

5. Electronics

The global size of the electronics assembly industry has been estimated by Electronic Trend Publications as approximately US \$964 billion in 2008. In the United States alone, the value of shipments for the electronics industry totaled more than \$390 billion in 2006, and the industry provided over 1 million jobs in 2007.

a) Representative Operation – Electronics Assembly

This industry manufactures both finished electronic devices and electronic sub-assemblies. Typical products include assembled components and peripheral devices for brand-name manufacturers and distributors of electronic equipment, as well as for manufacturers in other industries who install electronic devices into their own products (e.g., automobile manufacturers).

The representative operation modeled is an electronics sub-assembly plant. As illustrated in Exhibit 3.18, this operation is characterized by:

- Significant land, building, and equipment requirements
- A workforce weighted heavily toward technical employees, plus a mix of skilled and unskilled staff
- Modest energy requirements
- Relatively high costs for materials, reflecting the significant use of components and sub-assemblies
- Modest in-house R&D activities.

The business is assumed to operate as a stand-alone profit center.

b) International Results

International results are illustrated in Exhibit 3.19. These results reflect the combined impact of 26 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.20.

c) Selected Cities

Exhibit 3.21 profiles results for selected cities, by country, from among the 95 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.7.

EXHIBIT 3.18 – ELECTRONICS	
Electronics Assembly – Summary of Operating Parameters	
Facilities Requirements	
Leased industrial facility	7 acres (28,328 m2)
Size of factory built	120,000 ft2 (11,148 m2)
Other Initial Investment Requirements	
Machinery and equipment – US \$'000	\$18,000
Office equipment – US \$'000	\$270
R&D equipment – US \$'000	\$750
Inventory – US \$'000	\$5,000
Equity financing – % of project costs	60%
Workforce	
Management	7
Sales and administration	12
Production/non-dedicated product development	
- Professional, technical	51
- Operators	20
- Unskilled laborers	6
Other	4
Total employees	100
Energy Requirements	
Electricity monthly consumption/peak demand	225,000 kWh and 720 kW
Gas monthly consumption	5,600 CCF (15,864 m3)
Other Annual Operating Characteristics	
Sales at full production – US \$'000	\$45,000
Materials and other direct costs – % of sales	48%
Other operating costs – % of sales	4%
Investment in tax-eligible R&D – % of sales	2.8%

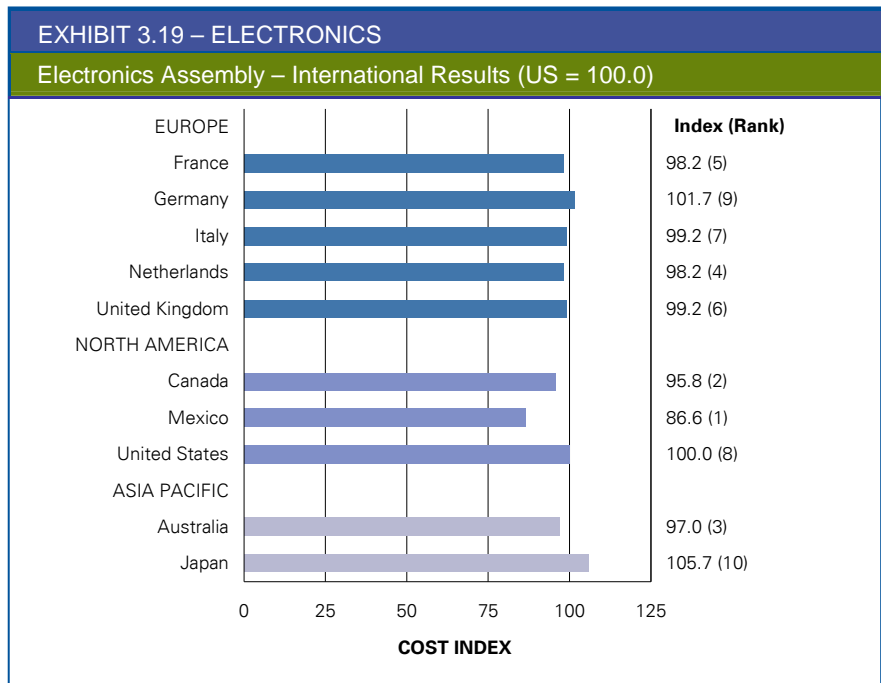


EXHIBIT 3.20 – ELECTRONICS

Electronics Assembly – Costs, by Major Component, US \$'000

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
Revenues	43,300	43,300	43,300	43,300	43,300	43,300	43,300	43,300	43,300	43,300
Costs										
- Salaries & Wages	4,920	6,851	5,405	5,950	5,307	5,634	2,354	5,830	5,901	7,402
- Statutory Plans	2,228	1,167	1,156	783	508	487	168	551	769	710
- Other Benefits	1,032	1,471	1,568	1,664	1,783	1,440	689	2,265	1,333	1,852
- Total Labor & Benefits	8,180	9,489	8,130	8,397	7,599	7,562	3,211	8,647	8,002	9,964
- Facility Lease	820	1,024	984	1,091	1,672	637	579	607	861	1,901
- Transportation	1,672	1,737	1,891	2,116	1,604	2,051	2,111	1,889	2,067	1,341
- Utilities	321	442	662	418	420	290	302	263	493	422
- Interest & Depreciation	2,692	2,838	2,735	2,732	2,807	2,778	1,679	2,816	2,293	2,990
- Non-Income Taxes	669	311	65	63	937	508	62	718	240	1,294
- Location-Insensitive Costs	22,408	22,408	22,408	22,408	22,408	22,408	22,408	22,408	22,408	22,408
Profit Before Income Tax	6,537	5,052	6,427	6,077	5,855	7,068	12,949	5,953	6,937	2,980
- Income Taxes ¹	1,670	1,551	1,963	1,206	1,384	1,260	3,560	1,805	1,611	1,051
Effective Rate	25.5%	30.7%	30.5%	19.8%	23.6%	17.8%	27.5%	30.3%	23.2%	35.3%
After-Tax Profit	4,868	3,501	4,464	4,871	4,471	5,809	9,389	4,149	5,326	1,929
Total Annual Costs	38,432	39,800	38,837	38,429	38,830	37,492	33,910	39,152	37,975	41,371
Index (US=100.0)	98.2	101.7	99.2	98.2	99.2	95.8	86.6	100.0	97.0	105.7
Rank	5	9	7	4	6	2	1	8	3	10

1 Income taxes may be either positive or negative, irrespective of whether profit before income tax is positive or negative, due to the impact of specific expense deduction rules, minimum taxes, and refundable income tax credits. Effective tax rates are not shown where results are not meaningful because of low profitability.

EXHIBIT 3.21 – ELECTRONICS

Electronics Assembly – Results for Selected Cities, by Country

Country and City	Index	Rank ¹	Country and City	Index	Rank ¹	Country and City	Index	Rank ¹
International Locations – All Cities						North America – Lowest Cost Cities		
AU Adelaide	96.9	27	JP Osaka	105.0	93	CA Moncton, NB	93.9	3
Brisbane	97.0	30	Tokyo	106.4	95	St. John's, NL	94.0	4
Melbourne	96.2	19			Sherbrooke, QC	94.0	5	
Sydney	97.8	46	MX Mexico City	86.5	1	Fredericton, NB	94.2	6
			Monterrey	86.7	2			
FR Lyon	97.6	42			US Shreveport, LA	95.7	15	
Paris	98.7	67	NL Amsterdam	98.1	50	McAllen, TX	96.6	21
			Brabant Stad	97.7	43	Cheyenne, WY	96.7	22
GE Berlin	100.9	87	The Hague	98.2	55	Sioux Falls, SD	96.7	23
Frankfurt	102.4	90	Utrecht	98.1	52	Lexington, KY	96.8	24
					Tampa, FL	96.9	25	
IT Milan	98.5	61	UK London	102.3	89	Oklahoma City, OK	96.9	26
Rome	99.9	82	Manchester	96.0	18	Omaha, NE	96.9	28

1 Rank among 95 cities.