

**Sustainable Development:
Its Implications for Union Gas**

Union Gas Limited E.B.R.O. 462

Testimony of

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The Canadian Institute for Environmental Law and Policy

On behalf of

Energy Probe

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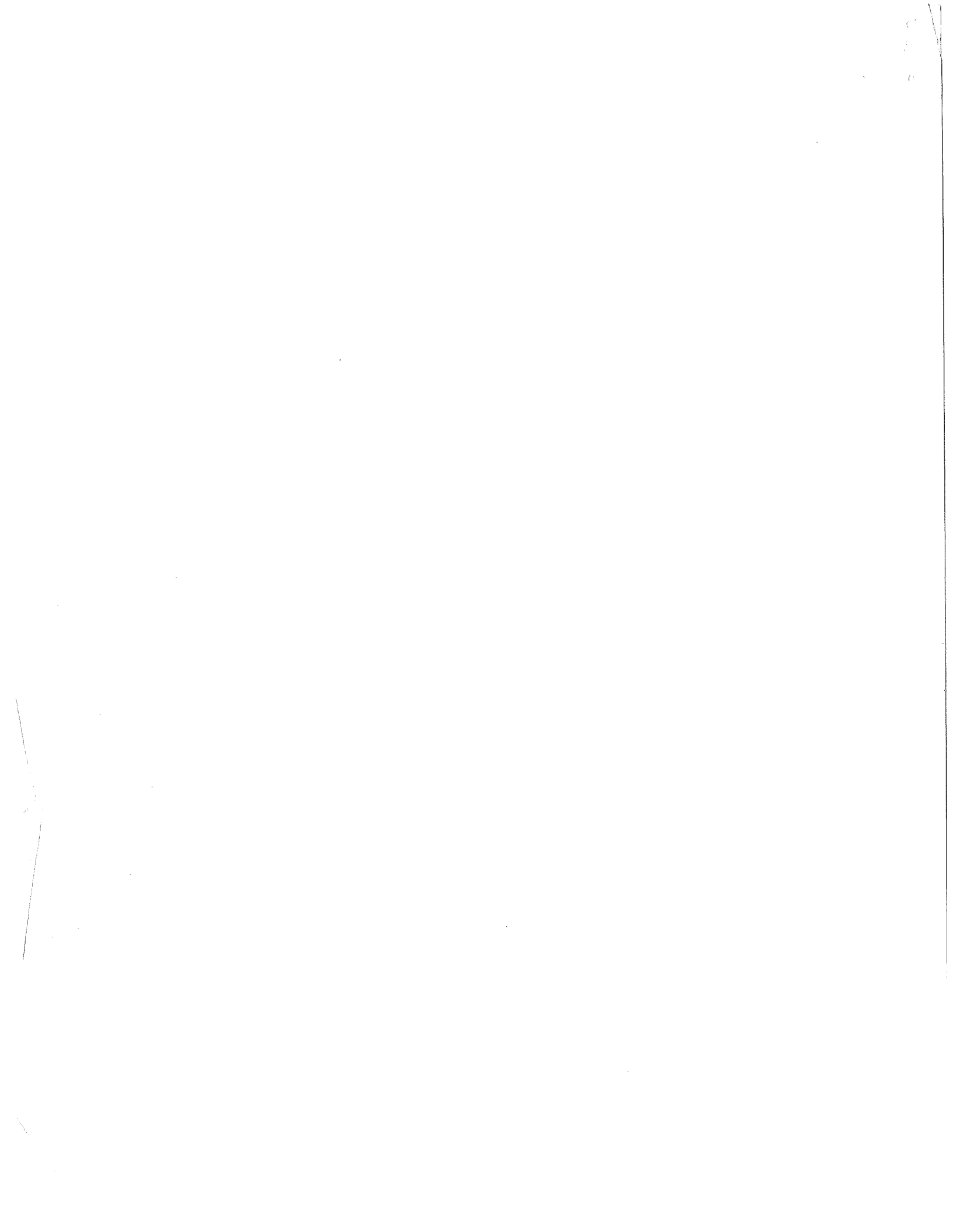
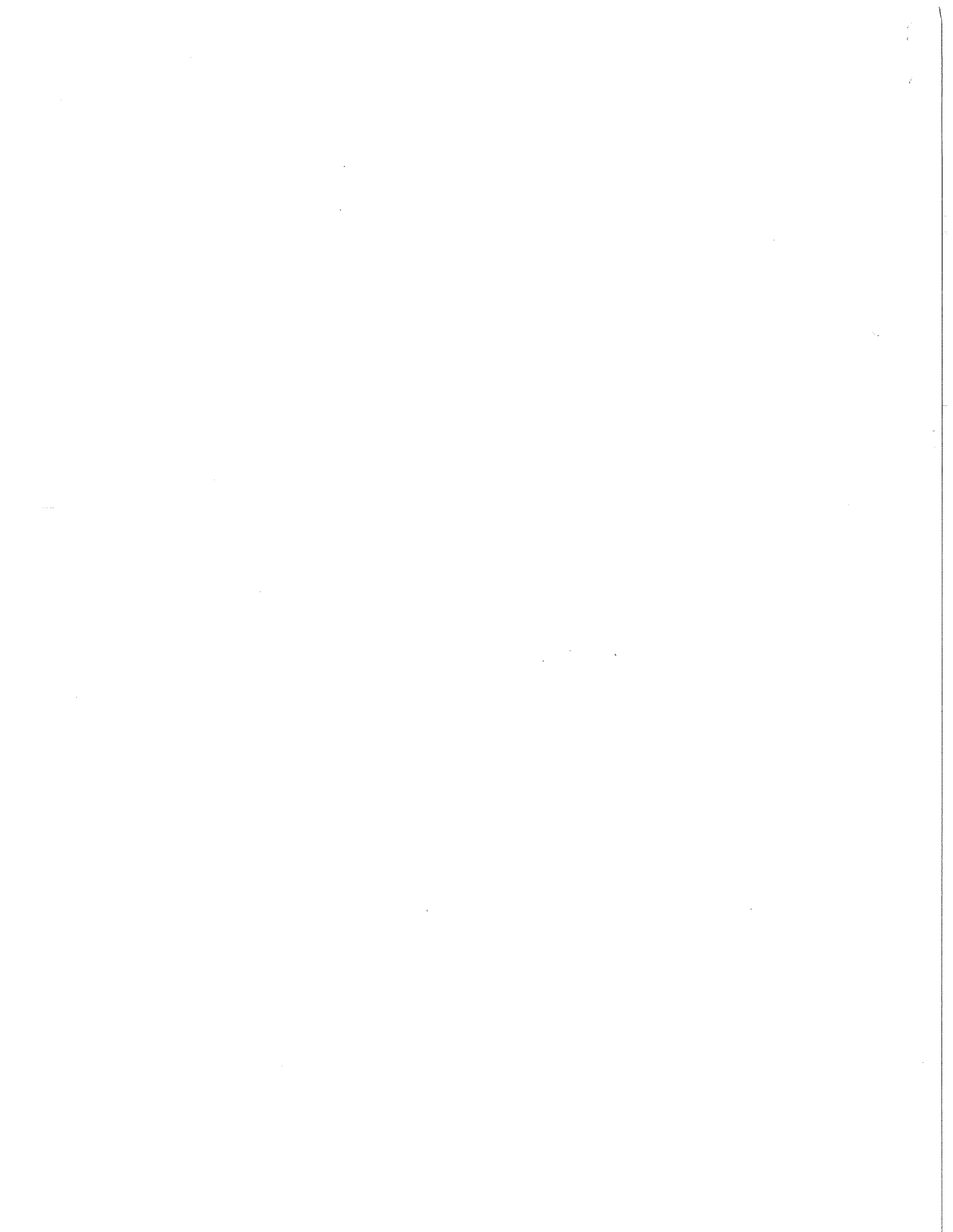


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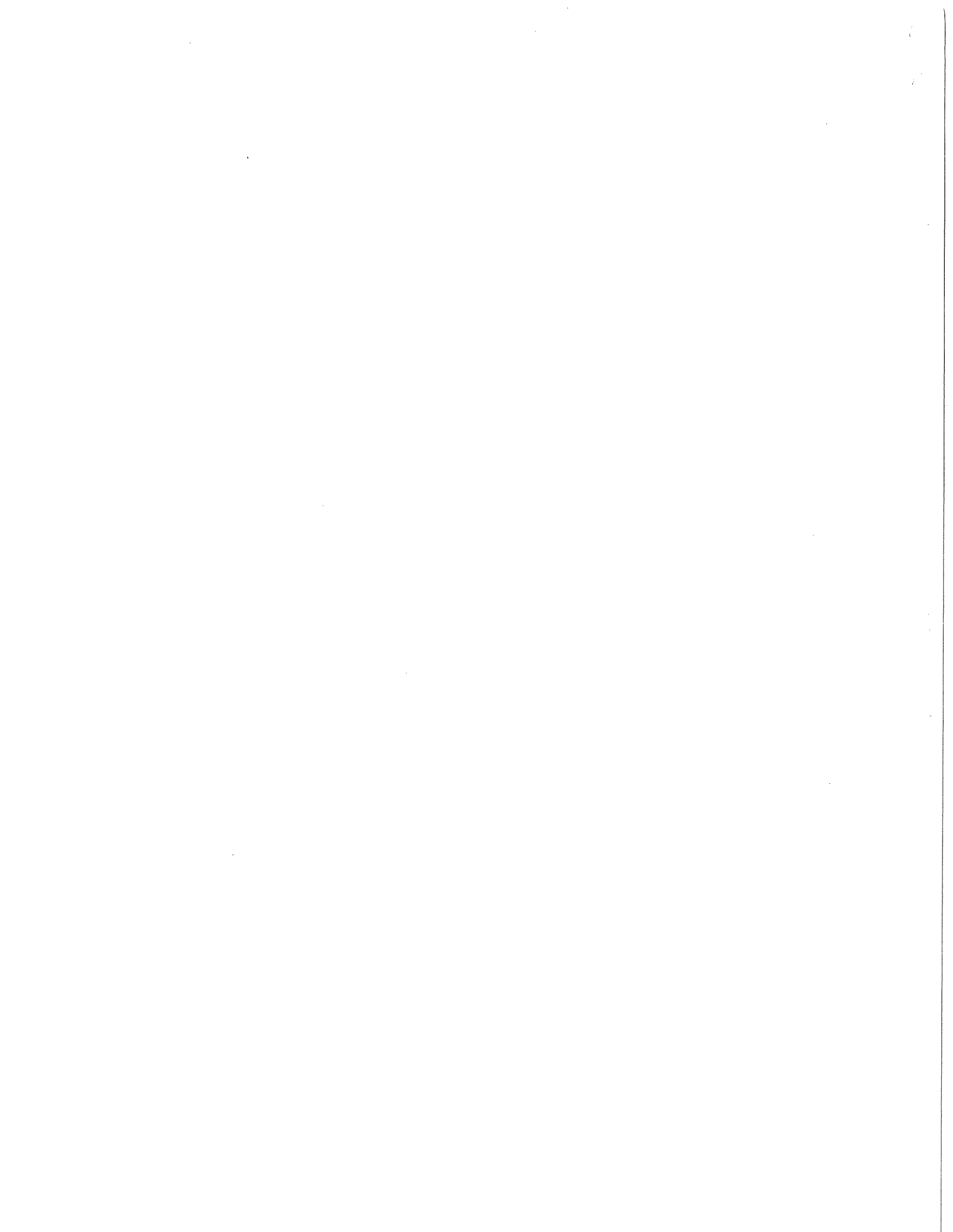
1. Introduction

On February 2, 1989 the Legislature of Ontario passed a motion that requires the Government of Ontario to apply the principles of sustainable development to all areas of government decision-making. The motion directed the Government to:

"Conduct a thorough review of its programs, policies and practices to ensure that the concept of sustainable development is applied within all areas of Ontario government decision-making."

I have been retained by Energy Probe to investigate the implications of the above motion for: a) the Ontario Energy Board's (O.E.B.) principles and procedures for regulating Union Gas (Union) ; and b) Union's 1991 revenue requirement.

My testimony will address these issues by answering the following questions: a) what is sustainable development and what are its implications for energy policy and Union; b) does the O.E.B. have the authority to include the costs of programmes to promote sustainable development in Union's revenue requirement; c) how should the O.E.B. evaluate the cost-effectiveness of sustainable development programmes; d) how can the promotion of sustainable development be made the most profitable course of action for Union?



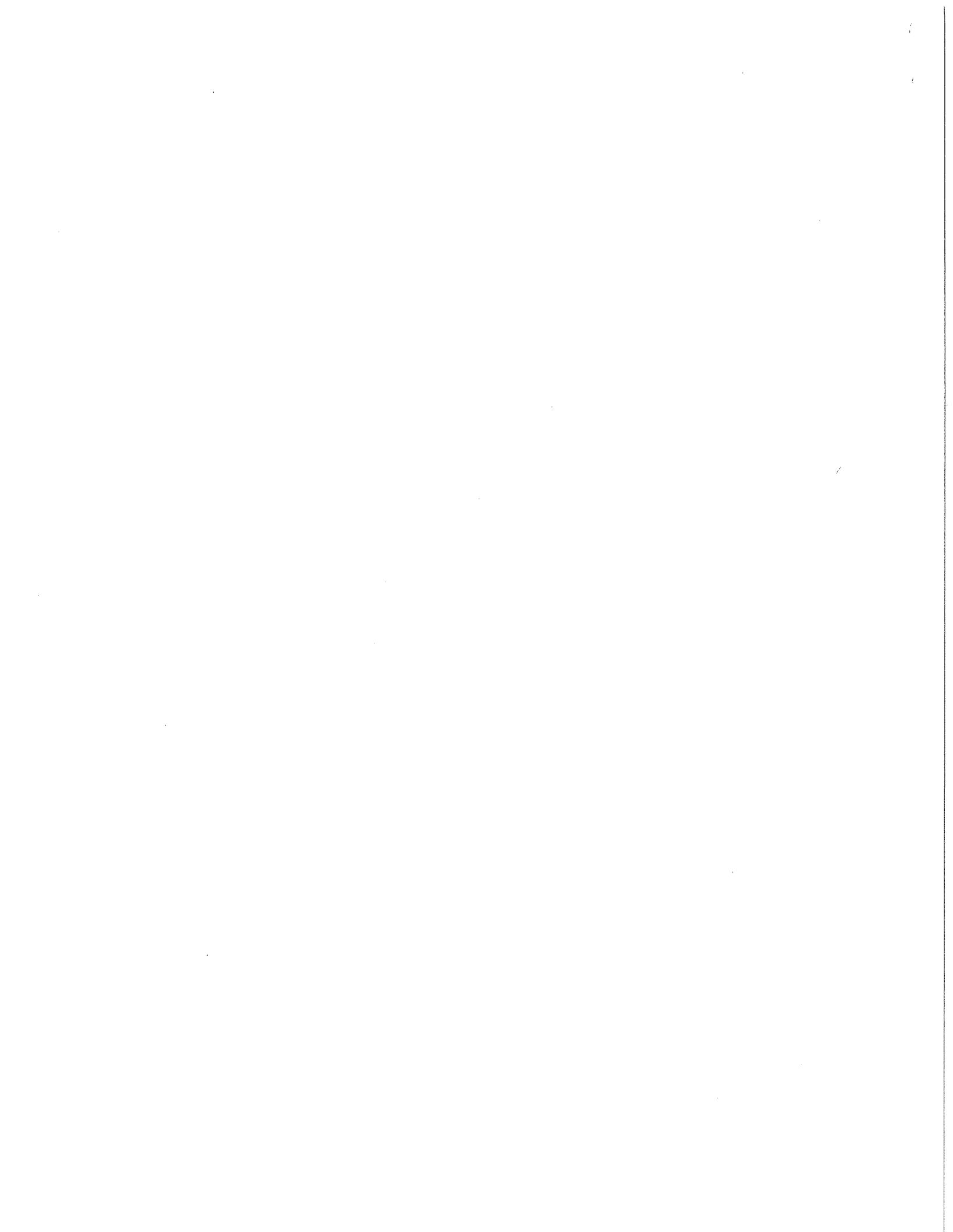
2. What is Sustainable Development?

According to the report of the United Nation's World Commission on Environment and Development, Our Common Future (the Brundtland Report), sustainable development is:

"development that meets the needs of the present without compromising the ability of future generations to meet their own needs."²

Unfortunately the world's present patterns of production and consumption are compromising the ability of future generations to meet their needs. For instead of consuming only the income of the earth's environmental capital, today's generation is consuming the capital as well. The Brundtland Report states that the cost of our spendthrift ways will be paid by future generations in terms of acid rain, global warming, ozone depletion and species loss:

"Many present efforts to guard and maintain human progress, to meet human needs, and to realize human ambitions are simply unsustainable—in both the rich and poor nations. They draw too heavily, too quickly, on already overdrawn environmental resource accounts to be affordable far into the future without bankrupting those accounts. They may show profits on the balance sheets of our generation, but our children will inherit the losses. We borrow environmental capital from future generations with no intention or prospect of repaying. They may damn us for our spendthrift ways, but they can never collect on our debt to them. We act as we do because we can get away with it: future generations do not vote; they have no political or financial power; they cannot challenge our decisions.



But the results of the present profligacy are rapidly closing the options for future generations. Most of today's decision makers will be dead before the planet feels the heavier effects of acid precipitation, global warming, ozone depletion, or widespread desertification and species loss.¹³

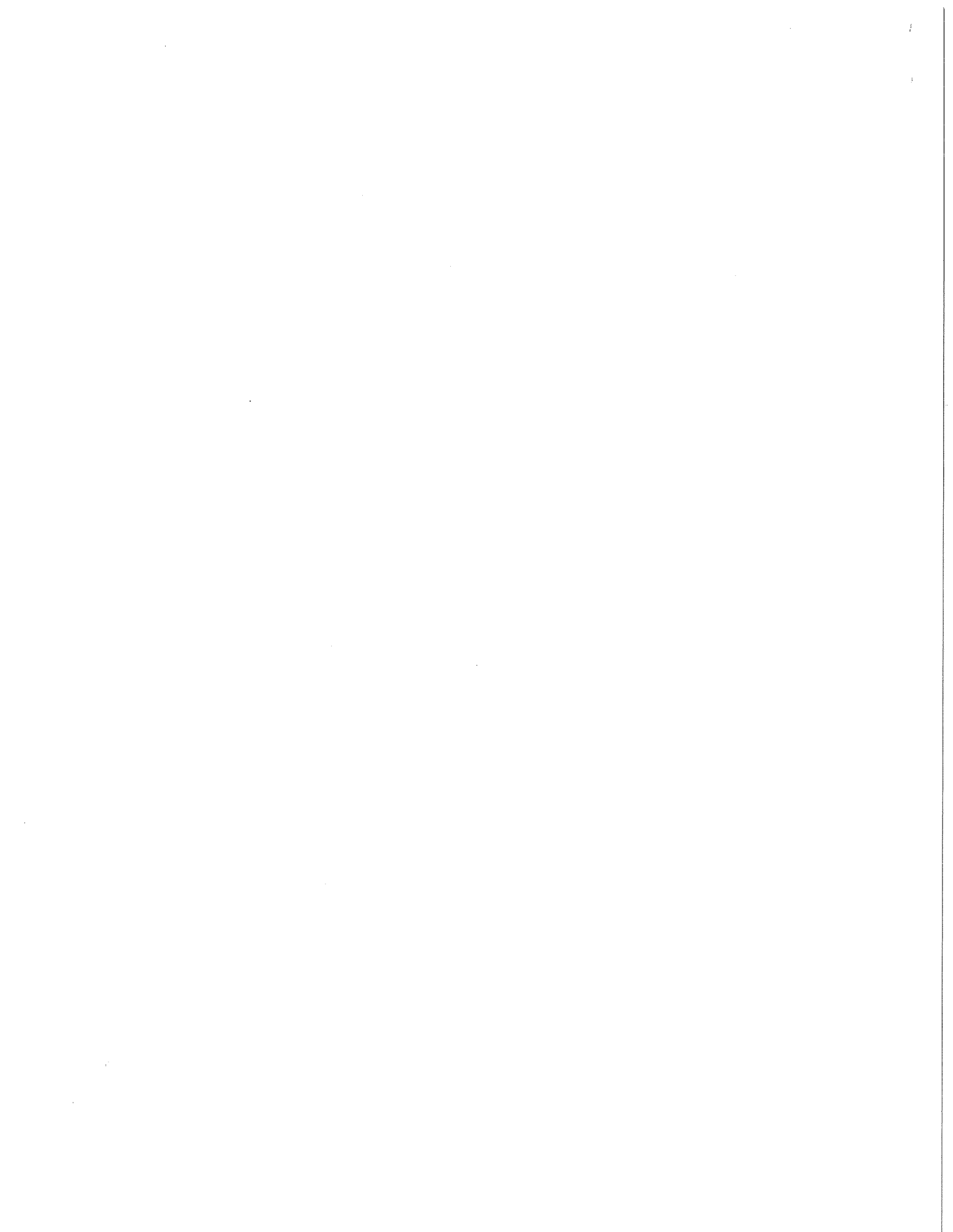
2.1 What are its Energy Policy Implications?

With respect to the energy sector, the Brundtland Report has noted two fundamental implications of sustainable development. First, the generation of nuclear power is only justifiable if "there are solid solutions to the unsolved problems to which it gives rise."¹⁴ Second, the world's industrialized nations must substantially reduce their consumption of fossil energy.⁵ A substantial reduction in fossil fuel consumption is necessary because it is the prime cause of global warming.*

The Toronto conference on "The Changing Atmosphere: Implications for Global Security" eloquently articulated the significance of global warming:

"Humanity is conducting an unintended, uncontrolled, globally pervasive

* The anthropogenic greenhouse gases and their approximate percentage contribution to global warming from the beginning of the industrial revolution to the present are: carbon dioxide (59%), methane (23%), chlorofluorocarbons (8%), ground-level ozone (6%), and nitrous oxide (4%). See L.D.D. Harvey, "Managing Atmospheric CO₂", Climatic Change, (in press). The consumption of fossil fuel contributes to the emission of all of the above greenhouse gases with the exception of chlorofluorocarbons.

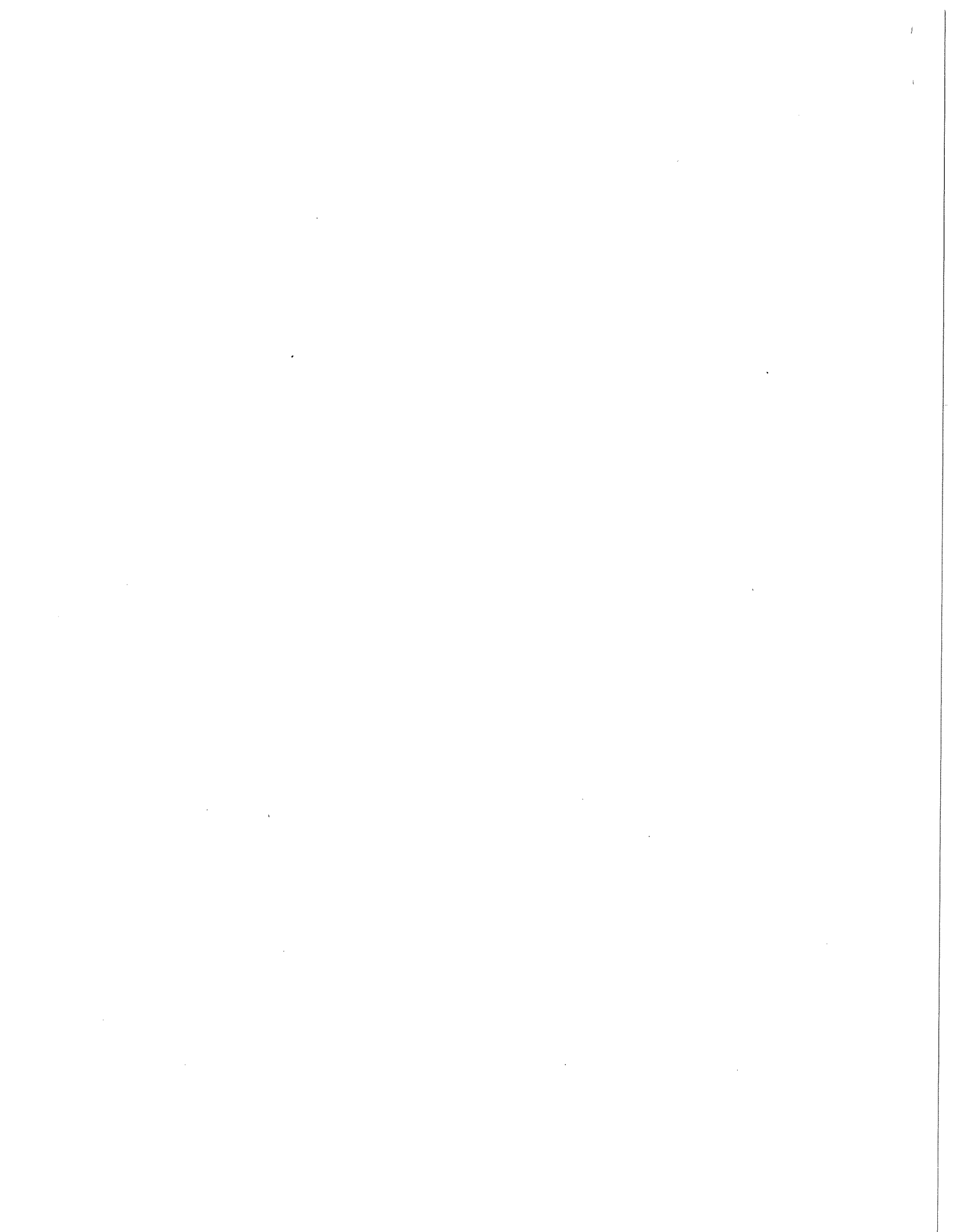


experiment whose ultimate consequences could be second only to a global nuclear war."⁶

According to the Toronto conference, the rising concentrations of greenhouse gases in the atmosphere may cause the earth's average temperature to rise by 2.7 to 8.1 degrees Fahrenheit before the middle of the twenty-first century. If this occurs the climatic change over the next 60 years will substantially exceed that experienced over the last 5000 years. Greenhouse warming will diminish global food security, raise sea-levels, alter precipitation patterns, accelerate the extinction of animal and plant species, and change the productivity and diversity of our forests.⁷

The Toronto conference on "The Changing Atmosphere" stated that a halt to global warming will require a global reduction of carbon dioxide emissions by 50% or more. As a first step in this direction the conference called for a 20% reduction in carbon dioxide emissions by the year 2005.⁸

On August 28, 1989 the Honourable Lyn McLeod, Ontario's Minister of Energy, co-chaired the Federal-Provincial-Territorial Conference of Ministers of Energy. The Conference urged everyone to work towards a 20 per cent reduction in carbon dioxide



emissions by the year 2005:"

"The Task Force report found that the recommendation of the Toronto Conference on the Changing Atmosphere of a reduction of CO₂ emissions to 20 per cent below 1988 levels is clearly ambitious. However, Ministers agreed that the consequences of inaction are unacceptable. Ministers encouraged everyone to work towards a reduction of 20 per cent¹⁰ (emphasis added)

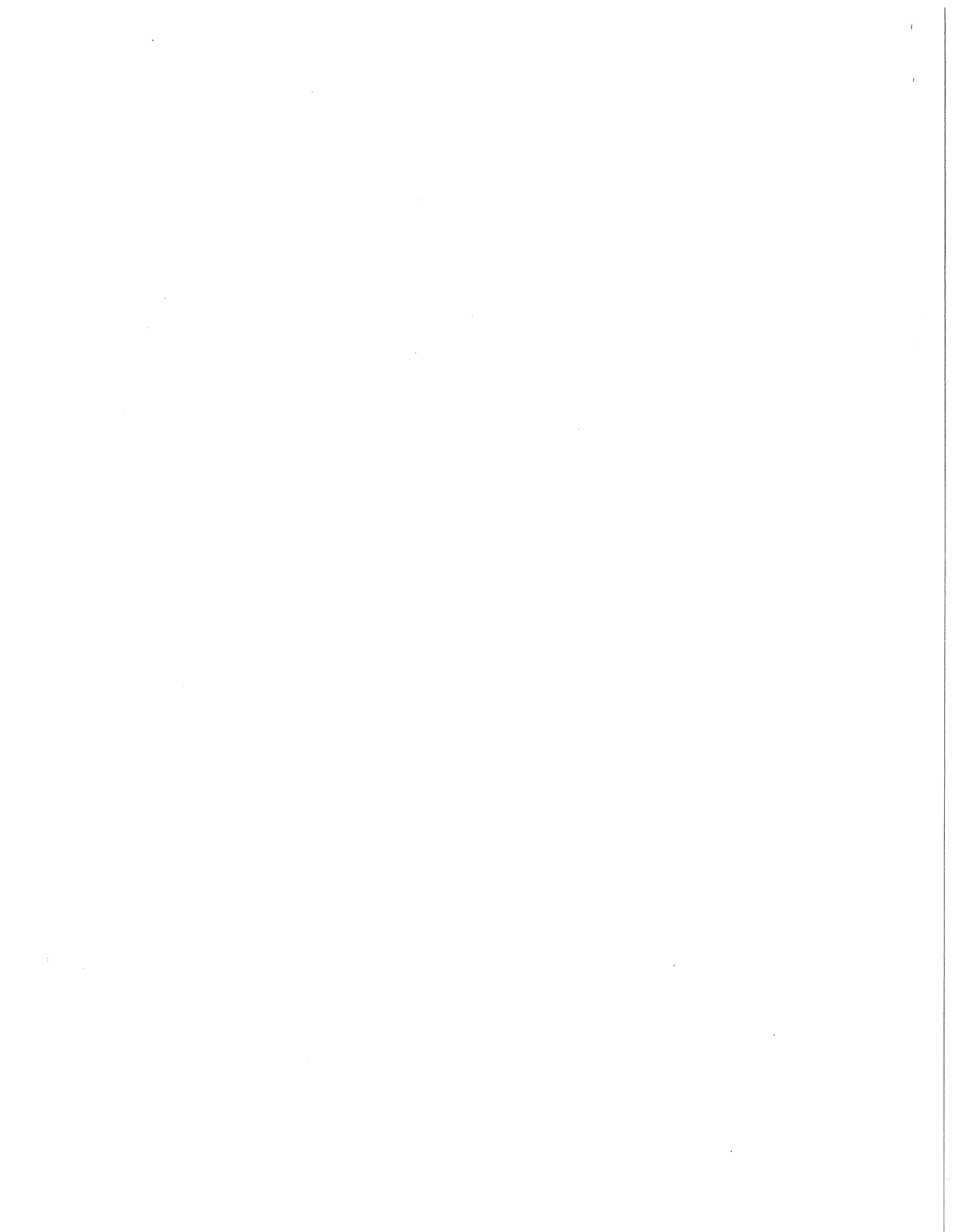
In addition, the Conference urged natural gas utilities to aggressively promote energy conservation:

"Ministers underlined the key role of electric and natural gas utilities in encouraging energy efficiency. In particular, they noted that there exists scope for significant action by utilities to develop demand management programs and welcomed the first steps of some utilities in this area. They strongly encouraged all utilities to develop aggressive programs in this area."¹⁰ (emphasis added)

2.2 What are its Implications for Union Gas?

Union can promote the achievement of sustainable development by funding programmes which will reduce Canada's contribution to global warming. In particular it can:

** Reducing Canada's carbon dioxide emissions by 20% with respect to the 1988 level would require reducing Canada's projected carbon dioxide emissions in 2005 by 46%. See Federal/Provincial/Territorial Task Force on Energy and the Environment, Report on Reducing Greenhouse Gas Emissions, (August, 1989), p. 39.



1. promote the substitution of natural gas for coal, oil and coal-fired electricity;***
2. promote energy conservation and the efficient use of natural gas; and
3. reduce natural gas consumers' net contribution to global warming by implementing measures: a) to reduce greenhouse gas emissions from other sources (e.g., purchase methane from landfills); and/or b) to mitigate the impact of greenhouse gas emissions (e.g., reforestation projects).

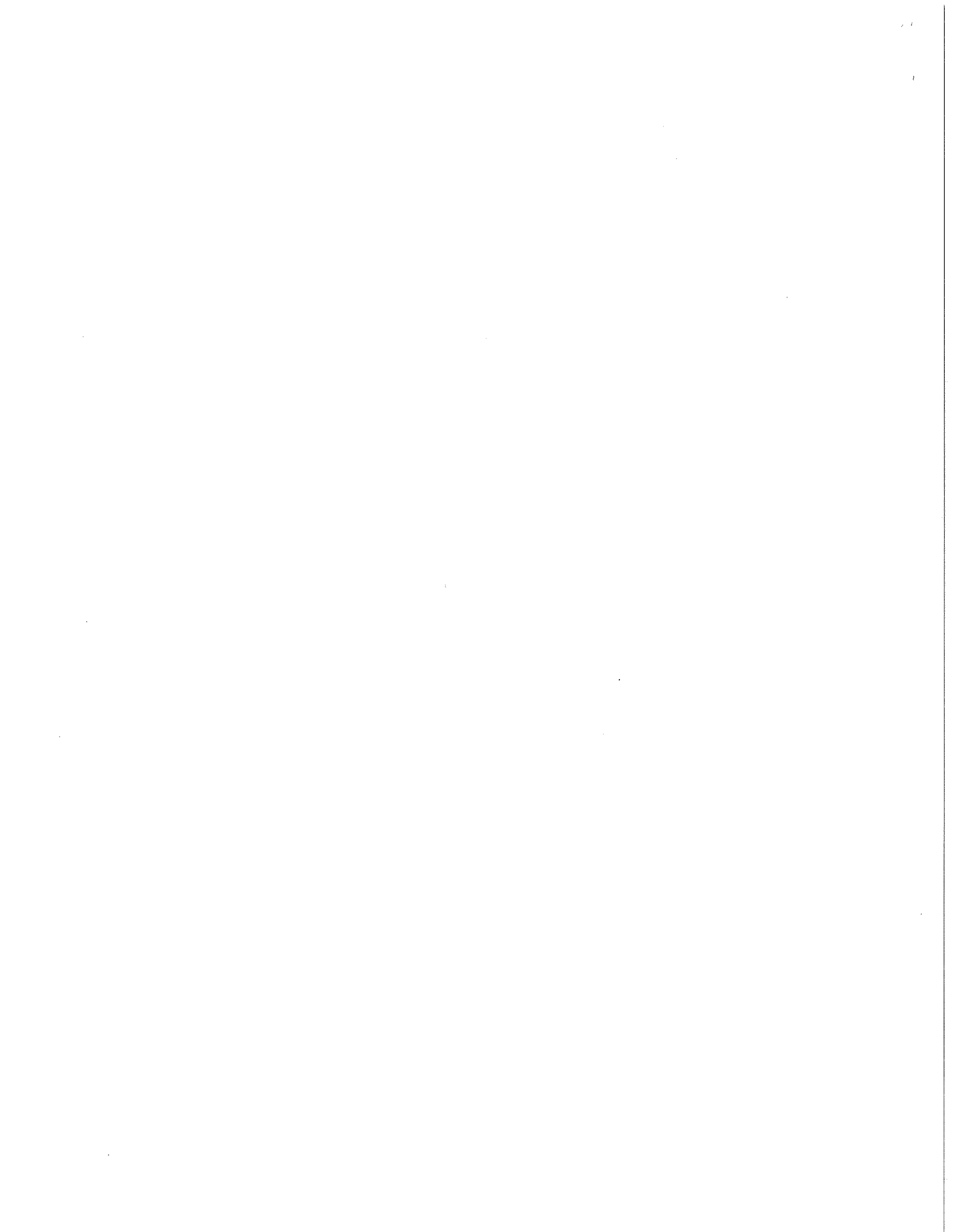
Clearly the implementation of the above measures by Union would be compatible with government policy; but does the O.E.B. have the authority to include their costs in Union's utility revenue requirement?

3. Can the O.E.B. Include the Cost of Programmes to Promote Sustainable Development in Union's 1991 Revenue Requirement?

Mr. Justice Keith in Union Gas Limited v. Township of Dawn [(1977), 76 D.L.R. (3d) 613 (Ont. Div. Ct.)] found that the O.E.B. has very broad powers to protect the public interest in all matters relating to or incidental to the distribution of natural gas:

"In my view this statute makes it crystal clear that all matters relating to or

*** Natural gas' carbon dioxide emissions per unit of energy are approximately 30% less than those of oil and approximately 50% less than those of coal. See Irving Mintzer, A Matter of Degrees: The Potential For Controlling The Greenhouse Effect, (Washington, D.C.: World Resources Institute; 1987), p. 48.



incidental to the production, distribution, transmission or storage of natural gas, including the setting of rates, location of lines and appurtenances, expropriation of necessary lands and easements, are under the exclusive jurisdiction of the Ontario Energy Board...

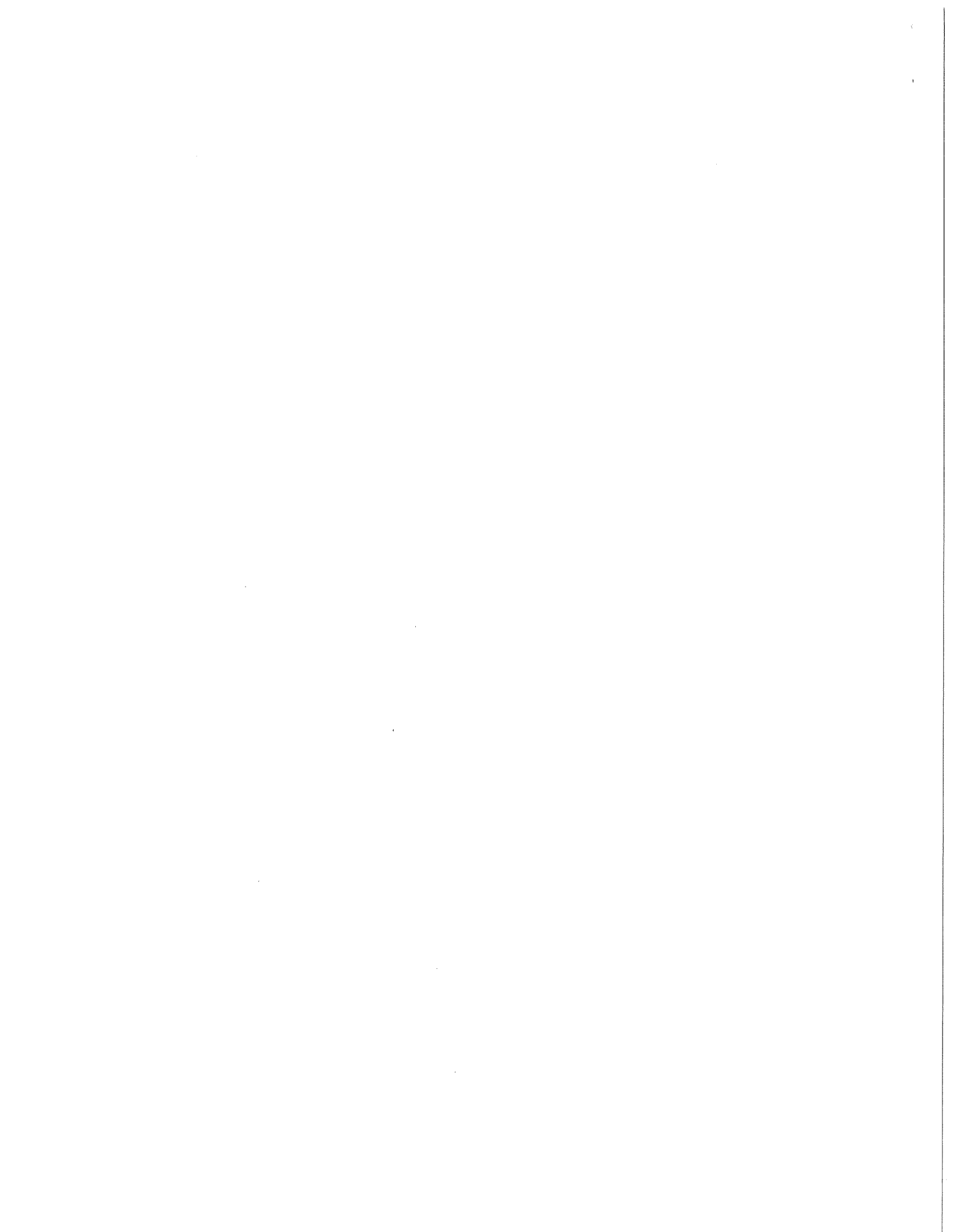
These are all matters that are to be considered in the light of the general public interest and not local or parochial interests." (at 622)

Furthermore, the Board has found that it has jurisdiction "to review all matters relating to the production, distribution, transmission and storage of natural gas."¹¹

In its E.B.R.L.G. 28 Report the Board ruled that the public interest will be served by undertakings that will enhance the general welfare of the public:

"In broad terms, the public interest will be satisfied by an undertaking or action that will result over time in an enhancement of the economic or general welfare of the public. The public interest can be satisfied without improving the economic or general welfare of every member of society; indeed, it is possible that the public interest in general can be satisfied even if some members of society are economically damaged. Essentially, one might interpret the public interest as the best possible accommodation of conflicting interests.

In the regulatory context, the OEB follows a judgemental path in resolving conflicts of particular interests so as to arrive at a decision which the Board feels to be the best possible, in the public interest. There are no firm criteria for determining the public interest that will hold good in every situation and, generally speaking, it is probably preferable not to attempt to define these criteria too closely. The public interest is dynamic, varying from one situation to another and the criteria by which the public interest is judged may also change according to the circumstances. In considering the criteria, the Board must exercise judgement as to the specific values of conflicting interests. It must decide whether the public interest would be done any disservice in the event that the particular proposal was not approved."¹²



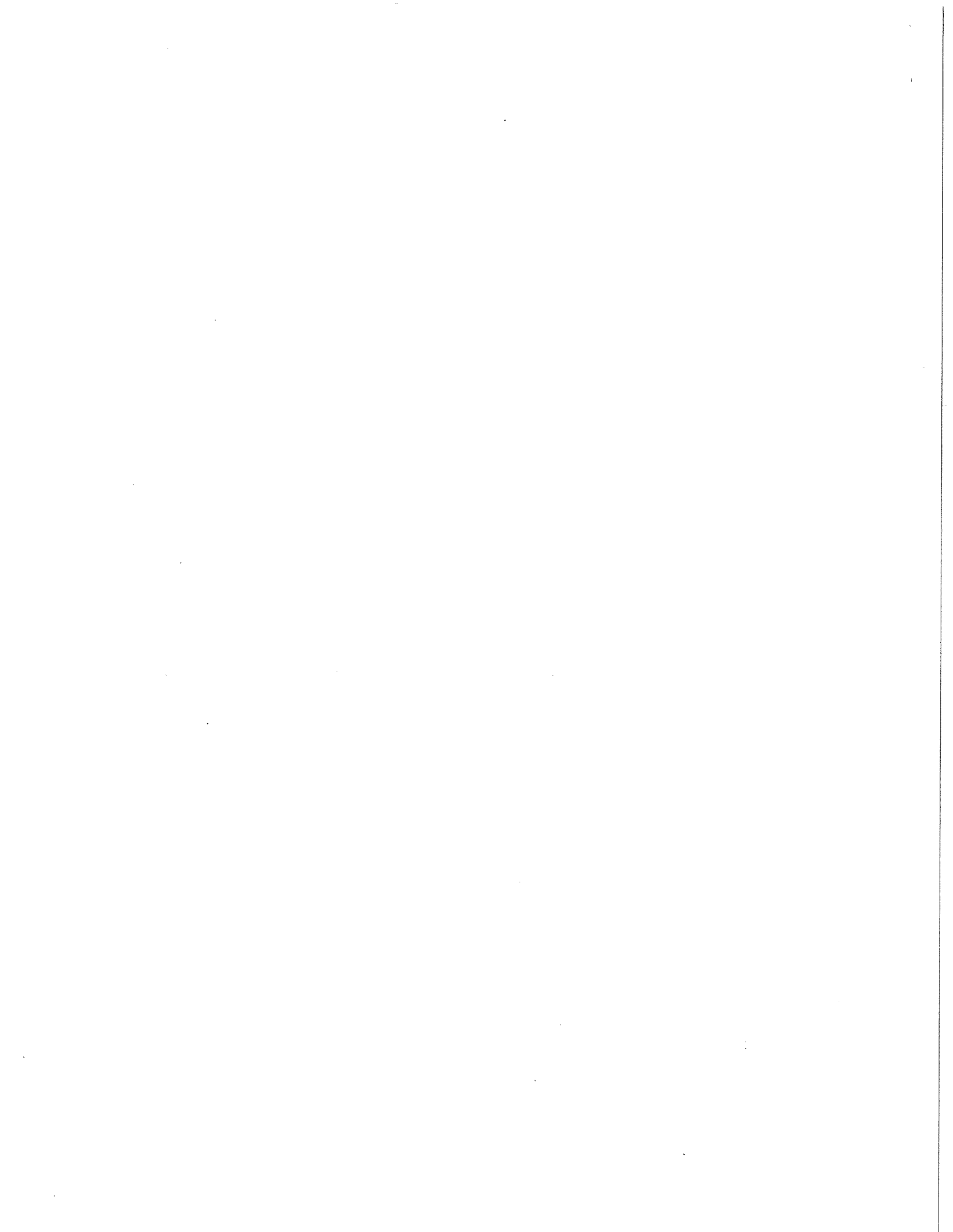
The above decisions indicate that the cost of programmes to reduce global warming can be included in Union's revenue requirement if they are in the public interest. Thus the question becomes is it in the public interest for Union to reduce global warming by any or all of the three strategies I have outlined above?

3.1 Substituting Natural Gas for Coal and Oil

The substitution of natural gas for coal, coal-fired electricity****, and oil is in the public interest when natural gas can meet our energy needs at a lower societal cost than these alternatives.¹³

In the perfect world of economic theory, where the prices of all energy sources equal their marginal costs, capital markets are perfect and all end-users have perfect information, there would be no need for Union to fund programmes to promote the substitution of natural gas for other fuels. However, in the Ontario marketplace the above conditions do not hold. Electricity is not priced at its economic, let alone economic and environmental, marginal cost. The prices of oil and coal do not include

**** Coal is Ontario Hydro's marginal source of electricity. In 1989 Ontario Hydro will generate approximately 25% of its electricity from coal. See O.E.B. Docket H.R. 17, Ex. 8.1.8, p. 4; and Ontario Hydro, Consistent Energy Set 89-1, (January, 1989), Table S2.

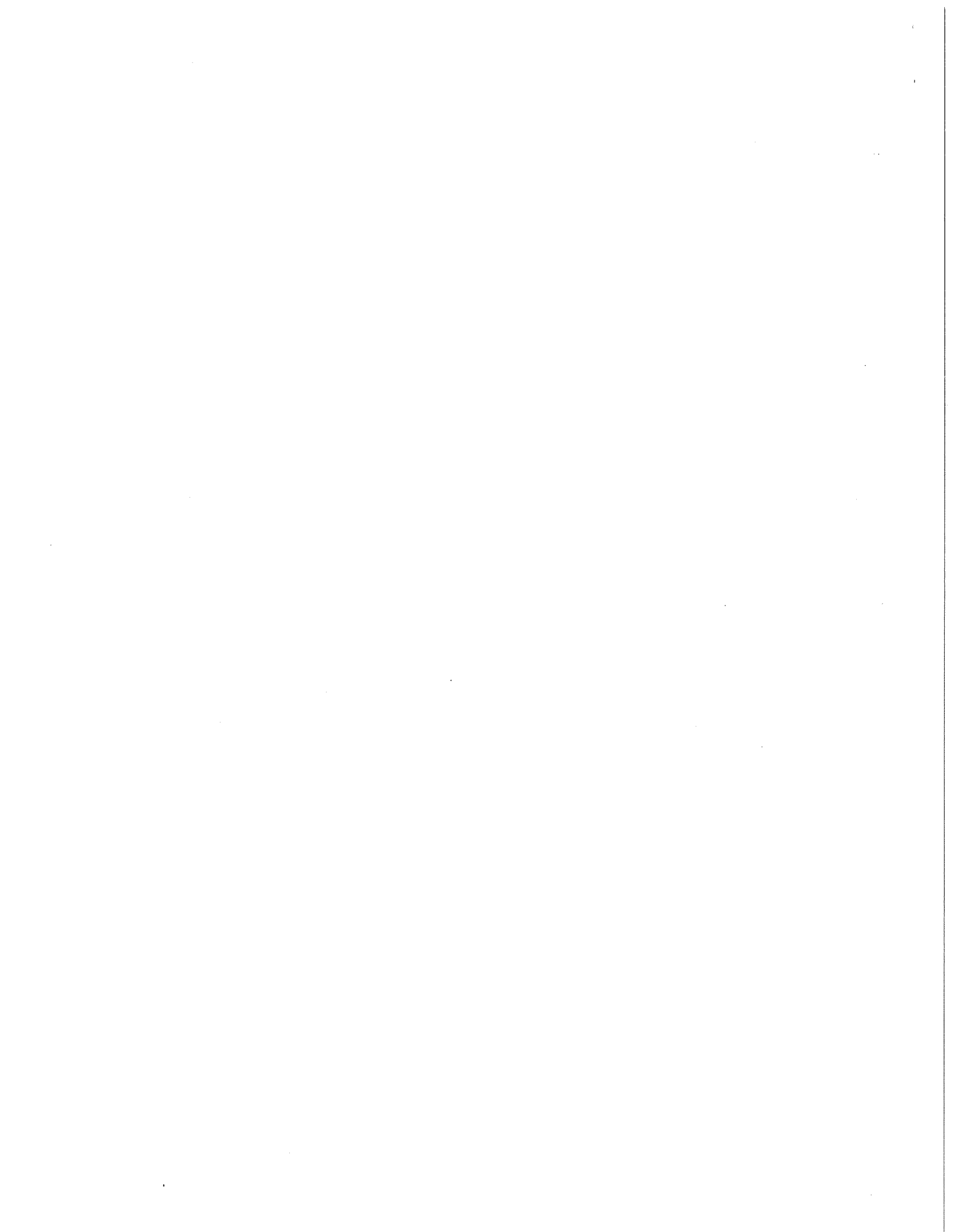


their environmental costs. End-users are not fully aware of the potential for natural gas substitution to reduce society's total energy costs. Furthermore, end-users are not willing to invest in all their cost-effective fuel substitution options.

I recommend that cost-effective programmes to encourage the socially appropriate substitution of natural gas for other energy sources be included in Union's revenue requirement.

3.2 Promotion of Energy Conservation

Union's customers' expenditures with respect to energy conservation and gas efficient equipment are below the socially optimal level for at least two reasons. First, the price of natural gas to the end-user does not equal its total cost to society (e.g., it does not include its cost in terms of global warming). Assuming perfect capital markets and perfect information, it will be in the end-user's financial self-interest to invest in energy conservation until the cost of his incremental investment equals his resulting incremental discounted life-cycle energy cost savings. If the price of natural gas to the end-user equals its total cost to society then the end-user's optimal level of expenditures on energy conservation will equal the socially optimal level. That is, there will be a harmony of interest between the individual and society (Adam Smith's invisible hand). However, since the price of natural gas to the individual is less than its total cost to society, the end-user's optimal level of energy conservation is less than the social



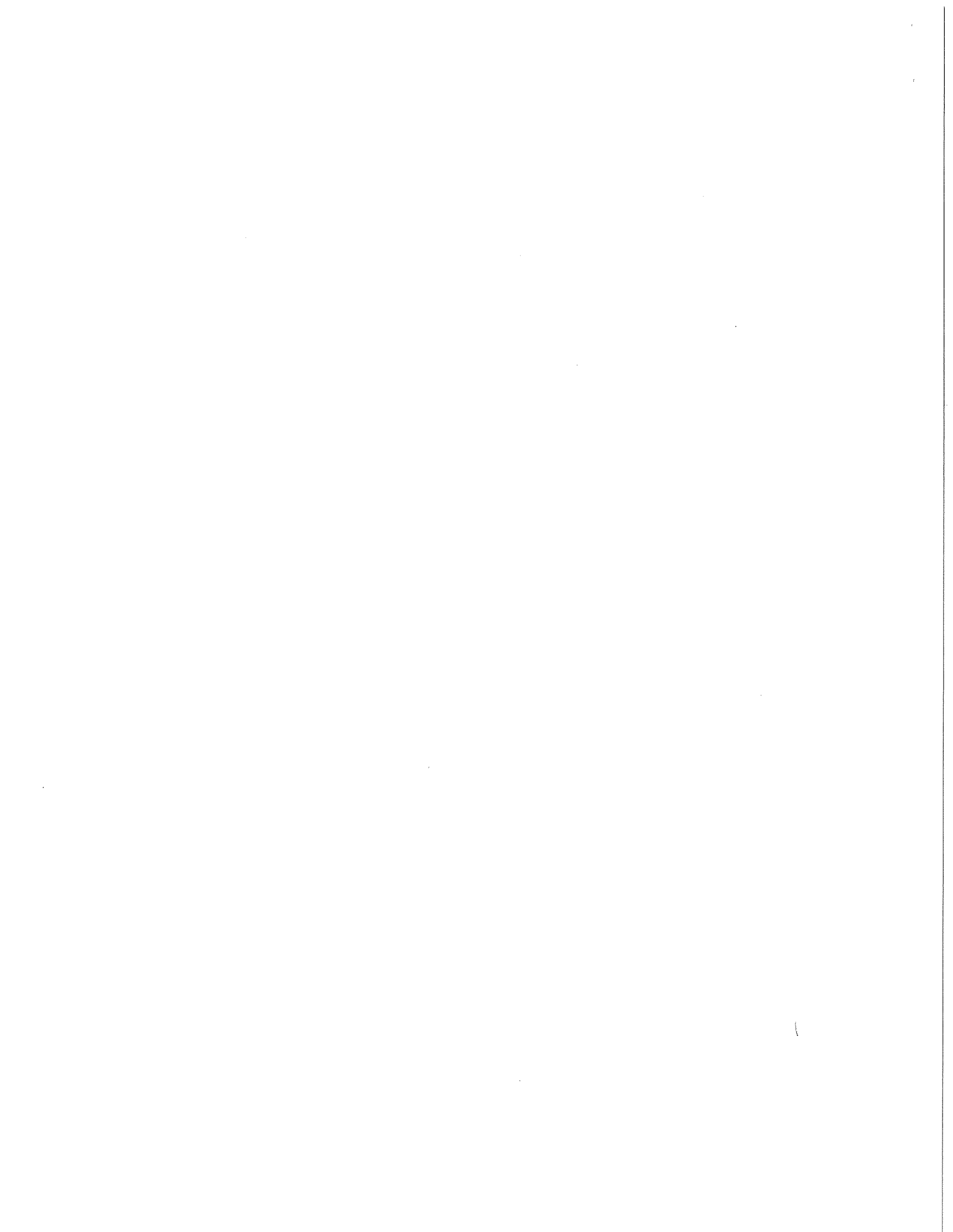
optimum.

Second, even if the price of natural gas did equal its total cost to society the end-users' energy conservation expenditures would still be sub-optimal since their required pay-back period is much shorter than the investment's expected life-cycle. For example, the end-users' required pay-back period for energy efficient investment's is typically one month to three years,¹⁴ whereas the expected life of gas equipment is 10 to 17 years¹⁵ and the expected life of a home or a building is much longer.

In contrast, Union is prepared to accept pay-back periods commensurate with its assets' expected lives, namely, 8 to 55 years.¹⁶ The difference between Union's and its customers' pay-back periods for the same investment, "the pay-back gap", is due to a number of factors including:

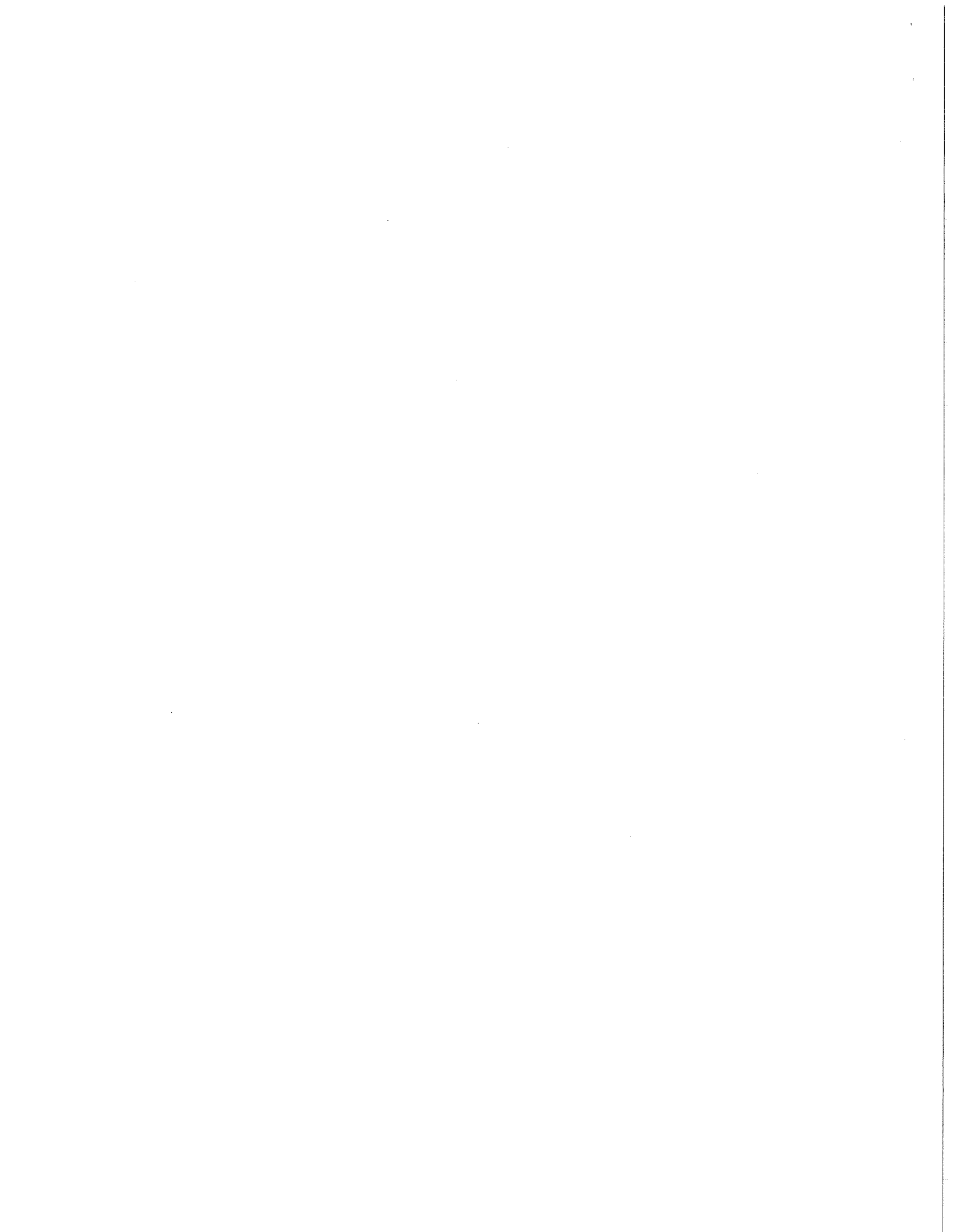
- Union has access to capital on more favourable terms than many of its end-users;
- Union can acquire and evaluate technical information at a much lower unit cost than the typical end-user; and
- Union's probability of recovering its costs is much greater than that of many end-users (e.g., if an end-user buys a super-efficient furnace or super-efficient windows he is not likely to recover his costs if he sells his house in the next year).

Cost-effective programmes to reduce the gap between the gas users' actual level of expenditures on energy conservation and the socially optimal level (e.g., by installing,



financing and/or renting energy conserving equipment and technologies) are in the public interest since they will reduce society's total cost of obtaining energy services. Furthermore there are a number of reasons why it is in the public interest for Union to fund such programmes. First, because Union is willing to recover investment expenditures over a relatively long time period, it is probable that some energy conservation investments that Union's customers do not wish to finance will be financially attractive investments for Union. Second, since the consumption of natural gas is imposing external environmental costs on society, it is fair to recover the cost of reducing these externalities from Union's customers. This can be achieved by imposing a surcharge on Union's distribution rates to subsidize financially non-sustaining (to Union), but socially worthwhile, energy conservation investments. Third, such a surcharge would make Union's rates more "cost-based". That is, Union's natural gas rates would more accurately reflect the full economic and environmental cost of natural gas consumption. This would give consumers an additional incentive to conserve natural gas.

It is my recommendation that socially cost-effective programmes to promote energy conservation and efficiency be included in Union's revenue requirement.



3.3 Mitigating the Net Environmental Impact of Natural Gas Consumption

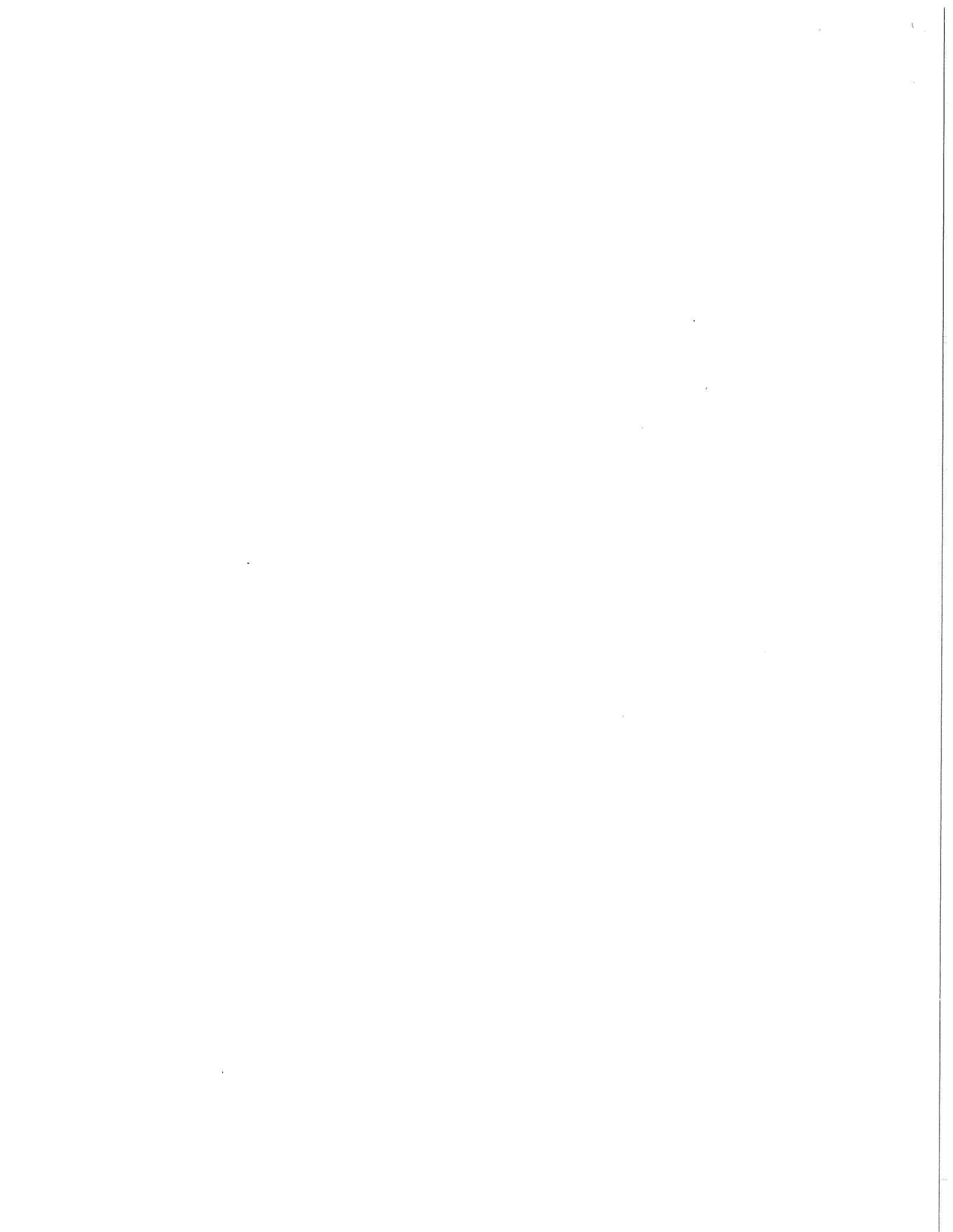
In the previous section we discussed some of the reasons why the natural gas related level of greenhouse gas emissions is above the socially optimal level. As noted above, one way to correct this problem is to promote energy conservation. An alternative and complementary approach is to implement programmes to minimize the global warming consequences of a unit of natural gas consumption.

For example, a reforestation programme could mitigate the greenhouse warming impact of natural gas consumption by capturing in woody matter enough carbon to offset all or part of the carbon-dioxide emissions that result from the combustion of natural gas. According to Gregg Marland of the Oak Ridge National Laboratory a reforestation programme could play a significant role in mitigating global warming:

"It is clear that although it is impractical to think in terms of solving the CO₂ problem through forestry alone, forestry could play a significant role."¹⁷

It is worth noting that the City of Toronto's Special Advisory Committee on the Environment has recommended that the City of Toronto finance "reforestation projects in Central America and/or southern Ontario to offset 20 percent of the city's carbon emissions".¹⁸

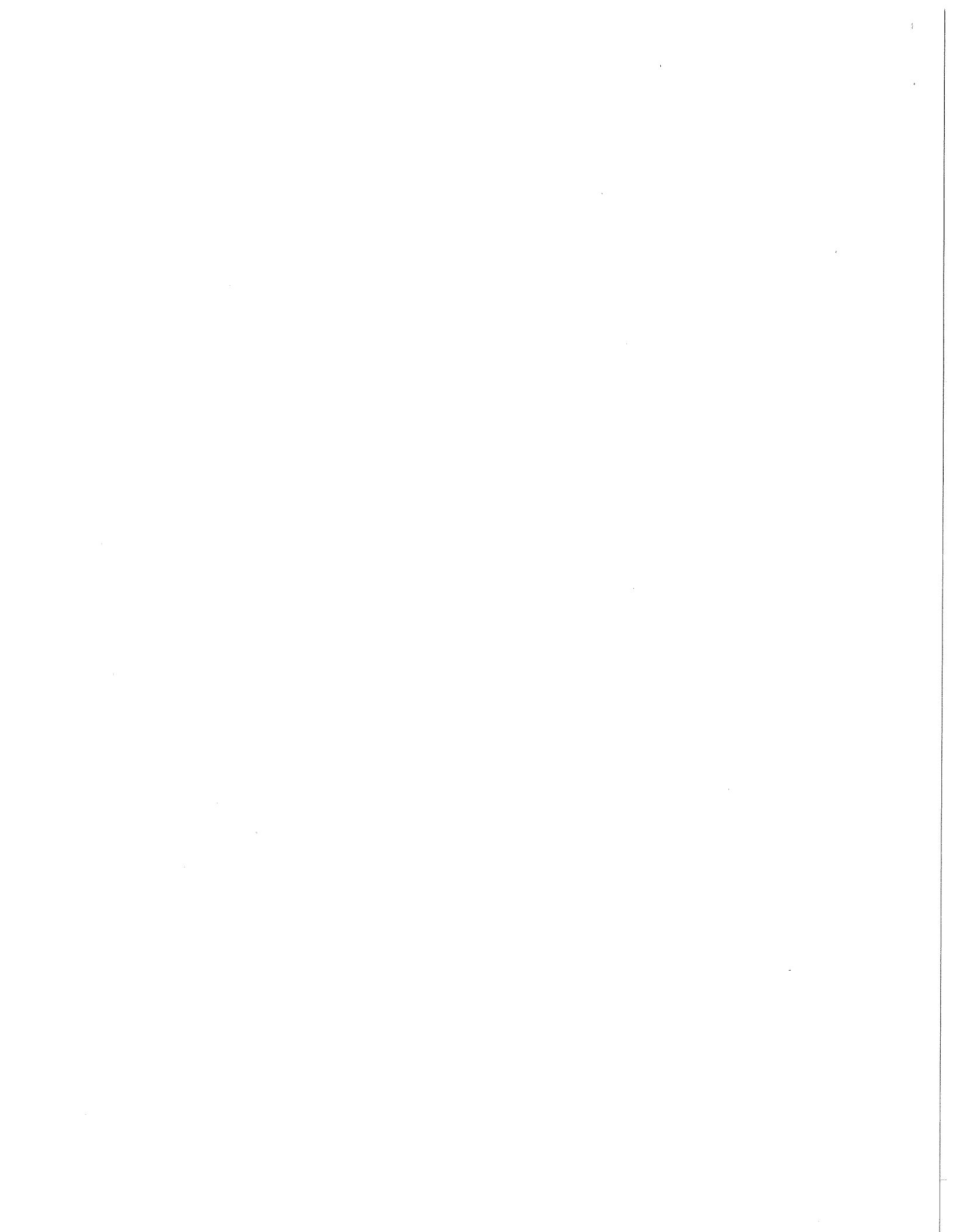
The carbon dioxide emissions from natural gas consumption could also be partially offset by purchasing methane from sanitary landfills (natural gas is approximately 98 per



cent methane). At the present, the methane emissions from landfills escape into the atmosphere. This is undesirable since the direct global warming impact of a molecule of methane when it is vented into the atmosphere is 20 to 40 times greater than when it is burned as a fossil fuel and converted into carbon dioxide.¹⁹ Thus if Union were to purchase methane from landfills the net contribution of natural gas consumption to global warming would fall by 20 to 40 units per molecule of methane purchased.

Programmes to reduce the global warming implications of the consumption of a unit of natural gas are clearly in the public interest. There are also a number of reasons why it would be appropriate for Union to finance such programmes. First, as a natural gas utility, Union is uniquely capable of undertaking certain types of measures to mitigate global warming (e.g., purchase methane from landfills). Second, it is fair to recover the cost of reducing the external costs of natural gas consumption from natural gas consumers (the polluter pay principle). Third, an environmental surcharge on Union's distribution rates would make the rates for natural gas consumption more "cost-based". In this context it is worth recalling that the Board has recently stated that "an environmental surcharge on [Ontario Hydro's] rates might be called for."²⁰ Fourth, an environmental surcharge would provide natural gas consumers with an additional incentive to use gas efficiently and hence reduce their greenhouse gas emissions.

It is my recommendation that socially cost-effective programmes to offset the global



warming consequences of natural gas consumption be included in Union's revenue requirement.

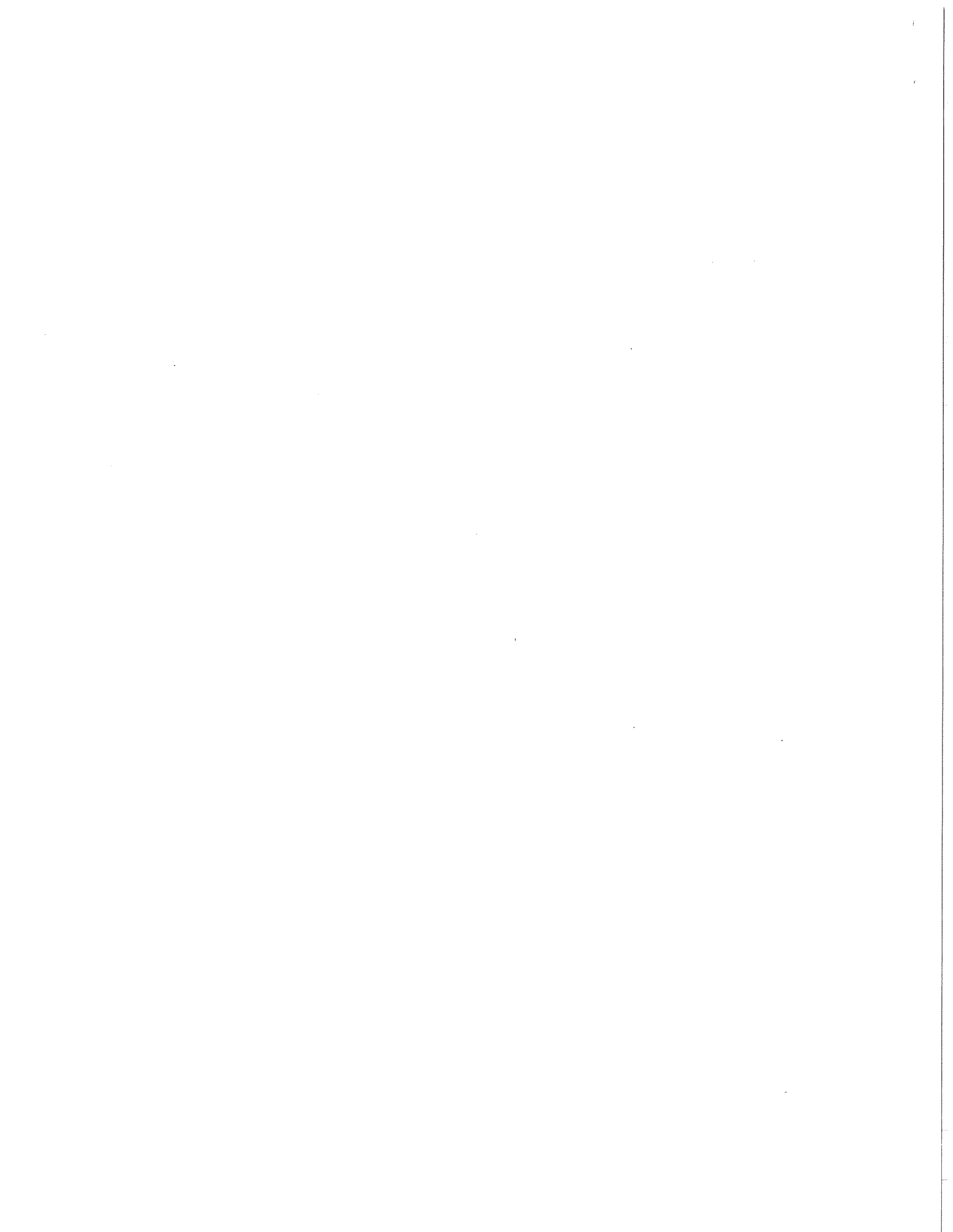
Possible Objections

I have submitted that it can be in the public interest for Union to encourage the substitution of natural gas for coal, oil and coal-fired electricity; promote the conservation and efficient use of gas; and mitigate the environmental impact of natural gas consumption. I will now address two anticipated questions concerning my recommendations:

1. is it proper to include the costs of energy conservation or mitigation expenditures in Union's revenue requirement if they will raise rates; and
2. is it proper to include the costs of mitigating (obtaining) external costs (benefits) in Union's revenue requirement?

3.4 Can Rates be Raised to Finance Energy Conservation or Greenhouse Gas Emission Reduction Programmes?

In its E.B.O. 134 Report the Board explicitly rejected the claim that system expansion projects are not in the public interest if they will lead to a rise in rates. The Board stated that subsidizing financially non-sustaining projects is legitimate if they are in the overall public interest and do not cause an undue burden on any individual,



group or class:

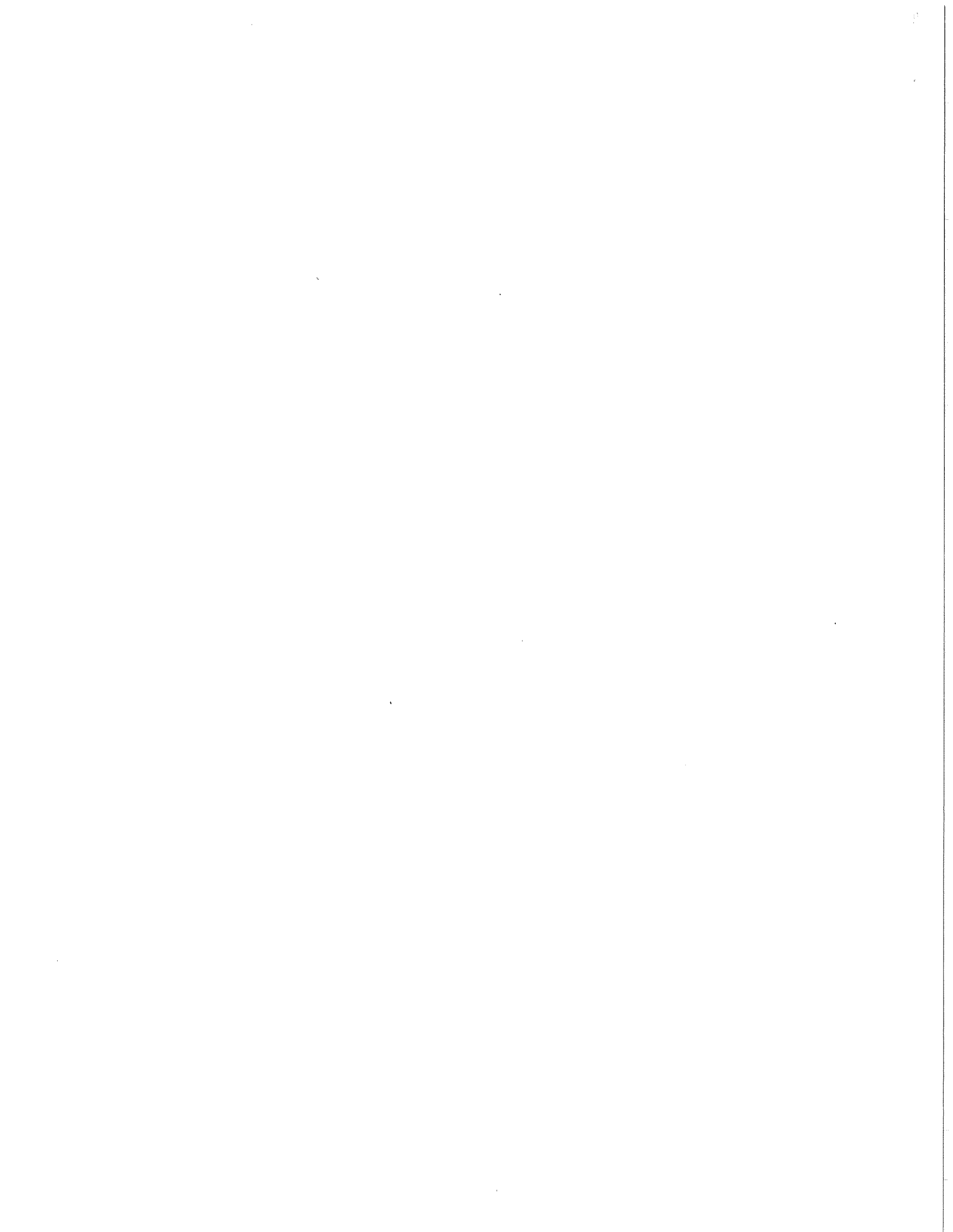
"The Board continues to hold the opinion that it is appropriate for existing customers to subsidize, through higher rates, financially non-sustaining extensions that are in the overall public interest if the subsidy does not cause an undue burden on any individual, group or class."²¹

By parity of reasoning, it is legitimate to subsidize energy conservation and environmental mitigation measures that are in the overall public interest.

Moreover, it is important to remember that many potential energy conservation expenditures are in the customers' long run financial self-interest (the discounted life-cycle energy cost savings exceed the investment expenditure) and hence will not necessarily require a subsidy from other customers.

Furthermore, it is important to distinguish between a rise in rates and a rise in the customers' energy bills. (It is bills not rates that customers really care about.) If the drop in natural gas consumption, due to the energy conservation measure, exceeds the percentage rise in rates then the customers' energy bills will fall.

Finally, it is worth noting that Union has received or is seeking Board approval for financially non-sustaining system expansion projects for fiscal 1989, 1990 and 1991 whose negative net present value is \$46.7 million.²²



3.5 Can the Cost of Mitigating (Obtaining) External Costs (Benefits) Be Included in Union's Revenue Requirement?

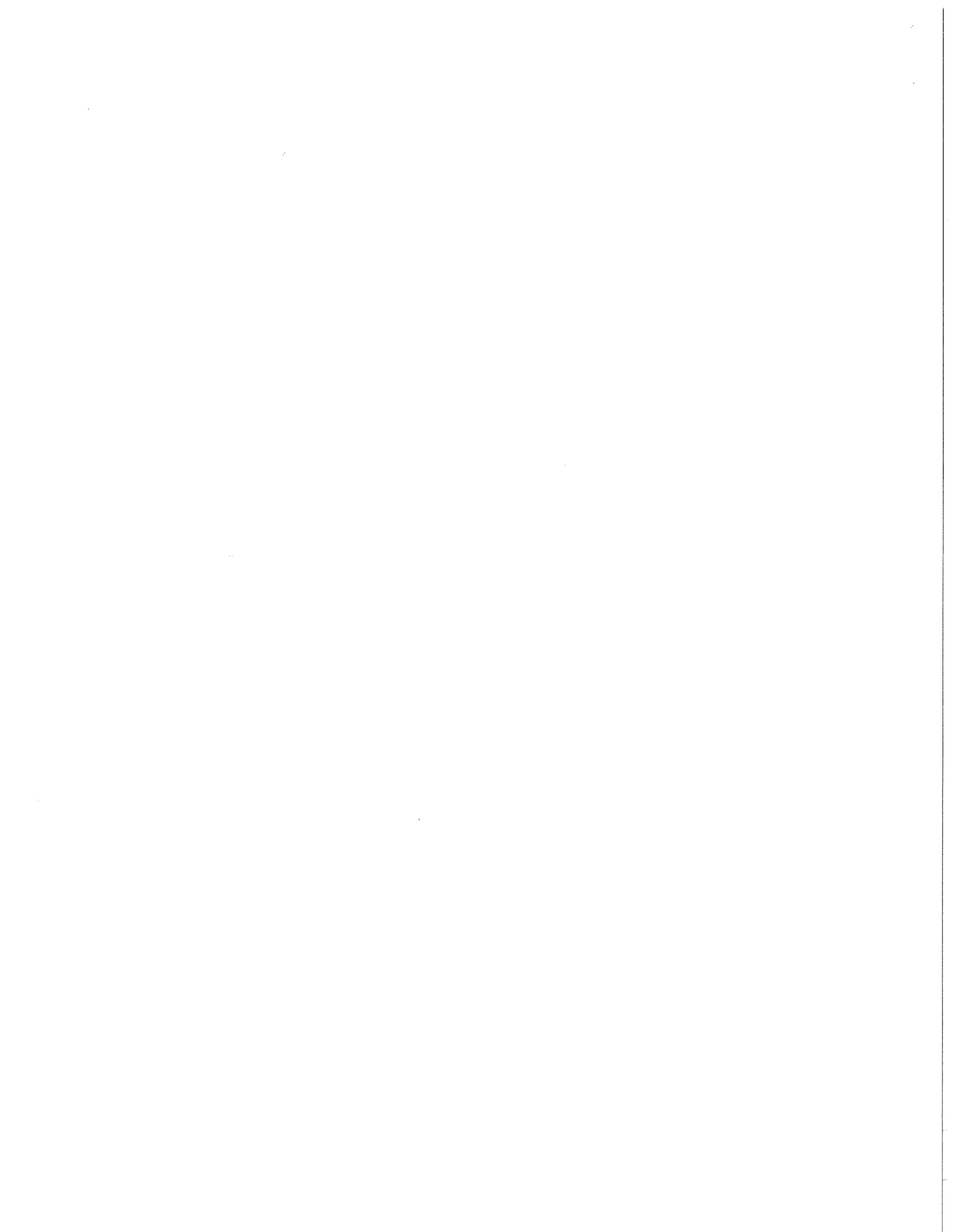
From the perspective of Union, the external costs or benefits of its activities are those costs or benefits for which it is neither legally responsible for (e.g., greenhouse gas emissions) nor legally entitled to (e.g., customers' energy cost savings when they switch from oil to gas).

In its E.B.O. 134 Report the Board explicitly rejected the notion that it should only consider Union's internal costs and benefits to evaluate a project:

"The Board considers that regardless of the "economic feasibility" test used to evaluate a project, it has not been, nor will it be, the sole criterion examined."²³

The Board listed some of the external costs and benefits that could be relevant for the determination of whether or not a project is in the public interest:

- "2. Community benefits
 - Industrial development
 - Alternative fuel considerations
 - Increased revenues to government (e.g., taxes)
 - Local employment
 - Regional development;
3. Utility benefits;
4. Security of supply and safety;
5. System flexibility;
6. Route/site selection and landowners' concerns;
7. Environmental impact;



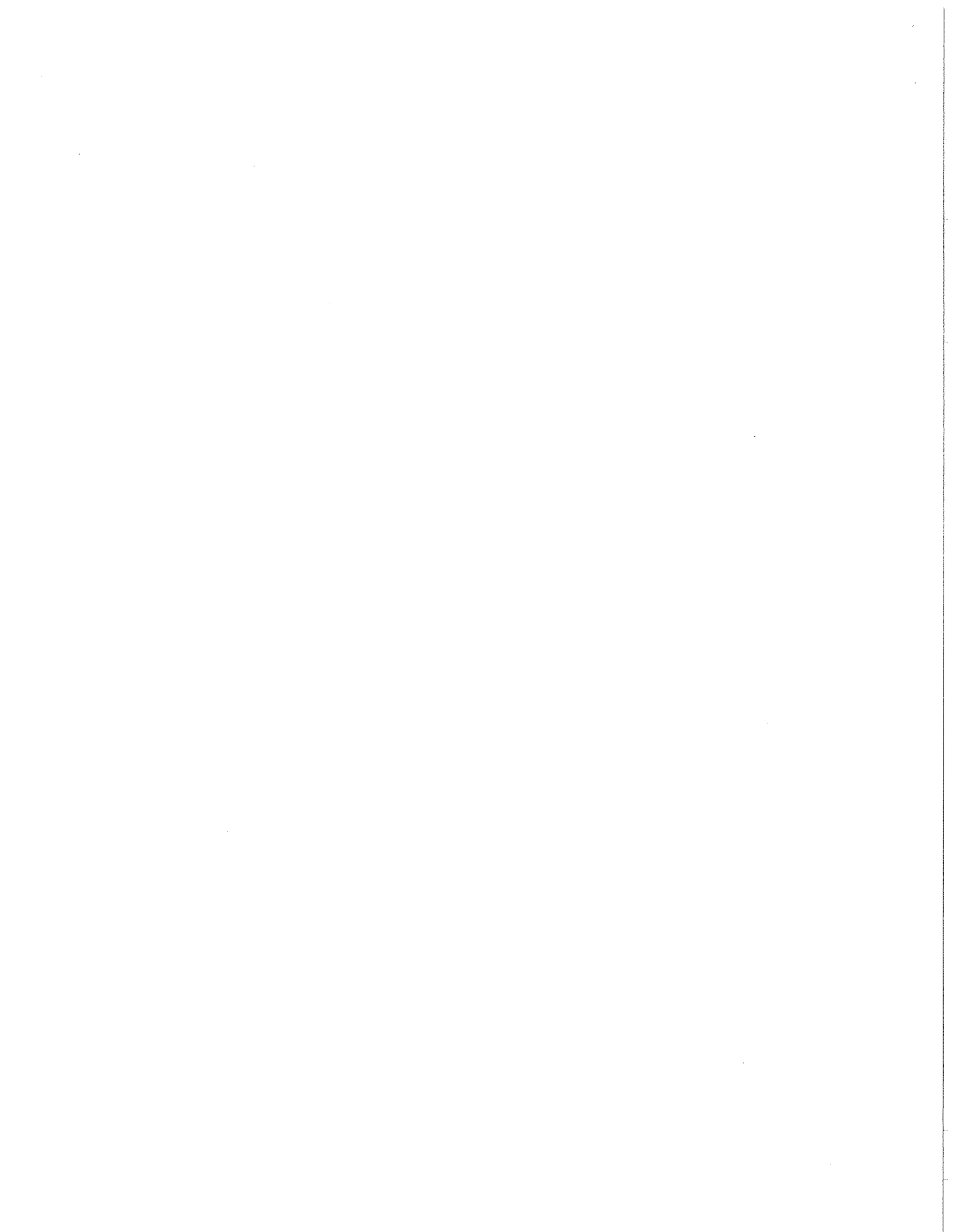
8. Government policy; and
9. Other factors."¹²⁴ (emphasis added)

A number of U.S. regulatory agencies have also stated that the external costs of energy production and consumption should be taken into account in the decision making processes of natural gas utilities. For example, the Oregon Public Utilities Commission has stated that natural gas utilities should meet their customers' needs at the lowest total (internal and external) cost to society:

"The goal of utility planning is to assure an adequate and reliable supply of energy at the least cost to the utility and its customers consistent with the long-run public interest. Long-run public interest is included as part of the goal because not all costs of a supply- or demand-side resource are necessarily borne by the utility and ratepayers. Nor are all costs readily quantifiable. However, it is the Commission's intent that all costs should be considered in the planning process and that their effect on the public interest should be a factor in determining a plan's resource mix."¹²⁵

The Massachusetts Department of Public Utilities (DPU) has also ruled that external environmental costs should be taken into account when evaluating the cost-effectiveness of Boston Gas' conservation and load management programmes. According to the DPU a societal cost-effectiveness test is in the overall public interest even though it will not necessarily minimize the ratepayers' total revenue requirement:

"...as ratepayers are also members of society in which externalities are imposed, ratepayers and non ratepayers alike benefit from the use of a societal cost-effectiveness test."¹²⁶

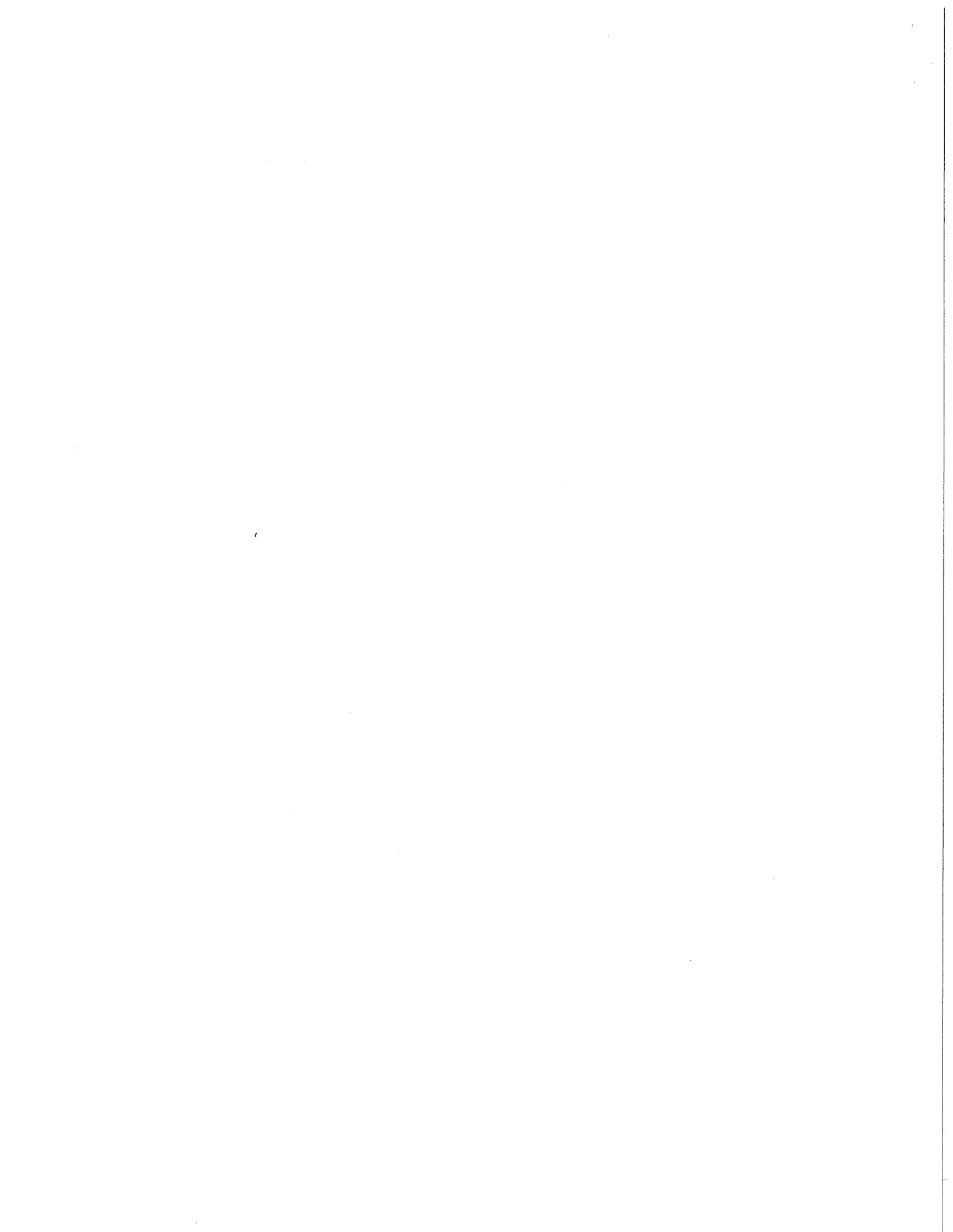


Finally, it is worth noting that the O.E.B.'s decision to take external environmental costs into account is in accord with the Brundtland Report's recommendation that regulating agencies should consider the ecological as well as the short-term economic implications of their decisions:

"...the major central economic and sectoral agencies of governments should now be made directly responsible and fully accountable for ensuring that their policies, programmes, and budgets support development that is ecologically as well as economically sustainable."¹²⁷

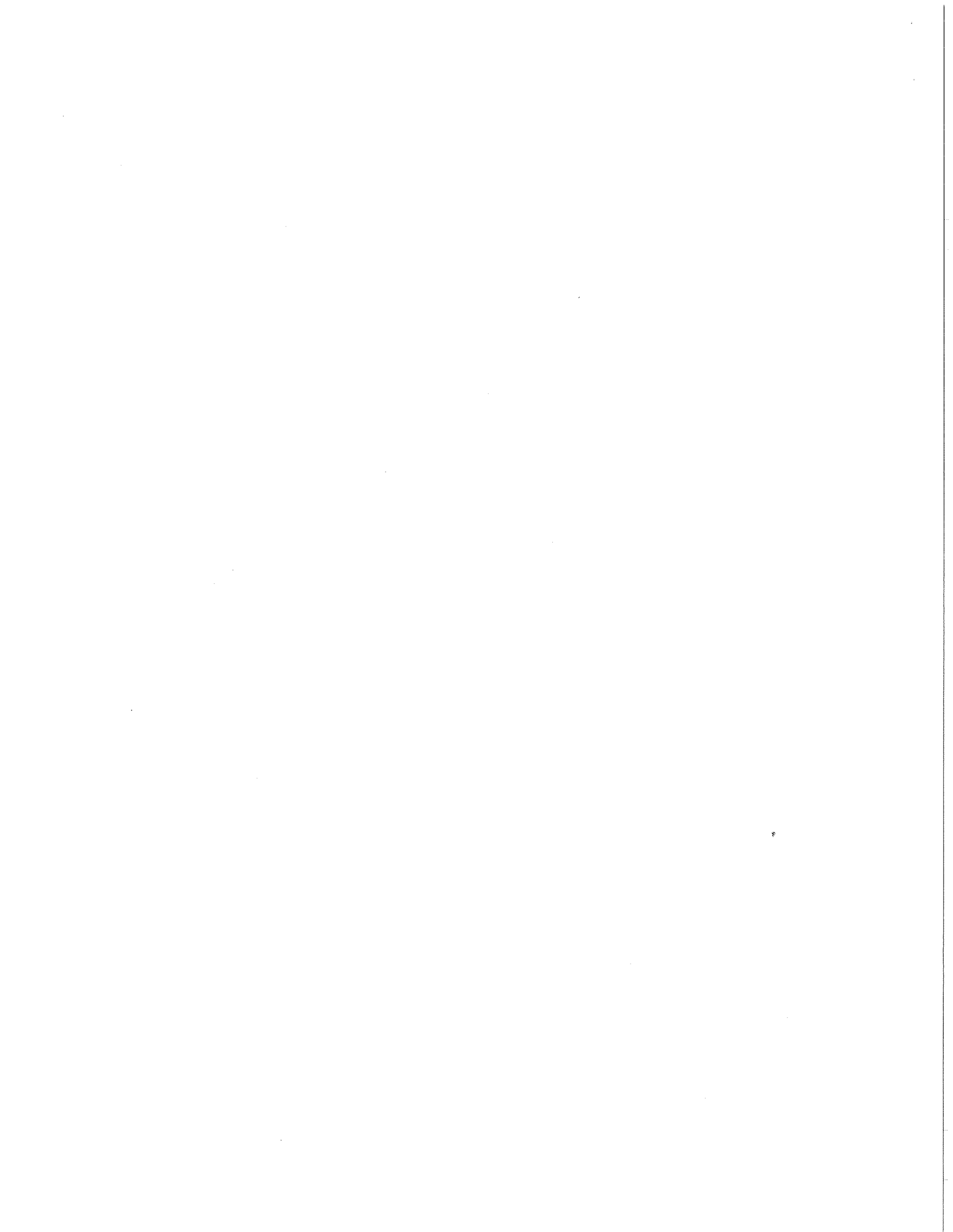
4. How Should the O.E.B. Evaluate the Cost-Effectiveness of Sustainable Development Programmes?

In its E.B.O. 134 Report the Board established a three-stage test for the evaluation of system expansion (gas supply) projects. The first stage is a discounted cash flow analysis of the utility's incremental revenues and costs that are attributable to the project. If the project passes this test, i.e., has a positive net present value, then it does not require a subsidy from the utility's existing customers. The second stage involves the quantification of all quantifiable external costs and benefits that are attributable to the project. The third stage is the decision making stage. The results of the first two stages are combined with an assessment of all non-quantifiable public interest factors



and a decision is made as to whether the project is in the overall public interest.²⁸ While the three stage test methodology was originally developed to evaluate system expansion projects it is equally valid for evaluating conservation and/or greenhouse gas mitigation programmes. For example, let's assume that Union wants to evaluate the costs and benefits of purchasing a super-efficient furnace and installing it in the home of one of its customers. The first stage test would consist of a discounted cash flow analysis of Union's revenues and expenses. The revenue stream would consist of the customer's life-cycle rental or leasing payments to Union. The expense side would consist of the cost to Union of purchasing and installing the furnace. The second stage would consist of a quantification of the customer's life-cycle energy cost savings and the life-cycle reduction in greenhouse gas emissions. The energy cost savings and the greenhouse gas emission reductions can be calculated by comparing the customer's forecast gas consumption with the super-efficient furnace with his forecast gas consumption in the absence of the super-efficient furnace supplied by Union. At the third stage the results of the first two stages are combined with an assessment of any non-quantifiable public interest considerations and a judgement is made as to whether the project is in the overall public interest.

If the super-efficient furnace proposal passes the first stage test, i.e., has a positive net present value, then it is almost certainly in the public interest. If the proposal fails



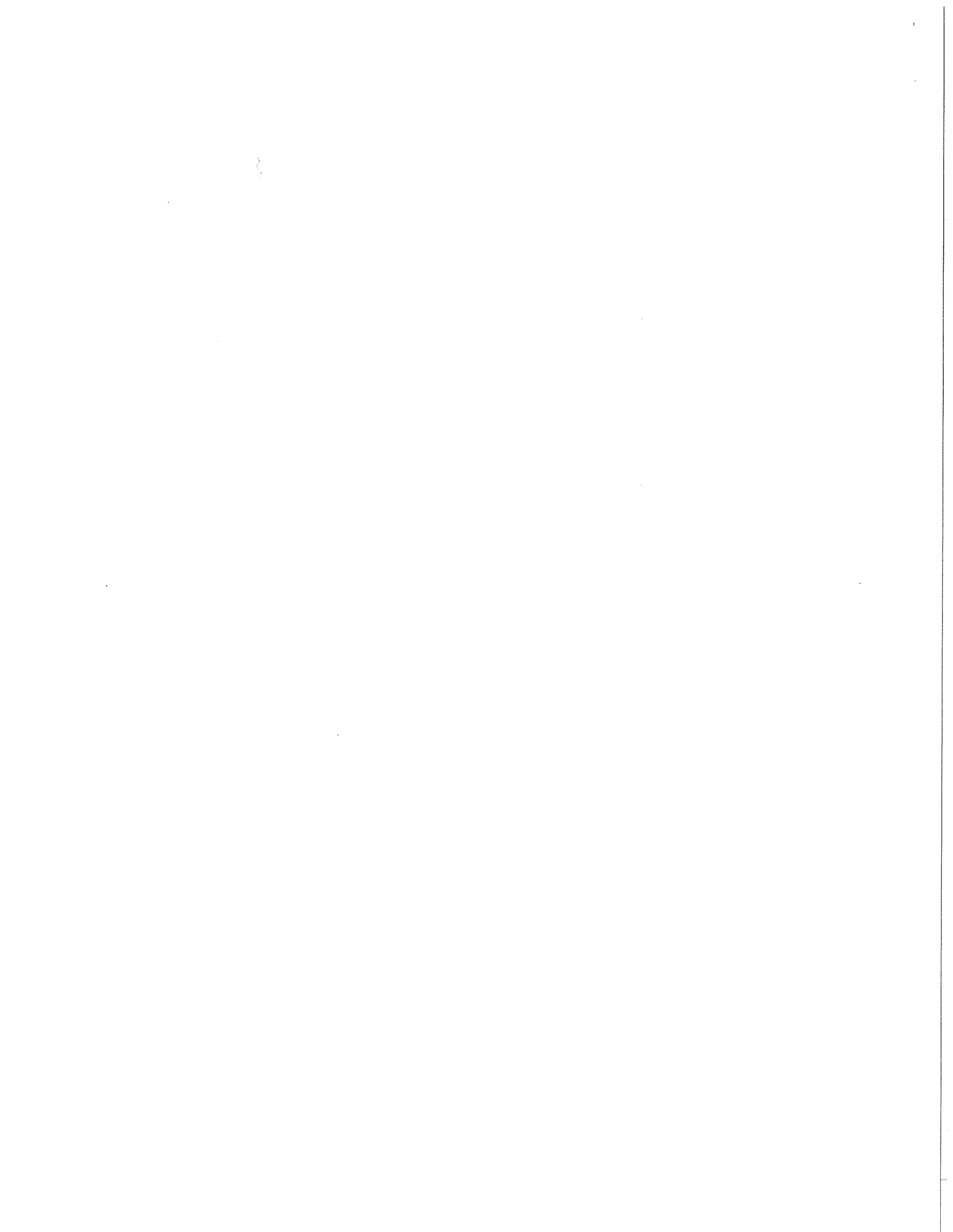
the first stage test but the customer's energy cost savings exceed its net cost to Union (its negative net present value) then the project is clearly desirable from an economic perspective since it will reduce the total energy bill of Ontario consumers. If the project fails the first stage test and the customer's energy cost savings do not completely offset Union's net cost then a judgement must be made as to whether the benefits in terms of greenhouse gas reductions can justify the resulting net increase in the energy bills of Union's customers.

5. How Can the Promotion of Sustainable Development be Made Union's Most Profitable Course of Action?

5.1 Removing the Regulatory Roadblocks to Energy Conservation

In the previous sections we have submitted that it is in the public interest for Union to be a conservation utility as well as a natural gas distribution utility. Unfortunately, due to the Board's method for setting Union's rate of return, the promotion of energy conservation is not in Union's short-run financial self-interest.

Union's rates for any given year are determined by dividing its Board-approved revenue requirement (i.e., Union's cost of providing gas service) by its forecast gas



throughput. If its actual throughput equals its forecast throughput then, everything else being equal, its rate of return on its capital will equal the Board-approved rate of return. However, if the actual throughput exceeds the forecast throughput then its actual revenues, profits and rate of return will exceed the forecast rate of return. As a consequence, it is always in Union's financial self-interest to increase throughput since the result will be an increase in its profits. Conversely, it is never in Union's short run financial self-interest to promote energy conservation. For example, if Union were to promote an energy conservation measure that would reduce the M2's (the rate class for residential, small commercial and small industrial customers) natural gas consumption by 1% then its profits would fall by at least \$1.2 million.²⁹

At its summer 1989 meeting the Executive Committee of the National Association of Regulatory Utility Commissioners (NARUC) passed a resolution with respect to incentives for electric utility least-cost planning. The resolution stated that linking a utility's profits to its throughput frustrates "efforts to provide low-cost energy services for consumers and to protect the environment". The Committee urged its member commissions to establish rate making mechanisms that will ensure that the implementation of cost-effective conservation measures (least cost planning) is a utility's "most profitable course of action".³⁰ (emphasis added)

The link between Union's realized profits and its realized throughput can be de-

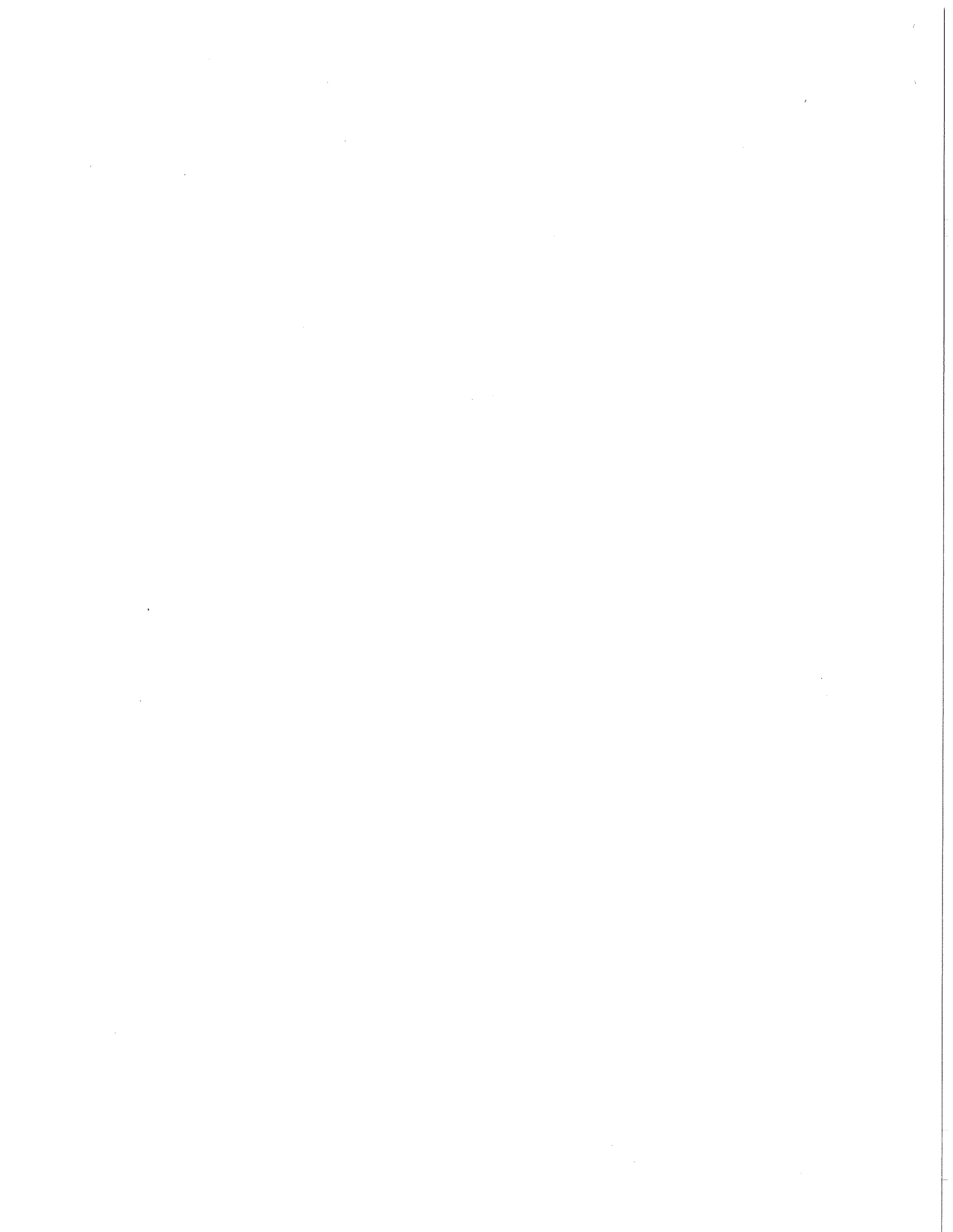


coupled by establishing a Distribution Margin Deferral Account (DMDA) and retaining the Purchase Gas Deferral Account (PGVA). The DMDA would be credited/debited with the difference between Union's actual and forecast distribution revenues.*****

At the end of the year if there is a net credit (debit) in the DMDA then it can be returned to (collected from) Union's customers by means of a rebate (surcharge). Alternatively, the credit (debit) can be disbursed (recovered) by lowering (raising) Union's revenue requirement and hence rates for the following year.

In addition to removing Union's financial disincentive to promote energy conservation the creation of a DMDA would reduce Union's business risks by severing the link between its profits and unforecast changes in the business cycle, the weather and inter-fuel price competition. According to Dr. Sherwin, the creation of a DMDA would reduce Union's cost of equity capital from 14.6 per cent to 13.75 per cent. As a result Union's revenue requirement would fall by approximately \$5.8 million.³¹

***** For Union's gas sales customers, rates M2 to M10, the DMDA could be credited/debited according to the following formula: {(actual total revenue - forecast total revenue) - [(actual throughput volumes - forecast throughput volumes) x the Board-approved WACOG]}. For Union's contract carriage customers, rates T1 to T3, the credit/debit formula could simply be: {actual total revenues - forecast total revenues}.



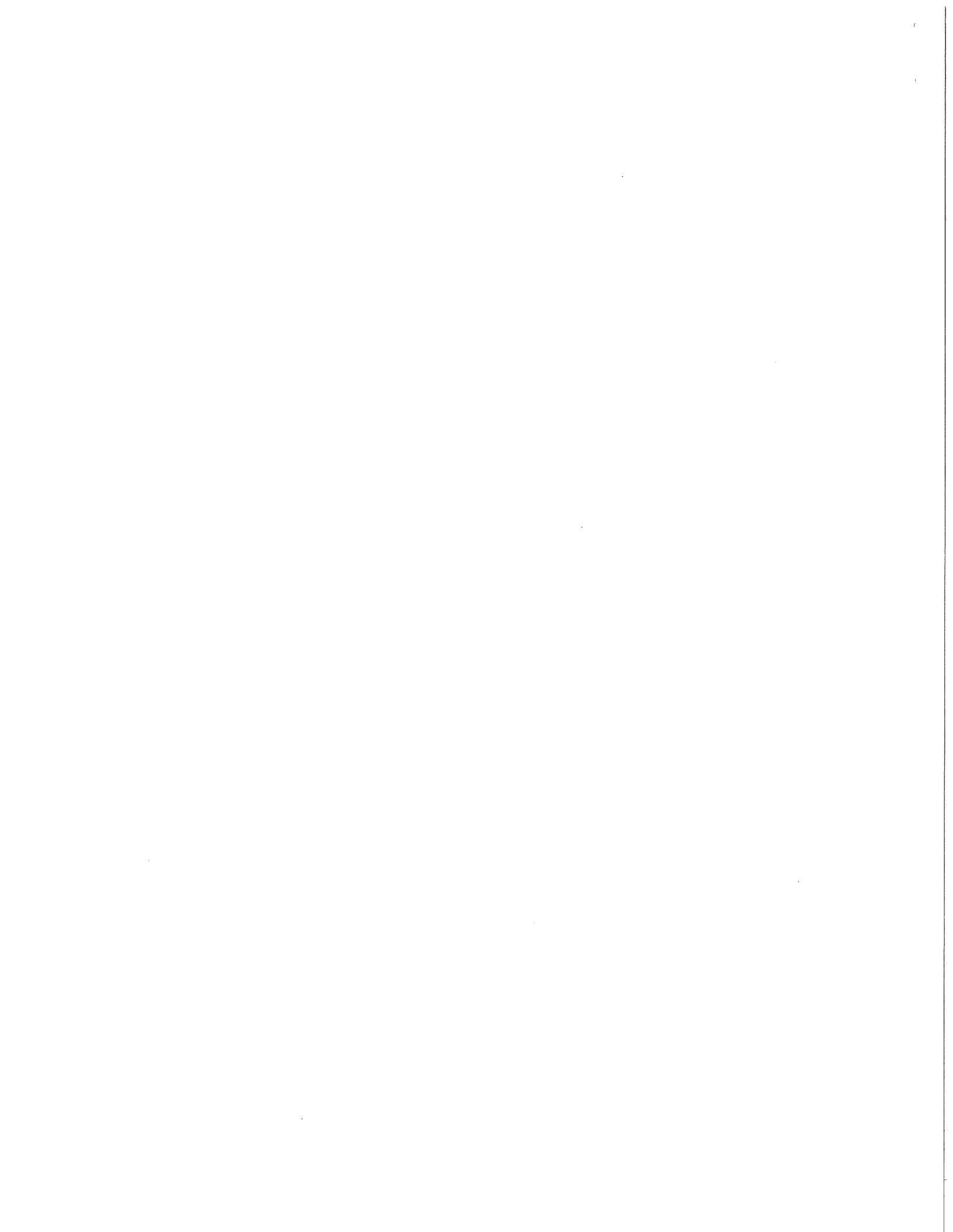
It is my recommendation that the Board establish a DMDA for Union's 1991 test year.

To ensure that the promotion of energy conservation is not contrary to Union's financial self-interest it is also necessary to create a PGVA which insulates Union's shareholders from all differences between their forecast and actual weighted average cost of gas (WACOG). It is my understanding that Union is proposing the establishment of such a PGVA. Furthermore, it is my recommendation that the Board accept this proposal.*****

It is important to note that the establishment of a DMDA and a PGVA does not provide Union with a guaranteed rate of return. On the contrary, Union will still be at risk for its non-gas costs. The creation of these deferral accounts will simply remove Union's financial disincentive to promote energy conservation and insulate its rate of return from factors that are beyond its control (e.g., changes in the business cycle, weather fluctuations, changes in the prices of gas and other fuels).

There are a number of precedents for severing a utility's actual rate of return from

***** Needless to say, if the actual WACOG is greater than the forecast WACOG because of imprudent management, as opposed to unpredictable events or the promotion of energy conservation, then Union's shareholders should be held liable for the increased cost.

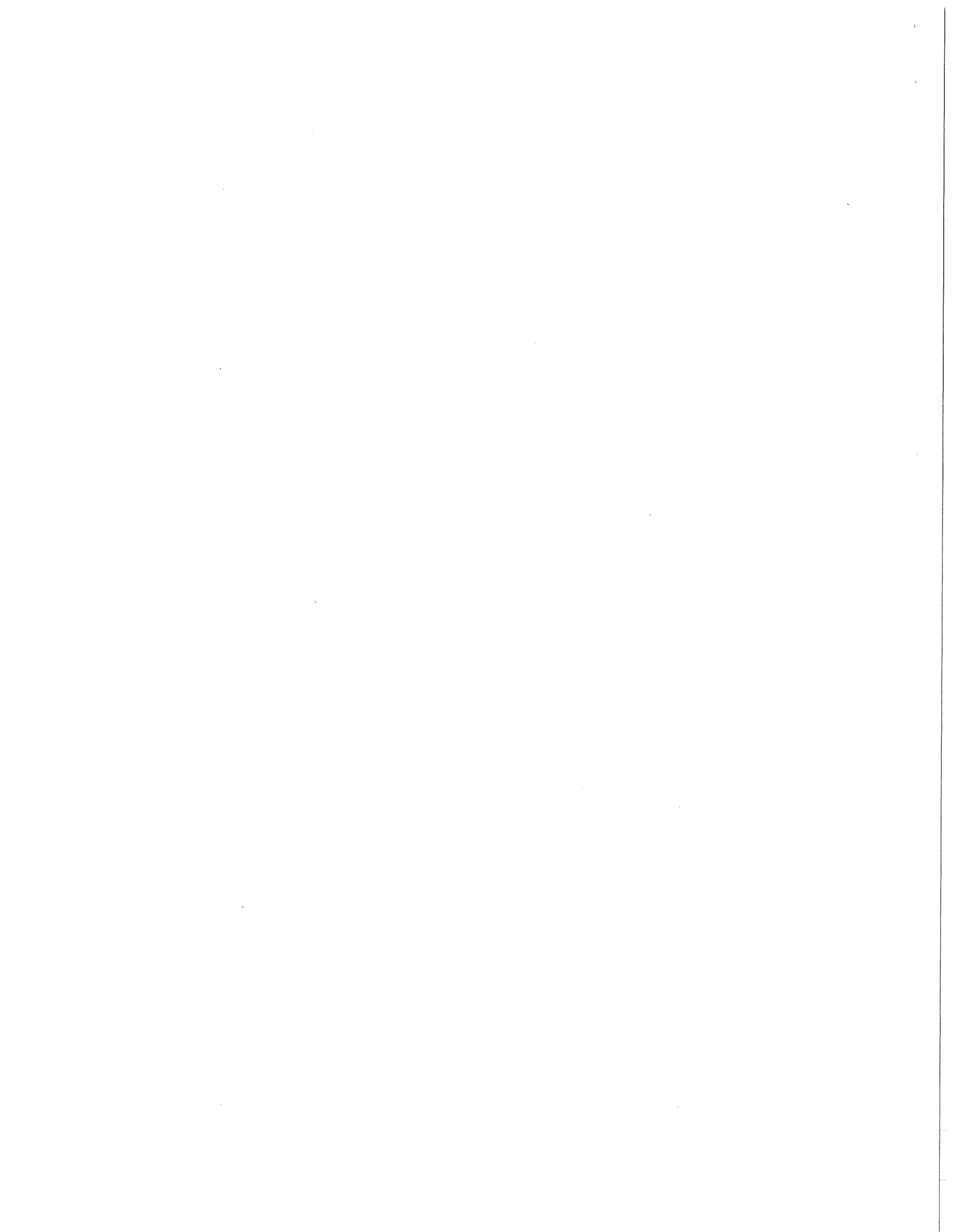


its actual throughput volumes. The most immediate is this Board's rate making treatment of Union's storage and transportation customers, rates C1 and M12 To M14. As a result of long term contracts and a rate making procedure which recovers Union's fixed costs and return on equity through the demand charges, Union's rate of return from these customers is independent of their actual throughput.

At the federal level, the National Energy Board has established deferral accounts which insulate TransCanada PipeLines' actual rate of return from its actual throughput.

In 1978 the California Public Utilities Commission de-coupled the link between the actual throughput and the actual rate of return of California's natural gas utilities. The de-coupling was achieved by establishing a Sales Adjustment Mechanism (SAM), the equivalent of my proposed DMDA, and retaining their Purchase Gas Adjustment (PGA), the equivalent of Union's proposed PGVA. One of the California Public Utilities Commission's reasons for severing the throughput/profit link was to remove the utilities' disincentive to promote conservation:

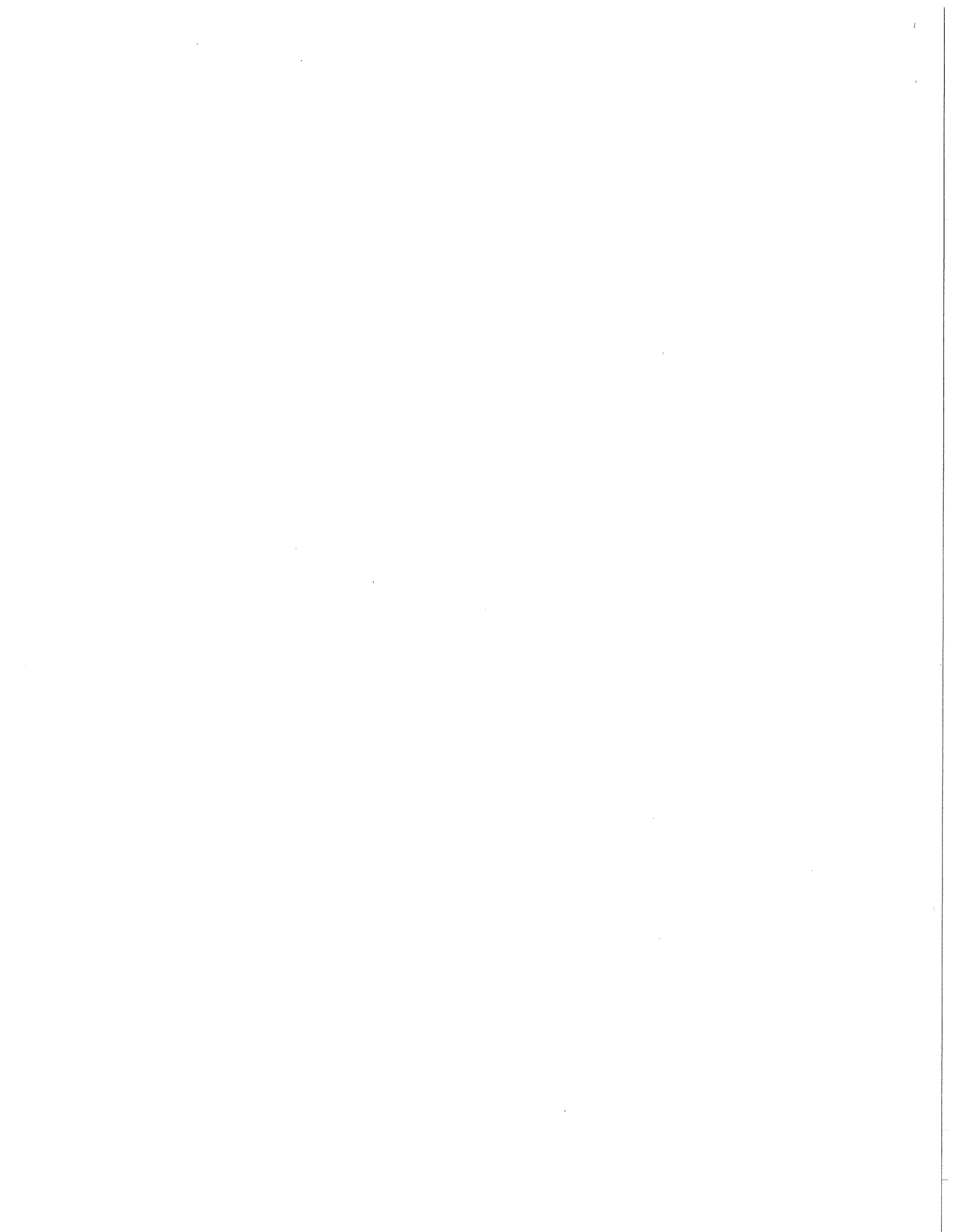
"Further, we are convinced that a SAM could encourage conservation, a matter of highest priority to this Commission and to many of the parties to this proceeding. Current results indicate that conservation efforts initiated over the last few years have been somewhat successful. But, obviously, conservation efforts must continue. In this regard we have been troubled by the apparent inconsistency between traditional ratemaking and the utility's incentive to promote conservation. As we have noted earlier, sales in excess of the volume employed for the test year will result in a gas margin significantly larger than that authorized.



A SAM will remove the risk to the utility of promoting conservation, while not allowing for the recovery of additional operating expenses. There would no longer be a conflict between the interests of the ratepayers and shareholders.¹³² (emphasis added)

5.2 Linking the Public Interest to Union's Rate of Return on Equity

In the previous sections I have submitted that it is in the public interest for Union to contribute to the achievement of sustainable development by reducing its customers' net contribution to global warming. As we have discussed above, this objective can be furthered by at least three strategies: 1) substituting natural gas for coal, oil and coal-fired electricity; 2) promoting energy conservation; and 3) offsetting or mitigating the global warming consequences of natural gas consumption. Clearly it is also in the public interest for Union to achieve reductions in its customers net contribution to global warming at the lowest possible societal cost. Union's management would have a strong incentive to pursue these dual objectives if their company's return on equity were linked to their success in these matters. That is, a harmony of interest between Union's shareholder and the public interest could be created by linking Union's future Board-approved return on equity to: a) their reduction of their customers' net contribution to global warming; and b) the unit cost of these reductions.



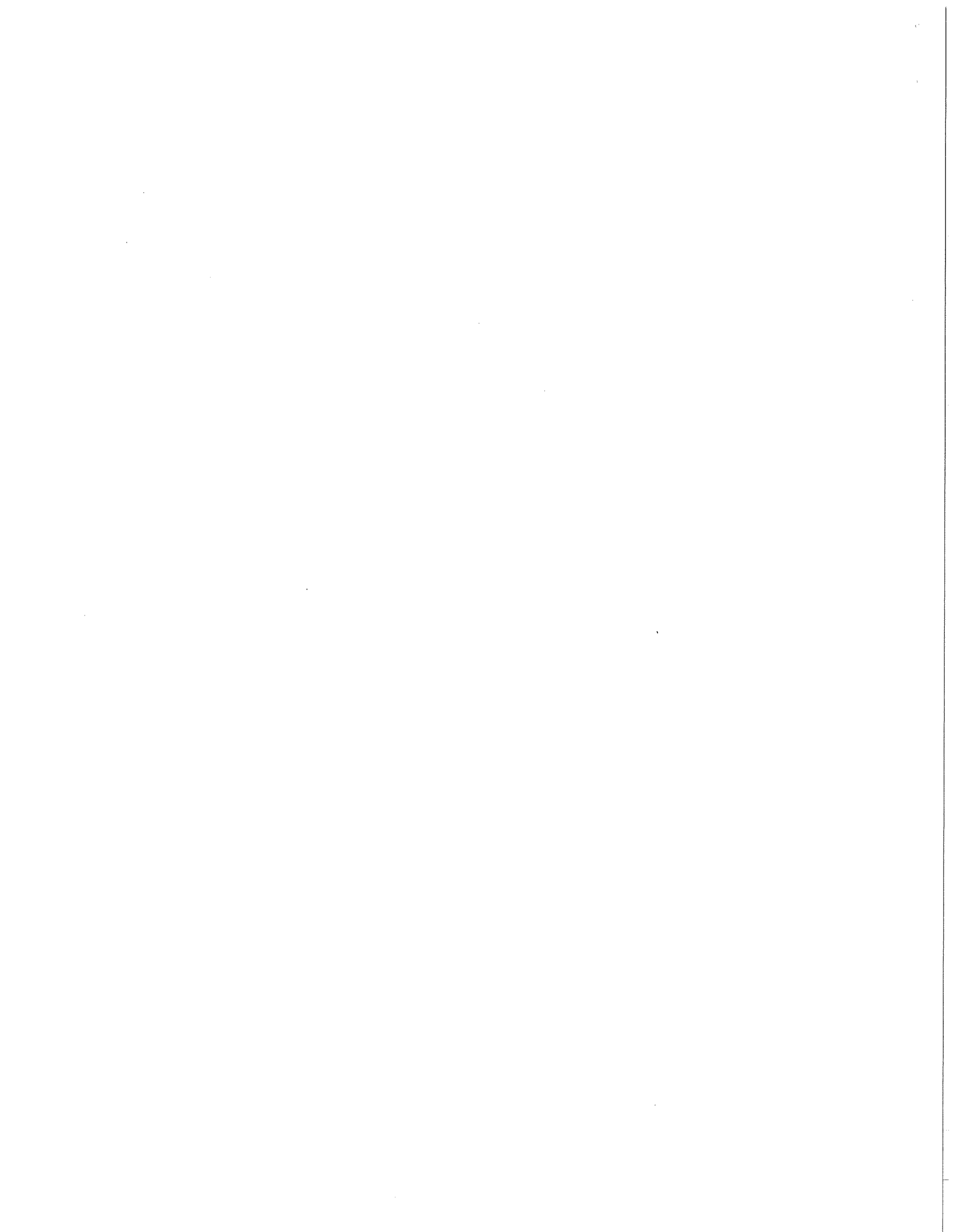
Earlier this year the Idaho Public Utilities Commission created a link between the rate of return for its electric utilities and their commitment to energy conservation:

"Accordingly, we take this opportunity to notify our regulated electric utilities that in future rate cases we will take into account the utility's commitment to energy conservation in determining the allowed rate of return. A utility that aggressively addresses the issues and concerns found in this Order, all other things being equal, may expect the allowance of higher return than might otherwise be allowed."³³

It is worthy of note that James C. Bonbright in his classic text, Principles of Public Utility Rates, also suggested that utilities with superior management should be awarded an above average rate of return on equity:

"But while a situation of this kind [the absence of a link between the quality of a utility's management and its rate of return] may be tolerable, it suggests the wisdom of more systematic and deliberate efforts on the part of regulating agencies to distinguish, somewhat as competition is supposed to do, in favor of companies under superior management and against companies under substandard management. The distinction might take the form of an express and publicly recognized differential rate of return--a differential, for example, under which otherwise comparable companies might be allowed a 6 per cent rate of return under standard management, a 5 per cent rate under substandard management, and a 7 per cent rate of return under top-grade management."³⁴

Bonbright went on to discuss two possible objections to his proposal. First, it may not be appropriate unless there is a close link between the utility's executive officers and its shareholders. Second, it may not be appropriate in the absence of "objective tests of relative efficiency in the performance of public services."³⁵ The first objection does

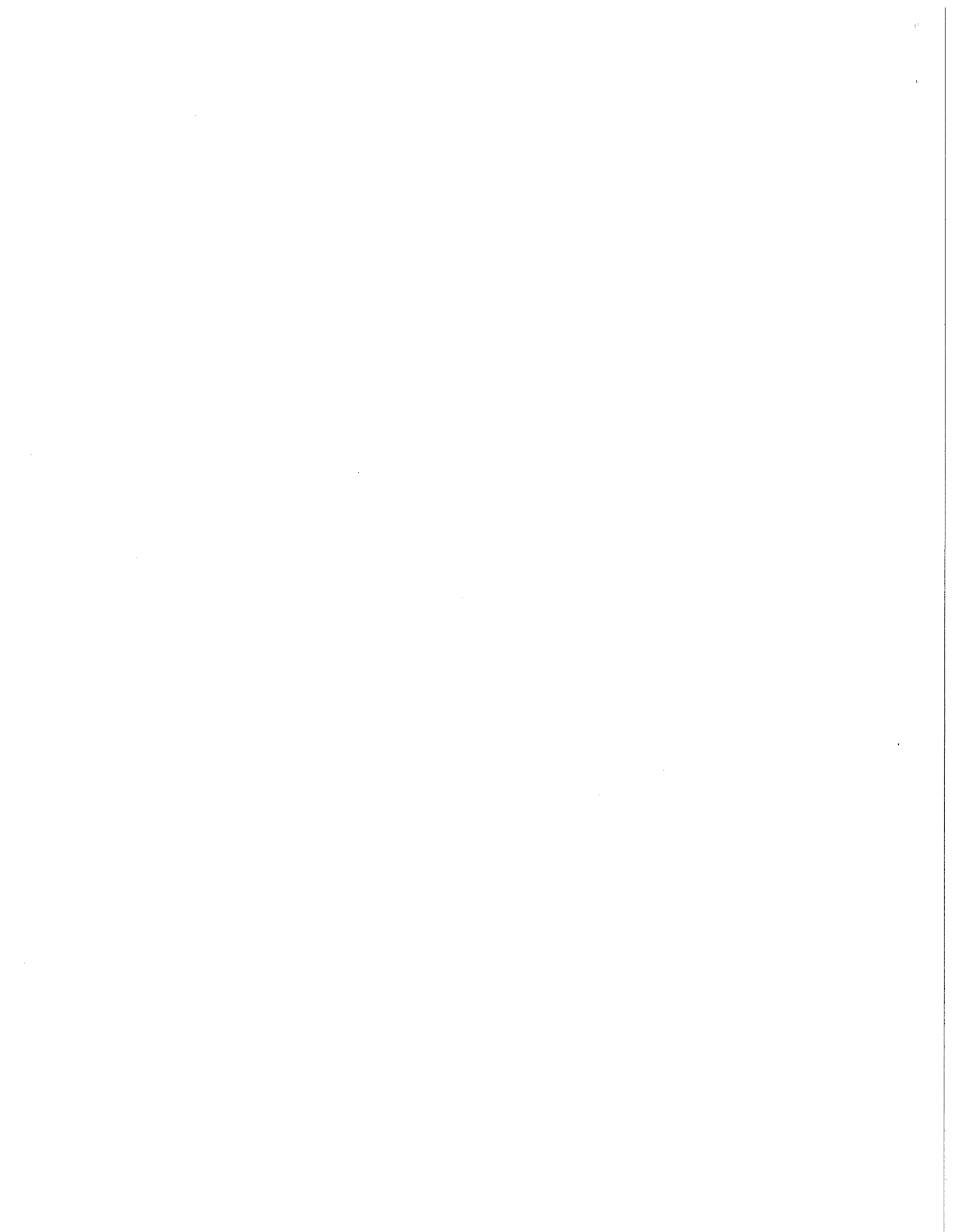


not apply to Union. The second objection could be overcome if the Board required Consumers' Gas (Consumers'), ICG Utilities (ICG) and Union to provide, at their rate hearings, data on their success in reducing their customers' net contribution to global warming (in proportion to their throughput volumes) and the unit cost of these reductions. This information could be used to rank the management of Ontario's three major natural gas utilities and to help the Board determine the appropriate relative rates of return on equity for Consumers', ICG and Union.

It is my recommendation that the Board state that, in future rate hearings, it will take into account the effectiveness of Union's management in reducing its customers' net contribution to global warming when setting Union's rate of return on equity.

6. Conclusion

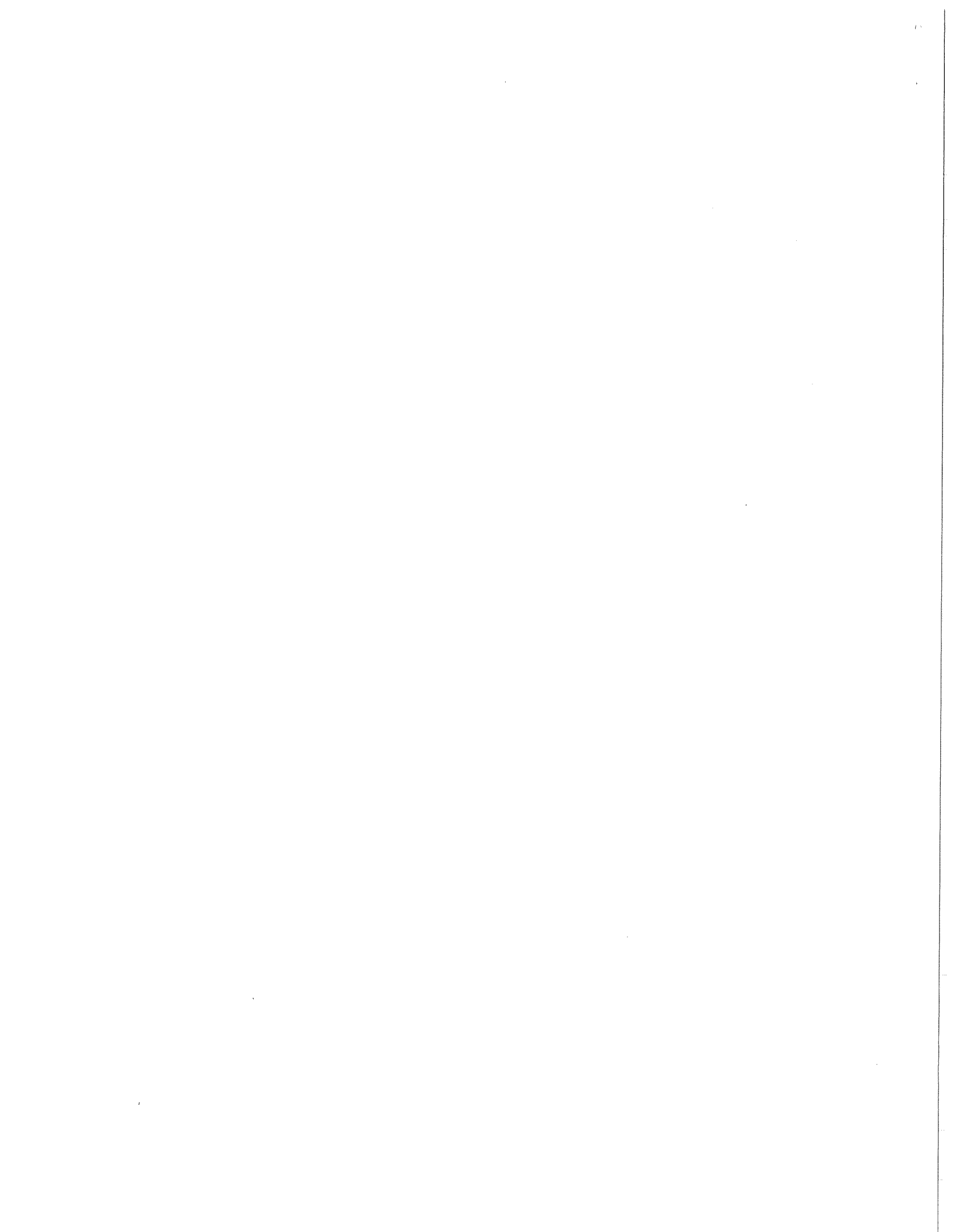
The Board's present mode of natural gas utility regulation is designed to maximize natural gas consumption in Union's franchise area. One of the Board's key means for promoting this objective is its formula for determining Union's actual rate of return on equity. This formula creates a direct link between Union's return on equity and the quantity of natural gas consumed in Union's franchise area. Conversely, the formula financially penalizes Union if it promotes energy conservation.



Until very recently the O.E.B.'s principles of natural gas utility regulation were generally accepted to be in the public interest and to be in accordance with government policy. However, due to the recent rise of our awareness of the seriousness of global warming and the link between it and fossil fuel consumption, informed public opinion and government policy on these matters has changed rapidly and dramatically. To be specific, in August 1989 Ontario's Minister of Energy, the Honourable Lyn McLeod, urged everyone to work towards a 20% reduction in carbon dioxide emissions by the year 2005. Furthermore, the Minister asked Ontario's natural gas utilities to aggressively promote energy conservation. This significant change in government policy reflects the fact that it is now clearly in the public interest for Union to provide its customers with energy services at the lowest total cost to society. To achieve this objective Union must aggressively promote energy conservation and initiatives to reduce the net contribution of natural gas consumption to global warming. In short, Union must become a conservation utility as well as a natural gas distribution utility.

Needless to say, the Board's procedure for determining Union's rate of return, which penalizes Union for promoting energy conservation, must be reformed. As the father of public utility regulation, James C. Bonbright has stated:

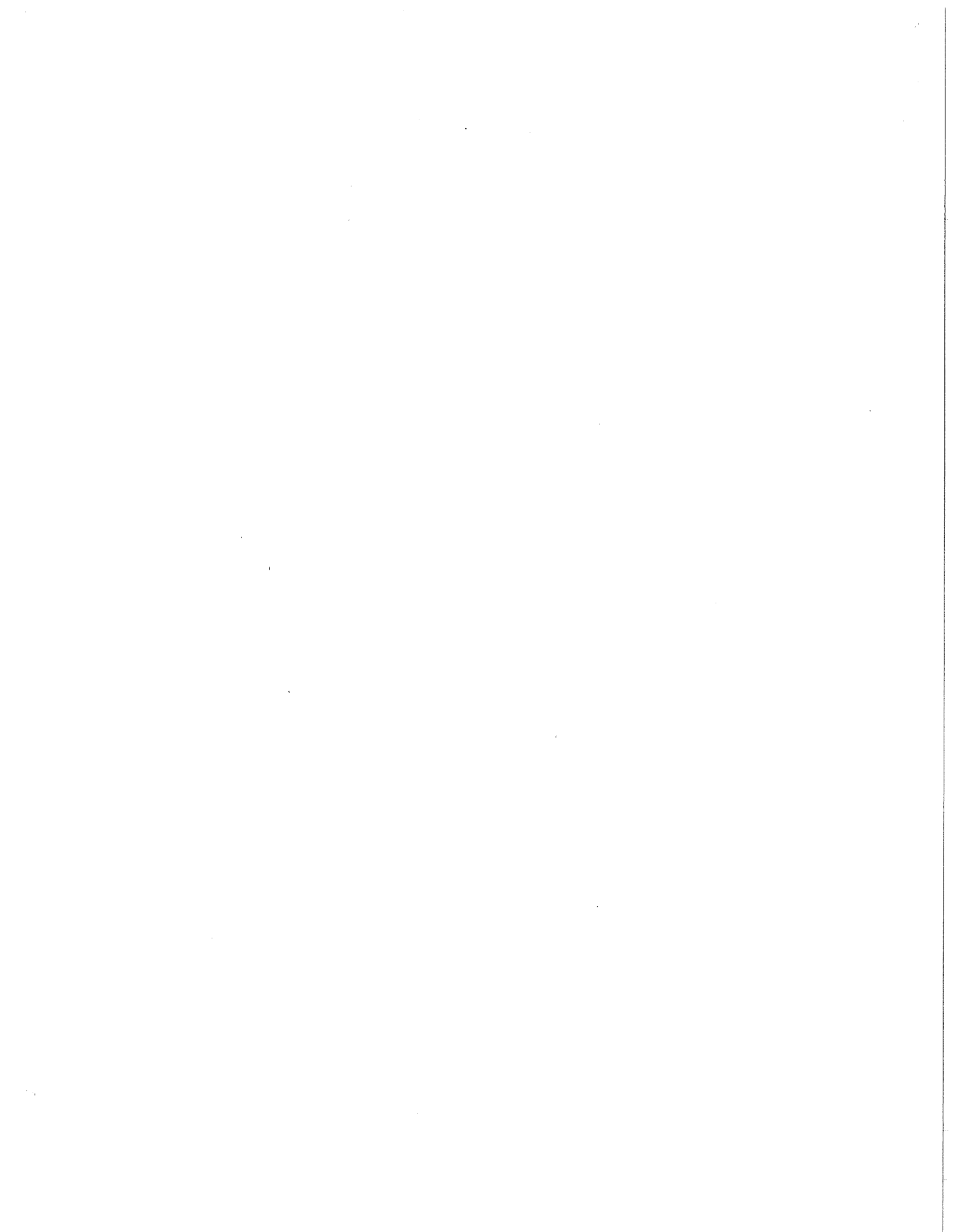
"...rate regulation...should at least take pains to avoid rules of rate making that positively penalize stockholders for efficient or otherwise desirable action by the management."³⁶



In the future Union's return on equity should be linked to its success in providing its customers with energy services at the lowest total cost to society.

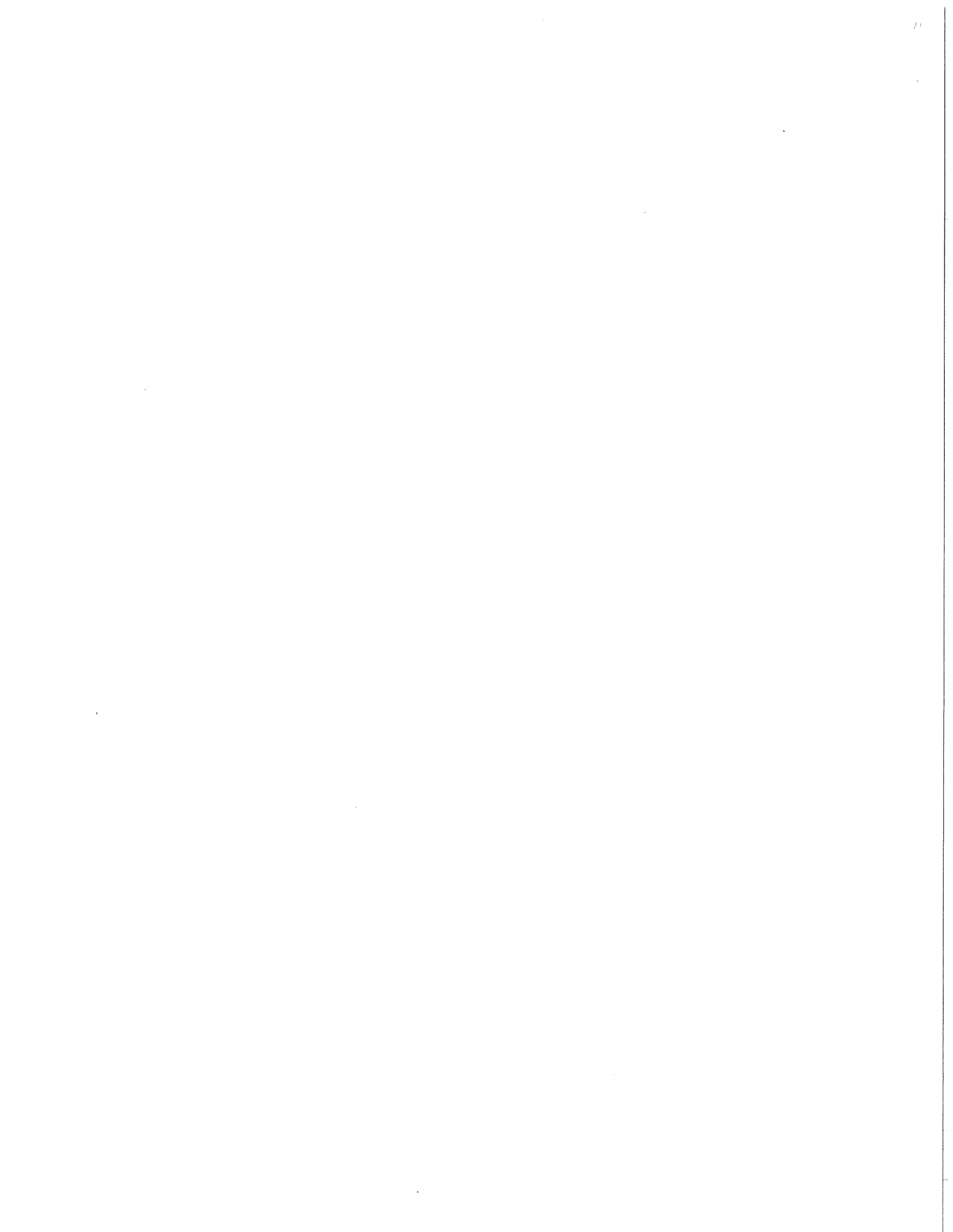
7. Summary of Recommendations

1. That the O.E.B. state that it is in the public interest for Union to be a conservation utility as well as a natural gas distribution utility;
2. That the O.E.B. state that it is in the public interest for Union to reduce its customers' net contribution to global warming by: 1) promoting the substitution of natural gas for coal, oil and coal-fired electricity; 2) promoting energy conservation; and 3) offsetting or mitigating the global warming consequences of natural gas consumption;
3. That the O.E.B state that programme proposals to achieve the objectives listed in recommendation # 2 be evaluated by the Board's three-stage test methodology;
4. That the O.E.B. de-couple the link between Union's return on equity and its throughput volumes by establishing a Distribution Margin Deferral Account, DMDA, and a Purchase Gas Variance Account, PGVA.
5. That the O.E.B. state that, in future rate hearings, it will take into account the efforts of Union's management in reducing its customers' net contribution to global warming when setting Union's rate of return on equity.



Endnotes

1. Legislative Assembly of Ontario, Hansard Official Report of Debates, (February 2, 1989), pp. 7850, 7860.
2. World Commission on Environment and Development, Our Common Future, (Oxford: Oxford University Press; 1987), p. 43.
3. *ibid.*, p. 8.
4. *ibid.*, p. 14.
5. *ibid.*, pp. 173, 174.
6. World Meteorological Organization, CONFERENCE PROCEEDINGS: The Changing Atmosphere: Implications for Global Security, (Geneva, 1988), p. 292.
7. *ibid.*, pp. 292-294.
8. CONFERENCE PROCEEDINGS, pp. 296, 297.
9. Federal-Provincial-Territorial Conference of Ministers of Energy, Communique, (Toronto: August 28, 1989), p. 2.
10. *ibid.*, p. 6.
11. E.B.O. 134, Report of the Board, (1987), p. 24.
12. E.B.R.L.G. 28, Report of the Board: In the matter of a Reference respecting Unicorp Canada Corporation/Union Enterprises Ltd., Vol. 1, pp. 6/9, 6/10.



13. Electricity for space heating is typically produced by coal-fired generating stations. In 1981 I estimated that the economic cost of coal-fired electricity for space heating was 2.7 to 5.8 times greater than that of natural gas. The carbon emissions (millions of tons of carbon per exajoule) for conventional gas, oil and coal are 13.8, 19.7 and 26.9 respectively. Coal-generating stations have a combustion efficiency of approximately 35% whereas gas furnaces have combustion efficiencies of approximately 65% to 93%. Hence the relative carbon emissions per unit of space heating for electricity and gas are 77 ($26.9/0.35$) and 15 to 21 ($13.8/0.93$ and $13.8/0.65$) respectively. See Jack Gibbons, Electric Heating: Does It Make Sense for Ontario?, (Toronto: Energy Probe; 1981); and Irving Mintzer, A Matter of Degrees: The Potential for Controlling The Greenhouse Effect, (Washington, D.C.: World Resources Institute; 1987), p. 48.
14. Ralph Cavanagh, "Responsible Power Marketing in an Increasingly Competitive Era", Yale Journal on Regulation, Vol. 5, 1988, p. 342; Florentin Krause and Joseph Eto, Least-Cost Utility Planning Handbook for Public Utility Commissioners, Vol. 2, The Demand Side: Conceptual and Methodological Issues, (Washington, D.C.: NARUC; 1988). pp. II-5, II-7; Amory Lovins, "The Great Demand-Side Bidding Debate Rages On", The Electricity Journal, March 1989, p. 36; Stephen Wiel, "Making Electric Efficiency Profitable", Public Utilities Fortnightly, July 6, 1989, p. 10.
15. E.B.R.O. 462, Exhibit F4, Schedule 4, p. 4.
16. Union Gas, 1989 Annual Report, p. 24.
17. Gregg Marland, The Prospect of Solving the CO2 Problem through Global Reforestation, (Washington, D.C.: U.S. Department of Energy; 1988), p. ix.
18. City of Toronto, Special Advisory Committee on the Environment, The Changing Atmosphere: A Call To Action, (30 October 1989), p. v.
19. Donald J. Wuebbles and Jae Edmonds, A Primer On Greenhouse Gases, (Washington, D.C.: U.S. Department of Energy; 1988), p. 23.
20. H.R. 18, Report Of The Board, p. 312.
21. E.B.O. 134, Report Of The Board, (1987), p. 48.
22. E.B.R.O. 462, Exhibit R4, Question 15.

23. E.B.O. 134, Report Of The Board, pp. 25, 26.
24. *ibid.*, pp. 20, 21.
25. Public Utilities Reports - 102 PUR4th, p. 304.
26. Commonwealth of Massachusetts, Department of Public Utilities, D.P.U. 88-67 (Phase II), (May 31, 1989), p. 119.
27. Our Common Future, p. 314.
28. E.B.O. 134, Report of the Board, pp. 46, 47.
29. The decline in Union's after-tax profits was calculated according to the following formula: $\{[(\text{distribution commodity charge} - \text{WACOG}) \times (1\% \text{ of Union's forecast M2 volumes})] \times (1 - \text{Union's marginal income tax rate})\}$. I assumed that: 100% of the reduction in residential consumption occurs in the first rate block; 50% of the decline in commercial consumption occurs in the second rate block and 50% in the third block; 100% of the decline in industrial consumption occurs in the fourth block. I assumed that Union's out-of-pocket expenses for promoting the energy conservation measures would be zero. Hence my assertion that Union's after-tax profits would fall by at least \$1.2 million.
30. "NARUC Executive Committee Adopts Resolution in Support of Incentives for Electric Least-Cost Planning", NARUC News, No. 88-89, (4 August 1989).
31. E.B.R.O. 462, Exhibit R2, Question 2 Corrected.
32. Public Utilities Commission of the State of California, Decision No. 88835, (May 16, 1978), p. 8. In 1986 the California Public Utilities Commission partially eliminated the SAM and PGA for non-core customers. The rationale for this action was to "encourage the gas utilities to promote gas usage and to pressure pipelines and suppliers to keep their commodity prices competitive with oil." Public Utilities Commission of the State of California, Decision 86-12-010, p. 129; see also pp. 124-147.
33. Idaho Public Utilities Commission, Case No. U-1500-165, Order No. 22299, p. 19.
34. James C. Bonbright, Principles of Public Utility Rates, (New York: Columbia University Press; 1961), pp. 262, 263.

35. *ibid.*, p. 264.

36. *ibid.*, p. 265.

