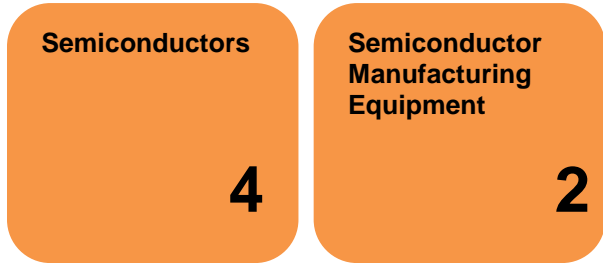




2016 Top Markets Report **Semiconductors and Semiconductor Manufacturing Equipment** Country Case Study

Korea

Korea is the fourth largest export market for semiconductors and the second largest export market for semiconductor manufacturing equipment. Korea is a participant in the WTO Information Technology Agreement, so most types of semiconductors and semiconductor manufacturing equipment enter the country duty-free, and any remaining types are covered under the U.S.-Korea Free Trade Agreement and the WTO Information Technology Agreement expansion.



Overview of the Markets

Korea is a large market for U.S. exports of both semiconductors and semiconductor manufacturing equipment. Due to Korea's position as a leading semiconductor producer, it is the second largest market for semiconductor manufacturing equipment as a U.S. export market and as a world market. The Korean market is receptive to both U.S. semiconductors and semiconductor manufacturing equipment, though it is the top contender in the memory IC industry. Korea ranks lower as a market for semiconductors because the country is less important as a location for ICT/electronics equipment assembly. Semiconductor buying decisions by Samsung, LG and other major electronics equipment manufacturers may be made in Korea, however, even though the actual product manufacturing and assembly will more likely take place in China.

Semiconductors

Korea is the fourth largest export market for U.S. semiconductors and is the world's second largest producer of semiconductors behind the United States.

Korea's electronic products industry, which is the largest demand factor for semiconductors, is expected to grow from \$24.7 billion to \$26.2 billion from 2014 to 2016, an average annual growth rate of 3 percent. Growth will be driven by production of consumer electronics, mobile communications, displays, next generation LCD TVs, Internet-enabled sensors, the Internet of Things and automotive electronics.¹

Korean imports of semiconductors grew 3.52 percent from 2014 to 2015, from \$35.3 to \$36.7 billion. Imports are not the best measure of the size of market, however, due to imports of semiconductors manufactured on contract (Foundry) and OSAT (Outsourced Semiconductor Assembly and Test - semiconductor final assembly, packaging and test). This is reflected in Korea's import statistics, with Taiwan (leader in foundry/OSAT) and China (leader in OSAT) as the top importers into Korea, even though the U.S. is the top producer of semiconductors.² According to ITA's best-guess estimates, based on Korean production of electronic products containing semiconductors and size of the total Asia other than Japan and China and other semiconductor market,³ the Korean market

represents around 7 to 9 percent of worldwide sales of semiconductors.

Semiconductor Manufacturing Equipment

As the world's second largest market, Korea is vital for the U.S. semiconductor manufacturing equipment industry, and U.S. companies are well established in the Korean market.⁴ Due to continued semiconductor fabrication/manufacturing facility (fab) construction and fab equipment upgrading by Korean semiconductor manufacturers, Korea grew from the third largest market for semiconductor manufacturing equipment to second in 2010 and has remained there ever since. Korea represented 19 percent of the world market for semiconductor manufacturing equipment in 2015, growing 18 percent to \$8.08 billion from 2014's \$6.84 billion.⁵

Challenges and Barriers to U.S. Semiconductor and Related Equipment Exports

Overall, U.S. companies enjoy access to the Korea semiconductor, and semiconductor manufacturing equipment markets present no significant tariff or non-tariff barriers to U.S. exports. Korea's semiconductor industry is innovative and is currently the United States' largest competitor, with a global market share of 17 percent in 2015.⁶ There is no regulation applied to semiconductor chips, per se, but when chips are assembled into electronic devices, the products are subject to KC Mark conformity assessments.⁷ Also, protection of intellectual property rights is a concern for the semiconductor manufacturing equipment industry.

Semiconductors

Korea is the second largest producer of semiconductors, behind the United States, with 17 percent share of world sales.⁸ Korean companies Samsung and SK Hynix are the second and third largest semiconductor companies in the world. Korea has no other companies among the top 10.⁹ Korea's strength is in memory (DRAM and NAND) with 63.1 percent and 47.7 percent of the production of those products (2013 – latest available).¹⁰ U.S. company Micron is also a major producer of memory semiconductors. Micron, the fifth ranked producer of semiconductors, is Samsung's and SK's largest competitor in memory (Japan's Toshiba, ranked seventh, also competes in memory, making this a crowded space).¹¹

The Korean semiconductor industry is perhaps the most cost-competitive in the world, posing challenges to U.S. semiconductor companies. The product mix of the U.S. industry is wider than that of Korea, creating opportunities for U.S. products such as microprocessors, ASICs, analog and sensors.

Semiconductor Manufacturing Equipment

Unlike semiconductors, there are no major Korean producers of semiconductor manufacturing equipment, and Korean companies have less than 3 percent of the world market.¹² U.S. companies may confront IPR issues in Korea, some of which appear to be influenced by Korean policies to promote local production of semiconductor manufacturing equipment. In a past industry survey, Korea was identified by the semiconductor manufacturing equipment and materials industries as the country of most concern with respect to IPR.¹³

Opportunities for U.S. Companies

WTO Information Technology Agreement Expansion

Implementation of the expansion will begin in July 2016. Korea will offer duty-free access immediately after three tariff cuts in 2019 for almost all of the semiconductor and semiconductor manufacturing related products covered by the WTO ITA expansion (with a near 50/50 split). The exception is for microprocessors with a staging period of seven years (tariff free in 2023).¹⁴ See Appendix 1 for a list of the semiconductor-related products in the WTO ITA expansion, information on the WTO ITA expansion and links to key documents.

Semiconductors

In 2015, Korea imported \$36.7 billion of semiconductors.¹⁵ Couple that with Korean electronics production of \$24.7 billion in 2014 and you come up with a very attractive market. Korea is a world leader in developing innovative consumer electronic products, including mobile communications, displays (including next-generation Ultra High Definition monitors and televisions), automotive electronics, appliances that digitally talk to one another in a household network (Internet of Things), and "smarter" cars, buildings and entire smart cities—all of which require advanced semiconductors as inputs.

According to the U.S. Commercial Service, semiconductors is a best prospect industry. Best subsectors for U.S. semiconductor companies include analog semiconductors, automotive-related semiconductors (microcontrollers, tire pressure mounting systems and other sensor systems) and system semiconductors (HDMI and power semiconductors, both discrete and integrated circuit).¹⁶

Semiconductor Manufacturing Equipment

After growing 31 percent from 2013 to 2014 and another 18 percent from 2014 to 2015, the Korean

market is forecast to contract in 2016, decreasing 9 percent from \$8.08 to \$7.36 billion.¹⁷ Korea is expected to retain its ranking as the second largest market and will experience an upturn in future years as fabs are upgraded and built. More than 80 percent of semiconductor manufacturing equipment sold in Korea is imported, and the U.S. is the top producer, so Korea should continue to be an excellent market for semiconductor manufacturing equipment.

2017 Trade Shows/Events in Korea

February 8-10 2017: SEMICON Korea. Seoul, Korea

¹“The Yearbook of World Electronics Data, Volume 2: Americas, Japan, Asia Pacific 2014”, Reed Electronics Research.

²Global Trade Atlas, accessed 4/4/2016.

³WSTS data and Reed Electronics Research data.

⁴“Captive IC Equipment Suppliers”, VLSI Research, 2014.

⁵SEMI’s 2015 Year End Forecast Report Final SEMI 12/2015.

⁶“SIA 2016 Factbook”, Semiconductor Industry Association March 2016.

⁷“Korea – Semiconductors”, Korea Country Commercial Guide, U.S. Commercial Service, 2/2015 <http://apps.export.gov/article?id=Korea-Semiconductors>

⁸“SIA 2016 Factbook”, Semiconductor Industry Association March 2016.

⁹“Gartner Says Worldwide Semiconductor Revenue Declined 1.9 percent in 2015” Gartner Newsroom1/7/ 2016.

¹⁰“Investment Opportunities in Korea – Semiconductors” Invest in Korea, KOTRA, 2015

¹¹“Global Semiconductor Market Slumps in 2015, IHS Reports” Solid State Technology, 4/4/2016.

¹²“The Chip Insider: Equipment and Emerging Markets July 31, 2014”, VLSI Research.

¹³“IP Challenges for the Semiconductor Equipment and Materials Industries”, SEMI, June 2012 (updated 10/12)

¹⁴[WTO members conclude landmark \\$1.3 trillion IT trade deal](#) – Includes link to the parties’ national line schedules. WTO, 12/16/2015. Also see

Appendix 1.

¹⁵Global Trade Atlas

¹⁶“Korea – Semiconductors” Country Commercial Guide – Korea 2/2015.

¹⁷SEMI’s 2015 Year End Forecast Report Final SEMI 12/2015.