

## SOLUTION TO THE TARGET COSTING CASE STUDY

The cost per unit for product related costs was computed by dividing total budgeted costs by the projected volume of sales over the product's life. The driver cost for facility sustaining costs was estimated by dividing Giant's Motors' total cost deemed to be capacity by the estimated practical capacity, stated in cost driver units. The implication of this calculation was that as volume changes, in the long run, capacity, and therefore these facility-sustaining costs, will adjust accordingly.

The cost estimates produced the following unit budget calculations.

		Engine 1	Engine 2	Engine 3
Lifetime Volume		850000	2200000	1500000
Price		\$7,500	\$4,500	\$6,000
Materials Cost				
	Raw Material Cost	2500	1800	2300
	Components Cost	2200	1400	1200
Unit Related Cost				
	Assembly	245	105	175
	Quality assurance	84	42	84
	Rework	105	35	105
	Material handling	140	56	112
Batch Related Costs				
	Moving	350	250	200
	Setup	2000	1000	1750
Product-Related Costs				
	Engineering	94	20	37
	Supervisory	9	4	5
Facility Sustaining Costs				
	General Administrative	306	126	252
	General overhead	50	36	46
Total projected costs		\$8,017	\$4,849	\$6,199
Projected Profit		-517	-349	-199
Target profit		1100	800	1000
Excess of projected profit over target		<b>(\$1,617)</b>	<b>(\$1,149)</b>	<b>(\$1,199)</b>

### **Value Engineering:**

Engine design can put together a team and can undertake a value engineering exercise. The team purchases engines from competitors and dismantles the engines to develop alternative engine design ideas. In addition the team works with design engineers to identify new designs that will accomplish the same functions with a lower cost to eliminate unneeded functions. The value engineering activity results in the changes shown in the following table.

<b>Changed Item</b>	<b>Engine 1</b>	<b>Engine 2</b>	<b>Engine 3</b>
RM Costs	\$2,400	\$1,600	\$2,200
Purchased Components costs	\$2,100	\$1,300	\$1,000
Assembly hours	6	2	4
Rework hours	2	No change	2

These changes result in the following cost projections:

		<b>Engine 1</b>	<b>Engine 2</b>	<b>Engine 3</b>
Lifetime Volume		850000	2200000	1500000
Price		\$7,500	\$4,500	\$6,000
Materials Cost				
	Raw Material Cost	2400	1600	2200
	Components Cost	2100	1300	1000
Unit Related Cost				
	Assembly	210	70	140
	Quality assurance	84	42	84
	Rework	70	35	70
	Material handling	140	56	112
Batch Related Costs				
	Moving	350	250	200
	Setup	2000	1000	1750
Product-Related Costs				
	Engineering	94	20	37
	Supervisory	9	4	5
Facility Sustaining Costs				
	General Administrative	270	108	216
	General overhead	48	32	44
Total projected costs		\$7,709	\$4,492	\$5,791
Projected Profit		-209	8	209
Target profit		1100	800	1000
Excess of projected profit over target		(\$1,309)	(\$792)	(\$791)

### **Functional Analysis:**

Then design team evaluates power, fuel consumption, weight, quietness levels for each of the three engines. The team interviews customers to identify situations in which a change in any of these elements, up or down, will increase (decrease) in the costs less (or more) than the corresponding increase (decrease) in the price that the customer is willing to pay. Suppose that this process results in the following changes in each of these functions for the three engines.

Based on the function changes, the prices of engine 1, 2 and 3 become \$7200, \$4800 and \$6300, respectively; the raw materials costs become \$2200, \$1700 and \$2400; the assembly

hours become 4, 3 and 5; the materials hours become 5, 3, and 4: and the engineering costs become \$70,000,000, \$50,000,000 and \$62,000,000. These changes result in the following cost projections:

		<b>Engine 1</b>	<b>Engine 2</b>	<b>Engine 3</b>
Lifetime Volume		850000	2200000	1500000
Price		\$7,200	\$4,800	\$6,300
Materials Cost				
	Raw Material Cost	2200	1700	2400
	Components Cost	2100	1300	1000
Unit Related Cost				
	Assembly	140	105	175
	Quality assurance	84	42	84
	Rework	70	35	70
	Material handling	140	56	112
Batch Related Costs				
	Moving	350	250	200
	Setup	2000	1000	1750
Product-Related Costs				
	Engineering	82	23	41
	Supervisory	9	4	5
Facility Sustaining Costs				
	General Administrative	234	144	234
	General overhead	44	34	48
Total projected costs		\$7,387	\$4,695	\$6,053
Projected Profit		-187	105	247
Target profit		1100	800	1000
Excess of projected profit over target		<b>(\$1,287)</b>	<b>(\$695)</b>	<b>(\$753)</b>

**Re-engineering:**

The design team proceeded to the process design which involved considering changes to the current process the Engine division was using to make motors. This process was the basis for the cost projections for the new motors. The design team focused specifically on the production process and on identifying new ways to design the sequencing and assembly of engines. In conjunction with suppliers, the team developed a JIT manufacturing process and reorganized the production lines from a batch oriented system that involved moving assembly components in different parts of the plant to a continuous flow system that used

manufacturing cells. These changes were directed particularly at eliminating non-value added activities in the assembly process but also considered efficiencies in value-added activities. This process design resulted in the following activity changes. For engines 1, 2 and 3 respectively:

1. Assembly hours became 3, 2 and 4.
2. Inspection hours became 1,1 and 2
3. Rework hours became 1,1 and 1
4. Materials handling hours became 3,2 and 2
5. The number of moves became 4,2 and 2
6. Setup hours became 4,2 and 5
7. Engineering costs which included the cost of process redesign, became \$11500000, \$8000000, and \$9500000

<b>Particulars</b>	<b>ENGINE 1</b>	<b>ENGINE 2</b>	<b>ENGINE 3</b>
<b>Lifetime volume</b>	850000	2200000	1500000
<b>Price</b>	7200	4800	6300
<b>Materials Cost:</b>			
Raw Materials Cost	2200	1700	2400
Components Cost	2100	1300	1000
<b>Unit related Costs:</b>			
Assembly	105	70	140
Quality Assurance	42	42	84
Rework	35	35	35
Materials Handling	84	56	56
<b>Batch-Related Costs:</b>			
Moving	200	100	100
Setup	1000	500	1250
<b>Product-Related Costs:</b>			
Engineering	135	36	63
Supervisory	9	4	5
<b>Facility-Sustaining Costs:</b>			
General Administrative	144	108	162
General Overhead	44	34	48
<b>Total Projected Costs</b>	<b>\$6,074</b>	<b>\$3,960</b>	<b>\$5,277</b>
<b>Projected Profit</b>	<b>1126</b>	<b>840</b>	<b>1023</b>
<b>Target Profit</b>	<b>1100</b>	<b>800</b>	<b>1000</b>
<b>Excess of projected Profit over Target</b>	<b>\$26</b>	<b>\$40</b>	<b>\$23</b>

At this point the process concluded because the projected cost was less than the target cost.