated housing.

In September, 1979, the Building Code Branch of the Ministry of Consumer and Commercial Relations issued a set of proposed energy conservation improvements for the other classes of construction -- commercial and industrial.

Later this year, the Minister of Consumer and Commercial Relations will publish regulations extending energy conservation provisions of the Ontario Building Code to the

practical limits of technology. (These limits are changing rapidly, as indicated by results from such installations as the super-insulated housing in Saskatchewan.) This will result in an up-dating of the existing energy conservation regulations for housing and small buildings and in the enactment of new regulations for most types of commercial and light industrial buildings.

Work on the development of energy conservation provisions for more complex types of commercial buildings will continue and further regulations will be enacted as cost-effective solutions to technical problems are found.

Residential passive solar heating is being given high priority in the \$50 million, five year solar program announced in October, 1980, by the Minister of Energy. The Ministry of Energy is already working with the Housing and Urban Development Association of Canada in a program in which the additional costs to contractors of incorporating passive solar features in demonstration houses are subsidized.

RECOMMENDATION 10.3 Progressively stricter efficiency standards for all major energy-consuming appliances, such as water heaters, refrigerators, home furnaces and air-conditioners, should be put into effect through legislation.

GOVERNMENT RESPONSE: Accept in part.

IMPLEMENTATION:

The introduction of mandatory efficiency standards for energy consuming appliances should be decided on a case-by-case basis. The Ministry of Consumer and Commercial Relations has been actively promoting and co-operating in the production and adoption of standards for improved and new energy conserving appliances using gas, propane and fuel oil. Several such standards are already in use and appliances are in production. New gas furnaces must pass an efficiency test by the Canadian Gas Association. Retraining programs ensure that proper maintenance is carried out on existing equipment.

The federally sponsored Energuide electric appliance labelling program has been most successful. By 1981, virtually all major domestic appliances will have Energuide labels. This program has already resulted in a marked reduction in energy consumption for those appliances marketed in Ontario. Ontario Hydro's Research Division, in conjunction with the Canadian Electrical Association, was actively involved in the C.S.A. appliance testing program. This program has provided a solid information base to allow customers to make sound "energy-wise" decisions when buying appliances. The information base can ultimately be used to set minimum efficiency levels if it becomes necessary.

With respect to electrical appliances, the Government has supported the development of the federal Energuide Program in which new appliances are labelled to show the expected energy

consumption of the appliance as a result of CSA testing. In this manner, the conservation choice is left with consumers but they have the information necessary to make sound choices.

The Ministry of Energy has been active in funding the research development and demonstration of new generations of much higher efficiency gas furnaces. These will be commercialized through normal channels.

RECOMMENDATION 10.4 Direct Government loans and other economic incentives should be made available to finance the retrofitting of houses, multi-unit residences, and some commercial buildings with conservation equipment, including insulation and, where appropriate, storm windows and shutters.

GOVERNMENT RESPONSE: Accept in part.

IMPLEMENTATION:

A variety of homeowner grant, loan, tax exemption and other assistance programs are available to encourage energy conservation in Ontario homes. In brief, these programs are:

Residential Electrical Services Program

Ontario Hydro and municipal electrical utilities will provide homeowners with loans of up to \$2,000, along with advice on how to make their houses more energy-efficient and how to convert them from oil to electrical heating.

The loans, with interest rates close to the Ontario Hydro borrowing rate (currently about five per cent below the bank rate for personal loans) will be available to:

- o improve home insulation;
- o upgrade electrical wiring;
- o generally improve a home's energy efficiency;
- o convert heating systems wholly or partially to electrical heating.

In addition, Ontario Hydro and municipal utility advisors will be available to:

- o help homeowners take full advantage of assistance plans such as CHIP (Canadian Home Insulation Program) and the off-oil program;
- o discuss such electric heating options as partial electric heating, total electric heating and heat pumps.

Homeowners will be expected to pay at least \$200 of the cost before they are eligible for a loan. The loans will be repayable over five years.

The program will also make heat pumps more readily available to Ontario homeowners. By cushioning the cost, more homeowners will be able to install these energy-saving heat systems.

Ontario Hydro advisors will also help owners:

- o assess their home's insulation, weather sealing and electrical wiring needs;
- o locate qualified contractors for energy conservation or electrical heating projects;
- o conduct a follow-up inspection when the work is completed.

The audit and advisory program will start in areas of Ontario not served with natural gas and will eventually spread throughout Hydro's rural service area. Municipal electric utilities will have the authority to undertake similar programs in their service areas.

Canadian Home Insulation Program (CHIP)

This federal program provides taxable grants of up to \$500 to homeowners to upgrade the insulation in homes built before 1961.

The grant is divided into two parts:

- o up to \$350 for approved materials;
- o one-third of labor costs up to \$150.

Ontario Sales Tax Exemption

Numerous energy conservation measures have been introduced in Ontario budgets, including exemptions from the seven-per-cent provincial sales tax for:

- o weather stripping and caulking materials designed to prevent heat loss in buildings;
- o machinery or equipment designed to recover heat which would normally be released to the atmosphere;
- o licensed vehicles powered exclusively by electricity, hydrogen, propane, natural gas, alcohol or manufactured gas;
- o storm doors and storm windows; double-glazed windows and double-glazed patio doors; and window units sold complete with storm units and patio doors with double-track door systems, provided they incorporate the glazed insulating feature;
- o thermal insulation materials used in all buildings for the purpose of preventing heat loss;
- o heat pumps when used principally to provide heat;
- o heat recovery units used to extract heat from exhaust air or waste water for recovery of energy;
- o solar cells designed to produce, directly from sunlight, electricity to charge batteries;
- o solar furnaces, solar panels, and tubes specially designed to collect and convert solar energy into heat for use in solar heating systems;
- o wind generators and windmills for converting wind power to mechanical or electrical energy;
- o timer-controlled thermostats for heating systems for buildings; automatic timer controls for electrical equipment which are used to control energy in electrical lighting equipment;

- o wood-burning stoves and wood-burning furnaces;
- o wind deflectors for trucks;
- o a seven-per-cent or \$700, whichever is less, tax rebate to individuals who purchase taxable parts and materials to build their own solar heating system.

The Ontario Home Renewal Program provides financial assistance to low income families to rehabilitate their dwellings including the incorporation of energy conserving measures. This program is available to families with a maximum income of \$12,500.00 per year and where municipalities have taken up the program.

ECONOMIC & FINANCIAL FACTORS

RECOMMENDATION 11.1 In formulating its industrial policy, Ontario should recognize the need for an adequate and competitively priced supply of electricity, but Ontario should not attempt to compete aggressively for power-intensive industry with provinces with large remaining hydraulic resources.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

The Government acknowledges the Royal Commission's concern that no special price for electricity should be offered to attract power intensive industry. It is Ontario Hydro's policy not to provide any form of discount to attract power intensive industry.

RECOMMENDATION 11.2

The Ontario government should continue to support Ontario Hydro's efforts to utilize its surplus generating capacity by undertaking interruptible or firm sales to neighbouring utilities that are both profitable and in the best interests of the people of Ontario. No firm-sale commitments should be made that might jeopardize the generation reserves required to meet Ontario requirements or tie up needed transmission capacity.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

The Government's basic policy is to approve the export of electric power by Ontario Hydro where the quantities proposed for export are surplus to Ontario and Canadian needs. Following the reduced load forecasts of the past few years the Government looks favourably at all proposals for additional exports, interruptible and firm, presented to it by Ontario Hydro, which promise to provide a benefit to the Ontario electrical consumer. The Government supported the Ontario Hydro application for increased export sales, which was heard at the National Energy Board in March 1981.

During the past year and a half, Ontario Hydro has contacted more than 30 U.S. utilities as well as those in Manitoba and Quebec, to determine their interest in purchasing the surplus power expected to be available until the late 1980s.

The requirements of the National Energy Board, as well as the policy of the Ontario Government, dictate that the second part of the recommendation, relating to the maintenance of adequate generation reserves to meet Ontario requirements, must be satisfied.

RECOMMENDATION 11.3 Ontario Hydro should perform system simulations to estimate more accurately the incremental costs of encouraging the substitution of electricity for fossil fuels, especially oil.

The Ministry of Energy should develop comparable cost estimates of alternative means to supply, or save the same energy at point-of-end-use.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Within Ontario Hydro, the development of more accurate simulations is an ongoing activity by many groups, including the Economics Division, Resources Planning, Load Forecasting, the Comptrollers Division, the Energy Conservation Division and the Rates and Utilization Division. The simulations recommended by the Commission will be undertaken by Ontario Hydro as part of this activity.

As part of the analysis of alternative energy sources, the Ministry of Energy undertakes economic assessments of the alternatives. The Ministry plans to build on work already completed to develop comparable cost estimates of alternative means to save the same energy at point of use.

The Ministry will also monitor the work conducted by Ontario Hydro and is developing a methodology for its own work which is consistent and comparable with the approach used by Hydro.

RECOMMENDATION 11.4

Time-differentiated electricity rates (seasonal and time-of-day) should be introduced as soon as possible to as many classes of customers as practicable. Seasonal rates should be introduced first, to ensure that the higher long-run costs of supplying low-load-factor space-heating loads are properly recovered. Time-of-day rates should be phased in as day-night electricity supply-costs differentials become significant and obstacles to metering small customers are overcome.

GOVERNMENT RESPONSE:

Accept in principle subject to further study.

IMPLEMENTATION:

Following receipt of the Ontario Energy Board (OEB) report Principles of Electricity Costing and Pricing for Ontario Hydro, December 20, 1979, the Ontario Hydro Board of Directors established a review and consultation process to consider the OEB's recommendations. In August, 1980, the Ontario Hydro Board agreed in principle to the implementation of time of use rates at the bulk power level.

Ontario Hydro is now working towards implementation of time of use rates, which, for Hydro's bulk power customers, could be as early as 1982, following the Ontario Energy Board's review in 1981. Studies of customer acceptance and cost effectiveness are being conducted to determine when similar rate structures may become practicable for smaller use customers.

RECOMMENDATION 11.5 Means should be sought to ensure that all customers are made aware of the likely future trend in the costs of providing electricity service in each of the rating periods and end uses selected.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

General trends in electricity costs are forecast by Ontario Hydro for planning purposes and rate setting, and are publicly available as part of the normal process of rate review. In conjunction with the introduction of new policies and electricity costing and pricing, these forecasts will be expanded to reflect the costs, in each of the rating periods, at least at the bulk power level. However, the number of years for which the forecast data will be available has not yet been determined.

RECOMMENDATION 11.6

For rate-making purposes, Ontario Hydro should calculate marginal electricity supply costs in each "rating period" on the basis of the current system expansion plan, for comparison with expected near-future accounting costs proposed by the Ontario Energy Board.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

In its report to the Minister of Energy on Principles of Electricity Costing and Pricing for Ontario Hydro (December, 1979), the Ontario Energy Board recommended that marginal-cost pricing be rejected for rate design purposes.

The recommendation by the Royal Commission is not an endorsement of marginal-cost pricing. It recommends only that marginal electricity supply costs be calculated for comparison with accounting costs.

Costing and pricing proposals are still being reviewed by Ontario Hydro with its bulk power customers. These proposals recommend the use of time-differentiated rates based on accounting costs, but also propose that "time differentiated system incremental costs should be determined, and shall be considered in the costing and pricing process".

RECOMMENDATION 11.7 Ontario Hydro should include, in its tests of time-of-use rates, not only assessments of customer response concerning willingness to change personal energy habits, but also the required technology.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Ontario Hydro is investigating a number of devices for both energy storage during off-peak periods and for limiting consumption during peak periods. The former includes super insulated, oversized water heaters charged to higher temperatures during the night and drawn down, using mixer valves during the day. The latter includes radio controlled appliances such as hot water heaters, and clothes dryers.

RECOMMENDATION 11.8

To encourage the prudent and efficient use of electricity, such features as declining block rates, uncontrolled flat rate water heaters, and bulk metering of new electrically heated apartment buildings should be modified or eliminated.

GOVERNMENT RESPONSE:

Accept in principle subject to further study.

IMPLEMENTATION:

The prudent and efficient use of electricity will continue to be stressed by Ontario Hydro; uncontrolled flat rates are being phased out, and the declining block rates are being flattened to correspond more closely to Ontario Hydro's changing cost pattern.

The Ministry of Energy is undertaking a major investigation into the development, implementation and enforcement of electrical energy management strategies for all electric multi-unit residential construction. This would be an alternative method of achieving conservation gains without abandoning the economic advantages of bulk metering. The results of this investigation, which will be based in part on data generated by an Ontario Hydro/Ministry of Housing field test now in its second year, will be the basis of a set of guidelines to be used by utilities and developers for an efficient metering system designed for conservation and load management purposes.

RECOMMENDATION 11.9

Ontario Hydro should pursue vigorously the potential of the miniaturized solid-state (silicon chip) meter for mass application and include such meters in its current tests of load-management systems and time-of-use rates. A demonstration project involving perhaps 100 residential consumers should be set up during the next few years.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

If tests currently being conducted by Ontario Hydro indicate that time of use rates should be universally applied, solid state meters will be investigated for mass use. Testing of solid state equipment will be part of Ontario Hydro's time of use experiments.

RECOMMENDATION 11.10

In analysing the options for increasing the province's capacity for energy self-sufficiency, a systems approach should be adopted in which the incremental costs of conventional electricity generation are compared with the unit costs of conservation or renewable energy technologies, taking into account the load characteristics of each end use.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Ontario Hydro's Economics Division and Energy Conservation Division are developing an approach to calculating incremental costs in the context of a comprehensive, social cost-benefit framework for assessing alternative energy sources. This approach is to be applied in a variety of case studies including the assessment of improved appliance efficiency standards (a study undertaken for the Canadian Electrical Association), industrial co-generation, and renewable energy projects such as solar water heaters.

RECOMMENDATION 11.11 Because of institutional and financial obstacles facing decentralized, heavily "front-ended", alternative energy and conservation programmes, and in view of the redeeming social importance of reducing Ontario's oil dependency, provincial loan guarantees, tax and fiscal incentives, and direct financial support should be made available to promote industrial co-generation, heat-loss and building design standards aimed at optimizing energy-conservation investments, solar water heating, and passive solar systems. The setting up of a mini-utility, backed by the Ontario Energy Corporation, should be considered, to support industrial co-generation initiatives.

GOVERNMENT RESPONSE: Accept in part.

IMPLEMENTATION:

The Government has already adopted the thrust of this recommendation as evidenced by for example the sales tax exemption on conservation materials and solar collectors. In October 1980, the Ministry of Energy announced a 10-point conservation and Oil Substitution Program involving the expenditure by the Government of \$165 million over five years.

The program components include:

1. Alternative Transportation Fuels Program.
2. Ontario Solar Industry Development Program.
3. Conservation and Off-Oil Conversion Program for Municipal Buildings and Public Institutions.

4. Municipal Energy Audit Program.
5. Extension of Ontario Government Buildings Conservation Program.
6. Oil Substitution for Ontario Government Buildings.
7. Ontario Industrial Energy Conservation and Oil Substitution Program.
8. Revisions to the Ontario Building Code -- Conservation for Commercial Buildings.
9. An Expanded Role for the Ontario Energy Corporation.
10. Skills Development Program for Natural Gas Fitters and Installers.

It is expected that a provincial policy on co-generation will be announced shortly by the Ministry of Energy. Ontario Hydro is also developing proposals on initiatives it might take, consistent with the provincial policy.

DECISION MAKING

RECOMMENDATION 12.1 Ontario Hydro should be encouraged to continue and, where necessary, to expand its public participation programme to ensure that the public is fully involved. Ontario Hydro should adopt joint planning processes whereby real decision making authority is shared with, and in some cases (see recommendation 6.3) left to the initiative of, citizen representatives.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Over the past few years, Ontario Hydro's public participation program has been developing in the directions indicated by the Commissions's recommendation. The Government is fully supportive of Hydro's efforts in this regard and will encourage Hydro to continue to find ways of enhancing its participation program.

RECOMMENDATION 12.2 Ontario Hydro should ensure that the participants in the utility's participation programme have access to independent expertise whether the expertise is supportive of or opposed to Ontario Hydro's planning concepts.

GOVERNMENT RESPONSE: Accept in part.

IMPLEMENTATION:

The Government accepts this recommendation to the extent that it calls for Ontario Hydro to provide opportunities for experts to meet with citizens groups but not for Ontario Hydro to routinely fund the cost of studies by independent experts chosen by citizen representatives.

Ontario Hydro is prepared to make independent expertise available to assist the citizens' committees involved in environmental assessments (see response to Recommendation 6.7)

RECOMMENDATION 12.3

In order to enhance the optimum utilization of electricity, both public utility commissions and the Regional Offices of Ontario Hydro should be adequately financed and encouraged to sponsor, in their areas, educational programmes, seminars, and workshops in energy utilization and conservation.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

In addition to a comprehensive internal conservation program which has resulted in substantial energy savings during the past three years, Ontario Hydro has an extensive program directed at all customer groups to ensure the most effective and efficient applications of electrical energy. Special advice on such topics as the utilization of high efficiency motors, energy conservation in the home, the substitution of electricity for oil through the use of heat pumps, and dual heating systems is available in the form of publications.

In addition, seminars to discuss energy conserving techniques and systems are being organized by Hydro's regional offices in conjunction with the Energy Conservation Division for such customer groups as municipalities, farmers, shopping centres, retail and food chains, department stores, hotels, banks, and office and apartment buildings. Slide presentations are being prepared for use in schools. Films are available for clubs and information is being disseminated to consultants and engineers through forums and direct contact.

In the industrial sector, new energy and existing conservation processes are being reviewed and monitored by Ontario Hydro. Information gathered on energy savings achieved are disseminated by means of seminars and publications.

A test program is being implemented to conduct residential energy audits. It is hoped that this will lead to the development of a full scale program.

In order to increase the effectiveness and scope of these educational programs, seminars and workshops, Ontario Hydro will give further consideration to ways and means of enhancing the role played by the municipal hydro commissions. Currently, Hydro's approach is to bring them up to date on energy utilization and conservation, and to assist them in identifying the kind of information they should put before their customers. In future, Hydro expects the commissions to take more of the initiative in this regard and will encourage them to do so.

RECOMMENDATION 12.4 Ontario Hydro should find practical means to give effect to its commitment to greater openness by commencing to publish a technical-paper series, containing accounts of technical, scientific, and socio-economic research in language understandable to the layman. These publications should be made widely available to libraries across the province.

GOVERNMENT RESPONSE: Accept.

IMPLEMENTATION:

Ontario Hydro already publishes large numbers of reports on a wide range of technical and non-technical issues relating to electrical energy. Its detailed submissions to the Royal Commission contained valuable accounts of research, usually written in relatively non-technical language. Furthermore, Ontario Hydro has established a Public Reference Centre at its head office which provides public access to a good selection of the corporation's own research reports as well as to other important energy documents.

These efforts by Ontario Hydro to keep the public informed of its research activities could be enhanced by the publication of a single, technical paper series of the sort recommended by the Royal Commission. The precise form and content of the publication requires further consideration which Ontario Hydro will be undertaking in the near future.

RECOMMENDATION 12.5

A clear statement of the objectives and responsibilities of the utility, especially as they are related to the social objectives as endorsed by government, should be issued by the Ministry of Energy.

GOVERNMENT RESPONSE: Accept.

A Memorandum of Understanding between the Ministry of Energy and the Board of Directors of Ontario Hydro is being prepared. This Memorandum will set out the responsibilities of the Ontario Hydro Board with respect to operations, reporting requirements, and its role in meeting Government objectives for energy and related matters.

Recommendations 12.6 - 12.9 all relate to a proposal for an "Ontario Energy Commission" and so the Government has chosen to respond to them as a set rather than individually.

- RECOMMENDATION 12.6 The status of the existing Ontario Energy Board should be enhanced through expanded membership, representing a broad range of interests and disciplines, and the Agency should be renamed the Ontario Energy Commission. It should be an authoritative and independent body.
- RECOMMENDATION 12.7 The chairman of the recommended Ontario Energy Commission should be a person well known to the public and not associated with any of the special interests that should be represented.
- RECOMMENDATION 12.8 As well as providing a vehicle for the consideration and examination of rate structures for both electricity and natural gas, the Ontario Energy Commission should be responsible for advising the government and the people of Ontario on energy policy in general and on electric power planning in particular. The Ontario Energy Commission should be strongly future-oriented and just as strongly people-oriented.
- RECOMMENDATION 12.9 The Ontario Energy Commission should be provided with a modest increment in staff and consulting budget over and above that of the existing Ontario Energy Board. The designation "Commission" as against "Board" was selected not only to suggest a break from the past but also to provide a broader umbrella to embrace a policy advisory function as well as a traditional regulatory function. The indications are that the additional staff requirements would be small.

GOVERNMENT RESPONSE: Reject

DISCUSSION:

These recommendations of the Royal Commission are an attempt to assist the Government in improving the energy decision-making framework in Ontario.

The three principal ways in which the Commission believes the present system can be improved are:

1. The replacement of the existing "fragmented" or "multiple-window" approach to decision-making by a "single window" approach to avoid undesirable duplication and overlapping.
2. The establishment of a more open, independent, comprehensive review process involving the public.
3. The assembly, review and dissemination of data and information, and the development of energy and electricity scenarios required for energy-policy formulation, especially in relation to electric power planning.

The mechanism proposed by the Royal Commission to make these improvements is the creation of an Ontario Energy Commission which "would provide a 'single window' to decision-making, would provide for comprehensive review, would be open, and would provide a vehicle for information dissemination, technology-assessment, policy advice and regulation". (Final report of the Royal Commission on Electric power Planning Vo. 1, p. 173).

While the Government acknowledges the importance of continually striving to improve the decision-making process it is not persuaded that a complete restructuring of the existing process, as proposed by the Royal Commission, is necessary or desirable. One of the reasons for this is that the existing process already performs most if not all of the functions identified as being important by the Royal Commission. Where improvements may be required the Government believes that these can best be achieved through adjustments to the process that already exists rather than through the creation of an Ontario Energy Commission.

1. Duplication and overlap in energy decision-making should be avoided. To this end, legislation is being proposed to permit a single hearing for projects that come under more than one of Ontario's environmental acts (The Environmental Assessment Act, The Environmental Protection Act, The Ontario Water Resources Act), The Expropriation Act, The Planning Act and other specific legislation under which hearings may be required. In all these cases a single hearing will be conducted by a panel drawn from the appropriate boards.
2. With respect to establishing an open, independent and comprehensive review process, the Government believes that the Environmental Assessment Process is an excellent means for accomplishing this for energy and other projects. In addition, the existing Ontario Energy Board Act provides for any energy matter to be referred to the Board for

CNA

LAP + OEB
no allow for
public input

review in a public hearing. (One example of the OEB participating in policy review was the extensive set of hearings leading to the Board's report on Principles of Electricity Costing and Pricing for Ontario Hydro, December, 1979).

When it comes to giving policy advice, a role recommended by the Royal Commission for the proposed Ontario Energy Commission, the Government believes it would be inappropriate for a quasi-judicial body, which reviews and/or regulates rates, also to be a permanent policy advisory body. Energy policy advice to the Minister of Energy and the Government generally is, and should continue to be, primarily the responsibility of the Ministry of Energy.

3. Some of the Royal Commission's concerns regarding data collection and dissemination have already been addressed in the Government's responses to Recommendations 3.1 and 3.2. Through the efforts of the Ministry of Energy and Ontario Hydro, more and better energy end-use data will be collected and disseminated. Other data and information required for energy policy formulation are already being gathered by the Ministry of Energy, Ontario Hydro and the Central Statistical Services which obtains a great deal of information from Statistics Canada.

The dissemination of this information is also the responsibility of these organizations, a responsibility that is being met through such publications as the Ministry of Energy's Ontario Energy Review, Ontario Hydro's Statistical Year Book and the Ministry of Treasury and Economic's Ontario Statistics.

The Ministry of Energy has responsibility for preparing medium and long term energy demand scenarios of the sort recommended by the Royal Commission and is devoting increasing time and effort to this activity. The demand

scenarios will continue to be made public through the Ontario Energy Review and other publications.

The development of electric power scenarios is the responsibility of Ontario Hydro which has, on several occasions, published alternative scenarios, including a set submitted to the Royal Commission. Ontario Hydro will continue to develop these scenarios, and include the full range of impacts on the province. The scenarios will continue to be made available to the public.