
CAEF
The European
Foundry Association
2021

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Preface

Once again, the CAEF - The European Foundry Association - Commission for economics & statistics has compiled a statistical annual entitled "The European Foundry Industry 2021" from national reports and statistical material gathered from its member countries. The main tables were supplemented by information from European foundry nations being non-members of CAEF as far as data has been available.

The publication thus presents an authentic statistical picture of the European foundry industry. All the same, data in some categories, particularly those regarding output values, have remained incomplete. Despite those inadequacies the Annual Report published by the Commission for economics & statistics remains the most comprehensive Europe-wide survey of our industry.

The Commission wishes to express its gratitude to all those CAEF member association representatives who helped in preparing these reports and figures.

Düsseldorf, November 2022

CAEF - The European Foundry Association





Dr. F.-W. Lohe

Secretary General

T. van de Sand

Commission for economics & statistics, Secretary

TOTAL SURVEY

The European Foundry Industry in 2021

The Economy and the Casting Customer Industries

The Macro-economic Situation at the end of the year 2021

The year 2021 was still dominated by the Covid-19 pandemic. While business was directly affected in the beginning of the year due to lockdowns, the second half of 2021 has been characterised by global supply chain disruptions. For the European foundry industry 2021 was a difficult year again. Challenges for foundries were different depending on the customer sectors.

While in Europe and North America Covid-19 related restrictions have been implemented in the beginning of the year, an increasing share of vaccinated citizens led to an easing in the second half of 2021. Nevertheless, the spread of new variants of the Corona disease had a negative impact on the recovery process in Europe. Contrary the European approach, the central government of China followed a so called zero-Covid policy. Even though infection numbers were low, several million inhabitants were forced to stay at home during regional lockdowns. The closing of global trading centres and major international trade hubs led to unprecedented disruptions in global trade and value chains. Transport prices multiplied due to increased energy prices and very limited transport capacities. Shipments of raw materials and intermediate products were stuck in ports for weeks and thus jeopardised industrial production and the economic recovery. Nevertheless, China's GDP increased by 8.1%[1]. Meanwhile, the figures for the USA show a GDP growth of 5.7%. In contrast, supply chain problems hit Europe's industrialised countries harder. Germany, which has a large automotive sector, was affected strongly by the disruptions. The German economy grew by only 2.6% over the year. The GDP of the CAEF countries increased by 5.5% after the drop of 6.4% in 2020. Due to extensive governmental aid measures the CAEF unemployment rate declined by 0.3 percent points to 7.4%. Meanwhile consumer prices increased from 1.0% in 2020 to 3.3% in 2021 for CAEF region.

[1] International Monetary Fund (2022): „World Economic Outlook – Countering the Cost-of-Living Crisis“, Washington DC., USA.

Table 1: Forecast 2022/2023

Country	Weighting In %		Gross Domestic Product Growth Rate in %			Consumer Prices Growth Rate in %			Unemployment Rate In %		
	Population	GDP	2021	2022	2023	2021	2022	2023	2021	2022	2023
Austria	1,6	2,3	4,6	4,7	1,0	2,8	7,7	5,1	6,2	4,5	4,6
Belgium	2,0	2,8	6,2	2,4	0,4	3,2	9,5	4,9	6,3	5,4	5,6
Bulgaria	1,2	0,4	4,2	3,9	3,0	2,8	12,4	5,2	5,3	5,1	4,7
Croatia	0,7	0,3	10,2	5,9	3,5	2,6	9,8	5,5	8,1	6,9	6,6
Czech Republic	1,9	1,3	3,5	1,9	1,5	3,8	16,3	8,6	2,8	2,5	2,3
Denmark	1,0	1,9	4,9	2,6	0,6	1,9	7,2	3,8	5,1	5,2	5,3
Finland	1,0	1,4	3,0	2,1	0,5	2,1	6,5	3,5	7,6	7,0	7,4
France	11,5	14,0	6,8	2,5	0,7	2,1	5,8	4,6	7,9	7,5	7,6
Germany	14,7	20,2	2,6	1,5	-0,3	3,2	8,5	7,2	3,6	2,9	3,4
Hungary	1,7	0,9	7,1	5,7	1,8	5,1	13,9	13,3	4,1	3,4	3,8
Italy	10,7	9,9	6,7	3,2	-0,2	1,9	8,7	5,2	9,5	8,8	9,4
Lithuania	0,5	0,3	5,0	1,8	1,1	4,6	17,6	8,4	7,1	7,3	7,0
Netherlands	3,1	4,8	4,9	4,5	0,8	2,8	12,0	8,0	4,2	3,5	3,9
Norway	1,0	2,3	3,9	3,6	2,6	3,5	4,7	3,8	4,4	3,9	3,8
Poland	6,7	3,2	5,9	3,8	0,5	5,1	13,8	14,3	3,4	2,8	3,2
Portugal	1,8	1,2	4,9	6,2	0,7	0,9	7,9	4,8	6,6	6,1	6,5
Slovenia	0,4	0,3	8,2	5,7	1,7	1,9	8,9	5,1	4,8	4,3	4,3
Spain	8,3	6,8	5,1	4,3	1,2	3,1	8,8	4,9	14,8	12,7	12,3
Sweden	1,8	3,0	5,1	2,6	-0,1	2,7	7,2	8,4	8,8	7,6	7,4
Switzerland	1,5	3,8	4,2	2,2	0,8	0,6	3,1	2,4	3,0	2,2	2,4
Türkiye	14,9	3,9	11,4	5,0	3,0	19,6	73,1	51,2	12,0	10,8	10,5
UK	11,9	15,1	7,4	3,6	0,3	2,6	9,1	9,0	4,5	3,8	4,8
CAEF[2]	**100**	**100**	**5,5**	**3,0**	**0,5**	**3,3**	**10,9**	**8,3**	**7,4**	**6,5**	**6,8**

Source: International Monetary Fund, World Economic Outlook Database, October 2022

The Economic Situation in the Major Casting Customer Industries

Vehicle construction

The international passenger car markets were hit hard by supply chain disruptions. Above all semiconductor shortages led to lower production numbers. While automotive OEMs cancelled call off in 2020, they underestimated the recovery process. Production capacities for semiconductor, however, are linked to longer-term planning. At the same time the demand for electronic components increased significantly due to a Covid related boost of the digitalisation all around the world. In addition to that, with the electrification of the engines the automotive sector increased the demand for semiconductors, too. Especially in the second half of 2021 the shortage led to significant lower production.

In 2021, passenger car sales in the EU fell by 2% to 9.7 million (m.) units. A very weak second half of the year led to negative figures, although 2020 has already been a record low base. This fall was the

[2] Gross Domestic Product and Consumer Prices weighted by GDP share of CAEF countries. Unemployment Rate weighted by population share of CAEF countries.

result of the semiconductor shortage that negatively impacted car production throughout the year. Compared to pre-crisis year 2019 the EU market is missing 3.3 m. registrations.

Looking at the full year for the four major EU markets, only Germany posted a decline (-10%) in 2021. While the semiconductor crisis affected the market in the second half, in first months of 2021 negative numbers were reported, since the VAT cut related to Covid-19 measures by the German government ended in December 2020. This led to a pull forward effect and lower demand in 2021. By contrast, Italy saw the highest increase (+6%), followed by Spain (+1%) and France (+1%) with modest growth. Also, in UK passenger car sales increased slightly (+1%). Turkish market registered a significant decline by 8%. Due to great disruptions in the previous years this, however, is linked to statistical base effects.

In the US, the light vehicle market (passenger cars and light trucks) finished 2021 with nearly 14.9 m. vehicles sold (+3%). Despite regional lockdowns China has largely managed to recover from the 2020 disruptions. With an increase of 7% (21.1 m. units) the largest market for passenger cars reached the 2019 level again. In 2021 the Japanese new car market totalled 3.7 m. passenger cars, some 4% below the previous year's result. Russia's light vehicle sales rose by 4% last year, to 1.7 m. units. In India the passenger car market recorded the most significant increase in 2021 of 27%, while Brazil reported only a minor growth of 1%.

Mechanical engineering

Machinery and equipment production in the EU exceeded the level of the crisis year 2020 by an average of 12% but remained 2% below the level reached in 2019. The persistent supply-side bottlenecks slowed down the production momentum. In the final quarter, production grew by 8%. Japan managed the highest year-on-year growth rate with a 17% increase in production. In the USA, the increase was around 10% due to strong summer months with double-digit growth rates.

Worldwide, machinery and equipment were manufactured for an estimated 3 trillion euros in 2021. In euro terms, this is around 15% more than in the pandemic year of 2020. In China alone, the turnover volume now amounts to almost 1.1 trillion euros. Thus, in 2021 turnover increased by 18% in China. As in previous years, this puts the country at the top of the country rankings. Despite the massive production problems caused by disrupted supply chains, Germany remained in third place with an estimated 311 billion euros in turnover (+10%), just behind the second-placed USA (347 billion euros; +11%). The 27 countries of the European Union together account for 748 billion euros in machinery turnover, a quarter of world machinery turnover.

Building industry

The construction industry in Europe recovered in 2021 after an unexpected decline in construction output in 2020 caused by negative socio-economic developments (national and sector-specific closures aimed at halting the development of the global COVID-19 pandemic). Following the 4.4% decline in 2020, construction output in Europe increased by 5.6% in 2021 and additionally closed the gap to 2019.

In 2021, in Western Europe ten countries achieved higher total construction volume than in the pre-pandemic year 2019. Of the BIG-5 countries, only Italy surpassed its pre-crisis level in 2021 significantly (+13.0%, after a decline of 4.5% in 2020). In Germany, the construction output in 2021 was close to the level of 2019 (+0.1%), while production was 5.7% lower in France, 3.2% in Spain, and 2.9% in the United Kingdom. All Nordic countries achieved a higher total construction volume in 2021 compared to the pre-pandemic year 2019, of which Denmark showed the highest growth (+17.8%).

Among the four Central and Eastern European countries, only one achieved a higher total construction volume in 2021 compared to 2019, namely Poland (+1.5%). On the other hand, the construction industry in Slovakia experienced a deep recession with a decline of 16.8%.

Steel industry

Global crude steel production reached 1,951 m. tonnes in 2021, which was 3.7% more than the year before.
The EU produced 152.5 m. tons of crude steel in 2021, an increase of 9.9% compared to 2020. Germany produced 40.1 m. tons of crude steel in 2021, 12.3% more than in 2020. Türkiye's crude steel production for 2021 was 40.4 m. tons, up by 12.7% on 2020.

Asia produced 1,382.0 m. tons of crude steel in 2021, an increase of 0.6% compared to 2020. China's crude steel production in 2021 reached 1,032.8 m. tons, down by 3.0% on 2020. China's share of global crude steel production decreased from 56.5% in 2020 to 53.0% in 2021. India's crude steel production for 2021 was 118.1 m. tons, up by 17.8% on 2020. Japan produced 96.3 m. tons in 2021, an increase of 15.8% compared to 2020. South Korea produced 70.6 m. tons, 5.2% more than 2020.

The United States produced 86.0 m. tons in 2021, 18.3% more than 2020. Russia is estimated to have produced 76.0 m. tons in 2021, 6.1% more than 2020. Ukraine produced 21.4 m. tons in 2021, 3.6% more than in 2020. The Middle East produced 41.2 m. tons of crude steel in 2021, an increase of 1.2% on 2020. Annual crude steel production for South America was 45.6 m. tons in 2021, an increase of 17.8% on 2020.

The strong economic recovery from the Covid-19 pandemic had a positive effect on the global steel demand in 2021. Since China struggled less in 2020 with the crisis, this recovery was mainly seen in Europe and North America.

The Foundry Industry

In 2021, the iron and steel foundries of the CAEF member states produced 10.7 million tons of castings. Compared to the year before, this corresponds to a 17.6% increase in production weight. However, production was still 5.7% lower than in 2019 and even 11.4% less than in 2018. The six countries that dominate the industry in terms of weight, namely Germany, Türkiye, France, Spain and Italy, account for 81.6% of the production of ferrous metal castings. The production increased in all countries compared to the previous year. The exceptions are United Kingdom and Hungary. While in United Kingdom the production was 1.7% lower than in 2020, Hungary that was one of two countries with a positive development in the crisis year 2020 noted a minus of 1.6% in 2021.

In 2021, non-ferrous metal foundries in the CAEF member states booked a production increase of 14.8% to 3.8 m. tons. The countries that dominate the production of non-ferrous metal castings, namely Italy, Germany and Türkiye, account for 61.9% of the total volume of non-ferrous metal castings produced in the CAEF member states. In both, Italy and Türkiye, production rose at an above-average rate (+33.6% and +29.4%) compared to the other CAEF countries. Germany, for the first time only second largest country of non-ferrous production was struggling with low production numbers in the automotive sector. Non-ferrous casting production only increased by 4.8% compared to 2020. Compared to 2019 production was still 20.1% lower in Germany.

The number of employees in iron and steel foundries increased in Austria, Italy, Portugal, Slovenia and Türkiye. All in all, however, the employment of foundries located in CAEF member states decreased by 0.9% to 122,600 people.

In 2021 the non-ferrous metal sector was dominated by positive employment trends. In the End of 2021 115,200 people worked for European foundries. Compared to 2020 the number of employees increased by 1.9%.

The share of cast iron with lamellar graphite in the output total of iron and steel castings was 49.3%, a slightly higher share than in the year before. Correspondingly, the share of ductile cast iron logged (43.5%). The share of steel casting sector was slightly lower (7.2%).

The production of castings made of non-ferrous metal alloys is still dominated by light metals. The share was 87.3%. Furthermore, the share of copper alloys holds the level of round about 5.7%. Therefore, the share of components made of zinc alloys was 6.2%.

From the data available it appears that the export quota of the iron and steel foundries increased from 42.3% to 49.9% in 2021. Calculation base is the foreign trade report of eight member countries. Germany, the country that dominated the export trade in castings in the past experienced an increase by 19.4% with a volume of more than 1.25 m. tons. Türkiye reported an increase by 48.5% in export volume to 1.46 million tons and therefore replaces Germany as the export nation leader of iron and steel castings. Spain exported a volume of 0.66 million tons (+6.0%) and is placed the third place.

If we consider only those CAEF member states with current figures for the previous year, the value of the iron and steel castings produced increased by 15.2%.

From the data that is available on the production value of the non-ferrous metal sector a year-on-year comparison shows an increase of 15.6% in turnover.

All countries with missing data were excluded from the calculations.

The Situation in the Casting Material Sectors

Iron

At 5.3 million tons, the output of the CAEF member states was up by 19.4%. Except Belgium, Hungary, Poland, Switzerland and United Kingdom all other countries experienced growth rates in double digits for the year 2021. Compared to 2019 however the production is still 6.4% lower. As ever, the data available for the cast-iron sector is too sketchy to allow determining the overall value of production. The output of components made of cast iron with lamellar graphite is largely destined for the motor vehicle and mechanical engineering industries. For the motor vehicle industry, the highest absorption rates were reported from Portugal (85.4%), Germany (65.1%) and Türkiye (30.1%) respectively. For the mechanical engineering in industry the highest shares in the output were posted for 2020 by Italy (53.2%), Türkiye (38.1%), and Germany (20.4%).

The number of persons employed in iron foundries (incl. ductile cast iron) increased in Italy, Portugal and Türkiye and was stable in Spain. In all other reporting countries employment decreased, leading to a 0.8% decline overall.

Ductile Cast Iron

The producers of ductile cast iron reported an increase of output by 16.5% to 4.7 million tons.

Hungary and Sweden reported a decline, while United Kingdom hold its production level. Greatest growth was reported from Türkiye (+29.6%) and Italy (+28.4%).

Cast iron with spheroidal graphite traditionally dominates the ductile cast iron sector with an unchanged share of 99% during the last years. Correspondingly, malleable iron as a niche product holds a share of a little bit more than 1%. In this context, it should be noted that malleable casting statistics have lost some of their meaning because in some states it is impossible to break down the figures for the ductile cast-iron sector. Therefore, data for malleable castings are not collected any more since 2016. Nodular iron components are mainly produced in Germany, Turkey, France, Spain, and Italy.
As ever, components for the motor vehicle and mechanical engineering industries predominate in the production of ductile castings, with the building industry following in third place among the customer industries. If analysing the shares of motor vehicle castings in those countries for which data are

available, one sees that the highest shares are reported from Portugal at 86.6%, Türkiye at 41.7%, and Germany at 37.5%. The mechanical engineering industry holds the highest shares in output in Italy at 55.2% and Germany at 37.2%. Unfortunately, it is impossible to present the share of the building industry.

Steel castings

In the year 2021 the output of steel castings increased by 12.3% to 770,400 tons. Türkiye, the leading producer since 2018, logged an increase of 45.4% in production volume compared to the year before. For Germany, second in line, the production increased by 4.2%. Together both countries account for 54.9% of CAEF steel casting production.

In those member countries for which data for a year-on-year comparison was available, the value of the output of steel casting components increased by 1.1%.

The number of persons employed in steel foundries decreased by 1.0%. In Türkiye, Spain and Poland the number of employees increased, whereas the number of persons employed stayed same in Italy. Meanwhile in Germany and Finland a reduction was reported. At the end of 2021 nearly 21,800 people were employed in European steel foundries.

Non-ferrous metal castings

The output of non-ferrous metal casting components in the CAEF member countries increased by 14.8% to 3.8 m. tons.

Traditionally, the production of non-ferrous metal castings is dominated by light metals. The motor vehicle industry is the foremost customer. In the year 2021 the output of light metal castings (aluminium and magnesium) increased by 15.2% compared to 2020, reaching nearly 3.3 m. tons. Together Italy, Germany and Türkiye, the three major producers, account for 61.2% of the light-metal castings. The production for these leading countries went up by 34.7% for Italy, by 6.4% for Germany and 28.6% for Türkiye. Only United Kingdom reported declining numbers in 2021. Among the light metal alloys, magnesium plays a subordinate role in terms of output weight.

The second most important material category in the non-ferrous metal sector is that of copper and its alloys. For countries with registered production for 2021 the level increased by 12.7% after a decline of 21.7% in 2020. The reported volume in 2021 reached a level of almost 216,300 tons. Italy and Türkiye, biggest and third biggest producer country of copper alloy castings in CAEF increased their production by 36.1% respectively 34.4%. All other countries reported production numbers lower than CAEF average or even negative trends.

The output of zinc castings rose by 12.7% with a volume of 236,200 tons. Italy, Germany, and Türkiye are the major producers, together holding a share of 75.8% in output total.

The statistical data available for the category of 'other non-ferrous metal alloys' are fragmentary. In addition, some countries include copper and zinc in this category, because there is no facility for segregating these. Therefore, it is impossible to analyse this category more extensively.

Source:
ifo Munich, IMF, ACEA, VDA, VDMA, Euroconstruct, Worldsteel, CAEF

REPORTS OF THE COUNTRIES



Economic Situation 2021 and Outlook 2022

In 2021, the Austrian industry obtained a preliminary production value of 202.2 billion EUR, leaving behind the pre-crisis level. Still this nominal volume includes some massive price increases, especially in energy costs and intermediate goods.

Gas and heat supply companies are the industrial sector where these price effects are most evident. This trend is not necessarily due to the volume, that has been increasing in recent months, but mainly because of price increases. Gas and heat supply companies have been boosting their sales considerably – especially in the fourth quarter of 2021.

The rise in material prices and the resulting decline in profit margins pose a major challenge to the industry and have a direct impact on liquidity in the short term and an indirect impact on the industry's investment capacity in a long-term perspective.

In particular, the competitiveness of Austria's energy-intensive industry is affected by energy price increases, as Austria is more affected by higher energy prices than other countries. Austria is one of the EU countries which depend most heavily on natural gas imports (recently the share of gas imports from Russia amounted to 80%). High gas prices are already forcing some of our industrial companies to cease production temporarily.

The war in Ukraine also causes failures by upstream suppliers, for example in the automotive sector. Supply shortages unfortunately remain frequent for the domestic industry. The risk of recession is growing, the consequences of the war are slowing down our industry – in addition to the already difficult framework conditions and stress factors such as price rises, supply chain problems and material shortages (e. g. semiconductors, fibreglass, plastics) – and pushing inflation ever higher.
Due to the war in Ukraine, companies with a good order situation have to apply for short-time work due to the lack of primary materials, and suffer from a lack of liquidity and profit margins shrunk to below zero, because of exploding prices. The main areas of concern besides oil and gas are steel, copper, nickel, aluminium and coal. In some cases, there have been cost increases of more than 100 percent in the past twelve months.

Even should the war end soon, the Austrian National Bank (OeNB) expects a real GDP growth of only 3.5 percent in the Austrian economy for 2022, with an inflation rate of 5.3 percent.

The WIFO revises its growth forecast for 2022 by -1.3 percentage points to 3.9% [2023 real GDP: +2.0%], the IHS growth forecast drops 0.6 percentage points. Inflation, on the other hand, due to energy price trends is strongly revised upwards [WIFO: +5.8% for 2022 and +3.2% for 2023]. The next revision of the forecasts will reflect even higher inflation expectations.

Table 1: WIFO Forecast (in %)

	2021	2022	2023
GDP, real terms	**4,5**	**3,9**	**2,0**
Goods production	**8,7**	**0,0**	**1,0**
CPI	**2,8**	**5,8**	**3,2**
Gross Capital Investment	**4**	**3,5**	**2,5**

Source: Press conference BSI, flash surveys of the Association of the Metal Technology Industry, WIFO June 2022

Situation of the foundry industry

The industry's own survey shows growth in production and sales for 2021, with the number of employees falling slightly compared to 2020. The total production in 2021 is about 291,835 t and has increased by 13.9% compared to 2020. The total turnover of the industry shows an increase of 16.9% compared to 2020 and amounts to approx. €1.40 billion. If you compare the turnover of ferrous and non-ferrous castings from 2019, 2020 and 2021, it can be seen that 2020 values had been lower than in 2019 and are almost back to the 2019 level in 2021.

Iron casting shows a total production of 152,258 t in 2021, an increase of 13.0%. Sales increased by 14.1% to roughly €436 million.

Production of ductile iron amounts to 104,800 t, an increase of 14.3% compared to 2020.
Steel castings rose as well to 10,338 t, up 7.7% from 2020.

In the area of grey cast iron, production increased by 11.1% compared to 2020 and amounts to 37,120 t.

In non-ferrous casting, production also increased by 14.9% and sales by 18.2%.

Table 2: Foundry Production

	Production in t		Change	Value in 1000 €		Change
	2021	2020	in %	2021	2020	in %
Grey castings	37,120	33,401	11.1			
Ductile cast iron (incl. malleable iron)	104,800	91,726	14.3			
Steel castings	10,338	9,601	7.7			
Iron castings	**152,258**	**134,728**	**13.0**	**436,311**	**382,445**	**14.1**
Total, zinc die-castings & heavy-metal castings	11,606	10,135	14.5			
Light-alloy castings	127,971	111,302	15.0			
whereof: Aluminium die-castings	104,210	90,305	15.4			
Permanent mould aluminium castings	17,264	15,689	10.0			
Aluminium sand-castings	1,030	804	28.1			
Magnesium castings	5,467	4,504	21.4			
Metal castings	**139,577**	**121,437**	**14.9**	**959,747**	**811,730**	**18.2**
TOTAL	**291,835**	**256,165**	**13.9**	**1,396,059**	**1,194,175**	**16.9**

Source: Association of the Austrian Foundry Industry

Employment situation

In 2021, the total employment amounted to 6,520 white- and blue-collar workers, down 0.3 percent compared to 2020.
The number of apprentices who are being trained in the industry's own apprenticeships (foundry technology and metal casters) went down, compared to 2020.

Incoming orders

Because of the difficult situation in the Ukraine, incoming orders have been fluctuating and lie still below pre-crisis level. Short-time work has decreased.

Investment plans

Due to existing framework conditions and delivery problems experienced by the suppliers, investment plans are rather cautious.

Personnel costs

The increase in wages and salaries according to the collective agreement amounts to 3.55%.

Supply of raw materials and energy

Commodity prices fluctuated in 2021, moving up again significantly from the end of the year, and this upward trend continued at the beginning of 2022.

Cost of electricity rose sharply compared to the previous year. Energy and gas prices in Austria are also showing a steep increase.

All companies are extremely affected by exploding energy and raw material costs. Despite exorbitant prices, raw materials are sometimes no longer available. It is also unclear which impact the Ukraine crisis will have on the automotive industry and whether there will be further production stops.

Outlook 2022

At the moment, we are above the level registered at the peak of the Corona crisis but below the level of 2019. Supply chain problems and the extreme price surge prevent a real recovery, problems which will accompany us in the future as well. It is also unclear to what extent it will be possible to pass on the cost increases. The situation is very tense.

Figure 1: Austrian Ferrous Casting Production (volume)

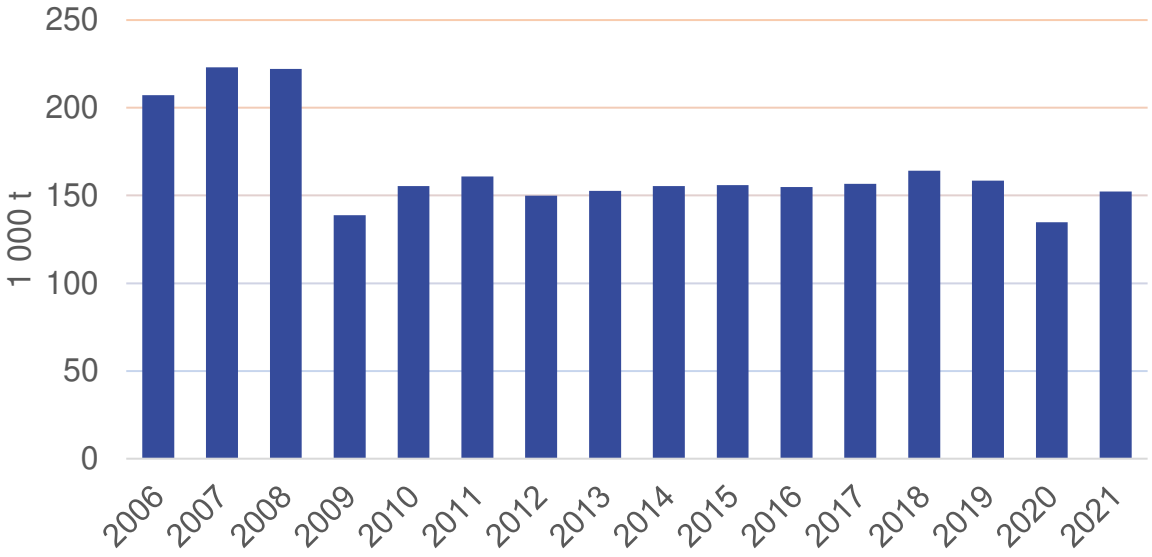
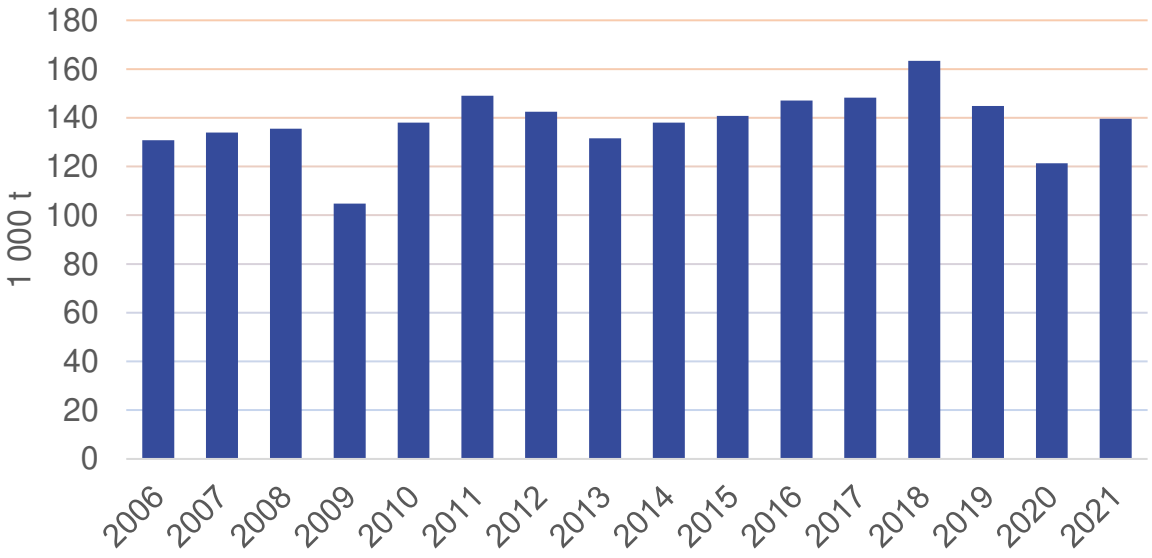


Figure 2: Austrian Non-Ferrous Casting Production (volume)



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Macroeconomic developments

2021 General Economic Situation

After a drop of 5,7% as a consequence of the covid-19 crisis, Belgian GDP grew by 6,2% in 2021. The first and second quarters have been particularly strong as the unexpectedly fast recovery during the second half of 2020 continued. The second half of the year has been less dynamic. The production in some sectors where demand was high has been hampered by shortages of qualified labor force, high material and energy prices, and disruption in the supply-chain.

Private consumption grew by 6,4% after a drop of 8,2% in 2019. As most sanitary measures were progressively lifted, household choose to spend a substantial part of their forced savings consecutive to the lock-down and restriction on contact service activities. On the other end, disposable income kept growing, thanks the further growth of employment. Acceleration of inflation in the middle of the year has however been a drag on consumption.

Enterprises investment also recovered strongly in 2021. During the first half of the year, high business confidence, favorable financing conditions (low interest rates), and the prospect linked to the Recovery and Resilience Facility all contributed to accelerate the implementation of investment plans. In the second part of the year, shortages and/or high prices of input resulted in a slow down or even a drop of investment.

With the strong activity in Europe, Belgium's exports reached pre crisis level as soon as mid-2021. With import growing slower, the net contribution of trade to growth was positive by 0,6%.

2022 General Economic Situation

After the rebound in 2021, economic activity is expected to slow down in 2022. The same factor that caused a loss of momentum in the second part of 2021 are still present made more acute by the aggression of Ukraine by Russia. Economic growth is forecast at 2,0%.

Inflation already reached a high level at the end of last year. With energy prices growing further and mounting food prices, private consumption index is now at a record level since the beginning of the 80's. This, combined with a loss of confidence, is expected to curb private consumption. On the other hand, further growing employment and automatic indexation will support consumers' income. All in all, private consumption is expected to grow.

Enterprises investments are expected to stagnate or even decrease slightly in 2022. They reached a high level in the middle of last year, before dropping down later on. Supply chain troubles and high prices deteriorated production climate and the degree of capacity utilization went down. However, business confidence remains high and implementation of RRP should support investment of firms in 2022.

The deterioration of trade conditions due to the aggression of Ukraine will weight on Belgian export while import will remain high to meet domestic demand. Therefrom, the contribution of net exports to GDP growth is expected to be slightly negative in 2022.

Inflation is forecast to accelerate from a low 1,7% in 2021 to 8%, a record level since the 80's. After the rise in energy prices, food prices started to go up followed by the other components of the consumer price index. Inflation is expected to remain high until the end of the year, before going down.

Thanks to widespread recourse to the “force majeure” temporary unemployment, job losses have been limited to 39 000 in 2020 and unemployment rate barely raised (from 5,4% in 2019 to 5,6%). However, the number of workers in temporary unemployment remains high at the moment and unemployment is set to increase in 2021, to reach 6,7%.

The situation in the major foundry customer industries

In the wake of the fast recovery that started as soon as the 3rd quarter of 2020, activity in mechanical engineering, metal products and automobile were already back to close to pre-covid level at the beginning of 2021.
However, with more and more severe supply-side obstacles, the growth in most sectors was interrupted in the second part of the year. The comparison with the same period of 2020 turned close to neutral or even negative for automobile. In aerospace, the extension of sanitary measures on air-transport resulted in a longer period of subdued activity and a recovery starting much later than elsewhere.

All in all, yearly growth of turnover reached 18% and 15% in metal products and mechanical engineering and 8% in automobile & aerospace. Most of those evolutions are originating from price increases. Corrected for, the growth of the volumes of activity were, respectively, of 4% (metal), 10% (mechanical) and 0% (auto & aero).

At the beginning of 2022, the aggression of Ukraine by Russia worsened the supply chain difficulties. Input and energy prices skyrocketed to reach record level. However, demand has until now not been substantially affected. It is still mainly obstacle on the production side that are preventing higher growth rates.

Table 1: Turnover evolution in major casting customer industries

Example	2016/ 2015	2017/ 2016	2018/ 2017	2019/ 2018	2020/ 2019	2021/ 2020
Mechanical engineering	-0,2	3,0	2,5	1,2	-8,0%	18%
Metal products	-1,9	2,3	4	2,3	-7,5%	15%
Automobile & aerospace	-10	-0,5	-0,5	-6,0	-13,0%	8%

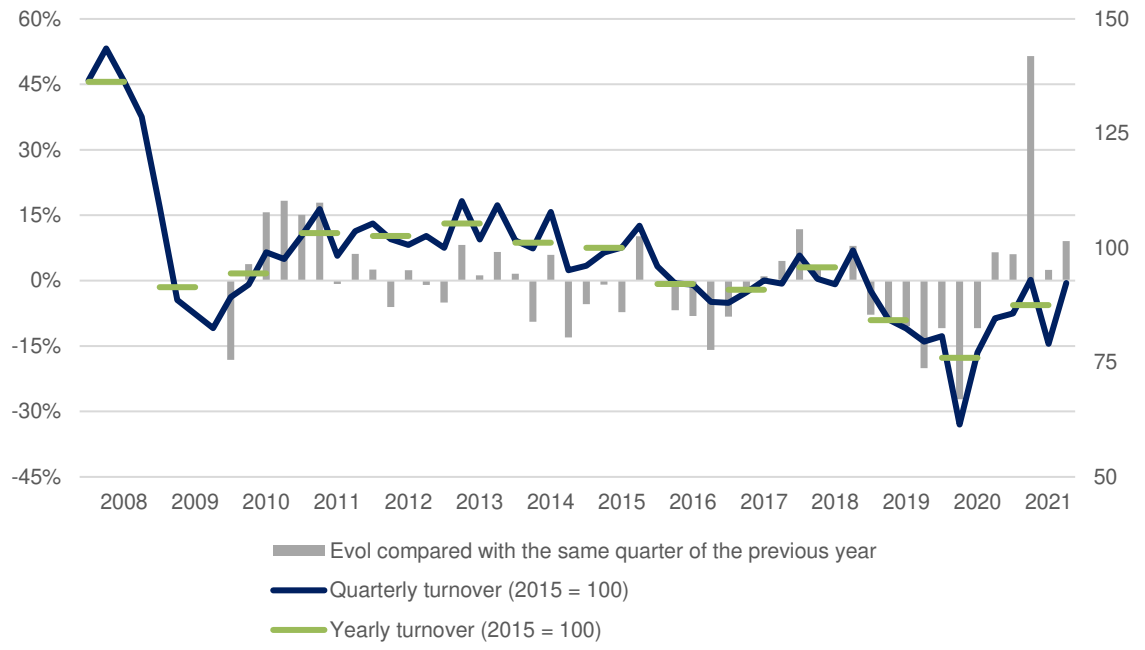
Source: Agoria estimates based on Prodcom statistics

The foundry industry in 2021

Industrial turnover

After two years of contraction where foundries’ industrial turnover fell by 20% the sector recovered somehow in 2021.
It is likely that the sector reached a low at the end of 2019 and that without Covid, a recovery would have taken place at the beginning of 2020. Instead, the Covid crisis and ensuing sanitary measures brought the activity to a new low. However, the rebound was only postponed and started as soon as the 3rd quarter of 2020. At the beginning of 2021, the industrial turnover of foundries was higher than the 2019 quarterly average. The turnover level remained high during the year, but the quarterly dynamic turned irregular and with no definite direction. The foundry industry was also hit by the trouble of the supply-chain and high prices.
For the whole year, foundries’ industrial turnover grew by 15%. Its level was higher than in 2019, but not yet at the level of the 2015-2018 period.

Figure 1: Industrial turnover of foundry industry



Production

The production of the Belgian foundry industry recovered in 2021 with a growth of 11% compared with 2020. With about 55.860 tons, the level remains however below the level of 2019. It is a first increase after 5 years of decline. However, the recovery is only present in all iron casting. The year on year evolution was negative during the first half of the year before turning moderately positive in the 3rd quarter and strongly positive (over 20%) at the end of the year.

In iron casting, the biggest sub-sector of the Belgian foundry industry, the production increased by 4% to 48.929 tons. At 5.311 tons, steel casting production declined further, by 3,5% compared with 2020. The production in the non-ferrous casting was also below its 2020 level, at 1.622 tons (-2%).

Energy Cost development

Eurostat statistics show how Belgian energy prices exploded in the second half of 2021.

Electricity: For consumers between 2000 and 20000 Mwh, prices (before VAT) prices were 17% higher at the end of 2021 than at the end of 2020. And for consumers between 20000 and 70000 Mwh, (before VAT) prices were 48% higher.
However, for both type of consumers, electricity prices before tax remains 12% to 14% lower in Belgium than in the EU 27 or the euro area.

Gas: Belgian market price for industrial consumer of natural gas increased by about 64% between the 2nd semester 2020 and the 2nd semester 2021. The advantage in prices compared with EU27 and the euro area was then about 18%, down from 25% a year ago.

Wage cost development

Average wage cost in 2021 was 0,9% higher than in 2020. This growth is due to the automatic indexation in July 2020, +1,01%, and in July 2021, +0,79%. Outside indexation, a bonus linked to the performance of each individual enterprises during the Covid crisis was also distributed in 2021.

For 2022, automatic indexation is expected to reach to 8% in July, as inflation is reaching a summit during the indexation period. The average increase of labour cost in 2022 is expected at 4,4% compared with 2021.

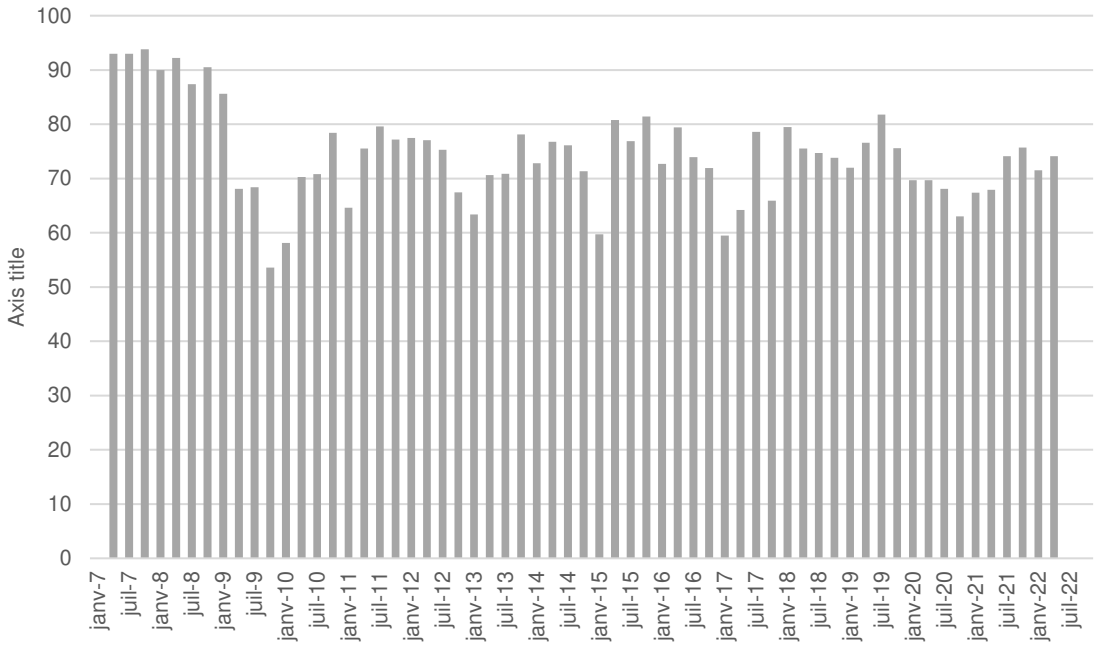
Outlook

Latest business surveys in the foundry industry produced slightly positive signals. The improvement began at the start of this year with a growing number of foundries regarding their situation as neutral or even favorable. However, the movement remains slow.

In particular, the demand for the products of the sector has improved as illustrated by the assessment of the order book level: in May 2022 most foundries regarded their orders as being at a “normal level for the period of the year”. A few consider them as higher. However, expectations for the next three months remain mixed and unstable. A majority of foundries expect a stabilization but from the one month to the other, the number expecting a growth is higher or lower than the number expecting a decrease.
In May, the indicator employment prospects show an almost unanimous anticipation of a stabilization for the next three months. Few foundries expect to raise their work force, none anticipate a decrease.

The assessment of capacity utilization was also irregular during the last quarters. At 74,1% in April, it is higher than in January, but still below its average since 2010 (72,5%).

Figure 2: Capacity utilization in the foundry industry



Source: National Bank of Belgium, quarterly business surveys

Figure 3: Belgium Ferrous Casting Production (volume)

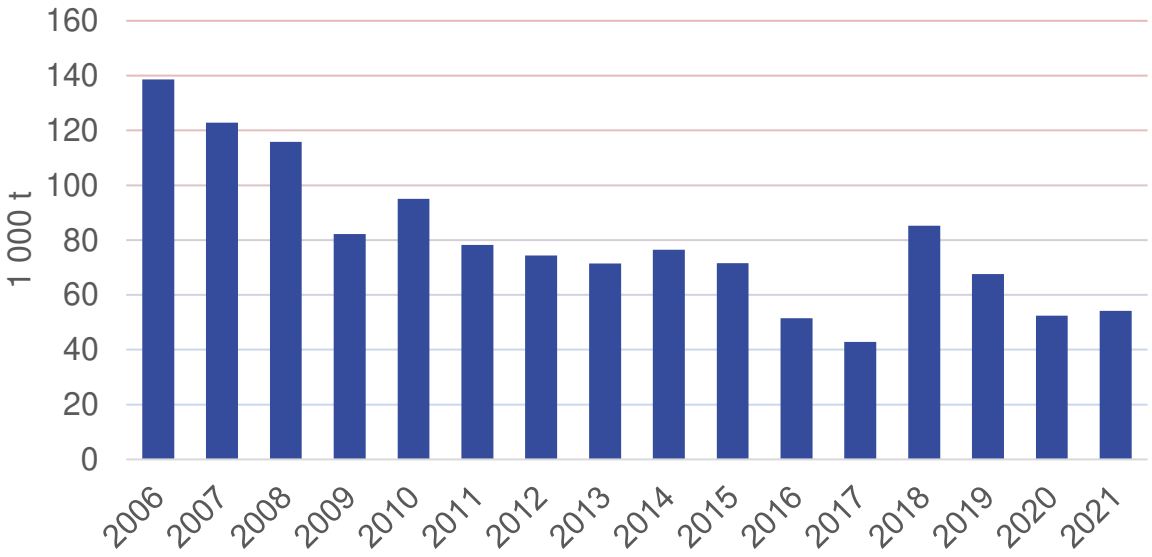
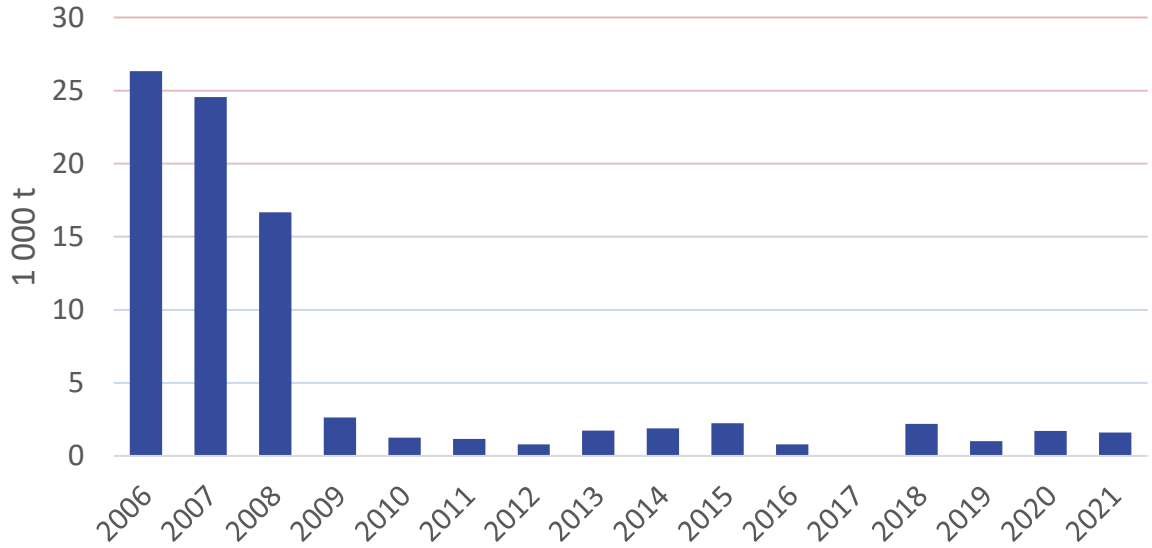


Figure 4: Belgium Non-Ferrous Casting Production



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Foundry production

Foundry production in 2021 fended off the slump caused by the COVID pandemic and felt a hunger for castings. The decline in production from 2020 was still evident in early 2021. During March, the COVID measures subsided and the foundries were able to fully start their production. Order volumes grew by up to 30% compared to the previous year. However, foundry production was limited by capacity possibilities. The shortage of foundry workers limited production and had a major impact on the overall production of our foundries. The rise in raw material and energy prices increased companies' turnovers, but firms' profitability declined. The price increase was necessary, but negotiations with the customers of the castings were difficult. Due to the economic exhaustion of the previous year and poor profits, it did not reach the planned investments. A number of investment projects have therefore been suspended or postponed. Employee wages rose even though they did not reflect the productivity of our foundries. Despite the increase in production expected after the pandemic subsided, the year 2021 did not reach the performance of 2019. In the total production of castings by 13% lower.

The pandemic measures of 2020 were still evident at the beginning of 2021, when they still limited foundry production. Since the beginning of the year, foundries have registered an influx of new orders, which was due to the exhaustion of stocks and new projects prepared during the "lockdown" period. However, the positive outlook and the expected return to 2019 volumes did not take place. The total production of 333,800 t was 16% higher compared to the previous year, but lower by 13% compared to 2019, which represents a difference of about 50 thousand tons of castings. Foundry production was affected by the rise in raw material and energy prices. If there was no agreement on the price increase with the customer, orders were reduced. A significant impact on the implementation of orders and deadlines for performance was also the lack of workers after the resumption of production. The shortage of workers is a long-term problem for own and now also agency employees. Overall, the year 2021 was comparable to 2010. But the material mix was different.
The total production of Fe castings in 2021 amounted to about 225,500 tons of castings. The year-on-year increase was 16%. The turnover of Fe foundries increased by 38%, due to the increase in the prices of feedstocks. In particular, the prices of scrap and pig iron have increased significantly. For steel foundries, there is a high increase in prices of alloying materials. Energy prices have also continued to rise throughout the past year. Shortages of workers and rising inflation were reflected in the wage costs of firms. Despite the increase in labor costs, the labor productivity of Fe foundries did not grow. This is due not only to the equipment and technology, but mainly to the nature of orders. For mass production, there is a high pressure on the price. Long-term orders do not reflect an ongoing increase in input prices. Again, it is and will be necessary to introduce not only material surcharges, but also an energy surcharge and, given the strongly rising inflation (now around 13%), an inflation surcharge. In terms of materials, the increase in GJL and GJS production was approximately the same growth of around 20%. The high percentage growth in 2021 was due to a significant drop in the previous year. However, the 2021 year was by 17% worse than the "pre-COVID" year 2019, which is not very little.
Although the 2021 year saw an increase in the production volumes of steel castings to 45 thousand tons, the increase was the lowest of all materials and amounted to only 8% compared to the "COVID" year. This value confirmed the long-term trend of declining interest in steel castings. The increase in energy and raw material prices has economic impacts on the sustainability of the number of steel plants in the Czech Republic. Carbon steels are economically costly and no longer profitable. The sustainability of steel plants is towards alloyed steels. The complexity of production, high production costs and low

labour productivity is a specific feature of steel castings. If we add to this the shortage of skilled workers, the situation in steel foundries and steel plants is not at all simple.

It seems that the future of castings belongs to aluminum alloys. This material compensates the decline in the production of Fe castings in the overall expression and continuously changes the ratio of the material mix in its favour. The year 2021 again broke the 100,000 tons mark and recorded an increase of 15%. Fluctuations in the automotive industry continue to affect production volumes as well as pricing policy. High production productivity relies on modern technologies with the mass use of robots. Despite the use of modern technologies, foundries here are also facing a shortage of workers similarly to Fe foundries. Production of aluminum alloys was the only one close to 2019 production, and its difference compared to that year was only 6% lower.
After a period of 20% decline in 2020, the production of copper alloy castings has seen a 10% increase and is slowly reaching the "pre-COVID" production volumes. Labour productivity is low and relies on the expertise of qualified personnel.

The year 2021 expected a renaissance and growth in casting production needs, which was also confirmed in the growth of orders and demands for new castings. The ability to respond to new challenges was strongly influenced by rising energy input prices and labour costs, which forced them to rethink companies' production capabilities. Inflation rose gradually, reaching 3.8%, while GDP grew by 3.3% compared to the previous year. 2021 was the year of negotiations on the sales prices of castings. The current general situation in Europe has a very strong influence on what is happening in industry. Raw material prices are rising extremely, as are energy prices. There is growing concern about shortages of raw materials and energy for foundry production, which has resulted in a steep rise in their prices. For the sustainability of our industry, it will be necessary to find and promote a common energy and material concept of our country and the whole of Europe.

Figure 1: Czech Ferrous Casting Production (volume)

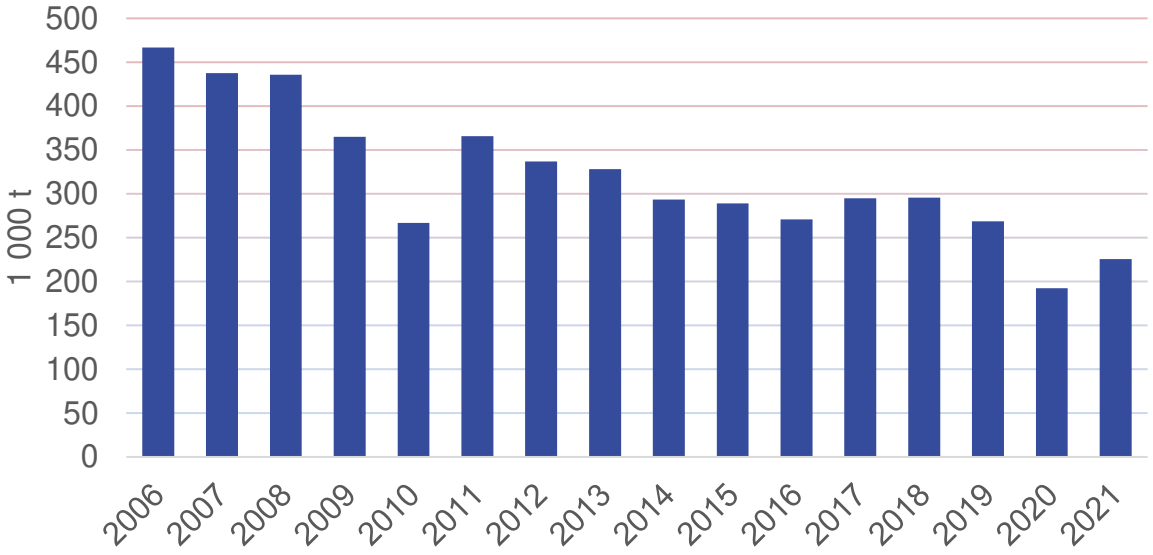
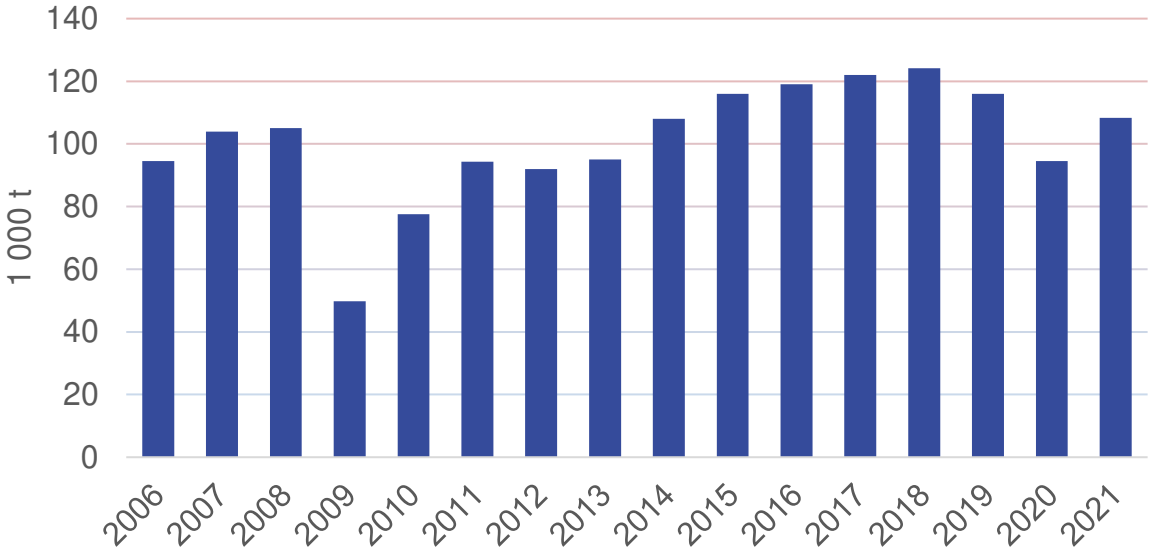


Figure 2: Czech Non-ferrous Casting Production (volume)



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Economic Background

The Finnish Technology Industry as a whole

According to preliminary data, the turnover of technology industry companies in Finland grew more than 6% in 2021 from 2020. Turnover was up in all main sectors except electronics and electrotechnical industry. The significantly higher level of costs contributed to turnover growth. In 2021, the turnover of technology industrycompanies in Finland amounted to approximately EUR 87 billion.

The quick rise of producer prices has contributed to the increase in the value of order intake. Of concern in the third quarter of 2021 was the fact that a significant majority of companies reported that their new order intake dropped from the second quarter. After the last quarter of 2021, a significant majority of technology industry companies reported that the value of new orders was up from the previous quarter.

The number of tender requests received by companies remained at a healthy level during the autumn. The balance figure for October was +17. The positive figure indicates that demand has remained at a good level during the autumn. At the end of December, the value of order books was 8% higher than at the end of September and 16% higher than in December 2020. The books include all orders yet to be delivered, which means that they are also currently inflated by the delivery problems caused by material and component shortages.

The number of personnel employed by technology industry companies in Finland was less than 1% higher than the 2020 average. On average, the industry employed 317,000 people in 2021. At the end of December, the industry employed approximately 320,000 people. Personnel grew in each quarter of 2021. According to the personnel survey by the Federation of Finnish Technology Industries, the number of employees affected by lay-off procedures at the end of December was only approximately 3,000. Recruitment of new employees remained at a high level in the October-December period. In total, recruitments came to 11,500. Some companies were increasing their personnel, others were hiring new employees due to retirements and employee turnover.

Mechanical Engineering in Finland

According to preliminary data, the turnover of mechanical engineering companies (machinery, metal products and vehicles) in Finland increased by slightly less than 4% in 2021 from 2020. In 2021, their turnover in Finland amounted to approximately EUR 34 billion. Year-on-year, the value of new orders increased by 9%. The quick rise of producer prices has contributed to the increase in the value of order intake. At the end of December, the value of order books was 1% lower than at the end of September, but 20% higher than in December 2020. It remains necessary to consider that the shipyards' share of the total value of order books is exceptionally large.

The number of personnel employed by mechanical engineering companies in Finland was up approximately 1% from the 2020 average. The industry employed approximately 134,100 people, up 1,200 from 2020.

Metals Industry in Finland

According to preliminary data, the turnover of metals industry companies (steel products, non-ferrous metals, castings and metallic minerals) in Finland increased by approximately 31% in 2021 from 2020. In 2021, their turnover in Finland amounted to as much as EUR 13 billion. The sharp rise in producer prices has contributed significantly to the turnover growth in the metals industry. The total production of steel products, non-ferrous metals, castings and metallic minerals in Finland in the January-November period increased by approximately 9% year-on-year. The number of personnel employed by metals industry companies in Finland fell by approximately 1% in 2021 from the 2020 average. The industry employed approximately 16,000 people, down 100 from 2020.

Foundry Industry in Finland

Foundry industry as a whole

In the year 2021 the total production of castings in Finland increased about 9% in 2021 from 2020. The production of iron and steel castings was 51.677 tons which is 10% more compared to year 2020. Iron and nodular iron casting production increased about 14% and steel casting decreased about 15%. Metal castings production was 4.310 tons, which is about 4% more than the previous year. The value of the casting production of Finnish foundries was 200 m€, which is 7% more compared to year 2020. The foundry industry employed 1384 people, 130 less than in 2020.

Table 1: Finnish grey cast iron production

GJL	2021	2020	Change in %
Production (t)	17,270	20,588	+19
Export (t)	3,899	6,263	+60
Value of production (m. €)	31.92	36.13	+13
Employees	645	629	-2

Table 2: Finnish ductile cast iron production

GJS	2021	2020	Change in %
Production (t)	23,118	25,513	+10
Export (t)	8,002	8,974	+12
Value of production (m. €)	51.95	62.98	+21
Employees	645	629	-2

Table 3: Finnish steel casting production

Steel Castings	2021	2020	Change in %
Production (t)	6,664	5657	-15
Export (t)	1,997	1242	-38
Value of production (m. €)	58.95	49.5	-16
Employees	525	366	-30

Table 4: the Finnish non-ferrous casting production

Non-Ferrous Castings	2021	2020	Change in %
Production (t)	4,145	4,310	+4
Export (t)	1,350	948	-30
Value of production (m. €)	45.23	53.69	+19
Employees	348	347	0

Figure 1: Finish Ferrous Casting Production (volume)

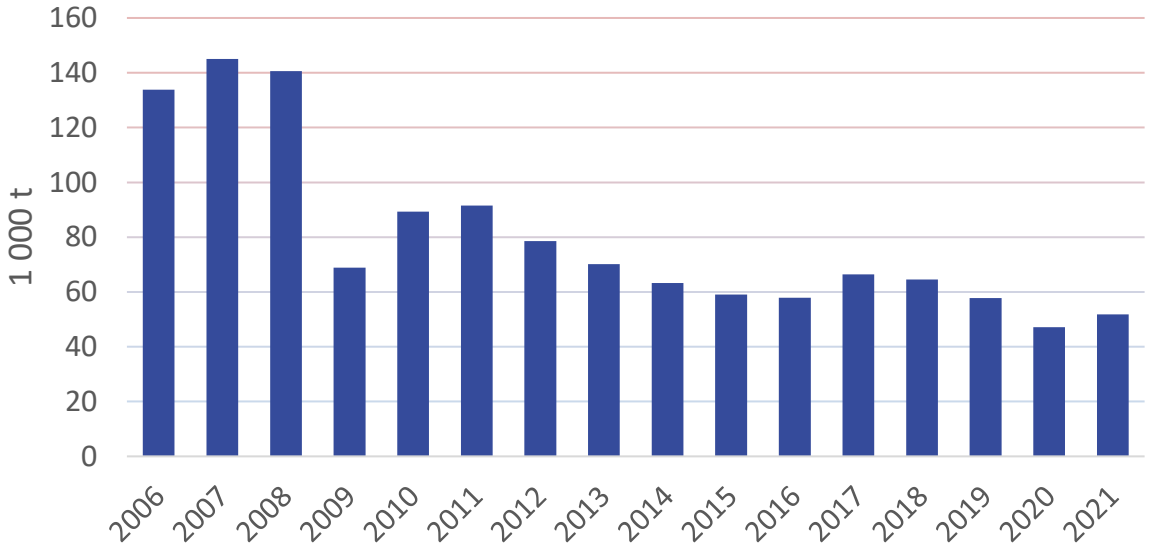
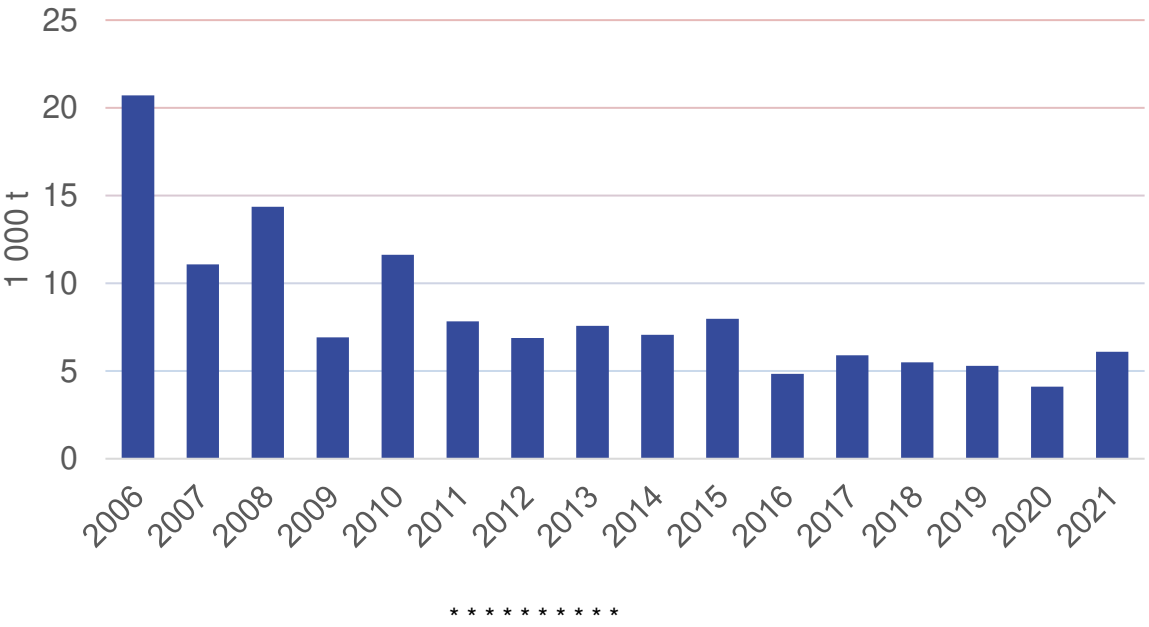


Figure 2: Finish Non-Ferrous Casting Production (volume)



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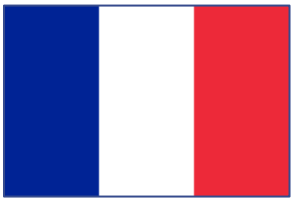


Macroeconomic developments

At the end of 2021, French quarterly GDP was quite significantly above its pre-crisis level.

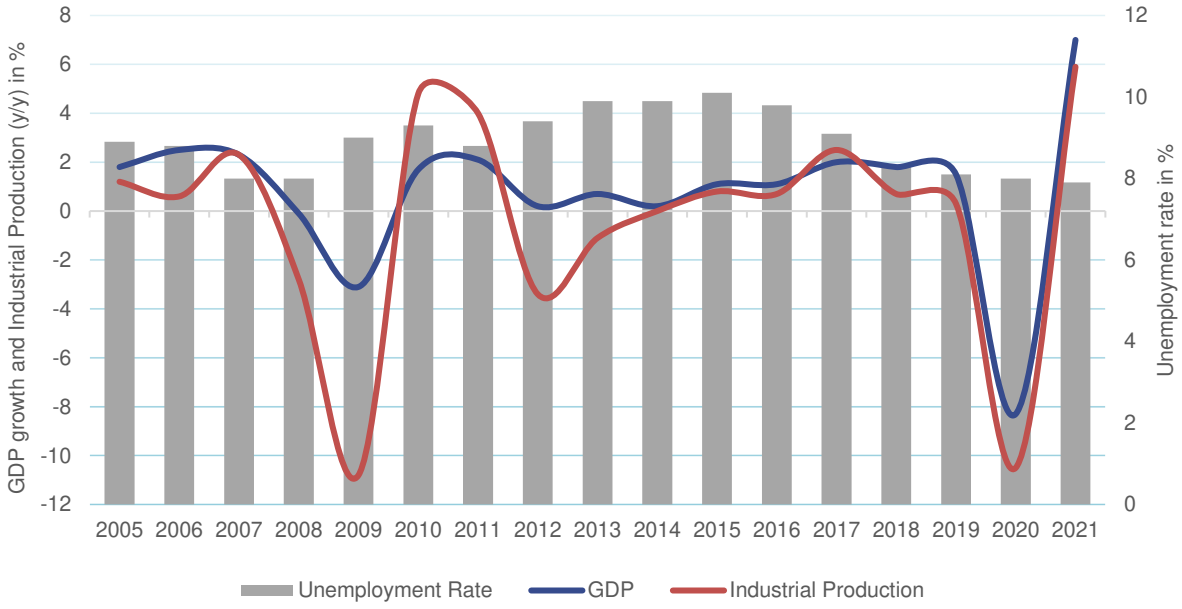
France has exceeded – quite significantly – its Q4 2019 level of activity. The French economy's growth is +7% in 2021. At the same time, the GDP increased by +2.7% for Germany, +6.6% for Italy and +5% for Spain.

In this context of growth, inflation increased by +1.6% in 2021.
At the end of 2021, private salaried employment exceeded its end-2019 level by 1.5% (i.e. around 300,000 jobs) by the end of 2021. The unemployment rate is limited to 7.9% in 2021 (annual average).

Industrial production increased by +5.9% in 2021 after the decline of -10.7% during the previous year.

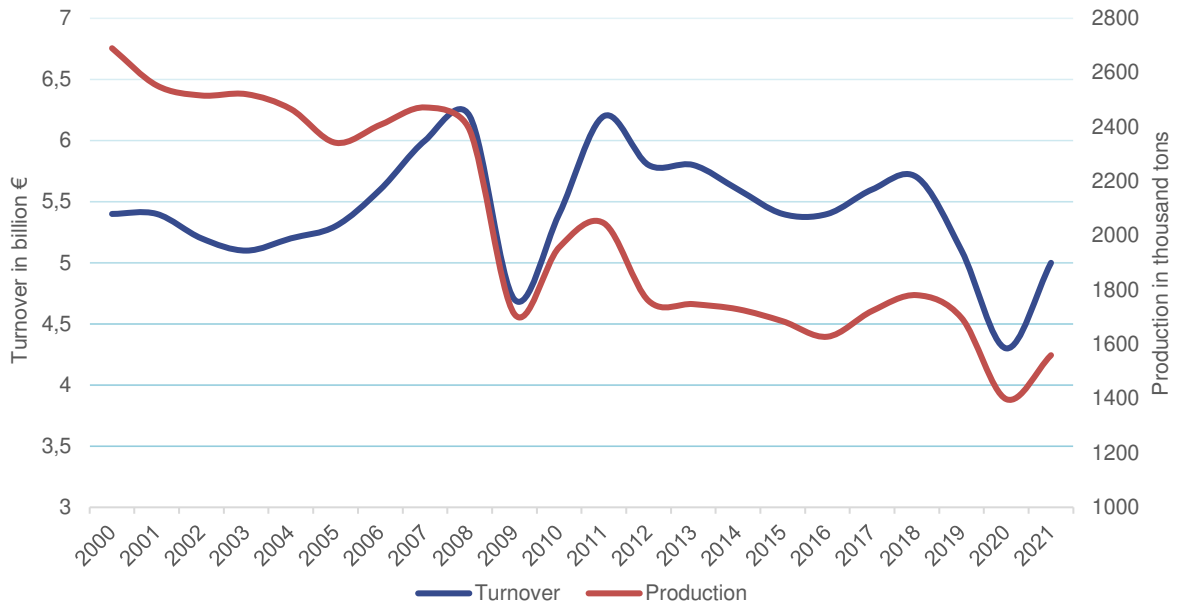
French GDP should continue to grow in 2022; the increase is estimated at +2.9% (central hypothesis and no stalemate of the war in Ukraine).

Figure 1: GDP growth, Industrial Production and Unemployment Rate



Situation of the foundry industry

Figure 2: Evolution in volume and in value



Production and billings for the foundry industries returned to growth in 2021, after the decline in 2020.

Demand from the main customer markets in France favored the activity of the foundry industries, with the exception of the automotive sector which recorded a low activity rate, whereas this sector is the main outlet for the French foundries (more than 40% of the total outlet). Weak demand from the automotive sector is fortunately offset by the dynamics of other client sectors. The building and the road network are in an upward phase. Construction recorded sustained growth in its activity in 2021 according to the FFB. As for French mechanics, the foundry's third-largest client market, this sector has recorded significant growth (+11.4% increase in 2021).

In total, ferrous and non-ferrous metal foundries produced 1.560 million tonnes in 2021 compared to 1.398 million tonnes in 2020.

The activity of all foundry industries, all sectors combined, increased significantly in 2021:
- Total production increased by +11.6% (in tonnes).
- Total billings also increased by +16%.

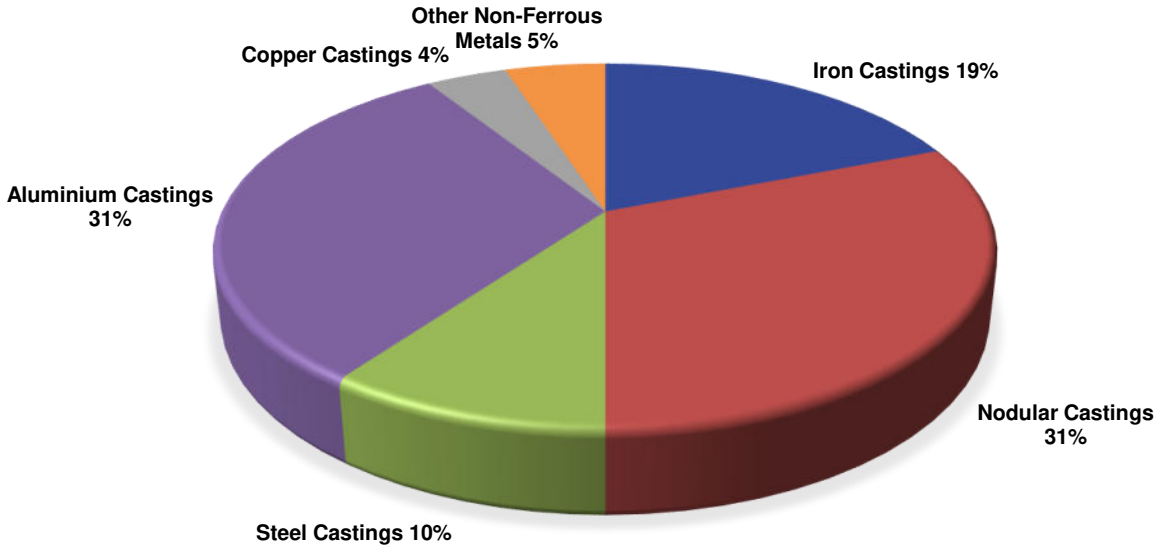
In 2021, the analysis by category shows that the ferrous metal foundry activity increased faster than the non-ferrous activity (+14.3% against +2.9%). Activity increased steadily throughout 2021 as non-ferrous metal smelter production slowed in the second half of 2021.

Table 1: Production by alloys

	2021 production in t	Change 2021/2020 in %
Iron Castings	504,046	16.7
Nodular Castings	634,385	6,9
Steel Castings	43,062	2,8
Total Ferrous Castings	1,219,897	14.3
Aluminium Castings	299,106	1.9
Copper Castings	18,379	14.0
Other Non-Ferrous Castings	22,910	8.8
Total Non-Ferrous Castings	340,395	2.9
TOTAL	**1,560,292**	**11.6**

The total production value of the foundry industries is estimated at 5 billion euros in 2021.

Figure 3: Segmentation by main alloys



The workforce of the French foundry fell in 2021; the decrease is -2% compared to 2020. The number of employees is estimated at 28,275 people at the end of December 2021. The number of companies in the foundry sector is 320 (<10 people included).

Figure 4: French Ferrous Casting Production (volume)

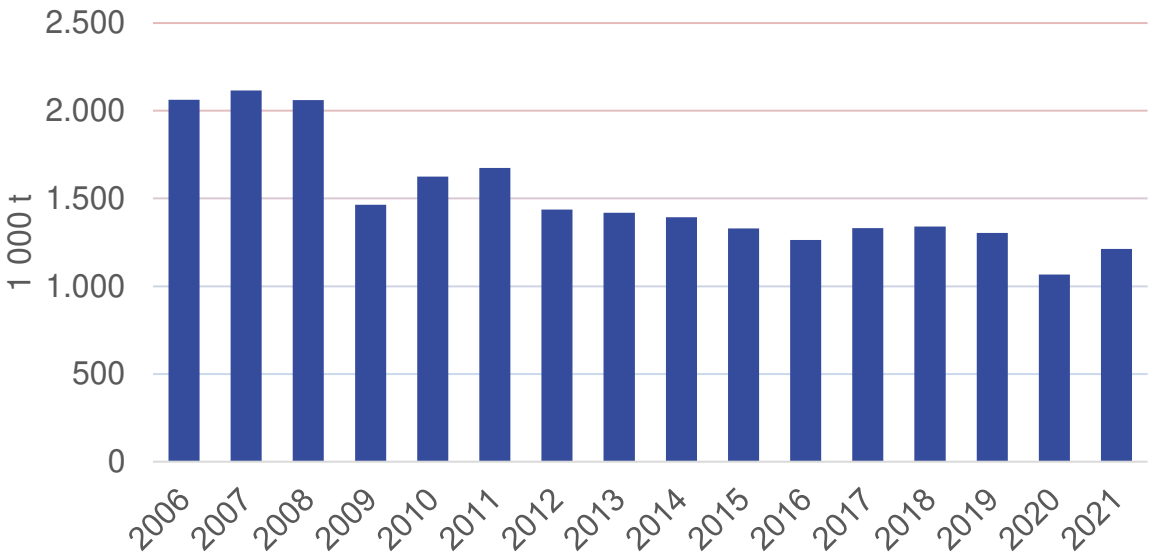
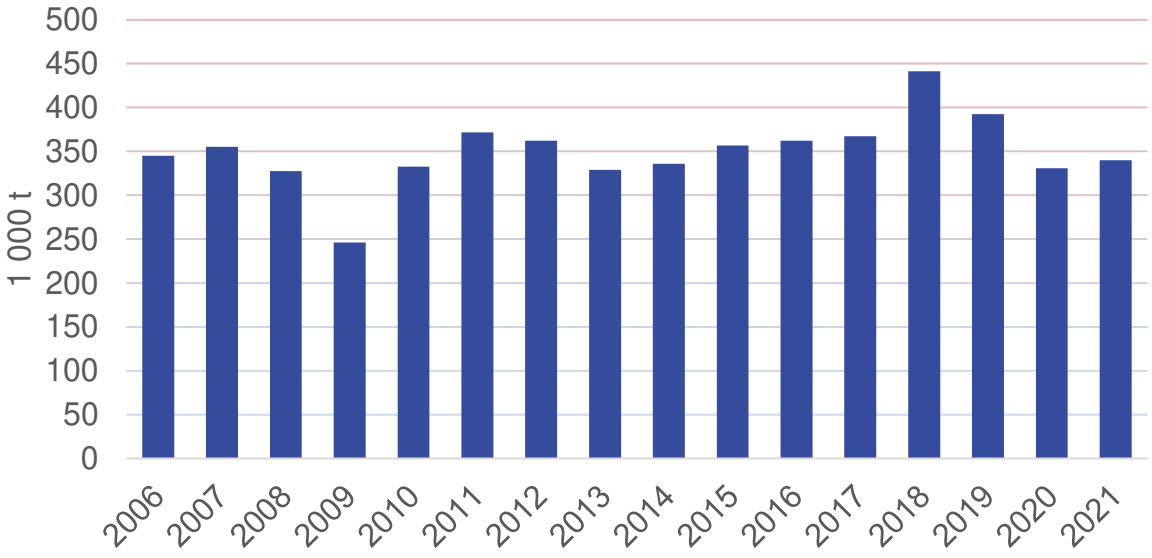


Figure 5: French Non-Ferrous Casting Production (volume)



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The German Economy and the Casting Customer Industries

Macroeconomic developments

The German economy grew by 2.7% in 2021, following a sharp drop in gross domestic product (GDP) in 2020 due to the Corona crisis. Industry suffered from severe supply shortages of key inputs last year and - despite full order books - could not really ramp up production again. Some service sectors had to cope with painful restrictions in their economic activities due to the pandemic at the beginning and again towards the end of the year. Compared to 2019, the year before the start of the Corona pandemic, GDP in 2021 was still 2.0% lower.

Price-adjusted gross value added in the manufacturing sector rose significantly by 4.4% compared to the previous year. In the combined economic sector of trade, transport and gastronomy, economic growth was somewhat more restrained due to the continuing pandemic-related restrictions, with a plus of 3.0%. Only in the construction sector, where the Corona pandemic had no significant impact in 2020, did economic output fall slightly by 0.4% in 2021 compared to 2020. Despite the increases in 2021, economic output in most economic sectors has not yet returned to pre-crisis levels. For example, economic output in the manufacturing sector in 2021 was still 6.0% below the level of 2019.

Price-adjusted private consumer spending stabilised in 2021 at the low level of the previous year and is thus still far from its pre-crisis level. Government consumption expenditure continued to be a pillar of growth in the German economy in 2021. Despite the already high level of the previous year, it rose by a further 3.4% in price-adjusted terms in the second year of the Corona pandemic.

Construction investment grew by only 0.5% in 2021 due to bottlenecks in labour and materials, having previously grown more strongly for five years in a row. In equipment - which is mainly investment in machinery and equipment as well as vehicles - price-adjusted investment increased by 3.2% in 2021, albeit after a sharp decline in the crisis year 2020.

Foreign trade recovered in 2021 from the sharp declines in the previous year. Germany exported 9.4% more goods and services abroad in price-adjusted terms than in 2020, while imports increased by 8.6% in price-adjusted terms. Germany's foreign trade in 2021 was thus only slightly below the level of 2019. The economic output in 2021 was generated on average by 44.9 million employed persons in Germany. This was roughly the same number of employed persons as in the previous year. However, many employed persons were now working in other economic sectors or in other employment conditions than before. There were employment gains in public services, education, health (+2.2%), information and communication (+2.4%) and construction (+1.2%). On the other hand, there were employment losses in trade, transport and hotels and restaurants (-1.8%), as in the previous year. The number of marginally employed and self-employed persons continued to decrease in 2021, while more employed persons were subject to social security contributions.

According to preliminary calculations, the state budgets ended the year 2021 with a financing deficit of 153.9 billion euros. This was still slightly more than in 2020 with 145.2 billion euros and the second highest deficit since German unification. The deficit of the federal government increased considerably and was even slightly higher than the deficit of the state as a whole in 2021 at 155.3 billion euros. In contrast, the fiscal balances of the states (-1.6 billion euros) and the social security funds (-0.1 billion euros) were only slightly in the red. The municipalities even closed the financial year with a small surplus of 3.1 billion euros. Measured in terms of nominal GDP, a deficit ratio of 4.3% is calculated for the state in 2021.

The situation in the major casting customer industries

In 2021, significant production declines due to a lack of availability of preliminary and intermediate products, especially semiconductors, led to a collapse in sales figures in the German passenger car market. While significantly positive growth rates were still achieved in the first half of the year due to the lockdown in the previous year, the entire second half of 2021 was characterised by declines in the double-digit percentage range. In 2021 as a whole, the domestic passenger car market reached a volume of 2.6 million passenger cars and was thus 10% below the first corona year 2020.
In the year, 681,900 electric cars were registered (+73%). This corresponds to an electric share of 26% for 2021, meaning that more than one in four newly registered passenger cars in Germany was equipped with an electric drive. German Group brands achieved a market share of 65 percent in the electric segment on the domestic market.
In 2021, domestic order intake was up 6%. Business abroad was less positive: German manufacturers' customers from abroad ordered a total of 2% more passenger cars in 2021 than in 2020.
At 3.1 million units, domestic passenger car production in 2021 as a whole remained significantly below the previous year's corona-related figure (-12%) and reached the lowest production volume since 1975. Exports developed similarly to production: German passenger car exports for the year as a whole are also clearly in the red at 2.4 million vehicles (-10%).

Despite many disruptions in the supply chains, machinery and plant manufacturers from Germany were able to significantly increase their exports again in 2021, although exports in the fourth quarter only increased by a nominal 4.6% or 2.0 billion euros to 45.2 billion euros. For the full year 2021, however, machinery exporters from Germany recorded an increase of 9.8% or 15.9 billion euros to 179.4 billion euros. By comparison, an export decline of 10.1% was recorded for the full year 2020 compared to 2019. This means that machinery exports are still about 1% below pre-crisis levels.
While the first Corona year 2020 was still characterised by significant declines in orders, the order books were filled again strongly in 2021. Overall, German mechanical engineering companies recorded a real order growth of 32% compared to the previous year, with domestic orders increasing by 18% and foreign orders by 39%. Adjusted for prices, incoming orders even exceeded the high level of the economically good year 2018 by 7%. As a result, companies started 2022 with an above-average order backlog of 10.9 months.

For the first time in three years, crude steel production in Germany rose again in 2021. With an increase of just under 13% to 40.2 million tonnes, the 40 million tonne mark was just exceeded. However, this increase cannot compensate for the losses from 2018-2020: Overall, production in 2021 was still around 8% below the 2017 level (43.3 million tonnes).

Turnover in the main construction sector reached 144.8 billion euros in 2021 (+1.2%). The price development for construction services was 7.4%, the real turnover development thus -6.2%. The development of orders picked up again in the second half of 2021 and still led to a nominal plus of 9.4%. Especially from the business sector, impulses came again with a nominal +16%. But demand in residential construction also remained high at a nominal +8.5%. Public construction added only +3% in nominal terms.
Turnover in residential construction reached approx. 55.4 billion euros in 2021 after 54.3 billion euros in the previous year (+2.0%). Turnover in commercial construction reached approx. 51.0 billion euros in 2021 after 49.8 billion euros in the previous year (+2.3%). The share of civil engineering in commercial construction has thus increased from 38% to 43% in the last five years. The background to this is the development of infrastructure projects such as airports and the DB, but also the expansion of broadband, the expansion and renovation of electricity networks, sewer and pipe systems. Commercial building construction was still affected by the Corona impact in the first half of the year, but picked up again in the second half. Contrary to what was to be expected after the trend towards home offices, demand for office buildings has picked up strongly again. Turnover in public construction reached approx. 38.5 billion euros in 2021 after 38.9 billion euros in the previous year (-1.2%).

Developments in the foundry industry

In 2021, Germany´s iron and steel foundries received orders for around 3.5 million tons of castings. Compared to 2020, this marks an increase of 19.4%. Orders from the biggest customer industry, motor vehicle engineering, were 10.8% higher than the year before (2.0 million tons). At 891,000 tons, the volume of orders from the mechanical-engineering industry went up by 39.4% compared to the previous year. Circa 0.6 million tons of parts for miscellaneous applications were ordered, a level that is 25.3% more than in the preceding year.

Germany´s foundries focusing on non-ferrous components received an order volume of 823,100 tons. The demand went up by 5.0% compared to 2020. With approximately 74% of incoming orders the vehicle industry is dominating the non-ferrous sector. The nominal demand increased by 3.2% (610,800 tons). The foundries related to mechanical engineering received orders with a volume of 9,400 tons (+32.4%). Nearly 202,900 tons of miscellaneous parts were ordered, which is an increase of 9.8%.
We should bear in mind, that there is a lack of definition between engineering and miscellaneous applications. This applies for all casted materials.

In 2021, the weight of castings produced by Germany´s iron and steel foundries amounted to 3.2 million tons. Compared to 2020 this corresponds to a 16.4% increase. By looking at the two major customer industries, casting production for the motor vehicle industry increased by 15.4% to 1.7 million tons, while production for the mechanical engineering sector rose by 28.8% to 828,900 tons. The output of castings for miscellaneous functions (including rolls, moulds and castings for buildings as well as pipes and fittings) reached a volume of 584,100 tons, 4.7% more than the previous year.

Non-ferrous foundries registered a production increase of 4.8%, correlating with a volume of 806,200 tons of castings. While more than 76% were produced for the vehicle industry (610.000 tons), this output increased by 3.8%. The foundries related to mechanical engineering produced a volume of 9,100 tons (+26.7%). The casting of non-ferrous components for all other customer industries rose by 7.1% and therefore had a volume of almost 187,000 tons.

In 2021, 34.3% of the total production volume was exported directly. All in all, 1.36 million tons were sold to customers abroad, representing a 17.2% increase.

By the end of 2021, orders in stock equaled a weight of more than 1.47 million tons of ferrous castings, 13.6% higher than at the end of 2020. The non-ferrous back orders had a volume of approximately 180,300 tons (-6.7%).

Capacity utilisation in the iron (grey and nodular) foundry industry amounted to 85.3% in 2021. In comparison to 2020, this means an increase of 27.1 percentages. Steel foundries have reported a capacity utilisation of 79.3%, 10.6 percentages more than in 2020. Capacity utilisation in the non-ferrous foundry industry is calculated as 78.8% in 2021 (plus 21.0 percentages). Capacity utilisation in ferrous, steel and non-ferrous foundries cannot be compared.

The employment situation

As of December 2021, Germany´s foundries (ferrous and non-ferrous) employed circa 65 900 persons, 1.8% less than at the end of 2020. This figure corresponds with 351 foundries (survey cut-off at <50 employees per company).

At the end of 2021, 543 foundries (ferrous and non-ferrous, no cut-off) were operating in Germany.

Raw materials

After the Covid-19 outbreak in 2020 and renewed lockdowns at the beginning of 2021, the economic recovery has been faster than expected. Costwise, many input materials and energy sources plummeted at the beginning of the pandemic. After costs had normalised for the first year, the entire industry experienced an unexpected raw material rally since the end of last year 2020. Global steel producers had sold their steel in 2021 before the iron ore had even been extracted from the mine. But wood, polymers and semiconductors were also in short supply. Inflation has a firm grip on the global economy since the beginning of 2022 at the latest. The outbreak of the Ukraine war has further aggravated the situation on the commodity and energy markets. In some European countries - including Germany - the one-sided dependence on Russia is now taking its toll. Although this publication refers to the past year, it ventures an outlook on foreseeable developments.

Metallic input materials

Generally, raw materials account for about 25% of prime costs. Hence, they have the second largest importance after personnel costs. In this respect, reliable documentation and observation of developments and forecasting with regard to planning, control and quotation calculation are very helpful.

The lower price fluctuations of the past years made some planning easier. This is because the foundries have no way of absorbing strong changes, as production can hardly be delayed. The costs of raw materials can therefore only be calculated separately and on a daily basis. Finally, a price increase in raw materials of only 10% causes an increase in the cost price of about 2.5%. Pig iron fell by 9% on average in 2020, scrap by 6%. But while many commodities experienced a correction at the beginning of the pandemic, prices have only known one direction since November 2020: up!

Before Corona, prices had reached their lowest point at the turn of 2015/2016. For 2020, looking at average values is irrelevant - the price dynamics since the end of the year are too great. The rapid strengthening of the Chinese economy is causing a shortage of scrap and primary metals on the world market. The "recovery" had already begun in May and June of last year. First, steel scrap dropped significantly, pig iron remains high due to the necessary substitution of former Russian sources. An estimate is not possible until the publication date (September 2022). However, it can be assumed: The share of metal use will quickly rise to 30% and more in 2021, but also in 2022, depending on the development of energy costs.

Payroll costs

The share of personnel costs in the cost of goods sold has risen to just over 30% on average.

Due to the reinstatement of the ERA remuneration agreement of 14 February 2018 in the new collective agreement, the remuneration table of 1 April 2018 continues to apply unchanged. In addition, a Corona allowance of 500 euros for full-time employees and 300 euros for apprentices was agreed for 2021. There are special regulations for employees in partial retirement and employees with interruption periods.

With the settlement for February 2022, the employees received an agreed transformation payment (T-payment) of 18.4% for the first time; from the calendar year 2023, this amounts to 27.6% of a monthly remuneration. This new special payment and calculation is part of the TV T-ZUG (A). In the event of a collective reduction in working time to safeguard employment, the T-money can be used by way of a voluntary company agreement to reduce or compensate for the loss of pay resulting from the reduction in working time.

The new T-ZUG (B) supplementary pay in the amount of 12.3% of the applicable basic pay of EG 8 (currently 354.67 euros) was postponed to the payroll month of October in the calendar year 2021. In addition, it can be differentiated in a simplified manner in the calendar year 2021: e.g. in the case of a

difficult economic situation, the postponement is possible for up to 6 months. If the net profit margin is below 2.3% or would fall below 2.3% if the T-payment (B) were paid out, the entitlement to the T-payment (B) lapses definitively.

Energy

Measured against the peak prices for (crude) oil in the summer of 2014, prices were lower until October of 2020. The price for 100 litres of heating oil here was just under 40 euros. Since then, it has risen to around 65 euros by May 2022.

The prices for electricity are primarily subject to individual company circumstances. The time and duration of the conclusion of the contract, in addition to the purchase quantity, grid charges and agreed peak loads, have a considerable influence not only on the level but also on the development of electricity costs. In 2021, the EEG levy returned to the record level of 2018. In addition, many limited foundries faced the risk of falling outside the cap due to lower gross value added. The abolition of the EEG in 2022 at least creates some bureaucratic relief here, although the merit order causes electricity costs to skyrocket to such an extent that the EEG cap has long since been overcompensated. However, the years 2021 and even more so 2022 will be marked by exorbitant increases in energy costs across all energy sources.

The coke price has risen by 35% in the past year and was well above the pre-crisis level on an annual average. At the same time, the coke aggregate is under strong political and social pressure, even though it remains the cheapest smelting process at high utilisation rates and represents the best recyclability of scrap. Unfortunately, this "circular idea" and recyclability is little perceived by the public.

According to the figures of the Federal Statistical Office, gas has even become 103% more expensive in 2021. The sharp jumps since the outbreak of the Ukraine war have not even been taken into account. This publication does not include forecasts or "current" figures; the volatility is too great.

Miscellaneous

Most recently, the exchange rate of the US dollar to the EURO has fallen below the 1 Euro mark. Although this makes the export of products from the euro area "cheaper", raw materials and energy (e.g. natural gas, crude oil) have to be imported at a disadvantageous rate.

The current upheavals of the Ukraine war hardly allow a forecast and also enormously reduce the informative half-life of the retrospective to 2021. At the same time, the figures of the Federal Statistical Office (StBA) are available later and later, so that the cost review tends to be shifted to the later months of the year.

Summary

On the basis of our model calculations, it has been shown that the developments shown will have a significant impact on the cost price in 2021. It is hardly possible to make a statement about the foundries most affected. Rather, it should be argued from the customer side: Foundries in the automotive supply industry were most affected in 2021 due to the semiconductor and raw material crisis. On the cost side, all input materials have become much more expensive.

The Situation in the Material Sectors

Grey cast iron

Throughout 2021, production increased by 15.8% to 1.874 million tons. The output of motor vehicle components rose by 17.6% to 1.265 million tons. The volume of casted parts for mechanical engineering

increased by 26.1% to 381,400 tons. Other grey iron components (including moulds and railway parts, fittings, and components for the steel industry) reached an output volume of 226,900 tons (-5.7%).

Iron foundries received orders for approximately 1.232 million tons of castings from the motor vehicle industry, which is a 20.7% increase. The demand of the mechanical engineering industry reached a volume of 403,360 tons. Thereby, the orders rose by 34.8%. Orders for parts for miscellaneous applications made of cast iron reached a volume of 221,100 tons, 19.2% more than in the preceding year.

At the end of December 2021, the order backlog amounted to more than 889,100 tons, 17.1% higher compared to the end of December 2020.

Ductile cast iron (nodular and malleable)

At 1.141 million tons, the production of ductile iron castings was increased by 19.2% compared to the year before. A separate calculation of nodular and malleable castings is not possible, because of the low volume of malleable castings. Nonetheless, malleable castings have their specific markets. The output of motor vehicle components increased by 9,8% to 470,000 tons. The volume of casted parts for mechanical engineering rose by 33.7% to 424,500 tons. Other components reached an output volume of 246,500 tons (+15.9%).

At the ductile iron sector, the volume of incoming orders reached 1.550 million tons (+16.6%). Ductile iron foundries received orders for more than 785,400 tons of castings from the motor vehicle industry, which is a decrease of 1.6%. With plus 51.5% compared to the order volume received the year before, the demand of the mechanical engineering industry reached a volume of 481,600 tons. Orders for parts for miscellaneous applications made of ductile cast iron reached almost a volume of 283,200 tons, 32.9% more than in the preceding year.

At the end of December 2021, the order backlog amounted to 539,800 tons, 10.3% more compared to the end of December 2020.

Steel

Throughout 2021, production of steel castings increased by 4.2% (143,800 tons). The output of motor vehicle components decreased by 0.9% to 9 900 tons. The volume of casted parts for mechanical engineering decreased by 2.5% to 23 000 tons. Other components reached an output volume of 110,800 tons (+6.0%).

At 146,700 tons, the volume of orders received by the producers of steel castings in 2021 was increased by 18.6% compared to the year before. Steel foundries received orders for 10,800 tons of castings from the motor vehicle industry, a downturn of 4.5%. The demand of the mechanical engineering industry reached a volume of 25,600 tons (+21.1%). Orders for parts for miscellaneous applications made of steel castings reached nearly a volume of 110,300 tons, 20.7% more than in the preceding year.

At the end of December 2021, the order backlog amounted to 41,000 tons. The order cushion was 9.3% lower compared to the end of December 2020.

Non-ferrous Metal Castings

In 2021 the production of aluminium castings increased by 7.4% (701,200 tons). For the magnesium sector the production reached a level of 15,500 tons (-24.4%). The output of copper castings rose by 5.1%. The level was more than 48,400 tons. Nearly 41,100 tons of zinc castings were produced, marking a decrease of 17.4%.

Aluminium foundries received orders for 717,300 million tons (+6.6%). 84.1% of the demand (603,100 tons) came from the vehicle industry. Down by 21.6% compared to the order volume received the year before, the demand of magnesium castings reached a volume of 15,900 tons. Orders for parts made of copper castings reached a volume of 48,700 tons, 11.4% higher than the year before. Foundries producing casted parts from zinc logged an order level of 41,200 tons (-12.3%).

Source: BDG, Stat. BA, VDA, VDMA, Worldsteel, Kraftfahrt Bundesamt, ZDB, IFO, WV Stahl

Figure 1: German Ferrous Casting Production (volume)

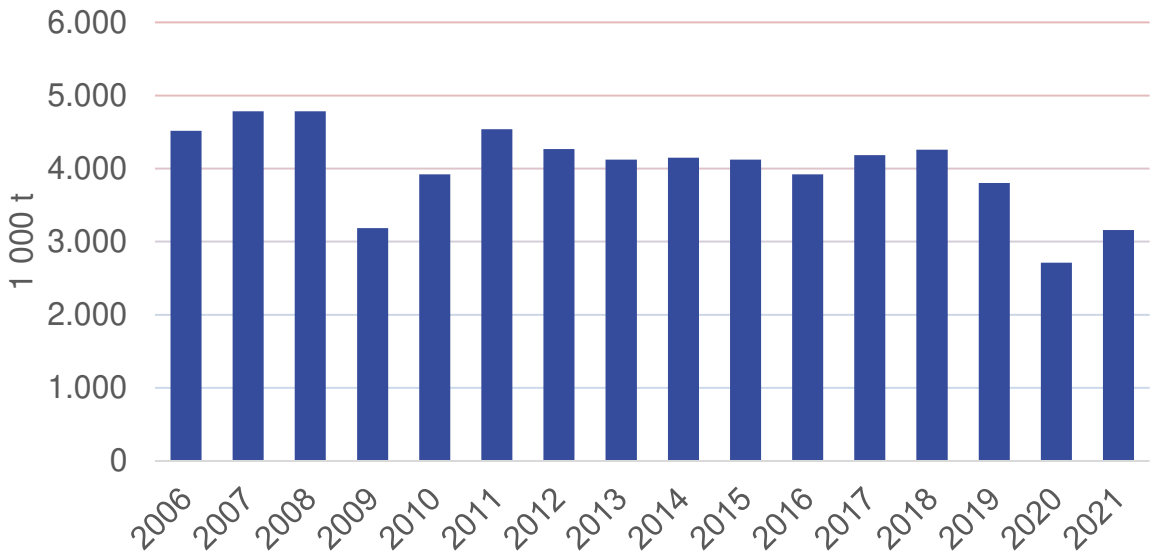
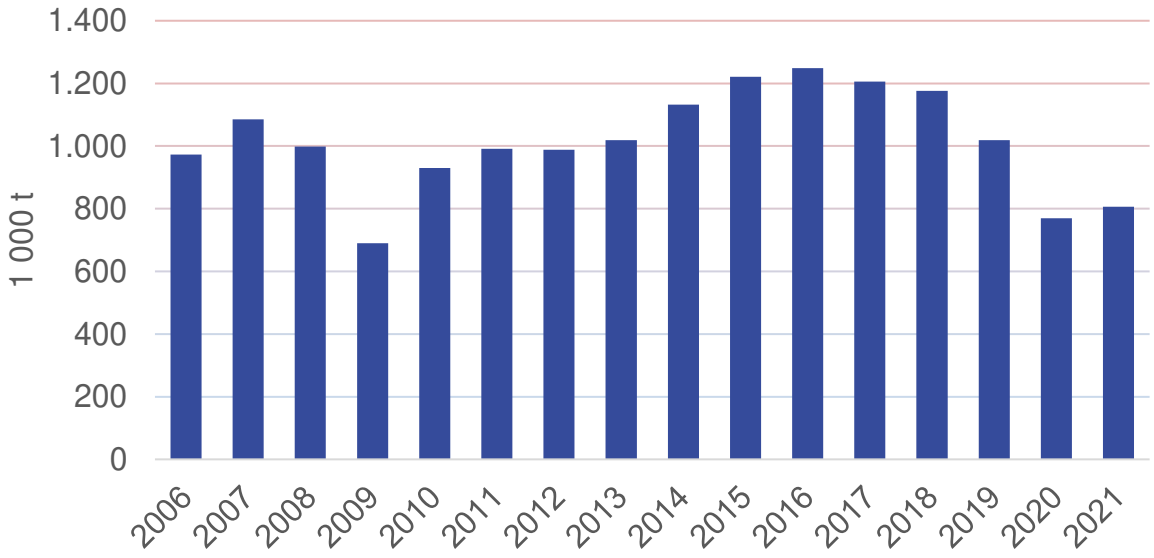


Figure 2: German Non-Ferrous Casting Production (volume)



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Hungarian Economy 2021

The increasing of the Hungarian GDP average in 2021 was 7.1%. The forecasted economic expansion about the Corona pandemic was dramatically decreased. Some 40.000 Hungarian died in the Corona pandemic lasting for two and a half years.

Employment is shifting towards higher-skilled jobs with the tighter integration of manufacturing into global value chains and the expansion of the service sector. Wages are rising with 9% but remain relatively low comparing to the EU average.

Health care spending as a share of GDP is relatively low and is expected to be reduced so in the long run, despite a projected 10 year increase in life expectancy and the demand changes arising from population ageing.

The main economic figures are:

- Unemployment rate was less than 3.7%.
- Inflation more than 2.8%.
- Rate of interest 1.25%.
- Trading balance – negative.
- National dept compared to GDP – more than 80% and increasing,
- Business Sentiment Index – negative, - 1.2%.
- Consumer Sentiment Index – negative, -27.2%
- Company's tax ratio – 9%.
- Personal's tax ratio – 15%.

Hungarian foundry industry 2021

The published oral and written mid-year briefings showed that the industrial recovery in the EU had slowed down, stagnated in many places as a result of the pandemic period, and deteriorated slightly in 2019/2020 years, in almost all foundry disciplines. Demand for automotive parts has also declined somewhat. The shortage of skilled labour has remained widespread as in Europe, as company leaders are trying to keep the workforce confident in ending the pandemic quickly, but many are already looking for a livelihood elsewhere due to significant wage declines.

The results of last year's domestic foundry production can be said to have shown very fluctuating results. At the beginning of the year - in the first half of the year - the order backlog of several companies deteriorated significantly, the performance of most companies stagnated with uncertain planning, and the number of those who were able to increase their production was small compared to the previous year. In the second half of the year, there was a general improvement in the foundries' order backlog (among others, they were not able to meet all the needs of their customers in some cases, see high pressure foundries, iron foundries).
Despite the fluctuations, the iron foundries rated their annual results as modest and better than the year before. Expectations could only be formulated on the basis of orders that could be planned for 2 -3 months in advance; customers do not communicate / do not know their needs for the longer term. The management difficulties caused by the rise in the prices of basic and auxiliary materials and energy became critical by the end of the year, and accordingly they were very difficult to manage, only at a loss. Energy prices, especially for electricity, rose in several cases in the second half of the year to such an

extent that e.g. at the beginning of the year, the contract was still in place (for the sake of publication, 1.35 EUR / MW had to be paid for 1 EUR / MW of goods at the beginning of the summer, and then 2.61 EUR / MW from November). Labour shortages continued to be a problem, and there were no unique cases of Vietnamese, Indian, Turkish or even Mongolian (labor of inadequate performance and discipline) being recruited by companies undertaking this task…

Table 1: Hungarian casting productions, 2019 - 2020; Value in tons

Denomination	2019	2020	2021
Grey iron casting	18,016	16,446	16,303
Nodular iron castings	36,408	37,375	39,333
Compacted graphite iron castings	19,210	20,145	17,865
Alloyed iron castings	378	445	496
Malleable iron castings	3	6	9
Total iron castings	74,015	74,417	**74,006**
Unalloyed steel castings	1,419	785	665
Alloyed steel castings	763	1,195	943
Total steel castings	*2,182*	*1,980*	**1,608**
Aluminium gravity die castings	734	530	48,153
Aluminium pressure die castings	49,234	49,759	70,761
Aluminium sand castings	73,058	69,024	112
Total aluminium castings	122,425	119,430	**119,026**
Bronze castings	181	360	329
Brass castings	302	369	372
Zinc castings	763	1,662	1,542
Other heavy metal castings	48	99	77
Total heavy metal castings incl. investment cast.	1,294	2,490	**2,320**
Magnesium Castings	282	316	**278**
TOTAL	**200,166**	**198,317**	**197,238**

Die casting foundries were able to handle the above difficulties even better at this time due to lower energy requirements. Their order backlog was generally such that no downtime was realized at the end of the year. In the 1st quarter of 2022, the order backlog promised to be outstanding, but long-term customer needs became not known or only to a limited extent. In the automotive industry, while the production of electric cars is soaring, the production of diesel cars is stagnant, in many cases already declining. Unfortunately, it has also become negative that, despite the good producer - customer relationship, the order has sometimes been cancelled with brutal rudeness and without justification, and withdrawals have been delayed, rescheduled - without justification and sympathy.
One of the main long-term problems of the year is that while the transformation of the University of Miskolc and the creation of the Technology and Innovation Park will be in full swing, the declining, possibly critically low number of students entering technical courses makes it almost impossible for these courses to be sustainable.

Source: OECD

Figure 1: Hungarian Ferrous Casting Production (volume)

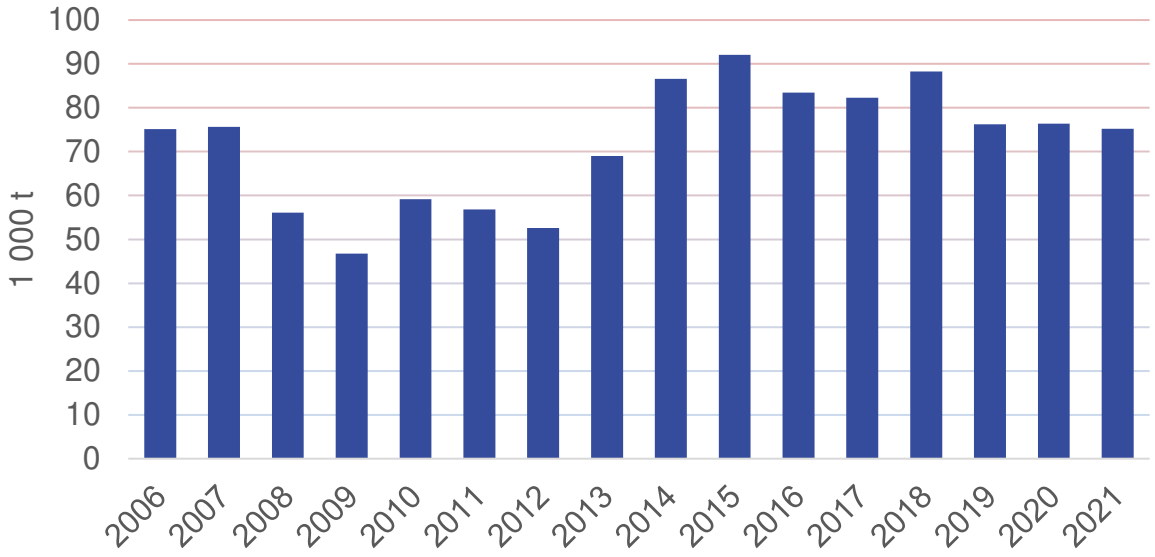
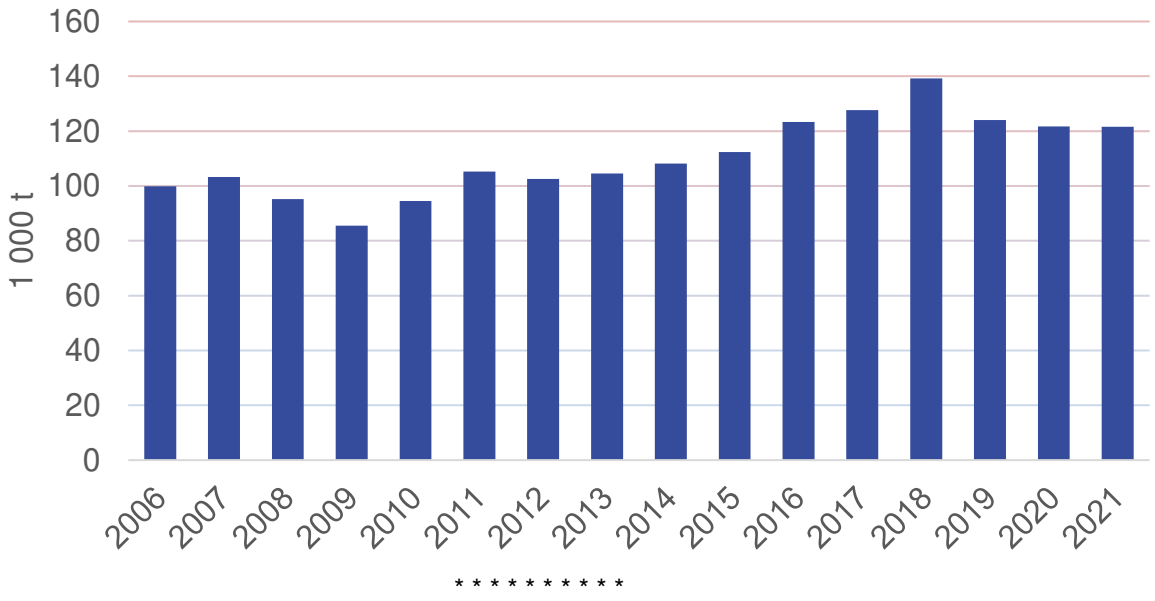


Figure 2: Hungarian Non-Ferrous Casting Production (volume)





Macroeconomic developments

GDP, Inflation

Last year Italy's GDP rose by 6.6 per cent, making up for two thirds of the exceptional contraction that occurred in 2020 due to the health crisis. Economic activity was particularly vigorous in the two middle quarters of the year, driven by the easing of restrictions as a result of roll-out of the vaccination campaigns; however, it slowed in the fourth quarter, reflecting difficulties in procuring intermediate goods, the resurgence of the pandemic and the sharp increase in commodity prices, especially energy commodities. The number of people employed and that of hours worked rose, although they both remained below pre-pandemic levels.

Inflation, as measured by the twelve-month change in the harmonized index of consumer prices (HICP), rose to 1.9 per cent on average for the year, after being virtually nil in 2020. The rise in prices was driven, mainly in the second half of the year, by higher energy prices. Core inflation instead remained low, in part thanks to moderate wage growth.

At the start of 2022, economic activity was affected by the rapid rise in new cases of the Omicron variant of COVID-19, the difficulties encountered in procuring intermediate goods and the rise in energy prices. Since the end of February, the effects of the Russian invasion of Ukraine have caused further spikes in the prices of the goods for which the two countries are major exporters. Higher energy and commodity prices, dependency on Russia for a significant share of our energy needs, the slowdown in trade, and more generally the increase in uncertainty regarding the global macroeconomic scenario are some of the elements of the conflict that could have significant repercussions for the Italian economy.

GDP fell by 0.2 per cent in the first quarter of this year, almost standing still in industry and declining in services. High-frequency data indicate that a modest recovery in economic activity is under way in the second quarter of 2022, although there are wide margins of uncertainty owing to the extreme volatility of the macroeconomic situation. In April, inflation rose to 6.3 per cent (core inflation to 2.2 per cent). The inflation expectations of firms, households and analysts are also rising significantly.

Firms

In 2021, production began to expand again, especially in manufacturing and in construction, while rising more moderately in services. Only the residential building sector was able to fully return to its pre-pandemic level, having benefited from sizeable tax incentives for renovating and improving existing homes. On the one hand, the recovery was supported by the roll-out of the vaccination campaign, which made it possible to ease measure for containing the spread of the virus; on the other, it was held back by persistent difficulties in procuring intermediate goods in the global supply chains and, especially starting in the second half of 2021, by rising commodity prices, particularly for energy commodities. The outbreak of the conflict in Ukraine last February worsened these tendencies. Most firms have experienced ongoing problems in obtaining inputs and have seen their costs rise significantly, situations they expect to persist for the rest of 2022. In a context that has become even more precarious, firms plan to slow investment for the year. The digital and green transition of the economy are the main lines of actions laid out in the NRRP. The production system has made considerable progress in digitalizing corporate processes: basic digital technologies have become more widespread, including among small and medium-sized enterprises, and the use of remote working has continued, albeit to a lesser extent than in 2020.

The financial situation of firms

Last year firms' profitability improved - although it remained slightly lower than in 2019 - and the ample liquidity, which increased further, helped to limit the need for new loans. The growth in debt was also slow in the first few months of 2022, being almost zero for the smallest firms, which continue to encounter greater difficulty in obtaining financing. Following the outbreak of the conflict in Ukraine, banks' lending criteria have tightened, primarily due to the uneasiness about the economic outlook. In the coming months, credit access conditions are expected to be impacted by higher energy costs and difficulties in procuring commodities and intermediate inputs.

The labour market

The recovery of economic activity in 2021 led to a relatively limited increase in the number of people employed and a more marked rise in the number of hours worked, which in 2020 had absorbed most of the decrease in labour demand. At the end of the year, however, hours worked per capita were still below pre-pandemic levels, also owing to the still intense use of wage supplementation schemes. In early 2022, employment grew at a slightly faster rate, but recourse to wage supplementation remained high. It accelerated considerably in construction and turned upward in manufacturing and trade, returning to the pre-pandemic growth trajectory. Employment dynamics in the tourism sector were instead much weaker than in the two years before the crisis.
Labour market participation increased significantly, especially among young people and women, which more than other population segments had stopped looking for a job owing to the poor chances of success and the constraints introduced to contain infection.

Prices and costs

In 2021, consumer prices in Italy rose on average for the year to 1.9%, from an almost zero value in 2020, driven - especially in the second half of the year - by the rise in energy prices.
Inflation grew further in the early months of this year: in March, it reached its highest level since the early 1990s, mainly owing to the sharp rises in oil and gas prices, whose effects were only in part mitigated by the measures adopted by the Government. Production prices accelerated and are expected to continue to rise at a faster pace in the coming months, especially in the industrial sector, which is more exposed than services to increases in the costs of energy products and of production inputs and to supply chain disruptions.
The rise in inflation has so far passed through to wages to a limited extent; wage growth remains moderate even when compared with other European countries. This is taking place against a backdrop in which the structural characteristics of collective bargaining agreements tend to dampen the short-term impact of increases in inflation on wages and in which there are still ample margins of spare labour capacity, mainly owing to the still partial recovery in the number of hours worked per capita.
Producer prices of industrial goods sold on the domestic market rose by 13% in 2021, driven by the trend of those energy (33.6%).
In early 2022 commodity prices, in further acceleration also in following the invasion of Ukraine, they continued to push higher inflation. The latter in March reached its highest level from the early nineties (6.8%), due to strong increases in energy component despite Government interventions on tariffs and taxes.

Foreign trade, competitiveness and the balance of payments

As world trade staged a strong recovery, Italy's exports of goods rose sharply in 2021, despite the emergence of bottlenecks in global supply chains. Exports of services, while expanding significantly thanks to the recovery in tourism receipts, are instead still below pre-pandemic levels. Imports rose too, both for goods and services, driven by the improvements in domestic demand and in foreign sales.
The current account surplus narrowed to 2.4% of GDP, mainly owing to the larger energy balance deficit. The latter widened further in the first quarter of 2022, owing to the higher prices connected with the tensions generated by the war in Ukraine.

The public finances

The strong recovery of the Italian economy in 2021 paved the way for a significant improvement in the public accounts. General government net borrowing fell to 7.2% of GDP, reflecting the narrowing in the primary deficit. The debt-to-GDP ratio fell to 150.8%, owing above all to the wide spread between nominal GDP growth and the average cost of the debt.
According to the plans presented in the 2022 Economic and Financial Document (DEF 2022) approved in April, net borrowing and the debt as percentages of GDP will both decrease further, to 5.6% and 147.0% respectively. These estimates incorporate the impact of the changes to personal income tax (IRPEF) and of the measures to support households and firms that were adopted during the first five months of 2022 to address the rising energy prices.

Developments in the foundry industry

Ferrous castings

Overall volumes of ferrous castings in 2021 reached over one million tons, with a percentage increase of +18.6% and a gain of about 166,000 tons compared with the previous year. The high costs of raw materials and the surge in energy costs put pressure on the trend in turnover which, on the whole, increased by +26.8% in the ferrous sector. The production capacity utilization rate was 80%, 14 percentage points above the use in 2020. The entire sector bore the brunt of the impact of higher energy costs and, in general, higher costs of all raw materials. This resulted in a significant erosion of company margins caused by the difficulty in fully passing on the price increases affecting supplies downstream. Very different trends are buried inside the average growth levels within the various segments of the ferrous castings sector in 2021: +20% growth in volumes of iron castings, followed by a +14.3% recovery in investment castings and a -2.1% loss affecting the production of steel castings.

Table 1: Ferrous Castings

	2020	2021	Change 2021/2020 (in%)
Production (t)	894,324	1,060,299	28.6
Turnover (b. €)	1.8		26.8
Production capacity	66%	80%	

**Includes investment castings production*

Foreign trade

In 2021, Italy's ferrous castings sectors benefited from the positive contribution of exports, which increased +22% in volumes against a slightly higher increase of values (+24%); the imports grew +31% in volume and in value. The mature European markets, a traditional reference point for Italian foundries, in 2021 only recovered as much as they lost in 2020, while recovery in North America was more accelerated.

Cast Iron foundries

In 2021, the recovery in volumes for cast iron foundries was generally good, albeit with considerable differences in performance among the destination sectors for castings. Turnover also rebounded substantially, driven by the explosive price trend in all raw materials. The cost shock has produced a strong margin squeeze.

Table 2: Cast Iron

	2020	2021	Change 2021/2020 (in%)
Production (t)	835,058	1,002,069	20.0
Turnover (b. €)	1.3	1.8	39.1
Production capacity	65%	81%	

The Italian cast iron foundries closed 2021 with a solid rebound in production volumes (+20%), together with about a +39% increase in turnover compared to the previous year.

With the production results of 2021, cast iron production returned to the over one-million-ton threshold (1,002,069 t), disastrously affected by the collapse in 2020, which led to the industry's all-time low of just above 835,000 tons.

Demand, on the whole, was satisfactory; however, there were considerable differences among customer sectors. Construction, after years of suffering, started to pick up. The demand for cast iron from mechanical engineering-related sectors has been strong, while the chip shortage and uncertainties linked to the shift towards e-mobility have heavily affected the transport sector, causing a slowdown in the production of cast iron intended for that supply chain. The steel industry also contributed to boosting the development of cast iron production.

The production capacity utilization rate was just over 80%, 16 percentage points greater than the use in 2020.

The seemingly stellar performance in terms of revenue, however, has to reckon with the record increase in raw material prices, which has had a jarring impact on the cost of all purchase inputs. In 2021, pig iron and steel scrap increased by about +60; the various types of ferroalloys increased by +50% to +110%. Furthermore, there was an increase in energy costs (over +200% for electricity and +300% for gas) and transport.

In the light of the increases documented above, it would appear that the increase in revenues is not enough to safeguard margins, which have suffered a severe squeeze due to the challenge of transferring all price increases to customers.

Grey, Ductile (nodular and malleable) cast iron

As regards the two macro-types of cast iron alloys, in 2021, ductile cast iron grew +28.2%, while the increase in grey cast iron was slightly lower (+15.3%). A total of 616,206 tons of grey cast iron and 385,863 tons of ductile cast iron were produced. The latter is almost entirely comparable to spheroidal cast iron since malleable cast iron is no longer produced in Italy.

In the production mix of the two types of cast iron in 2021, grey cast iron accounted for 61% of total castings, and ductile cast iron for 39%.

Production of cast iron by customer industries

A breakdown of the 2021 production of cast iron castings into the five target markets considered confirms the mechanical engineering industry's share at 54% in 2020 (against 50% in 2019), and a further decline in the transport industry, dropping to 29.5% (30.5% in 2020 and 32.3% in 2019).

The share of the construction and steel industry was 7.4% and 3.5% respectively. The category of miscellaneous applications saw an uptake of 5.6%.

The solid performance of the mechanical engineering industry, for which 541,117 tons (+20% compared to 2020) of cast iron castings were produced, was a major contributor to the growth of the cast iron foundry sector in 2021.
The production of cast iron castings absorbed by the transport industry in 2021 grew +16.1% for a total volume of 295,610 tons.

Finally, the building industry also contributed to boosting the production results of cast iron castings last year. The expansion of +23.3% caused the tons intended for the construction sector to reach 74,153 tons.

As regards castings for the steel industry, mainly ingot moulds and rolling mill cylinders, total production in 2021 reached 35,072 tons, +20% up on the previous year.

Finally, volumes in the 'miscellaneous applications' category achieved a remarkable growth rate of +40%. Production in this segment amounted to 56,116 tons.

The Russia-Ukraine conflict weighs heavily on the outlook for 2022

The positive trend of 2021 had an excellent knock-on effect also on the production results of the first two months of 2022. This was also reflected favorably in the economic situation at the beginning of the year, to the point where we have good reason to hope that numbers in 2022 will match those of 2018.

While the forecasts for 2022 made at the beginning of the year were therefore positive, the Russian-Ukrainian military crisis has totally changed the scenario and threatens to heavily impact the global economy and specifically the foundry sector.

Ongoing inflation dynamics, exploding energy costs, and difficulties in sourcing pig iron and other raw materials from conflict zones threaten to undermine the expansionary phase earlier this year, seriously reducing the profitability of companies in the short term.

The turbulence and volatility of the commodity markets already heavily affected and put a strain on the economic performance of companies in the second half of 2021; this situation worsened in the first two months of the year when electricity prices soared: +70% compared to the average of 2021, reaching over +400% compared to 2020.

The outbreak of war exacerbated an already tense market situation. The reaction of markets was quick with different magnitudes: pig iron prices rose significantly, while electricity prices doubled, peaking on 8 March 2022, when it just about reached a staggering 700 €/MWh (about 6 times the prices of 2021 and a good 18 times more than those of 2020).

In addition to the price tsunami, the other consequence, perhaps even more tragic for the pig iron foundry sector in view of its extremely high dependence not only on energy, but also the supply of other raw materials, was the cessation of pig iron supplies from Ukraine and Russia, which, until last February, provided about 80% of the sector's demand for pig iron.

The pig iron supply is characterized by a very high concentration: the shortage of pig iron on the European market is mainly covered by imports from Russia, Ukraine, Brazil and South Africa. Pig iron imports to Italy in 2021 came 80% from Russia and Ukraine. In particular, the 2021 figures highlight Italy's very strong dependence on imports from Ukraine, the weighting of which has increased significantly from 14% in 2020 to over 50% in 2021.

The Russia-Ukraine conflict rendered these supply channels impracticable, therefore the entire demand for pig iron is being covered by Brazil, South Africa and Germany, triggering an additional hike in the prices of these raw materials, which bounced between +40% and 50% depending on the category: a growth that, moreover, added to the already extremely bullish situation of the first two months of this year and 2021.

Average price trend for pig iron:

2021 vs 2020
- Hematite: +49% - For ductile iron: +59% - Basic: +59%

May 2022 vs 2021
- Hematite: +51% - For ductile iron: +64% - Basic: +57%

May 2022 vs 2020
- Hematite: +124% - For ductile iron: +161% - Basic: +150%

Steel foundries

2021 was a disappointing year for the steel foundry sector, which closed with a production of 56,782 tons, down -2.1% from 2020.

The positive aspect, not be underestimated, is that in 2020 the production of steel castings was considerably less negative than the remaining production sectors in both ferrous and non-ferrous metals. Losses in the pandemic year were in fact limited to -3%, a figure that had, however, raised hopes for a stronger tone in 2021.

Table 3: Steel Castings

	2020	2021	Change 2021/2020 (in%)
Production (t)	58,000	56,782	-2.1
Turnover (b. €)	452	450	-0.5
Production capacity	70.0%	66.4%	

Steel alloys

In terms of production mix, 2021 there were only slight changes from the previous year. Alloyed steel castings accounted for 60.5% of last year's steel castings, or 34,342 tons, with an average annual growth rate of +3.7%. The remaining 39.5% of production was shared almost equally between carbon steel (20.2% of the total, or 11,448 tons) and stainless steel (19.3%, or 10,992 tons).

The drop in production affected both above specialist productions, but it affected carbon steels (-15.4%) to a greater extent. The decline in stainless steel castings was much lower (-3.2%).

Production of steel castings by customer industries

From a destination market perspective, our analysis for 2021 essentially shows the same picture as the year before, except for the mechanical engineering industry, which gained a percentage point, and construction and the mining industries, which gained around two points compared to 2020.

Of all customer sectors, the worst performing was generally the transport industry: shipbuilding (-4.3%), railways (-2.9%) and automotive (-1.7%), while positive contributions came from the mining industry (+12.7%), construction industry (+2.6%) and steel industry (+2.3%). The mechanical engineering industry also expanded slightly by +1.4%.

Investment casting foundries

The sector comprising investment castings produced a total of 1,448 tons in 2021, up +14% with respect to the levels achieved in the previous year. This is clearly not enough to recover the losses of the 2020 volumes, which for this sector resulted in a collapse of more than -30%, more severe than those seen in the other ferrous and non-ferrous alloys.

Results for this segment were hit hard by the impact of the COVID-19 pandemic on one of the most important target markets: the aeronautical sector that, still in 2021, struggles to make up for lost ground.

Non-ferrous Metal Castings

In 2021, the production of non-ferrous castings returned to above pre-pandemic levels. The final figure is nearly two percentage points above 2018's record levels. In 2021, the production in Italy of non-ferrous castings stood at 880,453 tons, with a jump of about 34 percent after the devastating slump in 2020, which caused volumes to drop to around 660,000 tons. 2021 ended with a production of non-ferrous castings higher than the last year prior to the pandemic (2019), during which 827,300 tons were produced, but the figure was also +1.5% up on the volumes in 2018 (867,544 tons), one of the best years following the 2008 - 2009 global crisis. Alongside the growth in volumes in 2021, the sector also showed good performance in terms of turnover, with an increase of 27%, contributed to heavily by the inflationary surge in metal and energy commodities.
The production capacity utilization rate was 82%, 16 percentage points above the use in 2020.

Table 4: Non-Ferrous Metals Castings

	2020	2021	Change 2021/2020 (in%)
Production (t)	659,209	880,453	+33.6
Turnover (b. €)	3,7	4,6	+26.9
Production capacity	66%	82%	

Non-ferrous alloys and production technologies

In 2021, light alloys, especially aluminium, were again dominant in the non-ferrous metal foundry business, also considering the "multi-metal" phenomena, i.e. the simultaneous production of multiple metals. 880,453 tons of non-ferrous castings were reached, comprising 82% aluminium castings, 11% zinc alloys, 6% copper-based alloys (brass, bronze...) and 1% magnesium alloys.

On average for 2021 as a whole, growth in the non-ferrous sector was fairly symmetrical across the various alloys, although of course the expansion in production of castings is mainly explained by the excellent performance of aluminium (+34.6%). However, the contribution of other alloys was also very positive.
In order of importance by volumes produced: the production of zinc castings registered a growth of 25.4% and the production level was just above 95,000 tons; for copper, brass and bronze, the growth rate exceeded 36.1% and volumes produced approached 52,000 tons. Finally, magnesium had the best performance in terms of percentage changes, with an increase of 43.7%, but volumes remain limited to around 5,000 tons a year.
The strong capacity for recovery of aluminium in 2021 is in line with the results of the upstream link in the supply chain. The national output of aluminium foundry ingots in 2021 stood at 770,000 tons with an increase of more than 35% compared with 2020.
In the area of technologies adopted to produce non-ferrous castings, diecasting (squeeze casting and rheocasting) is in top spot (76% of the total). In 2021, around 670,000 tons of castings (+35% compared with 2020) were produced with this type of casting, including around 550,000 tons of aluminium and alloys, 3,000 tons of magnesium, 95,000 tons of zinc and 22,000 tons of copper alloys.
Following diecasting, the second most widespread type of casting is shell gravity and low-pressure casting, with a share of 22%. Overall, production in 2021 exceeded 194,000 tons, with a growth rate of

41% compared with 2020. Finally, the remaining 2% of total production of non-ferrous castings of around 17,000 tons (+6.8% compared with 2020) was produced by sand casting (lost foam and investment casting). The latter showed the most modest growth.

Production of non-ferrous castings by customer industries

The transport industry remains by far the most important target market for non-ferrous metal foundries. In 2021, 461,357 tons were destined for this industrial sector, accounting for more than half the total production of non-ferrous castings.
Even though 2021 was an unquestionably difficult year for the automotive market, hampered by chip supply problems and rising commodity prices, according to ISTAT (Italian official institute of statistics), industrial production relating to vehicle parts and accessories rebounded significantly, around +30%, therefore very close to the +35% recovery achieved in volumes of non-ferrous castings destined for the transport industry.
Construction is the second reference market for non-ferrous casting foundries in Italy. The non-ferrous components destined for this sector in 2021 represented 16% of production by volume, or 139,112 tons, achieved thanks to a growth of 35.3%.
The performance of the other purchasing sectors in 2021 was equally very positive. Electrical engineering accounted for 10% of the production of non-ferrous castings. This category includes applications for electric motors, components for interior lighting and for urban design. Overall, production intended for this application grew by 33.6% and volumes reached 88,045 tons.
The use of non-ferrous castings in process machine manufacturing and miscellaneous mechanical engineering was also on the rise. A change of +32.1% compared with 2020 allowed around 80,000 tons of non-ferrous castings to be directed to this industrial sector.
The durable goods category, which includes parts for household appliances, household items and metal furniture (shelves and other accessories) increased its uptake by nearly one percentage point from 9.3% to 10% in 2021. Production from non-ferrous casting foundries related to this sector grew by 36.4% to 83,643 tons.

Figure 1: Italian Ferrous Casting Production (volume)

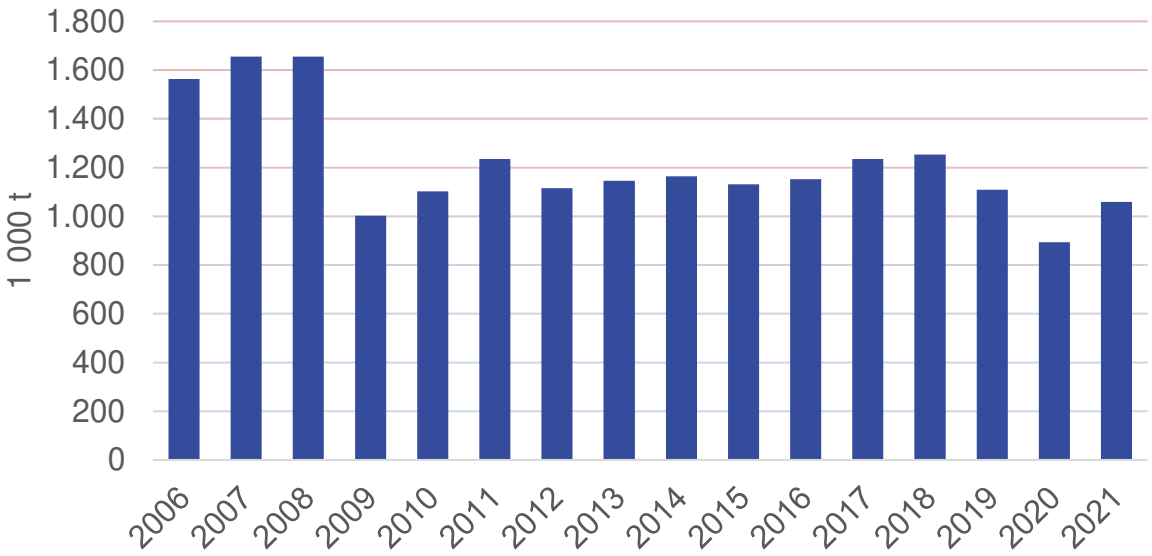
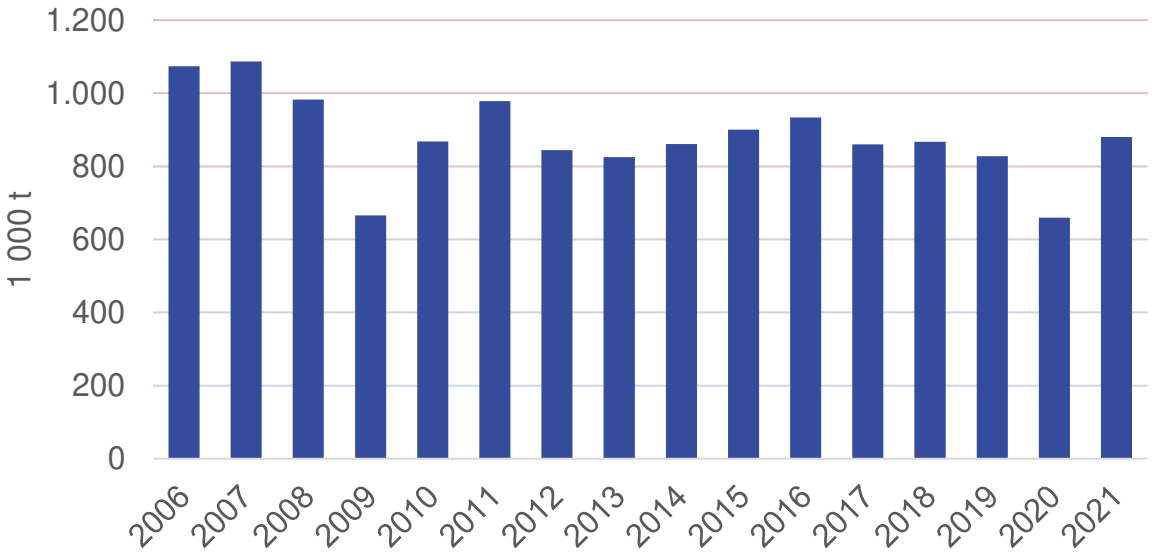


Figure 2: Italian Non-Ferrous Production (volume)



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General

The Omicron wave this winter proved to be short-lived in advanced countries, and most containment measures have been lifted in many countries. Activity in the Norwegian economy has continued to rise after Covid-19 containment measures were removed in winter (mainland GDP grew by 4.2% in 2021, after falling by 3.0% in 2020, projected 4.1% in 2022). Labour markets have improved during 2022. Wage growth is on the rise, and manufacturing industries agreed on a 3.7% hike in 2022. High employment and little spare capacity in the Norwegian economy. Economic activity among Norway's trading partners has continued to rise. High energy prices, a surge in freight rates and long delivery times have driven up CPI-inflation in many countries. Underlying inflation in Norway has also moved up, and inflation expectations have increased. The objective of stabilising inflation around the inflation target (around 2%) points to higher key interest rates the next 18 months.

Russia's invasion of Ukraine will likely dampen the economic upswing a little, but growth is still expected to continue

Prices for many commodities, including oil and gas, on the rise. Supply chain disruptions may last longer. The economic upturn among trading partners is expected to continue, but higher inflation, export market disruptions and greater uncertainty among households and firms are expected to dampen economic growth ahead, especially in Europe. Uncertainty associated with the war in Ukraine has resulted in financial market volatility. Norwegian money market premiums have also moved up. The krone has appreciated more than projected in most analyses, reflecting the rise in oil prices. Norwegian market rates have also increased. Further policy rate hikes are on the way, 0.75 in May 2022 rising to 2.5% late 2023. Mortgage rates have moved up broadly as expected in response to the policy rate hikes in 2021.

Prices for energy, metals and agricultural products have risen substantially since late 2021 and had already risen before Russia's invasion of Ukraine. Demand had picked up on the back of the global economic recovery. A faster-paced climate transition leads to higher demand for many metals. Supply was hampered by pandemic-related disruptions but was also held back by insufficient investment to expand freight and production capacity in recent years. Low energy and commodity stocks indicates that growth in consumption is outpacing growth in production.

Russia's invasion of Ukraine led to a further increase in energy and other commodity prices as Russia is a major exporter of various raw materials; gas, coal, industrial metals such as aluminium, nickel and steel, Russian and Ukraine together account for about 30% of global also major exporters of inputs to fertiliser production.

Electricity prices in Europe rise when gas prices go up, which in turn affects electricity prices in Norway. Higher energy prices also have a significant impact on agricultural production costs. The same applies to energy-intensive production of industrial metals.

Outlook 2022 and into 2023

Strong growth in the mainland economy is expected in 2022, even if the war in Ukraine dampens the upturn somewhat. Unemployment is low and many businesses are experiencing labour shortages. Capacity utilisation appears to be above a normal level. Underlying inflation, consumer price index adjusted for tax changes and excluding energy products, has risen and was 2.1% in February. Wage growth and wage expectations have also increased. Capacity constraints and higher interest rates push down growth in the years ahead. Underlying inflation rises further through 2022 on the back of higher wage growth and increases in global prices. Further out in the next years, lower capacity utilisation curbs price and wage inflation. CPI-inflation is projected to be slightly above 2% at the end of 2023.

Figure 1: Norwegian Ferrous Casting Production (volume)

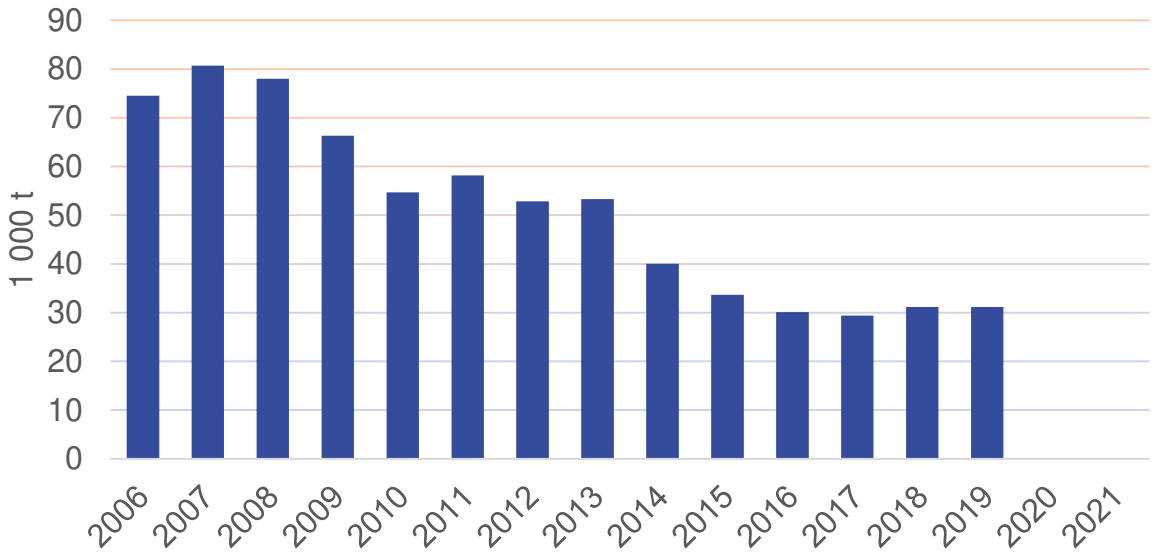
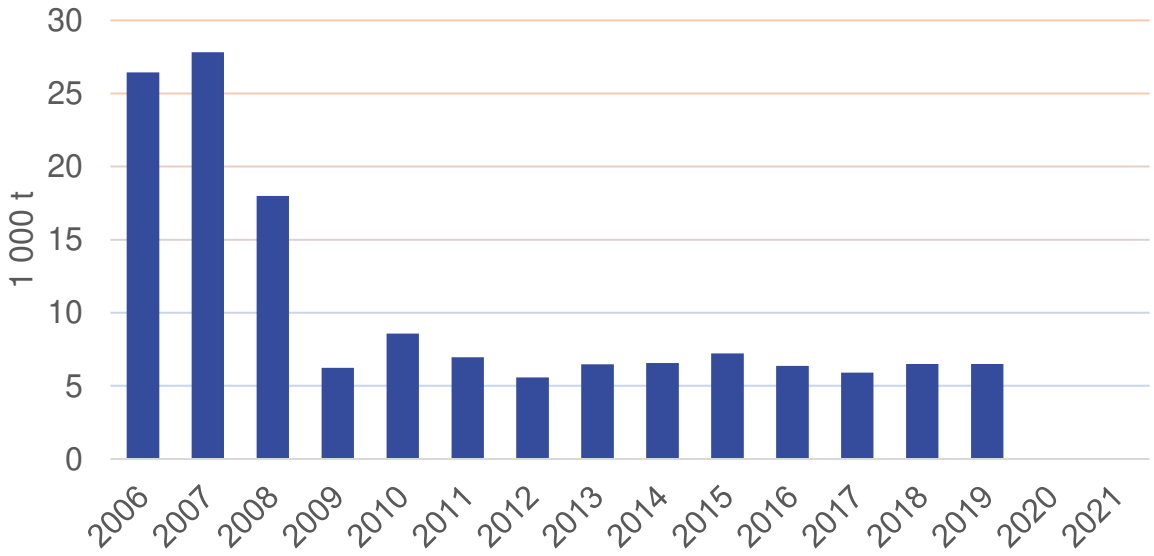


Figure 2: Norwegian Non-Ferrous Casting Production (volume)



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Poland's economic performance in 2021

In 2021, the socio-economic situation of the country was still influenced by the COVID-19 pandemic. Temporary restrictions in socio-economic life (the most intense in the first months of the year) were mostly less tight than during the spring of 2020, when the epidemic state was introduced in the country. In the basic areas of economic activity in 2021 better results were obtained than in the previous year. The situation on the labour market improved slightly: at the end of 2021, the number of employed in the national economy was higher than a year before, while the registered unemployment rate was lower. During the year, the inflation continued to intensify gradually – in December 2021, the annual growth in both consumer and producer prices was the highest in many years.

Real gross domestic product increased by 5.7% as compared to 2020 (when a decrease of 2.5% was recorded).

Domestic demand was the main factor of the economic growth. The impact of both consumption and investment demand was positive.

Domestic demand was by 8.2% higher than in 2020. Final consumption expenditure increased by 4.8% (against a drop of 1.1% a year before), of which consumption expenditure of the household sector grew by 6.2%. Gross fixed capital formation increased by 8.0%.

Gross value added in the national economy grew by 5.3% as compared to the previous year (when it decreased by 2.6%). A high growth in gross value added was recorded in industry – of 14.1%, and a slight one in construction – of 1.2%. In trade; repair of motor vehicles gross value added increased by 5.9%.

Both the employment in the national economy and the average paid employment in enterprise sector were slightly higher than a year before (when their decrease was observed). At the end of 2021, the number of registered unemployed was lower than in the previous year; also, the registered unemployment rate was lower than at the end of 2020.

The average annual growth in prices of consumer goods and services was the highest since 2001 and it was also higher than assumed in the Budget Act (which forecast price growth of 4.3%). In subsequent months, the dynamics of prices continued to accelerate gradually, particularly in the second half of the year.

Producer prices in industry grew in 2021 at the highest rate since 1997, and in construction – since 2008.

Sold production of industry, after a slight decline in 2020, increased the most since the beginning of the economic transition. In entities employing more than 9 persons, sales increased in all sections of industry, most notably in electricity, gas, steam and air conditioning supply. The growth was also high in manufacturing (similar to that for the total industry). In most of the main industrial groupings, the

growth was high, including the production of capital goods, where it was similar to the average one in industry. Only in the production of non-durable consumer goods the growth was relatively small.

Construction and assembly production increased after a decline in the previous year. In enterprises employing more than 9 persons the production was higher than in 2020 in units dealing mainly with specialized construction activities and specializing in civil engineering, and lower – in those specializing in construction of buildings. Sales of restoration works increased, while of investment works – decreased.

Foreign trade turnover was much higher than in the corresponding period of 2020 (when exports increased subtly and imports decreased slightly). With a greater growth in imports than exports, the positive balance of exchange was much smaller than a year before. Turnover with all groups of countries increased, imports from Central and Eastern Europe countries the most. The terms of trade index in the period of January - October 2021, unlike a year before, was unfavorable.

Foundry industry in Poland in 2021

The production of castings in Poland in 2021 increased by 9% in comparison to 2020.

Iron castings:	392 400 tonnes
Nodular iron castings:	135 160 tonnes
Steel castings:	43 600 tonnes
Copper alloy castings:	5232 tonnes
Aluminum castings:	296 480 tonnes
Zinc castings:	6540 tonnes
Other alloy castings:	2616 tonnes

Total production in 2021: 882 028 tonnes

The structure of Polish foundry branch:
180 ferrous foundries
36 steel foundries
240 non-ferrous foundries

More than 90% of foundries belong to SME sector. SMEs are responsible for 40% of total production in Poland.

Export of castings:
iron castings – 49%
steel castings – 40%
non-ferrous castings – 45%

The main markets for Polish castings are:
Automotive industry – 60%
Building industry – 10%
Machines and constructions - 10%
Iron and steel industry – 10%
Energy industry – 3%
Other – 7%

Source: Central Statistical Office - www stat.gov.pl

Figure 1: Polish Ferrous Casting Production (volume)

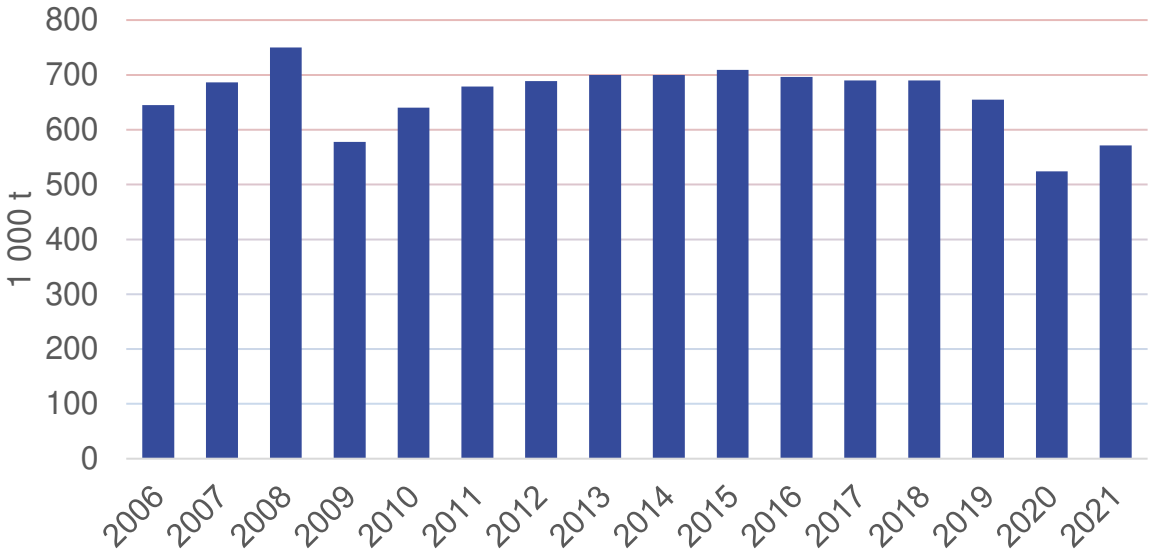
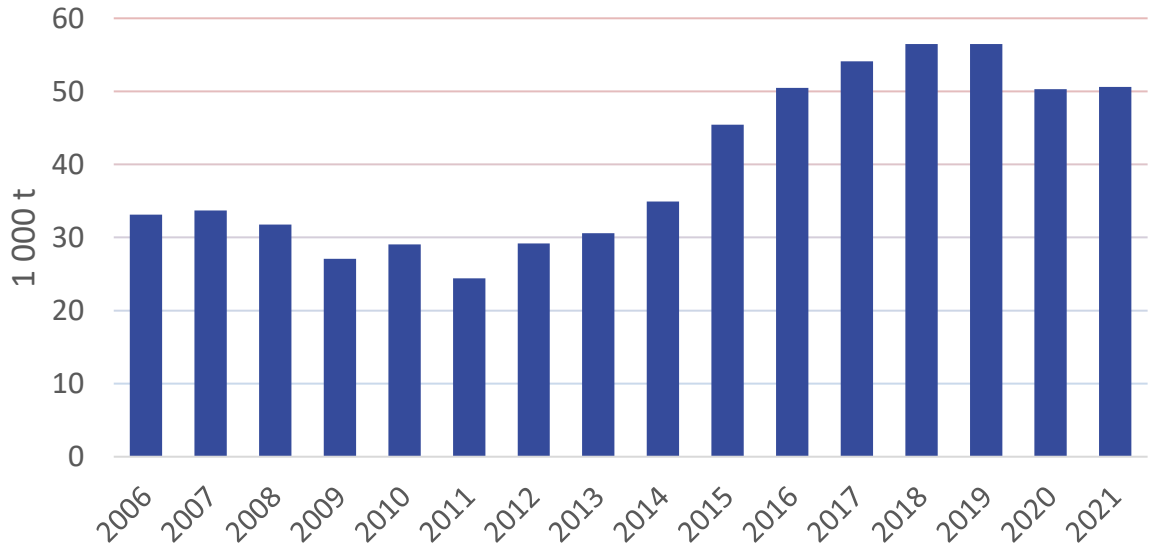


Figure 2: Polish Non-Ferrous Casting Production (volume)



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General Economic Situation

The year 2021, marked by the total opening of the world economy, was a year of slight recovery compared to 2020. However, this opening highlighted and deepened the already existing problems in the supply chains of raw materials, causing a significant increase in their prices. In parallel, the increase in energy prices has also caused serious economic constraints to companies.

According to the latest results of the INE (National Statistical Institute) in 2021, Gross Domestic Product (GDP) registered an increase of 4.9%, in relation to the previous year.

In 2021, exports and imports of goods and services grew by 13% and 12.8%, respectively, compared to falls of 18.6% in the case of exports and falls of 12.1% in imports recorded in 2020.
Exports of goods by volume increased by 11.1% in 2021 (-11.4% in 2020), while exports of services recorded a rate of change of 18.6% (-34.0% in 2020).

The employment situation

In 2021, the active population in Portugal amounted to 5 151.1 thousand people and the employed population was estimated at 4 812.3 thousand people. The unemployment rate reached in 2021 was 6.6% of the active population.

In the foundry area, the demand for skilled technicians, operators and maintenance staff has been increasing every year. Companies have difficulties in attracting talent and keeping it in their organisations.

Foundry Industry

The automotive industry remains the main customer market, which absorbs about 68.4% of the Portuguese global production of foundry products.

The Portuguese foundry sector exports 89.5% of the total production (by weight) mainly to the European market.

Production

In 2021, the outcome of the Portuguese foundry industry was roughly 171 thousand tons, 121 thousand tons from the ferrous sector and 50 thousand tons from the non-ferrous sector. Which means a growth of 13.5% and 0.5% for the ferrous and non-ferrous sectors, respectively.

Table 1: Casting Production

	2020 (t)	2020 (share in %)	2021 (t)	2021 (share in %)	2021/2020 (in%)
Ferrous	106,338	67.9	120,689	70.5	13.5
Non Ferrous	50,334	32.1	50,578	29.5	0.5
TOTAL	**156,672**	**100**	**171,267**	**100**	**9.3**

Sales grew by 7.1% overall, with a more pronounced increase in ferrous metals.

Table 2: Casting Turnover

	2020 (t. €)	2021 (t. €)	2021/2020 (in%)
Ferrous	210,546	243,269.12	**15.5**
Non Ferrous	318,692	323,430.71	**1.5**
TOTAL	**529,238**	**566,699.83**	**7.1**

Ferrous Production

The following table shows the values for the ferrous sector, where, as mentioned above, an increase can be seen across all sub-sectors.

Table 3: Ferrous Casting Production

	2020 (t)	2020 (share in %)	2021 (t)	2021 (share in %)	2021/2020 (in%)
Iron Casting	26,093	24.5	39,699	33	**52**
Nodular Iron	76,119	71.6	76,586	63	**0.6**
Steel	4,126	3.9	4,404	4	**6.7**
TOTAL	**106,338**	**100**	**12,0689**	**100**	**13.5**

Steel and iron foundries had a production increase of 6.7% and 52%, respectively. Nodular foundries had a slight increase in their production, with a growth of 0.6% which was reflected in a global increase in the ferrous sector of 13.5% against 2020.

Non-Ferrous casting Production

The following table shows the figures for the non-ferrous sector, where a slight increase can be seen in the aluminium subsector.

Table 4: Non-Ferrous Casting Production

	2020 (t)	2020 (share in %)	2021 (t)	2021 (share in %)	2021/2020 (in%)
Light Castings	32,818	65.2	33,050	65.3	**0.7**
Copper	14,690	29.2	14,699	29.1	**0.1**
Zinc	2,826	5.6	2,829	5.6	**0.1**
TOTAL	**50,334**	**100**	**50,578**	**100**	**0.5**

The non-ferrous sector shows a maintenance of the 2020 values, with a growth of 0.5% in its production, at the expense of a slight growth in the aluminium sub-sector of 0.7%.

New casting plants and investments

In 2021, no new foundries were installed in Portugal, although there were several investments in existing foundries, aiming at process improvement.

Global investments in the non-ferrous sector during 2021 were around 20 M€, mainly in aluminium foundries. In 2022, investments are estimated to reach the amount of 14 M€.
Overall investments in the ferrous sector in 2021 were around 13.8 M€, carried out mainly by iron foundries. In 2022, planned investments are expected to reach a total amount of 11M€.

Industrial Cost

Raw materials - in 2021, the price of raw materials in the foundry sector steadily increased. This increase of around 40% was essentially due to the fall in supply chains, still as a consequence of the COVID 19 pandemic.

Energy - since the beginning of 2021, there has been an increase in energy prices. This increase became even more pronounced in the last quarter of the year, with occasional values above €200/MWh. The market shows no signs of slowing down in the increase in electricity prices, nor are natural gas costs expected to come down, with values three times higher than those in the international natural gas market in 2020. Natural gas price increases in 2021 were linked to three situations: strong diplomatic tension between Algeria and Morocco, lower availability of Russian gas for Central Europe and higher purchases of natural gas by emerging countries.
The strong increases in electricity were linked to uncertainties regarding wind productivity and the greater use of plants powered by natural gas, which leads to the wholesale price being influenced by the cost that these plants charge to the MIBEL (Iberian Electricity Market), worsening the final value of energy.
This upward trend in energy prices, exacerbated in February 2022 with the start of the war in Ukraine, is not expected to be reversed.

Incoming orders

The needs of the automotive sector will increase by 2021. However, the shortage of raw materials, caused by the disruption of supply chains, has made it difficult to respond and implied a drop in orders to the foundry sector. This drop in orders did not occur in other sectors.

Foundry vocational training

The Portuguese Foundry Industry has its own Professional Training Centre, CINFU, in a partnership between APF - Portuguese Foundry Association and the Institute for Employment and Professional Training. CINFU promotes professional training for the workers of the sector and for those who will join it in the future. There is also a long partnership with the University of Porto - Faculty of Engineering, for the training of future foundry engineers.

Figure 1: Portuguese Ferrous Casting Production (volume)

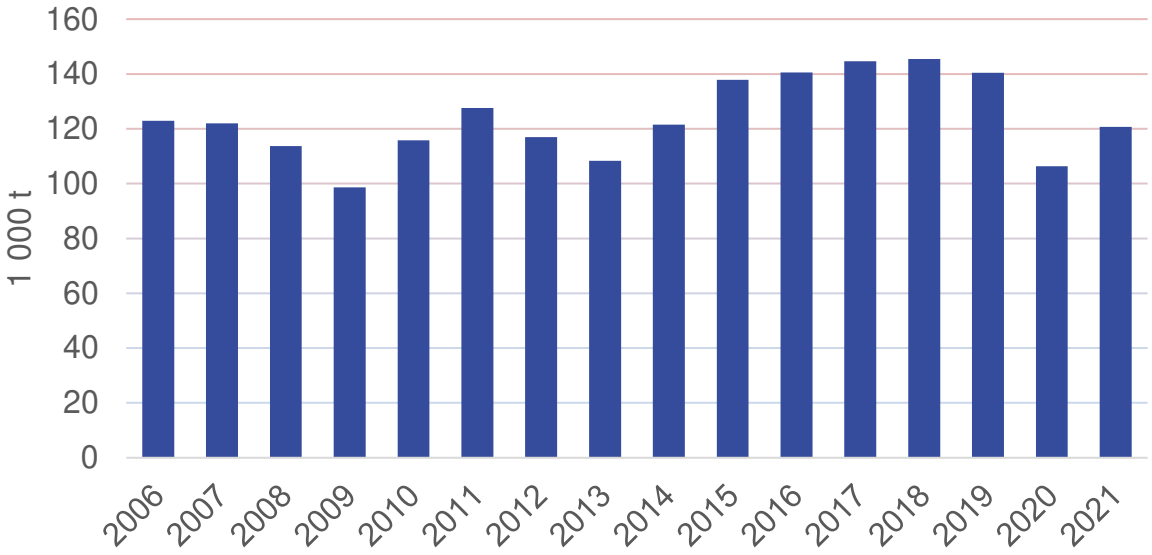
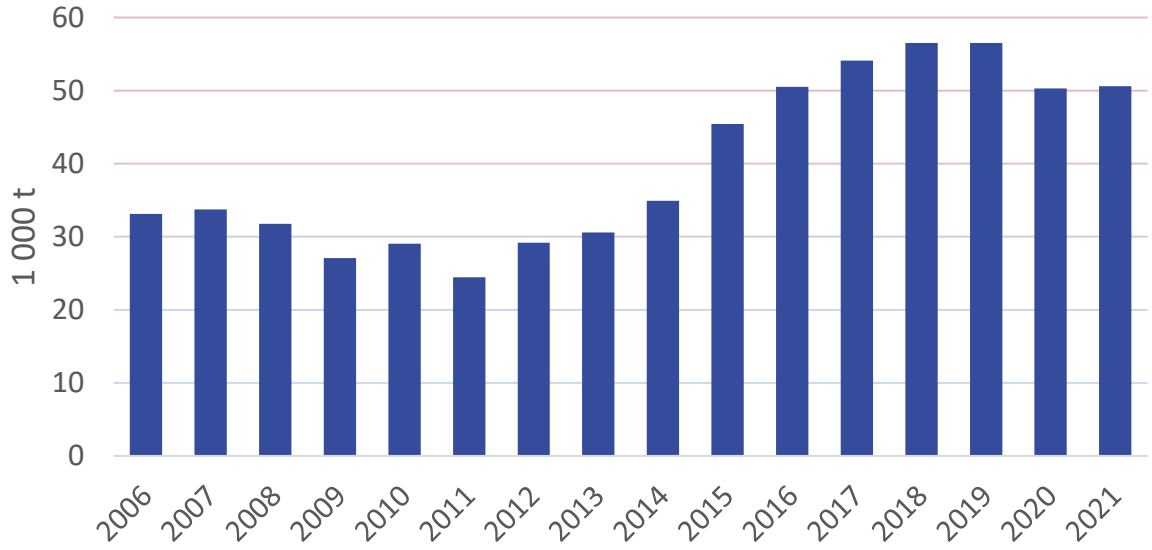


Figure 2: Portuguese Non-Ferrous Casting Production (volume)



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Spring Forecast of Economic Trends 2022 for Slovenia

The Spring Forecast of Economic Trends was prepared in a situation of high uncertainty due to the war in Ukraine, the escalation of which could pose a downside risk to the assumptions and outlook of the baseline scenario. In preparing the assumptions, we took into account the sanctions imposed or announced by Western countries up to 11 March, as well as the then few available scenarios prepared by international institutions and banks regarding the impact of sanctions on economic activity. The European economy is exposed to Russia and Ukraine mostly through energy imports, and the two countries are also major suppliers of certain metals and food commodities. The already high commodity prices have soared since the Russian invasion of Ukraine, and we expect the negative impact of economic sanctions to affect economic growth in the euro area mainly through higher prices for energy and other commodities. Lower confidence, financial stress and reduced trade in goods will also have a significant impact on the economy. Prices for energy and commodities are expected to remain high for an extended period of time, which will increase the inflationary pressures. This will reduce real household incomes and corporate profits and, together with lower confidence, hamper consumption and investment. The sanctions will cause supply chain problems to persist or even intensify, as it is difficult for companies doing business with Russia to find financial channels to trade with Russia after major Russian banks were excluded from the SWIFT system, and trade is also hampered by disrupted transport routes. We expect economic growth in the euro area to slow to 3.4% this year and to 2.6% in 2023. Assumptions about economic growth in all of Slovenia's major trading partners are fraught with pronounced uncertainty and carry significant downside risks that could materialise in the event of continued (escalation of the) war and sanctions against Russia.

In the Spring Forecast, IMAD forecasts GDP growth of 4.2% in 2022, slowing to 3.0% next year and to 2.8% in 2024. After a deep downturn in 2020, economic activity grew by 8.1% last year, surpassing the 2019 level. For 2022 we expect 4.2% GDP growth, which is 0.5 percent points. lower than projected in autumn forecast. After the strong rebound in economic activity last year, we had expected a slowdown of growth even before the war in Ukraine began, mainly due to increasing price pressures from high energy and commodity prices and supply chain bottlenecks, in addition to last year's high base. Russia's invasion of Ukraine and the imposition of sanctions have exacerbated this pressure, and the sectors most dependent on trade with Russia and Ukraine are (or will be) even more severely affected, which will reduce exports to this region. In addition, lower GDP growth than last year will be influenced by lower support measures, which have a positive impact on economic growth, also taking into account the measures taken in recent days. Economic growth this year will be largely driven by growth in domestic consumption. Private consumption growth will ease off this year, after a strong rebound last year as a result of further increases in disposable income (supported by government measures and a rapid recovery in the labour market) and the release of pent-up demand from 2020. We expect the easing of containment measures to lead to faster growth, mainly in the consumption of services, which was still far behind 2019 levels last year due to restrictions related to the epidemiological situation. Private consumption growth will be lower than last year under the impact of higher Spring Forecast of Economic Trends 2022 inflation, which will lead to a real stagnation in disposable income, so we also expect a decline in the savings rate, which rose sharply during the epidemic. Investment activity will continue to be high this year. Given the high production capacity utilisation, last year's favourable business results and low corporate debt, we expect further growth of investments in machinery and equipment. The growth of investment in industry will continue, and as containment measures ease, investment in the services sectors, which were most affected by the coronavirus restrictions, will also increase. Based on the data on building permits issued, we expect a further increase in housing investment, and according to the valid budget documents, we also expect further growth in general government sector investment. This is also supported by EU funds, as funding from the 2014 - 2020 financial perspective is coming to an end, and this is usually the time when the absorption of funds accelerates, while the contribution from the Recovery and Resilience funds is also increasing. We expect the export part of the economy to

continue to row, albeit at a slower pace than last year due to the slowdown in the growth of goods exports, which will be significantly affected by the consequences of the war in Ukraine and a sharp decline in exports to Russia, and, via the impact on the economic activity of Slovenia's main trading partners, a slowdown in the overall growth of foreign demand. In this uncertain situation, supply chain disruptions will only gradually ease over the course of this year and remain high in some sectors. The trend of bringing supply chains closer to the European markets where Slovenian companies would increasingly look for opportunities could have a positive impact. Over the next two years, GDP growth is expected to slow further, first to 3.0% and then to 2.8%. As foreign demand slows, this will also be affected by continued price pressures, which will have an impact on business costs and limit household purchasing power.

The rise in employment and the decline in unemployment will continue this year and, albeit at a slower pace, over the next two years, although this will be increasingly characterised by constraints related to labour availability impacted by demographic trends. The labour market situation started to improve rapidly in mid-2020 with the gradual lifting of containment measures and the resumption of most activities. Employment rose to its highest level last year, with a strong contribution from the employment of foreign workers, including in the context of labour shortages. Given the growing demand for labour, the number of registered unemployed fell sharply last year (to 74.3 thousand on average in 2021). We expect employment to rise by 1.7% this year and the number of registered unemployed will continue to fall, and will amount to around 61 thousand on average in 2022. We expect labour market conditions to continue to improve over the next two years, albeit at a less vigoraus pace than this year, due to somewhat lower growth in economic activity and demographic trends causing a decline in the working age population (aged 20 - 64).

This year, nominal wage growth in the private sector will be similar to last year, while the average nominal gross wage in the public sector will fall due to the cessation of allowances and last year's high base. Real wage growth will be dampened by high inflation. Private sector wage growth will remain relatively high this year, related to increasing labour shortage pressures, the minimum wage increase in January this year and other labour market pressures to maintain income growth in the face of high inflation. After high Spring Forecast of Economic Trends 2022 growth last year, wage growth in the public sector will be negative this year due to the cessation of epidemic-related allowances. As a result, nominal wage growth will be relatively low overall in 2022 (2.4%) and real wages will fall in the face of high inflation (-3.7%; private sector: -0.5%, public sector: -8.6%). For the next year we expect the growth of nominal wages to increase again to 4.0% and real wages to 0.7%.

Consumer prices rose sharply at the end of last year. Inflation is projected to persist at a relatively high level throughout most of this year, only approaching 2% in 2024, provided that price pressures ease. At the beginning of this year, inflation continued to rise as prices for energy, food, services and non-energy industrial goods increased. We expect it to remain at about the same level throughout most of this year, and even higher growth will be limited by measures to mitigate the impact of high energy prices. As containment measures ease, we expect some demand this year to be diverted from goods to services, whose price growth will accelerate. All this will lead to an overall increase in consumer prices of 6.4% in 2022 as a whole, moderating to 3.2% in 2023 and to 2.3% in 2024. Higher wages will at least partially pass through to final prices, especially in the services sector, which is less exposed to international competition.

Since the Russian invasion of Ukraine, the greatest risks to the realisation of the forecast have been related to the unfolding of the war and energy prices. Amid higher energy prices, EU Member States would be forced to rationalise energy and look for alternative sources, which would have an additional negative impact on economic activity in the short term given the EU's high dependence on Russian gas imports. The already severely weakened trade flows with Russia would decrease, which would have a negative impact on exports, at least in the short term. At the same time, inflation would remain high for an extended period of time (including next year) as oil and natural gas prices rise and are likely to remain high. Massive fiscal measures would be needed to help economies mitigate the negative impact on financial markets and the decline in consumer and business confidence, which would slow fiscal consolidation.

Downside risk to the realisation of the Spring Forecast is still related also to the epidemiological situation and increasingly to supply chain disruptions; there are,however, also some upside risks to the baseline projections. More stringent containment measures in the face of possible new waves of infections, including as a result of new and more infectious coronavirus mutations and/or insufficient vaccination coverage, remain a significant risk to a more stable recovery in some activities. The risk associated with possible prolonged persistence of supply chain problems is also increasing. In particular, a shortage of certain raw materials and semi-finished products, also as a result of further problems related to the Russian-Ukrainian conflict, would affect exports in particular and increase the risks of a more severe cost pressure. Economic growth could also be stronger than the baseline forecast for Slovenia and the assumptions for its trading partners, depending mainly on the situation in Ukraine and the adjustment of businesses to the situation, including through increased investment activity to accelerate reduction in dependence on Russian energy, and on the global capacity to cope with the pandemic, as well as on the effectiveness in terms of absorption of EU funds.

Slovenian Foundry Industry in 2021 and 2022

Production of Foundry Industry in tons

The complete foundry production was 188,717 tons in 2021. In comparison with year 2020 this is an increase by 9%. The production of the grey iron in 2021 was 73.236 tons, it was the same in 2020. Ductile iron production in 2021 was 44.315 tons,compared to 2020 it was 11% higher. In 2021 Malleable iron production was 3.100 tons, just like in 2020. 3.808 tons of steel castings were produced in 2021, this is 6% more than in 2020. Copper castings production was 1.005 tons in 2021, 2% more than in 2020. Production of aluminium castings was 52.692 tons in 2021, this is an 18% increase compared to the year before. There was no magnesium production since several years. Zinc production in 2021 was 8.187 tons, it is 9% more than 2020. Other casting production was 2.374 tons.

Production value (in million Euro)

The complete Slovenian casting industry production value in 2021 was 820,086,614 millions Euro, this is 19% more than in 2020. The export in 2021 stands for 82.3%. The iron casting (Grey Iron, Ductile Iron, Malleable Iron, Steel casting) was 132,437,145 Euro. This is a 20.1% increase compared to 2020. Export in 2021 ammounts 78%. Casting of steel was 36,770,177 million Euro, therof was 71.2% was exported. Casting of complete light metals was 585,848,286, it is 17% more than in 2020. The export share in 2021 was 85.7%. Non-ferrous metal castings of 65,012,609 million Euro were produced, it is 36% more than in 2020. Export share of these castings equals 66% in 2021.

Sources:
IMAD - the Institute of Macroeconomic and Development
Chamber of Commerce and Industry of Slovenia, Association of Metals and Nonmetals
Slovenian Foundrymen Society

Figure 1: Slovenian Ferrous Casting Production (volume)

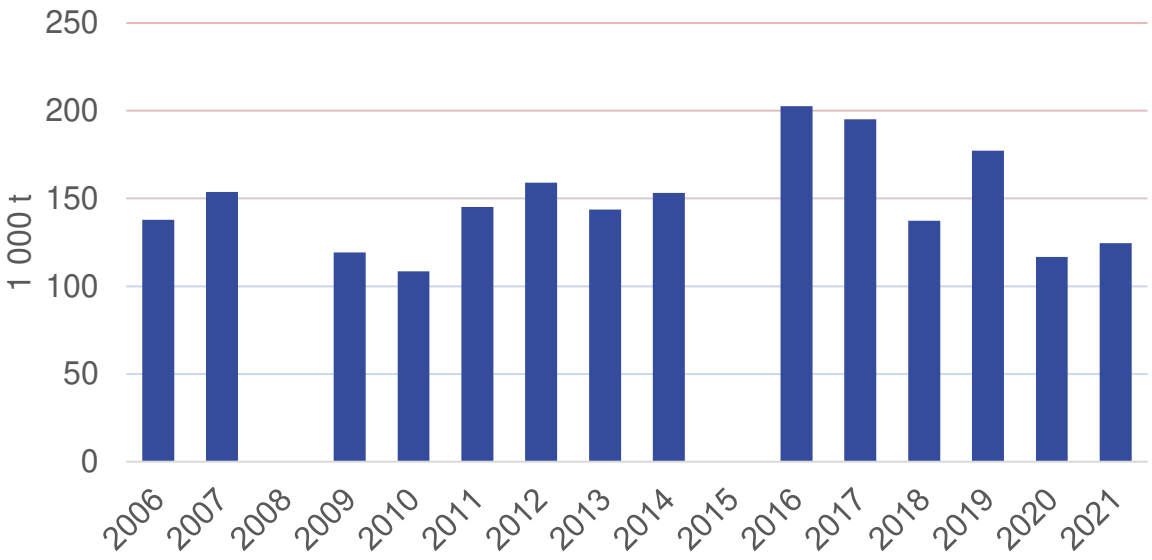
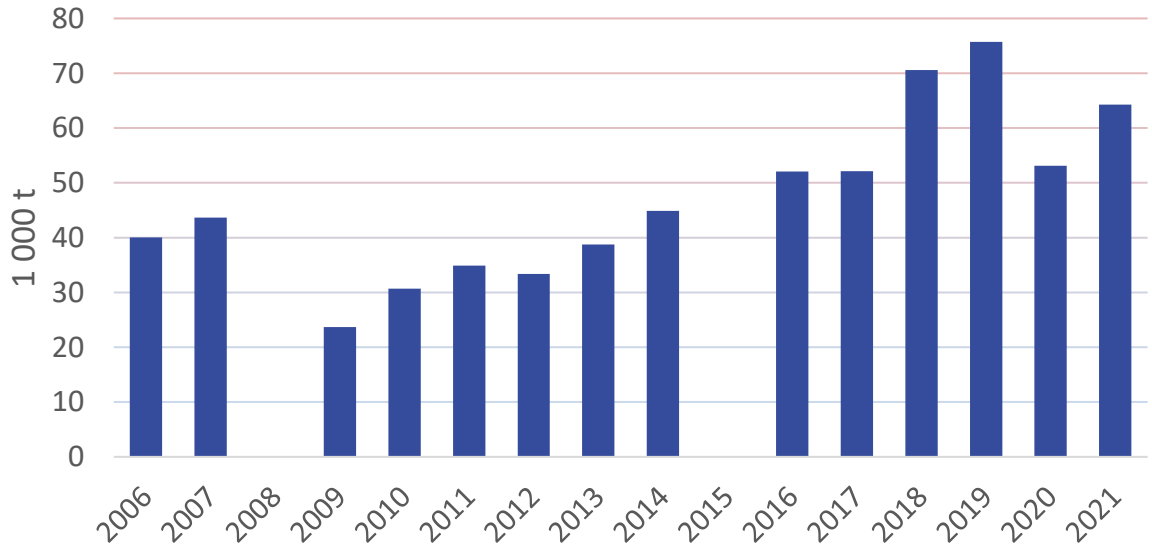


Figure 2: Slovenian Non-Ferrous Casting Production (volume)



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The Economy in General and Industrial and Metal Sector in particular

Spain's Gross Domestic Product (GDP) has increased by +4.5% in 2021 compared to the previous year, and the forecasts for 2022 is to rise +5.4%. The CPI has registered an interannual increase of +6.5%, its highest level in 29 years. The year closed with an average inflation rate of 3.1%.

Before the outbreak of the war, it was expected the GDP to grow by 5.6% in 2022 and 4.4% in 2023. After the outbreak of the war, the CEOE (The Spanish Confederation of Business Organizations) estimates a more moderate growth rate in its economic outlook report (February´s report), placing it at 5.3% in 2022 and 4% for 2023.

The economic sanctions imposed on Russia will have different repercussions, including the impact on the value and volume of Spanish imports, especially from Ukraine, the effect on Spanish investments and tourism revenues, and the increase in the prices of energy products and raw materials, with the consequent impact on the already high inflation.

Industrial Sector

In 2021, the Industrial Production Index (IPI) increased by 7%. Regarding industrial prices, the annual rate of the Industrial Price Index (IPRI) increased by 35.9% in 2021. The Industrial Turnover Index accumulated for the year 2021, recorded a growth rate of +16.3% (-12.2% in 2020).

Metal Situation

Industrial Metal production, measured by the Metal Production Index (IPIMET), closed the year 2021 with a growth rate of 7.4% (in 2020 -14.2%) and turnover increased by 12.7% (decreased by 13% in 2020). On the other hand, the Industrial Price Index of the Metal Industry (IPRIMET) recorded an annual growth rate in January of 13.2%. Exports of the Metal Sector, in the accumulated year 2021 have registered a rate of +15.4%, compared to the rate of -12.8% of the same period of the previous year. As for Metal imports, in 2021 they recorded an increase of 17.2% compared to a rate of -15% in the same period of the previous year.

Labour Market

As data have shown, the mechanisms of employment protection and internal flexibility, such as the RTER (Record of Temporary Employment Regulation), have continued to prove their effectiveness for another year during the pandemic. The figures place the level of employment in Spain at pre-COVID levels. In year-on-year terms, the average number of people affiliated to the Social Security system was 19,824,911, i.e., an increase of 777,478 people, which represents a +4.08% increase in the rate.

Metal Labour Market

An annual average of 766,531 workers was reached, a variation rate of +1.53% with respect to the average of the previous year.

Foundry Sector

In 2021, in global terms, the expectations of the Foundry Sector have not been met. After a 2020 year in which there had been a 17% drop in tons produced, in 2021 an increase in production of +6.89% is recorded; +7.59% for iron casting, +5.99% for steel casting and +2.49% for non-ferrous casting.

In general, markets have behaved better in the first half, with a significant drop in the second half, especially in the automotive sector, the main customer of the foundry sector, which represents 57% of the Sector's sales. Approximately 28% of companies have had RTER (ERTEs), as well as other measures to adjust the workforce.

Although there is still tremendous uncertainty about how the key markets for the foundry industry will perform, we believe that the markets will evolve upside in 2022.

Sector Situation Report elaborated by FEAF as of September 30th, 2021, showed the following scenario.

Comparing data of the common enterprises, 2020 vs 2021, the occupancy rate decreased from 73% to 71%. The order book, from January to September 2021, it has been increased from 85 to 94 days. During 2021 the overall employment has decreased by -2.74% and prospects for the first half of 2022 are to increase one point (+1.10% in June 2022).

In September 2020, the 68% of the foundries declared that they had had an RTER, while only the 28% have done so in 2021.

Iron Casting Section. Automotive Casting

In terms of production there have been a bit of everything. For some foundries, 2021 has been better than 2020, for others however, 2021 has been worse than 2020. There have been foundries with low volumes with stoppages. There are changes of parts, looks like the powertrain parts are going to disappear in the future. Regarding the truck subsector, it has performed well during 2021. There has been an inflation never seen in history. In general, the 2022 year is expected to be better than 2021.

Iron Casting Section. Manual Molding

2021 has been a year with lot of work. The stamping sector has performed good, except the internal market. The Machine Tool sector has had the same trend, it has had a lot of work during 2021. Meantime, the Wind Sector has performed reasonably well. In general, a 2022 with a good workload is expected.

Iron Casting Section. Mechanical Molding

The Automotive has gone bad during 2021. At the end of 2021 was very weak too. Regarding the Industrial engineering, in general, it has been strong and with work during 2021. The sewage sector has been fine too. Almost all sectors have grown during 2021 and at the end of 2021 there was work.

Stainless Steel

The end of 2020 was acceptable regarding load. However, September and October 2021 foundries had stops. Medium long series has performed better than the short one. The mining, offshore and rail sectors

have been doing well during 2021. In the same sense, Chemical and Naval Industry sectors have been very strong. Those sectors have saved the year. All raw materials have risen and continue growing.

Steel Castings. Carbon and alloy steels

During the year there have been projects in Oil & Gas sector. Additionally, the food and hydro sectors have been doing well too. There is uncertainty for 2022.

Non-Ferrous

Aluminium foundries have produced more than in 2020, there has been an increase of +4.8% regarding production volume. For the Zamak an increase of +9.16% is recorded. An increase in investments is expected for 2022.

Raw Materials prices and Auxiliaries in 2021

Scrap prices ended 2021 with prices higher than those at the end of the previous year. If we compare the scrap prices of the year 2020 with the ones of the 2021, on average, the scrap has had a growth of +53,15%.

Pig iron ingot prices have evolved upwards too, being at the end of 2021 well above than those of December a year earlier, and +48.68% on average of the year. In the case of nodular iron, the price was increased from December 2020 to December 2021 too, a rise of +41.45% was recorded, which means +50.26% on average of the year 2021.

It must be highlighted the high upward trend in all ferroalloys too (average 2021 vs 2020): FeSi Stone: +95.15%, FeSiMg (5-7%): 35.75%, FeMn Stone (6-8%): +38.42%, FeCr (0.05% C): +35.43%, FeMo: +64.54%.

Energy

Unfortunately, during the second semester of 2021, the increases in the prices of raw materials and the high energy costs have continued unstoppable. During 2021 FEAF have continuously showed its extreme concern about the market situation and the costs that companies were bearing, specifically the electricity and gas. At the end of 2021 the situation of most companies in the Foundry Sector was critical, endangering the competitiveness and continuity of the companies. On average, energy costs account for more than 10% of the total costs of FEAF´s companies, so bearing these price increases is clearly unsustainable.

From FEAF we are continuously working to try to advise and help all associated companies in energy management.

Figure 1: Spanish Ferrous Casting Production (volume)

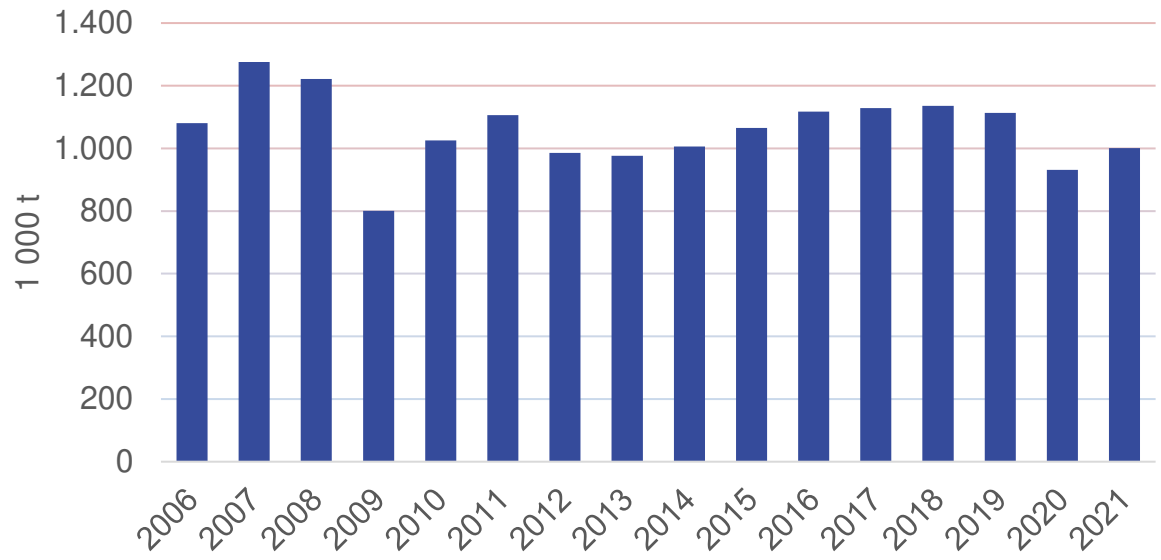
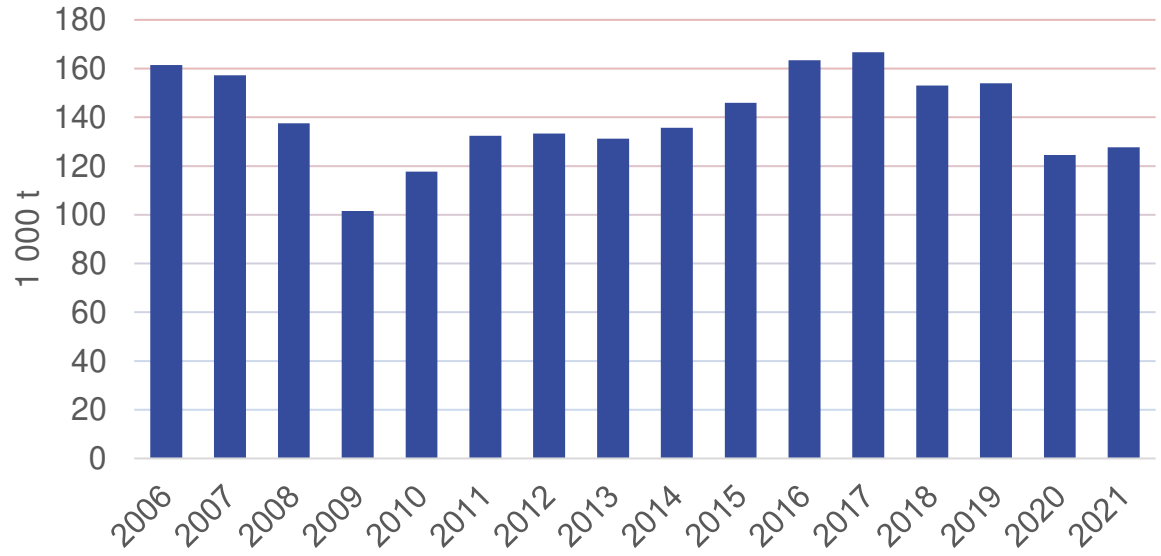


Figure 2: Spanish Non-Ferrous Casting Production (volume)



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Economic situation and main indicators for 2021

2021 was marked by the recovery after the corona pandemic and the Swedish GDP grew by 5.1 percent. Most forecasts predict a more normal growth of around 2.5 percent in 2022. The unemployment rate in Sweden was at the end of the year 8,8 percent.

The Swedish industry has in general had a year with an overall good recovery from the lower production levels during the pandemic.

General casting industrial structure

The number of foundries in Sweden remains stable. This means that during 2021 we still had just less than 100 foundries; 25 iron foundries, 11 steel foundries and some 60 metal foundries, mainly aluminum. During the year there has been no bankruptcies or reconstructions. As usual the customer side is dominated by the automotive sector, and nearly 70% of the total production end up in the transportation sector as components in trucks, light vehicles, and construction equipment.

The transportation sector started 2021 with a strong recovery in the economy after a tough 2020. This gave a boost to new registrations, which sharply increased during the first half of the year. Compared to 2019, which could be considered a normal year, 2021 registrations of passenger cars and light trucks were significantly lower. During 2021 the pandemic continued to affect the industry. Most significant was the lack of components including semiconductors, which resulted in major disruptions in production with an impact on both the number of vehicles and delivery times. Normally it is the size of demand that controls how much is produced, but in 2021, the number of produced vehicles was highly controlled by the supply of components.

The total foundry production has increased during 2021 compared to 2020 and the Swedish foundry industry has in general had a good year with high order stocks and several companies hitting records. Even though the increase of production the Swedish foundry industry is not back at the production levels that were seen before the pandemic. The production rates of 2019 were however not sustainable in the long run and to be able to sustain that level of production large investments must be made.

During the past couple of years both Scania and Volvo Trucks have made large investments in Sweden with a new foundry respectively a new production line. During 2021 Volvo Cars informed about a large investment in a new aluminum foundry that are to produce mega castings for Volvo Cars.

The past year the Swedish foundry industry also had several challenges. Being an energy intensive industry, the Swedish foundries have been impacted by the high energy prices. There have also been problems with increasing raw material prices and limited supply of raw material.

Future challenges for the Swedish foundries are the previously mentioned energy prices, the supply of raw materials and skilled workers in all levels. Furthermore, the upcoming SF-BREF and the renewed Industrial Emissions Directive (IED) could have a large impact on the industry, not only in Sweden but throughout Europe.

Figure 1: Swedish Ferrous Casting Production (volume)

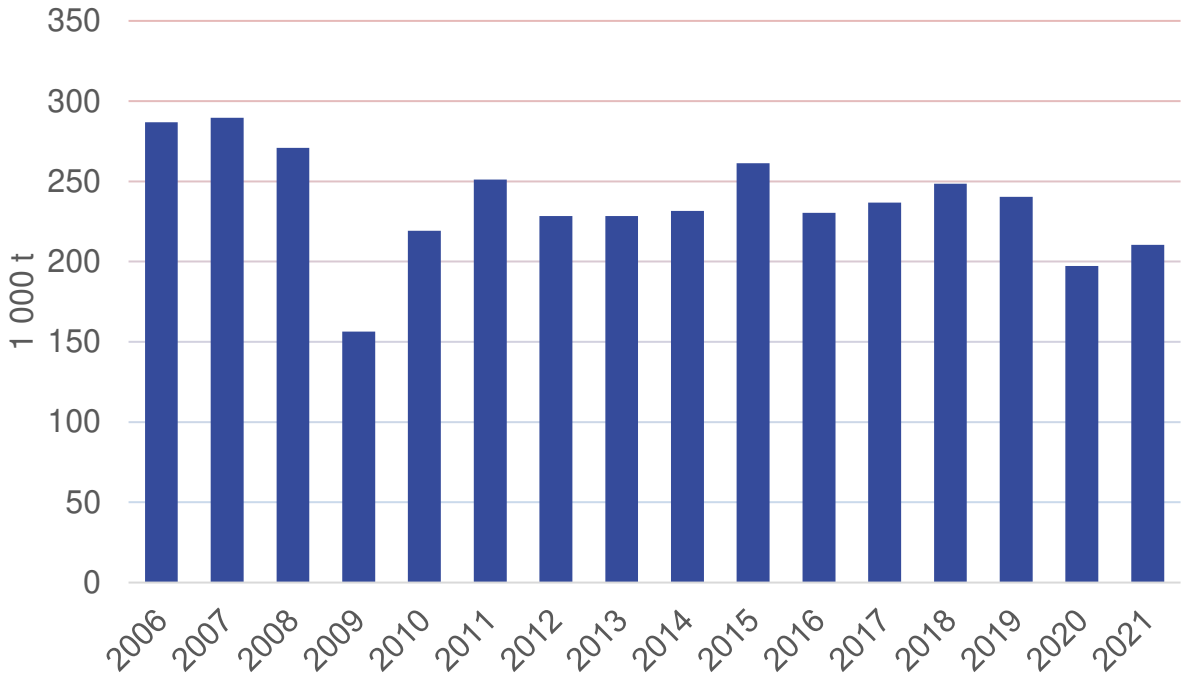
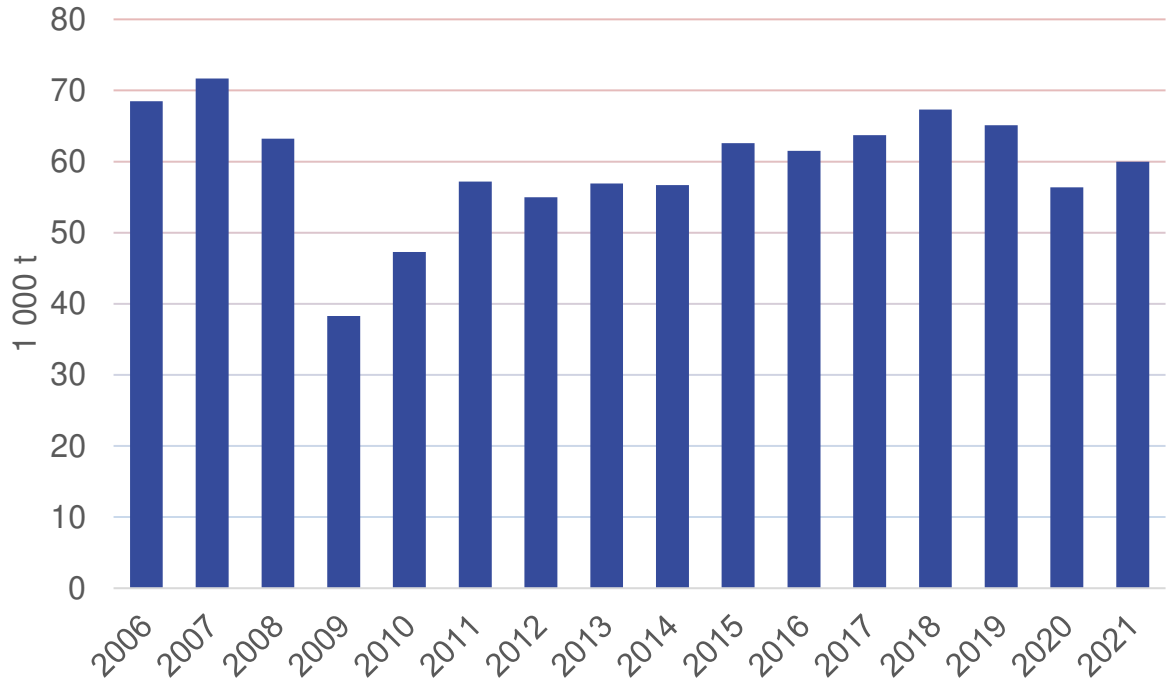


Figure 2: Swedish Non-Ferrous Casting Production (volume)



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Situation of Foundry Industry

The rapid economic recovery in practically every user market enabled good utilisation of production capacity for the Swiss foundry industry in 2021 – with increasing momentum. A positive development trend on a comparable level is expected for this year.

The highly innovative Swiss foundry industry that is eager to invest recovered manifestly in 2021 from the losses sustained in the previous year owing to the pandemic. According to the earnings figures of the Swiss Foundry Association (SFA), in which 46 companies with about 2,000 employees are amalgamated, production in light metal casting was up 15.5 per cent, in cast iron up 6.2 per cent and in copper alloys up 11.1 per cent. Compared to 2020, across all materials total production volume rose by 9.2 per cent to 38,767 tonnages delivered.

In every traditional user market, last year there was high demand for cast parts “made in Switzerland” again. Only demand from the stagnating large engine sector, including for shipbuilding, still remained low. However, as a consequence of the rapid economic revival there was further worsening of the shortage of skilled workers in the practically dried-up labour market. Because of the lack of staff resources, some foundries for instance were unable to meet the demand for shorter delivery times.

In the course of the year, orders from the automotive sector floundered owing to the chip shortage at vehicle manufacturers. Only in the premium car sector did demand remain constantly high. Increasingly the Swiss foundry industry faced major challenges through the spiralling raw material, transport and energy prices as well as the scarcity of raw materials. For instance, the high-quality “punching waste” type of scrap became a scarce commodity because of the reduced production in the automobile industry. With its stoppage of magnesium production, China triggered off a global shortage in this metal that is so important for the foundries.

At present, order books are good to very good for most member firms. However, 2022 carries many uncertainties. The drastic increases in raw material and energy prices are making longer-term planning difficult and necessitating extremely flexible business practice.

Member companies everywhere are making huge efforts to raise productivity and save energy. That alone is not enough, though, to be able to offset or absorb the mushrooming energy and material costs. We are also reliant on the understanding of our customers, to whom we, plausibly with reason, have to pass on the extra costs in the form on increased prices.

The continued huge lack of skilled workers is also a strain on the sector, which is currently still having to cope with absences due to the Coronavirus. The course of the pandemic and the currently very difficult economic circumstances are external factors that will co-influence how the Swiss foundry industry will develop economically. The SFA is expecting 2022 to have an economic trend on a level comparable with the previous year.

Figure 1: Swiss Ferrous Casting Production (volume)

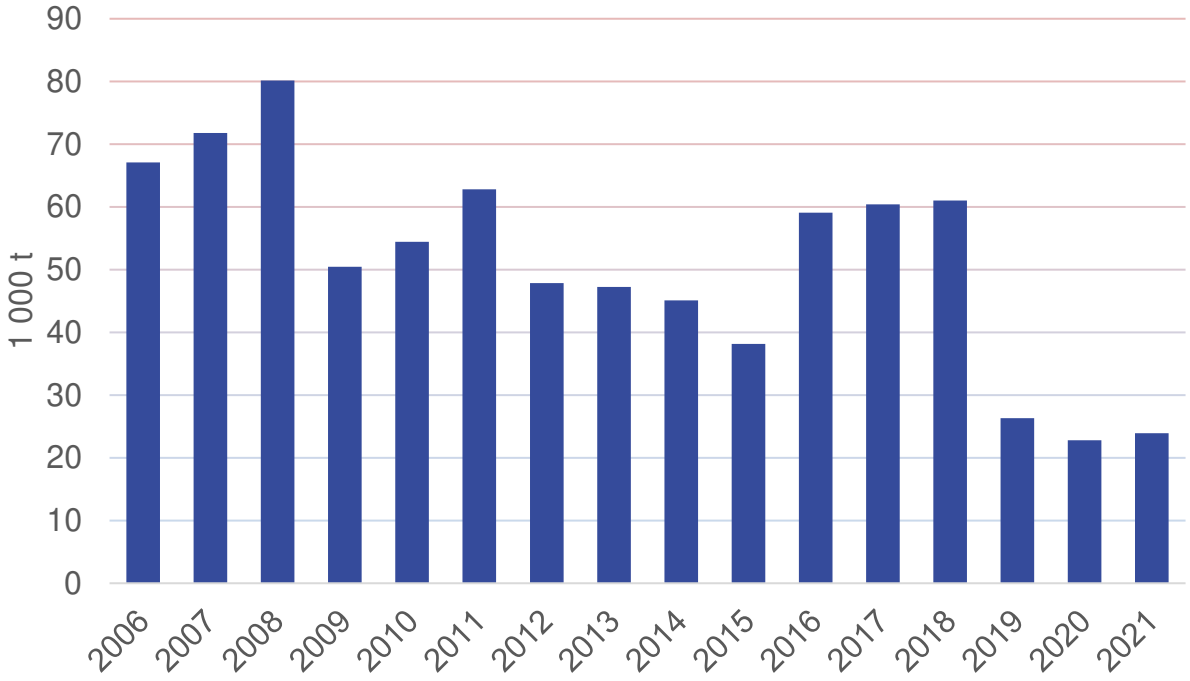
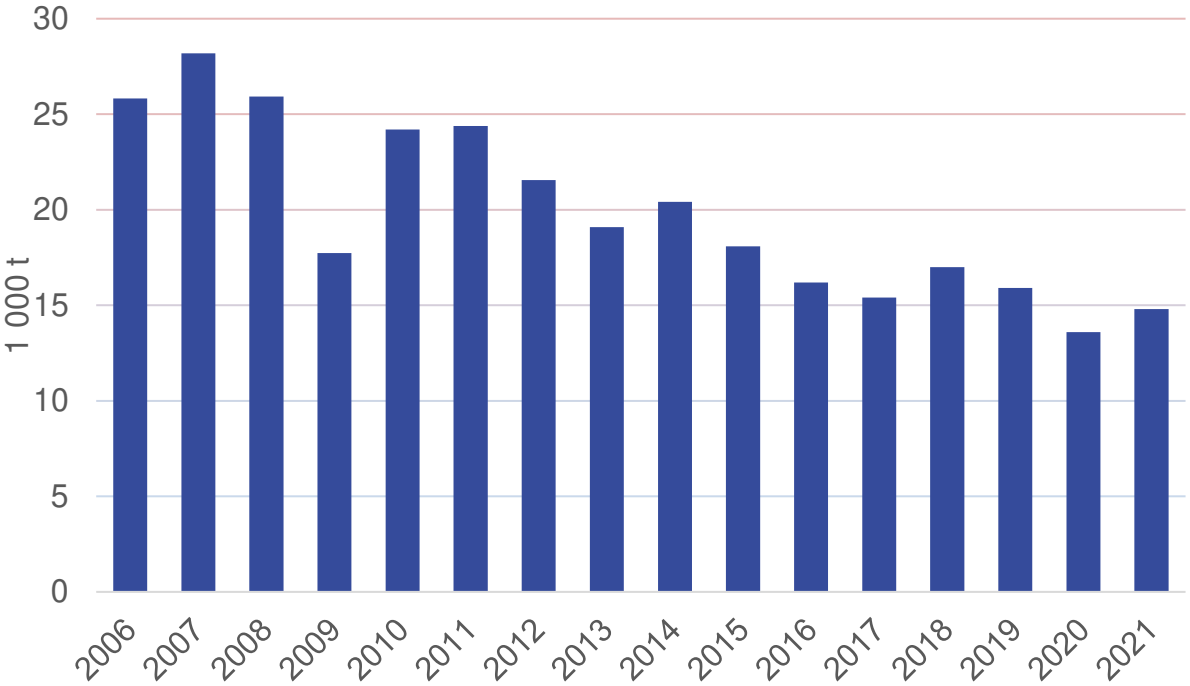


Figure 2: Swiss Non-Ferrous Casting Production (volume)



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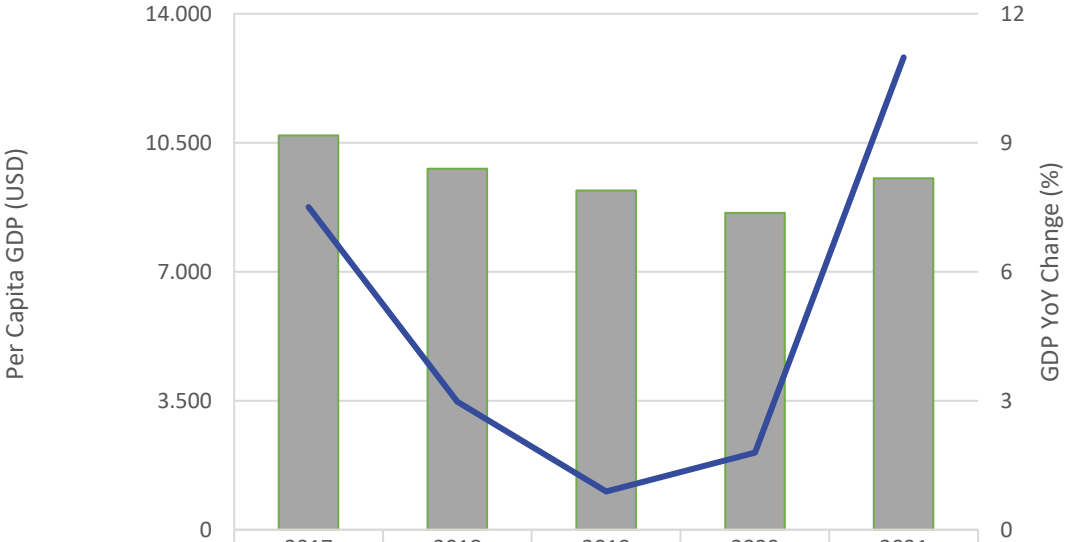
Macroeconomic Developments

After the weak growth performance in 2019 due to the exchange rate crisis in the second half of 2018, the recovery process of the Turkish economy was hit by the pandemic. However, Turkey was among the few countries with positive growth performance in 2020 (at 1,8%).

The growth accelerated to the highest rate among G20 countries in 2021 (at 11%) as COVID-19-related measures were gradually relaxed and monetary policies were loosened. The high domestic demand was driven by bringing forward some consumption expenditures in fear of continued price rises. The buoyant external demand was supported by sharp nominal depreciation of the local currency, and global supply chain disruptions (Figure 1).

Figure 1: Gross Domestic Product and Gross Domestic Product Per Capita



	2017	2018	2019	2020	2021
GDP Per Capita (USD)	10.696	9.793	9.208	8.597	9.539
GDP YoY (%)	7,5	3,0	0,9	1,8	11,0

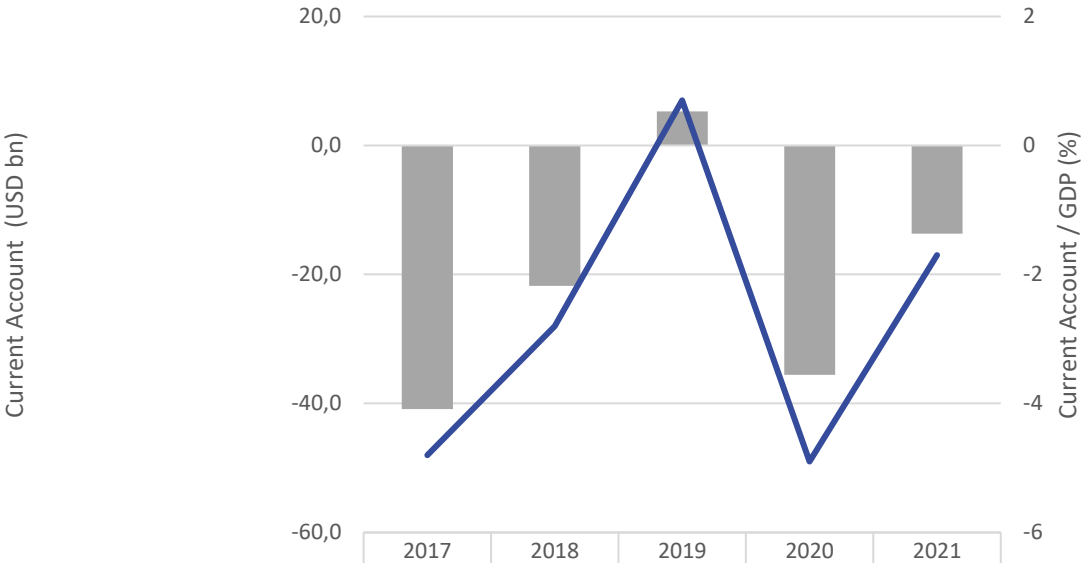
[1] The figures for 2021 are the sum of four quarters; subject to be revised when the annual figures will be published.
[2] GDP Per Capita calculation is based on the mid-year populations taken from the annual results of the Address Based Population Registration System.
[3] GDP YoY is calculated by the production approach in chain-linked volume percentage change [2009=100].
Source: Turkish Statistical Institute

However, the monetary stimulus also caused deteriorating macro-financial conditions. The lira depreciated to record lows, reaching a peak of 18,00 to the U.S. dollar in December 2021. As the depreciation raised foreign exchange–denominated debt service costs and public-private partnership outlays, the Government provided capital injections to shore up the balance sheets of energy-related state-owned enterprises and state-owned banks which caused an expansion in the central government budget deficit by 9,7% year-on-year. On the positive side, thanks to strong export growth, the current account deficit narrowed to 1,7% of GDP in 2021 from 4,9% in 2020 (Figure 2).

Manufacturing PMI stayed above the 50-threshold in 2021, except for May. On the other hand, rapid increases in input costs and final product prices came to the fore in the second half of the year.

The real sector confident index remained above the neutral 100-threshold that separates optimism from pessimism throughout the year. Though the confidence eased at the close of the fourth quarter, due to more pessimistic views on order books and stocks of finished goods (Figure 3).

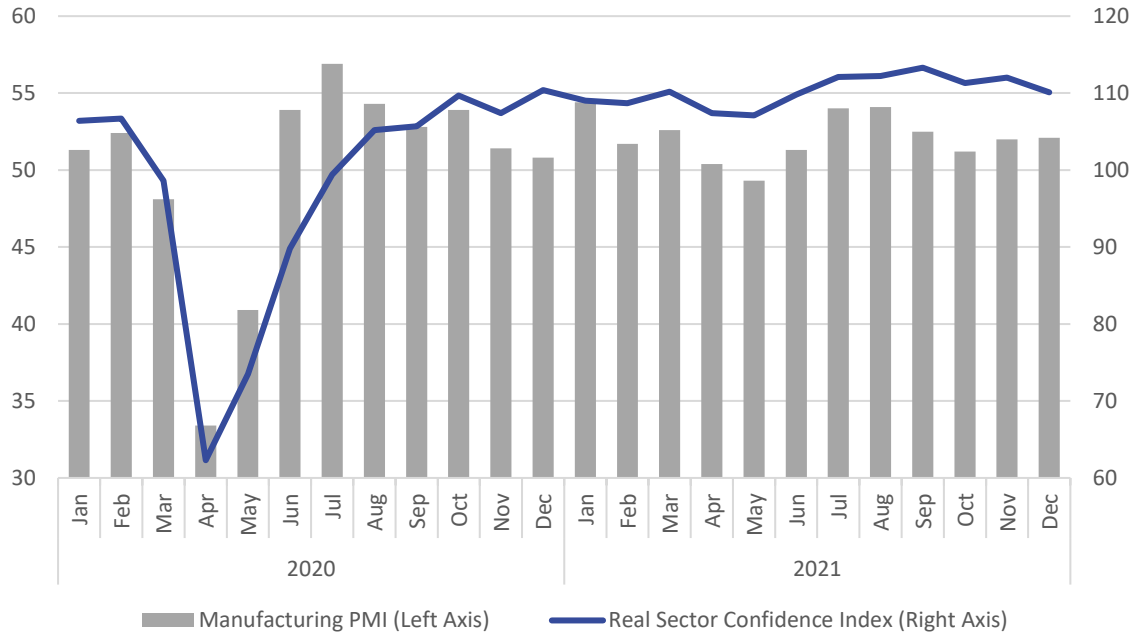
Figure 2: Current Account Balance



	2017	2018	2019	2020	2021
Current account (USD bn) [1]	-40,9	-21,7	5,3	-35,5	-13,7
Current account balance (%)	-4,8	-2,8	0,7	-4,9	-1,7

Source: Central Bank of the Turkish Republic of Turkey

Figure 3: Manufacturing Purchasing Managers' Index vs. Real Sector Confidence Index



[1] Real sector confidence indices are seasonally adjusted.
Source: Turkish Statistical Institute; Central Bank of the Republic of Turkey; Istanbul Chamber of Industry; IHS Markit

Total employment and labor force participation surpassed pre-pandemic levels in 2021. The recovery was faster for women than men. Between December 2020 and December 2021, female labor force participation (FLFP) increased by 14% compared to 6% for males, although Turkey's FLFP still remained the lowest among OECD countries. Youth employment also recovered, but 20,1% of youth were still unemployed at the end of the year.

The annual CPI inflation reached the highest level in the last 19 years with 36,1% at the end of 2021. Annual D-PPI also recorded its highest annual increase since February 2002 with 79,9% in this period.

The Situation In The Major Casting Customer Industries

In 2021, total motor vehicle production decreased by 2%, and passenger car production decreased by 8% compared to the previous year. The total production was 1.276.140 units, while passenger car production was at the level of 782.835 units.

In the commercial vehicle group, production increased by 11% in 2021, while it increased by 40% in the heavy commercial vehicle group and 9% in the light commercial vehicle group. Compared to the January - December period in 2020, the commercial vehicle market increased by 13%, the light commercial vehicle market by 8%, and the heavy commercial vehicle market by 51%. Tractor production increased by 46% to 55.503 units in 2021.

Turkey's total exports, including exports from Free Trade Zones, increased by 33% in 2021, compared to the previous year, reaching USD 225 billion. Total exports, excluding Free Trade Zones, were USD 206 billion. In 2021, machinery exports reached up to USD 21 billion, showing an increase of 18,3% and 23,3% compared to 2019 and 2020, respectively. Together with the Free Trade Zones, machinery exports reached USD 23 billion.
The rate of increases in exports to Germany, the USA, and the United Kingdom, which are Turkey's top 3 trading partner countries for exports were calculated as 19,7%, 3,4%, and 20,9%, respectively.

The export volume increased by nearly 62% in turbine, turbojet, and hydraulic systems; 23,3% in internal combustion engines and parts. While paper and printing machinery exports jumped around 35%, bearing exports increased by 31,5%. Pump and compressor exports saw an increase of 23,3% in 2021.

According to the construction permits given by municipalities, the number of buildings and dwelling units, and floor area of buildings increased by 42,2%, 27,8%, and 32,3%, respectively in 2021. The annual production and domestic sales of the cement industry rose by 9,2% and 8,2%, respectively. Cement export also grew by 9,1%.

In 2021, Turkey's steel industry output was 40,4 million tons with an increase of 12,7%. According to 2021 figures, Turkey's main export region was the European Union with 7,4 million tons, making 31% of Turkey's total steel exports.

The installed capacity in electricity production increased by 4% in 2021, where the driving force was the investments in renewable energy resources.

Production in the white goods sector recorded an increase of 17% in 2021; with a strong increase of 18% in the export volume.

Developments In the Foundry Industry

Industry Overview

According to the "55th World Casting Statistics", which includes the 2020 data and published in December 2021, the Turkish Metal Casting Industry maintained its position as the 9th largest casting producer in the world and 2nd in Europe. Although 2021 was another year dominated by Covid-19, it started with a historical increase in the incoming orders.

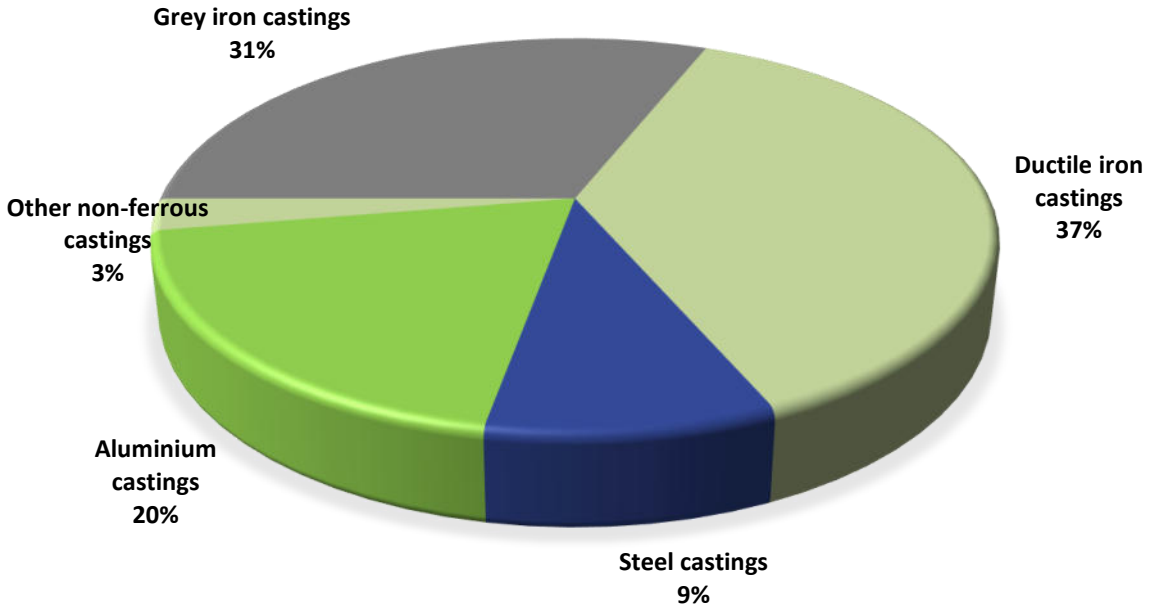
The tendency of European OEMs to supply products from geographies closer than the Far East and the tendency of some foundries in closer geographies to stop or reduce their activities as a result of financial difficulties played an important role in this acceleration. The great increase in industrial production during the second half of 2020 and the partial disruption of intercontinental logistics processes due to high freight prices provide Turkey with a more robust position in the metal casting sector.

In addition to expanding trade volumes with the European Union and the United States, the growth in commercial activities with neighboring countries and the high domestic demand made a strong contribution to the total casting production by ensuring that almost all of the casting buyer sectors had a strong recovery period. The capacity utilization level of the Turkish metal casting industry, which was 68% in 2020, exceeded 73% in 2021 and the total production increased by 36,5% and reached the all-time-high level of 2,96 million tons.

The growth was mainly due to ferrous castings. Production volume jumped by nearly 39%, exceeding 2,3 million tons which have been around 1,7 million tons in recent years. Capacity utilization for ferrous foundries was realized at 75% in 2021, which had dropped to 59% in 2020.

Non-ferrous foundries reported a 29% increase in the production volume and the total output was recorded as 656 thousand tons, while the capacity utilization dropped by 3 points to 60%.

Figure 4: Casting Production Distribution (2021)

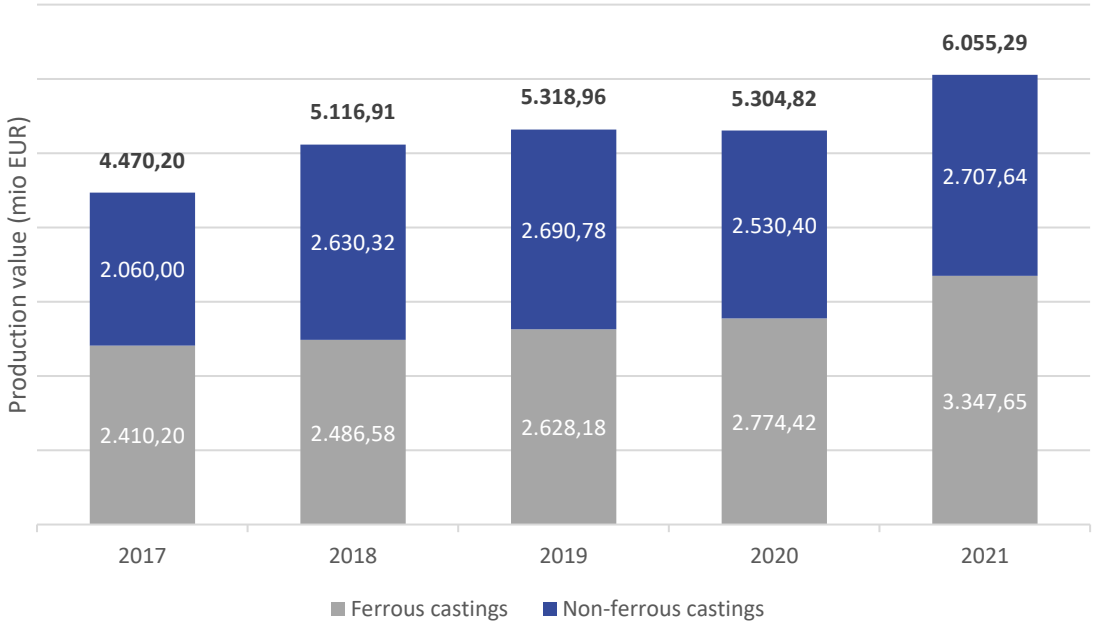


Source: TUDOKSAD – Turkish Foundry Association

The share of ferrous castings was up from 76,7% to 77,9% in 2021, compared to the previous year (Figure 5).

The robust production volume growth was not followed by the total value of metal castings. It was realized as EUR 6,06 billion, which rose 14% as compared to the previous year, indicating a 16% drop in the average unit production value of all metal castings (Figure 6).

Figure 5: Production Value of Metal Castings



Source: TUDOKSAD – Turkish Foundry Association

On the other hand, export volume grew larger than the production volume. It stepped up to around 2 million tons, increasing by 43,4%, which is another all-time-high for the industry.

Investments

While the industry increased equipment and technology investments during the year, some companies operating in other branches started to establish their own casting lines as well. It is noted that approximately 50 percent of the investments made are for capacity increase and that a total of more than 20 new production lines were ordered in Turkey in 2021, which will result in a considerable capacity increase in the following years based on their assembly plan.

The Situation in the Material Sectors

Iron Castings

The grey iron castings production increased nearly by 50% compared to 2020, realized at 920.694 tons, whilst nodular iron castings production recorded a 30% increase to 1.108.078 tons. Robust foreign demand maintained the key role which points out the increasing shifts in incoming orders and supply chain networks due to the pandemic.

The export ratio of grey iron castings remained stable at 47% in 2021; however, the export volume of nodular castings increased by 16% and the export ratio rose to 77%.
Increased installed capacity, due to production line investments in the sector in recent years, plays a major role in meeting the foreign demand that has been increasing explicitly for the last 2 years. While the production capacity allocated to ductile iron continues to attract attention, an increase of 35% was recorded on a rate basis. Grey cast iron capacity, on the other hand, increased by only 8%.

Steel Castings

In 2021, the capacity utilization in steel castings reached healthier levels again, realizing at nearly 78% on average and the production volume showed an extensive upward trend of more than 45%, resulting in 279.254 tons. Together with the increasing demand in a balanced way on the both domestic and foreign basis from the railway, iron-steel and general machinery, the recovery in mining and energy industries were the main factors of the growth. Yet the export ratio dropped 3 points from 62% to 59%, and the total production value increased only by 7,5%.

Aluminum Castings

The interrupted upward trend in the die casting production in 2020 due to the restrictions caused by the pandemic and the following downtimes in the main industries recorded a significant recovery in 2021.
Investments and capacity increases in the low-pressure die casting, in particular, played an important role, while high-pressure die casting facilities tried to maintain their positions.

As a result of wheel production, which recorded a 66% increase in production in 2021, an increase of 29% was recorded in the total aluminum castings production volume which reached 578.thousand tons. The export rate for aluminum castings remained at the level of around 80%, which increased by less than 2%. On the other hand, high-pressure die casting increased their export capacity by 13%. The capacity utilization rate dropped 6 points to 58% due to increased investments and installed capacity.

Other Non-ferrous Castings

The performance of other non-ferrous foundries was better than the aluminum foundries. 77.380 tons in 2021 was 35,1% higher than the total production in the previous year. The growth in zinc alloy castings exceeded 35% in line with the increasing demand from general machinery and white goods industries.

Similarly, castings from copper alloys showed an increase of 34% thanks to the advances in the construction and general engineering industries. The export volume remained stable at around 55% and capacity utilization jumped 14 points to 75%.

Cost Development

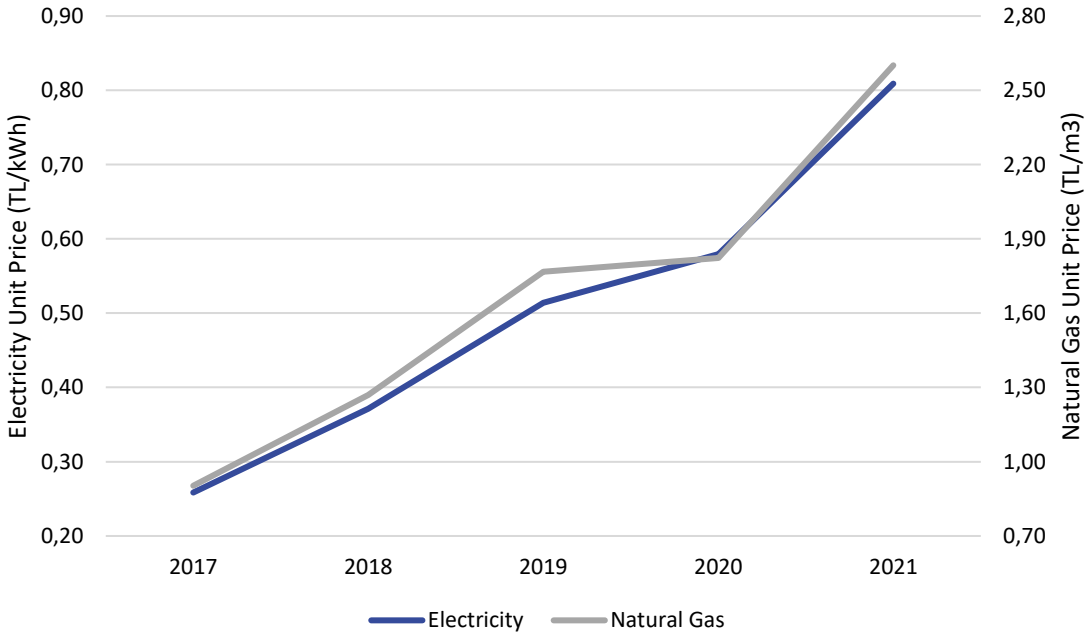
Apart from ongoing currency fluctuations which highly affected the manufacturing costs of foundries due to the import of raw materials, global price increases in Ferroalloys especially in the second half of 2021 were critical. The situation in foreign currencies in 2021 was similar to or worse than the one in 2020. The annual TL/USD and TL/EUR year-on-year exchange rate changes were 26% and 30%, respectively. According to the Turkish Statistical Institute, the domestic PPI year-on-year change for the metal casting industry in 2021 was 50%.

Energy

Both energy and gas prices in industrial consumption have been increasing sharply since 2017. In comparison with the previous year, the electricity and natural gas market prices for industrial facilities were up 39,6% and 42,7%, respectively (Figure 7).

In parallel with the increases in electricity and natural gas prices, foundries reported a 95,8% increase in total energy costs. It was more explicit in steel and non-ferrous foundries, which exceeded 100% and realized as 105% and 113%, respectively.

Figure 6: Electricity and Natural Gas Prices



Source: Turkish Statistical Institute

Raw Materials

The constant increase in raw material prices over the recent years accelerated sharply in 2021. Foundries reported stunning increases in each raw material group; basic pig, hematite pig iron, and nodular pig, at 98%, 105%, 104%, and 104%, respectively.

Labor

According to the Turkish Statistical Institute, the hourly labor cost index in the manufacturing industry was 20,1% above the previous year's figure. On the other hand, the industry has been suffering from a lack of manpower at different levels, despite the high unemployment and youth unemployment rates (12% and 22,6% respectively), thus average payroll costs are higher than the country averages. Foundries reported their labor costs grew by 51% compared to the previous year.

Figure 7: Turkish Ferrous Casting Production (volume)

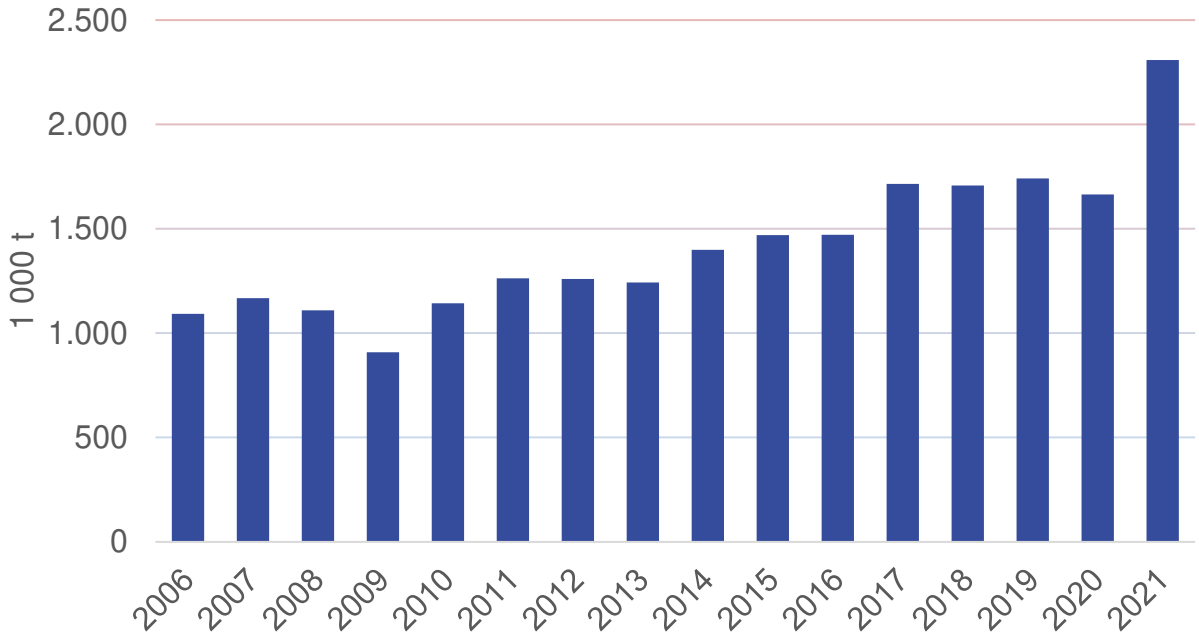
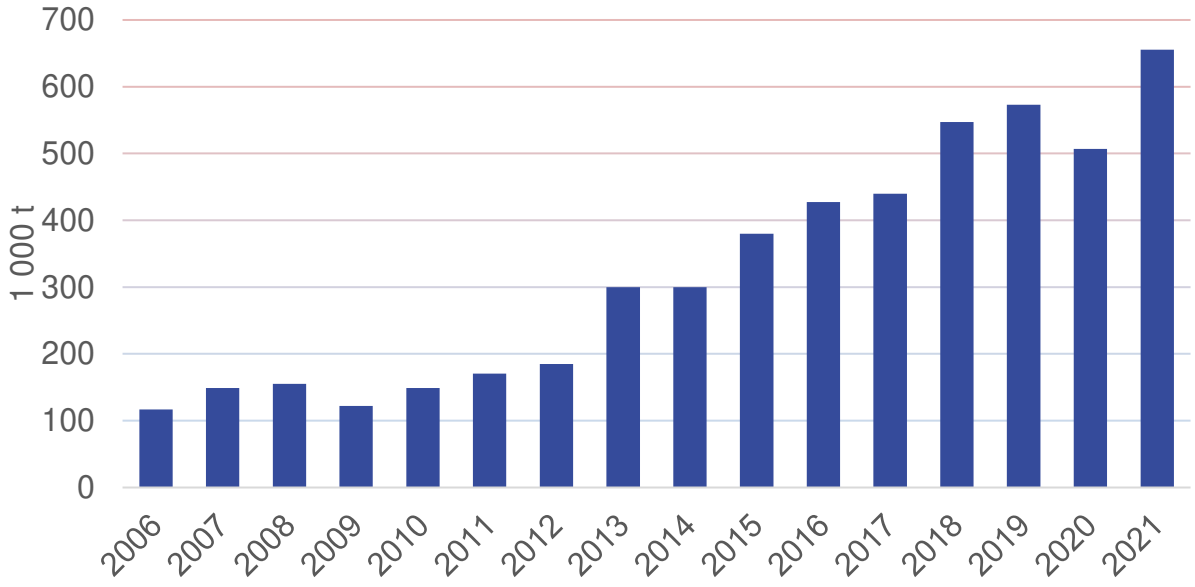


Figure 8: Turkish Non-Ferrous Casting Production (volume)



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Economic Situation

The gross domestic product of the United Kingdom in 2021 was just under 2.2 trillion British pounds. This represented an increase of approximately 152.3 billion pounds compared with 2020, at which point the size of the UK economy was 2.04 trillion pounds[1].

The UK economy experienced a severe economic shock in 2020 as it was also one of the worst-affected countries by the Covid-19 pandemic producing a record 18.4% fall in monthly GDP in April 2020. Although growth returned in May and reached a record growth rate of 9.2% in June, the UK economy at this point was still 15% smaller when compared with pre-pandemic levels. Another wave of the virus gripped the UK throughout the winter, resulting in the reintroduction of some restrictions that had earlier been lifted in the summer months.

A further sudden and extensive lockdown that began at the end of March 2021 forced the closure of significant parts of the UK economy. Production grew by 1.8% in March 2021 with growth in three out of the four sub-sectors. This is the fastest growth in production since July 2020, when it grew 5.6%. The economy continued to grow throughout 2021 but with mixed success depending for individual sectors. Manufacturing continued to steadily grow but the service sector struggled until the latter part of the year when the job support scheme unwound in September and more people returned to working either from the office or via hybrid activity.

GDP growth slowed again with a growth rate of -2.5% reported in January 2022. As the UK emerged from this slump, positive growth returned, and as of early 2022, the UK economy was around the same size as it was prior to the pandemic in February 2019. Annual GDP growth for the period 2022 - 2024 is forecast to be slower however, with a GDP growth forecast of 3.9% in 2022, 1.8% in 2023, and a predicted 2.1% for 2024[2] [3] [4].

In terms of the UK economy, UK manufacturing currently [3]:

- employs 2.5 million people – earning an average of £35,277
- contributes (roughly) 11% of GVA
- goods account for £183bn of output
- goods account for 51% of total exports
- represents 64% of business research and development (R&D)
- provides 15% of business investment.
- Total business investment by manufacturing is £31 billion in real terms in 2020

Political Uncertainty and the Pandemic: Effects on Manufacturing

The United Kingdom, like many other countries in the European Union, has faced a number of challenges as a result of the global pandemic, including but not limited to, supply chain disruption (both home and abroad) and labour shortages, in addition to rising costs due to supply and demand levels changing unevenly throughout the pandemic period.

The UK economy and the manufacturing base has also had to evaluate and learn to work with transformative challenges such as the resetting of the UK's trading relationships with the EU and wider global marketplace, as well as transitioning towards a net-zero future. Pledges made at COP26 and numerous delays on changes to environmental legislation have placed stresses onto manufacturers as

they have had to try to forecast what policies would be forthcoming from the UK Government and devolved administrations, to plans for future investments.

While investment is still taking place, businesses are starting to have to make repayments of business loans offered by the UK Government during the pandemic. This is likely to restrict future investment levels, particularly for small and medium sized businesses, unless they are operating in niche areas with high gross value-added products.

Business levels did return to higher levels than in 2020 during 2021, but for many sectors these remained well below pre-pandemic levels due to global supply chain problems. Shipping costs and delays also contributed to stress on manufacturers. The problems were caused by one of the world's largest container ships becoming stuck in the Suez Canal for six days in April, which resulted in hundreds of other vessels needing to take a much longer route, combined with shipping containers being out of place around the world with countries being in various states of lockdown and recovery.

Automotive and aerospace producers were significantly affected compared with other manufacturing sectors. With the loss of skilled labour from many markets and less EU and overseas workers in the UK, labour shortages remained a significant burden to UK businesses.

Productivity

UK gross domestic product (GDP) had returned close to where it was pre-coronavirus (0.1% below) by the end of 2021. As a result, GDP in 2021 had increased by 7.4% following a 9.3% decline in 2020 at the height of the pandemic [4]. This increase in GDP was the single largest annual increase since the second world war, according to the Bank of England.

Nominal UK GDP rose circa 3.0% on Q4 2021 and stands at a figure of 5.9% above the Q4 2019 figures, revised upwards from 1.5%.

Figure 1: Quarterly Real GDP growth (by Index, 2019 Q4 = 100)



Source: Office for National Statistics UK

The coronavirus pandemic led to a higher volatility in the output per hour worked estimates in all G7 countries, with a variation in spread. Factors which are most likely to have influenced output included differing policies and strategies to lockdowns and other constraints during the pandemic, vaccination rates across countries, differences in structured economics and the locations where people were working (home, office, retail or manufacturing facility), but there may also be other individual factors within each country.

Worked hours in the UK fell faster than the fall in output, which led to an increase in output per hour worked. This was a result of the industries most affected being those with naturally lower levels of productivity. This is also reflected in other G7 countries to a greater or lesser extent, for example Canada and the USA did not operate a furlough scheme such as the UK undertook so, as a consequence, saw larger declines in employment and hours worked.

With all countries still at various stages of recovery from the pandemic and in some countries, including the UK, changes made to how information on output per hour, per employee and other metrics, and with further revisions still being made, it is believed that a better understanding of the productivity per nation and per employee etc. will not be clearer until the end of 2022.

A word of caution must be added, as headline GDP figures across countries are not 100% comparable. The UK, for example, takes a different approach to others when calculating output in sectors such as education and health, which resulted in the UK GDP figure being lower than those for other G7 countries in 2020, but higher in 2021 as the effect unwound.

In the latter stages of 2019, the UK Office for National Statistics stated that it was starting to review the OECD report from 2018 together with subsequent reports, to establish if the UK needed to adjust the way the national body reports data to bring it in line with other nations. To date, it is not known whether the results of this work have been fully completed or if the changes are still underway, potentially with plans for further revisions as a result of the pandemic and other factors.

The UK Government is still to address many of the actions proposed for its “levelling up” campaign, one of the cornerstones of the Conservative Party’s pledges in the 2019 election manifesto, due to the effect of the pandemic, with work in many areas having only just started before the Omicron variant put pressure on this recovery programme.

Employment

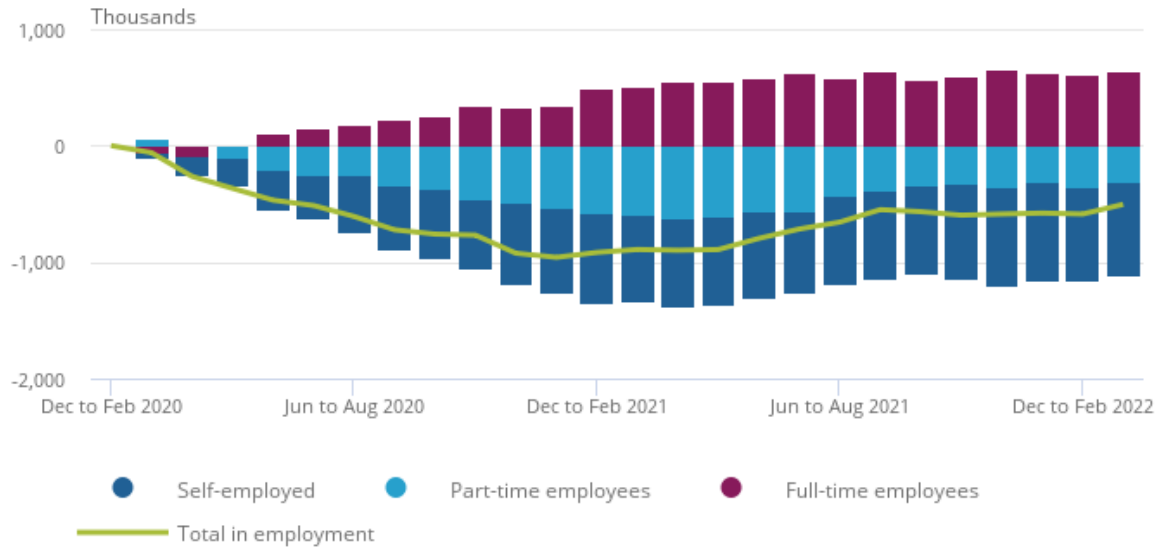
Employment levels were lower during 2021 compared with 2019 in many sectors due to the effect of the pandemic, with those working in travel and retail affected more than those who work in manufacturing plants. This was a direct effect of the lockdown conditions in the UK meaning that people were not able to travel or to have access to the high street for periods of time.
As the country came out of lockdown and the furlough scheme ended, an increase in unemployment was experienced as UK Government support ended and employers started to have to take on the full salary costs of employees. The ability of many to work from home had a significant effect on retail and service sectors, such as food outlets, where passing trade is vital to high street businesses. At the end of 2021 there were circa 29.5 million UK employees in work.

Manufacturers who had been able to introduce covid security measures to their workplace and had been encouraged to remain working by government ministers took less of a direct hit. This was especially for those businesses deemed as critical to the supply chain by either their direct customers or OEM businesses, who were able to continue to trade.

UK employment was at 75.6% at the end of Q4 2021, which while showing an increase on the previous two quarters, remained 1 full percentage point lower than pre-pandemic levels [(5)]. UK unemployment decreased in the final quarter to 4.1%. The redundancy rate also decreased to a record low following the phasing out of the coronavirus job retention scheme (furlough). The economic inactivity rate increased to 21.3% [(6)].

The number of job vacancies grew to a record high in Q4, with most industries also reporting record numbers of vacancies, however the growth rate of vacancies was slowing down. There were a number of factors that influenced the number of vacancies including the effect of Brexit and the pandemic, with nationals from other countries returning home, thereby reducing the number of workers available to employers. There had also been an increase in the number of persons economically inactive, be that through retirement, early retirement or other.

Figure 2: UK Employment Numbers by Employment Status



Source: Office for National Statistic UK

Economic Outlook for 2022

In December 2021, the British Chamber of Commerce expected GDP to grow in 2022 by 4.2% but by the end of Q1 had downgraded this to 3.6%. This was as a result of high inflation and predictions of lower business investment as a result of rising costs, higher taxes coming into effect and weakening confidence in the UK and global outlooks, which include geopolitical situations in a number of countries around the world[7]. Business investment is forecast to be significantly lower in 2022 than the Bank of England initially projected (13.5% predicted by BoE at start of 2022).

Inflation is expected to continue to increase throughout 2022 with the Bank of England predicting that it could hit 10% by the end of the year, a value not seen in circa 40 years. Inflation is expected to outpace wages, which will impact on the cost of living for families.

UK interest rates have already started to climb from their record low levels and are predicted to be 1% by the end of 2022[7].

The longer-term outlook beyond 2022 shows a further decline in growth for 2023 and 2024 of 1.3% and 1.2% respectively.

Unemployment levels are predicted to be stable at 4% in 2022, however, this is not a given as it depends on the duration of several global factors, including lockdowns in the Far East due to ongoing outbreaks of the covid virus and other geopolitical issues.

Foundry Industry

2021 remained a challenging year for the UK casting and foundry industry, especially those working in aerospace and automotive sectors where supply shortages of electronic components to OEM's and the numbers of manufacturers with a large number of employees on furlough until September 2021 remained.

The automotive and aerospace sectors experienced the most significant reduction in demand for castings due to the closing of air travel and national lockdowns, meaning that purchasing of large items, such as cars, was put off both by business and households. An increase in commercial vehicle castings was experienced, as online shopping and deliveries became more normal during lockdown periods. Towards the latter stages of 2021 an increase in demand for vehicles was seen, with sales of electric vehicles increasing quite significantly, albeit from a very low starting point. Diesel vehicles saw the largest drop-off and therefore foundries supplying parts for these took a hit to their order books.

Regular meetings with foundries within CMF membership showed that an increase in orders for light alloy castings, especially high pressure die castings was taking place towards the end of the year, with an increase in interest from a wider number of sectors, not just automotive. CMF members reported that their capacity utilisation was on average circa 75% for those in automotive while those in medical and other sectors reported levels between 75 and 85%.

Aerospace foundries started to see an increase in orders, but for lower volumes per order than pre-pandemic levels as travel started to open up to all destinations. The large OEMs started to see a global increase in orders from airlines, especially for lighter, more fuel efficient, aircraft and engines, as the requirement to reduce aviation emissions becomes more important with the transition towards net-zero.

Employment in the Sector

As in previous years, 2021 saw many foundries report that both recruitment and retention of the right calibre of staff continued to be a problem. This was across all main casting process types and to all size of foundries. Workers from overseas, who were typically from eastern Europe, continued to be less inclined to come to the UK.

2021 saw a small increase in the number of companies taking on apprentices using the new foundry apprentice programmes, but not as many as are needed to help fill the shortfall in skilled workers leaving the sector, retiring or as a consequence of being made redundant.

Employment in the sector remained strong overall, but a reduction was seen as a result of the pandemic whereby some employees were released due to reduced volumes of work being available, especially in the first half of the year. The second half of 2021 saw a strong demand to replace these lost workers, however, as with many other sectors, there was a significant decrease in the numbers of people with relevant skills seeking employment in the industry.

Closures and Consolidation

During 2021, despite the continued uncertainty in manufacturing, very few foundry closures or consolidations took place in the UK. 1 iron foundry and 1 aluminium sand foundry ceased trading, 1 multi-metal investment foundry ceased trading and 1 steel foundry was closed, with the work from the steel foundry moving to EU counterparts within the same group. 1 secondary aluminium smelter also ceased trading. A combination of the pandemic, Brexit, operating costs and other issues were the reasons for the closures.

Costs and Raw Material Prices

By the middle of the 2021 CMF members were reporting that some costs were increasing, including for logistics, for a number of reasons such as lack of transport and container capacity. Prices for some raw materials, including IPA, increased quite significantly due to a lack of production capacity, demand for medical uses and also a lack of shipping capacity. This was a continuation of cost pressures seen in 2020. By the end of the year a number of metals had significantly increased in cost (aluminium, nickel, chromium) and alloying elements for ferrous metals also increased significantly [8]. The availability of scrap metal, such as aluminium due to less vehicle scrappage, and from other scrap sources, was driving up prices internationally and having an impact on the UK. Several members reported that by Q3 conventional quoting models and price escalators were no longer working due to the ever-changing prices; prices were only being held on quotes for a matter of days in some cases.

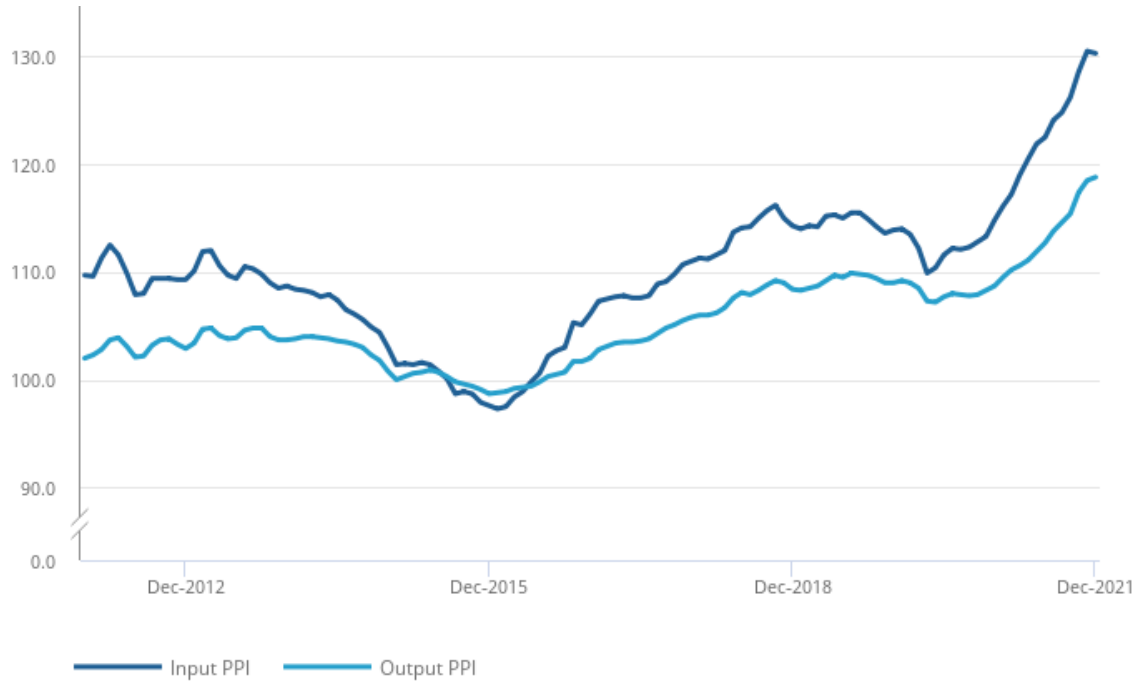
At a time when business expenses for both foundry and supplier members were increasing, in a small number of cases customers were reported to be seeking price reductions, and even significant reductions in a few instances.

By Q3, a number of factors such as driver shortages, shipping container availability and slots on container vessels were adding further pressures on the supply of metallics with some foundries reporting prices doubling between Q1 and the start of Q3. Costs increased further for transport as that sector too had been raising wages in order to attract and retain new drivers.

Quarters 3 and 4 saw significant increases in energy costs for some members and a small number reported being subjected to penalties for not taking the amount of power agreed in their contracts ('take or pay' clauses being invoked). Insurance costs rose for a few and increases in wage costs in the devolved nations also impacted some members.

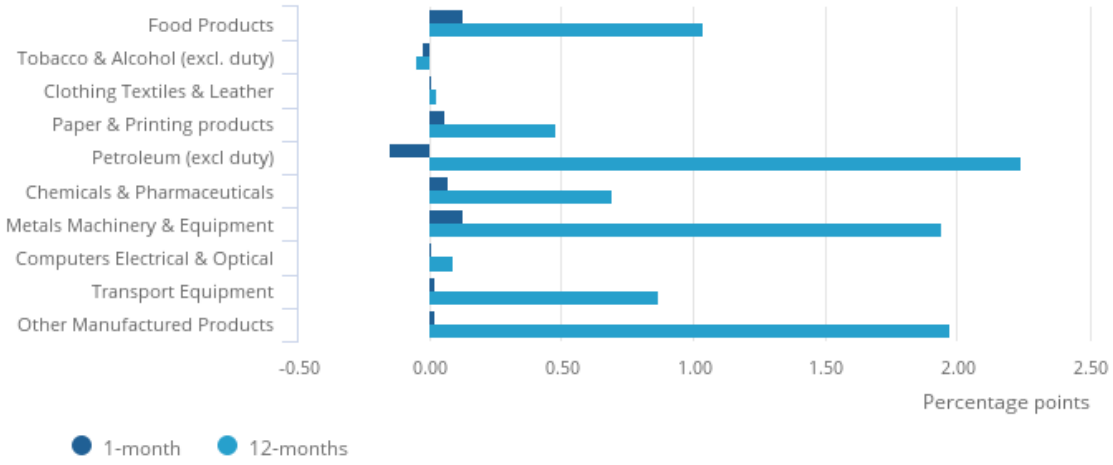
Foundry salaries and wages were increasing during 2021 to try to help attract new recruits to the industry and retain existing staff.

Figure 3: Input producer price inflation (PPI, Index 2015 =100).



Source: Office for National Statistics UK

Figure 4: Output Prices Contribution to 1-Month and 12-Month Growth Rate (December 2021).



Source: Office for National Statistics UK

Outlook for 2022

The industry outlook for 2021 is positive as many UK foundries are reporting significant increases in requests for quotations, both domestically and because of other global effects. The continuing lockdowns in other countries to curtail covid breakouts, the cost of international shipping and an increase in awareness from customers about climate change, combined with the work required by them to reduce their own and their supply chain emissions, were all contributory factors in some reshoring being seen. Shipping containers continue to be out of place globally fully 12 months after the Suez Canal ship incident. This has increased the number of companies looking to source a supply of castings closer to home, placing less stress on their available supply and inventory.

The investment casting sector, which produces a large volume of castings for the aerospace sector remains under pressure, but the situation is easing as more airlines place orders for new aircraft with the key OEM's.

Both light and heavy commercial vehicles continue to see problems with their supply chain as the costs and raw material availability remains very volatile, in part due to the geopolitical situation in a number of countries who are some of the most predominant producers of metals and chemicals used in the industry. International lockdowns remaining in place continue to impact on the supply of other components used by customers alongside castings supplied by UK foundries, but this is expected to ease throughout 2022.

The costs of energy and gas remain at higher levels than have been seen before and while there is no threat to supply to the UK industry as far as can be foreseen, it nonetheless places pressure on the foundries, particularly where it is not possible to pass these costs onto customers due to contractual agreements in place for cast parts.

Business investment is continuing, albeit at lower levels, as foundries have to consider where monies can best be invested into the kinds of technologies which should lessen their impact on carbon and other emissions, as pressure grows to avoid climate change and meet net-zero targets.
Cast Metal Federation's members remain optimistic about the longer-term future, with the use of technologies such as 3D core printing, simulation software and other technologies playing a greater part at their sites enabling the production of very complex castings more readily than even could have been envisaged just a few years ago.

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7. British Chambers of Commerce, https://www.britishchambers.org.uk/news/2022/03/bcc-forecast-uk-economic-growth-to-halve-this-year-as-domestic-global-headwinds-soar
8. Office for National Statistics, https://www.ons.gov.uk/economy/inflationandpriceindices/bulletins/producerpriceinflation/december2021includingservicesoctobertodecember2021

Figure 5: UK Ferrous Casting Production (volume)

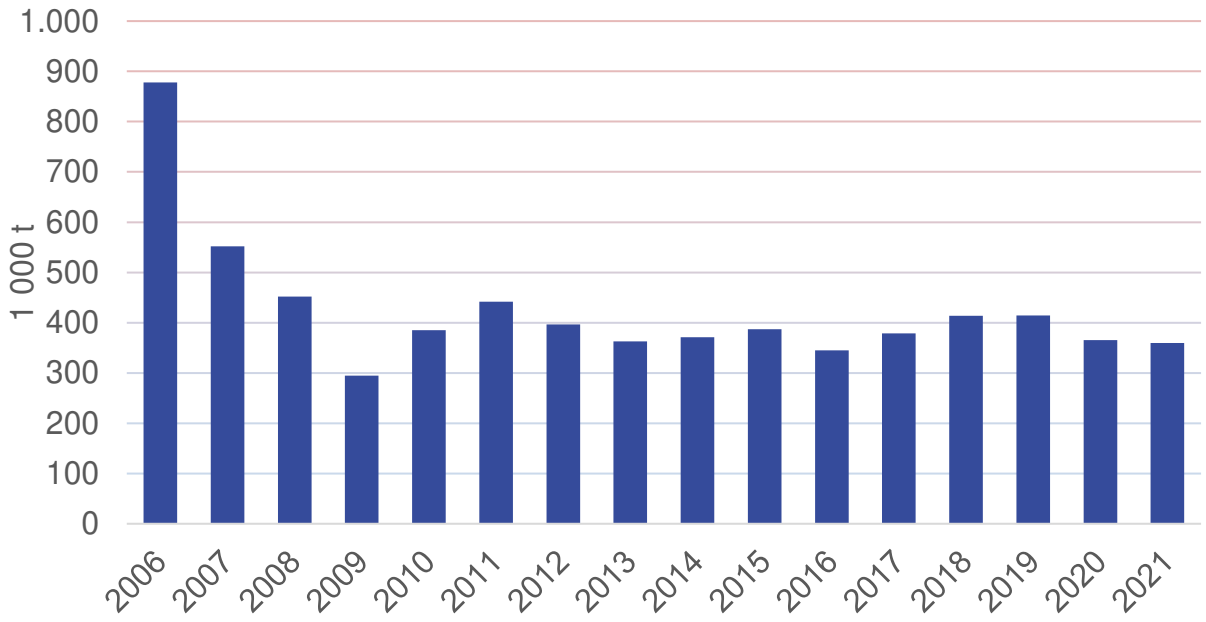
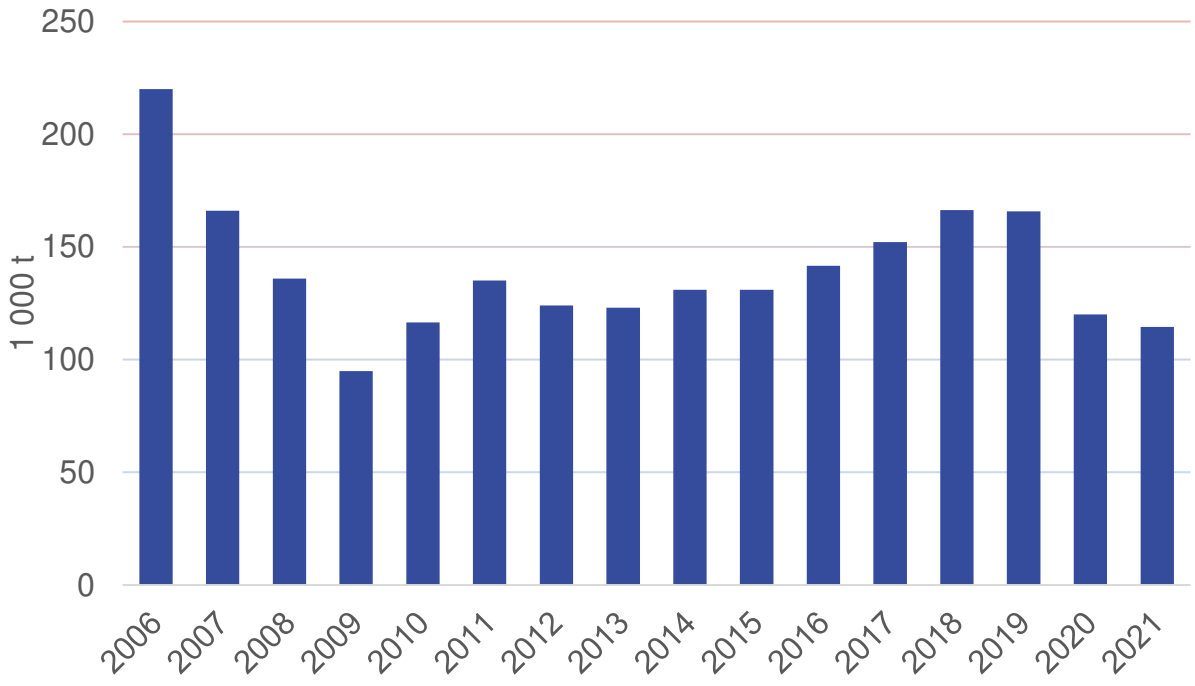


Figure 6: UK Non-Ferrous Casting Production (volume)



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TABLES

IRON, DUCTILE IRON AND STEEL CASTINGS

Table 1
Total production in 1000 t - Iron, Steel and Malleable iron castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria	156,6	164,2	158,5	134,7	152,3	-15,0	13,0
Belgium	42,9	85,2	67,6	52,4	54,2	-22,5	3,5
Bulgaria	49,8						
Czech Rep.	295,0	295,5	268,5	192,5	225,5	-28,3	17,1
Denmark	83,5	91,5	86,9				
Finland	66,4	64,6	57,8	47,1	51,8	-18,7	10,0
France	1.330,9	1.339,9	1.304,3	1.067,4	1.212,4	-18,2	13,6
Germany	4.184,9	4.256,2	3.804,9	2.714,8	3.158,4	-28,7	16,3
Hungary	82,3	88,3	76,2	76,4	75,2	0,3	-1,6
Italy	1.235,0	1.253,1	1.108,9	893,1	1.058,8	-19,5	18,6
Norway	29,4	31,2	31,2				
Poland	690,0	690,0	655,0	524,0	571,2	-20,0	9,0
Portugal	144,6	145,4	140,4	106,3	120,7	-24,3	13,5
Slovenia	195,1	137,4	177,2	116,7	124,5	-34,2	6,7
Spain	1.128,7	1.135,7	1.113,3	931,1	1.000,8	-16,4	7,5
Sweden	236,7	248,6	240,4	197,2	210,4	-18,0	6,7
Switzerland	60,4	61,0	26,3	22,8	23,9	-13,2	5,0
Türkiye	1.715,0	1.708,2	1.741,2	1.664,0	2.308,0	-4,4	38,7
United Kingdom	378,7	413,6	414,2	365,6	359,4	-11,7	-1,7
Total CAEF	**12.105,9**	**12.209,8**	**11.472,8**	**9.106,1**	**10.707,4**	**-19,8**	**17,6**

Table 2
Production value in Mio. € - Iron, Steel and Malleable iron castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria	408,6	427,3	431,8	382,4	436,3	-11,4	14,1
Belgium		165,0					
Bulgaria							
Czech Rep.							
Denmark							
Finland	156,4	203,0	177,7	142,8	154,3	-19,6	8,0
France	2.767,0	2.862,0	2.769,0	2388,4	2.758,1	-13,7	15,5
Germany a)	7.151,7	7.503,0	6.874,6	5.448,0	6.432,9	-20,8	18,1
Hungary	206,0	235,0	226,0	232,0	247,0	2,7	6,5
Italy	2.608,5	2.055,4	1.979,0	1.709,0	2.232,0	-13,6	30,6
Norway	65,8	36,0	36,0				
Poland				816,0			
Portugal	264,4	265,5	253,2	210,5	169,2	-16,8	-19,6
Slovenia				136,6	243,3		78,1
Spain	1.922,0	1.949,0	1.913,0	1.731,0	1.936,0	-9,5	11,8
Sweden							
Switzerland							
Türkiye	2.410,2	2.486,6	2.628,2	2.774,4	3.347,6	5,6	20,7
United Kingdom	1.800,0	1.944,0	1.950,0	2.340,0	2.200,0	20,0	-6,0
Total CAEF	**19.760,6**	**20.131,8**	**19.238,6**	**18.311,2**	**20.156,8**	**-9,6**	**15,2**

a) foundries > 50 employees, turnover

Table 3
Number of foundries (Production units) - Iron, Steel and Malleable iron castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria	23	15	15	15	15	0,0	0,0
Belgium	15	13	13	13	13	0,0	0,0
Bulgaria	80						
Czech Rep.	71	71	71	70	69	-1,4	-1,4
Denmark	8	8	8				
Finland	18	16	18	16	15	-11,1	-6,3
France							
Germany	240	239	232	225	220	-3,0	-2,2
Hungary	34	29	39				
Italy	191 a)	185 a)	172	172	176	0,0	2,3
Norway	7	5	5				
Poland	215	215	215	216	216	0,5	0,0
Portugal	31	31	31	31	31	0,0	0,0
Slovenia	57	13	11	11	10	0,0	-9,1
Spain	75	75	71	74	74	4,2	0,0
Sweden	38	38	36	36		0,0	
Switzerland	17	17	15	15	13	0,0	-13,3
Türkiye	546	546	550	556	564	1,1	1,4
United Kingdom	212	210	207	202	197	-2,4	-2,5
Total CAEF	**1.878**	**1.726**	**1.709**	**1.652**	**1.613**	**-0,3**	**-0,2**

a) including investment casting

Table 4
Employment in the foundry industry - Iron, Steel and Malleables iron castings

Country	2017	2018	2019	2020	2021	2020/19	2021/20
Austria	2.971	2.257	2.215	2.158	2.165	-2,6	0,3
Belgium	1.193 b)	1.757	1.766	1.727	1.633	-2,2	-5,4
Bulgaria	4.382						
Czech Rep.	11.000	11.000	10.500	9.500	9.400	-9,5	-1,1
Denmark	1.095	1.079	1.047				
Finland	1.318	1.363	1.264	1.170	995	-7,4	-15,0
France							
Germany a)	41.774	42.019	39.675	35.385	34.657	-10,8	-2,1
Hungary	1.920	3.850	3.720	3.620	3.506	-2,7	-3,1
Italy	9.182	9.248	9.040	9.432	9.587	4,3	1,6
Norway	640						
Poland	16.000	16.000	16.000	11.125	10.600	-30,5	-4,7
Portugal	2.640	2.444	2.582	2.181	2.380	-15,5	9,1
Slovenia	1.418	1.135	1.110	1.277	1.321	15,0	3,4
Spain	11.070	10.928	11.162	10.808	10.869	-3,2	0,6
Sweden			7.000	7.000		0,0	
Switzerland	1.070	1.058	1.012	1.012	764	0,0	-24,5
Türkiye	20.500	20.100	20.100	20.500	20.995	2,0	2,4
United Kingdom	14.500	14.600	14.150	13.850	13.700	-2,1	-1,1
Total CAEF	**142.673**	**138.838**	**142.343**	**130.745**	**122.572**	**-8,1**	**-0,9**

a) foundries >50 employees b) only workers

Table 5
Direct exports total in 1000 t - Iron, Steel and Malleable iron castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria							
Belgium							
Bulgaria							
Czech Rep.							
Denmark							
Finland	25,3	21,4	14,5	13,9	16,5	-32,6	18,6
France	451,3	433,2	448,0	384,3	432,1	3,4	12,5
Germany	1.630,6	1.669,8	1.553,6	1.046,2	1.248,7	-7,0	19,4
Hungary	58,0	53,2	45,1	64,9	61,5	-15,2	-5,2
Italy	473,7	520,9	488,4	386,6		-6,3	
Norway	14,8	16,1	16,1				
Poland	311,9	311,9		253,0	258,5		2,2
Portugal	136,7	137,0	128,0	97,7	110,5	-6,6	13,0
Slovenia							
Spain	704,0	746,8	746,7	621,8	659,4	0,0	6,0
Sweden							
Switzerland							
Türkiye	961,5	1.024,3	1.086,6	981,2	1.456,6	6,1	48,5
United Kingdom							
Total CAEF	**4.767,7**	**4.934,7**	**4.527,0**	**3.849,5**	**4.243,8**	**-20,3**	**22,5**

IRON CASTINGS

Table 6
Total production in 1000 t - Iron castings

Country	2017	2018	2019	2020	2021	2020/19	2021/20
Austria	42,9	43,0	42,3	33,4	37,1	-21,1	11,1
Belgium	26,9	69,9	55,9	43,0	44,5	-23,1	3,4
Bulgaria	30,3	29,9					
Czech Rep.	176,0	176,5	166,5	117,0	140,0	-29,7	19,7
Denmark	27,5	29,6	28,9				
Finland	19,5	18,4	18,2	17,3	20,6	-4,9	19,2
France	574,1	597,4	537,2	431,9	503,9	-19,6	16,7
Germany	2.421,4	2.435,6	2.189,0	1.618,7	1.873,7	-26,1	15,8
Hungary	24,6	22,0	18,4	16,5	16,3	-10,6	-0,9
Italy	755,8	767,6	667,8	534,4	616,2	-20,0	15,3
Norway	8,3	8,8	8,8				
Poland	480,0	480,0	450,0	360,0	392,4	-20,0	9,0
Portugal	41,5	43,4	41,1	26,1	39,7	-36,5	52,1
Slovenia	195,1	106,5	130,5	59,3	73,2	-54,6	23,5
Spain	365,7	357,6	362,6	283,1	322,8	-21,9	14,1
Sweden	159,4	161,7	154,9	126,0	141,7	-18,7	12,4
Switzerland	36,5	36,7	9,3	8,4	8,6	-9,8	3,1
Türkiye	720,0	603,0	614,3	617,3	920,7	0,5	49,1
United Kingdom	138,0	144,9	144,5	128,4	128,4	-11,1	0,0
Total CAEF	**6.243,4**	**6.132,6**	**5.640,0**	**4.420,7**	**5.279,9**	**-21,1**	**19,4**

Table 7
Production value in Mio. € - Iron castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria							
Belgium							
Bulgaria							
Czech Rep.							
Denmark							
Finland	35,4	37,7	34,4	31,9	36,1	-7,1	13,2
France							
Germany a,b)	6.048,9	6.348,4	5.721,0	4.519,9	5.511,8	-21,0	21,9
Hungary							
Italy							
Norway	10,3	11,0	11,0				
Poland				816,0			
Portugal	66,3	73,6	68,1	50,7	70,9	-25,6	40,0
Slovenia				108,9	132,4		21,6
Spain a)	1.583,0	1.622,0	1.537,0	1.338,0	1.514,0	-12,9	13,2
Sweden							
Switzerland							
Türkiye	745,2	607,3	626,0	765,6	1.028,9	22,3	34,4
United Kingdom							
Total CAEF							

a) incl. nodular and malleable iron castings b) foundries >50 empl., turnover

Table 8
Production of iron castings in 1000 t / subdivided by the major customer industries

Country	Year	1 Pressure pipes and fittings	2 Drain pipes and fittings	3 Building and domestic goods	4 Ingot moulds and bottoms	5 Rolls	6 Eng. Plant and machinery	7 Vehicle industry	8 Any other iron castings	Total iron castings
Austria	2020									33,4
	2021									37,1
	in %									11,1
Belgium	2020									43,0
	2021									44,5
	in %									3,4
Czech Rep.	2020									117,0
	2021									140,0
	in %									19,7
Denmark	2020									
	2021									
	in %									
Finland	2020					3,3	5,0		8,9	17,3
	2021					3,3	0,5	1,1	15,7	20,6
	in %					-1,9	-89,6		76,3	19,2
France	2020									431,9
	2021									503,9
	in %									16,7
Germany	2020						302,4	1.075,7	240,6	1.618,7
	2021						381,4	1220,4	226,9	1.873,7
	in %						26,1	13,5	-5,7	15,8
Hungary	2020									16,5
	2021									16,3
	in %									-0,9
Italy	2020			29,3	12,5		286,5	166,1	40,1	534,4
	2021			32,1	14,0		328,0	186,0	56,1	616,2
	in %			9,5	12,0		14,5	12,0	40,0	15,3
Norway	2020									
	2021									
	in %									
Poland	2020									360,0
	2021									392,4
	in %									9,0
Portugal	2020		1,1	0,9			1,1	20,1	2,9	26,1
	2021		1,1	1,1			1,1	33,9	2,6	39,7
	in %		-1,6	21,7			-7,6	68,8	-9,6	52,1
Slovenia	2020									59,3
	2021									73,2
	in %									23,5
Spain	2020	2,8		11,3			34,0	229,3	5,7	283,1
	2021	2,0		16,1			46,7	250,3	7,8	322,8
	in %	-30,3		41,9			37,4	9,2	38,4	14,1
Sweden	2020									126,0
	2021									141,7
	in %									12,4
Switzerland	2020									8,4
	2021									8,6
	in %									3,1
Türkiye	2020	12,1	11,9	68,6	21,8	17,0	213,2	230,2	42,6	617,3
	2021	22,5	21,5	111,4	37,5	27,1	351,1	284,5	65,2	920,7
	in %	85,4	80,8	62,4	71,9	60,1	64,7	23,6	53,1	49,1
United Kingdom	2020									128,4
	2021									128,4
	in %									0,0

Table 9
Number of foundries (Production units) - Iron castings (incl. nodular and malleable castings)

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria	20	12	12	12	12	0,0	0,0
Belgium		5	5	5	5	0,0	0,0
Bulgaria							
Czech Rep.		56	56	55	54	-1,8	-1,8
Denmark	8	8	8				
Finland	11	11	11	11	11	0,0	0,0
France							
Germany a)	151	150	144	140	134	-2,8	-4,3
Hungary	27	27	27	27	27		
Italy	139	147	134	134	136	0,0	1,5
Norway	5	5	5				
Poland	180	180	180	180	180	0,0	0,0
Portugal	23	23	23	23	23	0,0	0,0
Slovenia			11	8	7	-27,3	-12,5
Spain	46	46	42	43	43	2,4	0,0
Sweden	26	26	25				
Switzerland	15	15	13	13	10	0,0	-23,1
Türkiye	441	441	443	447	452	0,9	1,1
United Kingdom							
Total CAEF	**1.092**	**1.152**	**1.139**	**1.098**	**1.094**	**-0,3**	**-0,4**

a) foundries >50 employees

Table 10
Employment in the foundry industry - Iron castings (incl. nodular and malleable castings)

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria							
Belgium							
Bulgaria							
Czech Rep.							
Denmark	1.095		1.047				
Finland	741	800	724	645	629	-10,9	-2,5
France							
Germany a)	35.006	35.398	34.096	29.496	29.276	-13,5	-0,7
Hungary				3450	3.340		-3,2
Italy	6.869	6.990	6.736	7.119	7.256	5,7	1,9
Norway	640						
Poland	12.500	12.500	12.500	8.010	7.400	-35,9	-7,6
Portugal	1.815	1.848	2.064	1.684	1.861	-18,4	10,5
Slovenia			1.110	1.066	1.120	-4,0	5,1
Spain	8.752	8.600	8.800	8.182	8.199	-7,0	0,2
Sweden							
Switzerland		951	910	910	527	0,0	-42,1
Türkiye	14.000	13.600	13.600	13.875	14.225	2,0	2,5
United Kingdom							
Total CAEF	**81.418**	**80.687**	**81.587**	**74.437**	**73.833**	**-11,9**	**-0,8**

a) foundries >50 employees

Table 11
Direct exports total in 1000 t - Iron castings (incl. nodular iron castings)

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria							
Belgium							
Bulgaria							
Czech Rep.							
Denmark							
Finland	23,8	18,5	12,9	11,9	15,2	-7,5	28,0
France	432,4	409,4	429,2	371,2	418,7	-13,5	12,8
Germany a)	1.551,4	1.589,0	1.455,2	978,2	1.179,4	-32,8	20,6
Hungary	55,9			64,9	61,5		-5,2
Italy							
Norway	14,8	16,1	16,1				
Poland	295,9	295,0		237,0	258,5		
Portugal	132,5	133,3	124,3	94,6	107,4	-23,9	13,5
Slovenia							
Spain a)	655,2	696,4	693,0	569,6	603,1	-17,8	5,9
Sweden							
Switzerland							
Türkiye	833,5	875,8	936,8	862,0	1.291,2	-8,0	49,8
United Kingdom							
Total CAEF	**3.995,5**	**4.033,5**	**3.667,5**	**3.189,5**	**3.935,0**	**-20,9**	**23,4**

a) incl. malleable iron castings

DUCTILE IRON CASTINGS

Table 12
Total production in 1000 t - Ductile iron castings (Nodular and Malleable iron castings)

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria	102,9	109,7	104,7	91,7	104,8	-12,4	14,3
Belgium	8,4	7,8	5,1	3,9	4,5	-23,5	14,4
Bulgaria	9,2						
Czech Rep.	55,0	57,0	50,0	34,5	41,0	-31,0	18,8
Denmark	56,1	61,9	58,1				
Finland	36,3	36,2	29,3	23,1	25,5	-21,1	10,4
France	696,3	682,1	711,4	593,6	665,5	-16,6	12,1
Germany	1.587,7	1.636,0	1.433,7	957,1	1.140,9	-33,2	19,2
Hungary	54,5	63,4	55,6	58,0	57,2	4,2	-1,3
Italy	425,1	428,6	381,3	300,6	385,9	-21,1	28,4
Norway	21,1	22,3	22,3				
Poland	160,0	160,0	155,0	124,0	135,2	-20,0	9,0
Portugal	97,2	96,8	94,4	76,1	76,6	-19,4	0,6
Slovenia	38,6	46,6	46,7	39,8	47,4	-14,9	19,2
Spain	698,1	711,6	663,0	582,8	608,8	-12,1	4,5
Sweden	55,6	64,0	62,0	51,0	47,5	-17,7	-6,8
Switzerland	22,8	22,1	14,7	11,9	12,9	-18,8	8,4
Türkiye	825,0	912,9	934,4	854,7	1.108,1	-8,5	29,6
United Kingdom	196,0	219,5	220,5	195,6	195,6	-11,3	0,0
Total CAEF	**5.145,9**	**5.338,5**	**5.042,3**	**3.998,4**	**4.657,2**	**-19,4**	**16,5**

Table 13
Production value in Mio. € - Ductile iron castings (Nodular and Malleable iron castings)

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria							
Belgium							
Bulgaria							
Czech Rep.							
Denmark							
Finland	54,7	89,2	71,5	52,0	63,0	-27,4	21,2
France							
Germany a)							
Hungary							
Italy		1.602,6					
Norway	55,5	25,0	25,0				
Poland							
Portugal	155,4	150,4	143,5	121,7	129,5	-15,2	6,4
Slovenia							
Spain a)							
Sweden							
Switzerland							
Türkiye	1.155,0	1.304,5	1.382,5	1.401,2	1.665,9	1,4	18,9
United Kingdom							
Total CAEF							

a) contained in: Tab. 7

Table 14
Production of Ductile iron castings (Nodular and Malleable iron castings) in 1000 t subdivided by the major customer industries

Country	Year	1 Pressure pipes and fittings	2 Eng. plant and machinery	3 Vehicle industry	4 Any other nodular iron castings	Total nodular iron castings
Austria	2020					91,7
	2021					104,8
	in %					14,3
Belgium	2020					3,9
	2021					4,5
	in %					14,4
Czech Rep.	2020					34,5
	2021					41,0
	in %					18,8
Denmark	2020					
	2021					
	in %					
Finland	2020		20,9		2,2	23,1
	2021		6,1		19,5	25,5
	in %		-71,0		774,6	10,4
France	2020					593,6
	2021					665,5
	in %					12,1
Germany	2020		317,5	427,0	212,6	957,1
	2021		424,5	428,0	246,5	1.140,9
	in %		33,7	0,2	15,9	19,2
Hungary	2020					55,6
	2021					57,2
	in %					2,9
Italy	2020	30,8	164,4	88,6	16,8	300,6
	2021	42,1	213,1	109,6	21,1	385,9
	in %	36,5	29,6	23,6	26,0	28,4
Norway	2020					
	2021					
	in %					
Poland	2020					124,0
	2021					135,2
	in %					9,0
Portugal	2020	7,5	0,8	66,2	1,6	76,1
	2021	7,9	0,8	66,3	1,6	76,6
	in %	4,8	-1,1	0,2	-1,6	0,6
Slovenia	2020					39,8
	2021					47,4
	in %					19,2
Spain	2020	128,2	151,5	291,4	11,7	582,8
	2021	135,2	162,8	293,1	17,7	608,8
	in %	5,5	7,4	0,6	52,1	4,5
Sweden	2020					51,0
	2021					47,5
	in %					-6,8
Switzerland	2020					11,9
	2021					12,9
	in %					8,4
Türkiye	2020	116,4	248,4	392,5	97,5	854,7
	2021	137,8	370,8	462,6	137,0	1108,1
	in %	18,4	49,3	17,9	40,5	29,6
United Kingdom	2020					195,6
	2021					195,6
	in %					0,0

STEEL CASTINGS

Table 15
Total production in 1000 t - Steel castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria	10,8	11,4	11,4	9,6	10,3	-16,1	7,7
Belgium	7,3	7,5	6,6	5,5	5,3	-16,5	-3,7
Bulgaria	10,4						
Czech Rep.	64,0	62,0	52,0	41,0	44,5	-21,2	8,5
Denmark							
Finland	6,2	10,1	10,4	6,7	5,7	-35,9	-15,1
France	60,4	60,4	55,7	41,9	43,1	-24,8	2,8
Germany	175,8	184,7	178,2	138,0	143,8	-22,6	4,2
Hungary	3,1	2,8	2,2	2,0	1,7	-9,3	-15,8
Italy	54,1	56,9	59,9	58,0	56,8	-3,1	-2,1
Norway							
Poland a)	50,0	50,0	50,0	40,0	43,6	-20,0	9,0
Portugal	5,9	5,3	4,9	4,1	4,4	-16,4	6,7
Slovenia	30,2	2,1		17,6	3,8		
Spain	64,9	66,6	71,4	65,3	69,2	-8,5	6,0
Sweden	21,8	22,9	23,5	20,2	21,2	-14,0	5,0
Switzerland	1,1	2,3	2,3	2,5	2,4	8,7	-5,0
Türkiye	170,0	192,4	192,5	192,0	279,3	-0,2	45,4
United Kingdom	44,7	49,2	49,2	41,6	35,4	-15,3	-15,0
Total CAEF	**780,6**	**786,5**	**770,2**	**686,0**	**770,4**	**-13,2**	**12,3**

Table 16
Production value in Mio. € - Steel castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria							
Belgium							
Bulgaria							
Czech Rep.							
Denmark							
Finland	66,3	76,1	71,9	59,0	55,2	-18,0	-6,4
France							
Germany a)	1.102,8	1.154,3	1.137,2	945,4	921,1	-16,9	-2,6
Hungary							
Italy		452,8					
Norway							
Poland							
Portugal	42,7	41,6	41,6	38,2	42,9	-8,2	12,2
Slovenia				27,7			
Spain	339,0	327,0	376,0	393,0	422,0	4,5	7,4
Sweden							
Switzerland							
Türkiye	510,0	574,8	619,7	607,6	652,8	-2,0	7,5
United Kingdom							
Total CAEF	2.060,8	2.626,5	2.246,4	2.070,8	2.094,0	-9,0	1,1

a) foundries >50 employees

Table 17
Production of steel castings in 1000 t / subdivided by the major customer industries

Country	Year	1 Eng. plant and machinery	2 Vehicle industry	3 Steel castings for railways, locomotives, carriages, wagons and trams	4 Any other steel castings	Total steel castings
Austria	2020					9,6
	2021					10,3
	in %					7,7
Belgium	2020					5,5
	2021					5,3
	in %					-3,7
Czech Rep.	2020					41,0
	2021					44,5
	in %					8,5
Finland	2020	2,5			4,1	6,7
	2021	0,9	0,7		4,0	5,7
	in %	-63,1			-2,6	-15,1
France	2020					41,9
	2021					43,1
	in %					2,8
Germany	2020	23,6	9,9		104,5	138,0
	2021	23,0	9,7		110,8	143,8
	in %	-2,5	-1,9		6,0	4,2
Hungary	2020					2,0
	2021					1,7
	in %					-15,8
Italy	2020	9,8	3,1	1,5	43,6	58,0
	2021	9,9	3,0	1,4	42,4	56,8
	in %	1,4	-1,7	-3,7	-2,9	-2,1
Poland	2020					40,0
	2021					43,6
	in %					9,0
Portugal	2020	2,3	0,3	0,1	1,5	4,1
	2021	2,3	0,3	0,1	1,7	4,4
	in %	0,8	12,3	19,4	13,8	6,7
Slovenia	2020					17,6
	2021					3,8
	in %					-78,3
Spain	2020	45,0	2,6	15,7	2,0	65,3
	2021	45,5	2,0	15,3	6,4	69,2
	in %	1,0	-22,3	-2,5	226,5	6,0
Sweden	2020					20,2
	2021					21,2
	in %					5,0
Switzerland	2020					2,5
	2021					2,4
	in %					-5,0
Türkiye	2020	70,2	20,8	26,0	75,0	192,0
	2021	113,4	29,5	39,2	97,3	279,3
	in %	61,4	42,0	50,8	29,6	45,4
United Kingdom	2020					41,6
	2021					35,4
	in %					-15,0

Table 18
Number of foundries (Production units) - Steel castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria	3	3	3	3	3	0,0	0,0
Belgium		8	8	8	8	0,0	0,0
Bulgaria							
Czech Rep.		28	28	27	27	-3,6	0,0
Denmark							
Finland	7	7	7	7	6	0,0	-14,3
France							
Germany a)	41	40	41	39	38	-4,9	-2,6
Hungary	7		12		6		
Italy	37	38	38	38	40	0,0	5,3
Norway							
Poland	35	35	35	36	36	2,9	0,0
Portugal	8	8	8	8	8	0,0	0,0
Slovenia		5		3	3		
Spain	29	29	29	31	31	6,9	0,0
Sweden	12	12	11				
Switzerland	2	2	2	2	3	0,0	50,0
Türkiye	105	105	107	109	112	1,9	2,8
United Kingdom							
Total CAEF	**337**	**286**	**320**	**329**	**321**	**9,8**	**-2,4**

a) foundries >50 empl.

Table 19
Number of persons employed total - Steel castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria							
Belgium							
Bulgaria							
Czech Rep.							
Denmark							
Finland	577	563	540	525	366	-2,8	-30,3
France							
Germany a)	6.768	6.621	6.657	5.889	5.386	-11,5	-8,5
Hungary				170	166		-2,4
Italy	2.313	2.258	2.304	2.313	2.331	0,4	0,8
Norway							
Poland	3.500	3.500	3.500	3.115	3.200	-11,0	2,7
Portugal	825	596	518	497	519	-4,1	4,4
Slovenia		352		211	201		-4,7
Spain	2.318	2.328	2.362	2.626	2.670	11,2	1,7
Sweden							
Switzerland	130	107	102	102	237	0,0	132,4
Türkiye	6.500	6.500	6.500	6.625	6.770	1,9	2,2
United Kingdom							
Total CAEF	**22.931**	**22.825**	**22.483**	**22.073**	**21.846**	**-3,5**	**-1,0**

a) foundries >50 empl.

Table 20
Direct exports total in 1000 t - Steel castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria							
Belgium							
Bulgaria							
Czech Rep.							
Denmark							
Finland	1,5	2,9	1,6	2,0	1,2	25,0	-37,8
France	19,0	23,8	18,8	13,1	13,5	-30,5	2,8
Germany	79,1	80,8	83,6	67,6	69,3	-19,1	2,5
Hungary	2,1						
Italy							
Norway							
Poland	16,0	16,0	16,0	16,0			
Portugal	4,1	3,7	3,7	3,1	3,1	-14,8	-1,2
Slovenia							
Spain	48,8	50,4	53,7	52,2	56,3	-2,9	7,9
Sweden							
Switzerland							
Türkiye	128,0	140,5	149,8	119,2	165,4	-20,5	38,8
United Kingdom							
Total CAEF	**298,5**	**318,1**	**327,2**	**273,2**	**308,8**	**-16,5**	**20,1**

NON-FERROUS METAL CASTINGS

Table 21
Total production in 1000 t - Non-ferrous metal castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria	148,3	163,4	144,8	121,4	139,6	-16,1	14,9
Belgium		2,2	1,0	1,7	1,6	59,9	-2,2
Bulgaria							
Czech Rep.	122,0	124,2	116,0	94,5	108,3	-18,5	14,6
Denmark	4,4	4,0	3,5				
Finland	5,9	5,5	5,3	4,1	6,1	-21,9	47,5
France	367,3	441,3	392,4	330,7	339,9	-15,7	2,8
Germany	1.206,1	1.176,7	1.019,2	769,4	806,1	-24,5	4,8
Hungary	127,7	139,2	124,0	121,7	121,6	-1,9	0,0
Italy	860,3	867,5	827,3	659,2	880,5	-20,3	33,6
Norway a)	5,9	6,5	6,5				
Poland	346,5	346,5	356,5	285,2	310,9	-20,0	9,0
Portugal	54,1	56,5	56,5	50,3	50,6	-11,0	0,5
Slovenia	52,1	70,6	75,7	53,1	64,3	-29,9	21,0
Spain	166,7	153,1	153,9	124,6	127,7	-19,1	2,5
Sweden	63,7	67,3	65,1	56,4	60,0	-13,4	6,4
Switzerland	15,4	17,0	15,9	13,6	14,8	-14,4	9,0
Türkiye	440,0	547,0	573,0	506,8	655,5	-11,6	29,4
United Kingdom	152,1	166,3	165,8	120,1	114,5	-27,6	-4,7
Total CAEF	**4.138,4**	**4.354,8**	**4.102,6**	**3.312,8**	**3.801,9**	**-19,1**	**14,8**

a) without copper (only 2 foundries = no data collection)

Table 22
Production value in Mio. € - Non-ferrous metal castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria	1.079,9	1.123,4	973,7	811,7	959,7	-16,6	18,2
Belgium							
Bulgaria							
Czech Rep.							
Denmark							
Finland	62,5	62,1	51,0	45,2	53,7	-11,3	18,7
France	2.876,0	2.727,0	2.373,0	1.882,6	2.095,5	-20,7	11,3
Germany a)	5.962,5	6.127,8	5.558,2	4.429,0	5.190,0	-20,3	17,2
Hungary	396,0	395,0	387,0	390,0	408,0	0,8	4,6
Italy	4.712,0	4.680,0	4.390,0	3.569,0	4.646,0	-18,7	30,2
Norway			51,0				
Poland	58,0	51,0					
Portugal			381,1	324,7	323,4	-14,8	-0,4
Slovenia	325,8	334,9			650,9		
Spain			1.020,0	803,0	893,0	-21,3	11,2
Sweden	960,0	951,0					
Switzerland							
Türkiye			2.690,8	2.530,4	2.707,6	-6,0	7,0
United Kingdom	2.060,0	2.628,7	1.050,0	950,0	920,0	-9,5	-3,2
Total CAEF	**18.492,7**	**19.080,8**	**18.925,7**	**15.735,6**	**18.847,9**	**-16,6**	**15,6**

a) foundries >50 employees

Table 23
Number of foundries (Production units) - Non-ferrous metal castings

Country	Total		thereof: Pressure die casting		Other Light casting		Other Heavy metal alloy casting	
	2020	2021	2020	2021	2020	2021	2020	2021
Austria	22	22						
Belgium	6	6						
Bulgaria								
Czech Rep.	37	37						
Denmark								
Finland	13	13	5	5	4	4	4	4
France								
Germany	327	322						
Hungary	31	32	19	20	8	8	4	4
Italy	866	843						
Norway								
Poland	240	240	240	240				
Portugal	57	57	28	28	12	12	17	17
Slovenia	47	45						
Spain	52	52	35	35	17	17		
Sweden								
Switzerland	31	30						
Türkiye	396	404	301	305	60	62	35	37
United Kingdom	195	191						
Total CAEF	**2.320**	**2.294**	**628**	**633**	**101**	**103**	**60**	**62**

Table 24
Employment in the foundry industry - Non-ferrous metal castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria	4.127	5.029	4.718	4.380	4.357	-7,2	-0,5
Belgium	266	496	496	494	466	-0,4	-5,7
Bulgaria	280						
Czech Rep.	4.000	4.000	4.000	4.000	4.000	0,0	0,0
Denmark			372				
Finland	413	413	381	344	350	-9,7	1,7
France							
Germany a)	35.967	36.845	35.522	32.473	31.242	-8,6	-3,8
Hungary	6.076	5.650	5.230	5.250	5.333	0,4	1,6
Italy	18.836	18.312	18.815	18.813	18.878	0,0	0,3
Norway	296	287	287				
Poland	8.300	8.300	8.300	7.387	11.200	-11,0	51,6
Portugal	3.400	3.461	3.365	3.293	3.339	-2,1	1,4
Slovenia	4.195	4.138	4.032	3.669	3.576	-9,0	-2,5
Spain	5.275	5.321	5.242	4.623	4.597	-11,8	-0,6
Sweden			7.000				
Switzerland	1.274	1.504	1.450	1.450	1.166	0,0	-19,6
Türkiye	13.500	13.750	13.750	13.850	14.150	0,7	2,2
United Kingdom	13.000	13.650	13.150	13.000	12.560	-1,1	-3,4
Total CAEF	**119.205**	**121.156**	**126.110**	**113.026**	**115.214**	**-4,6**	**1,9**

a) foundries > 50 employees

COPPER ALLOY CASTINGS

Table 25
Total production in t - Copper alloy castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria							
Belgium							
Bulgaria	292						
Czech Rep.	20.000	20.500	20.000	16.000	18.000	-20,0	12,5
Denmark	1.292	1.285	1.188				
Finland	3.247	3.031	3.124	2.415	2.508	-22,7	3,9
France	17.877	19.307	17.409	16.118	17.705	-7,4	9,8
Germany	79.192	79.278	77.225	46.076	48.425	-40,3	5,1
Hungary	1.799	705	483	729	701	50,9	-3,8
Italy	51.515	50.587	48.232	38.168	51.947	-20,9	36,1
Norway							
Poland a)	6.100	6.100	6.000	4.800	5.232	-20,0	9,0
Portugal	16.800	16.496	17.054	16.203	14.699	-5,0	-9,3
Slovenia	842	755	872	990	1.005	13,5	1,5
Spain	15.096	14.400	14.634	15.279	12.807	4,4	-16,2
Sweden	8.312	8.792					
Switzerland	2.021	2.086	2.131	2.023	2.039	-5,1	0,8
Türkiye	25.000	30.709	29.285	24.851	33.388	-15,1	34,4
United Kingdom	8.500	8.670	8.650	8.300	7.885	-4,0	-5,0
Total CAEF	**257.885**	**262.701**	**246.287**	**191.952**	**216.340**	**-21,7**	**12,7**

Table 26
Production value in Mio. € - Copper alloy castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria							
Belgium							
Bulgaria							
Czech Rep.							
Denmark							
Finland	35,4	27,5	29,7	27,0	28,5	-9,1	5,4
France							
Germany a)	871,0	895,2	865,6	777,4	925,4	-10,2	19,0
Hungary							
Italy							
Norway							
Poland							
Portugal	115,2	105,5	114,6	105,1	104,0	-8,3	-1,0
Slovenia							
Spain				168,0	89,0		-47,0
Sweden							
Switzerland							
Türkiye	187,0	246,5	237,1	190,7	207,4	-19,6	8,8
United Kingdom							
Total CAEF	**1.208,6**	**1.274,7**	**1.247,0**	**1.268,2**	**1.354,3**	**-11,8**	**6,8**

a) copper and zinc; foundries >50 employees

Table 27
Copper alloy castings
in t

Country	Year	Sandcast and gravity die castings					Pressure die casting (Messing, Laiton, Brass)	general engineering	automotive industry	other	Total production
		Total	thereof: Copper	Aluminium Bronze	other Bronzes	Brass					
Czech Rep.	2020										16.000
	2021										18.000
	in %										12,5
Finland	2020	2.415,0		358	1.107	950					2.415
	2021	2.508		343	1.102	1.063					2.508
	in %	3,9		-4,2	-0,5	11,9					3,9
France	2020										16.118
	2021										17.705
	in %										9,8
Germany	2020	27.289					18.787,3			46.031	46.076
	2021	29.271					19.153,6			48.363	48.425
	in %	7,3					1,9			5,1	5,1
Hungary	2020										729
	2021										701
	in %										-3,8
Italy	2020										38.168
	2021										51.947
	in %										36,1
Poland	2020										4.800
	2021										5.232
	in %										9,0
Portugal	2020	16.203		1.800	2.360	12.043		1.700		14.503	16.203
	2021	14.699		1.750	2.960	9.989		3.100		11.599	14.699
	in %	-9,3		-2,8	25,4	-17,1		82,4		-20,0	-9,3
Slovenia	2020										990
	2021										1005
	in %										1,5
Spain	2020	15.279						11.459	306	3.514	15.279
	2021	12.807						9.949	207	2.651	12.807
	in %	-16,2						-13,2	-32,4	-24,6	-16,2
Switzerland	2020	2.023									2.023
	2021	2.039									2.039
	in %	0,8									0,8
Türkiye	2020	13.022	3.825	3.169	1.232	4.796	5.424	4.264	2.141		24.851
	2021	16.576	5.259	3.985	1.754	5.578	7.767	6.355	2.690		33.388
	in %	27,3	37,5	25,7	42,4	16,3	43,2	49,0	25,6		34,4
United Kingdom	2020										8.300
	2021										7.885
	in %										-5,0

LIGHT AND ULTRALIGHT CASTINGS

Table 28
Total production in t - Light and ultralight castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria	148.287	150.559	133.406	111.302	127.971	-16,6	15,0
Belgium	799	799	683	539		-21,1	
Bulgaria	5.540						
Czech Rep.	101.000	102.500	95.000	77.700	89.400	-18,2	15,1
Denmark	3.014	2.566	2.224				
Finland	2.548	2.395	2.184	1.730	3.604	-20,8	108,3
France	346.899	394.727	348.062	293.529	299.016	-15,7	1,9
Germany	1.137.096	1.038.211	1.011.599	673.227	716.616	-33,4	6,4
Hungary	124.229	136.791	122.675	119.186	119.304	-2,8	0,1
Italy	717.844	724.300	685.584	543.972	732.537	-20,7	34,7
Norway	5.883	6.525	6.526				
Poland	330.000	330.000	340.000	272.000	296.480	-20,0	9,0
Portugal	35.000	37.612	37.009	31.966	33.050	-13,6	3,4
Slovenia	51.209	61.315	54.625	44.618	52.692	-18,3	18,1
Spain	141.810	127.159	129.345	101.317	106.185	-21,7	4,8
Sweden	46.138	48.000	48.000	39.195	45.000	-18,3	14,8
Switzerland	13.373	13.790	12.699	10.815	11.726	-14,8	8,4
Türkiye	380.000	476.253	504.328	450.264	579.124	-10,7	28,6
United Kingdom	136.200	149.540	149.100	104.522	99.296	-29,9	-5,0
Total CAEF	**3.726.869**	**3.803.043**	**3.683.049**	**2.875.882**	**3.312.001**	**-22,0**	**15,2**

Table 29
Production value in Mio. € - Light and ultralight castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria							
Belgium							
Bulgaria							
Czech Rep.							
Denmark							
Finland	26,3	33,6	21,3	18,2	25,2	-14,4	38,5
France							
Germany a)	5.091,5	5.232,6	4.705,2	3.933,1	4.264,6	-16,4	8,4
Hungary							
Italy							
Norway	58,0	51,0	51,0				
Poland							
Portugal	192,4	211,0	247,0	200,6	200,3	-18,8	-0,1
Slovenia							
Spain				571,0	680,0		19,1
Sweden							
Switzerland							
Türkiye	1.748,0	2.207,4	2.289,4	2.223,8	2.374,1	-2,9	6,8
United Kingdom							
Total CAEF						**-12,2**	**8,6**

Table 30
Light and ultralight castings in t

Country	Year	Aluminium			Magnesium						Total Production
		Sandcast and gravity die casting	Pressure die casting	Total	Sandcast and gravity die casting	Pressure die casting	Total	general engineering	automotive industry	other	
Austria	2020	16.493	90.305	106.798							111.302
	2021	18.294	104.210	122.504							127.971
	in %	10,9	15,4	14,7							15,0
Belgium	2019										683
	2020										0
	in %										-100,0
Czech Rep.	2019			77.400			300				77.700
	2020			89.000			400				89.400
	in %			15,0			33,3				15,1
Denmark	2019										
	2020										
	in %										
Finland	2019	1.211	520	1.730							1.730
	2020	704	1.098	1.802							3.604
	in %	-41,9	111,2	4,2							108,3
France	2019										293.529
	2020										299.016
	in %										1,9
Germany	2019	293.971	350.749	652.738		20.489	20.489	7.099	586.180	79.922	673.227
	2020	309.512	385.609	701.118		15.498	15.498	8.933	608.656	99.010	716.616
	in %	5,3	9,9	7,4		-24,4	-24,4	25,8	3,8	23,9	6,4
Hungary	2019	49.876	69.024	118.900			286				119.186
	2020	48.265	70.761	119.026			278				119.304
	in %	-3,2	2,5	0			-2,8				0,1
Italy	2019			540.296			3.676				543.972
	2020			727.254			5.283				732.537
	in %			34,6			43,7				34,7
Norway	2019										
	2020										
	in %										
Poland	2019										272.000
	2020										296.480
	in %										9,0
Portugal	2019	1.293	30.672	31.966							31.966
	2020	1.719	30.359	33.050							33.050
	in %	32,9	-1,0	3,4							3,4
Slovenia	2019			44.618							44.618
	2020			52.692							52.692
	in %			18,1							18,1
Spain	2019	1.317	100.000	101.317							101.317
	2020	1.500	104.685	106.185							106.185
	in %	13,9	4,7	4,8							4,8
Sweden	2019										39.195
	2020										45.000
	in %										14,8
Switzerland	2019	2.542	8.273	10.815							10.815
	2020	2.079	9.647	11.726							11.726
	in %	-18,2	16,6	8,4							8,4
Türkiye	2019	51.660	397.843	449.503	374	387	761				450.264
	2020	62.399	515.714	578.113	396	615	1.011				579.124
	in %	20,8	29,6	28,6	5,9	58,9	32,9				28,6
United Kingdom	2019			102.522			2.000				104.522
	2020			97.396			1.900				99.296
	in %			-5,0			-5,0				-5,0

ZINC

Table 31
Total production in t - Zinc

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria							
Belgium							
Bulgaria	42						
Czech Rep.	1.000	1.200	1.000	800	900	-20,0	12,5
Denmark							
Finland	101	100					
France	24.719	24.854	24.486	18.880	20.739	-22,9	9,8
Germany	62.188	59.205	57.182	49.761	41.095	-13,0	-17,4
Hungary	1.717	1.610	763	1.662	1.542	117,8	-7,2
Italy	89.673	91.287	92.161	75.834	95.089	-17,7	25,4
Norway							
Poland a)	7.500	7.500	7.500	6.000	6.540	-20,0	9,0
Portugal	2.250	2.440	2.464	2.165	2.829	-12,1	30,7
Slovenia		8.510	9.665	7.477	8.187	-22,6	9,5
Spain	8.941	9.020	8.426	7.304	7.973	-13,3	9,2
Sweden	9.274						
Switzerland	1.209	1.118	1.051	762	1.054	-27,5	38,3
Türkiye	35.000	40.025	39.432	31.644	42.981	-19,8	35,8
United Kingdom	7.350	8.085	8.090	7.300	7.300	-9,8	0,0
Total CAEF	**250.964**	**254.954**	**252.220**	**209.589**	**236.229**	**-16,9**	**12,7**

Table 32
Production value in Mio. € - Zinc

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria							
Belgium							
Bulgaria							
Czech Rep.							
Denmark							
Finland	0,8	1,0					
France							
Germany a)							
Hungary							
Italy							
Norway							
Poland							
Portugal	18,2	18,4	19,5	19,1	19,2	-2,2	0,5
Slovenia							
Spain				56,0	63,0		12,5
Sweden							
Switzerland							
Türkiye	125,0	174,8	164,3	115,9	126,1	-29,4	8,8
United Kingdom							
Total CAEF							

a) included in Table 26

Table 33

Zinc in t

Country	Year	Pressure die casting	general engineering	automotive industry	other	Total Production
Czech Rep.	2020					800
	2021					900
	in %					12,5
France	2020					18.880
	2021					20.739
	in %					9,8
Germany	2020		83	1.349	48.330	49.761
	2021		161	1.359	39.575	41.095
	in %		95,5	0,7	-18,1	-17,4
Hungary	2020					1.662
	2021					1.542
	in %					-7,2
Italy	2020					75.834
	2021					95.089
	in %					25,4
Poland	2020					6.000
	2021					6.540
	in %					9,0
Portugal	2020		2.165			2.165
	2021		2.829			2.829
	in %		30,7			30,7
Slovenia	2020					7.477
	2021					8.187
	in %					9,5
Spain	2020		3.433	3.214	657	7.304
	2021		3788,0	3117,0	1068,0	7.973
	in %		10,3	-3,0	62,6	9,2
Switzerland	2020					762
	2021					1.054
	in %					38,3
Türkiye	2020		4.181	6.028	21.435	31.644
	2021		8.086	8.406	26.489	42.981
	in %		93,4	39,4	23,6	35,8
United Kingdom	2020					7.300
	2021					7.300
	in %					0,0

OTHER ALLOY CASTINGS

Table 34
Total production in t - Other alloy castings

Country	2017	2018	2019	2020	2021	2020/19 in %	2021/20 in %
Austria							
Belgium							
Bulgaria							
Czech Rep.							
Denmark	100,0	89,0	112,0				
Finland							
France	2.501,0	2.424,0	2.486,0	2.180,3	2.395,0	-12,3	9,8
Germany	3,7	5,2	5,2	19,0		265,5	
Hungary		93,0	86,0	99,0	77,0	15,1	-22,2
Italy	1.311,0	1.370,0	1.324,0	1.235,0	880,5	-6,7	-28,7
Norway							
Poland	2.900,0	2.900,0	3.000,0	2.400,0	2.616,0	-20,0	9,0
Portugal							
Slovenia					2374,0		
Spain	850,0	2.516,0	1.502,0	683,0	719,0	-54,5	5,3
Sweden							
Switzerland							
Türkiye							
United Kingdom							
Total CAEF	**7.665,7**	**9.397,2**	**8.515,2**	**6.616,4**	**9.061,5**	**-21,3**	**1,4**

WORLD PRODUCTION

Table 35

World production 2020, selected countries - Iron and Steel castings in t

Country		Iron castings	Nodular iron castings	Malleable iron castings	Steel castings	Total
Austria		33,400	91,700		9,600	**134.700**
Belgium		43,000	3,900		5,500	**52.400**
Brazil		1,148,123	468,952		269,512	**1.886.587**
Canada	***	330,841			90,091	**420.932**
China		21,750,000	15,300,000	630,000	6,350,000	**44.030.000**
Croatia		19,465	6,161		120	**25.746**
Czech. Rep.		117,000	34,500		41,000	**192.500**
Denmark	*	28,900	58,100			**87.000**
Finland		17,300	23,100		6,700	**47.100**
France		431,900	593,600		41,900	**1.067.400**
Germany		1,618,700	957,100		138,000	**2.713.800**
Hungary		16,500	58,000		2,000	**76.500**
India		7,911,763	1,095,522	50,000	912,893	**9.970.178**
Indonesia		77,783	42,060	86,940	128,724	**335.507**
Italy		534,400	300,600		58,000	**893.000**
Japan		1,598,113	1,169,743	29,439	153,000	**2.950.295**
Korea (Republic of)		881,400	670,700	500	150,000	**1.702.600**
Mexico	**	816,160	560,270		336,250	**1.712.680**
Norway	*	8,800	22,300			**31.100**
Pakistan	*	181,000	24,540		48,750	**254.290**
Poland		360,000	124,000		40,000	**524.000**
Portugal		26,100	76,100		4,100	**106.300**
Romania	*	15,000	1,500	3,500	3,500	**20.000**
Russia	*	2,184,000			1,134,000	**3.318.000**
Slovenia		59,300	39,800		17,600	**116.700**
Spain		283,100	582,800	16,300	65,300	**931.200**
Sweden		126,000	51,000		20,200	**197.200**
Switzerland		8,400	11,900		2,500	**22.800**
Taiwan		543,617	179,697		55,007	**778.321**
Türkiye		617,300	854,700		192,000	**1.664.000**
United Kingdom		128,400	195,600		41,600	**365.600**
United States		7,616,824				**7.616.824**

Source: Modern Casting, data can differ from CAEF data

* 2019 Results

** 2017 Results

*** 2015 Results

Table 36

World Production 2020 selected countries - Non-ferrous metal castings in t

Country		Copper	Aluminum	Magnesium	Zinc	Others	Total
Austria			106,798	4,504			**111,302**
Belgium							**52,400**
Brazil		20,524	160,464	4,534	1,064		**186,586**
China		870,000	6,800,000			250,000	**7,920,000**
Croatia		202	65,606			131	**65,939**
Czech. Rep.		16,000	77,400	300	800		**94,500**
Denmark	*	1,188	2,224			112	**3,524**
Finland		2,415	1,730				**4,145**
France		16,118	293,529		18,880	2,180	**330,707**
Germany		46,076	652,738	20,489	49,761	19	**769,083**
Hungary		729	118,900	250	1,662	99	**121,640**
India			1,344,182				**1,344,182**
Indonesia		46,086	182,586			25,600	**254.272**
Italy		38,168	540,296	3,676	75,834	1,235	**659,209**
Japan		57,019	343,651		13,792	82,146	**496,608**
Korea (Republic of)		24,100	642,200	12,000			**678,300**
Mexico	**	215,500	832,770		79,500	15,200	**1,142,970**
Norway	*		6,526				**6,526**
Pakistan	*	14,200	21,200			2,730	**38,130**
Poland		4,800	272,000		6,000	2,400	**285,200**
Portugal		16,203	31,966		2,165		**50,334**
Romania	*	3,000	60,000	2,000	250	90	**65,340**
Russia	*	117,600	588,000	75,600		100,800	**882,000**
Slovenia		990	44,618		7,477		**53,085**
Spain		15,279	101,317		7,304	683	**124,583**
Sweden			56,400				**56,400**
Switzerland		2,023	10,815		762		**13,600**
Taiwan		27,368	481,593	6,237			**515,198**
Türkiye		24,851	449,503	761	31,644		**506,759**
United Kingdom		8,300	102,522	2,000	7,300		**120,122**
United States		304,279	1,425,120		47,786	354,802	**2,131,987**

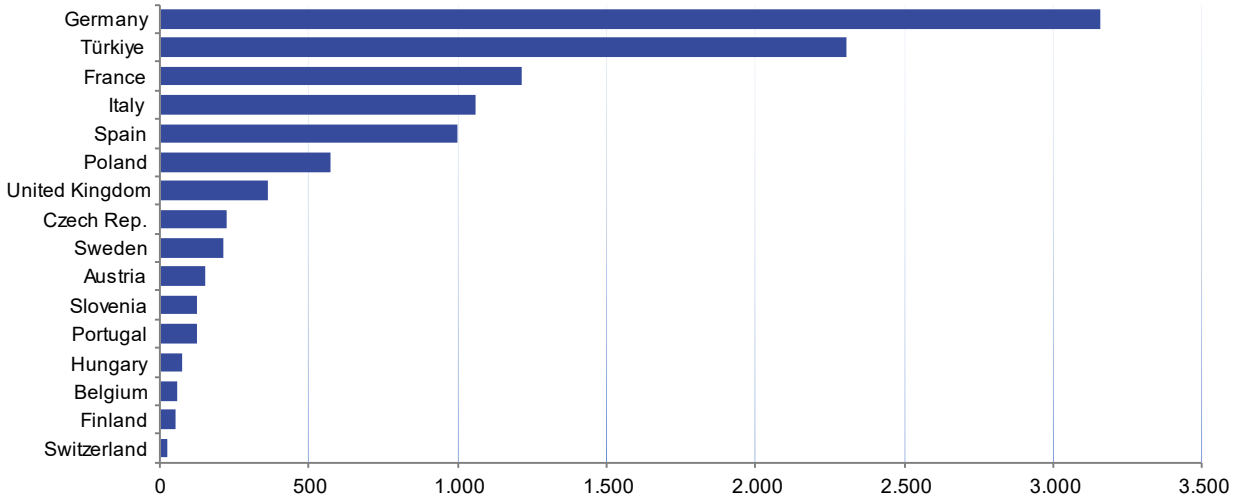
Source: Modern Casting, data can differ from CAEF data

* 2019 Results

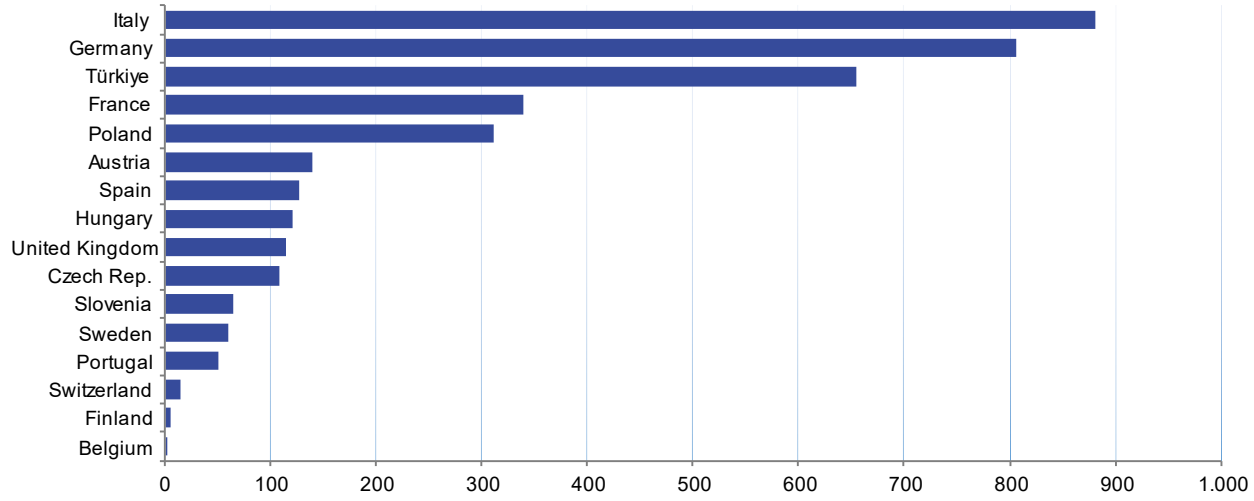
** 2017 Results

GRAPHS

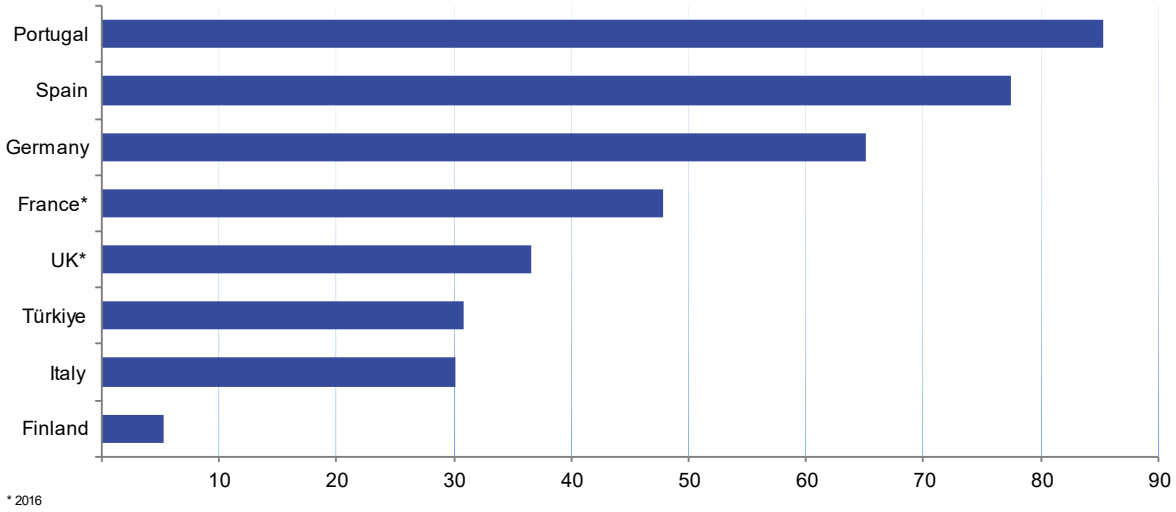
Production of Iron, Ductile Iron and Steel Castings in the European Foundry Industry 2021 (in 1.000 t)



Production of Non-Ferrous Metal Castings in the European Foundry Industry 2021 (in 1.000 t)

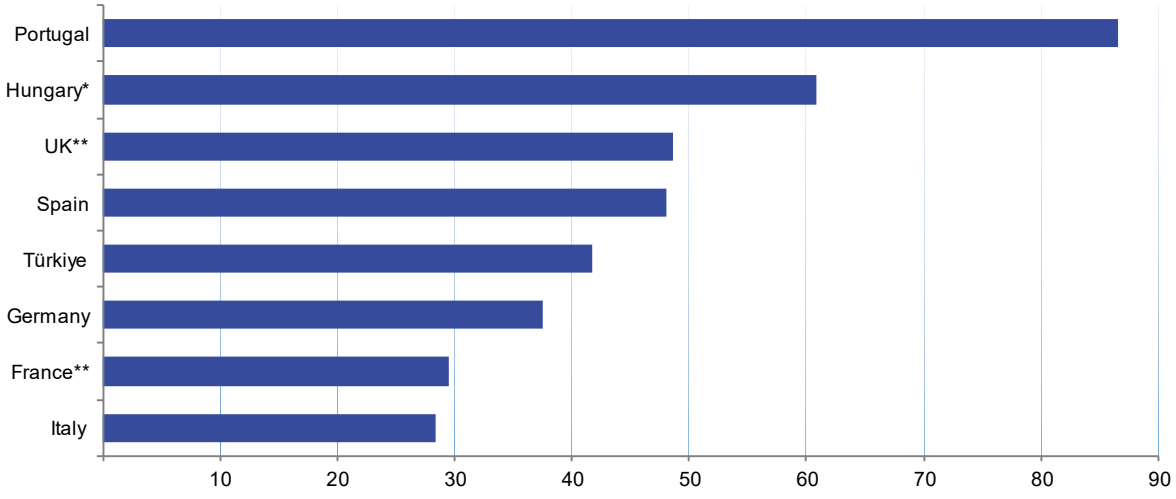


Iron Castings for the Vehicle Industry
National Production Share 2021 (in %)



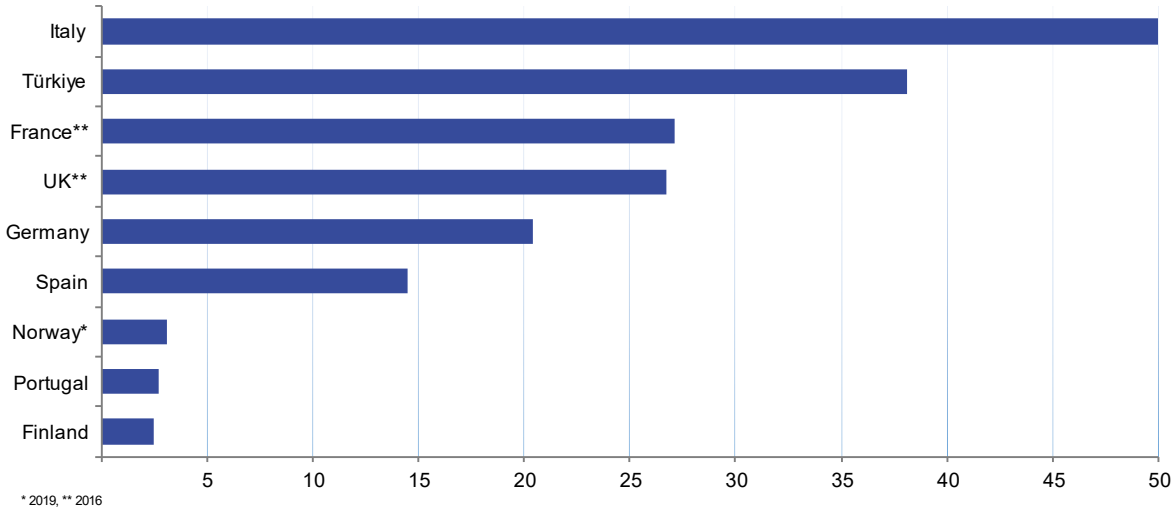
* 2016

Ductile Iron Castings for the Vehicle Industry
National Production Share 2021 (in %)



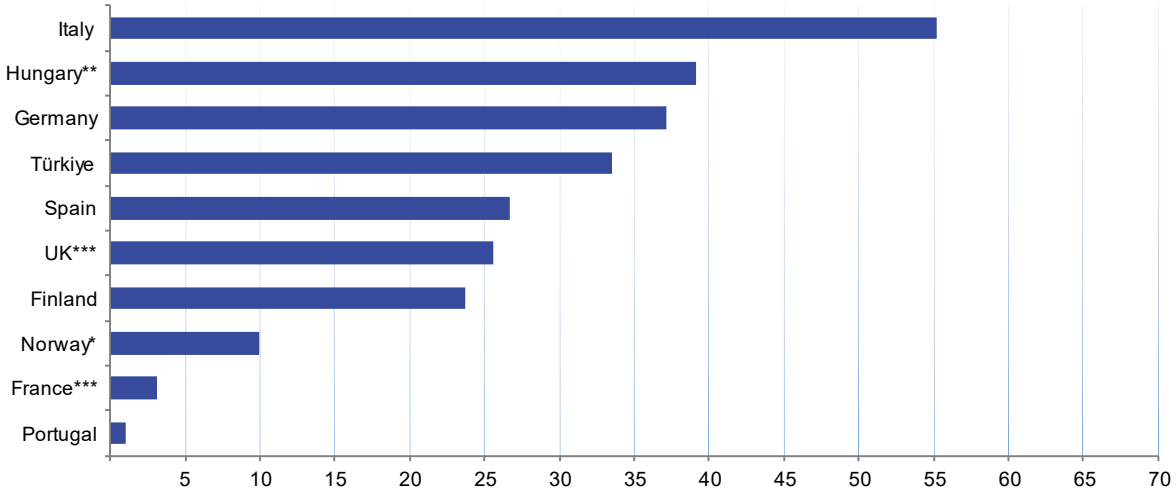
* 2017, ** 2016

Iron Castings for Engineering Plant and Machinery
National Production Share 2021 (in %)



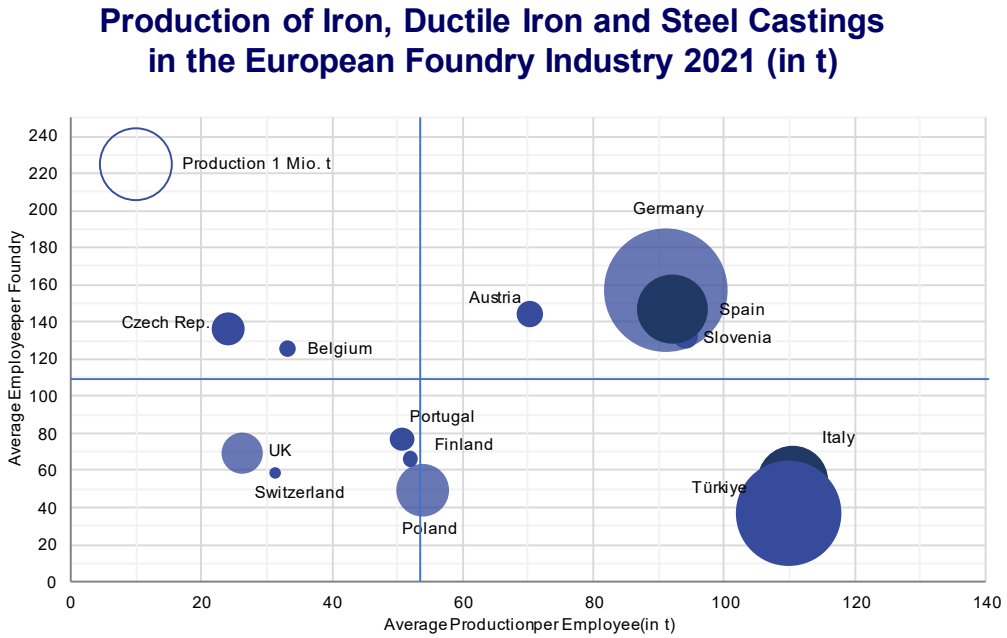
* 2019, ** 2016

Ductile Iron Castings for Engineering Plant and Machinery
National Production Share 2021 (in %)

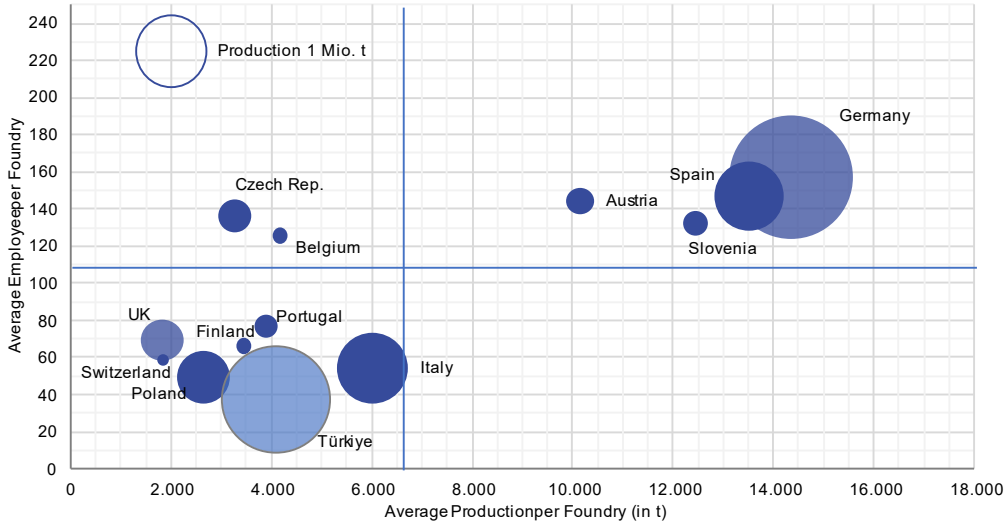


* 2019, ** 2017, *** 2016

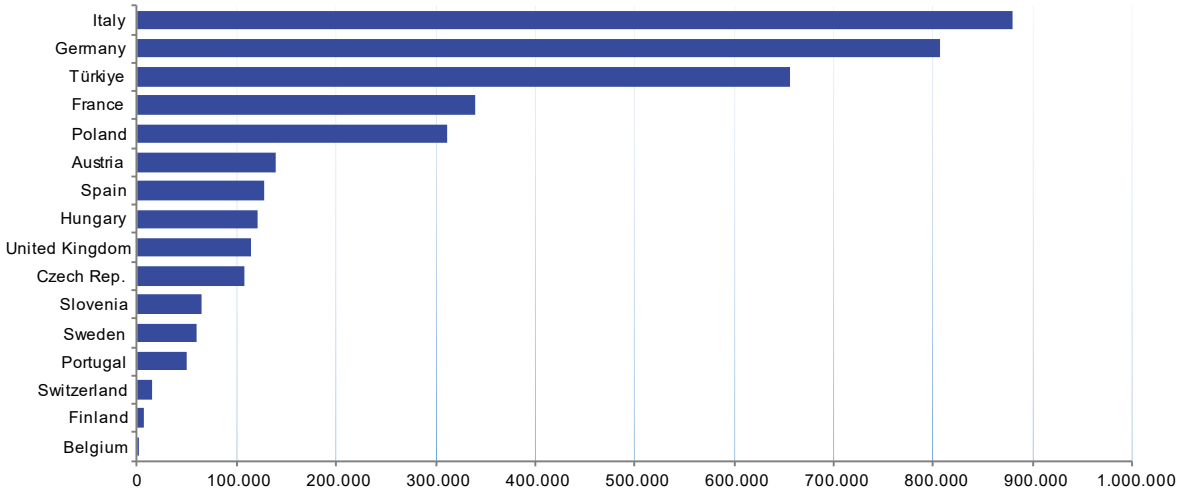
Average Production per Employee – Iron, Steel and Malleable Iron Castings



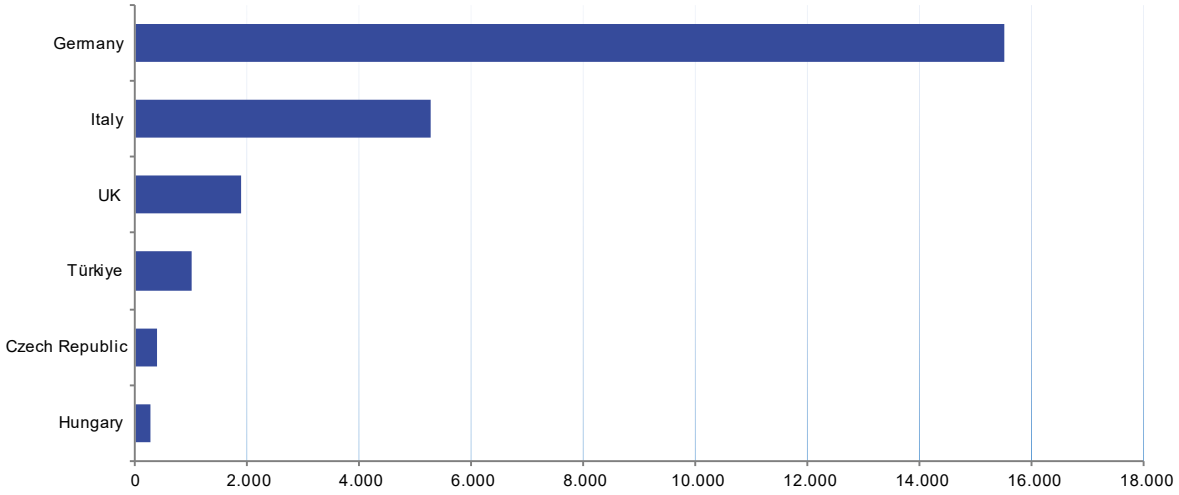
Average Production per Foundry – Iron, Steel and Malleable Iron Castings



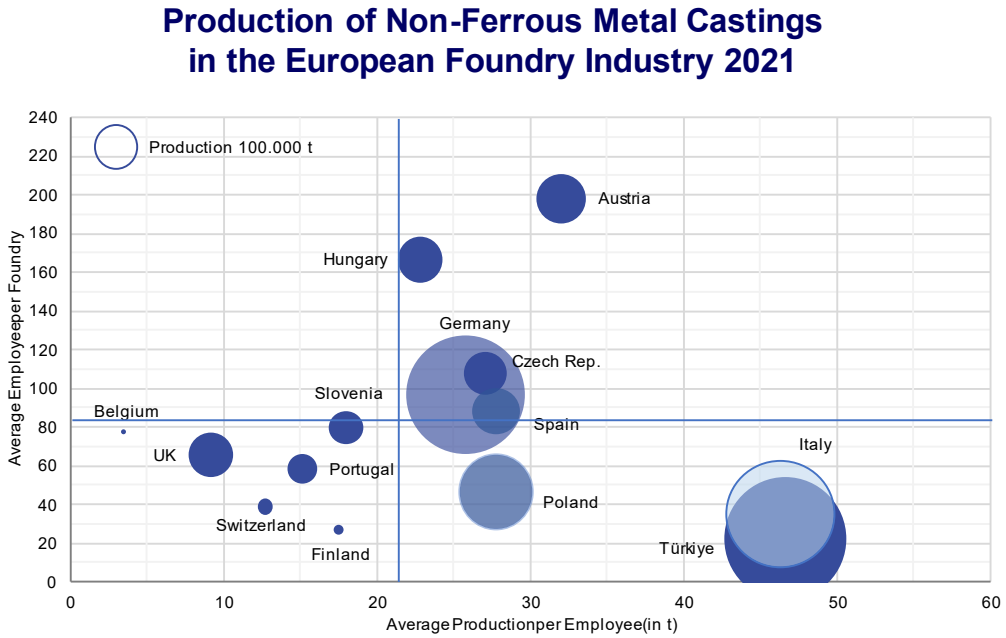
Production of Light and Ultralight Castings in the European Foundry Industry 2021 (in t)



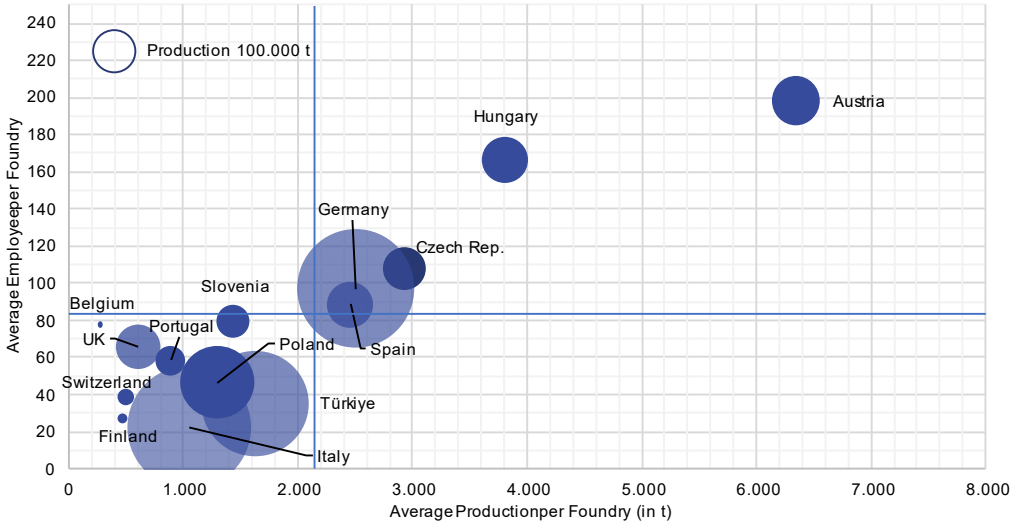
Major Producers of Magnesium Castings in the European Foundry Industry 2021 (in t)



Average Production per Employee – Non-Ferrous Metal Castings



Average Production per Foundry – Non-Ferrous Metal Castings



CAEF - The European Foundry Association
Commission for economics & statistics
c/o Bundesverband der Deutschen Gießerei-Industrie
Hansaallee 203, 40549 Düsseldorf, Germany
info@caef.eu, www.caef.eu

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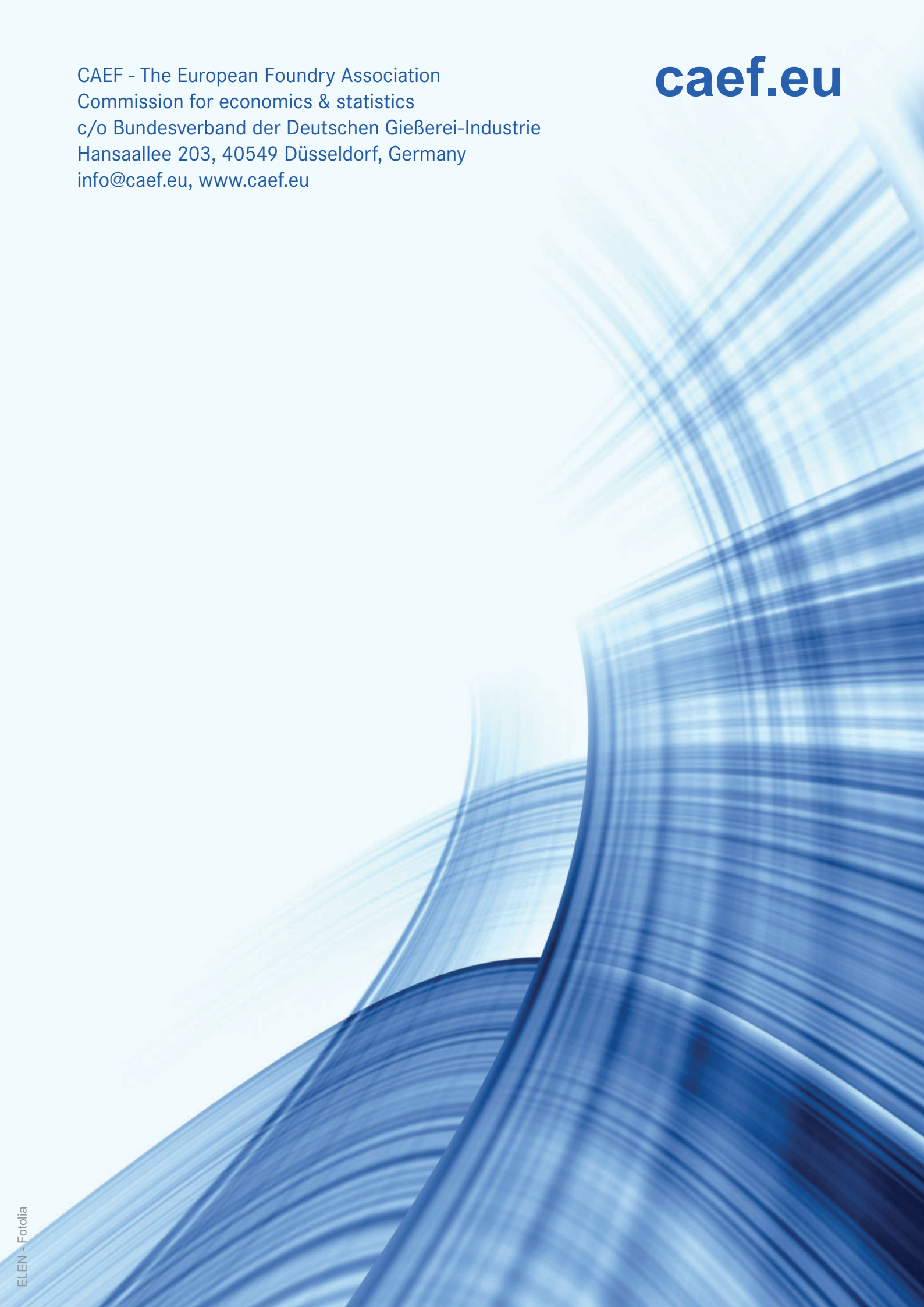

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