



CBI Product Factsheet for Semiconductors for automotive and industrial applications in the Czech Republic

'Practical market insights on your product'

Despite contributing only a small share to the EU's total GDP and manufacturing output, the Czech Republic is expected to show remarkable growth in manufacturing and high tech technologies over the next few years, driven by government aid and incentive schemes for investors, historic heritage in industrial and automotive manufacturing and skilled human resources. The government has established growth policies for these sectors in light of the fact that high technology products containing semiconductors will make up the highest share of all exports in 2017. These outlooks, combined with the possibility of entering the competitive landscape as a 'disrupter' are making the Czech Republic an attractive target market for semiconductor manufacturers from developing countries.

Product Definition

Semiconductors are materials that have electrical conductivity between that of a conductor and that of an insulator. They can display a range of useful properties such as passing current more easily in one direction than the other, variable resistance, and sensitivity to light or heat. Because the conductive properties of a semiconductor material can be modified by the controlled addition of impurities or the application of electrical fields or light, devices made with semiconductors are very useful for the amplification of signals, switching, and energy conversion. They are the foundation of modern electronics and are found in virtually all electronic devices today. They are particularly used in:

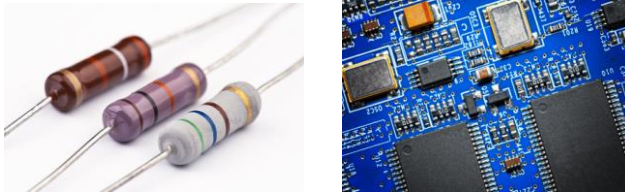
- Transistors
- Solar cells
- Light-emitting diodes (LEDs) and
- Integrated circuits

Semiconductors are applied in the production of all electronic equipment and assemblies for industrial, automotive and other applications.

Semiconductors are grouped under HS codes that start with 854221, 85429, 85044, 85411, 85412, 85413, 85415, 85419, 85319020, 85044050, 901380, and 901390.

Both brand names of semiconductors and product quality are important to the buyer. [ABB Semiconductors](#) and [ON Semiconductor](#) have production facilities in the Czech Republic.

Photo examples: *Transistor, Circuit board*



Source: Fotolia

Product Specifications

Quality:

High product quality and compliance with international and the European standards on safety, as well as national legislation and practices are key for all European companies.

The highest levels of quality can only be shown by following the ISO 9001, ISO/TS 16949 and ISO 26262 (for the automotive application) standards. The materials used, especially hazardous substances have to comply with RoHS and must also fulfil REACH requirements (see "Buyer requirements" in this document).

In addition to the above mentioned standards, industry specific standards set by [JEDEC](#) (Joint Electron Device Engineering Council) for general semiconductor devices and [AEC](#) (Automotive Electronics Council) for semiconductors used in the automotive industry, are required by European (and Czech) customers. These standards define several stress tests, which simulate the lifetime of semiconductors. Each customer defines the specific stress tests that must be successfully passed.

Overall, European (and Czech) customers expect very low defect rates for semiconductors. When used in commercial or industrial applications, defect rates must not exceed 50 ppm, while integrated circuits used **in the automotive industry must be supplied with defect rates of close to 0 ppm.**

Key specifications for semiconductors include the voltage, current and frequency of semiconductors. To answer the demands of the current mega trends of 1) energy efficiency, 2) mobility, 3) security, new generation semiconductors **improve energy efficiency, reduce operating noise, enable efficient digital power conversion, enable the construction of microcontrollers, and support the security of people's lives.**

Labelling:

Products marketed in the Czech Republic must be labelled in accordance with the EU requirements, i.e., must provide product information and protect consumers' health, safety and interests.

The label information must also be electronically readable. Examples of suitable label technologies include:

- Bar Codes
- Data Matrices
- Radio Frequency ID

Semiconductors are typically labelled with the description of content, including the following types of information:

- type of product,
- model type,
- quantity,
- net and gross weight (in kilograms),
- supplier/manufacturer name,
- supplier/manufacturer location,
- serial number,
- various environmental logos,
- country of origin,
- moisture sensitivity level,
- temperature,
- hours,
- "sealed" date.

Photo example:
Labelling



Source: Fotolia

Packaging:

- Packaging for products marketed in the Czech Republic, must meet certain EU requirements. Make sure that your packaging:
 - o has minimal weight and volume;
 - o has low levels of hazardous substances and materials in the packaging material;
 - o is recyclable.
- Packaging must protect products from damage, moisture and protect consumers from possible injuries. The supplier must test the semiconductor packaging for moisture sensitivity. The testing procedures are outlined in standards [EIA/JEDEC A112-A](#) and [EIA/JEDEC A113-B](#) and result in moisture sensitivity levels ranging from 1 to 6:
 - o JEDEC level 1 corresponds to a package that is not moisture sensitive.
 - o Any package denoted level 2 or higher requires removal of moisture.
- Semiconductors are usually packed in one of three primary component containers: **Stick magazines** (also called shipping tubes), **trays**, or **tape-and-reels**.
 - o Stick magazines are constructed of rigid clear or translucent polyvinylchloride (PVC) material. They are extruded in outlines that meet current industry standards and can be used to feed automated assembly processes. Stick magazines are usually packed and shipped in multiples of single magazines
 - o Trays are constructed from carbon-powder or fibre materials that are selected according to the maximum temperature rating of the specific tray. They are moulded into rectangular JEDEC standard outlines, containing matrices of uniformly spaced pockets. The pocket protects the component during shipping and handling, and the spacing provides exact

- component locations for standard industry automated-assembly equipment.
- o The tape-and-reel configuration is designed for feeding components into automatic-placement machines for surface mounting on board assemblies. This configuration can be used for all SMT packages and provides component lead isolation during shipping, handling, and processing. The complete configuration consists of a carrier tape with sequential individual cavities that hold individual components, and a cover tape that seals the carrier tape to retain the components in the cavities. In most cases, single reels of components are inserted into intermediate boxes before shipping.

Buyer Requirements

To assure durability and safety, products *must* comply with relevant EU regulations and standards, since the Czech Republic is one of the 28 EU member states. Compliance with 1) *must* requirements, and 2) *common* requirements, is a basic necessity for *all exporters* in the electronics and electrical engineering sector. Below you will find all standards that apply to **semiconductors**. Familiarise yourself with guidelines on the application of all *must and common* requirements.

Requirements you must meet

1. CE marking

- For the intra-European trade, semiconductors must be marked with the CE mark, which shows that the product was assessed before commercialisation and that it meets EU safety, health and environmental protection requirements. For semiconductors, the most important Directives on CE marking are:
 - Electromagnetic compatibility (EMC Directive 2004/108/EC),
 - Low voltage equipment (LVD 2006/95/EC),
 - Ecodesign for energy-related products (Directive 2009/125/EC), which are not standards but implementing measures,
 - RoHS (see below).

Considerations for action:

- Apply for CE marking for all your products, **before** approaching potential customers in Czech Republic.
- The [European Commission page on CE marking](#) is a useful starting point to find out how the legislation on CE marking is relevant to you; it illustrates the key steps you need to take to comply and have your products CE marked.
- Check information for relevant standards and guidelines on the application of LVD, EMC and Ecodesign in the [Buyer Requirements](#) section on CBI's Market Intelligence platform.
- Familiarise yourself with standards that apply for semiconductors [here](#) (LVD) and [here](#) (EMC)
- Familiarise yourself with implementing measures on ecodesign [here](#)
- Read more about CE marking for [low voltage equipment](#) and [electromagnetic compatibility](#) in the EU Export Helpdesk

2. Chemicals

- Use of certain chemicals is restricted by the EU and is regulated through several Directives and Regulations. Suppliers of semiconductors must be aware of the buyers' expectations in the use of certain substances.

Considerations for action: Exporters of electronic components have to meet the requirements under both RoHS and REACH.

- **Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).** The Directive sets maximum levels for lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE) in electronic equipment (0.01% by weight for cadmium and 0.1% for the other substances). The Directive covers all electronic components with the exception for the products mentioned in [Annex III](#) to the Directive. Since 2013, CE marking has been required in relation to RoHS compliance of final products. This includes technical documentation and a declaration of conformity.

Considerations for action:

- Make sure that you provide the Czech buyer with all information required in relation to chemicals used in semiconductors. Fill out this information in the form required by your buyer, e.g., by providing information in Material Safety Data Sheets (MSDS) or software in which you declare the chemical content of your product (e.g. [BOMcheck](#) – a collective data system developed by a group of large electronics companies to collect chemical composition information from suppliers).
- Provide the Czech buyer with technical documentation and a declaration of conformity for the products supplied.

- **REACH Regulation.** This legislation restricts the use of certain dangerous chemicals (as per [Annex XVII of the Regulation](#)) and sets requirements on indicating information about the chemicals used. Manufacturers are required to provide information on the properties of chemical substances used to their buyers.

Considerations for action: List all chemicals, including raw materials and additional materials, used in your production process. Check the candidate list of [Substances of Very High Concern](#).

- **Waste of Electrical and Electronic Equipment (WEEE).** If you want to export semiconductors to the EU, be aware that your EU producers are obliged to participate in product take-back schemes. This does not directly affect exporters from developing countries, but specific requirements on the design may be set in order to facilitate the reuse and recycling set out by WEEE.

Considerations for action: To have a better understanding of WEEE requirements, familiarise yourself with information published in [the EU Export Helpdesk](#).

Common Buyer Requirements

- **Quality management systems (QMS).** If you plan to export to Czech Republic, all products must meet buyers' quality demands. ISO 9001 and 14001 are designed to make sure that the manufactured and/or exported products to Czech Republic meet the needs of customers. For *automotive applications*, components within an assembly, subassembly and finished goods have to meet quality demands outlined in **ISO/TS 16949 QMS**. Compliance with [VDE](#) (a European standard with several variations) is often also required by EU/Czech buyers.

Considerations for action:

- Apply for ISO 9001 as quickly as possible and plan for ISO 14001. Understand your target customers' requirements and if you plan to target the *automotive industry*, apply for ISO/TS 16949.
- Familiarise yourself with the VDE requirements. This requirement is important when entering the European market.
- Consider forming a Quality Assurance team within your company that will assure the high product quality required by EU/Czech buyers.
- **Corporate Social Responsibility (CSR).** EU buyers increasingly look for products that have been manufactured with due respect for human rights, labour conditions and the environment. Bigger EU companies even develop their own CSR policies and require suppliers to conform to these requirements. In particular, workers' health and safety are sensitive topics in Europe and buyers want to avoid reputation loss.

Considerations for action:

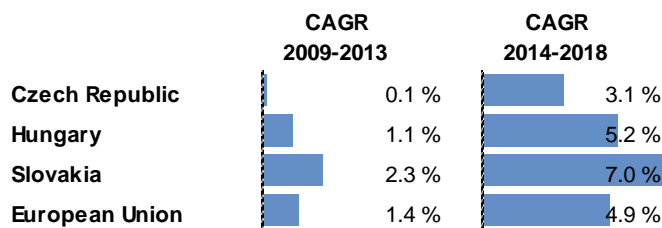
- Understand what CSR policies are required by your customers by checking websites of electronic companies in Czech Republic.
- An important initiative for the electronics sector is the [EICC Code of Conduct](#). Most large electronics companies have implemented this code and require their suppliers to act in accordance with it.
- [SA 8000](#) is a certification standard for social conditions. Although this certification is not a requirement, the standard is publicly available, so you may want to be aware of the most important issues.
- Consider implementing OHS - Occupational Health and Safety - that deals with aspects related to labour conditions. These requirements are not mandatory, but they will definitely give you an advantage over other DC exporters.

Macro-Economic Statistics

The largest economy in Central and Eastern Europe (CEE), the Czech Republic is expected to show solid growth in manufacturing and high tech technologies over the next few years, driven by strong R&D capacities and human capital with technical background.

The Czech Republic is expected to have a lower than average growth in Europe with approximately 3.1 % annual growth in 2014- 2018. Year-on-year growth in 2013/2014 is forecast to reach a marginal 0.1 %.

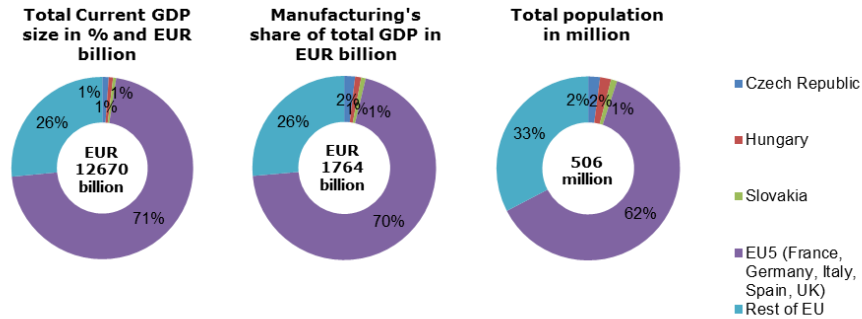
Figure 1: GDP (current prices) Compound Annual Growth Rate (CAGR) for 2009-2013 and estimate for 2014-2018 for the EU and selected countries



Data source: IMF 2014, World Economic Outlook Database

The Czech Republic is the largest economy in Central and Eastern Europe, with a GDP of approximately €145 billion and a manufacturing value of €33 billion, accounting respectively for a 1.2 % share of total GDP and a 1.9 % share of total manufacturing in the EU. The population of the Czech Republic constitutes 2.1 % of the total EU population, with approximately 11 million people.

Figure 2: Key 2013 macroeconomic indicators for Czech Republic, the EU and selected countries, in € billions



Data source: IMF and OECD 2014

The Czech automotive industry is the most developed market in the CEE region. Electrical engineering and electronics is also one of the key sectors in the country, driven by the strong historic heritage, technological specialisation, and a solid educational system. Besides automotive and EEE, the Czech Republic is strong in the sectors of Nanotechnology & Materials, Aerospace, Energy & Environment, Life Sciences, High-Tech Mechanical Engineering and ICT.

Strong research and development drives economic and manufacturing competitiveness in the Czech Republic. The country has attracted many investors, supported by government aid programmes. Human capital, with a strong technical background, and numerous science and technology parks and incubators also drive R&D. R&D in the Czech Republic increased from nearly 1% of the GDP in 2001 to 1.9% in 2011 (Source: Czech Invest). The country is the leader in R&D in the automotive segment (by number of R&D centres and companies) in CEE. Porsche, Bosch, Continental, Faurecia, Hella, Honeywell, Horiba, Siemens are just a few of the companies with R&D centres in the Czech Republic. The market also offers extensive R&D experience in the electronics sector.

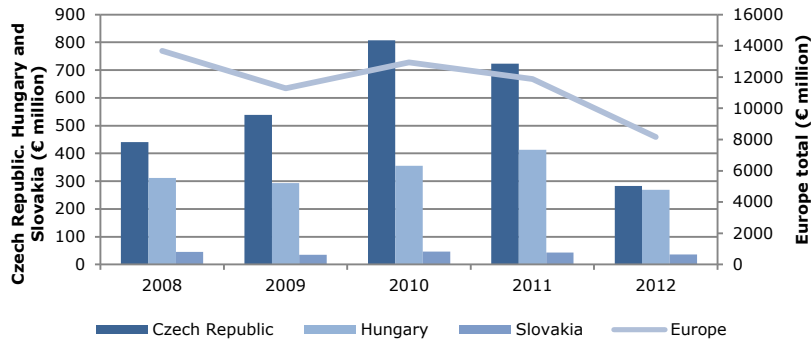
Trade Statistics

Production and Consumption

The Czech Republic is a market with a solid demand for semiconductors, driven by its strong manufacturing sector. Currently in recession, the demand for semiconductors is expected to boom in the next few years.

The Czech Republic has a long history of semiconductor production, dating back to the 1960's. The production of semiconductors in the Czech Republic peaked in 2010 with a value of ca €807 million, well above other countries in CEE such as Hungary and Slovakia. This was followed by a drop to a below average level of €283 million in 2012. The average annual growth of Czech Republic's semiconductor production for the period from 2008 until 2012 was -10.5 %, weakened by the economic slowdown in most European countries and the slump in exports in Czech Republic.

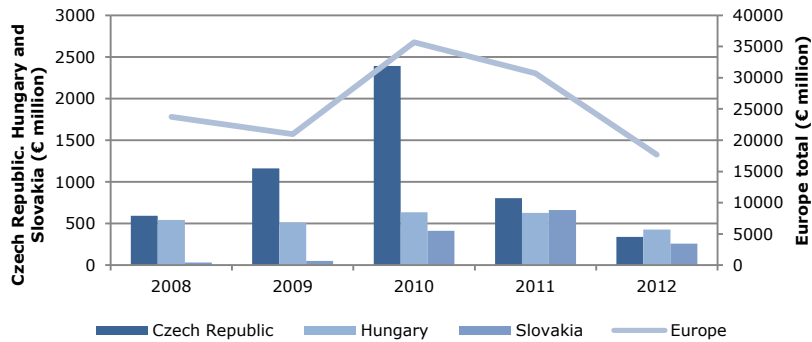
Figure 3: Production of semiconductors in Hungary, Czech Republic and Slovakia, value in € million



Source: Eurostat Prodcom (May 2014)

The apparent consumption of semiconductors in the Czech Republic shows an even more marked cyclical behaviour. While levels rose sharply from approximately €593 million in 2008 to €2,391 million in 2010, they fell as sharply to approximately €340 million in 2012. During the same years, European consumption rose from €23,751 million to €35,696 million before falling again to €17,700 million. The resulting Compound Annual Growth Rates (CAGR) for the time period were -13% for the Czech Republic and -7.1 % for Europe.

Figure 4: Apparent consumption of semiconductors in Hungary, Czech Republic and Slovakia value in € million



*Apparent consumption (Production + Imports - Exports)

Source: Eurostat Prodcom (May 2014)

- The consumption levels for semiconductors were constantly greater than production over the years 2008 to 2012

Considerations for action: Consider carefully the target market you want to reach, as this defines the volumes you can sell. Either pick a market where you can excel with cost advantages (if you have scale economies) or choose a niche segment where volumes are lower, but where you can demand higher prices due to superior product features, such as semiconductors for high-tech medical equipment.

- Production and consumption are currently in recession in the Czech Republic, but are expected to rise again due to the cyclic demand for semiconductors.

Considerations for action: Consider entering the Czech market now, or wait a few years until the next boom cycle. Carefully evaluate the market situation and your competitiveness.

- The National Research Development and Innovation (RDI) Policy, approved in 2009, identified four thematic areas: sustainable energy/competitive industry, molecular biology, information society, and the environment. The new Strategy for International Competitiveness (2012-20) aims to place the Czech Republic among the world's 20 most competitive nations.

Considerations for action:

- Enter the Czech market with a clear value proposition for the thematic areas that are placed in Czech Republic's national innovation and competitiveness policies.
- Clearly define value propositions on how you can better cater to the needs of Czech Republic's Technology manufacturers.

Import and Export

The Czech Republic is expected to focus its export trade flow on electrical equipment, road vehicles & transport equipment and industrial machinery. DC exporters are likely to benefit from the cooperation with the Czech Republic, if R&D and the manufacturing of semiconductors focus on these specific customer segments.

In 2013, the Czech Republic imported €384 million worth of semiconductors, only 5% of which originated from developing countries (€18 million in value). In the same year, 55% of semiconductor imports originated from the EU, while 40% came from the rest of the world. Imports peaked in 2010, when their value reached a level of €2.656 billion, but dropped significantly in the following years, resulting in a CAGR of -26.9 % for the 4 years from 2009 until 2013.

The leading import partner from the group of developing countries is China, with a total share of 3.6 % of all imports in 2013 (€13.9 million). The next most important developing country trading partners are Malaysia (€3.1 million; 0.8 %), the Philippines (€0.9 million; 0.2 %), and Thailand (€0.2 million; 0.1 %). Malaysia, Mexico, Turkey, and South Africa are importers with the strongest growth rates in 2009-2013.

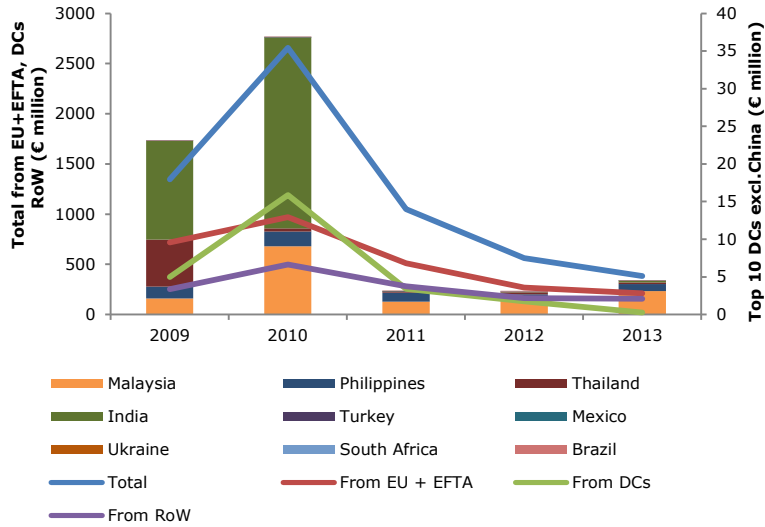
Figure 5: Import of semiconductors in Czech Republic in 2013, %

	Share of imports from DCs of total in-country imports, 2013	2009-2013 CAGR* of imports from DCs	2009-2013 CAGR* of imports from EU+EFTA	2009-2013 CAGR* of total imports
Imports	4.8%	-52.9%	-26.5%	-26.9%

*Compound Annual Growth Rate

Source: Eurostat (May 2014)

Figure 6: Imports of semiconductors to the Czech Republic by region of origin (excluding China) and selected developing countries, in € millions



Source: Eurostat (May 2014)

Overall exports of semiconductors show a similar drop to imports, falling from a high in 2010 (€866 million) to €227 million in 2013. The CAGR for the 4 year span from 2009 to 2013 is -20.4 %.

The Czech Republic’s main export partner is Germany, buying a total of ca. €59 million, i.e. 26 % of all semiconductor exports in 2013. This is because many car-makers and European distributors are based in Germany as it is an important industry and trade hub.

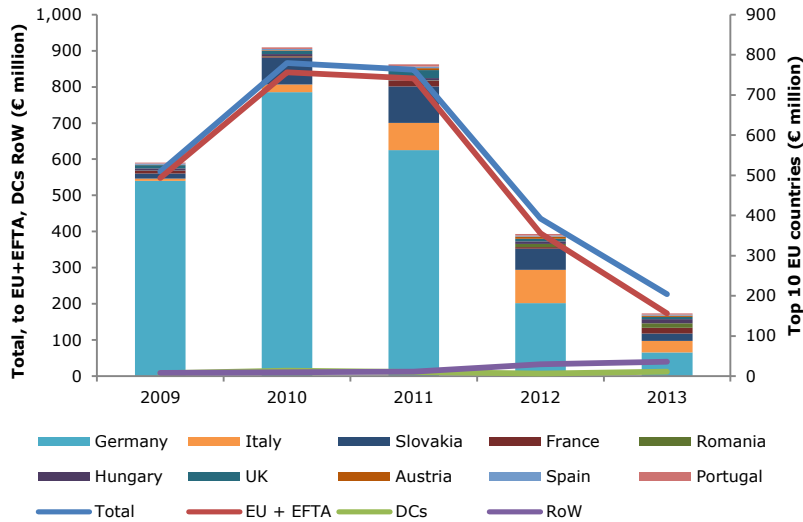
Figure 7: Export of semiconductors from Czech Republic in 2013, %

	Share of exports to EU+EFTA of total in-country exports, 2013	2009-2013 CAGR* of exports to DCs	2009-2013 CAGR* of exports to EU+EFTA	2009-2013 CAGR* of total exports
Exports	76.7%	10.8%	-25%	-20.4%

*Compound Annual Growth Rate

Source: Eurostat (May 2014)

Figure 8: Exports of semiconductors from the Czech Republic by region of origin and top 10 trading partners, in € millions



Source: Eurostat (May 2014)

- Imports and exports fell drastically over the last few years, which is not uncommon for a highly cyclical industry such as semiconductor manufacturing.

Considerations for action: Be aware of the current recession in the Czech market, but consider entering the market soon.

- Semiconductor imports from developing countries have been on a constantly low level over the past years.

Considerations for action: Bring your product and process quality up to Western standards, so that you can penetrate this market segment that is currently still dominated by suppliers from developed countries outside the EU.

- By 2017, the Czech Republic is expected to mainly import office telecom & electrical equipment. The expected import levels of these products will rise from €28 billion in 2011 to €43 billion in 2017. By 2017, the Czech Republic's exports will mainly consist of office telecom & electrical equipment, road vehicles & transport equipment and industrial machinery. Together these products will represent 55% of total exports in 2017. (Source: ING International Trade Study)

Considerations for action: Devise a mid-term strategy on how to benefit from the expected rising import levels. Focus on R&D and manufacturing for these specific product groups while devising your market entry strategy.

Market Trends

- E-Mobility and renewable energy, electronic lighting, advanced manufacturing and big data** are the top growth drivers for the semiconductor industry:
 - E-mobility and renewables drive the demand for more efficient and new generation semiconductors.
 - Electronic lighting has substituted traditional lighting, which is already banned in Europe.

- Advanced manufacturing creates demand for more intelligent products with the integration of small processors with high performance and low energy consumption.
- Big data requires more advanced data processing and analysis and secure storage solutions.
- The following semiconductors are key to many applications that answer the aforementioned trends:
 - sensors
 - LEDs
 - processors
 - memories
 - controllers

Considerations for action: Depending on your production capabilities, build your product proposition around the following product groups: sensors, processors, memories, controllers and LEDs. Consider diversification of your products based on different applications.

- The use of semiconductors in the automotive industry is set to increase, as “connected car” applications will drive an increase in semiconductor use in vehicles by 8 to 10% annually over the coming years. Experts expect body electronics, chassis, safety and energy-related technologies to provide most of the semiconductor-related revenue in automotive applications. (Source: KPMG)

Considerations for action: Actively pursue opportunities in the automotive application. Find out where automotive production facilities are located in Europe and target these regions through authorised semiconductor distributors.

- Experts see medical technologies as an attractive growth field for semiconductors in the near future. The acceptance of wearable (and ingestible) health measurement, diagnostic, and management devices is increasing, thus the demand for application-specific semiconductors will rise too. Industry experts give medical imaging/scanning (e.g., MRIs, ultrasound, etc.) and patient monitoring systems (e.g., EKGs, blood pressure, etc.) as the two main semiconductor growth drivers in the medical field.

Considerations for action: Invest in product and process quality to meet the stringent requirements for the medical sector.

- The traditional semiconductor business is highly consolidated and has growth challenges (the long-term growth rate is set to decline). Value-added business in semiconductors is referred to as “More than Moore” (by adding new features such as more current, higher voltages, faster switching instead of just expanding the number of transistors on a chip) and it is set to grow twice as fast as the traditional business. (Source: Roland Berger)

Considerations for action: Continue innovating and investing in value-added semiconductors by adding new features to transistors. If it is not possible to develop your own capabilities for advanced semiconductors, consider a strategic alliance with high-end manufacturers of semiconductors.

- The shift to the next generation of semiconductors (450mm wafer) will have a significant impact on the industry. This move requires huge investments and Intel, Samsung, TSMC, Globalfoundries and IBM have already made their first investments. The EU supports 450mm wafer production and there are five pilot lines located in Europe (Source: Roland Berger). Besides this, experts believe that a raw material transition from silicon based chips to carbon nanotubes or grapheme is inevitable, as the ability to scale silicon to 10 nanometers and below is diminishing. (Source: KPMG)

Considerations for action: Since the shift to the next generation of semiconductors requires a huge investment, consider cooperating with one of the advanced semiconductor producers.

For more information on market trends, please refer to [CBI Trendmapping for Electronics and Electrical Engineering](#).

Market Channels

The standard structure for semiconductor and electronic component sales channels includes direct sales, manufacturer representatives, and distribution. At the same time, shifting market demands call for a revision of the way in which semiconductor manufacturers approach the market. Traditional customer engagement methods and information infrastructure will very soon be no longer sufficient.

- OEMs are increasingly shifting their multi-partner cooperation approach to a single-provider. An authorised distributor is the core element in the supply chain. Besides, there are EMS suppliers that provide value-added services:
 - resolving complex logistics problems,
 - providing local support services,
 - sourcing hard-to-find components,
 - providing small volume procurement,
 - minimising costs and saving time for OEMs/ODMs.

Considerations for action: Find out who are the leading authorised distributors and EMS providers in the Czech Republic and consider partnering with them. Sitronics and Bosch are two of the *EMS suppliers* present in the Czech Republic. Look for local companies in Czech directories and/or associations (e.g., Electronic Industry Association [EIA](#)).

- Internet blogs are another new sales channel for semiconductor suppliers who want to attract high-end customers. Manufacturers use the blog to showcase their expertise by posting technical topics and discussing them. This enables direct interaction with a customer's design team. This approach has proven successful in many markets.

Considerations for action: Consider using specialised internet blogs to demonstrate your professional skills and experience. You can also talk about your innovations, through intelligence centres in order to introduce your company and ideas.

For more information on market channels and segments, please refer to [CBI Channels and Segments for Electronics for Electronics and Electrical Engineering](#).

Market Segments

From an application point of view, a common segmentation distinguishes between three major categories:

- *Commercial applications:* This segment consists of semiconductors that are used for consumer electronics, such as PCs, mobile phones, MP3 players, etc.
- *Industrial / scientific applications:* Semiconductors that are used in industrial control systems or laboratory equipment (for measuring or testing) have different requirements than those used for commercial applications. They should therefore be grouped in a separate segment.

- *Automotive applications:* As automobiles are equipped with more and more electronics (for navigation, entertainment, or safety), car manufacturers have become an important customer of the semiconductor industry. Due to the high quality requirements which are well above those for industrial applications, car-makers demand their own market segment.

Product and process research is imperative to stay competitive in the semiconductor market. However, market returns from investments in product or process-centred research are harder to realise the further developed a product or process already is. Therefore, manufacturers should turn their R&D focus to alternative innovation strategies (Source: Deloitte):

- Concentrate on platform-centric innovation, i.e. work with ecosystem partners on tuning chip roadmaps and IP to better enable the whole end-user experience and differentiate the combined value proposition of your OEM partner on better visualisation, responsiveness, connectivity, form, etc.
- Enter strategic alliances to better penetrate your target market, e.g. set up joint ventures with device companies in embedded markets like medical or automotive. As an integrated circuit manufacturer, you can combine your expertise with the company’s applications expertise and market access to bring integrated solutions to these markets while sharing in the risk of development and revenue on the system sale.

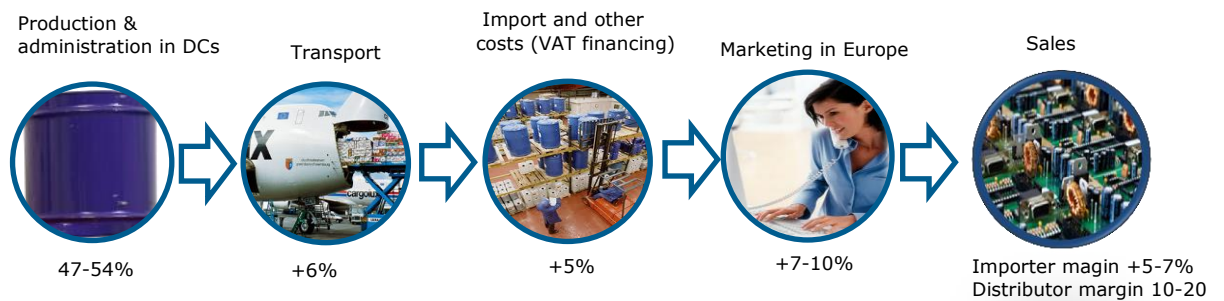
Price

Semiconductors have a wide price range, from €0.05 to €10 in Europe, depending on the specifications and application. Suppliers that are present in several European countries have harmonised their prices; any differences in pricing may occur because of the difference in logistics, taxes and other local costs.

Semiconductors	OEM volume price range, €
Integrated circuits	0.30-10
Transistors and diodes	0.05-5
LEDs and LCDs/assemblies	0.1- 5 (€5 refers to a LED/LCD assembly)

Be aware of different costs and value chain margins that add to the product price. Production and administration costs of the manufacturer usually comprise 47-54% of the end price (OEM volume price). Production and administration costs should include all raw material costs, development, labour, and other fixed and administration costs. To develop a unique selling proposition, DC exporters will have to understand their own costs, liabilities and responsibilities, and analyse product market price levels.

Figure 9:



Field of Competition

See [CBI Market Competitiveness for Electronics and Electrical Engineering](#) and [CBI Buyers' Black Box](#), as the market competitiveness of semiconductors in the Czech Republic does not differ significantly from this general overview.

Main Sources

- Eurostat, URL: <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home>
- Eurostat Prodcom, URL: <http://epp.eurostat.ec.europa.eu/portal/page/portal/prodcom/introduction>
- Organisation for Economic Co-operation and Development (OECD), URL: <http://www.oecd.org>
- International Monetary Fund (IMF), URL: <http://www.imf.org/external/index.htm>
- At the Core of Innovation, Deloitte
- KPMG Global Semiconductor Outlook, published in December 2013
- Opportunities and Challenges Beyond Moore's Law, Roland Berger, February 2014
- Decision Etudes & Conseil, URL: <http://www.decision.eu/>
- Investment and Business Development Agency CzechInvest, URL: www.czechinvest.org
- Nehanet Driving Competitive Advantage, URL: www.nehanet.com
- Distributors' and Manufacturers' Association of Semiconductor Specialists, URL: <http://www.dmass.com/>
- The European Semiconductor Industry Association (ESIA), URL: <http://www.eeca.eu/esia/home>
- ING Commercial Banking, URL: www.ingcb.com
- Other open sources such as Wikipedia, Wikinvest, Investopedia

More information

CBI market information: Promising EU export markets.

EU Expanding Exports Helpdesk - <http://exporthelp.europa.eu> - go to 'trade statistics'.

Eurostat - <http://epp.eurostat.ec.europa.eu/newxtweb> - statistical database of the EU. Several queries are possible. For trade, choose 'EU27 Trade Since 1995 By CN8'. Use the guide 'Understanding Eurostat: Quick guide to easy comext'

(http://epp.eurostat.ec.europa.eu/newxtweb/downloadobject.do?keepsessionkey=true&filenameOut=User_guide_EASY_Comext_EN_2_0_1.pdf&mimeType=application/pdf&objectID=2567&objectType=LOB&disposition=attachment) for instructions.

International Trade Statistics - <http://www.trademap.org> - you have to register

This survey was compiled for CBI by Global Intelligence Alliance
in collaboration with CBI sector expert Günther Fandrich

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