Assembly and Final Vehicle Costs

Getting From Manufacturing To List Price

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Body Shop</strong></td>
<td>$125,000,000</td>
</tr>
<tr>
<td><strong>Paint Shop</strong></td>
<td>$400,000,000</td>
</tr>
<tr>
<td><strong>Chassis/Engine Assy</strong></td>
<td>$125,000,000</td>
</tr>
<tr>
<td><strong>Trim Line</strong></td>
<td>$100,000,000</td>
</tr>
<tr>
<td><strong>Plant cost</strong></td>
<td>$750,000,000</td>
</tr>
<tr>
<td><strong>Years</strong></td>
<td>10</td>
</tr>
<tr>
<td><strong>OCC</strong></td>
<td>8%</td>
</tr>
<tr>
<td><strong>Volume</strong></td>
<td>150,000</td>
</tr>
<tr>
<td><strong>Plant Capital Cost</strong></td>
<td>$745</td>
</tr>
</tbody>
</table>

- Working Estimates - Greenfield
- Brownfield Plant Costs Can Be Considerably Less, Although Retrosits End Up Offsetting Much Of The Benefits
List Price Of An Automobile Is A Complex Value To Establish

Many Factors Beyond Manufacturing To Consider

<table>
<thead>
<tr>
<th>Parts To Make A Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body System (BIW)</td>
</tr>
<tr>
<td>Engine &amp; Drivetrain</td>
</tr>
<tr>
<td>Instrument Panel</td>
</tr>
<tr>
<td>Seats</td>
</tr>
<tr>
<td>Electronics</td>
</tr>
<tr>
<td>Electrical</td>
</tr>
<tr>
<td>Wheels/Tires</td>
</tr>
<tr>
<td>Paint</td>
</tr>
<tr>
<td>Trim</td>
</tr>
<tr>
<td>Glass</td>
</tr>
<tr>
<td>Fuel System</td>
</tr>
<tr>
<td>Airbag</td>
</tr>
<tr>
<td>Chassis</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Alternative Breakdowns of Subsystem Costs

| Body System (BIW)                  | $1,200  | 6%  |
| Engine & Drivetrain               | $2,500  | 13% |
| Instrument Panel                  | $1,200  | 6%  |
| Seats                             | $1,000  | 5%  |
| Electrical                        | $2,070  | 10% |
| Wheels/Tires                      | $800    | 4%  |
| Paint                             | $800    | 4%  |
| Trim                              | $350    | 2%  |
| Glass                             | $350    | 2%  |
| Fuel System                       | $500    | 3%  |
| Airbag                            | $400    | 2%  |
| Chassis                           | $1,500  | 8%  |
| Total                             | $13,511 | 68% |
| Electrical Detail                 |
| harness                           | $1,100  | 6%  |
| motors (50)                       | $500    | 3%  |
| connectors (300)                  | $200    | 1%  |
| alternator                        | $100    | 1%  |
| injector solenoids (8)            | $80     | 0%  |
| battery                           | $50     | 0%  |
| lamps                             | $40     | 0%  |
| Total                             | $2,070  | 10% |

| Body System (BIW)                  | $1,200  | 6%  |
| Engine & Drivetrain               | $2,500  | 13%|
| Instrument Panel                  | $1,200  | 6%  |
| Seats                             | $1,000  | 5%  |
| Electronics                        | $841    | 4%  |
| Electrical                        | $2,070  | 10% |
| Wheels/Tires                      | $800    | 4%  |
| Paint                             | $800    | 4%  |
| Trim                              | $350    | 2%  |
| Glass                             | $350    | 2%  |
| Fuel System                       | $500    | 3%  |
| Airbag                            | $400    | 2%  |
| Chassis                           | $1,500  | 8%  |
| Total                             | $10,500 | 53% |
| Corners Detail                    |
| Wheels/Tires                      | $200    | 1%  |
| Brakes                            | $325    | 2%  |
| Steering                          | $375    | 2%  |
| Suspension                        | $400    | 2%  |
| Corner Total                       | $1,300  | 7%  |
### Getting From Assembly To MSRP

<table>
<thead>
<tr>
<th>Category</th>
<th>100%</th>
<th>50.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle Manufacturing</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Production Overhead</td>
<td>10%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Warranty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D/Engineering</td>
<td>13%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Depreciation and Amortization</td>
<td>11%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Corporate Overhead</td>
<td>14%</td>
<td>7.0%</td>
</tr>
<tr>
<td>Corporate Overhead, Retirement and Health</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selling</td>
<td>47%</td>
<td>23.5%</td>
</tr>
<tr>
<td>Distribution, Marketing, Dealer Support and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dealer Discount</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sum of Costs</td>
<td>195%</td>
<td>97.5%</td>
</tr>
<tr>
<td>Profit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Contribution to MSRP</td>
<td>200%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

- Argonne Methodology - as cited in Vyas et al.; *Comparison of Indirect Cost Multipliers For Vehicle Manufacturing*; April 2000 - available on class WWW site

### Cost to MSRP - 2

<table>
<thead>
<tr>
<th>Category</th>
<th>Material Cost</th>
<th>42.4%</th>
<th>42.5%</th>
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</thead>
<tbody>
<tr>
<td>Vehicle Manufacturing</td>
<td>0.87</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assembly Labor and Other Manufacturing Costs</td>
<td>0.13</td>
<td>6.3%</td>
<td>6.5%</td>
</tr>
<tr>
<td>Fixed Cost</td>
<td>0.09</td>
<td>4.4%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Amortization and Depreciation, Engineering</td>
<td>0.44</td>
<td>21.5%</td>
<td>21.5%</td>
</tr>
<tr>
<td>R&amp;D, Pension and Health Care, Adverting and</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overhead</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selling</td>
<td>0.1</td>
<td>4.9%</td>
<td>5%</td>
</tr>
<tr>
<td>Price Discounts</td>
<td>0.06</td>
<td>2.9%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Dealer Markup</td>
<td>0.36</td>
<td>17.6%</td>
<td>17.5%</td>
</tr>
<tr>
<td>Sum of Costs</td>
<td>1.99</td>
<td>97.1%</td>
<td>95.5%</td>
</tr>
<tr>
<td>Profit</td>
<td>2.05</td>
<td>100.0%</td>
<td>100%</td>
</tr>
</tbody>
</table>

- Borroni-Bird presentation notes - as cited in Vyas et al.; *Comparison of Indirect Cost Multipliers For Vehicle Manufacturing*; April 2000 - available on class WWW site
<table>
<thead>
<tr>
<th></th>
<th>Division Cost</th>
<th>%</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Vehicle Manufacturing</td>
<td>0.72</td>
<td>33.6</td>
<td>33.7</td>
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<tr>
<td>Division Overhead</td>
<td>0.14</td>
<td>6.5</td>
<td>6.7</td>
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<tr>
<td>Assembly Labor and Overhead</td>
<td>0.14</td>
<td>6.5</td>
<td>6.5</td>
</tr>
<tr>
<td>Overhead</td>
<td>0.22</td>
<td>10.3</td>
<td>10.1</td>
</tr>
<tr>
<td>Engineering, Tooling and Facilities Expenses</td>
<td>0.26</td>
<td>12.1</td>
<td>12.0</td>
</tr>
<tr>
<td>Selling</td>
<td>0.49</td>
<td>22.9</td>
<td>22.9</td>
</tr>
<tr>
<td>Sum of Costs</td>
<td>1.97</td>
<td>92.1</td>
<td>91.9</td>
</tr>
<tr>
<td>Profit</td>
<td>0.17</td>
<td>7.9</td>
<td>8.1</td>
</tr>
<tr>
<td>Total Contribution to RPE</td>
<td>2.14</td>
<td>100.0</td>
<td>100</td>
</tr>
</tbody>
</table>

- Energy and Environmental Analysis Report (from OTA-ETI-638; September 1995) - as cited in Vyas et al.; *Comparison of Indirect Cost Multipliers For Vehicle Manufacturing*; April 2000 - available on class WWW site