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INTERIM EVALUATION OF THE CANADA/NOVA SCOTIA ENERGY CONSERVATION SUBSIDIARY AGREEMENT

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List of Acronyms

DREE - Department of Regional Economic Expansion

EPNS - Energy - A Plan for Nova Scotia

ESP - Energy System Planning

ME - Department of Mines and Energy

MT&T - Maritime Tel. & Tel. Company

NSPC - Nova Scotia Power Corporation

Sub - Subsidiary Agreement

SUMMARY AND CONCLUSIONS

S1. The aim of this Report is to provide an Interim Evaluation of the Canada/Nova Scotia Energy Conservation Subsidiary Agreement. The Agreement has been in force for slightly more than two years, having been signed on July 4, 1978. The Interim Evaluation covers the period of implementation up to the end of July 1980.

S2. The main general conclusion of the Report is that most of the first year of implementation, that is from July 1978 through June 1979, was lost through various kinds of delays affecting the projects comprising the Subsidiary Agreement.

S3. For some projects, such as Industrial Retrofit and the Energy Test and Information Centre, more time was lost during the 1979/80 fiscal year, reducing further their potential useful life under the Agreement.

S4. As for attributing causes for the delays, two factors stand out:

1) Lack of detailed preparatory analysis - this shows up in the absence of a meaningful Schedule A to the Agreement and the inability of some projects (Energy System Planning, Retrofit) to make any substantial progress during the first year.

2) Insufficient appreciation regarding the resources required to implement the Agreement in addition to those already available. This shows up as the continuing problem of staff limitations.

S5. Shortage of staff and the attempts to solve the problem by recruiting short term contract personnel has been the source of continuing disagreements between DREE and ME. The Agreement itself is clear on these matters but steps should be taken at the Management Committee level to resolve the issue and communicate the decisions taken to all concerned.

S6. Some delays in implementation appear to have arisen from poor communication between DREE and ME concerning what was actually intended in the Agreement. To a large extent the problem could have been avoided with a detailed and comprehensive Schedule A.

S7. The Energy System Planning programme could play a valuable role in the implementation of the Subsidiary Agreement by developing an energy planning framework with accompanying objectives. This would provide a much needed frame of reference for the other projects in the Agreement. Such a role has yet to develop, but many of the basic preconditions appear to have been satisfied for significant work to develop in that direction.

S8. One of the preconditions is the existence of Energy - A Plan for Nova Scotia. With this document as background, the basis exists to develop a set of energy priorities for Nova Scotia, to review the objectives of the Agreement in light of those priorities and make whatever adjustments appear to be necessary and to establish a meaningful planning framework for the remainder of the Sub.

S9. In the Energy Opportunities programme, a variety of factors have caused delays - shortages of personnel, scepticism concerning the value of the work to be undertaken, complicated and slow moving decision making committees, the intervention of the federal Treasury Board, lack of pre-planning, communication lags and the natural slowness of small business to respond to opportunities that they regard as secondary.

S10. Many of the problems cited have been overcome during the first two years of programme implementation. It is reasonable to expect now that all of the projects of this programme will proceed with acceptable speed.

S11. Given the time already lost, the manner in which some original budget allocations were determined and the apparent shift in priorities in one project, there is good reason to doubt that all of the budgeted funds will be spent. Such a result should not be regarded as inadequate performance. Account should be taken of the factors cited. Moreover, in the final evaluation the emphasis should be on the outputs produced by each project and the benefits associated with those outputs.

S12. A detailed evaluation of the Load Management project is premature given its progress as of July 1980. However, a review of the cost effectiveness of some elements of this project would be an appropriate step.

S13. Load Management in particular has generated unanticipated benefits of several kinds. A local firm has gained the opportunity to move well into the forefront of an important area of high technology design and manufacture. Other utility companies across Canada will have access to the lessons from this experiment at relatively low cost, so Canada gains as a whole. Maritime Tel. & Tel. is able to take advantage of the experiment for the introduction of new technology for its own purposes at reduced costs, a benefit for Nova Scotia. The value of these benefits is a matter that the Benefit Cost portion of the Load Management project should study carefully as their magnitude may be highly significant.

S14. The Industrial Retrofit project has suffered from a variety of delays over the first two years of its life. Many of its problems appear now to have been solved and implementation should proceed at a much more acceptable pace for the remainder of the Agreement.

S15. A number of changes have been introduced into this project in recent months. These changes can be traced directly to the Program Opinion Survey carried out in early 1980. This excellent piece of work provided the solid analytical base on which to revise the project eligibility and administrative criteria.

S16. Much of the first year of the Agreement was lost to Retrofit because of the windfall profits issue raised by the federal Treasury Board. As the analysis of the main body the report makes clear, windfall profits should not be an issue. They are an equity or distributional concern while the Sub is very clearly focussed on improving economic efficiency. Furthermore, firms regard energy saving investments differently than revenue expansion investments, such that they demand significantly higher rates of return to undertake them. Even for profitable energy saving investments, financial inducements will be necessary to make them sufficiently attractive to implement. For these and other reasons cited in the text, the question of devising a 'means test' for firms applying to Retrofit should not be pursued.

S17. Retrofit has experienced problems with slow up-take by eligible firms. Better analysis of the situation in preparation for the Agreement would have revealed that even in Nova Scotia energy costs rarely comprise more than 5 percent of total costs and in many cases account for less than 2 percent of total costs. Further, many eligible Nova Scotian firms are small, with limited staff available to undertake the necessary analysis and preparation to make application to Retrofit. These factors combine to generate a relatively low response rate to the project among its intended beneficiaries.

S18. Pilot Projects, after suffering a year of relative inactivity because of insufficient staff time available for its implementation, now appears to be well underway. It is unlikely to spend all of the funds allocated to it because of an apparent shift in priorities relative to one of its large components and because many of its funded activities are small scale. As mentioned previously, its ultimate success should be judged on the basis of the activities it funds and the benefits that are generated by those activities, not by what it spends. Finally, it appears that the project would benefit from more attention to the development of sectoral priorities in its activities and from a systematic weighting of the appraisal criteria used for pilot proposals.

S19. The Energy Test and Information Centre (ENERTIC) has suffered significant delays in its implementation. Several casual factors were responsible including insufficient personnel, unwillingness to make a decision between two competing proposals, diversion of Mines and Energy staff to work on the Energy Task Force, general inertia associated with merging two proposals into one and relatively slow progress in completing the detailed planning of the project. These problems have now been overcome and the project appears to be making acceptable progress toward achieving its objectives.

S20. Two issues connected with ENERTIC will require attention now. First, after the 1980/81 fiscal year approximately $1 million will remain in the project budget for which no firm plans exist. Second, both the Energy Test Centre and the Information Centre are planned as on-going operations but their long run financial viability is still open to question. Work on achieving self-sustaining financial status and determining who would be responsible for any financial losses that may arise after the termination of the Agreement should receive the highest priority for this project.

S21. Public Information is a good well-executed project. Its objectives appear to have expanded considerably from what was envisioned in the Agreement. The implications of this development need to be assessed. Some parts of the project, particularly the production of written material, have suffered from a lack of staff. The addition of a professional writer will reduce this deficiency; whether more needs to be done depends on the resolution of the project objectives question. There has been a heavy emphasis on electronic media in this project, leading to a rapid exhaustion of its allocated funds. Whether this distribution of expenditure is the most productive way to proceed needs to be reviewed, particularly when it has been suggested that the project will shift its focus somewhat in favour of promoting other projects of the Subsidiary Agreement. The relation of this project to public information activities planned by Energy System Planning needs to be clarified.

Energy Conservation Canada/Nova Scotia

I. OBJECTIVES

1. The objectives toward which the Energy Conservation Subsidiary Agreement is directed are defined in two places, the General Development Agreement between Canada and Nova Scotia, and the Subsidiary Agreement itself. For convenience, these objectives are summarized below.

The General Development Agreement

2. A General Development Agreement was signed between Nova Scotia and Canada on September 12, 1974. Subsidiary Agreements, signed pursuant to the GDA, should contribute to the achievement of GDA objectives. Hence, it is relevant to outline those objectives.

1) To encourage the expansion or maintenance of viable, long term employment opportunities and optimum quality of life in Nova Scotia;

2) To increase the earned incomes of people in Nova Scotia;

3) To assist in the development of a dynamic and creative provincial economy which will encourage growth and stability of economic activities in the province.

3. A general strategy composed of a wide range of elements was set down. Among the elements relevant for energy conservation are:

1) Development of new or expanded employment opportunities throughout the province by the identification and implementation of appropriate development opportunities;

2) The provision of interim assistance required to eliminate impediments threatening the retention and maintenance of otherwise viable employment opportunities and industries;

3) The development of energy resources and energy distribution systems to assist in providing adequate energy supplies to Nova Scotia consumers and industries.

It should be noted that this list accounts for only three of the ten elements of strategy outlined in the GDA.

4. The GDA objectives and strategy provide a general framework within which implementation of the Energy Subsidiary Agreement (Sub) should be carried out. In addition, specific objectives have been defined for the Sub:

1) to minimize employment and income losses resulting from increases in energy prices;

2) to create employment and income opportunities in a new industry;

3) to develop, with broad public involvement, plans and programs for the Nova Scotia energy system and its components so as to allow the longer term energy requirements of Nova Scotia to be met in the most efficient and cost-effective way.

To accomplish these objectives, the following elements of a Strategy are enunciated:

a) improving the efficiency of energy use;

b) minimizing the long run social cost of providing energy;

c) developing, with broad public involvement, plans and programs for the Nova Scotia energy and its components.

5. One is struck by the great similarity between the objectives and the strategy of the Sub. Indeed it is difficult to identify any significant differences between some items. This may be taken as the first sign of what becomes apparent during the evaluation: relative to other Subs, and perhaps even in its own right, this Agreement suffers from a lack of what the GDA describes as "the detailed analysis required to determine the basic feasibility of identified potential economic opportunities and the initiatives required to achieve these opportunities."

6. One is further struck by the apparently anamalous relationship between the Sub and the GDA. The former is aimed at conserving energy (although this aim is couched in the employment creation language more consistent with DREE's mandate),

the latter is aimed at expanding employment and income, one implication of which is increased energy consumption. Undoubtedly some rationalization is possible and has been achieved.

7. Generally it can be said that the programmes and projects of this Sub are directed toward achieving its objectives. However a detailed analysis of each programme and project in terms of the extent of its contribution to the objectives has not been attempted. Primarily the reason is straightforward: too little actual progress has been made to warrant such an analysis. Instead the evaluation has focussed on the reasons for the delays in getting the implementation underway and the problems which have hampered implementation progress.

8. At a later date evaluation will have to deal with how well the Sub objectives have been attained. It should be noted now that the lack of specificity in the Agreement will present difficult problems. To some extent the more refined detail provided in the various Project Briefs will help. However, even there, the use of soft terminology, a lack of definition of the benefits generated by project activities and relatively modest monitoring of project outputs will all contribute to some tricky final evaluation issues.

9. The remainder of this report deals with implementation of the Sub during the period July 1978 through July 1980. First, a number of general observations are made which apply to the whole Sub. Following this, each programme and/or project of the Sub is dealt with on its own.

II. GENERAL OBSERVATIONS

10. The following general observations cover factors which appear to have affected implementation of the Agreement, but which are not project specific.

11. On first reading the Subsidiary Agreement one is struck by the paucity of detail concerning what is actually intended. This deficiency is best illustrated by Schedule A. Unlike the corresponding schedules in the Agriculture or Forestry Agreements, which provide a good background to the problems each Agreement is intended to attack, elaborate on the strategy that will be followed in pursuing the objectives of the Agreement and describe in reasonable detail the programmes and projects which comprise the actual spending components of the Agreement, Schedule A of the Energy Conservation Agreement contains only the skimpiest information: programme and project names, and total budgeted expenditure for each of them over the Agreement. The absence of such a solid descriptive core to which implementation staff and others could always refer appears to have been an important factor in many of the problems that have plagued this Sub.

12. The second striking feature of the Energy Agreement is the remarkable ease with which a 57 term reduced to a 39-45 month term according to which project is being considered. The delays in project start-up and the slow progress subsquently appear to be explained by a number of factors:

1) Lack of Advance or Pre-planning - some of this work would have provided the substance of a well-developed Schedule A and also cut down significantly on the amount of time spent on such activities subsequent to the signing of the Agreement.

2) Lack of Communication - primarily this refers to inadequate communication between DREE and ME concerning the actual intention of the originators of the Agreement. However, it also refers to such incidents as the removal of the retroactivity clause from the Agreement shortly before the signing, a fact which was not communicated in writing to ME.

3) Lack of Personnel - it appears that ME did not appreciate the full staffing implications of implementing the Agreement. Consequently,

staffing issues have been a continuing problem and a regular source of disagreement between DREE and ME.

13. Since the staff problem still seems to exist and does significantly retard progress on some projects, some additional comments are warranted. First, as mentioned, one of the main underlying causes of the problem appears to have been insufficient understanding on the parts of Mines and Energy of the full personnel implications of implementing a Subsidiary Agreement. The Agreement itself is clear that the cost of any regular employee of the Province is not an eligible cost (see subsection 6.5). Hence, any additional staff must be hired either as regular provincial employees, paid for out of the departmental budget, or as short term contract employees.

14. As for the first type of employee, any Mines and Energy proposal must be agreed to by other provincial officials including (apparently) Treasury Board, Finance Department and Management Board. To date such proposals have not met with great success. It is difficult to determine why but one reason appears to be a lingering misunderstanding carried over from the past Minerals Agreement. Under that Agreement it was possible to hire regular staff using the joint federal-provincial funding. Old perceptions die hard, even though, as already noted, such a possibility is unequivocally ruled out by the terms of the current Energy Subsidiary Agreement.

15. The second line of attack on solving the staff problem has been to hire contract staff. The Agreement allows for such hiring, usually according to a maximum number specified in each Project Brief. Two problems have arisen in this connection. First, Mines and Energy estimates for contract staff contained in Project Briefs have turned out to be too low, leading to subsequent requests for additional positions. Second, the dividing line between what constitutes a regular provincial employee and what is a contract staff position is not well defined.

Repeated requests from ME combined with differing DREE/ME perceptions on contract staff has led to a continuing series of disagreements on the matter with little or no productive results. It would seem that this issue should be resolved once and for all at the Management Committee level. A written document could be circulated to all parties concerned informing them appropriately.

16. The Agreement is silent on the respective roles of its two programmes, Energy System Planning and Energy Opportunities. However one would expect that a programme primarily concerned with planning would generate a framework within which the projects of the Energy Opportunities programme would fit. This does not appear to have been the case. There is still time for such a role to develop, especially once a Planning Coordinator has taken up his/her position. Some more specific ideas on this matter are discussed in a subsequent section dealing with Energy System Planning.

17. At the implementing level, a major concern continues to be the amount of spending that will occur. A more important issue, whose resolution would lead to an appropriate rate of spending, is establishing a systematic approach to implementation with clear objectives and output targets. The responsibility for insuring that such an approach is followed falls on the Co-ordinating Committee and the Management Committee. Until recently the former appears to have existed in name only. If, by attaining active status, it provides the means of inter-project communication and identifies major issues on which the Management Committee must take decisions, both of which items are sorely needed, many of the problems identified in this report can be solved in a relatively short period of time.

18. The Agreement permits projects approved and commitments made in writing prior to March 31, 1983, to continue in force until completion except that no

claims submitted after March 31, 1984 shall be paid. One would expect that planning and budgeting for the Agreement would operate with an appropriate time frame, say three or four years. Instead most documents focus only on the coming year. While this is understandable, it is too myopic. The whole of the time remaining should be kept in mind constantly if the last year of the Agreement is to avoid becoming an ad hoc scramble to spend or commit to spend uncommitted funds.

III. ENERGY SYSTEM PLANNING PROGRAMME (ESP)

19. A review of the Project Brief reveals the following objectives:

1) To evaluate and recommend that combination of energy sources and alternatives to best meet short run and long run needs in Nova Scotia;

2) Public participation in the development of the provinical energy plan;

3) Sectoral evaluations to identify the most appropriate energy saving measures according to economic sector;

4) To specify the Nova Scotia role in the Maritime Energy Corporation.

To achieve these objectives, the original Subsidiary Agreement budget called for a five year programme expenditure of $3 million. As of March 31, 1980 actual programme expenditure totalled slightly less than $135,000.

20. To date, a total of 13 projects or activities have been identified for funding under this programme. Of these, two are completed, five are in various states of implementation and six are in the planning stages. Expenditure associated with projects completed or under implementation totals approximately $363,000, while a further $830,000 is associated with the projects in the planning stage.

21. In pursuit of the objectives outlined above, one would normally expect a plan to be formulated which would present in detail the outputs to be produced at the end of the Agreement, the resource inputs required to produce those outputs and the activities in which the resources would be used. Work on such a plan was proposed in September 1978 but nothing has materialized yet. This presents a number of difficulties. First, in implementing the programme itself it leaves progress very much on an ad hoc basis. Second, for personnel planning, long range needs are very difficult to forecast. Third, it is difficult to assess

whether substantial progress has been made towards achieving the programme objectives since no detailed output targets have been specified. The alternative of using the amount of actual expenditure as a proxy variable by which to gauge success is not particularly desirable.

22. It appears now that the document Energy - A Plan for Nova Scotia (EPNS) has superceded any efforts that might have been directed towards establishing a work plan for the ESP. Given the large effort that went into its production, this is understandable although not altogether satisfactory from the point of view of implementing the Subsidiary Agreement. A work plan for the ESP would provide both long term guidance for that programme and a framework to which the Energy Opportunities programme and its projects could relate.

23. Certainly for the short run, and probably for the long run, ESP has turned from being an active source of plans, objectives and strategies for the whole Sub to serving as a reactive programme taking up project ideas from EPNS on a somewhat ad hoc basis. This may be good because the EPNS does identify a large number of areas where there is need for study and action in Nova Scotia. However the EPNS does not provide a well developed sense of priorities. Thus, there is a danger in selecting tasks to pursue through ESP that maximum benefits may not be attained from Sub expenditure.

24. The solution to this problem may be for a project to be designed for implementation under ESP whose main purpose is to assign priorities to all of the recommendations contained in EPNS. This could be done using a two stage procedure. The first stage would develop a priority ranking strictly on the basis of what are perceived to be the needs of Nova Scotia. The second phase would then select recommendations to be implemented and design projects according to the

extent to which they will contribute to accomplishing the objectives of the Sub. In the course of the analysis, the complementarity among the EPNS recommendations would be taken into account in developing the priorities. In this way Nova Scotia's needs would be as well served from the Sub as possible and maximum progress would be made in attaining the objectives of the Sub. Perhaps as important, approaching the problem in this way would provide a timely review of the Sub objectives and the extent to which they are consistent with the current perception of Nova Scotia's needs.

25. A revised Project Brief (May 1980) states the objectives of the programme as:

> "to undertake planning studies to identify and analyze energy options and opportunities and to develop strategies and programs pursuant to these opportunities."

A secondary objective is identified as:

> "to contribute to establishing an energy decision and evaluation process and of expertise which will be of ongoing use to the province."

Compared to the initial set of objectives there would appear to have been some significant changes. The new primary objectives are less specific in their intent. Specification of the Nova Scotia role in the Maritime Energy Corporation has been dropped. The new secondary objective introduces explicitly a target which was missing from the original objectives. These changes raise some questions which are difficult for an evaluator to deal with. To what extent do the new objectives really shift the direction of the programme? Will the new direction contribute better to achieving the Sub objectives.? Are the new objectives a reflection of changing circumstances, such that the old objectives no longer apply? These are not questions which this evaluation can answer, but they do need to be answered if the ESP is going to possess a firm sense of purpose and

make the maximum contribution to successful implementation of the Sub and to solving Nova Scotia's energy problems.

26. The ESP is now seen as having three constituent parts: (1) Consulting Services, (2) Planning Co-ordinator, and (3) Public Information and Education. Of these the second item has the smallest expenditure attached but is, in the opinion of the evaluator, the most important. A shortage of personnel within the Department of Mines and Energy appears to have been a severe bottleneck to progress in identifying priority areas for attention and for developing good projects to attack those areas. To date, responsibility for implementing the ESP has fallen on the shoulders of one person who has additional exacting duties. Finding all of the time necessary for ESP matters appears to have been impossible. A full-time Planning Co-ordinator would bring to bear the attention and effort that the ESP needs and deserves. Such a person would also have a valuable role to play in the development of priorities along the lines suggested previously.

27. Two questions do arise concerning the proposed Public Information and Education component of this programme. Originally broad public involvement was proposed as part of the Sub. Specifically for ESP, public participation was proposed in the development of the provincial energy plan. Is it now planned that such public involvement will be accomplished through the Public Information and Education component? Further, what will be the relationship between the activities under ESP and the public information activities undertaken by the Public Information project itself?

IV. ENERGY OPPORTUNITIES PROGRAMME

28. This is the second of the two programmes comprising the Energy Conservation Sub. Its main aims are:

1) to lead to improved utilization of energy resources;
2) to enhance private sector competitiveness; and
3) to reduce Nova Scotia's dependency on oil as a source of energy.

To accomplish these aims seven projects have been identified. These are:

1) Load Management - an experiment in peak load pricing and direct load management to be carried out by NSPC.

2) Industrial Retrofitting - a project that offers financial inducements to firms to engage in energy conservation, including the use of energy efficient equipment.

3) Co-generation and Soft Technology - a project to fund the feasibility and pre-design costs of the use of steam for heat and electricity from a single generation plant.

4) Pilot Projects - the funding of small scale projects in both the public and the private sector to demonstrate the use of indigenous resources such as wood, solar and hydro for energy generation.

5) Energy Information and Testing Service - to develop, evaluate and demonstrate new energy-saving devices and equipment and make the information available to all sectors.

6) Public Information - to produce and disseminate public information to encourage efficient use and conservation of energy, particularly as it relates to other components of the programme.

7) Evaluation - to undertake evaluation of the Agreement as to the efficacy of its implementation during and at the end of its term.

In this Interim Evaluation discussion and analysis of the programme are confined to the first six projects.

V. LOAD MANAGEMENT

29. The objectives of this project are to study the application of alternate rate structures, costing philosophies and direct load management to assess the impact of their use in reducing overall electricity costs. In pursuit of these objectives, six sub-projects have been defined:

1) Marginal Cost Pricing Study
2) Fully Allocated Cost of Service Study
3) Load Research Study
4) Rate Experiment and Load Management
5) Load Forecasting
6) Benefit Cost Analysis (applied to the results of 1-5)

Detailed analysis of each of the sub-projects is premature. Progress has been very uneven and a worthwhile analysis should be able to assess all sub-projects, both in terms of their performance relative to their own objectives and the manner in which their results blend together and contribute to the Load Management project objectives and the Sub objectives.

30. Parts of this project have been undertaken by consultants on contract. Some reports have been received. Although evaluation of the results so far may be premature, it does seem that the cost effectiveness of this work and its implications for the remaining work needs to be considered carefully by the Project Team and possibly by the Management Committee.

31. Delays in implementation characterize the early stages of this project. Pinpointing a single cause of the delay is not possible because varying factors have influenced each sub-project. Furthermore, it is questionable whether detailed knowledge of the causes is valuable now. However some comments are necessary.

32. No project expenditure occurred during the 78/79 fiscal year and expenditure during 1979-80 was far below the planned level. There appear to be four

factors which have contributed to the lag in reaching full project implementation:

1) The Nova Scotia Power Corporation (NSPC) does not appear to have pursued implementation of the project as vigorously in its early stages as one might reasonably expect. In part this situation may reflect a lack of enthusiasm for doing work requested by the Public Utilities Board. Scepticism about the usefulness of the results may also have reduced NSPC's level of interest. Whatever was the case, this problem no longer exists. It should be noted that a similar comment could be made concerning the depth of the Mines and Energy commitment to the project in its early stages.

2) The Project Team is large and widely dispersed geographically, with members from B.C. Hydro, Ontario Hydro, Quebec Hydro, the Canadian Electrical Association as well as representatives of four local agencies (DREE, MT&T, ME and NSPC). From purely a decision making point of view, the Team size and composition appear to have complicated and slowed things down. In part, this is a reflection of the additional objectives (incremental to the ones initially defined for the project by the funding and implementing agencies) that the non-Nova Scotian Team members have introduced. However, these delays must be balanced against some obvious benefits flowing from the Team composition. The background and experience of the Team members has contributed to improved project definition. Experience with this project will be transmitted quickly to other electrical utilities across Canada at relatively low costs, generating potentially significant benefits for all of Canada.

3) The involvement of the Maritime Tel. & Tel. in the project may also have led to some minor delays. However, once again, there appear to be substantial benefits likely to accrue from the MT&T participation. (These aspects will presumably be analyzed in the Benefit Cost sub-project.) Apart from permitting MT&T to proceed more rapidly at a lower cost with their own plans for the introduction of high level communication technology, the project will assist at least one Nova Scotian company to establish itself in the forefront of an area of high technology development. This appears to have been a wholly unanticipated benefit of the project.

4) Finally, related to the previous item, the emergence of a new local producer for some of the equipment to be used in the Load Research Study has caused some delay. However the longer run benefits to Nova Scotia, incremental to those generated by the project itself, may be very substantial. The value of this unanticiapted benefit is an issue that should be investigated by the Benefit Cost sub-project.

33. The major factors contributing to project delay have now been overcome and implementation appears to be proceeding at an acceptable pace. However, given the time lost - the project is approximately one year behind its original implementation schedule - there remains an important question yet to be answered. Can all elements of the project activities be completed within the Sub time frame? This is an urgent matter which should be studied by the Project Team so that recommendations can be made to the Management Committee as necessary.

VI. INDUSTRIAL RETROFITTING

34. The major objective of this project is to promote industrial energy conservation, including the use of energy efficient equipment. Participating firms are offered financial incentives to carry out energy investment activities within their operations which will reduce their energy costs and thereby make them more energy efficient.

35. It is difficult to argue with an objective the successful accomplishment of which will increase the operating efficiency of firms in Nova Scotia. This seems doubly true when one recalls the conventional wisdom that Nova Scotia firms operate under the severe disadvantage of some of the highest energy costs in Canada. With such a background, one is puzzled by the long delays in getting the project underway and then the apparent lack of response on the part of Nova Scotia business firms. The situation can be explained; it should not be repeated.

36. For evaluation purposes, three stages in project implementation have been identified:

1) June 1978 - June 1979: this period is essentially one of inactivity while the eligibility criteria were being agreed with the federal Treasury Board;

2) June 1979 - June 1980: this period is the first year of actual project implementation. During this time, problems of slow uptake of the project were analyzed and changes proposed in the eligibility criteria.

3) June 1980 - March 1983: this period represents the time remaining for project implementation under the new set of eligibility criteria. It is not dealt with in the evaluation.

37. Before discussing the causes of delay, it should be stressed that the project now appears to be well in hand and the remaining time should see a record

of successful implementation. Nevertheless, this does not mean that all of the budgeted funds will be spent. Too much time has been lost already to accomplish such an objective, given the nature of the firms in Nova Scotia eligible to participate and the eligibility criteria themselves. This conclusion will be elaborated on later.

38. Further, implementation staff have now evolved to the point in their association with the project that they are able to monitor results on an ongoing basis. This contributes to their ability to introduce continuous improvements in project design and implementation. One aspect of this development is the computerized financial monitoring system which provides an up-to-date picture of project progress on a regular basis.

39. Another example of the recent good implementation experience is the Program Opinion Survey carried out in early 1980. In the opinion of this writer, this was a well conceived and well executed survey whose results have helped to shape the nature and directions of the project for the remainder of its implementation period. Its evident success does raise two questions: (1) given that the Agreement is attempting to achieve objectives in what is basically virgin territory and that consequently there was little relevant experience on which to base implementation activities, one cannot help but ask why such a survey was not carried out immediately following the signing of the Agreement? (2) One conclusion of the survey report was that the personal interviews proved to be a very good promotional exercise for the project. One is naturally led to ask why the extent of knowledge of the project among intended beneficiaries was still so low in January 1980?

40. In connection with the apparently high utility derived from promoting Retrofit by personal contact with firms, several comments are relevant. First, it is a long established fact in business that many sales are successfully made only through personal contact. Why else do firms maintain costly travelling sales personnel? Why should it have taken so long to recognize this fact in Retrofit? Second, personal visits to firms, while effective, are very time consuming. Retrofit staff devoted to it cannot also be engaged in processing applications to participate in the project. Given the apparent staff limitations, what does this say about the possibility of actually increasing the implementation rate? However, having noted this problem, it is only fair to indicate that the planned hiring of an Industrial Liaison officer will undoubtedly assist in promoting Retrofit and linking it with other energy activities.

June 1978 - June 1979

41. Most of this period was lost in so far as project implementation is concerned. There appear to have been a wide range of causes contributing to the situation. Isolating which factors played the greatest role was not pursued in any depth since it was felt identifying them was sufficient at this stage.

The Payback Period

42. One of the major holdups affecting implementation arose from the concerns expressed by the federal Treasury Board over the possibility of windfall profits accruing to some firms participating in the Retrofitting project. Much effort was directed at resolving this issue, none of which appears to have had the slightest impact in terms of successful implementation. The reason is simple enough: the issue is irrelevant. Retrofit is aimed at increasing the

energy efficiency of Nova Scotia manufacturing and other firms. In economic theoretical terms, the project is concerned with economic efficiency. Windfall profits, to the extent that they would ever occur (and it will be argued later that experience shows they would not, did not and will not arise in any significant degree) are an equity issue, something which is neither part of the Sub objectives nor the project objectives.

43. Pursuing the issue along a slightly different tack, a definition of windfall profits would be necessary in order to decide whether they are being received or not. Such a definition does not appear to have been part of the discussion. Hence, it is difficult analytically to push things very far.

44. There is a further difficulty which would have to be resolved. On the one hand, if participation in the Retrofit project would bestow windfall profits on a firm, surely the energy investment concerned must have been profitable in the first place. The project grant would transform it from the merely profitable to a 'more profitable than the alternatives' category. This is exactly the inducement the project was intended to offer in order to achieve its objectives. On the other hand, if the energy investment was already a highly profitable alternative that the firm had not chosen, then one is led to wonder whether such a firm is acting as a profit maximizer. In either case, the project grant would have achieved its purpose if the firm undertook the investment to increase its energy efficiency.

45. To end this discussion, there is some evidence that firms in the industrial sector appear to use different criteria for cost reduction investments than they do for production expansion investments. According to Armstrong,[1]

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1. Graham T. Armstrong, Conservation Energy - Potential and Practice in Canada, presented to the Conservation Energy Seminar Series, July 24, 1980, Regina, Saskatchewan, Conservation and Renewable Energy Branch, Energy Mines and Resources Canada, Ottawa, 1980.

for example,

> "Canadian experience indicates that a rate of return better than 25 percent real (3 year payback, assuming reinvestment of proceeds) is generally sought for conservation investments and 10 to 25 percent for production expansion. Furthermore, these rates of return are generally well above those for conventional energy supply industries, particularly utilities. Rates of return in these industries generally fall in the 0 to 15 percent range, and thus, even under long run marginal cost pricing of energy, resource misallocation could be substantial. The situation calls for serious consideration of incentives to encourage firms to undertake investments in energy efficiency."

46. Armstrong goes on to point out that few Retrofit energy investment opportunities are undertaken with a simple investment payback of greater than three years, even at current energy prices. Such investments are attractive relative to the rates of return that prevail on new energy investments (0 to 10 percent even with pricing and fiscal incentives), but they are still not undertaken. He argues that even with higher energy prices many such investments would still not be undertaken in light of industrial investment criteria and different fiscal treatment. Other significant barriers include lack of liquidity, disruptions of plant production when the energy saving equipment is installed, R and D lags and the less attractive fiscal incentives available to conservation investments.

47. All of the foregoing should lay to rest questions concerning payback period and whether a 'means test' could be constructed to test firms applying to participate in the project. Clearly, pursuing such a course of action runs counter to achieving the objectives of the project and also would be highly counterproductive given the manner in which firms evidently view energy investments.

Eligibility Criteria

48. From the previous discussion, it seems clear that the three year pay-back rule has been a factor in holding down the number of participants. However, it is only one of a number of factors. Changes in the project have now been introduced in the project to overcome some of these problems but it does seem appropriate to take note of them.

49. Until recently, any firm applying to participate in the project must have had an ENERSAVE audit. The impact of this restriction is evident from the situation in November 1979 when, of approximately 600 eligible firms only 120 had been analyzed by ENERSAVE. Of that 120 firms, applications had been received from only 15. Using the ENERSAVE audit to identify good energy saving investments is sensible, but the current practice of permitting firms to apply and then follow up with an audit is even more sensible, especially since it means that audits will be performed for firms that are already interested in energy saving possibilities.

50. In the initial formulation of the project, it appears to have been assumed that all eligible firms would participate in the project. This has turned out to be an overly optimistic assumption, one which a reasonable person would have doubted in the first place. A little analysis would have revealed that in spite of the conventional wisdom in Nova Scotia, energy costs for many firms are still not a major item. The Program Survey mentioned previously found that for 47 percent of the firms surveyed, energy costs amounted to less than 2 percent of their total costs, while for another 33 percent, energy accounted for 2-5 percent of total costs. Only 20 percent of the firms surveyed indicated that energy accounted for more than 5 percent of total costs. One

would have thought that such information would have formed an important part of the pre-planning and project definition work connected with Retrofit.

51. Furthermore, even if all eligible firms did participate, the small size of many Nova Scotian firms should have been considered. In 1975, according to data in December 1978 DREE memo on Retrofit, 304 of 689 Nova Scotia industrial firms, or 44 percent, had sales of less than $200,000, and 62 percent had sales of less than $500,000. One would not expect such firms to make large scale energy saving investments. Thus, even with a high participation rate, one would still wonder whether all of the available funding could be distributed on good proposals.

52. Leaving aside the deficiencies in the early planning and turning to the actual implementation, very quickly it became apparent that ME did not have the staff to promote the Retrofit project effectively. This problem was solved by the addition of an engineer whose time was solely devoted to Retrofit. Accordingly, it became possible to turn some attention to the application rate. A number of reasons (in addition to those cited by Armstrong previously) have been advanced to explain the small number of participants: lack of promotion, high interest rate, the long payback periods required by the project, lack of commitment to energy conservation, too much paperwork, cash flow problems. Moreover, one would expect that many small firms would not have the personnel to devote to formulating an energy saving investment proposal. Finally, it turns out that the natural response rate for participants will be relatively low because of the time required to learn of the project, to assess a firm's particular situation and then plan the firm's response. In many cases, a firm's capital budget will be committed already for up to a year or more. The upshot

is that under the old project operating system one could expect a lag of anywhere from 8 to 18 months after an energy audit before an application would be forthcoming. In hindsight, this is not surprising. Better pre-planning, particularly as regards the investment behaviour of small firms, would have avoided or, at the very least, contributed to the early development of procedures to cope with the situation more effectively. It should be noted that many of the recent changes in the project procedures will overcome the problems mentioned. However, given the revealed nature of business investment behaviour, a low participation rate should not be surprising, even among the new expanded set of eligible firms.

53. The recent changes in the project will almost certainly improve its performance. Nevertheless, it still seems highly unlikely that all of the $10.875 million allocated to the project will be spent within the Sub time period. It was mentioned previously that underspending should not necessarily be regarded as poor performance. First, spending the whole amount on good investments is an impossible target to reach. This should be recognized and appropriate steps taken. This conclusion carries greater weight when it is remembered that the $10.875 million figure is the result of an uncorrected clerical error, made during the preparation of the Agreement, that increased the original spending target by several million dollars. Second, it should be recognized that Retrofit at its inception was a wholly new concept for which little or no previous experience existed. A relatively slow start-up should have been expected and planned for with appropriate objectives and targets.

VII. CO-GENERATION

54. The objective of the co-generation project is to try to identify likely industries where the production of steam for heating and electricity generation is feasible. The project itself would promote the idea through seminars and provide funding assistance for feasibility studies and for demonstration projects.

55. Until May 1980, this project has received very low priority by both ME and DREE. In the case of ME, staffing problems meant that no one was available to carry out implementation activities. At DREE, it appears that senior management had regarded co-generation as less important because, relative to other projects in the Energy Opportunities programme, it only involved expenditure of $600,000.

56. In both agencies changes have occurred which should now lead to implementation. ME have acquired a new engineer whose responsibilities focus mainly on co-generation. At DREE a new project officer has taken over the project.

57. Other than these comments, there is little that can be said. The Project Brief has only recently been drafted, the first step in an implementation just commencing.

VIII. PILOT PROJECTS

58. This project is described as having two objectives:

1) To encourage and stimulate conversion to renewable energy resources; and

2) To encourage and stimulate more efficient use of conventional energy sources by practical demonstration.

Generally, these objectives were to be accomplished by the funding of small scale public and private sector projects to demonstrate the use of indigenous resources such as wood, solar, hydro and other possibilities. It was envisioned that solar panels, wood gasifiers, small hydro generators and district heating would all be part of the project at some point in its life. Three major concerns were to be addressed by the project: (1) the identification and investigation of new technology; (2) the application of such technology wherever feasible; and (3) the creation of new industrial opportunities.

59. The original budgetary allocation for this project was $5.3 million, an amount which still stands. Of that amount, $2.3 million was allocated for a District Heating Demonstration project, $1.3 million for biomass energy projects, $735,000 for solar projects and various smaller amounts for wind and miscellaneous projects, resource evaluation and administration. These allocations would appear to indicate some order of priority in the original formulation of the project. To the extent that such a priority existed, it appears to have shifted, since the status of the District Heating project is now uncertain and no reference is made to it in recent budget proposals for 1980/81. This situation is symptomatic of what appears to be the only real problem with this project: a lack of a sense of priority and overall direction.

60. The situation can be characterized as follows. For any proposal advanced for under Pilots, a three phase implementation procedure is laid down.

1) Receive proposal; Appraise; Accept or reject; if the former, construct.

2) Monitor Operation of the project

3) Publicize project and results.

61. In making the appraisal and deciding whether to accept or reject a proposal, the following criteria are used:

1) Nova Scotia applicability
2) Replicability
3) Extent of energy savings
4) Financial aspects - will it pay for itself?
5) Ability of the proposer
6) Spin-offs to Nova Scotia industries

This is a comprehensive list. The problem is that no weights are assigned. Each proposal is appraised individually using good judgement as to its merits. On the one hand, there can be no complaint with the application of good judgement. On the other hand, there is a danger that lacking a formal assignment, weights are assigned implicitly and may change over time (unconsciously), leaving the project at the end of its term with a mixed bag of results.

62. The question of priorities needs to be considered from another angle too - the relative importance attached to projects from different sectors. Project documents identify five sectors: Agriculture, Commercial, Industrial, Residential and Transportation. A structured approach to the identification, acceptance and funding of pilot projects would involve identifying sectoral priorities, developing some target outcomes by sector and then actively promoting these targets with the intention of soliciting pilot projects accordingly. Such an approach was apparently initiated early in the project's life when a

consultant was hired to develop such a scheme. Residual elements of the scheme remain but it does not appear to have received a favourable response.

63. There appear to be three reasons why such an approach has not succeeded. First, in the earlier states of the project, implementation staff was limited and the operating philosophy was primarily reactive. Responding to unsolicited proposals leaves one in a very vulnerable position in terms of trying to implement a structured approach. Second, by their very nature, pilot projects are in many instances dealing with technologies and concepts for energy saving which are unproven in their effectiveness. In other cases, ideas for pilot projects will be totally new and unknown to project administrators before a proposal is received. Without a crystal ball, it is difficult to predict the future under these circumstances. One can thus argue that assigning sectoral priorities is futile; the best that can be done is to choose good projects as they come along. Third, while the current staff situation is much improved with the addition of an engineer to deal with pilot projects, the relatively large number of proposals being generated and the wide variety of technologies covered take up a lot of time to process. Often the proposers of a project idea do not have sufficient technical knowledge and much time is required to educate them. Thus, the time to consider project proposals in terms of a structured approach becomes a relative luxury.

64. The reasons cited make it easy to understand why the structured approach has not found favour up to this point. They do not however provide convincing evidence for abandoning it entirely. There would still seem to be real benefits to be gained from establishing sector priorities, associated outcome targets and the implied weighting systems that follow.

65. Like the other projects in the Sub, Pilots get off to a slow start. This seems to have been primarily due to an underestimate of the personnel required to implement the project. With a full-time project engineer now, the project will no doubt make much faster progress. One is still left with some doubt however as to what is a reasonable rate of progress given the large number of small scale proposals, the wide range of technologies involved and the high education component that is required for successful implementation.

66. Connected with the 'reasonable rate of progress' is the question of how much of the initial budget can actually be spent. Past performance and currently planned rates of expenditure would suggest that the final outcome will fall short of $5.3 million. Similar to Retrofit, the success of this project should not be judged in terms of how much is spent. Pilot projects represent an attempt to explore creative and innovative attacks on saving energy. In evaluating the success of its implementation and the outputs that it generates should be approached in that spirit.

IX. ENERGY INFORMATION AND TESTING SERVICE (ENERTIC)

67. From a review of this project, one is led to the conclusion that attempting to evaluate its progress now is premature. The question then turns to why this should be the case. A brief recounting of the project's history should suffice.

68. Until October 1978, the project appears to have suffered from a lack of personnel dedicated to its implementation and an unwillingness by decision makers to choose between what were then two separate proposals for a testing and information service. The personnel problem was solved in October 1978 with the addition of a staff person to deal with ENERTIC as it is now called. From October 1978 through July 1979, all effort appears to have been directed at reaching agreement between the Nova Scotia Technical College (now the Technical University of Nova Scotia) and the Nova Scotia Research Foundation for a joint proposal. Such a proposal was submitted in July 1979 but consideration of it was postponed until October 1979 because Mines and Energy staff were totally devoted to Energy Task Force activities. By November 1979, the Project Team had reviewed the joint proposal and actual implementation was able to commence in December of that year. However, even then, there was still a need to iron out the details, a procedure which occupied the period January through June 1980. The upshot is that the 1980/81 fiscal year will be the first fiscal year in which significant project activity will occur.

69. One is left with the feeling once again that the readiness to implement was the important missing ingredient at the time the Agreement was signed.

70. The general objective of this project is to promote increased efficiency in energy use. More specifically, this objective can be disaggregated into four elements:

1) To develop an Energy Information Centre for energy consumers from all sectors, energy hardware manufacturers and suppliers and government;

2) To evaluate, demonstrate and monitor performance of energy conservation and alternate energy products and equipment;

3) To provide a technical resource to assist industry in development of an energy hardware industrial sector through (a) provision of information, and (b) execution of pre-commercial technical evaluations; and

4) To encourage the development of technical innovations by carrying out preliminary evaluations of ideas and inventions.

In addition a secondary objective has been mentioned: increased consumer protection through product evaluation. However laudable, such an objective is clearly outside the objectives of both the Sub and this project, and would not constitute sufficient reason to undertake the project within the current context.

71. As concerns 1-4 above, however slowly, the project does seem to be making some progress. At the moment, it is too soon to say anything more.

72. Turning to the budget for the project, the original allocation, which apparently still stands, was $1.5 million. Planned expenditure for 1980/81 will bring both testing and information components of the project to virtually full operation. Operational expenditures for ENERTIC are relatively modest. Accordingly, almost $1 million will remain in the budget for fiscal years 81/82 and 82/83 and there appear to be no firm plans for its expenditure.

73. ENERTIC has one feature which differentiates it from the other projects in the Agreement. Both the Testing Centre and the Information Centre are planned as ongoing operations. This raises the question of their financial viability once Sub funding ceases, an issue which has been recognized by the Project Team. Marketing studies have been or are currently underway for both arms of ENERTIC. These appear to have revealed important insights into what will be required to

achieve financial success. One especially important aspect is adopting a 'business-like approach', involving the full or part-time participation of business managers in both Centres. Without a doubt this should be followed up by the Project Team as a necessary component of ENERTIC. Furthermore, there appears to have been some discussion concerning who would be responsible for any operating losses of either the Testing Centre or the Information Centre. Formalizing such arrangements would seem to be an appropriate step in the near future.

74. From an administrative point of view the project appears now to be well in hand. The major remaining problem is finishing the detailed planning so that full implementation of all parts of ENERTIC can be completed.

X. PUBLIC INFORMATION

75. As described in the Agreement, the objective of this project is to encourage the efficient use and conservation of energy, particularly based on the activities of the Sub. Based on what has actually occurred under the project and statements in the Project Brief, the objectives of the project have expanded considerably from what was envisioned in the Sub. In general terms, the primary objective now seems to be to create a more energy conscious public.

76. To accomplish this objective, five sub-areas constitute the focus of project activities:

1) Research: attitudinal research into changing public awareness and attitudes;

2) Seminars: public meetings to convey relevant energy related information;

3) Literature: creation of written material to support and publicize other elements of the project and other projects of the Sub;

4) Media: use of print and electronic media to disseminate energy information;

5) Signs and Public Awareness: primarily to raise public awareness of the activities being undertaken through Sub funding.

77. In general, performance on this project has been effective, and in some cases highly innovative. The questions that need to be answered are how and why did actual project objectives deviate so far from what was apparently the original intention, and is the project better because of the deviation or not?

78. This deviation in objectives has been recognized by the Project Team and some attempt will be made to realign objectives stated in the Project Brief with what the Sub says. What remains to be seen is whether such a realignment represents a real shift in objectives, or simply new words to describe what was going to be done anyway.

79. Staffing problems continue to hamper implementation of some parts of this project. For example, the production of written material has suffered from the lack of a professional writer. This problem has now been solved but regular staff time available to devote to the project is still very scarce. Indeed, it is commendable that so much has been accomplished under the circumstances.

80. In spite of its inactivity during the first year of the Agreement, and the inability to progress on some parts of the project, expenditure performance has been well ahead of the four year project budgets dated March 1979 and June 1979. One wonders what, if anything, those budgets meant? In any case, the reason for the high rate of expenditure is advertising on television and other media. On a per person basis, the cost of this method of disseminating energy related information is low, but on aggregate basis it is high. So high, in fact, that the project will virtually exhaust its total budget by the end of this financial year. Given the high degree of difficulty in measuring the effectiveness and longevity of impact of television advertising, one must wonder whether from the overall Sub point of view this represents an optimal allocation of expenditure. At the same time, of course, one also wonders how optimality could be determined anyway.

81. The project commissioned a public attitudinal survey which created the opportunity to compare Nova Scotia energy attitudes to a national standard. The study will be replicated at various times during the Agreement, permitting some measure of the change in public energy attitudes over time. Given that there seems to be no way associating changes in attitude, or the lack of them, with activities of the Sub, one wonders just what is being accomplished through the survey.

82. Aside from the questions raised, there is little else to say in connection with the Public Information project. It is a very well run exercise which is accomplishing about as much as can be expected. The intended shift in its emphasis towards disseminating more information on the activities of the Sub directly appears warranted. All things considered, this should provide a better balance of project outputs relative to the Sub Agreement and its objectives.