

# Mechanical and Electrical Engineering in the Czech Republic.

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# 1 Executive Summary

- The Manufacturing industry has a long tradition in the Czech Republic and creates almost 40% of the GDP. It is high above the EU average.
- The Automotive industry is the most important sector in the Czech Republic as for the absolute volume as well as dynamic growth. Other accompanying sectors also use this trend (Plastic and Rubber, Electrical, Textile, etc.)
- The state agency CzechInvest ensures supporting and attracting new investors. There are sectors with higher added value, greater need for skilled workers, but sectors with future potential are preferred at the moment (Aerospace, Automotive, Environmental Technology, Renewable Sources of Energy, Electrical Engineering & Electronics, High-Tech Engineering, Medical, Nanotechnology etc.).
- After a crisis in 2009, Mechanical Engineering has reached the level of 2007 again in 2011. Thanks to growth in the Energy sector, Electrical Engineering has grown more than Mechanical Engineering in the last few years.

## **Opportunities for Swiss companies in particular sectors:**

### **Machine Tools and Manufacturing Technology**

- Delivering components to local producers of cutting and forming machines
- Taking-over local producers to gain their target markets in Russia, China and India.

### **Textile Machinery**

- Delivering textile machines for technical fabrics (e.g. machines for non-woven textiles)
- Delivering textile machines for special purpose and functional clothing
- Delivering components to local producers of textile machines
- Taking-over local producers

### **Plastic Machinery**

- Delivering plastic machinery to a wide range of local plastic producers (There is no serious local competitor.)
- Delivering machinery for recycling and secondary use of plastic waste

### **Packaging Technology**

- Delivering machinery for smooth cardboard manufacturing
- Delivering machinery for recycling and secondary use of paper waste
- Delivering every innovated packaging technology
- Delivering components to local producers of packaging machines
- Taking-over local producers of packaging machinery to gain the network of their current customers

### **Environmental Technology**

- New technologies of wastewater treatment (removal of nitrogen, phosphorus, drugs and aggressive cleaning products)
- Biodegradable waste - composting and biogas plants
- Recycling of plastics, paper, glass, metals, and building materials
- Technologies for energy recovery of communal waste (incinerators)
- Modern solid fuel furnaces and boilers for household use
- Technologies of combined production of electricity and heat (eventually cold) by biomass or biogas
- Heat pumps

### **Precision Tools**

- Delivering precise components for above-mentioned potential customers
- Delivering of machinery for precise metal processing

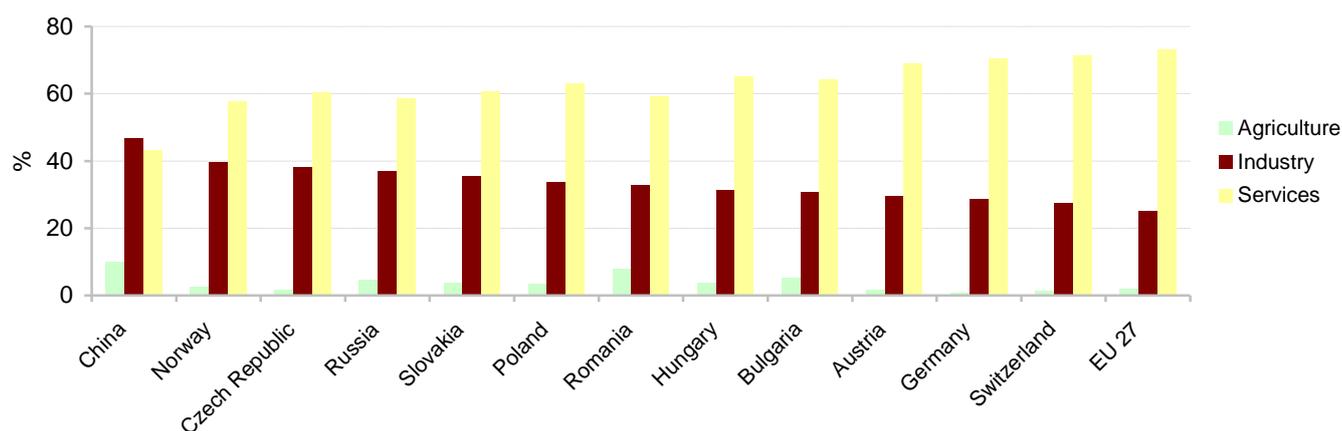
## 2 Economy and Business Environment

### 2.1 Current Economic Situation

The Czech Republic is a small open market, with a **strong connection** to its neighbouring countries, especially to **Germany and Slovakia**. The export to these two countries represents more than 40% of Czech exports.

The **manufacturing industry** is a very important source of GDP in the Czech Republic. Its share is one of the highest among European countries. There is a long tradition of metallurgy, machinery production, automotive and electro-technical industry in the CR. On the other hand, agriculture and services are under the EU average.

**FIGURE 1 Sources of GDP in Selected Countries, Ranked by Share of Manufacturing Industry (in %)**



Source: Eurostat

The results of the manufacturing industry were the worst in 2009. The production then grew until the 2<sup>nd</sup> quarter of 2012. Now it looks like the crisis is showing its second fall. The prospects are unclear. Large engineering companies have published new orders from BRIC countries, especially from Russia, China and India (the business relation with Brasil is lower). On the other hand, some automotive companies cancelled announced investments, because of expected decline of demand in 2013-2014.

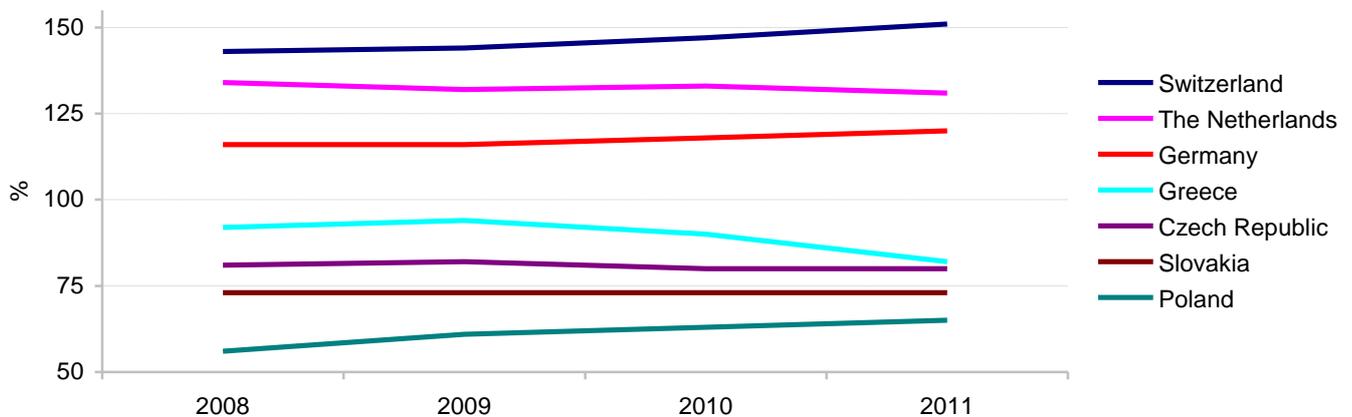
**TABLE 1 Macroeconomic data (index year-to-year)**

Indicators	2007	2008	2009	2010	2011	CAGR
<b>GDP</b>	109,2	105,1	97,2	101,0	100,9	102,7
<b>Manufacturing industry</b>	104,7	91,0	80,0	117,9	122,5	103,2
<b>Inflation</b>	104,9	104,7	100,4	102,0	102,4	103,1
<b>Unemployment</b>	5,3 %	4,4 %	6,7 %	7,3 %	6,4 %	-
<b>Growth of nominal wages</b>	107,2	107,8	103,3	102,2	102,4	105,0

Source: Czech Statistical Bureau

The Czech Republic has one of the most developed economies in Central and Eastern Europe. However, its growth has stopped in recent years, while growth in neighbouring countries (Poland, Hungary) increases. The Czech Republic has kept 80% of EU27 GDP in the past several years.

**FIGURE 2** The comparison of GDP per capita in Europe (EU 27 = 100)



Source: Eurostat

## 2.2 Business Environment

The business environment is based on a strong state role in the regulation of business. This is due to historical practice – with roots in the Austro-Hungarian Empire, through state-controlled economy in 1948-1989, to the economy's transition to the market principles in the nineties of the 20<sup>th</sup> century. In recent years, some firm's duties have simplified and access to the market has shortened. However, it is not caused by simplifying the system, but rather by new technologies. Still, nine procedures for starting a business are required. Many of them are possible to manage on-line, so the time has been reduced from 40 to 20 days.

Also, offices and state institutions are fully-equipped with ICT and their databases are interconnected. For instance, dealing with construction permits consists of 33 procedures. This number is the same since 2006. But while processing of applications formerly took 276 days, it's now just 120 days. Nevertheless, it's a very long time compared to other countries, where just one month is necessary to assess all requirements.

A company newly entering the Czech market must prepare for three more difficult tasks. One of them has already been mentioned - starting a business. The Czech Republic is ranked in the 138<sup>th</sup> place among 183 countries in this indicator.

The Czech tax system is the second trouble. Czech companies must spend 557 hours a year for tax reporting. In most countries, the tax system is much simpler and companies spend half the time with these obligations.

The worst conditions occur when companies request electrical connection. The very long wait time is the main reason for the 148<sup>th</sup> rank. However, this varies according to location. There are many industrial zones with complete infrastructures ready for production or to handle other intentions of new investors in the Czech Republic.

Other monitored criteria are rather good in the Czech Republic, for instance resolving insolvency, registering property, getting credit and others (see the following table).

**TABLE 2 Summary of Doing Business indicators (rank among 183 countries)**

Indicators	CZ 2011	CZ 2012	SK 2012	HU 2012
<b>Starting a Business</b>	130	138	76	39
<b>Dealing with Construction Permits</b>	65	68	50	55
<b>Getting Electricity</b>	149	148	102	103
<b>Registering Property</b>	48	34	10	43
<b>Getting Credit</b>	48	45	24	48
<b>Protecting Investors</b>	93	97	111	122
<b>Paying Taxes</b>	129	119	130	117
<b>Trading Across Borders</b>	69	70	95	74
<b>Enforcing Contracts</b>	79	78	71	19
<b>Resolving Insolvency</b>	32	33	35	66
<b>Consolidated Rank</b>	70	64	48	51

Source: *The World Bank – Doing Business in 183 countries*

For more information see: <http://www.doingbusiness.org/~media/fpdkm/doing%20business/documents/profiles/country/CZE.pdf>

## 2.3 Direct Investment Support

The character of the economy is gradually changing in the Czech Republic. It is also visible in the government support of investments. Previously, the state supported such projects which employed the greatest number of employees. Between 1998-2008, hundreds of green-field production and assembly facilities were established. Thanks to foreign direct investments (FDI) 300 thousand jobs (approx. 9% of all workers) were created, approx. 27% of which were directly within investors and 73% were at the level of local subcontractors. The Czech state invested CZK 30 billion in investment incentives during the above-mentioned 11 years and gained CZK 230 billion in fiscal revenues. The state agency CzechInvest ensures supporting and attracting new investors from abroad as well as from the Czech Republic.

Under the impact of external circumstances (the beginning of the economic crisis, moving of some assembly factories further into Eastern Europe) CzechInvest began promoting selected sectors and activities only. These are the sectors with higher added value, greater need for skilled workers, and sectors with future potential. Since 2009, those preferred are:

- Aerospace Industry
- Automotive Industry
- Business Support Services
- **Cleantech – environmental technologies and renewable sources of energy**
- **Electrical Engineering and Electronics**
- **High-Tech Mechanical Engineering**
- IT and Software Development
- Life Sciences – Medical, Pharmaceutical and Biological branches
- Nanotechnology
- R&D

On the other hand, this strategy generates fewer jobs and less immediate financial benefits. In combination with the decline in investment activity in most European companies in the past three years, the change of CzechInvest's support has not yielded visible benefits such as the previous strategy focused on quantity. However, economists and politicians believe that quality rather than quantity is the right way.

Reasons for investing in the Czech Republic:

- Strategic position in Central Europe – the closest distance to the EU market among other CEE countries, direct connection by highways as well as railways, modern logistics infrastructure
- Highly educated and skilled workforce; over 6,000 mechanical and electrotechnical engineers graduating every year
- High density of suitable local suppliers and business partners

Investors who locate their investments in the Czech Republic can obtain aid in the form of **investment incentives**. Czech and foreign companies with their own registered office in the CR can apply for investment incentives.

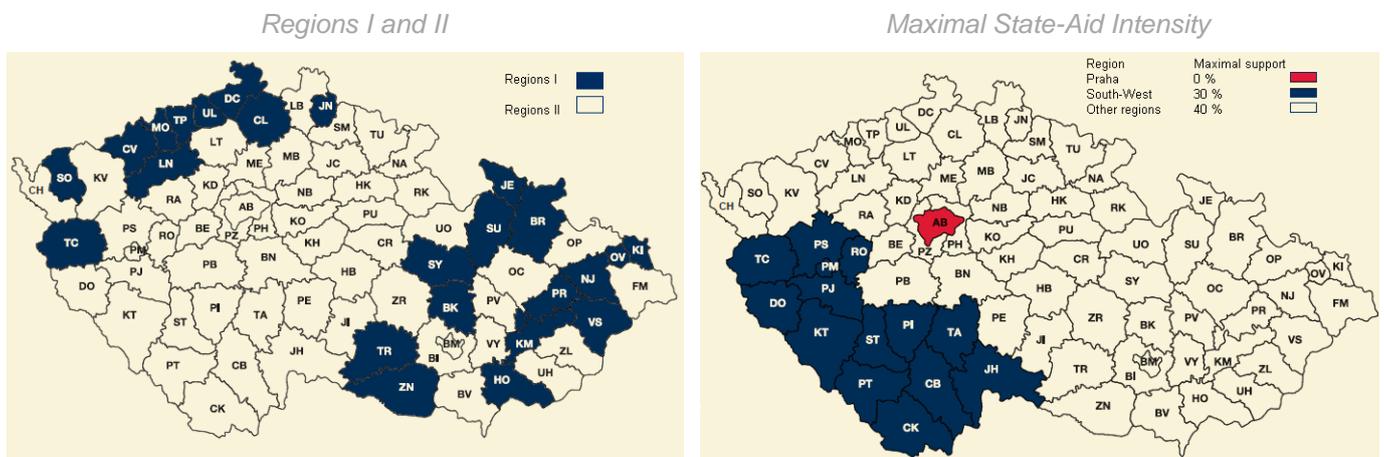
Supported Areas:

Strategic position in Central Europe – the closest distance to the EU market among other CEE countries, direct connection by highways

- Industry - introduction or expansion of production in sectors of the **manufacturing industry**
- Technology centers - Construction or expansion of **R&D** centers
- Business support services centers - Launch or expansion of the shared-services centers, software-development centers, **high-tech repair centers**

There are preferable regions with higher unemployment, where CzechInvest attracts investors by easier access to incentives.

**TABLE 3** The division of the Czech Republic for level of Incentives



Source: CzechInvest

The maximum state aid is 40% of total eligible costs (30% in the Southwest region). In the case of the manufacturing industry with investments in Regions II and concurrently with low-tech sectors, aid is reduced to 75% of the maximum state-aid intensity in individual regions, i.e. also just 30% . The territory of the city of Prague is excluded from the possibility to receive investment incentives.

**TABLE 4** General conditions for getting State-Aid

Investment in	Division of Regions	Min. Amount of investment	Min. Amount of investment in new machinery	Min. number of new jobs
<b>Manufacturing Industry</b>	Region I	CZK 50 mil.	CZK 25 mil.	0
<b>Manufacturing Industry</b>	Region II	CZK 100 mil.	CZK 50 mil.	0
<b>Strategic Investment in Manufacturing</b>	Regions I+II	CZK 500 mil.	CZK 250 mil.	500
<b>Technology Center</b>		CZK 10 mil.	CZK 5 mil.	40
<b>Strategic Investment in Technology Center</b>		CZK 200 mil.	CZK 100 mil.	120
<b>SW-Development Center</b>				40
<b>Share-Service or Repair Center</b>				100

Source: CzechInvest

Forms of Investment Incentives:

- Corporate income-tax relief for 10 years
- Transfer of land for favourable prices
- Job creation grants – CZK 50,000 for one newly created job (just for nine selected regions, suffering the most from unemployment)
- Training and retraining grants – 25% of total expenditures on training (also just for nine regions)
- Cash grants on 5% of capital investment (in the case of strategic investments only, max. CZK 1.5 billion in the case of a manufacturing project and max. CZK 0.5 billion in the case of a technology-center project)

For more info – see <http://www.czechinvest.org/data/files/brochure-of-amended-investment-incentives-3298-en.pdf>

# 3 Mechanical and Electrical Engineering

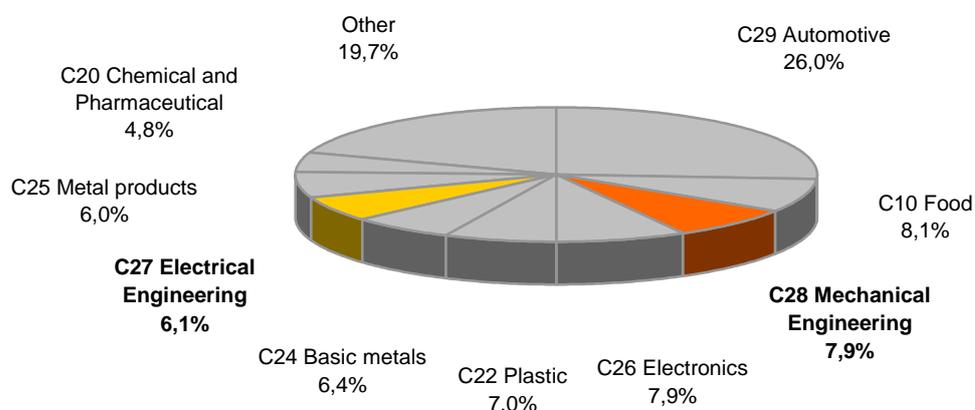
## 3.1 Role and Development of MEM Industries

MEM industries create 14-15% of entire production in the Czech Republic. Mechanical Engineering is the third largest manufacturing sector in the Czech Republic, with a long tradition and many successful deliveries all over the world. Electrical Engineering is connected mainly with the development of the Automotive and Energy sector, so it has grown in recent years.

The following graph shows the Automotive industry is the most important sector in the Czech Republic, and it is the best not only by absolute volume, but also by dynamic growth. While other sectors have gone through a “V” path in the last five years, the Automotive industry just slowed down its growth in 2009 and then has continued smoothly in growth. The Automotive industry's CAGR for 2011/2007 is 7,6%.

Also, other sectors related to the Automotive industry have grown (Plastic and Rubber, Electrical).

**FIGURE 3 Structure of the Manufacturing Industry in the Czech Republic (in % of total sales in 2011)**



Source: Czech Statistical Bureau

Industry as a whole, as well as MEM industries, touched bottom in 2009. Most of them (for instance Electrical Engineering) exceeded the level of 2007 already in 2010. The others (for instance Mechanical Engineering) definitely exceeded the 2007 level in 2011.

**TABLE 5 Production of MEM industries in the Czech Republic, 2007 - 2011**

Divisions of MEM Industries	in million EUR					CAGR
	2007	2008	2009	2010	2011*	
C 27 Manufacture of electrical equipment	7.644	7.454	6.178	8.486	9.672	6,6 %
C 28 Manufacture of machinery and equipment	11.806	11.547	8.998	10.297	12.789	2,1 %
Manufacturing Industry in total	132.714	130.864	109.529	128.256	158.159	4,8 %
MEM Industries/ Industry total	14,65%	14,52%	13,86%	14,64%	14,11%	

Source: Czech Statistical Bureau, own calculation

\* Estimation

MEM industries are strong export-oriented sectors. The export has exceeded the import in long-term view. The export of electrical equipment is higher than import by 30-32% in particular years. The export of machines and mechanical devices is bigger even by 40-45% than import.

The figures are not directly comparable in the tables No. 4 and 5. There is wider range of products in table No. 5. This is mentioned just for imagining on time series and share on the total export from the Czech Republic. The export-import statistics will be mentioned in more detail in the particular sub-sectors in Chapter Four.

**TABLE 6 Export of MEM industries from the Czech Republic, 2007 - 2011**

Divisions of MEM Industries	in million EUR					
	2007	2008	2009	2010	2011	CAGR
HS 85 Electrical Equipment and Electronics	16.682	17.768	14.678	17.670	19.905	5,5 %
HS 84 Machinery and Metal products	20.066	19.584	16.084	20.135	23.166	5,0 %
Export in total	99.169	98.949	85.545	101.312	115.148	4,6 %
MEM Industries/ Export total	37,1 %	37,7 %	36,0 %	37,3 %	37,4 %	

Source: Czech Statistical Bureau, own calculation

MEM industries invest substantial financial amounts in R&D. Again, besides Automotive, which is market leader even in R&D expenses, Mechanical Engineering and Maintenance and Installation of machinery are the No. 2 and 3. Electrical Engineering is also ranked at the top of innovative sectors (it holds the rank of 7th from 24 sectors of manufacturing industries).

**TABLE 7 R&D expenses in Manufacturing Industries in 2009**

Divisions of Industries	R&D expenses	Share	of which by Source of expenses		
			Commercial	Public	International
C29 Automotive	321,0	39,0 %	296,9	4,5	19,6
<b>C28 Mechanical Engineering</b>	<b>91,1</b>	<b>11,1 %</b>	<b>70,7</b>	<b>14,6</b>	<b>5,8</b>
<b>C33 Maintenance and Installation of machines</b>	<b>73,8</b>	<b>9,0 %</b>	<b>13,5</b>	<b>15,0</b>	<b>45,3</b>
C26 Electronics	52,7	6,4 %	41,5	8,2	3,0
C30 Other Transport Vehicles	52,4	6,4 %	43,6	7,4	1,4
C21 Pharmaceuticals	47,6	5,8 %	44,9	2,4	0,2
<b>C27 Electrical Engineering</b>	<b>42,8</b>	<b>5,2 %</b>	<b>34,3</b>	<b>4,4</b>	<b>4,1</b>
Other	141,1	17,2 %	109,4	19,4	12,3
Total	822,4	100,0 %	654,7	75,9	91,7

Source: Ministry of Industry and Trade, Yearbook "Panorama českého průmyslu"

## 3.2 Mechanical Engineering

The sector is classified as CZ-NACE 28 and consists of the following sub-sectors:

- 28.1 Manufacture of machinery and equipment for general purpose (furnaces, kilns, transport and lifting equipment, cooling, ventilation and air conditioning equipment, etc.)
- 28.2 Manufacture of machinery and equipment for general purposes (for metallurgy, mining and construction equipment, machinery for food processing, glass, textiles, etc.)
- 28.3 Manufacture of agricultural and forestry machinery;
- 28.4 Manufacture of metal-processing machinery and machine tools;
- 28.9 Manufacture of other special-purpose machinery

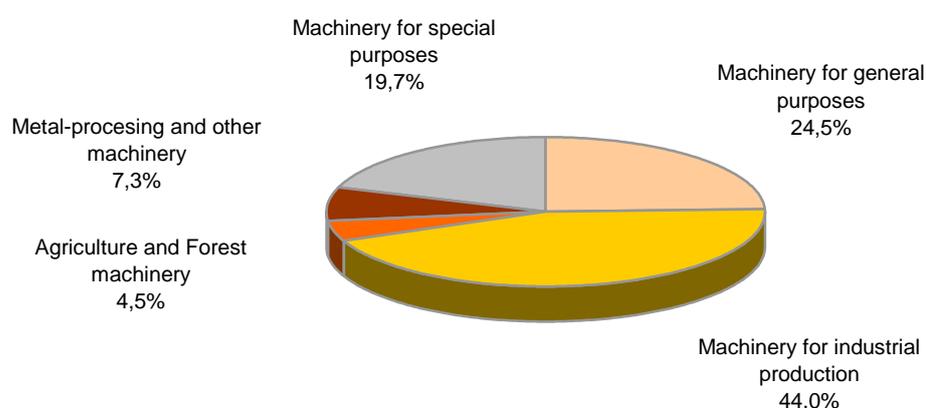
The sub-sector 28.2 is the largest and also the fast growing one. It exceeded the level of 2007 even in 2010. No other sub-sector was so successful.

**TABLE 8** Production of Mechanical Engineering in the Czech Republic, 2006 - 2010

						in million EUR
Division of Mechanical Engineering	2006	2007	2008	2009	2010	CAGR
CZ-NACE 28.1	2.222,4	2.703,4	2.771,8	2.317,7	2.520,2	4,1 %
CZ-NACE 28.2	3.614,9	4.289,6	4.068,8	3.466,3	4.531,4	7,4 %
CZ-NACE 28.3	535,9	704,1	648,0	420,4	465,9	-0,2 %
CZ-NACE 28.4	895,4	1.046,5	1.145,8	757,7	750,3	-2,1 %
CZ-NACE 28.9	2.570,9	3.062,0	2.912,4	2.035,6	2.029,5	-4,0 %
<b>CZ-NACE 28</b>	<b>9.839,6</b>	<b>11.805,6</b>	<b>11.546,8</b>	<b>8.997,8</b>	<b>10.297,3</b>	<b>2,5 %</b>

Source: Ministry of Industry and Trade, Yearbook "Panorama českého průmyslu"

**FIGURE 4** Structure of the Mechanical Engineering in the Czech Republic (in % of total sales in 2010)



Source: Czech Statistical Bureau

The following tables show number of companies and number of employees. There are rather small companies in the sub-sector 28.2, the average number of employees is ten workers in this sub-sector. On the other hand, 28.1 – producers of general industrial machines – are really large companies. One quarter of employees work in 8% of companies. The number of companies is still very stable, but the number of employees has gone down significantly – minus 30 thousand workers during 2007 to 2010, i.e. 22%%

**TABLE 9** Number of Companies in Sub-Sectors of Mechanical Engineering in the Czech Republic, 2006 - 2010

Division of Mechanical Engineering	2006	2007	2008	2009	2010	CAGR
CZ-NACE 28.1	483	493	492	511	514	1,6 %
CZ-NACE 28.2	3.633	3.642	3.685	3.694	3.639	0,0 %
CZ-NACE 28.3	402	411	413	418	408	0,4 %
CZ-NACE 28.4	343	341	362	355	321	-1,5 %
CZ-NACE 28.9	1.325	1.316	1.315	1.301	1.248	-1,5 %
CZ-NACE 28	6.186	6.203	6.267	6.279	6.130	-0,2 %

Source: Czech Statistical Bureau, own calculation

**TABLE 10** Number of Employees in Sub-Sectors of Mechanical Engineering in the Czech Republic, 2006 - 2010

Division of Mechanical Engineering	2006	2007	2008	2009	2010	CAGR
CZ-NACE 28.1	28.487	30.084	29.863	25.994	23.944	-4,0 %
CZ-NACE 28.2	41.453	43.294	43.774	39.035	39.033	-1,5 %
CZ-NACE 28.3	7.365	7.504	7.782	6.554	5.792	-5,3 %
CZ-NACE 28.4	14.389	14.633	15.002	12.138	10.722	-6,4 %
CZ-NACE 28.9	36.486	38.683	38.526	29.522	25.352	-7,6 %
CZ-NACE 28	128.180	134.198	134.947	113.243	104.843	-4,6 %

Source: Czech Statistical Bureau, own calculation

Sector C28 is not too concentrated. TOP 30 companies create only 23% of industry sales. The largest companies are listed in the following table. A large number of medium-sized firms (50-249 employees) with a diverse range of products helps to diversify risk and are relatively resistant to external economic influences. On the other hand, customers of sector C28 can choose from a large number of competitors and thereby save costs..

**TABLE 11 TOP 30 Mechanical Engineering Companies**

Company name	Sector	Turnover (mil. EUR)	Number of employees	www
Daikin Industries Czech Republic s.r.o.	28.2	346,0	826	www.daikinczech.cz
ŠKODA POWER s.r.o.	28.1	331,1	1079	www.doosanskoda.com
DENSO MANUFACTURING CZECH s.r.o.	28.2	330,2	1487	www.denso.cz
Carrier Refrigeration Operation Czech Republic s.r.o.	28.2	174,9	800	www.carrier-ref.cz/cs
VÍTKOVICE HEAVY MACHINERY a.s.	28.1	165,5	2700	www.vitkovicemachinery.com
MANN + HUMMEL (CZ) s.r.o.	28.2	147,1	855	www.mann-hummel.com/mhcz
ZETOR TRACTORS a.s.	28.3	140,0	856	www.zetor.cz
Valeo Compressor Europe s.r.o.	28.1	122,9	940	www.valeohumpolec.cz
Rieter CZ s.r.o.	28.9	120,5	879	www.rieter.cz
VALEO VÝMĚNÍKY TEPLA k.s.	28.2	112,8	608	www.valeozebrak.cz
Doosan Bobcat Manufacturing s.r.o.	28.9	87,2	339	www.bobcatdobris.cz
Groz-Beckert Czech s.r.o.	28.9	83,1	1100	www.gbcz.groz-beckert.com
AGROSTROJ Pelhřimov, a.s.	28.3	80,4	1062	www.agrostroj.cz
Parker Hannifin Industrial s.r.o.	28.1	78,3	521	www.parker.cz
IMI International s.r.o.	28.1	77,4	398	www.imi-international.cz
TOS VARNSDORF a.s.	28.4	71,5	500	www.tosvarnsdorf.cz
POCLAIN HYDRAULICS,s.r.o.	28.1	69,1	250	www.poclain-hydraulics.com
Daikin Device Czech Republic s.r.o.	28.1	67,4	380	www.daikinbrno.cz
ČZ a.s.	28.1	66,0	974	www.czas.cz
Slovácké strojírny, akciová společnost	28.2	63,0	1038	www.sub.cz
Erwin Junker Grinding Technology a.s.	28.4	61,5	460	www.junker-group.com
EMERSON CLIMATE TECHNOLOGIES, s.r.o.	28.1	60,9	201	www.emersonclimate.eu
OTIS a.s.	28.2	60,9	526	www.otis.cz
Ingersoll-Rand Equipment Manufacturing CR s.r.o.	28.2	57,0	475	www.irco.cz
Schindler CZ, a.s.	28.2	56,2	526	www.schindler-cz.cz
Ingersoll-Rand CZ s.r.o.	28.1	56,2	330	www.ircr.cz
Caterpillar Global Mining Czech Republic, a.s.	28.9	55,1	547	https://mining.cat.com/cda/jsp
Husqvarna Manufacturing CZ s.r.o.	28.2	53,7	544	www.advplast.cz
KOVOSVIT MAS, a.s.	28.4	53,2	530	www.kovosvit.cz
Primus CE s.r.o.	28.9	52,4	520	www.primuslaundry.cz
Aisan Industry Czech, s.r.o.	28.1	51,9	514	www.aisan.cz

Source: ČEKIA – Magnusweb database

### 3.3 Electrical Engineering

The sector is classified as CZ-NACE 27 and consists of the following sub-sectors:

- 27.1 Manufacture of electric motors, generators, transformers and electricity distribution and control equipment
- 27.2 Manufacture of batteries and accumulators
- 27.3 Manufacture of optical and electric cables, electric wires and wiring devices
- 27.4 Manufacture of electric lighting equipment
- 27.5 Manufacture of household appliances (fans, vacuum cleaners, kitchen appliances, washing machines, etc.)
- 27.9 Manufacture of other electrical equipment (battery chargers, electrical bells, buzzers, sirens, etc.)

The sub-sector 27.1 is the largest one for the entire monitored period (2006-2010).

The highest growth in sub-sector 27.4 is caused by change of statistical observation. Two large companies (Automotive Lighting s.r.o. and Koito s.r.o.) were moved from C 29.3 to C 27.4 in 2010 (i.e. plus 300 mil. EUR only as a result of this change).

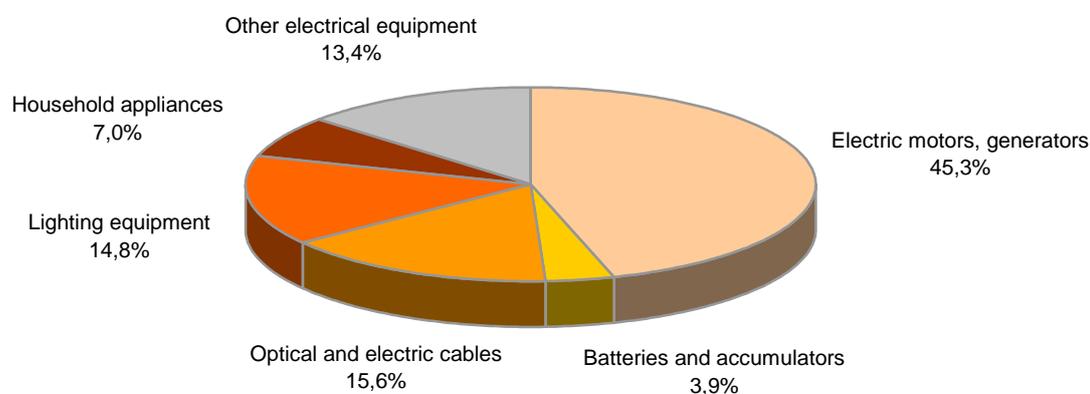
**TABLE 12** Production of Electrical Engineering in the Czech Republic, 2006 - 2010

Division of Electrical Engineering	2006	2007	2008	2009	2010	CAGR
CZ-NACE 27.1	3143,4	3462,1	3553,9	2920,4	3843,6	5,6
CZ-NACE 27.2	296,9	336,8	383,5	283,6	330,4	2,8
CZ-NACE 27.3	1201,0	1293,9	1132,4	986,3	1325,1	2,6
CZ-NACE 27.4	801,7	903,3	792,1	651,4	1254,3	14,1
CZ-NACE 27.5	689,7	700,5	650,4	552,8	597,4	-3,3
CZ-NACE 27.9	813,0	947,1	942,0	783,4	1134,7	9,9
CZ-NACE 27	6945,7	7643,7	7454,2	6177,9	8485,6	5,5

in million EUR

Source: Ministry of Industry and Trade, Yearbook "Panorama českého průmyslu"

**FIGURE 5** Structure of Electrical Engineering in the Czech Republic (in % of total sales in 2010)



Source: Czech Statistical Bureau

The following tables show number of companies and number of employees. The dominant number of companies are engaged in electricity distribution and control equipment (switchboards, control systems, components of electrical distribution circuits). Besides this sub-sector (C27.1), there are relatively small numbers of companies in the other sub-sectors.

**TABLE 13** Number of Companies in Sub-Sectors of Electrical Engineering in the Czech Republic, 2006 - 2010

Division of Electrical Engineering	2006	2007	2008	2009	2010	CAGR
CZ-NACE 27.1	11.980	11.830	11.424	11.344	11.112	-1,8 %
CZ-NACE 27.2	72	72	66	65	61	-3,8 %
CZ-NACE 27.3	291	303	316	323	312	1,8 %
CZ-NACE 27.4	411	409	416	409	379	-1,9 %
CZ-NACE 27.5	525	519	521	534	539	0,7 %
CZ-NACE 27.9	2.021	2.238	2.347	2.587	2.759	9,1 %
CZ-NACE 27	11.980	11.830	11.424	11.344	11.112	-1,8 %

Source: Czech Statistical Bureau, own calculation

The number of employees has declined in all sub-sectors of Electrical Engineering, besides C27.3 Optical and Electric Cables. Thanks to relations with the automotive industry, this sub-sector has grown even after 2009.

**TABLE 14** Number of Employees in Sub-Sectors of Electrical Engineering in the Czech Republic, 2006 - 2010

Division of Electrical Engineering	2006	2007	2008	2009	2010	CAGR
CZ-NACE 27.1	37.217	39.191	39.996	34.608	32.589	-3,1 %
CZ-NACE 27.2	1.500	1.571	1.570	1.439	1.463	-0,6 %
CZ-NACE 27.3	12.833	14.156	14.455	12.127	13.692	1,7 %
CZ-NACE 27.4	8.969	8.815	8.762	7.225	9.130	0,4 %
CZ-NACE 27.5	8.682	8.718	7.913	6.448	5.602	-8,9 %
CZ-NACE 27.9	14.230	15.321	15.135	13.025	13.656	-1,0 %
CZ-NACE 27	83.431	87.772	87.831	74.872	76.132	-2,2 %

Source: Czech Statistical Bureau, own calculation

There is a high level of concentration in Electrical Engineering. The group of the 45 largest companies (with 250 and more workers) creates 64% of the sector's sales and employs approx. 38.000 workers. TOP 30 companies are mentioned in the following table.

On the other hand, there are more than 10.900 small companies with 49 and fewer workers. They employ less than 28.000 persons and share less than 20% of total sales. The group of the middle-sized companies (50-249 workers) is rather less important. Approximately 150 companies employ 10.000 workers and contribute by 17% to the market's turnover. There is a large share of the companies in foreign hands. Two thirds of sales are generated by companies under international control.

TABLE 15 TOP 30 Electrical Engineering companies

Company name	Sector	Turnover (mil. EUR)	Number of employees	www
Siemens, s.r.o.	27.1	1022,0	7062	www.siemens.cz
ABB s.r.o.	27.1	436,8	2736	www.abb.cz
Johnson Controls Autobaterie spol. s r.o.	27.2	306,0	633	www.varta-automotive.cz
Automotive Lighting s.r.o.	27.4	252,3	1321	www.al-lighting.cz
Eaton Elektrotechnika s.r.o.	27.1	209,9	1152	www.eatonelektrotechnika.cz
HELLA AUTOTECHNIK NOVA, s.r.o.	27.4	207,4	912	www.hella.com
nkt cables s.r.o.	27.3	182,5	410	www.nktcables.cz
AVX Czech Republic s.r.o.	27.9	179,9	3389	www.avx.com
PRAKAB PRAŽSKÁ KABELOVNA, s.r.o.	27.3	168,1	370	www.prakab.cz
Tyco Electronics EC Trutnov s. r. o.	27.1	158,4	1275	www.tycoelectronics-trutnov.cz
M.L.S. Holice, spol. s r. o.	27.1	155,9	1165	www.leroy-somer.com
OEZ s.r.o.	27.1	151,3	1754	www.oez.cz
nkt cables Vrchlabí k.s.	27.3	142,5	573	www.nktcables.cz
Miele technika s.r.o.	27.5	140,5	516	
Draka Kably, s.r.o.	27.3	134,6	353	www.draka.cz
Schneider Electric a.s.	27.1	130,1	515	www.schneider-electric.cz
BRUSH SEM s.r.o.	27.1	119,1	957	www.brush-sem.cz
TRCZ s.r.o.	27.3	108,4	800	www.trcz.cz
JULI Motorenwerk, s.r.o.	27.1	102,3	320	www.juli.cz
ŠKODA ELECTRIC a.s.	27.1	101,8	654	www.skoda.cz/electric
Electric Powersteering Components Europe s.r.o.	27.1	96,2	163	www.epceurope.cz
VISHAY ELECTRONIC spol. s r.o.	27.9	73,7	1548	www.vishay.com/
Engel strojírenská spol. s r.o.	27.1	72,6	504	www.engel.cz
OSRAM Česká republika s.r.o.	27.4	66,7	940	www.osram.cz
KOITO CZECH s.r.o.	27.4	65,0	462	www.koito-czech.cz
Ametek elektromotory, s.r.o.	27.1	60,0	489	
nkt cables Velké Meziříčí k.s.	27.3	56,8	180	www.nktcables.cz
EGE, spol. s r.o.	27.3	54,0	541	www.ege.cz
MORA MORAVIA, s.r.o.	27.5	51,4	620	www.moramoravia.cz
EPCOS s.r.o.	27.1	49,9	815	www.epcos.com

Source: ČEKIA – Magnusweb database

# 4 Opportunities in Selected MEM Branches

## 4.1 Machine Tools and Manufacturing Technology

Production of machine tools is the basis of industrial production, thanks to producing "machines for making machines". In the Czech Republic, with its industrial tradition, the production of machine tools developed very early in the first half of the 20th century. Its important role has been confirmed in times of a divided Europe. The Czech Republic has been a supplier of machinery for the whole of Eastern Europe and other related countries (Middle East, Vietnam, Cuba, etc.).

Czech companies lost their traditional markets after the "fall of the Berlin Wall". German, Italian, Japan and Swiss producers of machine tools entered the Eastern European markets with their modern and high-quality machines. The markets in the former Soviet Union countries solved their own political and economic problems and their industry went down. Czech producers of metal cutting and forming machines experienced hard times in the nineties. Eastern markets disappeared and their products had a low image for Western markets.

In the period 1998-2003, hundreds of foreign companies opened own green-field manufacturing facilities in the Czech Republic or took-over appropriate local companies as a result of governmental investment incentives. Unfortunately for the manufacturing machinery, investors didn't use local sources, but imported complete manufacturing equipment from abroad.

**TABLE 16** Import of Machine Tools to the Czech Republic

	1999	2004	2009	2010	2011	CAGR*
Physico - chemical machines	30,3	32,2	40,8	29,1	33,6	-2,3 %
Machining centers	44,8	81,4	111,5	93,7	61,1	1,9 %
Lathes	35,3	57,3	54,7	47,0	66,8	-3,5 %
Machines for drilling, boring, milling	35,1	29,6	32,9	41,9	43,6	-2,2 %
Machines for grinding, sharpening, lapping	32,3	40,8	65,8	44,1	39,6	-4,8 %
Machines for planing, shaping, sawing machines	11,6	18,9	13,9	12,6	17,1	-1,9 %
Metal forming incl. presses	112,0	124,2	129,2	117,0	138,2	-6,2 %
Other metal forming machines	11,4	20,2	25,4	14,6	24,0	-1,2 %
Stone-processing machines	13,9	34,4	27,6	15,3	11,2	-13,7 %
Wood-processing machines	42,1	45,3	68,4	46,4	90,8	-3,3 %
Parts of cutting and forming machines	104,4	130,5	157,9	137,1	135,6	-1,4 %
Special purposes machines	277,6	394,3	400,0	336,3	368,2	0,5 %
HS 8456-8466 + 8479	750,8	1009,1	1127,9	935,0	1029,8	-1,7 %

Source: Czech Statistical Bureau

\* CAGR for period 2006-2011

In 2004, the Czech Republic entered the group of EU-countries and the situation changed. On the one hand, further new investors came to produce in the Czech Republic, but the import of manufacturing machines grew again. On the other hand, Czech export of machines started to grow, thanks to simpler access to the EU market and also to other markets, where the EU had hassle-free business relations.

Czech producers of manufacturing machinery had the most successful periods of their recent history in 2005-2008, when their exports grew by 10-15% annually. In 2007, exports exceeded imports for the first time and the positive balance continues to this day.

The economic crisis has stopped investment activity of all European manufacturers. Import of machines into the CR fell by 50% (import in 2010 compared to 2008). Export of machinery also declined, but only by 28%. Risk diversification is the reason for this relatively successful result. Czech producers had started to build business relationships, not only with EU-partners, but also with fast-growing countries (BRICS countries) since 2005. Export of machines to Russia, China and India is a great success of Czech manufacturers. With this strategy, the export is almost the same value in 2011 as in 2008.

**TABLE 17 Czech Export of Cutting and Forming Machinery by Target Countries (in % of particular year)**

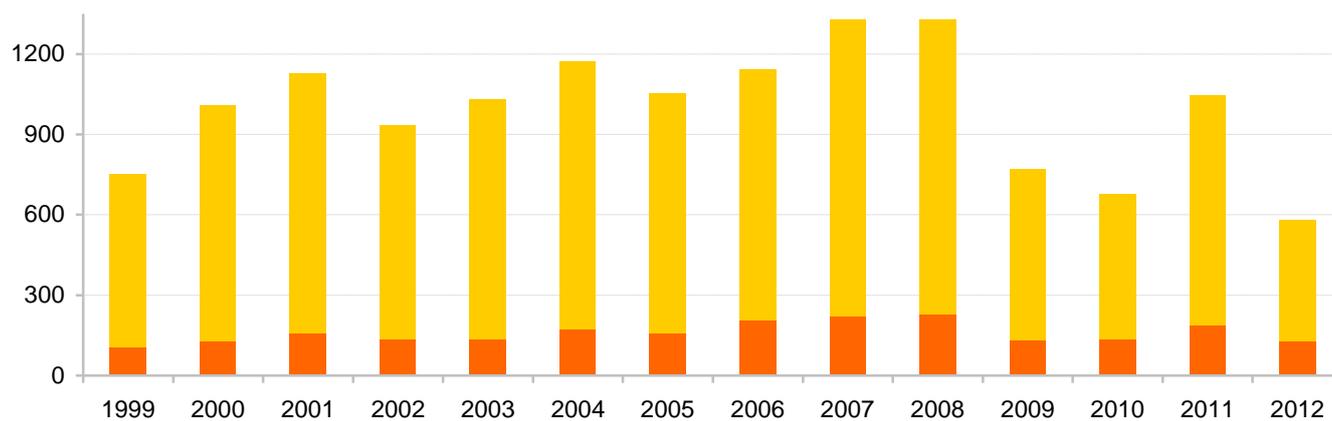
	2005	2011	Trend
Germany	42,5 %	37,0 %	↓↓
Russia	6,3 %	11,7 %	↑↑
China	5,9 %	7,5 %	↑
Slovakia	6,3 %	5,8 %	↓
Poland	3,5 %	3,9 %	↑
Austria	4,4 %	1,5 %	↓↓
Italy	3,3 %	2,1 %	↓
USA	3,3 %	2,1 %	↓
Ukraine	2,3 %	1,5 %	↓
India	1,5 %	3,5 %	↑
France	2,4 %	1,7 %	↓
Switzerland	1,3 %	2,1 %	↑
Other	17,0 %	19,6 %	↑
<b>Total</b>	<b>100,0 %</b>	<b>100,0 %</b>	
<i>of which</i>			
<i>EU + Switzerland + Norway</i>	<i>74,0 %</i>	<i>61,4 %</i>	<i>↓↓</i>
<i>BRICS</i>	<i>14,1 %</i>	<i>24,3 %</i>	<i>↑↑</i>
<i>Other</i>	<i>11,9 %</i>	<i>14,3 %</i>	<i>↑</i>

Source: Czech Statistical Bureau

Switzerland is the only Western European country where Czech export was higher in 2011 than in 2005. Exports for all other target countries dropped in Western Europe.

in million EUR

**FIGURE 6** The Import of Finished Machines Contra their Parts or Semi-Finished Products



Source: Czech Statistical Bureau

While components represented just 13-14% of imports in 1999-2000. Its ratio is 20-22% today. Components are imported as spare parts for machines installed during the last 15 years by foreign suppliers of machines, but also as inputs for local producers of machine tools.

**TABLE 18 TOP 30 Machine Tools Companies**

Company name	Turnover (mil. EUR)	Number of employees	www
TOS VARNSDORF a.s.	71,5	500	<a href="http://www.tosvarnsdorf.cz">www.tosvarnsdorf.cz</a>
Slovácké strojírnny, akciová společnost	63,0	1038	<a href="http://www.sub.cz">www.sub.cz</a>
Erwin Junker Grinding Technology a.s.	61,5	460	<a href="http://www.junker-group.com">www.junker-group.com</a>
KOVOSVIT MAS, a.s.	53,2	530	<a href="http://www.kovosvit.cz">www.kovosvit.cz</a>
TAJMAC-ZPS, a.s.	45,6	602	<a href="http://www.tajmac-zps.cz">www.tajmac-zps.cz</a>
Šmeral Brno a.s.	43,4	494	<a href="http://www.smeral.cz">www.smeral.cz</a>
TOSHULIN, a.s.	38,7	378	<a href="http://www.toshulin.cz">www.toshulin.cz</a>
Walter s.r.o.	36,7	194	<a href="http://www.walter-machines.com">www.walter-machines.com</a>
FERMAT CZ s.r.o.	33,0	331	<a href="http://www.fermatmachinery.com">www.fermatmachinery.com</a>
TOS KUŘIM - OS, a.s.	22,6	374	<a href="http://www.tos-kurim.cz">www.tos-kurim.cz</a>
TS Plzeň a.s.	16,5	283	<a href="http://www.tsplzen.cz">www.tsplzen.cz</a>
TRIMILL, a.s.	9,8	96	<a href="http://www.trimill.cz">www.trimill.cz</a>
ROJEK dřevoobráběcí stroje a.s.	9,6	140	<a href="http://www.rojek.cz">www.rojek.cz</a>
BOMAR, spol. s r.o.	8,6	135	<a href="http://www.bomar.cz">www.bomar.cz</a>
TOS, a.s.	8,4	187	<a href="http://www.tosas.cz">www.tosas.cz</a>
CZ. TECH Čelákovice, a.s.	8,1	50	<a href="http://www.cztech.cz">www.cztech.cz</a>
WEILER Holoubkov s.r.o.	8,0	218	<a href="http://www.weilercz.com">www.weilercz.com</a>
TOS Olomouc, s.r.o.	6,9	190	<a href="http://www.tos-olomouc.cz">www.tos-olomouc.cz</a>
PEGAS - GONDA s.r.o.	5,7	79	<a href="http://www.pegas-gonda.cz">www.pegas-gonda.cz</a>
TM JESENICE servis, spol. s r.o.	5,6	63	<a href="http://www.tmj.cz">www.tmj.cz</a>
BALÍNEK TRADE, s.r.o.	5,6	23	<a href="http://www.balinek.cz">www.balinek.cz</a>
PILOUS-pásově pily, spol. s r.o.	5,4	65	<a href="http://www.pilous.cz">www.pilous.cz</a>
AXA CNC stroje, s.r.o.	5,1	45	<a href="http://www.axacnc.cz">www.axacnc.cz</a>
HOUFEK a.s.	4,8	142	<a href="http://www.houfek.com">www.houfek.com</a>
STROJÍRNA TYC s.r.o.	4,7	50	<a href="http://www.strojirna-tyc.cz">www.strojirna-tyc.cz</a>
DIEFFENBACHER - CZ, hydraulické lisy, s. r. o.	4,7	34	<a href="http://www.dieffenbacher.cz">www.dieffenbacher.cz</a>
TOOL Werkzeugbau s.r.o.	4,4	57	<a href="http://www.toolgmbh.cz">www.toolgmbh.cz</a>
ČZ Strojírna, s.r.o.	4,3	150	<a href="http://www.czas.cz">www.czas.cz</a>
ELITEX Machinery, s.r.o.	4,2	125	<a href="http://www.elitex-kdyne.cz">www.elitex-kdyne.cz</a>

Source: ČEKIA – Magnusweb database

#### Opportunities for Swiss companies:

- Delivering components to local producers of cutting and forming machines (see above-mentioned list of the largest companies)
- Taking-over local producers to gain their target markets in Russia, China and India.

## 4.2 Textile Machinery

Manufacture of textile machinery has a long and successful history in the Czech Republic. Czech textile engineering gave the world several technical inventions in the last 100 years - open-end spinning, shuttleless weaving, multiphase weaving loom, Arachné technology, interlacing, etc. Focus on the development and production of textile machinery was a result of domestic demand. The textile and clothing industry was one of the pillars of the Czech economy in 1950-1990. In its golden age, the textile industry employed over 250.000 employees (more than 5% of all working people).

As a result of the competition from Asian textiles and clothing, the number of textile companies and their employees is declining. At present 46.000 persons work in the approx. 12.000 companies. Of these, over 10.000 are small businesses (0-19 employees). Many of them began when workers released from large enterprises opened their own workshops. These companies are engaged in the production of small series of clothing. Their machinery is also mostly taken from failed large companies.

The production of textile yarn has gone down significantly. Most of textile companies import yarns from India and Pakistan. The clothing companies purchase fabrics abroad too. The mass character of production of yarns, fabrics and other semi-finished products was changed to special purpose textiles and garments. Many of local textile companies modified their production for the automotive industry (interior equipment, tire cords etc.) and other technical textiles (filtration, agriculture, construction etc.).

A lot of Czech clothing companies are engaged in the manufacture of sports and functional clothing. Special fibers, fabrics and clothing are designed in the Czech Republic. Production takes place mostly in the Czech Republic. But it is not unusual that the holder of the Czech brand co-operates with an Asian manufacturer. This may be another reason for the declining interest in textile machinery.

Decline of demand for classical textile machines (spinning machines, looms, knitting machines) corresponds to the above-described developments. After a significant decline in 2009, we can see an increase of import in 2010 and 2011. From the long-term point of view, the figures for 2011 are lower than in the years 1999 - 2004.

Import of machinery for production of non-woven textiles is the only exception. Non-woven textiles are prospects for the Czech textile industry. Their use is very wide – hygienic applications, health care, agriculture, building construction and many others.

**TABLE 19 Import of Textile Machinery to the Czech Republic**

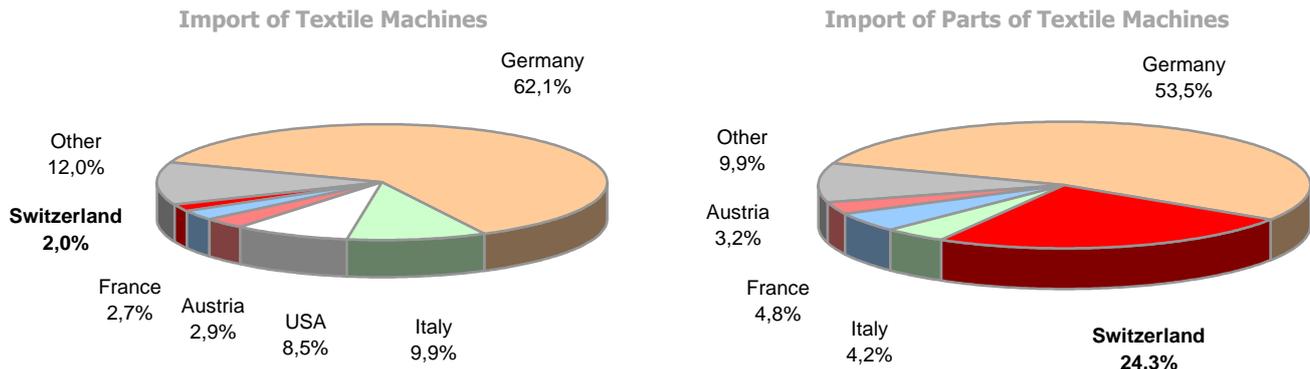
	1999	2004	2009	2010	2011	CAGR*
	in million EUR					
Machinery for shaping and cutting of textiles	6,0	1,7	2,0	0,7	4,7	23,0 %
Machines for the production of textile fibers	33,1	22,0	8,3	4,7	6,4	-10,4 %
Looms	24,9	14,5	5,4	3,2	9,2	-6,8 %
Knitting machines	8,4	6,7	2,9	2,5	3,7	0,7 %
Parts and components of Textile machinery	59,2	93,7	41,7	68,9	73,8	-6,5 %
Machinery for Non-woven textiles	5,4	10,9	1,8	9,1	40,3	316,0 %
Leather processing machinery, shoe repair machines	2,5	2,4	1,2	3,7	2,8	-3,6 %
HS 8445-8449 + 8453	139,7	137,0	63,2	92,8	140,7	-1,0 %

Source: Czech Statistical Bureau. \* CAGR for period 2006-2011

Germany is the most important supplier of textile machines and their components to the Czech Republic. **Switzerland** has a very significant role in the **import of components**. Most of components are delivered to RIETER's manufacturing plant in the city Usti nad Orlici. The follow-

ing graphs show the structure of import. The shares are created as % from cumulative import for the last 31 months (January 2010 to July 2012).

**FIGURE 7 The Countries of Origin of Imported Machines and their Parts (% of imports I/2010-VII/2012)**



Source: Czech Statistical Bureau

**Opportunities for Swiss companies:**

- Delivering textile machines for technical fabrics (For instance, the import of prospective machines for non-woven textiles is realized mainly from Germany and the USA. Swiss suppliers could replace ones from the USA.)
- Delivering textile machines for special purpose and functional clothing (water-proof, wind-proof, seamless clothing, nanotechnology, textile products with electronic sensors, etc.)
- Delivering components to local producers of textile machines (see above-mentioned list of the largest companies)
- Taking-over local producers and thus follow the success story of RIETER in the Czech Republic.

**TABLE 20 TOP 20 Producers of textile machines**

Company name	Turnover (mil. EUR)	Number of employees	www
Rieter CZ s.r.o.	123,8	879	<a href="http://www.rieter.cz">www.rieter.cz</a>
Groz-Beckert Czech s.r.o.	87,5	1100	<a href="http://www.gbcz.groz-beckert.com">www.gbcz.groz-beckert.com</a>
Primus CE s.r.o.	62,3	520	<a href="http://www.primuslaundry.cz">www.primuslaundry.cz</a>
Novibra Boskovice s.r.o.	33,5	389	<a href="http://www.novibra.cz">www.novibra.cz</a>
KASPER KOVO s.r.o.	12,2	200	<a href="http://www.kasperkovo.cz">www.kasperkovo.cz</a>
TRATEC – CS, s. r. O.	6,7	119	<a href="http://www.tratec.cz">www.tratec.cz</a>
ELITEX Nepomuk a.s.	6,4	142	<a href="http://www.elitexnepomuk.cz">www.elitexnepomuk.cz</a>
INPROMA, spol. s r.o.	6,1	180	<a href="http://www.inproma.cz">www.inproma.cz</a>
MEBATEX s.r.o.	4,0	30	<a href="http://www.mebatex.cz">www.mebatex.cz</a>
NN STEEL s.r.o.	3,7	64	<a href="http://www.nnsteel.cz">www.nnsteel.cz</a>
AMF Reece CR, s.r.o.	3,9	100	<a href="http://www.amfreece.com">www.amfreece.com</a>
ANITA B s.r.o.	3,9	13	<a href="http://www.anita.cz">www.anita.cz</a>
e m z Hanauer s.r.o.	3,0	171	<a href="http://www.emz-hanauer.de">www.emz-hanauer.de</a>
T. F. A. ALFA S. R. O.	2,6	61	<a href="http://www.tfa.cz">www.tfa.cz</a>
Holek Production s.r.o.	2,5	45	<a href="http://www.holektrade.cz">www.holektrade.cz</a>
NAVETA CZ s.r.o.	2,5	150	<a href="http://www.naveta.cz">www.naveta.cz</a>
KAMEL, s.r.o.	2,0	40	<a href="http://www.kamel.cz">www.kamel.cz</a>
Jakob Müller Česká republika, a.s.	2,5	21	<a href="http://www.mueller-frick.com">www.mueller-frick.com</a>
NEOTEC, SPOL.S R.O.	1,9	15	<a href="http://www.neotec.cz">www.neotec.cz</a>
SUSPA CZ s.r.o.	1,7	55	<a href="http://www.suspa.com">www.suspa.com</a>
VASMO s.r.o.	1,5	33	<a href="http://www.vasmo.wz.cz">www.vasmo.wz.cz</a>
MCR Technology s.r.o.	1,4	27	<a href="http://www.mcr.cz">www.mcr.cz</a>

Source: ČEKIA – Magnusweb database

## 4.3 Plastic Machinery

The production of plastic machinery doesn't have a tradition such as the above-mentioned manufacturing machines or textile machines. The statistical classification defines the production of plastic machinery together with machinery for rubber manufacturing – C 28.96. In the Czech Republic, the producers of rubber machinery are much more important than the plastic ones. Either way, the local production of both types of these machines is rather low. The following table shows the most important companies, and we can see that these are small companies.

**TABLE 21 TOP 10 Producers of Plastic Machines**

Company name	Machines for	Turnover (mil. EUR)	Number of employees	www
BUZULUK a.s.	Rubber	12,1 (34,8)*	610	<a href="http://www.buzuluk.cz">www.buzuluk.cz</a>
CHODOS CHODOV s.r.o.	Rubber/Plastic	7,3	221	<a href="http://www.chodos.cz">www.chodos.cz</a>
Bernex Bimetallic s.r.o.	Plastic	5,6	62	<a href="http://www.bernexgroup.com">www.bernexgroup.com</a>
MILACRON Czech Republic spol. s r.o.	Plastic	4,4	38	<a href="http://www.milacron.com">www.milacron.com</a>
BOCO PARDUBICE machines, s.r.o.	Plastic	4,3	54	<a href="http://www.boco.cz">www.boco.cz</a>
VÚK, spol. s r. o.	Rubber/Plastic	3,8	56	<a href="http://www.vuksro.cz">www.vuksro.cz</a>
INVERA s.r.o.	Rubber/Plastic	3,0	30	<a href="http://www.invera.cz">www.invera.cz</a>
PROZAX, s.r.o.	Rubber	3,0	29	<a href="http://www.prozax.cz">www.prozax.cz</a>
ÖKOLOGISCHE KAUSCHUK TECHNOLOGIE s.r.o.	Rubber	2,2	36	<a href="http://www.kks.cz">www.kks.cz</a>
FANAM s.r.o.	Plastic	1,5	55	<a href="http://www.fanam.cz">www.fanam.cz</a>
G D K spol. S r.o.	Plastic	1,5	11	<a href="http://www.gdk.cz">www.gdk.cz</a>
Výroba účelové mechanizace Zlín, a.s.	Plastic	0,7	28	<a href="http://www.vumz.cz">www.vumz.cz</a>
A.M. spol s r.o.	Plastic	0,3	16	<a href="http://www.amcz.cz">www.amcz.cz</a>

Source: ČEKIA – Magnusweb database

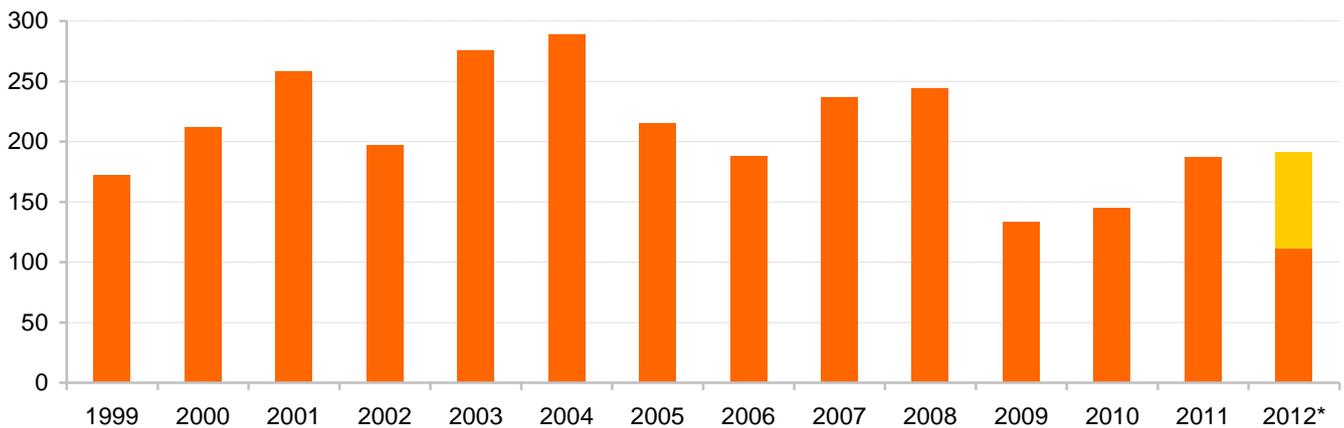
\* The production of rubber machinery represents just 35 % of BUZULUK's turnover

Most of the machinery for plastic production is imported. There isn't any clear trend of growth or decline of the import. The biggest imports were in 2003 and 2004. Then two weaker years occurred, but further higher imports were in 2007 and 2008. The complete time series is mentioned in the following graphs.

The machinery is imported mainly from Germany, Austria, Italy and France. Switzerland is ranked 5<sup>th</sup> with 2,8% of total imports.

**FIGURE 8 The Import of Rubber and Plastic Machinery**

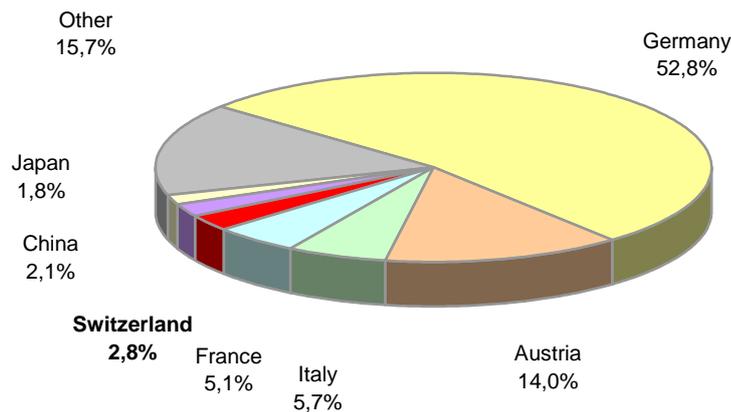
in million EUR



Source: Czech Statistical Bureau

\* Real data for January-July 2012 and estimation for whole year 2012

**FIGURE 9 The Countries of Origin of Imported Plastic Machinery (% of imports I/2010-VII/2012)**



Source: Czech Statistical Bureau

The plastic industry has a very strong position in the Czech Republic. It contributes by 7% to the total manufacturing industry. The EU's average share is just 3%. The Czech plastic industry is strongly connected with the automotive industry. Thanks to good results in the automotive industry, the plastic industry is also successful. The share of plastic parts will grow in cars, because weight reduction facilitates lower fuel consumption.

However, the plastic industry is not dependent on the automotive industry only. Plastic materials are used in the building industry very often, either as alternatives to traditional materials (sanitary equipment, windows, doors, decorations) or as main materials (pipeline, insulations, etc.). A massive government-supported campaign for reducing the energy consumption of buildings caused a great demand for insulating materials in the last five years. This demand will continue in the following years.

The third target branch is packaging. Today more than 40% of packaging is plastic. The volume of packaging has grown and the share of plastic ones too. This raises the logical question, what to do with the growing volume of plastic waste. Therefore, technology for recycling and secondary use of plastics is a promising field. Czech households sort almost 50% of plastic packaging, resp. 60% of PET bottles. These are the raw materials for the production of foils, synthetic fibers, building materials and more.

Plastic products are applied also in the electrical industry and consumer goods. While their delivering to the electronics industry has declined over the last three years due to troubles in this sector in the Czech Republic, the production of consumer goods has increased. This is caused by the results of one of the largest local plastic companies – the manufacturing plant of the Danish producer of LEGO toys.

There are 3.000 plastic companies with 57.000 employees in the Czech Republic. The number of companies has grown over the last five years (2700 companies in 2006), while the number of employees has remained rather the same. This means the average number of employees is decreasing and new companies are rather micro-companies with less than 20 employees. The TOP 50 companies create approx. one third of total sales in the sector and employ 37% of workers. These companies are main target groups for plastic machinery in the Czech Republic.

#### Opportunities for Swiss companies:

- Delivering plastic machinery to a wide range of local plastic producers (There is no serious local competitor. All machines are imported.)
- Delivering of machinery for recycling and secondary use of plastic waste

**TABLE 22 TOP 50 Producers of Plastic Products in the Czech Republic**

Company name	Target group*	Turnover (mil. EUR)	Number of employees	www
Magna Exteriors & Interiors (Bohemia) s.r.o.	Automotive	336,2	2100	<a href="http://www.magna.com">www.magna.com</a>
TRW-Carr s.r.o.	Automotive	275,9	1402	<a href="http://www.trwauto.cz">www.trwauto.cz</a>
LEGO Production s.r.o.	Toys	176,0	1060	<a href="http://www.lego.com">www.lego.com</a>
Fehrer Bohemia s.r.o.	Automotive	149,1	1095	<a href="http://www.fehrer.com">www.fehrer.com</a>
WOCO STV s.r.o.	Automotive	109,4	784	<a href="http://www.woco.de">www.woco.de</a>
Fatra, a.s.	Packaging	106,0	987	<a href="http://www.fatra.cz">www.fatra.cz</a>
GRUPO ANTOLIN TURNOV s.r.o.	Automotive	98,2	746	<a href="http://www.grupoantolin.es">www.grupoantolin.es</a>
Devro s.r.o.	Food	91,8	931	<a href="http://www.cutisin.cz">www.cutisin.cz</a>
TRW Volant a.s.	Automotive	88,2	450	<a href="http://www.trwauto.cz">www.trwauto.cz</a>
PLAKOR CZECH s.r.o.	Automotive	85,5	750	<a href="http://www.plakor.cz">www.plakor.cz</a>
BKR ČR, s.r.o.	Construction	70,5	400	<a href="http://www.velux.com">www.velux.com</a>
Alfmeier CZ s.r.o.	Automotive	66,8	330	<a href="http://www.alfmeier.de">www.alfmeier.de</a>
WAVIN Ekoplastik s.r.o.	Construction	61,8	290	<a href="http://www.ekoplastik.cz">www.ekoplastik.cz</a>
Kautex Textron Bohemia spol. s r.o.	Automotive	59,5	300	<a href="http://www.kautex.de">www.kautex.de</a>
GRANITOL, akciová společnost	Packaging	44,4	332	<a href="http://www.granitol.cz">www.granitol.cz</a>
RAVAK a.s.	Construction	42,9	450	<a href="http://www.ravak.cz">www.ravak.cz</a>
Company name	Target group*	Turnover (mil. EUR)	Number of employees	www
greiner packaging slušovice s.r.o.	Packaging	42,7	353	<a href="http://www.greiner-gpi.com">www.greiner-gpi.com</a>
DAIHO (CZECH)s.r.o.	Electro	42,2	260	<a href="http://www.daiho.cz">www.daiho.cz</a>
Styrotrade, a.s.	Construction	42,0	200	<a href="http://www.styrotrade.cz">www.styrotrade.cz</a>
A.RAYMOND JABLONEC s.r.o.	Automotive	41,8	208	<a href="http://www.araymond.com">www.araymond.com</a>
Gerresheimer Horsovsy Tyn spol. s r.o.	Medical	40,7	343	<a href="http://www.gerresheimer.com">www.gerresheimer.com</a>

Technické plastové systémy s.r.o.	Automotive	40,4	294	<a href="http://www.tps-group.de">www.tps-group.de</a>
BACHL, spol. s r.o.	Construction	39,4	193	<a href="http://www.bachl.cz">www.bachl.cz</a>
RECTICEL Interiors CZ s.r.o.	Automotive	38,3	330	<a href="http://www.recticel.cz">www.recticel.cz</a>
Seaquist Closures Löffler s.r.o.	Packaging	36,0	289	<a href="http://www.seaquistclosures.eu">www.seaquistclosures.eu</a>
Faerch Plast s.r.o.	Packaging	36,0	58	<a href="http://www.faerchplast.com">www.faerchplast.com</a>
EuWe Eugen Wexler ČR, s.r.o.	Automotive	35,7	459	<a href="http://www.euwe.cz">www.euwe.cz</a>
SULKO, s. r. o.	Construction	34,9	333	<a href="http://www.sulko.cz">www.sulko.cz</a>
KOPOS KOLÍN a.s.	Construction	31,6	350	<a href="http://www.kopos.cz">www.kopos.cz</a>
Alfa Plastik, a.s.	Construction	31,6	480	<a href="http://www.alfaplastik.cz">www.alfaplastik.cz</a>
RENOLIT Czech, s.r.o.	Semi-finished	31,4	71	<a href="http://www.renolit.com">www.renolit.com</a>
AKT plastikářská technologie Čechy, s.r.o.	Construction	31,3	403	<a href="http://www.akt-ag.de">www.akt-ag.de</a>
Pipelife Czech s.r.o.	Construction	30,0	150	<a href="http://www.pipelife.cz">www.pipelife.cz</a>
SPUR a.s.	Construction	27,8	187	<a href="http://www.spur.cz">www.spur.cz</a>
Key Plastics Janovice s.r.o.	Packaging	27,2	300	<a href="http://www.keyplastics.com">www.keyplastics.com</a>
BOS Automotive Products CZ s.r.o.	Autmotive	27,1	190	<a href="http://www.bos.de/cz">www.bos.de/cz</a>
GUMOTEX, akciová společnost	Foams	26,8	1253	<a href="http://www.gumotex.cz">www.gumotex.cz</a>
JOKEY PRAHA CZ, s.r.o.	Packaging	25,7	61	<a href="http://www.jokey.com">www.jokey.com</a>
proOFFICE, s.r.o.	Consumer	25,5	211	<a href="http://www.prooffice.cz">www.prooffice.cz</a>
FV - Plast, a.s.	Construction	25,0	159	<a href="http://www.fv-plast.cz">www.fv-plast.cz</a>
DOPLA PAP a.s.	Packaging	24,8	185	<a href="http://www.pap.cz">www.pap.cz</a>
IMG BOHEMIA s.r.o.	Semi-finished	24,4	126	<a href="http://www.img-management.cz">www.img-management.cz</a>
Simona Plast-Technik s.r.o.	Semi-finished	23,4	74	<a href="http://www.simona.de/cz">www.simona.de/cz</a>
Alca plast, s.r.o.	Construction	23,0	256	<a href="http://www.alcaplast.cz">www.alcaplast.cz</a>
PEBAL s.r.o.	Packaging	22,8	65	<a href="http://www.pebal.cz">www.pebal.cz</a>
FRAENKISCHE CZ s.r.o.	Automotive	22,4	324	<a href="http://www.fraenkische.com">www.fraenkische.com</a>
ZÁLESÍ a.s.	Automotive	22,3	436	<a href="http://www.zalesi.cz">www.zalesi.cz</a>
Fremach Morava, s.r.o.	Automotive	21,2	303	<a href="http://www.fremach.cz">www.fremach.cz</a>
PLASTIKA a.s.	Automotive	20,9	324	<a href="http://www.plastika.cz">www.plastika.cz</a>
Greiner packaging, s.r.o.	Packaging	20,1	162	<a href="http://www.greiner-gpi.com">www.greiner-gpi.com</a>

Source: ČEKIA – Magnusweb database

\* Main target group is mentioned. Most companies deliver to more target groups.

## 4.4 Packaging Technology

Packaging machinery for the food industry started to be produced by the company Sellier & Bellot in 1965. The range of products was gradually expanded by packaging and filling machines for other consumer goods. In the eighties of the last century, Sellier & Bellot was the largest manufacturer of such machines in the Czech Republic and the only exporter to countries of the former Eastern Bloc (Council for Mutual Economic Assistance - CMEA). In 1990, the company employed 2.700 workers, hundreds of which were engineers and designers who developed new packaging and dosing technology. The industry was de facto represented by this company based in the town of Vlašim only.

During the nineties, the company lost some of its customers in Eastern Europe and had to release over 1.000 employees. On the other hand, it gained new customers in Western Europe (France, Denmark, Holland, Finland, Germany), Middle East (Israel and Syria) and Central Asia (Kazakhstan, Mongolia). Four fifths of the turnover was created by export and the company began to grow again.

The production range consisted of:

- Machines for packaging into ready made paper bags - flour, sugar, rice, pulses, cereals, plaster
- Horizontal flow wrapping machines - waffles, muesli-bars, magazines, rubber gloves
- Vertical hose packaging machines - coffee, candy, pasta, legumes, cereals
- Machines for packing in shrink-wrap - a groups of filled bags, PET bottles, cans
- Machines for packaging into flat bags – dry soups and beverages, spices
- Lines for the production of aluminum tubes
- High speed mechanical presses
- Machinery parts and complete production lines according to customer documentation

Former employees released in the nineties have used their technical know-how and established their own engineering companies focused on the production of packaging and dosing machinery for food, feed and chemicals. Even today six of the TOP 25 companies operate in the region around the town of Vlašim.

In 2007, the owner of Sellier & Bellot closed the production of packaging machines and returned to the company's original activity - the manufacture of ammunition which the company was engaged in since 1825. The production and technical know-how was sold to two firms (Apecc Astro and Nomatech).

The production base of packaging and filling machines and machines for the production of packaging is very diverse. Most companies are classified in categories:

- C 28.29 (Manufacture of machinery and equipment for general purposes), resp.
- C 28.99 (Manufacture of other special purpose machinery)

However, there are many other machines that do not have their own classification in these two categories.

Furthermore, packaging machines appear in categories:

- C 28.95 (Manufacture of machinery for paper and paperboard)
- C 28.96 (Manufacture of machinery for plastics and rubber)

Again, things other than packaging machines appear in categories. Overall, statistics for the production of packaging machinery is therefore not officially monitored.

The following table shows the largest packaging machinery manufacturers. This gives some idea of the structure and size of the Czech market for packaging machinery.

**TABLE 23 TOP 25 Producers of Packaging Machinery in the Czech Republic**

Company name	Turnover * (mil. EUR)	Number of employees	www
Sklostroj Turnov CZ, s.r.o.	52,9	227	<a href="http://www.sklostroj.cz">www.sklostroj.cz</a>
NATE - nápojová technika a.s.	18,9	256	<a href="http://www.nate.cz">www.nate.cz</a>
Ing. Rudolf Mašek	8,0	180	<a href="http://www.masek.cz">www.masek.cz</a>
KOMFI s.r.o.	7,2	143	<a href="http://www.komfi.cz">www.komfi.cz</a>
FEIFER - kovovýroba, s.r.o.	4,8	76	<a href="http://www.feifer.cz">www.feifer.cz</a>
MARBACH - ČESKÁ REPUBLIKA, s.r.o.	4,2	48	<a href="http://www.marbach.cz">www.marbach.cz</a>
VELTEKO s.r.o.	3,2	55	<a href="http://www.velteko.cz">www.velteko.cz</a>
FRIMARK CZ s.r.o.	2,9	32	<a href="http://www.frimark.cz">www.frimark.cz</a>
EKOBAL, spol. s.r.o.	2,4 (20,9)	36	<a href="http://www.ekobal.com">www.ekobal.com</a>
Ing. Josef Milík	2,4	50	<a href="http://www.solarco.cz">www.solarco.cz</a>
NOMATECH s.r.o.	2,4	25	<a href="http://www.nomatech.net">www.nomatech.net</a>
Appec Group, a.s.	2,2	42	<a href="http://www.appecastro.cz">www.appecastro.cz</a>
ASTRO Vlašim s.r.o.	1,8	45	<a href="http://www.baliciostroje.cz">www.baliciostroje.cz</a>
BALPACK s.r.o.	1,5	15	<a href="http://www.balpacksro.cz">www.balpacksro.cz</a>
Triapex s.r.o.	1,4	41	<a href="http://www.triapex.cz">www.triapex.cz</a>
ATIP, spol. s r.o.	1,2	42	<a href="http://www.atip-cz.com">www.atip-cz.com</a>
LIKOP, s.r.o.	1,1	21	<a href="http://www.likop.cz">www.likop.cz</a>
AMPI, s.r.o.	1,0	12	<a href="http://www.ampi.cz">www.ampi.cz</a>
ERA-PACK s.r.o.	0,7 (33,4)	48	<a href="http://www.erapack.cz">www.erapack.cz</a>
ROBEX DK, s.r.o.	0,7	22	<a href="http://www.robex-dk.cz">www.robex-dk.cz</a>
MAVET CZ s.r.o.	0,6	25	<a href="http://www.mavet.cz">www.mavet.cz</a>
TECHNOLOGY s.r.o.	0,5 (16,4)	58	<a href="http://www.technology.cz">www.technology.cz</a>
API-NOVO-MACHINERY s.r.o.	0,5	16	<a href="http://api-novo.cz">http://api-novo.cz</a>
PRODUCT CZ, s.r.o.	0,5	11	<a href="http://www.product-cz.cz">www.product-cz.cz</a>
ALBERTINA TRADING, s.r.o.	0,2 (2,9)	20	<a href="http://www.albertina-trading.cz">www.albertina-trading.cz</a>
STARPACK s.r.o.	0,1	3	<a href="http://www.starpack.cz">www.starpack.cz</a>

Source: ČEKIA – Magnusweb database

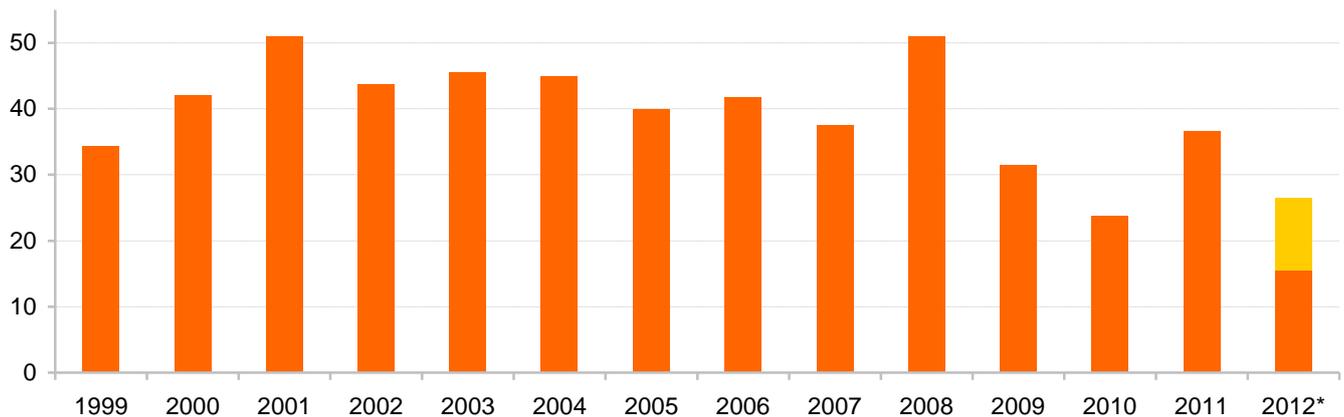
\* Turnover mentioned just for production and sale of packaging machinery. There is total turnover of selected companies in the brackets

Domestic producers exported about half of the produced machines (worth EUR 26 million) abroad in 2011. However, the second half sold to customers in the Czech Republic covers only about 40% of domestic demand. The rest of the machines (worth EUR 36 million) were imported from abroad last year.

The import of packaging machines oscillated between 40 and 50 million during 2001-2008. Then import slowed down and has ranged between EUR 30-40 million in the last four years. The machinery is imported especially from Italy and Germany. Switzerland ranks third.

**FIGURE 10 The Import of Packaging Machinery to the Czech Republic**

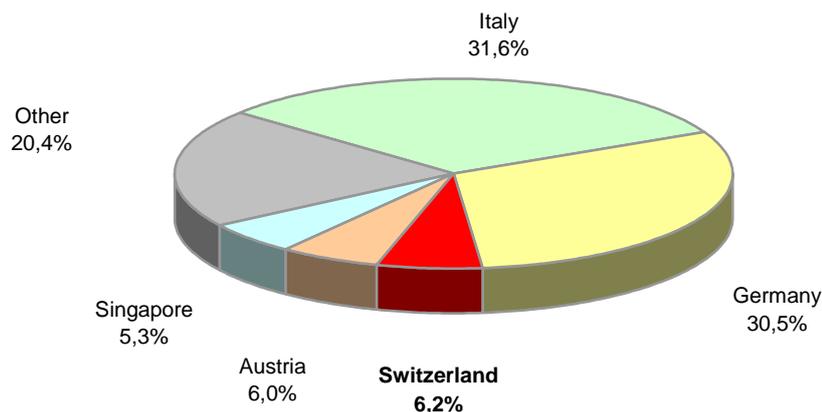
in million EUR



Source: Czech Statistical Bureau

\* Real data for January-July 2012 and estimation for whole year 2012

**FIGURE 11 The Countries of Origin of Imported Packaging Machinery (% of imports I/2010-VII/2012)**



Source: Czech Statistical Bureau

Packaging is made of paper, plastic, glass and aluminum. Earlier the experts and analysts discussed the trends of the replacement of one type of packaging by others and/or estimates of the disappearance of certain types completely. Today the companies solve other issues. Each material has its advantages and disadvantages, and their ratio in use is relatively stable.

**Paper and corrugated cardboard** have the advantage of being a renewable source, easily machined and printed. After fulfillment of their purpose, these are easily recycled. Through innovations of their barrier properties (against grease, aroma and moisture), paper is also allowing use in contact with food. The using of higher percentage of secondary fiber (used paper) is the other long-term trend. However, the sufficient production capacity to process the secondary paper is missing in the Czech Republic. Another problem is the lack of production of quality smooth cardboard. While there are many manufacturers of corrugated cardboard in the CR, smooth cardboard is imported.

Contemporary lifestyle prefers natural environmentally friendly materials. Consumers therefore accept replacing some plastic packages for paper ones. There is a renewal of interest in paper cups, packets, bags and especially supermarket bags. The main disadvantage of paper packaging is its weight and therefore increased transport costs.

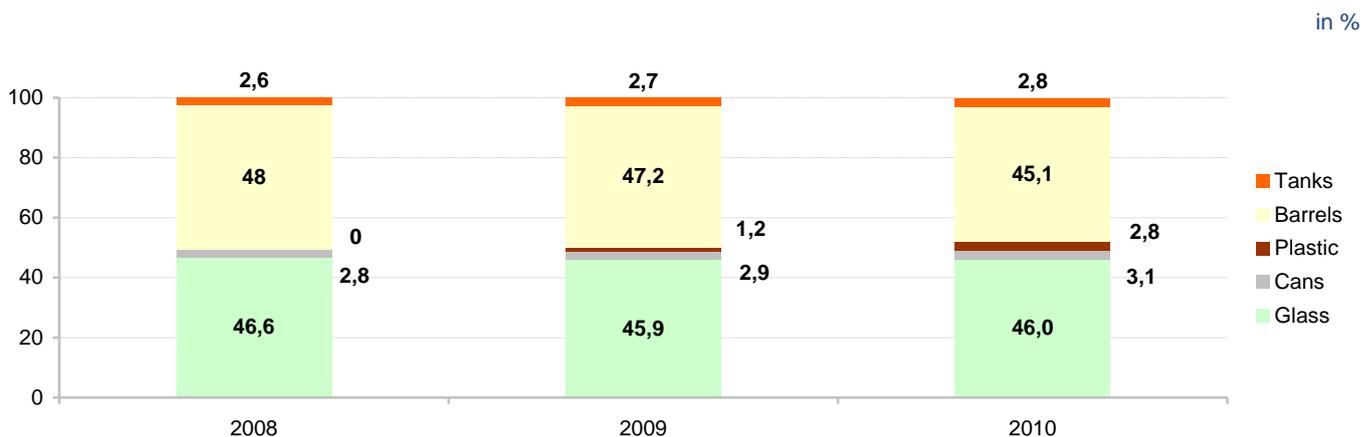
**Plastic wraps** have a unique advantage in barrier properties and therefore a still irreplaceable position in the food industry. Contrary to other materials, the second main advantage is their low weight, which reduces transport costs and improves product handling. Thanks to continuing R&D, plastic foils are thinner and thinner with the same or even better properties. The increasing proportion of recycled plastics is used for packaging production. Innovation of plastic and aluminum foils in combination with integrated valves allow the heating of packaged meals in microwave ovens.

In the near future the expansion of bioplastics is expected. Today these appear in the form of carrier bags in supermarkets only. The term bioplastics means both - plastics from renewable sources (mainly from corn starch), and oxo-degradable plastics made from crude oil, but mixed with other additives that accelerate the process of disintegration of plastic in conjunction with solar radiation. In the Czech Republic there is already a company that is engaged in the production of oxo-plastics ([www.oskarplast.cz](http://www.oskarplast.cz)).

**Glass bottles** are used for alcoholic beverages, but there are already some exceptions. Recently, beer has started to be bottled in PET, wine is sold in Tetra-boxes or bag-in-boxes. The advantage is less weight and better manipulation, but a significant segment of consumers remain conservative and prefers glass bottles. The second group using glass jars is canning products. But again, some products are also packed in plastics (ketchups or edible oils).

**Drink cans** do not have a tradition in the Czech Republic. Consumers appreciate this type of packaging especially on the road, but their consumption is growing slowly. The Czech "beer" nation remains faithful to glass bottles

**FIGURE 12 The Packaging of Beer in the Czech Republic**



Source: Czech Beer and Malt Association

Nanotechnology found its role in the packaging industry. New materials allow for active and intelligent packaging:

- active packaging systems primarily include various types of absorbers (not only O<sub>2</sub>, CO<sub>2</sub>, ethylene, but also the systems regulating the humidity in the package, removing unwanted tastes and smells, or limiting the development of micro-organisms)
- intelligent packaging systems cover the indicators of temperature, O<sub>2</sub>, CO<sub>2</sub>, atmospheric composition in the packaging, freshness indicators, etc.

Another trend is the response to the aging of the population. The design of packaging adapts to abilities of seniors, to comfortable handling with the product, easy opening (special closures), adjusting of the size of font used, etc.

**Opportunities for Swiss companies:**

- Delivering machinery for smooth cardboard manufacturing
- Delivering machinery for recycling and secondary use of paper waste
- Delivering every innovated packaging technology (see trends above in this chapter)
- Delivering components to local producers of packaging machines (see list of the largest producers of packaging machinery above)
- Taking-over local producers of packaging machinery and gain the network of their current customers, in the Czech Republic as well as in Eastern Europe.

**TABLE 24 TOP 30 Producers of Packaging in the Czech Republic**

Company name	Material	Turnover (mil. EUR)	Number of employees	www
MODEL OBALY a.s.	Paper	139,6	1195	<a href="http://www.modelgroup.com">www.modelgroup.com</a>
Ardagh Metal Packaging Czech Republic s.r.o.	Metal	113,8		<a href="http://www.ardaghgroup.com">www.ardaghgroup.com</a>
Smurfit Kappa Czech s.r.o.	Paper	96,6	375	<a href="http://www.smurfitkappa.cz">www.smurfitkappa.cz</a>
VETROPACK MORAVIA GLASS, akciová společnost	Glass	80,3	465	<a href="http://www.vetropack.cz">www.vetropack.cz</a>
greiner packaging slušovice s.r.o.	Plastic	68,2	353	<a href="http://www.greiner-gpi.com">www.greiner-gpi.com</a>
PROWELL s.r.o.	Paper	67,0	61	<a href="http://www.progroup.ag">www.progroup.ag</a>
ALPLA, spol. s r.o.	Plastic	66,4	152	<a href="http://www.alpla.com">www.alpla.com</a>
Kautex Textron Bohemia spol. s r.o.	Plastic	63,2	300	<a href="http://www.kautex.de">www.kautex.de</a>
SCA Packaging Česká Republika, s.r.o.	Paper	60,7	589	<a href="http://www.scapackaging.cz">www.scapackaging.cz</a>
MWV Svitavy s.r.o.	Paper	57,3	380	<a href="http://www.meadwestvaco.com">www.meadwestvaco.com</a>
MORAVIA CANS a.s.	Metal	49,4	340	<a href="http://www.moraviacans.cz">www.moraviacans.cz</a>
O-I Manufacturing Czech Republic, a.s.	Glass	43,6	390	<a href="http://www.o-i.com">www.o-i.com</a>
RETAL Czech a.s.	Plastic	40,3	58	<a href="http://www.retal.cz">www.retal.cz</a>
Duropack Bupak Obaly s.r.o.	Paper	40,1	193	<a href="http://www.duropack.cz">www.duropack.cz</a>
Faerch Plast s.r.o.	Plastic	36,9	58	<a href="http://www.faerchplast.com">www.faerchplast.com</a>
UNIPAP a.s.	Paper	36,5	250	<a href="http://www.unipap.cz">www.unipap.cz</a>
STÖLZLE - UNION s.r.o.	Glass	34,3	184	<a href="http://www.stoelzle.com">www.stoelzle.com</a>
Petainer Czech Holdings s.r.o.	Plastic	34,3	121	<a href="http://www.petainer.com">www.petainer.com</a>
THIMM Obaly, k.s.	Paper	33,9	170	<a href="http://www.thimm.cz">www.thimm.cz</a>
Ball Aerocan CZ s.r.o.	Metal	32,8	240	<a href="http://www.aerocan.cz">www.aerocan.cz</a>
JOKEY PRAHA CZ, s.r.o.	Plastic	28,2	61	<a href="http://www.jokey.com">www.jokey.com</a>
SCHÄFER - SUDEX s.r.o.	Metal	27,1	121	<a href="http://www.schaefer-werke.cz">www.schaefer-werke.cz</a>
DOPLA PAP a.s.	Plastic	25,7	185	<a href="http://www.pap.cz">www.pap.cz</a>
ALLTUB CENTRAL EUROPE s.r.o.	Metal	25,5	287	<a href="http://www.alltub.com">www.alltub.com</a>
ZÁLESÍ a.s.	Plastic	25,2	436	<a href="http://www.zalesi.cz">www.zalesi.cz</a>
Mondi Bags Štětí a.s.	Paper	25,0	125	<a href="http://www.papirove-tasky.cz">www.papirove-tasky.cz</a>
TECNOCAP s.r.o.	Metal	24,7	203	<a href="http://www.tecnocap.cz">www.tecnocap.cz</a>
PEBAL s.r.o.	Plastic	23,5	65	<a href="http://www.pebal.cz">www.pebal.cz</a>
FIOMO, a.s.	Plastic	21,7	128	<a href="http://www.fiomo.cz">www.fiomo.cz</a>
Plastipak Czech Republic s.r.o.	Plastic	21,3	66	<a href="http://www.plastipak.com">www.plastipak.com</a>

Source: ČEKIA – Magnusweb database

## 4.5 Environmental Technology

The negative effects of human activities on the environment are evident throughout the whole industrialization of the planet. In the last 20 years, the Czech Republic changed its approach to nature's protection on many levels. The government is trying to impact the behavior of companies and people in the form of legislation, controls and sanctions, but also by subsidies, guarantees of return on investment and enlightenment. Technologies for environmental protection are applied and will be applied in many fields, which can be divided to solutions for the past, present and future:

- The removal of old environmental damage
- Reducing of current pollution
- Pollution prevention and conservation of non-renewable resources

The first task - **removal of old environmental damage** - represents cleaning up the industrial sites of former state enterprises. As a part of privatization contracts, new owners gained a discount on the purchase price with the stipulation that they ensure clean up of the site. In locations where the environmental damage is too great, the state guaranteed the removal of soil contamination, unsecured landfills of hazardous and/or radioactive wastes, groundwater contamination, etc.

In 2009-2011, huge eco-tender was prepared. The government wanted to choose one provider, which removes all remaining problems in 510 locations. The total amount of the tender was estimated at 115 billion CZK (~ 4.6 billion EUR), of which the TOP 20 sites require investment of 90 billion CZK (78%). Already during the preparation of the tender, the independent experts warned that the price is over-valued and actual costs are rather 25-30 billion CZK (1-1,25 billion EUR). Three bidders submitted their bid, of which CZK 57 billion was the lowest one in September 2011. Later the government cancelled the all the tender and did not choose anyone.

The method of the future solution is not clear. One certainty is that the sites need to be cleaned. Individual sites will probably be solved separately. Suppliers of technologies for cleaning of contaminated areas should be prepared for the announcement of new (smaller) tenders.

### Present

Wastewater treatment, waste management and reducing of harmful air emissions are technologies dealing with the current state of pollution. Projects for **water protection** are the most important in terms of financial volume. In the last five years, 477 projects of sewerage and wastewater treatment plants were realized with the support of the Czech state budget or European funds. The total amount of the projects was CZK 55 billion, of which support reached CZK 37 billion. The following table shows the comparison of the allocation of funds for other types of environmental projects.

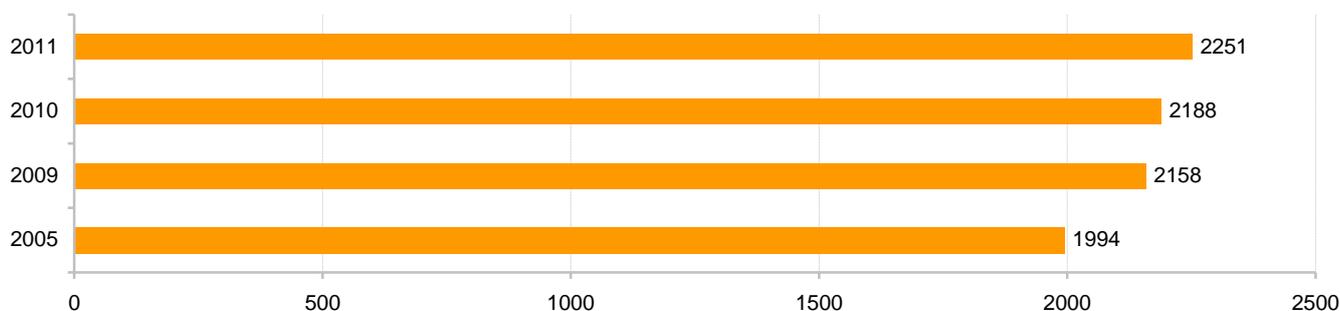
**TABLE 25 Approved Support to Environmental Projects in Period 1.1.2008 - 17.9.2012**

Area of Support	Number of Projects	Total costs (mil. EUR)	EU Support (mil. EUR)	Czech Support (mil. EUR)
Sewerage and wastewater treatment plants	477	2217,0	1344,4	80,2
Thermal insulation of residential buildings	1533	787,5	403,9	22,8
Waste management	1005	570,6	302,8	33,2
Limitation of emissions into air	152	382,1	111,5	19,2
Removal of old ecological burdens	139	234,3	162,6	11,6
Improving the quality of drinking water	49	210,8	129,9	7,6
Optimization of landscape water regime	799	205,1	160,1	15,4
Construction of sources of renewable energy	448	148,9	78,1	4,2
Other	2146	609,7	425,4	34,7
<b>TOTAL</b>	<b>6748</b>	<b>5366,0</b>	<b>3118,8</b>	<b>228,9</b>

Source: The Operational Programme Environment ([www.opzp.cz](http://www.opzp.cz))

In 2011, the length of the sewerage network increased by 1265 km in the Czech Republic, including connections to individual houses. This is a similar increase as in 2010 and 2009. 63 new sewage treatment plants were added in 2011.

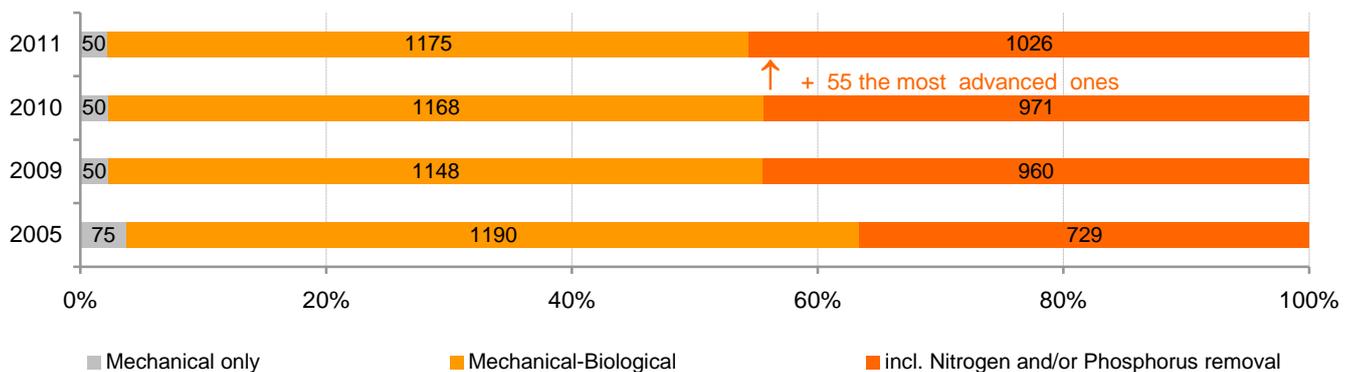
**FIGURE 13 The Number of Wastewater Treatment Plants in the Czech Republic**



Source: Czech Statistical Bureau

There is an improvement in the quality of wastewater treatment technologies. The number of the under-developed ones, which allow mechanical cleaning only, is the same for the last three years. The number of those which clean biologically too and remove nitrogen and phosphorus has significantly increased.

**FIGURE 14 The Number of Wastewater Treatment Plants According to their Technology**

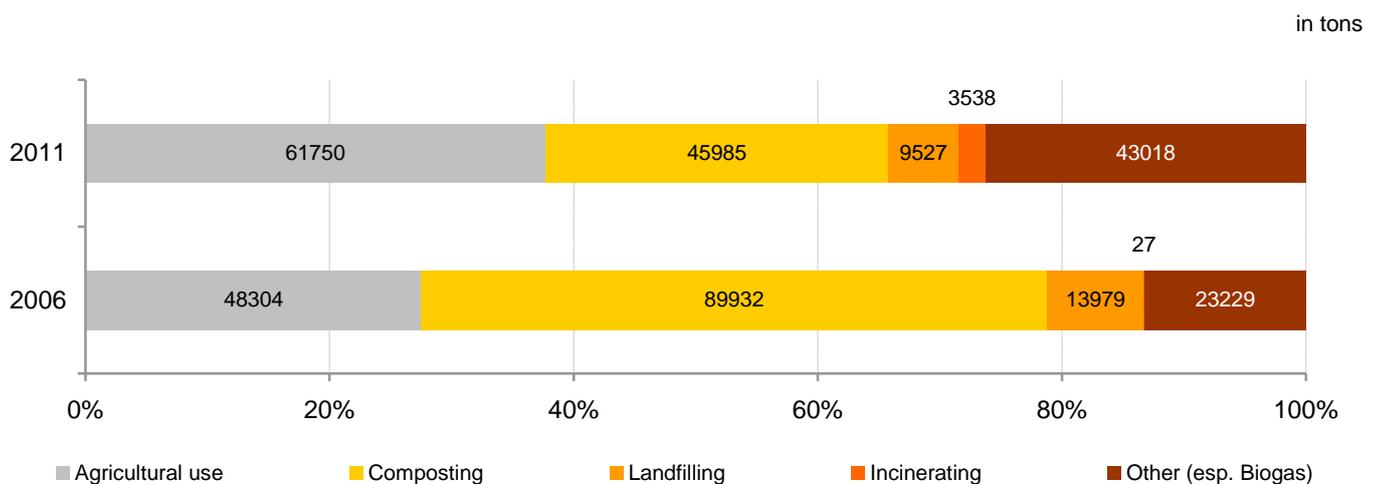


Source: Czech Statistical Bureau

However, the present water treatment technologies are not able to catch other dangerous substances dissolved in waters. These include increasing amounts of drugs in water (antibiotics, psychotropic drugs, hormonal contraceptives), that can reduce immunity, worsen concentration and behaviour. Cleaning and cosmetic products are the second threat. Normally there are bacteria that help clean water in the environment. As they are constantly exposed to various antibacterial agents, it leads to their evolution and the emergence of the new features of organisms, which then turn against man. Capture and processing of these substances is a challenge for other treatment technologies.

In the context of wastewater treatment, disposal of waste sludge is also an important issue. 163,800 tons of sludge were produced in WWTPs in 2011. The dominant use of sludge is as fertilizer. On the other hand, composting, which was prevailing before, is now dropping. Other processing, which includes energy use in biogas plants, also is growing.

**FIGURE 15 The Use of Sludge**



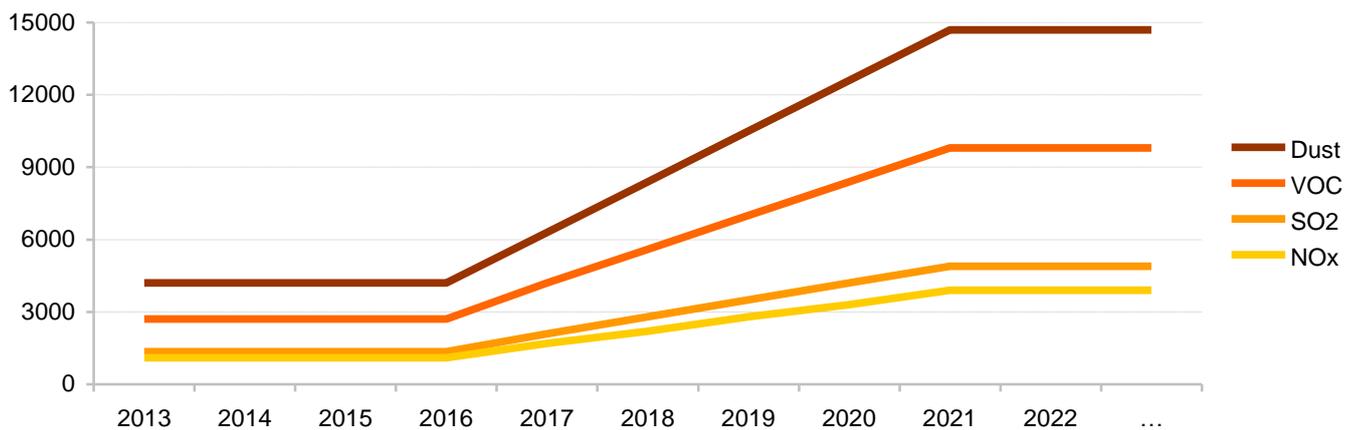
Source: Czech Statistical Bureau

The new **Air Protection Act** came into effect on the 1<sup>st</sup> of September 2012. The act sets higher fees for emissions by companies and forces households to change their local heating to more environmentally friendly ones. Since January 2014, simple furnaces and boilers (of the 1<sup>st</sup> and 2<sup>nd</sup> emission classes according to technical norm ČSN EN 303-5) will not be possible to purchase and to use at all from January 2022. Only the boilers of 3<sup>rd</sup> and upper classes will be enabled. Approximately 500,000 households will have to buy new boilers during the next 10 years.

As for the major pollution sources (energy, metallurgy, chemical industry), extensive investments in desulphurization, denitrification and dedusting were made in the period 1996-1998. Air quality has greatly improved since then. After fifteen years, some of the equipment must be upgraded now. Current technologies allow achieving better results in the cleaning of fumes. The Czech government has acceded to the increase of charges for emissions and thereby encouraging companies to investment in the second wave of air protection. The following graph shows the growth of charges for emitted pollutants.

**FIGURE 16 The Growth of Fees for Pollutants Emitted into the Atmosphere**

in CZK / ton

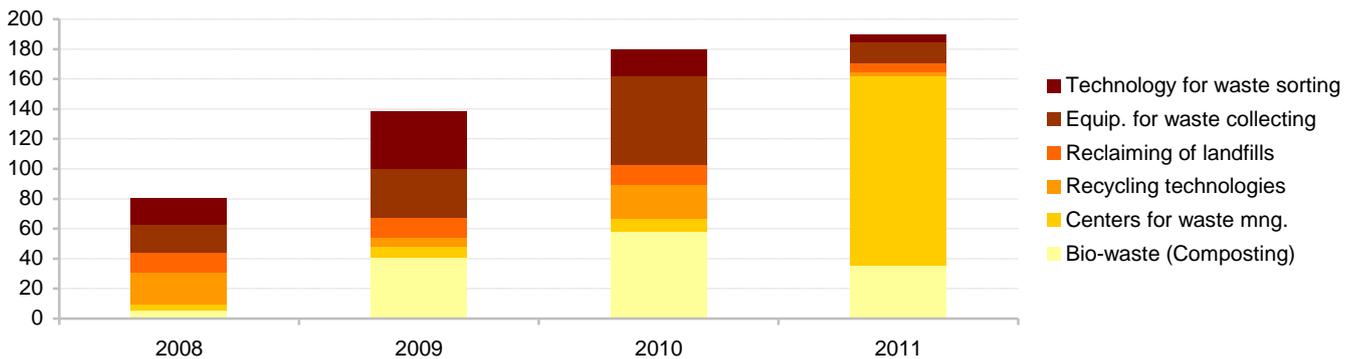


Source: Act 201/2012 Coll., on Air Protection, Annex No. 9

**Waste management** is the third largest area supported by the Operational Programme Environment (see TABLE 25) in the Czech Republic. Two thirds of the projects supported in 2008-2012 were for the purchase of equipment for the collection and sorting of waste (containers, vehicles) and the management of bio-waste (composting). In terms of allocated funds, the centers for complete waste management are the most important. They reached this position in 2011, when the top five projects with a total value of EUR 118 million were announced.

FIGURE 17 The Investment in Waste Management by Areas and Year

in mil. EUR



Source: The Operational Programme Environment ([www.opzp.cz](http://www.opzp.cz))

Thanks to large projects of complex waste treatment centers, the proportion of other waste management activities have declined. Each center includes technologies for sorting, recycling and waste disposal, eventually also composting. Therefore, other items fell in the column "2011" in the above-mentioned chart.

The Ministry of the Environment published a ten-year assessment and prospect of waste management in the Czech Republic in February 2012. Greater use of biodegradable waste (i.e. lower proportion of landfill) and increased support for energy using are the main priorities for the further development of waste management. The report also states that the system of waste separation is available for 98% of the population in 5900 villages. Sorted waste is recycled at a quite high level: 95% of sorted paper is recycled, 75% of glass, 64% metal and 61% plastic. Overall, the recycling rate of packaging is approaching three-quarters (73%).

### Future

**Energy savings**, and thus lower demand for electricity and heat, are fundamental measures to improve the environment.

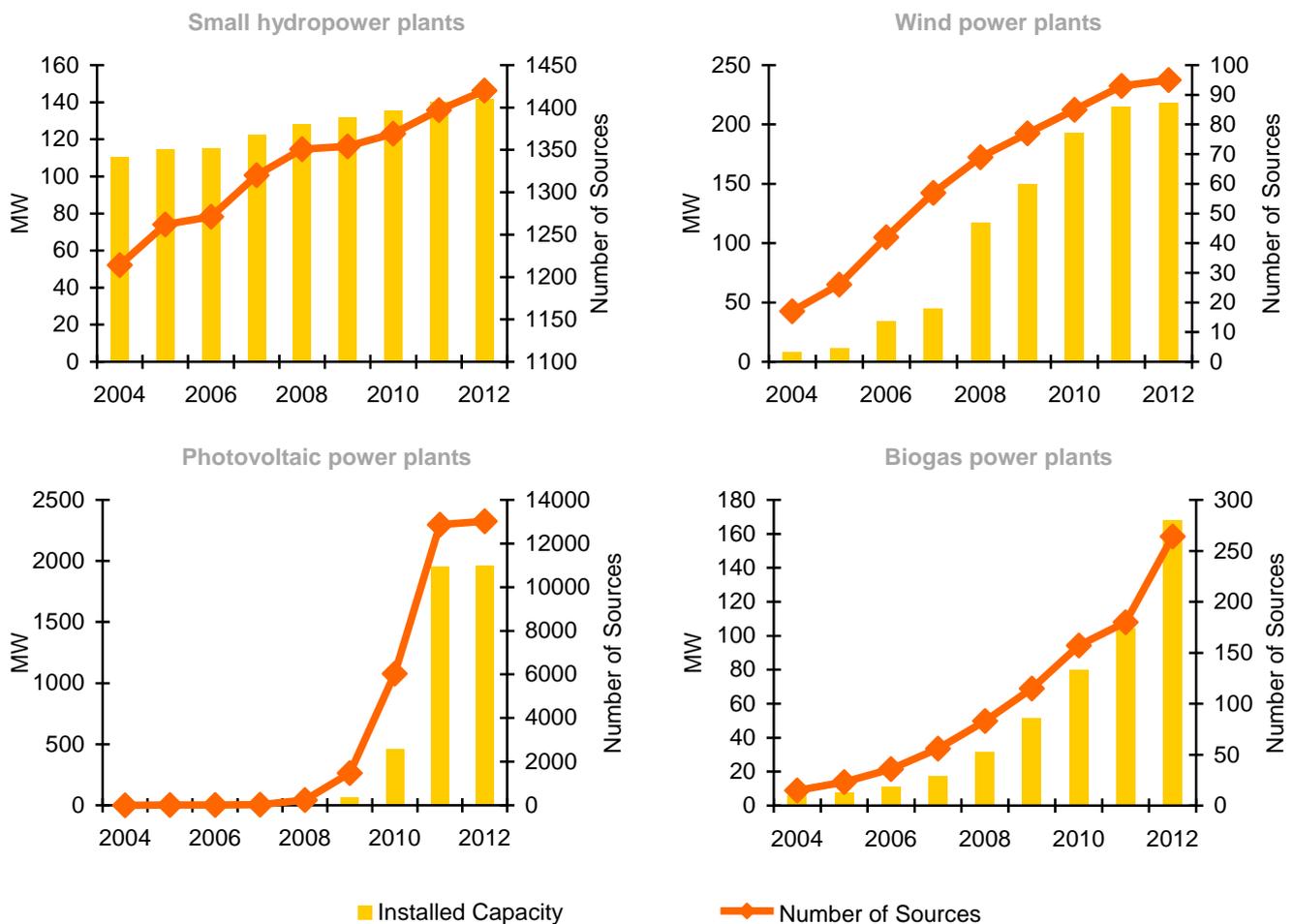
Thermal insulation of older residential buildings and construction of new buildings in the low-energy or passive standard are the most visible actions of this kind. Households prefer appliances and lights that consume less electricity. Technologies that control and manage the efficient use of electricity and heat (smart buildings) are in demand. Power consumption has also decreased in the industry. First, the Czech economy is departing from heavy industry, and more efficient machines are used in companies today.

In the field of electricity and heat sources, **renewable sources** are the trend of the last five years. In terms of clean energy, without any "carbon footprint", photovoltaics and wind energy are the best. On the other hand, these resources do not have stable production and cause problems in the transmission system. Biomass and biogas are therefore preferred in recent times. Hydroelectric power plants are the best choice in terms of purity and stability simultaneously. Large hydro capacity is already saturated in the Czech Republic. In the segment of small hydropower, plants' potential is estimated at 50-70 MW, but it will be power in smaller streams of different sizes up to 1 MW.

In the context of the variable performance of renewable sources, the question of electricity storage is becoming more topical. **Pumped storage hydropower plants** are one of the solutions to this problem. Several sites for their construction are proposed in the Czech Republic. Protests by environmental activists (sites are mostly in the mountains, in natural parks) and high investment costs are the main obstacles to the realization of these plants.

The production of electricity from renewable sources is supported by the system of purchased prices guaranteed for twenty years. Many investors entered this branch in the last five years, because they gained a guaranteed business. Especially in the case of photovoltaics, whose return is seven to ten years, the guarantee of twenty years caused a boom (see graphs below).

**FIGURE 18 The Development of Installed Capacity and Number of Sources (state on 1<sup>st</sup> of January in the year)**



Source: Energy Regulatory Office

The government realized the generosity of its offer later and significantly decreased support. For instance, the purchase price of photovoltaic sources decreased from 12.750 CZK / MWh in 2010 to 6.160 CZK / MWh in 2012. Furthermore, sources up to 30 kW are eligible only. Further development is expected in small installations on the roofs of houses only.

Investors therefore have lost interest in photovoltaics and moved into biogas. The government tightened rules for biomass and biogas, fearing a similar scenario as with the boom from photovoltaics. The support of guaranteed purchase price will be granted only to those projects with a combined production of electricity and heat from 2013.

**Opportunities for Swiss companies:**

- Public tenders for the removal of old environmental burdens (decontamination of soil, groundwater, disposal of hazardous waste)
- New technologies of wastewater treatment (removal of nitrogen, phosphorus, drugs and aggressive cleaning products)
- New technologies for the use of sludge from wastewater treatment plants (biogas, reclamation, incineration)
- Biodegradable waste - composting and biogas plants

- Recycling of plastics, paper, glass, metals, building materials
- Technologies for energy recovery of communal waste (incinerators)
- Modern solid fuel furnaces and boilers for household use
- Advanced filtration technology for large sources of pollution
- Systems and components for low-energy, passive and intelligent buildings
- Renewable sources of energy, which are competitive even without state aid:
  - "Small" Photovoltaics for houses - the island systems for own use
  - Technologies of combined production of electricity and heat (eventually cold) by biomass or biogas
  - Small biogas plants - for hotels, hospitals, etc.
  - Heat pumps

## 4.6 Precision Tools

The manufacture of high accuracy components and systems relates mainly to electronic, optical and medical devices in the Czech Republic. The target groups are the following CZ-NACE sectors:

- 26.5 Measuring, testing and navigating equipment; horology
- 26.6 Electromedical, electrotherapeutic and irradiation equipment
- 26.7 Optical instruments and photographic equipment

The relevant companies (from these sectors) purchase precision components for their production and/or have their own divisions of precision engineering. Then they are potential customers for machines and tools for precision machining.

The manufacture of precise electro-mechanical devices belongs to minority industries in the Czech Republic. The largest of the three described sectors fell by half in 2007. It has remained at a level of EUR 400-500 million since then. The other two branches are growing, but their total volume is marginal.

**TABLE 26 Production in Selected Electronics Sectors in the Czech Republic, 2006 - 2010**

	in million EUR					
	2006	2007	2008	2009	2010	CAGR
CZ-NACE 26.5	912,9	489,7	497,6	404,4	457,4	-12,5 %
CZ-NACE 26.6	14,1	20,0	23,7	23,0	78,6	114,1 %
CZ-NACE 26.7	79,1	96,1	89,2	75,8	104,0	7,9 %

Source: Ministry of Industry and Trade, Yearbook "Panorama českého průmyslu"

The following tables show number of companies and number of employees. While the number of employees partly corresponds with the development of production volume (TABLE 26 and TABLE 28), the number of companies has gone against this trend. There are fewer companies in the growing sub-sector 26.6, so the market's concentration has grown. On the other hand, the sector 26.5 has been diversified where fewer workers generate less production in more companies.

**TABLE 27 Number of Companies in Selected Electronics Sectors in the Czech Republic, 2006 - 2010**

	2006	2007	2008	2009	2010	CAGR
CZ-NACE 26.5	512	503	495	545	599	4,2 %
CZ-NACE 26.6	49	54	50	42	36	-6,6 %
CZ-NACE 26.7	130	140	144	138	123	-1,3 %

Source: Ministry of Industry and Trade, Yearbook "Panorama českého průmyslu"

**TABLE 28 Number of Employees in Selected Electronics Sectors in the Czech Republic, 2006 - 2010**

	2006	2007	2008	2009	2010	CAGR
CZ-NACE 26.5	10568	7725	7617	6150	6212	-10,3 %
CZ-NACE 26.6	236	278	287	295	431	20,7 %
CZ-NACE 26.7	2963	3317	3390	2788	2386	-4,9 %

Source: Ministry of Industry and Trade, Yearbook "Panorama českého průmyslu"

The largest producers of measuring, optical and medical devices are the potential customers for precise components or precision tools.

**TABLE 29 TOP 35 Producers of Precise Devices in the Czech Republic**

Company name	Product	Turnover (mil. EUR)	Number of employees	www
FEI Czech Republic s.r.o.	Microscope	125,4	340	<a href="http://www.fei.com">www.fei.com</a>
Meopta – optika, s.r.o.	Optical	82,0	2209	<a href="http://www.meopta.com">www.meopta.com</a>
Gambro Czech Republic s.r.o.	Medical	51,0	1059	<a href="http://www.gambro.com">www.gambro.com</a>
Invensys Appliance Controls s.r.o.	Measuring	27,3	382	<a href="http://www.invensyscontrols.com">www.invensyscontrols.com</a>
TESCAN, a.s.	Microscope	27,2	162	<a href="http://www.tescan.com">www.tescan.com</a>
BMT Medical Technology s.r.o.	Medical	24,5	356	<a href="http://www.bmt.cz">www.bmt.cz</a>
FOMA BOHEMIA spol. s r.o.	Medical	17,0	270	<a href="http://www.foma.cz">www.foma.cz</a>
AVL Moravia s.r.o.	Measuring	16,1	160	<a href="http://www.avl.com">www.avl.com</a>
Behr Thermot-tronik Czech, s.r.o.	Measuring	15,3	190	<a href="http://www.behrthermotttronik.de">www.behrthermotttronik.de</a>
ERA a.s.	Navigation	14,3	193	<a href="http://www.era.cz">www.era.cz</a>
ZPA Pečky, a.s.	Controls	13,9	243	<a href="http://www.zpa-pecky.cz">www.zpa-pecky.cz</a>
TSE spol. s r.o.	Medical	11,1	150	<a href="http://www.tse.cz">www.tse.cz</a>
SQS VláknoVá optika a.s.	Optical	10,2	210	<a href="http://www.sqs-fiber.cz">www.sqs-fiber.cz</a>
Meomed, s.r.o.	Medical	9,9	70	<a href="http://www.meomed.cz">www.meomed.cz</a>
Olympus Medical Products Czech s.r.o.	Medical	9,8	3	<a href="http://www.olympus.jobs.cz">www.olympus.jobs.cz</a>
BTL zdravotnická technika, a.s.	Medical	9,8	79	<a href="http://www.btl.cz">www.btl.cz</a>
TOROLA electronic, spol. s r.o.	Measuring	9,6	100	<a href="http://www.torola.cz">www.torola.cz</a>
ZPA Smart Energy a.s.	Measuring	9,3	169	<a href="http://www.zpa.cz">www.zpa.cz</a>
CHEIRÓN a.s.	Medical	9,0	50	<a href="http://www.cheiron.cz">www.cheiron.cz</a>
ELGAS s. r. o.	Measuring	9,0	52	<a href="http://www.elgas.cz">www.elgas.cz</a>
MESIT přístroje spol. s r.o.	Measuring	8,1	158	<a href="http://www.mesit.biz">www.mesit.biz</a>
RAMET C.H.M. a.s.	Navigation	7,8	180	<a href="http://www.rametchm.cz">www.rametchm.cz</a>
METRA BLANSKO a.s.	Measuring	7,4	200	<a href="http://www.metra.cz">www.metra.cz</a>
Loma Systems s.r.o.	Controls	7,3	86	<a href="http://www.loma-cintex.com">www.loma-cintex.com</a>
MAHR, s.r.o.	Measuring	7,1	119	<a href="http://www.mahr.com">www.mahr.com</a>
Medical Technologies CZ a.s.	Medical	6,8	96	<a href="http://www.medictech.com">www.medictech.com</a>
BD SENSORS s.r.o.	Controls	6,7	150	<a href="http://www.bdsensors.cz">www.bdsensors.cz</a>
UJP Praha, a.s.	Medical	6,0	82	<a href="http://www.ujp.cz">www.ujp.cz</a>
INOVA Praha s.r.o.	Measuring	5,6	55	<a href="http://www.inova.cz">www.inova.cz</a>
ELDIS Pardubice, s.r.o.	Navigation	5,6	130	<a href="http://www.eldis.cz">www.eldis.cz</a>
DELONG INSTRUMENTS a.s.	Microscope	5,5	64	<a href="http://www.dicomps.com">www.dicomps.com</a>
JSP, s.r.o.	Measuring	5,3	68	<a href="http://www.jsp.cz">www.jsp.cz</a>
ZPA Nová Paka, a.s.	Measuring	5,0	180	<a href="http://www.zpanp.cz">www.zpanp.cz</a>
APATOR METRA s.r.o.	Measuring	4,4	121	<a href="http://www.metra-su.cz">www.metra-su.cz</a>
SEIKO Flowcontrol, spol. s r.o.	Measuring	4,2	75	<a href="http://www.seiko-flowcontrol.com">www.seiko-flowcontrol.com</a>

Source: ČEKIA – Magnusweb database **Opportunities for Swiss companies:**

- Delivering precise components for above-mentioned potential customers
- Delivering machinery for precise metal-processing

# 5 Regulatory and Institutional Background

## 5.1 Regulations & Regulatory Authorities

Thanks to EU membership, the basic conditions for Czech market access are harmonized to the European ones. Swiss companies will face similar conditions as in other EU countries. Some specifics may occur in individual cases, types of business activities and commodities, but there are not major differences. The Czech Republic is a small open economy that does not defend entry of foreign goods and capital to its market.

Safety of products launched on the market is regulated by the Act No. 22/1997 Coll. on technical requirements for products. This Act sets out the basic principles of health protection and safety. The related government regulations set specific requirements on the technical characteristics of the selected possible dangerous products. This applies to electrical equipment (17/2003 Coll.), machinery (176/2008 Coll.), lifts (27/2003 Coll.), pressure vessels, toys and others.

In the case of importing these devices from Switzerland to the Czech Republic, the acknowledgment of meeting the conditions in any EU country can be used. This means, if the product is approved for sale in some EU country, it may be sold in the Czech Republic too. Public entities (municipalities, regional authorities) are the target group for the selected mechanical and electrical machines. These entities must follow the procurement rules when purchasing machinery and equipment. The conditions are mentioned in the Act No. 137/2006 Coll. on Public Tenders.

## 5.2 Professional organizations

Confederation of Industry of the Czech Republic	<a href="http://www.spcr.cz/en">www.spcr.cz/en</a>
Association of Engineering Technology	<a href="http://www.sst.cz/eng">www.sst.cz/eng</a>
Czech and Moravian Electrical and Electronic Association.	<a href="http://www.electroindustry.cz/DefaultEN.aspx">www.electroindustry.cz/DefaultEN.aspx</a>
Czech Woodworking Machinery Manufacturers Association	<a href="http://www.svdsz.cz/indexan.php">www.svdsz.cz/indexan.php</a>
Automotive Industry Association	<a href="http://www.autosap.cz/default-e.asp">www.autosap.cz/default-e.asp</a>
Association of Mechanical Engineers, Czech Republic	<a href="http://www.asicr.cz/en/home">www.asicr.cz/en/home</a>
Czech Agricultural And Forestry Machinery Association A.ZeT	<a href="http://www.zetis.cz/htm/en/intro.phtml">www.zetis.cz/htm/en/intro.phtml</a>
Czech Association of Energy Sector Employers	<a href="http://www.csze.cz/titulni.php?sel_lang=2">www.csze.cz/titulni.php?sel_lang=2</a>
Association of Chemical Industry	<a href="http://www.schp.cz/en">www.schp.cz/en</a>
Plastics Cluster	<a href="http://www.plastr.cz/en/index.php">www.plastr.cz/en/index.php</a>
Czech Packaging Association	<a href="http://www.syba.cz/index.php?inc=16">www.syba.cz/index.php?inc=16</a>
Association of Textile-Clothing-Leather Industry	<a href="http://www.atok.cz/lang-en.htm">www.atok.cz/lang-en.htm</a>
Association of the Pulp and Paper Industry	<a href="http://www.acpp.cz">www.acpp.cz</a>
Federation of the Food and Drink Industries of the Czech Republic	<a href="http://www.foodnet.cz/slozka/?jmeno=Basic+Facts&amp;id=13">www.foodnet.cz/slozka/?jmeno=Basic+Facts&amp;id=13</a>
Water Supply and Sewerage Association of the Czech Republic - SOVAK CR	<a href="http://www.sovak.cz/index.php?p=index&amp;site=en">www.sovak.cz/index.php?p=index&amp;site=en</a>
Czech Association of Waste Management	<a href="http://www.caoh.cz/caoh.php?clanek=onasaj.htm">www.caoh.cz/caoh.php?clanek=onasaj.htm</a>
The Czech Biomass Association	<a href="http://biom.cz/cz/o-biomu/english">http://biom.cz/cz/o-biomu/english</a>
Calla - Association for Preservation of the Environment	<a href="http://www.calla.cz/index.php?lang=eng">www.calla.cz/index.php?lang=eng</a>
Association of Innovative Entrepreneurship Czech Republic	<a href="http://www.aipcr.cz/eng/default.asp">www.aipcr.cz/eng/default.asp</a>
The Association of Research Organizations	<a href="http://www.avo.cz/index_e.htm">www.avo.cz/index_e.htm</a>

## 6 Conclusions & Recommendations

The gradual development of the country is accompanied by a transition from the manufacturing character of the economy towards R&D, design and services. Services constitute 70-80% of GDP in the most advanced economies of the world, but this is not true for the Czech Republic. Thanks to its fundamental traditions, industrial production contributes 38% of GDP. Therefore more opportunities for the supply of machines and components can be found in the Czech Republic than in other markets.

Czech producers export 73% of their production. Germany shares 31% of Czech exports. In total, Czechs are working almost a quarter for the German consumer, especially in the field of components for automotive, machinery and electrical products. Thanks to its location in the middle of Europe, foreign investors place their manufacturing facilities here and supply the western and central part of Europe from them.

The economic crisis hit the Czech manufacturing industry in 2008-2009, but not too much. Many sectors have reached the same or better results in 2010 compared to the pre-crisis year 2007. In 2011, most sectors continued in an upward trend.

All the companies that supply the automotive industry are promising partners for cooperation and for delivering components and machines for their production. This concerns companies that manufacture metal products, plastic parts, electrical components or textiles for interiors.

Environmental technologies are the second promising segment. The Czech Republic offers extensive support to installations of renewable sources of electricity and heat, wastewater treatment and waste management. This encourages the demand of investors, who are both private entities and often cities, municipalities and other public entities. Public tenders are a necessary condition before signing contracts with these suppliers. Cooperation with a Czech entity that already knows the market is therefore recommended.

Energetics and large technological units are another growing segment. Major domestic engineering firms are gaining more orders from the emerging markets of Russia, China and India. The planned extension of the nuclear power plant Temelín will be also a challenge for domestic companies.

It is necessary to import machinery for the plastics industry to the Czech Republic. There is no significant local manufacturer, while the plastics industry has a promising prospect. Not only because of the successful connection to the automotive industry, but especially because of further diversification, i.e. applications in many other fields - electrical industry, packaging industry, construction, etc.

Other sectors elaborated in this study are rather small (textile machinery, precision tools). But there are also some opportunities for cooperation and export from Switzerland to the Czech Republic.

The market-entry strategy for Swiss companies:

- Delivering machinery and manufacturing technology to the target industries
- Delivering components to the local producers of manufacturing machinery
- Taking-over local producers of machinery and thus gaining their distribution channels

In particular chapters the specifics and modifications of these three strategies are described in more detail.

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