SUBMISSION TO THE FEDERAL GOVERNMENT

GREEN PLAN CONSULTATION PROCESS

BY THE
CANADIAN NUCLEAR ASSOCIATION
JUNE, 1990

1.0 INTRODUCTION

The Canadian Nuclear Association (CNA) is a voluntary membership organization which represents the nuclear industry in discussions with government and the public on matters of interest and concern to the industry. The Association provides a forum where representatives of the industry, governments and the public can come together to discuss matters of mutual interest and opportunity. It also maintains close links with similar organizations in the U.S., Europe and Asia.

The members of the Association and its 1990-91 Board of Directors are listed in Appendix 1 of this submission. Membership includes manufacturers, electric utilities, consulting engineers, construction companies, banks, insurance companies, transport companies, non-profit organizations such as educational institutions, research laboratories, labour unions, and departments of federal and provincial governments.

CNA members represent a broad spectrum of companies involved in Canada's energy sector. Nuclear electric power generation, uranium mining and applications of radiation technology are but a part of their overall business interest and involvements in the Canadian economy. Many of these companies are also involved in the design and construction of hydraulic or coal-fired electric generating stations. They also represent a very large part of Canada's industrial base, with interest in the security of supply of energy sources for the production of goods, including energy efficient products, and in maintaining and expanding employment and investment in these Canadian facilities.

Approximately 100,000 Canadians are employed directly or indirectly in the nuclear industry. Collectively they generate more than $4 billion of nuclear-related business within the Canadian economy annually.

A specific area in which the use of nuclear power makes a significant contribution to addressing the major environmental concern of global warming is in replacing the use of fossil fuels to generate electricity.

The 1988 World Conference on the Changing Atmosphere suggested, with qualifications, that "nuclear power could have a role to play in lowering CO_2 emissions".

The Conference recommended that half of a target reduction of 20 per cent by 2005 should come from efficiency measures and conservation. The other half, the Conference said, "should be affected by modification in supplies".

The Task Force appointed by the federal and provincial energy ministers to examine the Conference recommendation concluded in its report, released in August 1989, that a 20 per cent reduction could

not be achieved through conservation and efficiency measures alone. The report confirms that only by some substitution of non-fossil fuelled electricity, or non-carbon fuel, for fossil fuel end uses, could a 20 per cent reduction be achieved.

This submission therefore examines the potential of nuclear power to play a role in lowering CO_2 emissions both in the short term, up to the year 2005, and beyond.

2.0 ENVIRONMENTAL IMPACTS OF ENERGY SOURCES

No energy utilization is without risks to the environment or to human health and safety. Conversely it is our use of energy which allows a majority of people in developed countries to perform service functions such as provision of health services. Indeed our use of energy, particularly electricity, is directly tied to our increasing longevity and growing population.

Energy choices are determined by environmental, social, economic, technical, regional and political factors. For instance the decision to develop nuclear power in Canada was based to a varying degree on a number of these factors.

Back in the mid 1950s Ontario was well on its way to fully developing most of its accessible, feasible and economic hydro potential and was starting to construct coal-fired generating stations. A growing dependence on imported coal was seen by the provincial government as a direct threat to energy sufficiency in a province which lacked fossil fuel resources and large untapped hydro. Nuclear generating stations using indigenous uranium, and which could be constructed and operated largely by Ontario workers, were seen as a desirable regional choice for the Ontario economy. The alternative of growing dependence on U.S. labour unions and coal companies was seen as potentially threatening. Thus nuclear power was developed, for reasons related to provincial economic impacts, with the first demonstration unit entering service in 1962. Today half of Ontario's electricity is generated from uranium.

The environmental risks of developing CANDU were well recognized by the utilities and government ministries. Fast acting shut down systems, independent of operator action, and structures to contain radioactive substances in the event of an accident, were built into the CANDU design from the outset. In 27 years of operation no nuclear plant worker in Ontario has lost time from the job as a result of radiation exposure. Yes, there have been equipment failures and operator errors. But the CANDU system was designed with the assumption of such failures and independent systems were provided to cope with them.

Apart from the risk posed by nuclear plant accidents there is also the need to manage the potential risks from the wastes produced

both in mining and milling of uranium and in the generating stations. The high level of radioactivity of used nuclear fuel requires that this waste is carefully stored, initially in pools of water to remove the heat produced as the radioactivity decays, and then in dry storage in concrete canisters.

Although initially highly toxic and radioactive the volumes of used fuel are small and manageable. The bundles used each day in a Darlington sized plant would fit comfortably into a typical kitchen refrigerator. An equivalent fossil-fuel fired station would use 38,000 tonnes of coal or 150,000 barrels of oil to produce the same amount of electricity with release of vast quantities of carbon dioxide to the atmosphere.

A method has been developed to dispose of these high level wastes in an engineered repository deep in the Canadian shield. This concept is about to be reviewed before a federal environmental assessment review panel. But certainly the careful retention and management of all the wastes produced in the process is viewed by the industry as the major environmental advantage of nuclear power. There need be no adverse environmental impacts from the proper management of nuclear wastes. The costs of ensuring this sound management are being charged to today's electricity consumers.

The CNA is in agreement with the response of the federal government to the recommendations of the 1988 report of the federal Standing Committee on Environment "High-level Radioactive Waste in Canada: The Eleventh Hour".

The government noted that "Many industries do not even keep their wastes in safe storage, let alone try to ensure their safe isolation for the indefinite future. In many respects, the nuclear industry in Canada is a pioneer to be emulated in its responsible approach to managing its used fuel in both the near and long term". And that safe management is assured under the strict control of the government's nuclear regulatory agency, the Atomic Energy Control Board.

2.1 PUBLIC HEALTH RISKS FROM VARIOUS ENERGY SOURCES

It is a little known fact that electricity generation from energy sources, other than nuclear, results in increased radiation exposure to the public and that the radiological impact from some fossil-fuel fired power plants is comparable to that from nuclear plants. The 1988 report of the United Nations Scientific Committee on the Effects of Atomic Radiation examines, in detail, radiation from the following sources.

ESTIMATED COLLECTIVE DOSE COMMITMENTS
FROM ELECTRICITY GENERATING SYSTEMS

Fuel	Man-Sieverts per Gigawatt year of Electricity Generated
Coal	4.0
Nuclear	2.5
Geothermal	2.0
Peat	2.0
Oil	0.5
Natural Gas	0.03

Even hydraulic, wind and solar electricity, to the extent that some of the above fuel sources are used in the manufacture and construction of generating systems, are not without some release of radioactivity to the environment. However, levels of radiation exposure listed in the above table pose minimal health risk since they are spread over large populations.

A comparison of the overall health risks associated with production and delivery of energy from various energy alternatives was published by Dr. Herbert Inhaber in 1982 ("Energy Risk Assessment" Gordon and Breach Science Publishers Inc., New York, ISBN:0677 05980 9). Dr. Inhaber, a former member of Canada's Atomic Energy Control Board, looked at the health risks both to workers and the public resulting from all the activities related to manufacture, construction and operation of energy delivery systems including transportation of equipment, construction and installation of components, mining, refining and transportation of fuel, operation and maintenance of equipment, disposal of process wastes, and delivery or distribution of the energy alternative.

The study concluded that "the risk from non-conventional energy sources (including solar and wind technologies, biomass etc.) can be as high as or even higher than that of some conventional sources". In particular, Dr. Inhaber concluded that non-conventional technologies posed higher health risks to society than the use of natural gas or nuclear power but substantially lower risks than that of coal or oil. A number of other analysts agree with Dr. Inhaber's conclusions. We know of no published studies to the contrary.

3.0 THE POTENTIAL OF RENEWABLE ENERGY FOR ELECTRICITY GENERATION

Through much of the twentieth century Canada relied to a great extent on renewable hydraulic power and avoided the need to use fossil fuels to generate electricity.

A list of untapped hydro sites which may prove economical and environmentally acceptable is provided in Electric Power in Canada (1988) published by Energy Mines and Resources. It is clear from this list that there is very little hydro potential in Alberta, Ontario, Saskatchewan and the Maritime provinces. Indeed, the total untapped planning potential in all 10 provinces would meet only about eight years of the rate of increase in electricity demand experienced in Canada in the last six years.

There are no similar limitations to solar energy. The major impediment to the use of active solar and wind power is not simply economics as frequently argued. It is the diffuse and variable nature of these sources and the large land mass required. For instance, to generate the amount of electricity used by Metropolitan Toronto from solar energy, a land area twice the size of Metro would be required for solar collectors. And with the low wind regime in Southern Ontario a land mass 20 times as great would be needed for wind farms. The low annual average output of only about 16 percent of peak capacity for both solar and wind power in much of Canada would also require a very large energy storage installation to match demand.

If trees, which absorb carbon dioxide, are removed to make way for large arrays of solar collectors, even the harnessing of solar energy would have an impact on the greenhouse effect albeit a relatively small impact compared to burning fossil fuels to produce the same amount of electricity.

The use of biomass as a fuel recycles carbon in the atmosphere. It has potential as a means of reducing CO_2 emissions when used to substitute for the use of fossil fuels. It captures solar energy and stores it effectively. However, care must be taken to ensure that the use of carbonanceous fuels in harvesting and transporting wood to point of use does not exceed the useful energy content of the wood fuel.

Reforestation or the planting of new forests could increase the planet's ability to absorb CO2. Land areas required are large and are highly dependent on soil conditions, latitude, and climate. For example in Saskatchewan, it has been estimated that a forest area of 10,000 square miles would absorb the CO2 from one 300 MW coal-fired station.

4.0 CANADIAN URANIUM AND FOSSIL FUEL RESOURCES

Canadian uranium and fossil fuel resources and 1987 levels of production, are shown in the following table.

1987 CANADIAN ENERGY RESOURCES AND PRODUCTION
MILLIONS OF TONNES OF OIL EQUIVALENT (MTOE)

	Reserves	1987 Production	Reserves/ Production
Coal	2600	38	68
Oil	1200	90	13
Natural Gas	2500	67	37
Uranium	3100	150	21

Source: Energy, Mines and Resources Canada

It will be seen that the energy content of Canada's uranium production, about 90 per cent of which is exported, is equivalent to total oil and gas production. In fact the global use of Canadian uranium avoids the emission of about the same amount of carbon dioxide as is produced from total Canadian consumption of fossil fuels. Today, world-wide, the use of 428 nuclear units prevent the release of 1.6 billion tonnes of CO2 emissions per year or about eight per cent of present emissions.

The relatively low ratio of resources to production level for oil clearly indicates that unless domestic oil consumption and exports can be reduced, Canada will soon be reliant on a combination of new tar sands development, frontier oil with its attendant environmental sensitivities and imports.

There is a large undeveloped uranium potential which is expected to be added to the resource base as the price of uranium increases. In addition the CANDU cycle can be adopted to the use of thorium, which is three times more abundant in nature than uranium, and to the use of fissionable material extracted from used nuclear fuel. Canada's fission fuel potential is very large and is not a constraint on increasing reliance on nuclear fission reactors.

5.0 ENERGY EFFICIENCY, ELECTRICITY AND THE ECONOMY

Of all the western industrialized countries, only Norway uses more electricity per person than Canada. Quebec uses even more than Norway, while Ontario uses less than other northern countries such as Sweden and Iceland. Even Prince Edward Island, with the lowest per capita electricity consumption of Canadian provinces, uses more than Britain or Japan.

A number of factors contribute to Canada's large per capita consumption of electricity. Abundant coal, water and uranium resources have permitted the development of economic hydro-electric projects, coal fired stations and nuclear power plants in various regions, making electrical energy relatively inexpensive and plentiful. This has led to relatively high electricity consumption and has encouraged the location of many electricity-intensive industries. As well, Canada's climate, with hot summers and long cold winters, results in much energy being used for air-conditioning and space heating.

Ontario and Canadian economies are also highly dependent on export of resources. More than 80 per cent of our highly energy-intensive mineral and forestry products are exported. Indeed it could be argued that the energy content of these exports should not be regarded as domestic consumption but as consumption of the importing countries. This would go some way towards providing a truer comparison of per capita energy consumption and greenhouse gas emissions.

Since the 1973 oil crisis Canada has been able to decouple the historical relationship between growth in total energy consumption from growth in the economy, mainly through conservation and the introduction of more efficient processes in industry. Driving this change, as in the Nordic countries, has been increased use of electricity. Figure 1 shows the growth in electricity demand and Gross National Product in constant dollars. Since 1973, electricity consumption per unit of GNP has continued to increase, but at an even faster rate than prior to 1973. Canada's move towards a more service-based economy is made possible only through more productive industries utilizing automation, computerization and new, more energy-efficient electro-technologies, all of which increase demand for electricity. The rising trend in electricity use is thus an important part of Canada's conservation efforts and has helped make possible the relatively "flat" trend of total energy consumption.

Many people involved in the consultation process are convinced that there are significant savings which could be made in consumption of electricity. "Electricity Conservation Supply Curves for Ontario" by Marbek Resource Consultants (Messrs. Brooks and Torrie) is frequently mentioned. As the authors state in the report, these supply curves are best seen as "general indicators for suggesting directions for conservation policy" and they recommend against the

use of the curves for determining the level of conservation potential in future years.

Mr. Torrie reiterated this caution in an appearance on November 28th last year before the Standing Committee on the Environment when he urged the Committee to consider seeking an analysis comparing conservation measures with supply options. It is evident from reading the Marbek Report that such detailed analysis is badly needed. For instance the largest single conservation measure identified in the Marbek Report is domestic refrigerators.

The study assumes a 17 year life for refrigerators. Any market penetration would therefore be very gradual without financial incentives to induce a quicker replacement rate. In that case the impact of energy required for early production of new units should also be included in calculating the net impact on CO_2 emissions in a given time frame. The calculation should also consider the net impact on domestic energy consumption of the levels of heat (inefficiency) put out by the unit. In the case of an oil or gas heated home replacement of a low efficiency unit with a high efficiency unit will transfer some heating load to fossil fuels and would therefore be counterproductive as a measure to reduce CO_2 emissions to the extent the electricity supply comes from hydro or nuclear power. We have similar concerns with many of the measures identified in the Marbek Report.

A focus on electricity efficiency improvement by such declared anti-nuclear advocates as the authors of the Marbek report should be treated to the same scrutiny which we expect to be applied to this submission.

Ontario Hydro has initiated a demand management plan designed to offset anticipated load growth during the 90's. It is clear that, beyond the Darlington units, no significant new supply facilities will be in place in Ontario much before the year 2000. This will require Ontario Hydro to utilize its fossil fuelled capacity through the 90s and well into the next century to offset increasing demand for electricity. There will therefore be no early reduction in CO2 emissions from the implementation of demand management programs such as Ontario Hydro's.

While the implementation of cost-effective energy efficiency programs is clearly desirable, care must be taken to calculate secondary impacts when considering the overall effect on, and rate of change of, energy consumption. Large capital investments in energy efficiency will increase economic activity and create a new demand for energy. The effect of implementing efficiency improvements may therefore be similar to that of constructing new supply facilities during the period of implementation. The net effect on the relationship between electricity demand and economic growth could well be zero or even counter-productive until some time after program implementation.

6.0 REDUCING CO_2 EMISSIONS BY USE OF NUCLEAR POWER

Approximately 18 per cent of Canada's 1988 CO_2 emissions were from the burning of fossil fuels to generate electricity. A large proportion of these emissions could be eliminated by the use of nuclear power. The manufacturing and construction infrastructure already exists in Canada to build up to four nuclear units per year. The following table indicates the number of nuclear units which would be required to displace the output of existing fossil-fired generating capacity. It would be desirable to retain some of the fossil-fired capacity to meet intermediate system peak requirements. But up to 16 per cent of total current CO_2 emission could be eliminated by the use of nuclear power in those provinces lacking additional hydro resources and now burning substantial amounts of fossil fuel for electricity generation.

	Fossil-Fueled Electricity 1988 GWh	No. & Size of Nuclear Units Required
Maritimes	15833	4 X 600 MW
Ontario	36877	6 X 900 MW
Saskatchewan	10594	4 X 450 MW
Alberta	38741	6 X 900 MW

The use of 20 additional nuclear units in Canada could greatly reduce CO_2 emissions from electricity generation. This would double Canada's installed nuclear capacity and could be achieved by the year 2005. Such a program would meet just about half the 20 per cent CO_2 emission reduction target for year 2005.

In fact Ontario Hydro's Demand/Supply Plan calls for four 900 MW units to be in service by 2005. In formulating its preferred plan Ontario Hydro assumed that it might be called upon to make only a proportional contribution to CO_2 emission reductions and that fossil fired electricity generation would not be a major target beyond such contribution.

The Demand/Supply Plan also calculates the difference in overall cost of implementing a very high nuclear component in the mix of new supply compared with adding no further nuclear capacity. At the highest level of electricity demand forecast studied (2.8 percent per year), there is no difference in the cost of these two extremes on a present worth basis. The difference in carbon dioxide emissions however would be 34 Tg in 2005 and 72 Tg in 2015.

ONTARIO HYDRO DEMAND/SUPPLY PLAN
UPPER LOAD GROWTH SCENARIO

	CO_2 Emissions Tg		
	1989	2005	2015
PLAN 26 (No additional Nuclear)	25	51	79
Plan 15 (Preferred Plan)	25	35 (4)	12 (14)
Plan 23 (High Nuclear)	25	17 (8)	6 (18)

The numbers in brackets in the table indicate the number of new 900 MW nuclear units which would be in service by the given dates. The total present value cost difference between Plan 15 and Plans 23 & 26 is given as approximately $1 billion.

It is evident from the Ontario Hydro Study that in meeting new electricity demand and retiring old coal-fired units, considerable carbon dioxide emissions can be eliminated by the use of nuclear power, at very little incremental cost to the electricity consumer.

7.0 INTERFUEL SUBSTITUTION

There are very few energy end uses for which nuclear electricity could not readily and directly substitute for the combustion of fossil fuels. A notable exception is the road transportation sector where progress on the development of new electric battery technologies has been steady but slow.

A long term alternative to electrification of road vehicles would be to develop the use of hydrogen as a transportation fuel. It must be recognized, however, that hydrogen produced in electrolyzers fuelled by nuclear electricity would cost approximately six times the current price of natural gas as a transportation fuel. But the world survived such a dramatic increase in the price of fossil fuels in the 70's and may well have to do so again at some point early in the next century.

The CNA has no disagreement with the conclusion of the principle author of the federal/provincial task force report that the bulk of any further reduction in carbon dioxide emissions beyond 20 per cent would have to come from alternative fuels such as solar energy, nuclear electricity and hydrogen, and in the very long term, from nuclear fusion. There is no physical limitation to such interfuel substitution either on a Canadian or global basis.

8.0 CONCLUSIONS

All energy sources pose some risks to public health and to the environment. The use of nuclear power, in New Brunswick, Ontario and Quebec, is strictly regulated to control all public health and environmental impacts. In practice the regulations have not only been met but a self imposed target of staying within one percent of regulatory limits for maximum exposure to any member of the public has also been met at operating CANDU stations. The potential hazards of nuclear power are contained by design.

Overall improvement in efficient use of all forms of energy and a judicious increase in the use of electricity produced from non-carbonaceous fuels can work together to address the problem of global warming.

The economics and performance of CANDU reactors are well established. The use of CANDU nuclear power is therefore an option which is relatively well proven both as to cost, availability, and environmental performance.

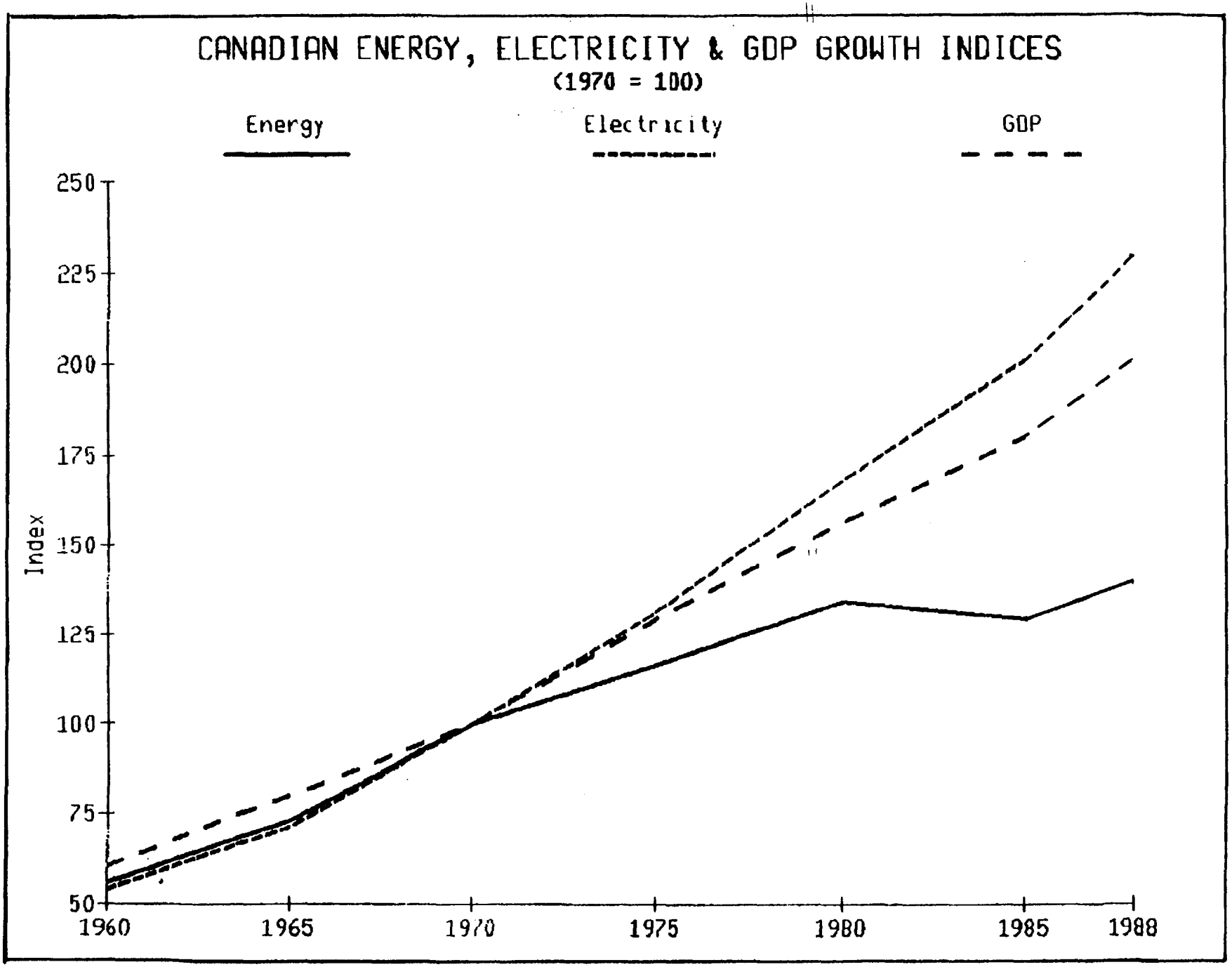
CANADIAN ENERGY, ELECTRICITY & GDP GROWTH INDICES
(1970 = 100)
Energy
Electricity
GDP
Index
250
225
200
175
150
125
100
75
50
1960
1965
1970
1975
1980
1985
1988

FIGURE 1

CANADIAN NUCLEAR ASSOCIATION
BOARD OF DIRECTORS
1990-91

CHAIRMAN

P. Koenderman,	**President, BABCOCK & WILCOX**
D.R. Anderson,	**V.P.& Manager, Ontario Operations,CANATOM**
R. Bartholomew,	Vice Pres, ONTARIO HYDRO
W.L. Baynton,	**President, DONLEE PRECISION**
R.P. Bell,	President, MONSERCO LIMITED
J. Britt,	V.P. DENISON MINES LIMITED
E.C. Card,	Vice Pres. WARDROP ENGINEERING INC.
H.C. Dickout,	President, SQUARE D CANADA
N.M. Ediger,	Exec. Director, SENTINEL ASSOCIATES LTD.
A. Elliott,	V.P., CONTROL DATA CANADA
S. Hatcher,	President, ATOMIC ENERGY OF CAN LTD.
G.J. Johnson,	Sr.V.P. Metro Toronto ROYAL BANK OF CANADA
L. Jones,	President, ZIRCATEC PRECISION IND INC.
E. Koczkur,	Chairman, SENES CONSULTANTS
R. Lawrence	Exec V.P. SaskPOWER
K. McCormick,	V.P. Quality Assurance, MIL GROUP
J. McNally,	V.P. (Mauricie Region)HYDRO-QUEBEC
B. Michel,	V.P. CAMECO
M. Poissonnet,	President, COGEMA/AMOK
W.I. Pollock,	V.P. Marketing, RIO ALGOM LTD.
J. Richman,	V.P. SPECTRUM ENGINEERING CORP LIMITED
O.J. Runnalls,	Professor Emeritus of Nuclear Eng,U OF T
P. Scholfield,	V.P. & GM GENERAL ELECTRIC CAN
R.V. Sligl,	Vice Pres. ECS POWER SYSTEMS INC.
H. Sonnenberg,	President, FOUNDATION COMPANY OF CAN LTD
E. Stapleton,	President, NEI PARSONS
M. Stewart,	President, HOWDEN GROUP
N.F. Thompson	**Director, Lummus Canada Inc.**
G.L. Titus,	Sr.V.P. Operations, NEW BRUNSWICK POWER
A. Wyatt,	President, THE BOOK PRESS

HONORARY DIRECTOR
J.S. Foster

EX-OFFICIO
H. Bonin,
F. Guenette

1990/91 RESIGNATIONS -- W.N. O'Brien, J-C Godel, R. Zellinsky

June 4/90

1. Acres International Limited
2. Alcan Aluminum
3. American Nuclear Society
4. Amok Limited
5. Andec Manufacturing Ltd.
6. ASEA Brown Boveri Inc.
7. Atomic Energy of Canada Ltd.
8. Australian Nuclear Science & Tech.
9. Babcock & Wilcox Canada
10. Bechtel Canada Inc.
11. The Book Press
12. British Nuclear Fuels PLC
13. Brown Boveri Howden Inc.
14. CAE Electronics Ltd.
15. Cameco, A Cdn Mining and Energy Corp
16. Canada Alloy Castings Ltd.
17 Canadian Electrical Association
18. Canadian Institute for Radiation Safet
19. Canatom Inc.
20. Carlton University
21. Centennial College of App. Arts & Tech
22. Chalk River Technicians & Technologist
23. Chromalox Canada Inc.
24. CM Engineering Research Corporation
25. Cogema Canada Limited
26. College Tool and Die Ltd.
27. commissariat a l'energie atomique
28. Control Data Canada Limited
29. Crane Canada Ltd.
30. Denison Mines Limited
31. Dept. of Energy, Mines and Resources
32. Dept. of Environment
33. Dept. of External Affairs
34. Dept. of Regional Ind. Expansion
35. Donlee Precision
36. ECS Power Systems
37. Embassy of Brazil
38. Euratom Library Commission
39. Farris Industries Canada
40. Foster Wheeler Ltd.
41. Foundation Company of Canada Ltd.
42. GE Canada
43. George Brown College
44. Harriet Irving Library Univ of N.B.
45. Hitachi (Canadian) Ltd.
46. Howard University Undergraduates
47. Hydro-Quebec
48. Idemitsu Uranium Explor.Canada Ltd.
49. Institute of Nuclear Energy Research
50. Invar Manufacturing Ltd.
51. Italimpianti S.P.A.

52. Jarda FCS Inc.
53. Korea Electric Power Corp
54. L'Ecole Polytechnique
55. LFI Laurentide Forwarders Canada Ltd.
56. Lummus Canada
57. Donald Lush (Beak Consultants Ltd)
58. MacLarentech Inc.
59. Martineau Walker
60. Marubeni Canada Ltd.
61. McMaster University
62. MIL Group
63. Mitsui & Co. (Canada) Ltd.
64. Monserco Limited
65. NEI Parsons Canada Ltd.
66. New Brunswick Power
67. Newman Hattersley Ltd.
68. Nicholls Radtke Ltd.
69. NPM Nuclear Project Managers Can Inc.
70. Nuclear Construction Managers
71. Nuclear Insurance Assoc. of Canada
72. Nuclear Metals Inc.
73. Nuclear Shielding Supplies & Service
74. NUEXCO
75. NUKEM GmbH
76. Ontario Government
77. Ontario Hydro
78. Ontario Hydro Employees Union CUPE
79. Pakistan Atomic Energy Commission
80. Phillips Cables Limited
81. PNC Exploration (Canada) Co. Ltd.
82. Qualprotech Inc.
83. Quebec Ministry of Energy & Resources
84. Queen's University
85. Reed Stenhouse Limited
86. Reuter Stokes Canada Ltd.
87. Rio Algom Ltd.
88. Royal Bank of Canada
89. Royal Military College
90. SENES Consultants
91. Sentinel Associates Limited
92. SIHI Pumps Limited
93. Society of AECL Professional Employees
94. Soc. of Ont. Hydro Prof.& Admin. Emp.
95. Soc. of Professional Eng. & Assoc.
96. Sopha Medical Inc.
97. Spar Aerospace Ltd.
98. Spectrum Engineering Corporation
99. Square D Canada
100. Stern Laboratories Inc.
101. Stone & Webster Canada Limited
102. Sulzer Bingham Pumps Inc.
103. Sulzer Canada Inc.
104. TDS Communications
105. TransAlta Utilities Corp.

106. TRIUMF
107. University of British Columbia
108. University of Regina
109. University of Saskatchewan Library
110. University of Toronto
111. Uranerz Exploration & Mining Ltd.
112. Urangesellschaft Canada Ltd.
113. Uranium Information Centre Ltd.
114. Velan Incorporated
115. Wardrop Engineering Ltd.
116. Weidmuller Limited
117. Western Project Development Assoc.

Canadian Nuclear Association
Association Nucléaire Canadienne

nuclear notes

A periodic information service for members of the Canadian Nuclear Association

NUMBER 59 JUNE/JULY ISSN 0713-0597

The following lists significant recent published references to nuclear energy, together with the sources from which they are available.

1. **The Canadian Nuclear Association Turns 30:** By Jim Weller. An overview of CNA history spanning three decades. **Published in Nuclear Canada Yearbook.** 5 pages. Copies can be obtained free of charge from the CNA.

2. **Green Plan Consultation Process - Submission to the Federal Government by the Canadian Nuclear Association June, 1990:** 16 pages. Copies can be obtained free of charge from the CNA.

3. **L'Energie Nucléaire Une Option Énergitique À Long Terme Pour Le Québec par L'Association Nucléaire Canadienne Juin 1990:** 16 pages. On peut se procurer gratuitement des exemplaires auprès de l'ANC.

4. **How Ontario Hydro Stores Radioactive Materials:** 4 page brochure produced by Ontario Hydro to show how Ontario Hydro stores used nuclear fuel and other nuclear wastes. Copies can be obtained free of charge from Ontario Hydro, Corporate Relations, 700 University Ave., H19, Toronto, Ontario, Canada M5G 1X6. Tel: 1-800-668-8500.

5. **How Ontario Hydro Proposes to Transport Used Nuclear Fuel:** 4 page brochure developed by Ontario Hydro on how they propose to safely transport used nuclear fuel. Copies can be obtained free of charge from Ontario Hydro, Corporate Relations, 700 University Ave., H19, Toronto, Ontario, Canada M5G 1X6. Tel: 1-800-668-8500.

6. **Canada's Nuclear Regulator:** An information brochure published by Atomic Energy Control Board. Copies can be obtained in English and French, free of charge from Atomic Energy Control Board, Office of Public Information, 270 Albert St., P.O. Box 1046, Station B, Ottawa, Ontario, Canada K1P 5S9. Tel: (613) 995-5894.

7. **Review of The Nuclear Liability Act:** An 18 page report from The Interdepartmental Working Group to Atomic Energy Control Board. Copies can be obtained free of charge from Atomic Energy Control Board, Office of Public Information, P.O. Box 1046, Ottawa, Ontario, Canada K1P 5S9. Tel: (613) 995-5894.