Evaluation of Canada's Oil Substitution Program (COSP)

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ABSTRACT

In October 1980 Canada launched a national "off-oil" program, called COSP, to lessen the dependency of its residential sector on oil-fired space heating. The goal was to convert two million residential units off-oil in the 1980-1990 period. Homeowners were offered a grant of $800 (maximum) towards conversion costs. How has this program performed over the 1980-1984 period? This paper presents national off-oil conversion statistics in relation to COSP program goals. It also describes the results of two major national consumer behaviour surveys carried out to assess the role COSP played in the homeowners decision to convert off-oil. The results indicate that conversion rates are on target with program goals but that COSP, in a majority of cases, was not the decisive factor in precipitating homeowners' conversion actions.

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Today's news of threatened oil shipments from the Middle East resulting from the Iraq-Iran conflict brings haunting memories of the oil shortage crisis experienced in 1973. The degree of threat to North Americans today is, however, much less than it could have been. Two factors contribute to the relative energy comfort of Canadians and Americans. The first is increased supply of domestic oil and the other is reduced demand for oil as a fuel source. Oil demand reductions have resulted from direct shifts to natural gas, electric, renewable or other fuel sources and from indirect curtailment activities. Indeed, North Americans today feel relatively energy secure, a far cry from the panic feelings of policy makers and homeowners alike in the immediate post-1973 period.

A substantial portion of developed nations' energy conservation successes have occurred in the residential sector. In the decade since the oil embargo, a wide variety of government and utility sponsored residential energy conservation programs have been implimented. These have been advanced in the belief that energy demand curtailment programs (making do with less) or demand shift programs (shifting to a more abundant/lower price fuel) are important strategies in achieving long-run energy security. This belief is reinforced by estimates that conservation efforts could reduce consumer energy consumption by as much as 40 percent (Anderson and McDougall 1980; Sawhill 1979; Sinden 1978; Stern and Gardner 1981). There is mounting evidence that these programs have helped speed energy self sufficiency.

The purpose of this paper is to report on the impact of a major financial incentive for residential energy "demand-shift" conservation in Canada, the Canada Oil Substitution Program (COSP). Evidence is presented from government statistics on COSP performance at the end of year three in its ten year life. More important to consumer energy researchers, results from two major surveys of COSP adopters are summarized. Together these data will contribute to the availability of substantive conservation program evaluation research which some authors have called for (eg.; Hirst, 1981).

The Canada Oil Substitution Program (COSP)

The COSP off-oil incentive, launched in October, 1980, is a bold attempt at a "demand shift" solution to Canada's oil squeeze. It is a voluntary rather than mandated program. It has a ten-year life with a goal of reducing the use of oil from over 30% to less than 10% of total energy use in residential space and water heating applications. The heart of the program is an $800 maximum grant to cover

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up to one half of the costs directly related to off-oil conversions, including equipment, materials, labour costs, and related provincial or municipal licence or inspection fees. The grant is taxable and must be included in the income of the spouse whose income is higher.

For administrative purposes, COSP operates through two procedures. For conversions to natural gas or electric heat, the relevant public utility (gas or electricity supplier) administers the program. For conversions to propane, wood, solar or other renewable fuels, COSP is administered directly by the federal Department of Energy, Mines and Resources (EMR) and its regional offices. It should be noted that fuels eligible vary among provinces, depending on their availability.

COSP is applicable to single, detached houses; semi-detached or row houses; mobile homes; and multiple unit buildings where each unit has its own separate heating system. A separate scale of incentives, based upon the number of units, is used for conversions of centrally heated multiple-unit buildings. Renters qualify for COSP but only with permission of the homeowner. In all cases the conversion must result in 50% or more of the total heating requirement being supplied by the "new" fuel source. It is not uncommon, especially in the case of conversions to wood, for homeowners to retain the "old" oil fired equipment as a backup or standby heating system.

The financial magnitude of the COSP incentive is substantial: the total federal government commitment over the ten year program is about 1.6 billion dollars. In addition to promotion by the government, public utilities and private heating contractors were quick to promote this program and to assist homeowners with the details.

COSP is not the only financial incentive available to Canadian homeowners to encourage in-home energy conservation. The Canada Home Insulation Program (CHIP) provides a taxable grant of 60% of the cost up to $500 (maximum) for insulation materials and labour. CHIP will curtail the home heating energy requirements and thereby will assist in reducing heating oil consumption. In addition, each province, through its public utility, offers homeowners grants and/or low interest loan programs for home insulation and other retrofit activity. Thus, the Canadian homeowner is enticed with both direct off-oil demand shift incentives and indirect curtailment incentives.

Canada's Heating Oil Demand and Conservation Targets

Canadians are heavy users of heating oil. As of the beginning of 1981, three million residential units (about 32%) were "on-oil" and eligible for a COSP grant. The major other heating fuel sources were natural gas (42%) and electricity (18%). The usage of heating oil in 1981 was about 4600 litres per oil-heated household. At an average 1981 price of 25 cents per litre this represents an average annual heating cost of about $1100 per oil-heated household, or approximately 150% to 200% the cost of heating with the alternative fuels, natural gas or electricity.

Due to regional differences in climate, fuel prices and natural gas availability, the use of oil heating varies considerably across the country. The eastern (Atlantic) provinces and Quebec have the highest concentrations of oil heating (68% and 53%, respectively) largely due to the unavailability of natural gas distribution in major portions of these provinces. The western (Prairie) provinces and British Columbia, which are situated close to natural gas supplies, have much lower rates of usage of oil heating (8% and 20%, respectively). Ontario, the province with the greatest number of households, has 24% of its homes heated with oil.

The federal government's target is to reduce the proportion of oil-using homes to 10% by 1990/91 from the approximate 32% in 1980/81. To meet this target, about two million households units must be converted off-oil during the decade. This represents a cumulative total annual displacement of about 10 billion litres of heating oil by 1990/91 or about 85% of 1981 annual heating oil demand. The total COSP grant payouts that will be associated with this displacement is about 1.6 billion dollars, assuming a maximum $800 per conversion. Clearly, therefore, Canada's off-oil program and the associated COSP grant incentive are a major national commitment which warrants evaluation research.

Evaluation Issues

One approach to assessing COSP's effectiveness is to look at the number of off-oil conversions achieved in relation to established program targets. However, evaluating the actual impact of COSP is extremely complex due to a host of non-program factors which influence conservation actions. The most notable factor is rising prices for domestic heating fuels. In Canada, the average retail price increase for domestic heating oil has increased 600% from 5 cents per litre in 1971 to 30 cents per litre in 1982, an average of over 50% per year. Considerable heating oil price increases may continue to occur in Canada throughout the 1980's in spite of the present worldwide recession, decrease in oil demand, erosion of OPEC oil prices, and "glut" of oil supplies. The price escalations are due to provisions of Canada's National Energy Plan, which contains scheduled price increases for crude oil of about $4.20 per barrel per year throughout the 1980's. Providing that the maximum price never exceeds 85% of the international price or the average price of oil in the United States, whichever is lower (Energy Mines and Resources 1980). These price increases will undoubtedly precipitate off-oil conversions. In addition, a host of situational and attitudinal factors will affect the decision to convert.

It is difficult but necessary to disentangle price and other off-oil conversion influences from the COSP incentive influence. Though research using experimental designs is required to separate these impacts, survey methodologies can help formulate initial hypotheses regarding the relative impacts of financial incentives (e.g. COSP) versus the combined effects of price and other influences on off-oil conversion decisions.

In order to ascertain qualitative consumer response to the COSP incentive, the sponsoring agency commissioned consumer research studies on COSP recipients to address a variety of issues. For the purpose of this paper, three major

questions will be examined: (1) How important a factor was the COSP financial incentive in the conversion decision process of recent converters? (2) How important is the COSP incentive relative to other conversion motives? (3) What proportion of off-oil substitutions appear to be attributable to the COSP incentive and what proportion appear attributable to the impact of price and other factors?

Data Sources

The performance of COSP relative to off-oil targets established at the outset of the program will be determined by examining statistics recently released by the federal government (Energy, Mines and Resources Canada, 1984). The data are at the third anniversary of the ten year program and should provide a valuable picture of response to this conservation initiative.

Data on qualitative aspects of consumer response to COSP result from two major evaluation research (mail) surveys conducted in 1981 and 1982 by the author. Both studies involved administering a survey questionnaire to samples of householders who had applied for and received a COSP grant of up to $800 towards their off-oil conversion costs. The questionnaires were very detailed and addressed, among other things; general energy views, home heating system characteristics, motives for and barriers to conversion; perceptions of the performance characteristics of different home heating energy sources; measures of COSP impact such as awareness, feature preference, the role of COSP in the conversion decision process; and demographic and housing characteristics. These studies are the only comprehensive evaluations of COSP impact available as of mid 1984.

The first survey was carried out in late 1981, almost one year after the inception of COSP. It involved homeowners who had converted to natural gas or electricity. The total population sampled from included over 100,000 natural gas and electric converters. The sample was based on EMR's COSP conversion records as of September, 1981. Timing for the study was governed by COSP managers who were anxious to obtain timely feedback. In total, 2100 questionnaires were mailed, with 1050 usable responses being returned, for a response rate of 50 percent.

The second survey was based on COSP applicants on file as of September 1982, approximately two years after the inception of the COSP initiative. Sampling was restricted to homeowners who had selected the renewable fuels, wood or propane, as their off-oil heating fuel choice. The total population sampled from included over 60,000 wood and propane converters. The sample size was 1565 with a 40% response rate.

RESULTS AND DISCUSSION

COSP Conversions to Date

Canada's COSP incentive has been an overwhelming statistical success. Table I displays the impressive targets and achievements. As indicated, approximately 747 thousand residential units have been converted off-oil during the first three

Table I. Selected COSP conversion targets[1] and achievements.

Total number of eligible "on-oil" residential units as of 1980	3,002,000
COSP target number of conversions during the 1980-1990 period	1,981,300 (all fuels)
Actual units converted, cumulative to end of fiscal 1983-84 (3 years into the 10 year program)	746,800 (all fuels)
Achievement as a percent of:	
10 year target	37.7% (all fuels)
3 year target	95.7% (all fuels)

	Cumulative to the end of fiscal 1983-84:				
	All Fuels	Electric	Natural Gas	Wood	Propane and other
Actual units converted (000)	746.8	288.9	269.7	164.7	23.5
Target units (000)	780.0	288.6	297.0	161.8	32.6
% achievement	95.7%	100.0%	90.0%	102.0%	72.0%
$ Payouts (000,000)	$438.8	$195.6	$139.9	$91.2	$12.1
Average COSP payout per unit	$590.	$680.	$520.	$550.	$510.

1. Targets are stated in residential units to be converted from oil or to undergo conservation improvements. They represent an estimate by program management of a pattern of annual conversions by province and energy source necessary over the lifetime of the program to achieve the 1990 COSP goal.

Source: Adapted from, Energy Mines and Resources Canada, "The Canada Oil Substitution Program (COSP): 1983-84 Operations and Three-year Statistics", Ottawa: Document number R88-1486R, May, 1984.

years of the program. This represents 38% of the ten year conversion unit target of over 1.98 million units and 95.7% of the three year target of 780 thousand units. Overall, therefore, the program objectives have been achieved.

The conversion rates to various fuel types are also largely on target for the three year period. One hundred percent of the target for conversions to electricity has been achieved; figures for other fuels are 90% (natural gas), 102% (wood) and 72% (propane and other fuels). The latter achievement figure is substantially lower than the others but the absolute size of this fuel group is very small (only 3 to 4% of total conversions).

The COSP initiative is very significant in the Canadian setting. This is evidenced by the fact that almost two million or about two-thirds of all oil-heated residential units in the country are expected to be converted off-oil in the ten year scope of the program. Since just over thirty percent of all the nation's residential units were oil-heated at the inception of the program, the COSP program is targeted to impact one out of every five Canadian households. In the first three years of the program, the 747 thousand households receiving COSP grants obtained a total of 439 million dollars in financial aid or about $590 per household unit. These statistics testify to the persuasiveness and magnitude of the program to Canadians.

The Role of COSP in Conversion Decisions

Though COSP conversion rates are roughly on target at the third anniversary of the ten year program, conversion statistics alone are an insufficient basis for assessing the impact of the program. The role of COSP in the homeowners space heating conversion decision must be assessed.

The 1981 and 1982 surveys of COSP recipients contained several measures of COSP's impact on the conversion decision process. Table II presents results for the first of these measures, conversion motives. Respondents were asked to indicate agreement or disagreement (five-point Likert scale) to a number of statements all beginning with the phrase "I converted my heating system because...". As Table II indicates the most frequently agreed to motive is concern about future rising costs of oil. Over 90% of natural gas, electric and wood converters cited this concern. Propane converters expressed slightly less concern (79%) likely due to the fact that the costs of propane heating are slightly greater than oil heating costs. The availability of the COSP financial aid was cited as a conversion motive by just over 80% of COSP recipients. Considering that about 20% of all recipients were unaware of COSP at the time they made their conversion decision, Table II tends to under-represent the role of COSP.

Other conversion motives also play a prominant role in conversion decisions. Differential heating costs between the old (oil) system and the new system are major motivators. For example, 94% of wood converters and 78% of all natural gas and electric converters agreed that heating costs were too high with the previous system. High percentages also appeared for some groups for the motive "heating costs will be lower with new system": 93% for wood converters; 88% for natural gas converters.

Table II. Off-oil Conversion Motives.

Measure (Conversion Motive)	Percentage Agreement[1] Among COSP Recipients			
	1981 Study		1982 Study	
	Natural Gas Converters (N = 588)	Electric Converters (N = 412)	Wood Converters (N = 400)	Propane Converters (N = 185)
. concerned about future costs of oil	(91)[2]		93	79
. could apply for government grant to help cover conversion costs	83	81	79	86
. heating costs were too high with previous system	(78)		94	68
. heating costs will now be lower with new system	88	56	93	52
. afraid of future shortages of oil	48	40	32	31
. previous system in poor working condition	(43)		15	64
. previous system broken down	(14)		n.a.[3]	n.a.

1. A five-point Likert agreement scale was used to assess importance of conversion motives. Agreement refers to the percentage who responded "strongly agree" or "agree". The remainder responded either, "neutral", "disagree" or "strongly disagree".

2. Percentages in brackets are for the combined sample of natural gas and electric converters.

3. n.a. = not measured.

Fear of future oil shortages were not a major conversion motive. Only 30% to 40% of COSP recipients cited this concern. It appears that fears about the high cost of oil heating was much more prominent on oil users minds than fears about lack of availability of oil fuel supply. Other minor conversion motives were tied to the state of mechanical performance of the (old) oil system, either its poor condition or the fact that it had broken down. Propane converters were an exception in that many (64%) cited poor condition of their old oil system as a conversion motive. This figure is of the same magnitude as the percentage of propane converters who were motivated by the high heating costs of their previous oil system (68%).

Overall, the role of the COSP financial incentive as a conversion motive appears to have been significant, especially for propane converters. However fear of rising oil costs in the future and the relative heating costs of oil versus alternative home heating energy sources were also important motivations for homeowners to undergo the expense and bother of a conversion. It should be noted that COSP covers a maximum of one-half of conversion costs and that the maximum COSP grant ($800) in many cases may represent only about one-quarter to one-third of the total costs the homeowner would incur in purchasing and installing a new heating system. Thus, homeowners must pay, one, two or three times the value of the COSP incentive out of their own pockets to fully pay for the conversion. Table II can be viewed as presenting COSP as a strong, but by no means the sole, factor in precipitating off-oil conversions in Canada.

Table III provides more specific evidence to assess the impact of COSP. The first measure presented indicates recipients' state of awareness of COSP at the time they made their decision to convert off-oil. About 20% had made the conversion decision without being aware of COSP. This suggests that, at best, about 75% of the conversion counts presented in Table I could be attributed to the existance of the COSP financial initiative.

Both the 1981 and 1982 studies indicate that the pre-conversion awareness levels for COSP were only about 60%. This is not a surprising figure for the 1981 study since it was conducted less than one year after the first announcement of the program. However, the 1982 study results are surprisingly low given that the timing was almost two years into the program. A possible explanation is the fact that people converting to wood and propane (the focus of the 1982 study) are primarily rural and may not have been as exposed to government and private heating contractor COSP-related promotions as were the largely urban natural gas and electric converters (1981 study). In fact, EMR's own COSP awareness studies conducted near the second anniversary of the program and in urban areas have produced awareness levels of 75% and more.

The questionnaires described the essential features of COSP and respondents were then asked to indicate the likelihood that they would have engaged in the conversion decision if COSP was not available. As indicated in Table III, the vast majority indicated that, indeed, they would have undertaken off-oil conversion without the COSP stimulus. A total of 78% of natural gas and electric converters surveyed in 1981 indicated they "definitely" (45%) or "probably" (33%) would have converted without COSP; only 5% "definitely would not have" converted

Table III. Role of COSP.

Measure of COSP Impact	Percentages[1]		
	1981 Study	1982 Study	
	Natural Gas and Electric Converters (N = 1000)	Wood Converters (N = 400)	Propane Converters (N = 185)
When first heard of COSP?			
- before converting	66	55	60
- about same time	12	22	20
- after converting	23	24	21
What likelihood of converting if COSP was not available?			
- definitely would have	45 (37)[2]	57	50
- probably would have	33 (37)	30	30
- probably would have not	17 (21)	11	17
- definitely would not have	5 (5)	2	4
Because COSP grant was available, was conversion made sooner than otherwise?			
- strongly agree	28	20	13
- agree	33	21	23
- neither agree nor disagree	15	19	25
- disagree	16	23	25
- strongly disagree	8	17	13
How essential was the COSP grant?			
- ESSENTIAL, I could not have afforded to convert without COSP	n.a.[3]	18	12
- HELPFUL, but I could have afforded to convert without COSP	n.a.	78	83
- COMPLETELY UNNECESSARY, in my case	n.a.	3	4

1. Some columns do not total to 100% due to rounding.

2. This second column refers to only those 660 who had heard about the COSP program prior to making their conversion decision.

3. n.a. = not measured

and a further 17% "probably would not have" converted. The figures for the subset of natural gas and electric converters who had indicated they had heard of COSP prior to making their conversion decision were very similar: 74% "definitely" or "probably" would have converted, 21% "probably would not have" and 5% "definitely would not have".

Results for this measure on the 1982 survey of wood and propane users were even more negative with respect to respondents' attribution of impact to COSP. For wood converters, 87% of recipients likely would have converted without COSP; 11% "probably would not have" and only 2% "definitely would not have". The comparable percentages for propane converters are 80%, 17% and 4% respectively.

Clearly, therefore, considerable off-oil conversion activity would have taken place in the absence of the COSP financial incentive. Speculations on the magnitude and economics of wholly COSP - induced conversion are presented later in this paper.

If COSP did not play a role as a strong stimulus causing householders to convert off-oil per se, did COSP cause them to convert sooner than they otherwise would have? Results in Table III suggest that COSP had a definite impact on the timing of the conversion action. In the 1981 study, 61% of all natural gas and electric converters were in agreement that COSP encouraged them to convert "sooner than otherwise", 15% were quite neutral on this measure, 16% disagreed and only 8% strongly disagreed. The comparable figures for the 1982 study of wood and propane converters were, respectively: 41%, 19%, 23% and 17%; 36%, 25%, 25% and 13%. It is noteworthy that the impact of COSP on the timing of conversion decisions was less prevalent in the 1982 study. This could be attributable to differences in the characteristics and situation of renewables converters (e.g., primarily rural) or to the lack of novelty of the COSP program itself.

As a final measure of COSP's impact on householders' conversion decision process, 1972 survey respondents were directly asked how essential the COSP financial aid was to their decision to convert. The results for this measure reinforce the idea that COSP was largely a contributory factor not a decisive factor. Only 12% to 18% indicated that COSP was "essential; I could not have afforded to convert without COSP". However, 78% to 83% labelled COSP with a contributory role ("helpful, but I could have afforded to convert without COSP"). Only 3% to 4% were prepared to say that COSP was "completely unnecessary".

In summary, COSP definitely appears to have encouraged homeowners to speed up their conversion decision. It does not, however, appear to have had a decisive impact role. Aside from COSP, there are other strong motivations for converting off-oil and a majority of converters would have followed through with their conversion action regardless of the COSP financial assist.

The reader might question the validity of using retrospective measures of intentions as a basis for assessing conservation program impact. This is a noteworthy point. However, several measures in Tables II and III (not just one) point to the same conclusion: COSP has contributory effectiveness but seldom is it cast in a role of decisive effectiveness. Furthermore, there is considerable

conceptual and empirical support for intentions - behaviour linkages if one looks to models of consumer behavior and the broad array of empirical research on attitude - intention - behaviour relations.

Conversions: At What Cost?

As previously discussed, survey methodologies, such as used in the present research studies, are not appropriate for clearly disentangling the conservation demand-shift effects of the COSP financial initiative from the effects of fuel prices and other factors. Ideally these issues should be addressed with experimental designs and objective measures of actual conservation results. However, based on results of consumer self-reports from the present studies and statistics on actual off-oil conversions since the inception of the program, it is possible to obtain some preliminary estimates (initial hypotheses) on the conversion or oil displacement impact of the COSP financial incentive and on the program cost per COSP-induced conversion.

From the results of Tables II and III it is obvious that only a portion of off-oil conversions that took place in the 1981 to 1984 period were directly or wholly COSP-induced. The size of this proportion cannot be pinpointed exactly but it can be narrowed down to a likely range. Since 20% to 24% of all converters surveyed apparently did not hear about COSP until after they had converted a conservative estimate is that at least 25% of conversions were not wholly COSP-induced. This estimate can be increased to the area of 40% on basis of the fact that 37% to 57% of various conversion groups stated they "definitely would have" converted without COSP availability. The estimate can be further increased to the region of 60% by including just half of those who stated they "probably would have" converted without COSP. A reasonably optimistic estimate, therefore, is that about 40% of off-oil conversion were COSP-induced.

A pessimistic estimate of the proportion of COSP-induced conversions can be obtained from several measures in Table III. Up to 5% of converters indicated they "definitely would not have" converted had the COSP grant not been available. If one-half of those who "probably would not have" converted without COSP are included, the estimate can be raised to about 12%. This pessimistic estimate can be increased to about 15% by considering that 12% to 18% of converters (at least in the 1982 study) stated that COSP was "essential"; they could not have afforded to convert without the benefit of the COSP grant.

Based on the above reasoning, the relevant range of wholly COSP-induced impact on householder off-oil conversion activity would appear to be 15% (pessimistic) to 40% (optimistic). A most likely figure of 25% can be chosen. This approximates the sum of the percentages of converters who, having had awareness of COSP prior to their conversion decision, stated they "definitely" or "probably" would not have converted if it were not for the fact that COSP was available as a financial assist.

Although these estimates are preliminary it appears that market forces (e.g., fuel prices) and householders' situational, attitudinal and other circumstances are, in the majority of cases, the decisive influencing factors in preci-

pitating off-oil conversion. At least 60%, probably 75% and perhaps as high as 85% of the off-oil conversion activity in Canada in the recent years would have occurred due to these forces. The federal governments COSP financial aid program may not have been necessary or, at least, it may have been a very expensive solution to the oil dependency problem. But just how expensive was it?

As previously indicated in Table I, about 747 thousand off-oil conversions occurred in Canada's residential sector in the 1981-82 to 1983-84 period. This represents 96% of the program target for the third anniversary date and 38% of the target for the 10 year program. The total COSP payouts were about 439 million dollars, an average of nearly $600 per residential unit converted. (The maximum payout per unit is $800). The "real cost" of each conversion for the various assumptions about wholly COSP-induced conversions are as follows:

Assumption Regarding COSP-Induced Conversion	COSP-Induced No. of Units	"Real Cost" per COSP-Induced Unit
pessimistic estimate 15%	112,050	$4,000.
most likely estimate 25%	186,750	$2,400.
optimistic estimate 40%	298,800	$1,500.
all conversions (approx.)	747,000	$600.

It is difficult to speculate on the extent of political support the COSP off-oil incentive would have received if the above data was available at the time the program was being proposed. Certainly the data would have provided "fuel" for those who wanted to oppose this expenditure of tax payers' money. Opponents could have argued that market and other forces would achieve the desired result (admitedly in a somewhat longer time horizon) and that paying out a real cost in the range of $1500. to $4000. to obtain a single conversion was too high. Perhaps, one could argue, that the money would be better spent in paying the full costs of conversion for the lower socio-economic strata of society, in support of other conversion incentives or even in support of oil supply enhancement programs. Possibly, a fraction of the total COSP payouts directed to a program to inform consumers of fuel substitution savings and paybacks from conversion activity would have resulted in a conversion impact approximating that of the COSP incentive.

On the other hand, Canada's National Energy Program targets would not likely be achieved by current market and other forces alone. As indicated above, the rate of conversions off-oil are approximately on target over the first 3 years of the program. Were it not for the COSP grant the actual figures would likely have been 15% to 40% behind target and the date of achieving the "10% only" level of housing units on-oil would be considerably beyond 1990/91. Also, it is likely

that market forces and situational/attitudinal factors alone will not be sufficient to encourage the "conversion resistant" segment to switch off-oil. Analysis of the conversion intentions of Canada's "on-oil" households has revealed that as many as 50% state that they "probably" or "definitely" will not convert off-oil in a several year planning horizon (Anderson and Rose, 1982; Anderson et al, 1983).

Clearly, attempts should be made to continue to monitor off-oil conversion rates and indicators of COSP impact. The present studies have set some tentative parameters on the likely magnitude of COSP specific influences and they should provide useful food for thought for managers of the COSP initiative and for conservation policy and program officials in other countries.

CONCLUSION

For nations wishing to speed up energy demand-shift in the residential space heating sector, Canada's COSP program is a model to emulate. COSP is a bold "demand-shift" policy thrust that is speeding up the achievement of quite bold objectives. The program is on target at year three of its ten year life. If it continues this performance one in five household units in the country will have been impacted in the short space of a decade and the nation's dependency on oil heat for residences will have been reduced from over 30% to under 10%. Other jurisdictions might be justifiably encouraged by Canada's apparent success with its COSP incentive.

This bold "demand-shift" initiative has been quite costly, however. The ten year program will cost over 1.6 billion dollars, about $600 per COSP recipient. Evidence from the consumer research studies presented in this paper suggests the real cost is in the range of $1500 to $4000 per unit converted off-oil. This results from the fact that many oil-heat using homeowners (perhaps 60% to 85% of them) would have converted off-oil if COSP was not launched. In this light, the cost/benefit aspects of COSP take on a different hue.

One thing is clear however; COSP is necessary if Canada is to achieve the off-oil conversion objectives outlined in its National Energy Plan. It would be unwise to discontinue COSP for this reason. Also, COSP may take on a more decisive impact role as the later adopters are reached. There is a sizeable segment of "conversion resistant" oil-using households for whom natural market forces may not be sufficient to precipitate an off-oil action. Indeed, the magnitude of the COSP incentive may have to be augmented to obtain penetration of this segment.

It is open to question whether the early picture of consumer response presented in this paper is truly representative of the impact that the COSP program will eventually achieve. It is imperative, therefore, that periodic samplings of COSP adopters and nonadopters be surveyed to monitor the progress of the program. The surveys should be modeled after the present studies to facilitate longitudinal comparisons. This research is particularly important since, at the time of present studies, COSP was quite young, several provinces had not introduced COSP and many homeowners with oil-fired systems had not become aware of the existence of the program and its features.

Canada's COSP initiative deserves the attention of conservation program officials in other countries. The present paper has raised the understanding of this program and has illustrated the important role consumer research can play in program evaluation.

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