CBI
Ministry of Foreign Affairs

CBI Product Factsheet for Electronic Assemblies in the United Kingdom

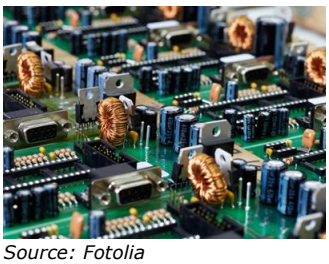
'Practical market insights on your product'

The UK is a developed market for electronic assemblies, and recent developments indicate that changes might lie ahead and provide opportunities for new market entrants. The government has dedicated funds to strengthening the technology sector in the UK and established OEMs are re-evaluating their existing manufacturing and supply chains. Researchers, both industrial and academic, agree on the most important upcoming R&D areas for electronic assemblies. Therefore, new market entrants who are able to deliver the right value proposition can challenge existing suppliers or enter alliances with domestic manufacturers to actively shape the market landscape.

Product Definition

Electronic assemblies can be complete finished products or subassemblies of a product in any application area where electronics is used. Electronic assemblies are a part of Electronic Manufacturing Services (EMS) including customer specific solution systems for different application industries. There are no limitations to the application industries of electronic assemblies, as they are used everywhere where electronics are present. Examples of applications range from lighting solutions for automotive industry and sensor electronics in materials handling to complete automation solutions, life-saving systems, data processing systems, control systems for automation, energy and other industrial applications. Aside from electronic assemblies, EMS providers also offer services such as development and production of system solutions for Original Equipment Manufacturers (OEMs), as well as after-sales services.

Photo example: *Electronic assemblies*



Source: Fotolia

Electronic assemblies are grouped under HS codes that start with 851790, 852290, 852990, 847310, 847321, 847329, 847330, 854390, 847340, 847350, 850490, 853890, 854250, 854270, 854390, 853400, and 850440.

Typically brand names of electronic

assemblies in Europe are not very significant, while the product quality and design are of higher importance. Suppliers of EMS and electronic assemblies in the UK include: ACW Technology, TT electronics, SMS Electronics, and many others.

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 UK companies. Product safety is essential in the application industry since people's lives depend on the system.

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 meet REACH requirements (see "Buyer requirements" in this document).

In addition to the aforementioned standards, UK customers expect a high level of reliability in electronic assemblies. They require product testing to be conducted by the supplier; Automated Optical Inspections (AOI) and In-Circuit Tests (ICT) are the most common tests although more sophisticated testing methods are also used.

Although defect rates of 500 ppm might be acceptable for non-critical applications, defect rates of 50 ppm or less are expected for higher quality suppliers. As these requirements are influenced by different factors each supplier must negotiate the specific requirements with the customer.

Specifications for electronic assemblies vary depending on the components and/or embedded systems used, the system complexity and the application industry of the electronic assemblies.

Labelling:

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

Photo example:
Labelling

Source: Fotolia

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

- Bar Codes
- Data Matrices
- Radio Frequency ID

Electronic assemblies 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 based on assembly.

Packaging:

- Packaging must protect products from damage and protect consumers from possible injuries.
- Packaging for products marketed in the UK, must meet certain EU requirements. Make sure that your packaging:
  - has minimal weight and volume;
  - has low levels of hazardous substances and materials in the packaging material;
  - is recyclable.
- The buyer defines the type of packaging. Typically, smaller electronic assemblies are packaged in plastic bags and cardboard boxes.
- Larger electronic assemblies are exclusively packaged in cardboard boxes to protect them from damage.

Photo examples:
Packaging

Source: Fotolia

Buyer Requirements

To assure durability and safety, products *must* comply with relevant EU regulations and standards. Compliance with 1) *must* requirements, 2) *common* requirements and 3) *niche* requirements, is a basic necessity for *all exporters* in the electronics and electrical engineering sector. Below you will find all standards that apply to **electronic assemblies**. Familiarise yourself with guidelines on the application of all *must, common,* and *niche* requirements.

Requirements you must meet

1. CE marking

- For intra-European trade, electronic assemblies must be marked with the CE mark. This shows that the product was assessed before commercialisation and that it meets EU safety, health and environmental protection requirements. For electronic assemblies, 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 the UK.
- 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 electronic assemblies 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.

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 assemblies with the exception of products mentioned in Annex III to the Directive. Since 2013, CE marking is 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 UK buyer with all information required in relation to chemicals used in electronic assemblies. 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 EU 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 electronic assemblies 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 of 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 the UK, all products must meet buyers' quality demands. ISO 9001 and 14001 are designed to make sure that the manufactured and/or exported products to the UK meet the needs of customers. For automotive application, 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 UK 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 VDE requirements. This requirement is important when approaching the European market.
- Consider forming a Quality Assurance team within your company that will assure the high product quality required by UK 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 the UK.
- 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.

Niche Buyer Requirements

Ecolabels

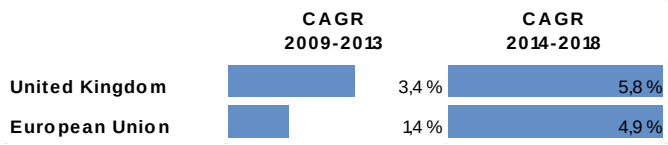
There is a growing niche market for environmentally friendlier/greener electronics. Green electronic assemblies can be sold under ecolabels to a third party, such as the "EU Ecolabel".

Considerations for action: Familiarise yourself with the "EU Ecolabel" or other European ecolabels. Check whether your customers need to have your products labelled. Consider selling your components to manufacturers of ecolabelled products.

Macro-economic statistics

The UK is expected to have growth higher than the EU average with a 5.8% Compound Annual Growth Rate (CAGR) in 2014- 2018 and forecast growth of 11.5% in 2014.

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

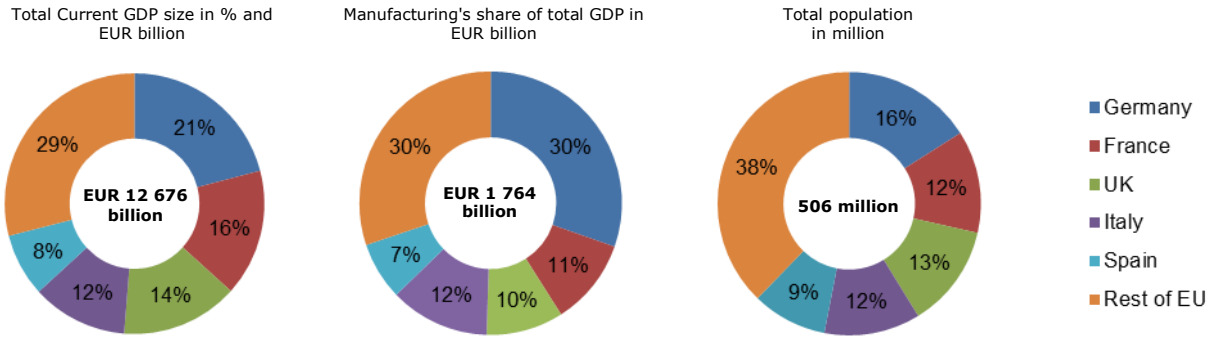


Data source: IMF 2014, World Economic Outlook Database

The UK is the third largest economy in the EU, with a GDP of approximately €1.850 billion and a manufacturing valued at €168 billion, accounting respectively for 14% share of total GDP and 10% share of total manufacturing

in the EU. The population of the UK contributes 13% to the total EU population, i.e. approximately 64 million.

Figure 2: Key 2013 macroeconomic indicators for the EU and selected countries, in € billions (population in millions)



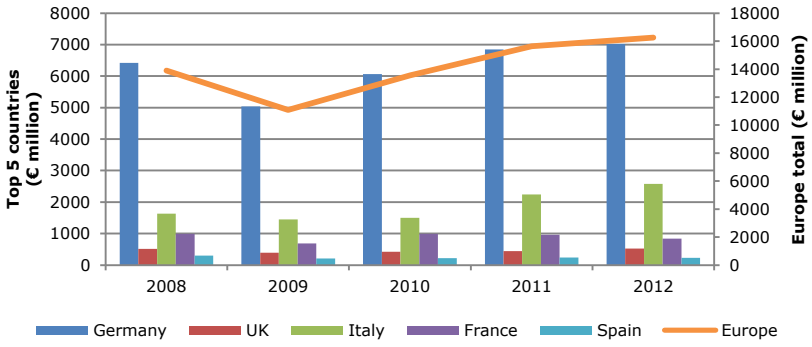
Data source: IMF and OECD 2014

Trade Statistics

Production and consumption

The production of electronic assemblies in the UK has followed the overall trend in Europe in recent years, although at a slower rate. While production in the UK was on a par with the European average in 2008 at €518 million, the recovery after 2009 was slower in the UK, so total electronics assembly production was at €525 million in the UK compared to the European average of €601 million in 2012. These levels correspond to CAGRs of 0.4 % and 4.0 % for the period from 2008 until 2012 for the UK and Europe, respectively.

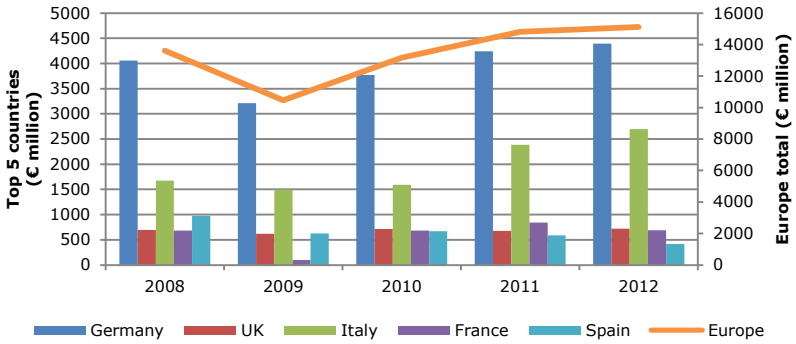
Figure 3: Production of electronic assemblies in the UK, in € millions



Source: Eurostat Prodcom (May 2014)

The consumption of electronic assemblies in the UK has proven to be more resilient in the aftermath of the economic crisis. Despite dropping in 2009, consumption recovered quickly, resulting in a CAGR of 0.9 % for the same period (2008 until 2012). For the duration of the time period, UK consumption of electronic assemblies has been clearly above the European average, with values of € 722 million in 2012 for the UK, compared to the European average of €560 million in the same year. Nevertheless, consumption growth rates in the UK remain behind Europe's growth of 2.6% for the period from 2008 to 2012.

Figure 4: Apparent consumption* of electronic assemblies in the UK, in € millions



*Apparent consumption (Production + Imports – Exports)
Source: Eurostat Prodcom (May 2014)

- Consumption of electronic assemblies has been clearly above domestic production in recent years, indicating that the UK is still a viable market for electronic assembly manufacturers. The ESCO Council has set numerous targets to achieve growth in the Electronic Systems' sector in the UK. It expects to see an annual growth rate of 6% in UK economic contribution from the sector, reaching 7.1% of GDP by 2020 (from the current 5.4% of GDP). The growth of the Electronic Systems' sector will be driven by a growth in UK vertical sectors, by improved recognition of the sector and by enhancing the skills of human capital. (Source: ESCO)

Considerations for action: Enter the UK market as early as possible, taking advantage of the good business climate and positive outlook. Using this early entry will make it easier to benefit from the expected growth of Electronic Systems and other electronics sectors in the UK.

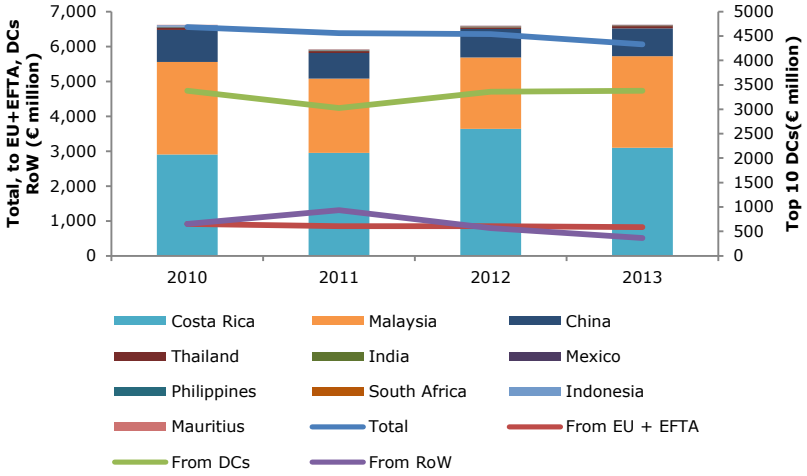
- Consumption levels have constantly been above the European average, although growth rates are below average.

Considerations for action: Enter the market with a clear strategy, knowing which segments you want to target and grow in.

Import and Export

The UK's electronic assembly import and export partners are distinct from one another. In 2013, about 78% of all electronic assembly imports originated from developing countries (€4.789 billion in value). Among these developing economies, some are especially important to UK's electronic assembly imports: Costa Rica and Malaysia accounted for 67% of electronic assembly imports to the UK in 2013, while India and Mexico were the fastest growing trade partners with CAGRs of 31.4% and 8.8% from 2010 until 2013, respectively. The total value of electronic assembly imports decreased slightly during the same period with a CAGR of -2.6 %, giving a total import value of € 6.063 billion in 2013.

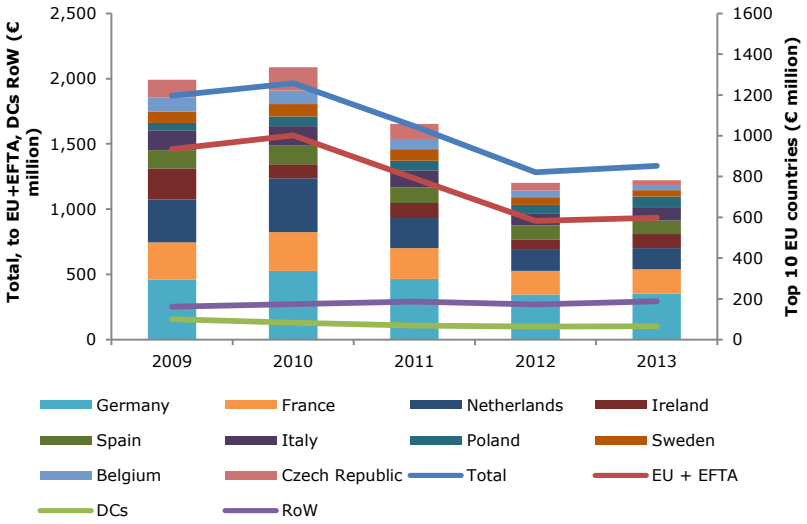
Figure 5: Imports of electronic assemblies to the UK by region of origin and top 10 trading partners in DCs, in € millions



Source: Eurostat (May 2014)

On the other hand, the UK only exported 8% of electronic assemblies to developing countries in 2013, while 70% were exported to the EU (€0.935 billion in value). There has clearly been a decreasing trend in export volumes (CAGR of -12.1% from 2010 until 2013) with the trend seeming to bottom out at €1.332 billion in 2013. The 10 most important export partners of the UK for electronic assemblies are Western and Southern EU countries. Germany holds the biggest share with an export volume of €226 million in 2013, i.e. 17 % of all electronic assembly exports.

Figure 6: Exports of electronic assemblies from the UK by destination region and top 10 trading partners in the EU, in € millions



Source: Eurostat (May 2014)

- Import levels of electronic assemblies remained relatively stable from 2010 to 2013, indicating that the electronic assembly market has already reached a mature state.

Considerations for action: Expect strong competition from existing importers when entering the UK market. Therefore, define a solid proposition to compete with existing players.

- Most electronic assembly imports have come from developing countries.

Considerations for action:
- Achieve the required standards that are already met by established producers from developing countries by introducing automated production or training your manual assembly staff.
- Implement ISO quality standards and become certified by established Western certification agencies.

- The UK is expected to experience strong growth in the future, which will also have an impact on imports and exports. International trade in the high-tech sector is projected to increase by 9% p.a. stemming mostly from the exports of developing countries. (Source: HSBC Global Connections)

Considerations for action: To benefit from increasing trade in high-tech products, you must invest in R&D to keep up with the technological sophistication that will take place in export-oriented developing countries.

Market Trends

- In the past, many UK based electronic assemblies suppliers chose to separate the design functions from manufacturing and logistics. High volume and low value production processes were subsequently outsourced, sometimes offshore. But with rising offshore labour costs, increasing transportation costs, and fear of intellectual property theft, many companies are considering insourcing their current offshore production again. These considerations are backed up by the UK government, which is willing to commit funds to help rebuild the domestic manufacturing landscape across all technology industries. (Source: techUK)
- Close monitoring of quality standards, and the convenience of close communications without language and time-zone barriers are seen as the main drivers for re-shoring.

Considerations for action: Make sure that you meet European quality standards and offer English speaking personnel that work UK business hours in order to compete with UK based electronic assembly manufacturers on a service level.

- Currently, European (including the UK) manufacturers invest in medicine, renewable energy and other industries. Driven by political measures and technological developments, electronics have penetrated new markets including:
    - electronic lighting;
    - electronic vehicles;
    - eHealth and Telemedicine.

Considerations for action: Consider offering electronic assemblies specifically to industries with high R&D investment volume, e.g. automotive (electric vehicles), energy (wind, solar and other renewable energy projects), and telemedicine. Consider sharing your knowledge and take part in pilot projects. Check on the Buyers' websites to see which projects they are currently working on.

- As the demand for energy grows, contemporary electronic systems need to handle high voltages. This means that requirements for product quality,

safety and efficiency get tougher, lead times shorten and supplier reliability plays a significant role in cooperation.

Considerations for action: Meet safety and quality demands by integrating a quality assurance programme in your production process. Work on production process optimisation and delivery time reduction. Make the production process more efficient and flexible by introducing a modular production approach and using different technologies. Minimise the risk of damage during production and meet customer requirements in terms of product quality and delivery time.

- Automation can be deployed at new product introduction stages while also delivering advantages such as flexibility in terms of accommodating evolution in product design and changes in delivery schedules.

Considerations for action: Strive to keep the overall costs (labour, transportation) significantly lower than in the UK, to compete with domestic manufacturers.

For more information on market trends, please refer to CBI Trendmapping for Electronics and Electrical Engineering.

Market Channels

- Over the last 10-15 years, original equipment manufacturers in the UK have outsourced production and logistics of electronic assemblies to save costs. Because of this, EMS providers have emerged as the dominant supply source for OEMs. They offer to not only to produce the required assemblies, but also deliver them according to customer preference – including Just In Time and Kanban delivery. These EMS providers can be domestic, but are mostly located in developing countries.

Considerations for action: Find out who are the leading EMS providers and consider a partnership with a local EMS supplier in the UK.

- Internet blogs are a new sales channel for electronic assembly suppliers who want to attract high-end customers. Manufacturers use blogs 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 specialised internet blogs in demonstrating your professional skills and experience. Besides, you can talk about your innovations, through intelligence centres in order to introduce your company and your 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

Market segments for electronic assemblies can be divided in different ways, depending on the way one chooses to break down the industry. From an application point of view, a common segmentation distinguishes between four major categories (Source: Circuit Assembly):

- Process Control: This segment includes all electric assemblies that are used to control any sort of industrial process. The field is very broad and can range from assemblies that steer entire processes in industrial

fields (e.g. programmable logic controllers) to assemblies that control single products (e.g. electric motors).
- Test & Measurement: Electronic assemblies belonging to this segment are used to test other electrical products or equipment. Most prominent for this field are assemblies that test semiconductors.
- "Other" Industrial: All assemblies that are not mentioned in the other categories can be grouped into "Other". This range is so diverse that it covers electronic assemblies for home appliances, cash withdrawal machines and material handling – to mention just a few.
- Clean Energy: Due to the rise in machines that harness renewable energy, it is worth grouping the assemblies that are used in wind turbines, solar power plants, etc. in their own category.

From a manufacturing point of view, electric assemblies can be separated into two categories:
- High Mix Low Volume (HMLV): This segment encompasses electronic assemblies that have highly complex functions and design, but are only built in small quantities. Examples include medical electronics or assemblies for specialised applications.
- High Volume Low Mix (HVLM): On the other hand, HVLM refers to assemblies that are less complex but produced in large batches, such as those used in home appliances.

Manufacturers must carefully select for which applications they want to build electronic assemblies as this determines the type of production that is best suited to serve customers – High Mix Low Volume (HMLV) or High Volume Low Mix (HVLM).

Test & Measuring equipment requires precise components, so you need to make sure that your production processes and quality assurance enable you to manufacture assemblies that meet such stringent requirements.

Clean energy electronic assemblies are very application-specific so you need to work closely with the customer to gauge his demands and define how you can best meet them. Sales representatives based in the UK are a prerequisite, as site visits are necessary for this consultative sales style. Also be aware of public tenders, as government funds are often used to finance new projects in renewable energies. Look for open sources of public tenders in the UK, at publictenders.net for example, and familiarise yourself with current renewable projects, like here.

Industrial process control and "other" industrial applications provide broader opportunities to enter the market. You can choose to position yourself as a high quality supplier because many special applications cannot be covered by commodity assemblies. For this, your engineering and development staff needs application expertise in the particular field and your sales representatives must maintain close relationships with your customers to anticipate their needs accurately.

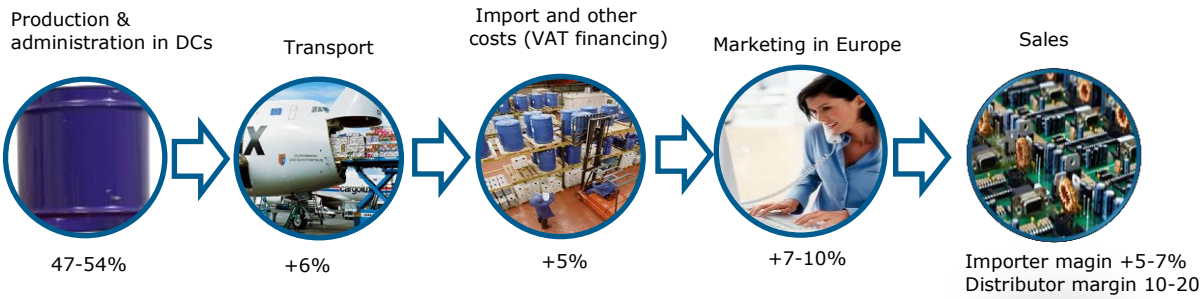
Price

Electronic assemblies have a wide price range. Prices for assemblies and sub-assemblies for industrial, automotive, lighting and data processing applications range from €5 to €200 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 a difference in logistics, taxes and other local costs.

Electronic Assemblies	OEM volume price range, €
Assemblies and sub-assemblies for industrial application	5 - 200
Assemblies and sub-assemblies for data processing	5 - 150
Assemblies and sub-assemblies for automotive	5 - 100
Assemblies and sub-assemblies for lighting	5 - 75

Be aware of different costs and value chain margins that add to the product price. Production and administration costs for the manufacturer usually make up 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 7:



Field of Competition

See CBI Market Competitiveness for Electronics and Electrical Engineering and CBI Buyers' Black Box, as the market competitiveness of Electronic Assemblies in the UK 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), URSL: http://www.imf.org/external/index.htm
- German Association for Electrical, Electronic & Information Technologies VDE, URL: http://www.vde.com
- Electronica - International Trade Fair for Electronic Components, Systems and Applications, URL: http://www.electronica.de/
- Decision Etudes & Conseil, URL: http://www.decision.eu/
- techUK, URL: www.techuk.org
- Electronic Systems Community ESCO, URL: http://www.esco.org.uk
- National Microelectronics Institute NMI, URL: http://www.nmi.org.uk

- Circuits Assembly, URL: www.circuitsassembly.com
- HSBC Global Connections Report, March 2014

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