

5. Electronics

The global size of the electronics assembly industry has been estimated by Electronic Trend Publications as approximately US \$923 billion in 2006. In the United States alone, the value of shipments for the electronics industry in 2006 totaled more than \$390 billion, and the industry provided over 1 million jobs.

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
- 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 27 location-sensitive cost components applied to the modeled operation. Detailed results, by key cost component, are presented in Exhibit 3.20.

c) Leading Cities

Exhibit 3.21 profiles results for the leading (lower-cost) cities, by country, from among the 102 cities featured in this report. Results for all other featured cities can be found in Chapter 4, Exhibit 4.10.

EXHIBIT 3.18 – ELECTRONICS	
Electronics Assembly – Summary of Operating Parameters	
Facilities Requirements	
Industrial site purchased	14 acres (5.6 hectares)
Size of factory built	120,000 ft ² (11,148 m ²)
Other Initial Investment Requirements	
Machinery and equipment – US \$'000	\$8,000
Office equipment – US \$'000	\$270
R&D equipment – US \$'000	\$750
Inventory – US \$'000	\$1,000
Equity financing - % of project costs	60%
Workforce	
Management	7
Sales and administration	12
Production/non-dedicated product development	
- Professional, technical	46
- Operators	18
- Unskilled laborers	13
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 m ³)
Other Annual Operating Characteristics	
Sales at full production – US \$'000	\$19,500
Materials and other direct costs - % of sales	25%
Other operating costs - % of sales	4%
Investment in tax-eligible R&D - % of sales	2.8%

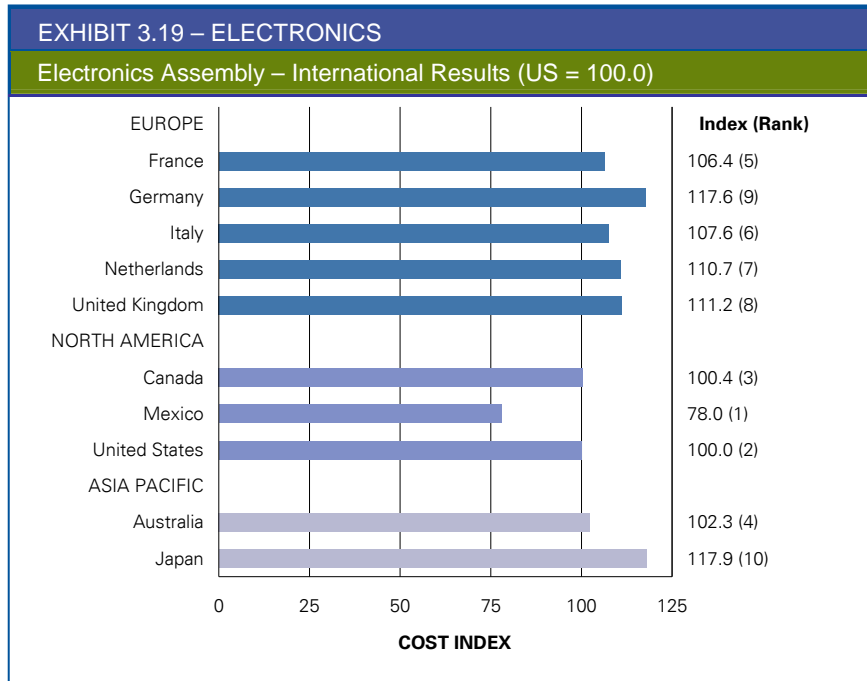


EXHIBIT 3.20 – ELECTRONICS

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

	Europe					North America			Asia Pacific	
	France	Germany	Italy	Netherlands	UK	Canada	Mexico	US	Australia	Japan
Revenues	18,750	18,750	18,750	18,750	18,750	18,750	18,750	18,750	18,750	18,750
Costs										
- Salaries & Wages	4,732	7,196	4,750	6,217	5,527	5,237	2,676	4,770	5,244	6,507
- Statutory Plans	2,005	1,147	1,544	786	663	397	327	458	682	601
- Other Benefits	966	1,460	1,273	1,926	1,742	1,116	581	1,330	1,172	2,082
- Total Labor & Benefits	7,704	9,803	7,567	8,929	7,931	6,751	3,584	6,558	7,099	9,190
- Transportation	252	264	333	260	295	314	328	288	224	312
- Utilities	390	562	727	525	470	302	442	235	444	572
- Interest & Depreciation	1,792	2,118	1,734	2,083	2,191	1,706	71	1,508	1,617	2,310
- Non-income Taxes	518	215	78	60	737	538	45	332	171	563
- Location-insensitive Costs	5,391	5,391	5,391	5,391	5,391	5,391	5,391	5,391	5,391	5,391
Profit Before Income Tax	2,703	397	2,919	1,692	1,735	3,750	8,889	4,449	3,804	412
- Income Taxes ¹	753	211	1,151	221	533	840	2,451	1,471	1,200	271
Effective Rate	27.9%	53.1%	39.4%	24.4%	30.8%	22.4%	27.6%	33.3%	31.6%	65.6%
After-tax Profit	1,950	186	1,768	1,279	1,202	2,910	6,438	2,967	2,604	142
Total Annual Costs	16,800	18,564	16,982	17,469	17,548	15,841	12,312	15,783	16,147	18,607
Index (US=100.0)	106.4	117.6	107.6	110.7	111.2	100.4	78.0	100.0	102.3	117.9
Rank	5	9	6	7	8	3	1	2	4	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 Leading Cities, by Country

Country	City	Index	Rank Among 102 Cities	Country	City	Index	Rank Among 102 Cities
France	Toulouse	104.8	75	Canada	Sherbrooke	94.5	10
	Mulhouse	105.6	79		Charlottetown	94.6	11
Germany	Halle	114.2	95	St. John's	94.9	13	
	Erlangen	118.3	99	Moncton	95.1	15	
Italy	Vicenza	106.6	82	Mexico	Reynosa	75.6	1
	Livorno	107.8	85		Aguascalientes	77.7	2
Netherlands	Utrecht	110.7	93	United States	San Juan	85.7	6
United Kingdom	Plymouth	108.7	87		Shreveport	92.8	7
	Barnsley	108.8	88		McAllen	93.3	8
Australia	Adelaide	100.2	42		Little Rock	94.4	9
	Brisbane	101.3	51		Montgomery	94.8	12
Japan	Fukuoka	117.2	97		Oklahoma City	94.9	14
	Hamamatsu	118.2	98		Greenville-Spartanburg	95.2	16
				Lexington	95.9	18	
				Charleston	96.0	19	