

APPENDIX G: GOVERNMENT REGULATORY IMPACT MODEL (GRIM)

G.1 INTRODUCTION AND PURPOSE

The purpose of the Government Regulatory Impact Model (GRIM) is to help identify the effects of various efficiency regulations and other regulations on manufacturers. The basic mode of analysis is to determine the change in value of the manufacturer(s) following a regulation or a series of regulations. The model structure also allows an analysis of multiple products with regulations taking effect over a period of time, and of multiple regulations on the same product.

Industry value is defined, for the purposes of this analysis as the present value of cash flows for the manufacturer(s) in question. Cash flow is calculated by the user entering shipment volumes and manufacturer prices (i.e., prices from manufacturers to the first customer, such as a wholesaler) and then selecting user-defined regulatory levels. The model calculates the actual cash flows by year and then determines the present value of those cash flows both without regulations (the pre-regulation base case) and with regulations (the post-regulation standards case).

Output comes from the model in terms of summary statistics, graphs of major variables, and, when appropriate, access to the complete cash flow calculation.

G.2 MODEL DESCRIPTION

The basic structure of the GRIM is a standard annual cash flow analysis that uses price and volume information as an input, builds on fundamental base cost information, and accepts a set of regulatory conditions as changes in costs and investments. The cash flow analysis is separated into two major blocks: income and cash flow. The income calculation determines the profit after taxes but before financial charges. The cash flow calculation converts profit after taxes into an annual cash flow by including investment and non-cash items. Below are definitions of listed items on the printout of the output sheet. (see Section G.3)

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|------------------------------|---|
| (1) Income Statement: | Overall calculation of Net Income Before Financing (17) using revenue and cost items subject to income tax effects as described in (2) through (17). |
| (2) Price/Unit: | Actual manufacturer unit price charged to the first level of distribution (distributor, retailer, etc.) |
| (3) Unit Sales: | Annual shipments for the industry obtained from the National Energy Savings Spreadsheet. |

- (14) **Product Conversion:** Expensable costs related to meeting a regulation, often including product redesign costs and expensable factory conversion expenses. Also includes costs incurred for new product literature and catalogs, product obsolescence, and various related marketing expenses. GRIM allocates these costs over a number of years.
- (15) **Profit Before Tax:** Profit before taxes and any financing costs; computed by subtracting *Cost of Sales* (11), *SG&A* (12), *R&D* (13), and *Product Conversion* (14) from *Revenues* (4).
- (16) **Taxes:** Taxes on *Profits Before Tax*; computed by multiplying the tax rate contained in Major Assumptions by *Profit Before Tax* (15).
- (17) **Net Income Before Financing:** Profits after taxes; computed by subtracting *Taxes* from *Profit Before Tax* (15).
- (18) **Cash Flow Statement:** Overall assessment including net income, other cash related items and adjustments and investments.
- (19) **Net Income:** Net income; identical to *Net Income Before Financing* (17).
- (20) **Depreciation:** Depreciation is a non-cash cost and is added back into *Net Income* (19) as part of the cash flow calculation; identical to *Depreciation* (10).
- (21) **Change in Working Capital:** Additional accounts receivable, inventory, and other cash investments necessary to support increased revenues; computed by multiplying a percentage from Major Assumptions by the change in *Revenues* (4).
- (22) **Cash Flow from Operations:** The cash flow from operating activities; computed by adding *Net Income* (19), *Depreciation* (20) and subtracting *Change in Working Capital* (21).

- (23) **Capital Expenditures:** Investment to maintain and replace existing production assets; computed as a percentage of **Revenues** (4) using a percentage contained in Major Assumptions. Post-regulation capital expenditures equal pre-regulation expenditures plus depreciation on **Conversion Capital Expenditures** (24).
Pre-regulation:
Capital Exp. = % of annual revenues
Post-regulation:
New Capital Exp. = New % of revenues based on (Capital Exp._Pre-regulation + (Conversion Capital Exp./Useful_ life))
- (24) **Conversion Capital Exp.:** Capital costs for meeting regulations, typically including plant, equipment, tooling and the like.
- (25) **Cash Used in Investments:** Cash required for assets; computed by adding **Capital Expenditures** (23) and **Conversion Capital Expenditures** (24).
- (26) **Net Cash Flow:** Annual cash flow from operations and investments; computed by subtracting **Cash Used in Investments** (25) from **Cash Flow from Operations** (22).
- (27) **Post-Regulation Value:** Value of the relevant industry following adoption and implementation of the regulatory scenario; the present value of the annual **Net Cash Flow** (26) from the base year to the year 2012, plus a terminal value based on the final year's cash flow valued as an annuity, are computed by model and listed. The discounted rate for the present value is the "Discount Rate for NPV" contained in Major Assumptions. Pre-regulation value is computed in a similar way using base case **Net Cash Flows**(26) and terminal value.

G.3 SAMPLE INCOME STATEMENT

		Clothes Washers							
				Base Year	Announce Year			Standard Year	
				1998	1999	2000	2001	2002	2003
									2004
(1)	Income Statement								
(2)	Price/Unit			285.9	285.9	285.9	285.9	285.9	285.9
(3)	Unit Sales			7.07	7.22	7.37	7.53	7.69	8.03
(4)	Revenues			2,020.1	2,063.5	2,107.9	2,153.2	2,199.5	2,246.8
(11)	<i>Cost of Sales</i>								
(7)	Labor			207.0	211.5	216.0	220.7	225.4	230.3
(8)	Material			1,050.7	1,073.3	1,096.3	1,119.9	1,144.0	1,168.6
(9)	Overhead - Fixed			-	-	-	-	-	-
(9)	Overhead - Variable			165.7	169.3	172.9	176.6	180.4	184.3
(10)	Depreciation			70.9	72.4	74.0	75.6	77.2	78.9
	<i>Selling, General and Administrative</i>				0.035			0.035	0.035
(12)	Standard SG&A			6	11.5	17.9	24.6	31.9	39.6
(13)	R&D			37.1	37.9	38.8	39.6	40.4	41.3
(14)	Product Conversion Expense			-	-	-	-	-	-
(15)	Profit Before Tax			25.8	28.5	31.3	34.1	37.0	39.9
(16)	Taxes			53.9	55.0	56.2	57.4	58.6	59.9
(17)	Net Income Before Financing			72.0	73.5	75.1	76.7	78.4	80.0
(18)	Cash Flow Statement								
(19)	Net Income			72.0	73.5	75.1	76.7	78.4	80.0
(20)	Depreciation			70.9	72.4	74.0	75.6	77.2	78.9
(21)	Change in Working Capital			-	(2.9)	(3.0)	(3.1)	(3.1)	(3.2)
(22)	Cash Flows from Operations			142.9	143.0	146.1	149.2	152.4	155.7
(23)	Ordinary Capital Expenditures			(89.5)	(91.4)	(93.4)	(95.4)	(97.4)	(99.5)
(24)	Conversion Capital Expenditures			-	-	-	-	-	-
(25)	Cash Used In Investment			(89.5)	(91.4)	(93.4)	(95.4)	(97.4)	(99.5)
(26)	Net Cash Flow			53.4	51.6	52.7	53.8	55.0	56.2
	Terminal Value								
	Present Value Factor			1.0000	0.9324	0.8694	0.8106	0.7558	0.7047
	Discounted Cash Flow			53.4	48.1	45.8	43.6	41.6	39.6
(27)	Industry Value (Net Present Value)			\$ 905.8					