



Benefit-Cost Analysis of Proposed Regulatory Instrument for 2-Butoxyethanol

Final Draft Report

APRIL 29, 2005

Prepared By:

HLB DECISION ECONOMICS INC.
1525 Carling Avenue, Suite 500
Ottawa, Ontario, K1Z 8R9
Canada

In Association with

Douglas Environmental Solutions
and
Michael Holliday & Associates

Note to the reader:

Please note that the results of the benefit-cost analysis (BCA) presented in this executive summary differ slightly from those presented in the Benefits and Costs section of the Regulatory Impact Analysis Statement (RIAS) published in the *Canada Gazette*, Part I, on July 9th 2005. The results presented in the RIAS prevail over those presented in this executive summary.

The difference in the reported results originates in one modification to the draft 2-Butoxyethanol (2-BE) Regulations made after submission of the final BCA report by HLB Decision Economics Inc.. This modification concerned the permit system. The BCA conducted by HLB Decision Economics Inc. is based on the preliminary assumption that permits could be renewed indefinitely. The proposed Regulations respecting 2-BE has been revised so that permits can only be renewed once.

The Benefits and Costs section of the RIAS shows the revised results of the analysis which reflect the permit renewal provision proposed by the Regulations respecting 2-BE.

EXECUTIVE SUMMARY

This study reports the results of the benefit-cost analysis of the impacts of the proposed regulatory instrument for 2-butoxyethanol that would limit the concentration of this substance in a wide range of consumer products, including household cleaners, automobile cleaners, and paints.

METHODOLOGY

The analysis is conducted in cost-benefit analysis framework that involves a comprehensive account of all costs and benefits of the proposed regulations over a period of time that is long enough for all costs and benefits to manifest themselves. All impacts of the proposed regulations are then quantified and estimated in monetary terms. In this study, the analysis period is 20 years.

In this assessment, the benefits of the proposed regulations are discussed in largely in qualitative terms as at the time of writing the report there was insufficient epidemiological data and evidence to claim with a large degree of certainty health benefits and estimate their monetary value. However, the study identifies a comprehensive range of costs of the proposed regulations, develops a methodology for their quantification and a model to obtain the specific cost estimates. The specific cost categories included in this analysis include:

- Incremental input costs;
- Reformulation costs;
- Regulatory compliance costs (monitoring and tracking, applying for permits);
- Transitional costs (equipment, second production line for exports), and
- Government compliance and enforcement costs.

All costs are assessed in terms of incremental costs, i.e. the model accounts for baseline scenario, or changes within the affected industries that would have taken place even in the absence of the proposed regulations.

The cost model is populated based on earlier research by consultants working for Environment Canada and Health Canada on related projects, additional research conducted specifically for this study, Statistics Canada import data, as well survey of industry and industry association on the potential impact of the proposed regulations. Uncertainty with respect to specific variable values is taken explicitly into account by specifying a probability distribution of all uncertain model variables. As a result, all outputs of the analysis are also obtained with a probability distribution.

BASELINE SCENARIO

The quantity of 2-BE used in Canada was growing during the 1990s and peaked in year 2000 at almost 8 kt. Starting from 2001, the quantities of 2-BE used in Canada have been steadily declining and fell to about 4.6 kt in 2004. This represents a decline of 42 percent between year 2000 and year 2004 and an average annual rate of decline of 12.6%.

ToxEcology (2003) indicates that the above trend is largely due to replacements of 2-BE with alternative formulations that already are taking place in the industry. The reformulations and replacements are taking place as other glycols, primarily P-series glycols, become cost-effective substitutes. Moreover, several product types, in particular paints and coatings products, show a trend towards lower VOC and zero-VOC formulations that are based on 2-BE alternatives.

We expect that these trends would continue for some time and that the quantity of 2-BE imported and used would further decline until about year 2010. This is based on the judgment that manufacturers would continue to use 2-BE in proven products and would reduce its concentrations slowly, but would use alternatives increasingly in newer products. It is also unlikely that there will be new uses for 2-BE as there are viable alternatives available from the same manufacturers. However, we expect that it is not very likely that 2-BE use would decline much beyond year 2010 because of its use as intermediate in a variety of industrial processes. The

total use of 2-BE is therefore projected to fall to about 2.6 kt by year 2010. This quantity will include about 480 tonnes of 2-BE used in consumer products and 2.1 kt used in industrial applications.

BENEFITS OF THE PROPOSED REGULATIONS

As argued elsewhere (see, for example, Holliday and Park [1995]), for all but a very few of the thousands of agents which could be considered environmental hazards, the relationships between morbidity/mortality indices and exposure are unknown or, at best, only partially understood. In acknowledging this fact, one is reduced—at best—to judging if regulatory actions will result in (or contribute to) a reduction of the exposure of Canadians to the environmental hazard. In so doing, one makes explicit the belief that a reduction in exposure will, of itself, result in a reduction in health risk—and, hence, be considered a "benefit".

The exposure of an individual using a product containing 2-BE is represented by the area under the "exposure curve" for the period that the individual is carrying out the task and is in the room where the activity is taking place.

One can establish baseline exposures based on the average current concentration levels of 2-BE, and judge the reduction on such exposures based on concentrations that would be required under the proposed regulations. The difference between the two cases could be taken as an indication of the regulation's "health benefit".

For this approach, however, could not be implemented within this study due to lack of necessary data as well as time and scope constraints. Accordingly, in the discussion of health benefits is primarily of qualitative nature.

It is clear from the baseline scenario discussed earlier that, even in the absence of regulation, exposure of the general population to 2-BE will likely be progressively reduced in the coming years because of general market trends. This in turn, will result in a reduction in the number of Canadians exposed to 2-BE. The question of regulatory benefits therefore reduces to answering the question: "will there be a more rapid reduction in exposure than would otherwise occur"?

Perhaps the area where the answer is most clearly "yes" will be in the use of 2-BE containing paints and coatings (and such ancillary products as paint thinners). The regulation will essentially result in 2-BE containing coatings-products being removed from the consumer market. Given that coatings and paints comprise about 30 percent of 2-BE containing products used by consumers [ToxEcology (2001), p.3 and p.64], it is unequivocal that a more rapid reduction in consumers' exposure will occur because of the regulation.

COSTS OF THE PROPOSED REGULATIONS

Summary Table 1 shows the total costs of the proposed regulations over the 20-year period from 2007 to 2027, by cost category. The table also shows the probability distribution, the probability of alternative outcomes at higher and lower than the traditional mean value.

**Summary Table 1: Costs of the Proposed Regulations by Category
over 2007 - 2027, Millions of 2004\$, Present Value at 5 Percent**

CATEGORY OF COSTS	PROBABILITY OF EXCEEDING VALUE SHOWN IN COLUMNS		
	50% MEAN	90%	10%

Total Costs	\$16.22	\$10.90	\$21.96
Government Costs of Monitoring and Enforcement	\$0.96	\$0.32	\$1.60
Total Costs to Industry*	\$15.26	\$9.93	\$20.95
Incremental Input Costs Compared to Baseline	\$2.66	\$0.16	\$5.83
Reformulation Costs	\$5.39	\$2.91	\$8.01
Regulatory Compliance Costs	\$4.22	\$2.11	\$6.55
Transitional Costs	\$2.99	\$0.71	\$5.46

NOTES: Industry costs include both costs to Canadian manufacturers as well as costs to importers of products containing 2-BE and directly subject to the proposed regulations

Summary Table 1 shows that the total expected costs of the regulations amount to \$ 16.22 million over the period from the first year of the proposed regulations in 2007 to year 2027. Out of these costs, the government is expected to incur about \$0.96 million for monitoring and enforcement activities, and the industry is expected to incur \$15.26 million.

The largest cost components are the reformulation costs accounting for \$5.39 million (or 35 percent of total costs to industry) followed by regulatory compliance costs and transitional costs accounting for \$4.22 million and \$2.99 million, respectively (or 26 percent and 19.5 percent, respectively). Incremental costs of input substitution are relatively small \$2.66 million (or 17.4 percent of total costs to industry).

Summary Table 2 shows the costs of the proposed regulations to various industry sectors classified by product category subject to the proposed regulations, i.e. cleaners, automobile cleaners, rug and carpet cleaners, floor and baseboard strippers, and paints and coatings. The first three product categories can in general be classified as soap and cleaning compounds industry, and the last two product categories as the paint and coatings industry.

Summary Table 2: Costs of the Proposed Regulations to Industry Sectors, Millions of 2004\$, Present Value at 5 Percent

CATEGORY OF COSTS	PROBABILITY OF EXCEEDING		
	50% MEAN	90%	10%
Total Costs to Industry	\$15.26	\$9.93	\$20.95
Cleaners	\$3.03	\$1.41	\$4.84
Automobile cleaners	\$0.13	\$0.05	\$0.22
Rug and carpet cleaners	\$1.01	\$0.52	\$1.58
Floor, baseboard, paint strippers	\$1.61	\$0.84	\$2.43
Paints and coatings	\$9.48	\$5.89	\$13.39

Summary Table 2 shows that the vast majority of costs will be incurred by the paint and coatings industry. Specifically, this industry will incur \$11.09 million, or 73 percent of all industry costs.

Summary Table 3 shows the industry cost in terms of dollars per capita across regions in Canada.

Summary Table 3: Geographic Distribution of Industry Cost of the Proposed Regulations, Cost per Capita, 2004\$

GEOGRAPHIC REGION	POPULATION, MILLIONS	SOAP AND CLEANING COMPOUNDS INDUSTRY COST PER CAPITA, 2004 \$	PAINTS AND COATINGS INDUSTRY COST PER CAPITA, 2004 \$
Ontario	12.39	\$0.14	\$0.44
Quebec	7.54	\$0.16	\$0.31
British Columbia	4.20	\$0.13	\$0.36
Rest of Canada	7.81	\$0.09	\$0.24
All of Canada	31.95	\$0.13	\$0.35

Summary Table 3 shows that in the paints and coatings industry, the largest cost burden of the proposed regulations would be incurred by the residents of Ontario in the amount of \$0.44 per capita. This is the same conclusion as that based on the number of establishments in each province. However, the second-largest burden would be incurred by the province of British Columbia in the amount of \$0.36 per capita.

In the soap and cleaning compounds industry, the costs of the proposed regulations would be more evenly distributed in terms of per-capita cost. The largest burden would be incurred by the province of Quebec in the amount of \$0.16 followed by Ontario in the amount of \$0.14.

EFFECTS ON SMALL ESTABLISHMENTS

Summary Table 4 shows that the brand-specific costs of the proposed regulations amount on average to \$40,000 (in present value terms) over the period 2007 to 2027. This cost is in the range of one annual salary in the affected industries and thus it appears that it is not a substantial burden when considered over the entire period of analysis.

Summary Table 4: NPV of Total Costs (Reformulation, Monitoring and Compliance, and Reformulation Costs) per Product Brand

INDUSTRY COST	SOAP AND CLEANING COMPOUND INDUSTRY	PAINTS AND COATINGS
Total Cost to Industry (excluding input costs), 2004\$ M in Present Value over 2007-2027, Mean Outcome	\$2.47	\$10.10
Number of Brands Exceeding Proposed Concentration Limits	59	261
Cost per Brand, 2004\$ M in Present Value, over 2007-2027	\$0.04	\$0.04

Although the costs reported in **Table 4** are small, it should be pointed out that some of these costs, and in particular reformulation and transitional costs occur in a lump sum in the first few years after implementation of the proposed regulations and thus present a significant burden to smaller companies with limited cash reserves and limited access to commercial financing.

EFFECT ON COMPETITIVENESS

Survey results indicate that affected companies would have to raise prices and that their profit margins would be reduced as a result of the proposed regulations. Some survey respondents indicated that they operate in a very competitive market and have a very small room for price adjustments. There are reasons to anticipate that a part of the impact would likely be absorbed in the form of reduced profit margins.

Survey respondents also indicated that they operate in very competitive international markets with intensive price competition and that the additional costs of the regulations would put them at a disadvantage against US and European suppliers in export markets. However, it should be pointed out that most of the costs of the proposed regulations in relations to export products could be avoided as the regulations would not apply to exported products. This would leave only the potential need for a second production line as the only cost impact. This cost accounts for about half of the transitions costs and thus can be considered relatively small.