

MARKET STATEMENT OF THE CZECH REPUBLIC 2022

1. Economy of the Czech Republic in 2021.
2. Impact of COVID-19 pandemic on forestry in the Czech Republic.
3. Developments in Czech forestry in 2021 affected bark beetle outbreak.
4. Outbreak, damage, biotic and abiotic effects in forestry.
5. Forest area, species and age composition.
6. Results of forestry in the Czech Republic.
7. Measures in forestry related to climate change.
8. Legislation and measures to expand the market for timber and wood-based products in the forestry sector in the Czech Republic.
9. Energy production and consumption, energy production from renewable sources, wood and biomass.
10. Fluctuations in currency exchange rates, restrictions on exports of unprocessed timber and extra-regional consumption of forest products.
11. Forestry research and raising awareness towards more efficient market for timber and wood-based products.
12. Results of the Czech manufacturing industry.
13. Forest area, growing stock and market for raw timber.
14. Harvest and market for roundwood in the Czech Republic.
15. Production and market for pulpwood.
16. Coniferous and broadleaved sawn wood by sawmills.
17. Production and market for fuelwood.
18. Production and market for other wood-based products.
19. Pulp and paper production.
20. Forest certification.
21. Gross value added in industry and wood processing sector in the Czech Republic.
22. Housing and construction.

BASIC TRENDS IN THE ECONOMY AND TIMBER MARKET IN THE CZECH REPUBLIC IN 2021

1. ECONOMY OF THE CZECH REPUBLIC IN 2021

In the Czech Republic (CR), the 2020 COVID-19 pandemic has not receded since 1 January 2021. The entry into the new year 2021 was good for the country. The COVID virus was aggressive and attacked all ages of the population. At the beginning of the year, over 37,000 people had succumbed to the disease, more than 47% in the first 6 months. From 5 October 2020, a strong lockdown was declared in the Czech Republic **with strict adherence to all anti-epidemic measures. It was only terminated on 11 April 2021, having lasted for 254 days. It did not bring any fundamental changes** and caused the Czech Republic to experience a decline in the economy and an increase in debt.

In the first quarter of 2021, the country's GDP growth was only 2.3%; gross value added (GVA) grew by 2.1%, employment by 1.6%, while sales of new cars dropped. The industrial production index (IPI) of logging and wood processing was up by +4.6%, furniture manufacturing by +0.7%, while pulp and paper was down by -1.5% and printing by -0.9%. However, trade, transport, healthcare and the entire infrastructure were already functioning.

After the lifting of the lockdown in Q2, the economic activity rebounded strongly. The GDP growth increased by +8.7% and GVA by +8.4%. However, the Czech Republic had below average growth rates within the EU. Austerity was fast disappearing. There were more public employees than private ones and their salaries grew up to 4 times faster compared to the latter. In addition, a tornado swept through seven local municipalities in southern Moravia, destroying 1,200 brick houses, many of which had to be demolished. The tornado claimed six lives and caused extensive damage in the area.

In Q3, the country was no longer under anti-epidemic measures, but GDP grew by only +3.1%. Industry was not in good condition and lagged behind compared to 2020. A fall in car production by -23% dragged down the industry's growth rate by -4.3% and its capacity utilisation fell from 95% in Q2 to 56%. The production of rubber, plastic and electronic products and timber fell significantly. Exports of cars, electronic, electrical, mechanical and other products also experienced a decline.

In Q4, the Czech Republic was again hit by the pandemic. On 9 November, 14,939 cases of COVID were recorded in one day and a state of emergency was declared from 26 November to 25 December 2021, which the newly elected government of the Czech Republic lifted on the day it won the vote of confidence. The GDP of the country increased again by only +3.6%, GVA by +2.9%, exports fell by -5.7% and imports rose by +4%. Car production declined by 32.9% and thousands of cars were left unsalable with missing chips to be installed.

In 2021, the Czech energy sector also started to suffer. It was clearly confirmed that the country's geographical location and climatic conditions do not allow it to meet its energy needs using solely renewable sources. It was proven that it can solve its energy situation in the long term only with nuclear power, considering it a long-term and clean source of energy, classified as a green investment, with the same support and loans for the construction of alternative sources, with entitlement to subsidies and unhindered access to them. The classification of nuclear power and gas as green investments by the EU appears to be a rational solution.

The country's full-year average GDP growth of +3.3% and GVA growth of 3.0% in 2021 did not result in growth at higher values. Even in the EU, GDP grew year-on-year by +4.8%. GDP per capita at purchasing power parity in constant prices and in thousands of USD in the Czech Republic in 2021 was USD 39.78, which represented only 75.16% of GDP per capita. The year 2021 for the Czech Republic was a year of stagnation, high cost growth, living on debt, and mismanagement marked with high deficits. It was a year of energy crisis, inflation,

bureaucracy, and adverse effects from the green deal. The "BCD" (NACE) Czech industry grew by 6.6% year-on-year and the "C" industry by 7%. The car market fell year on year and returned to the 2019 figures. Wood processing production fell -5.5% but furniture rose by 11.4% and pulp and paper by 9%. For the first time this year, the Czech Republic imported more goods than it exported. There were 100,000 more job vacancies than job applicants, but 73% of these with insufficient education.

2. IMPACT OF COVID-19 PANDEMIC ON FORESTRY IN THE CZECH REPUBLIC

In 2021, the negative impacts of the COVID-19 pandemic and lockdowns in the Czech Republic also had an adverse effect on the sector of forestry. As a result of bark beetle outbreak, there were increasing volumes of harvesting and planting work. This was addressed using mechanisation, in particular more harvester technologies, even at the expense of sharply increasing production costs. The rapid proliferation of the bark beetle in the Czech Republic before 2021 had already caused not only an increase in logging, but also opening of forest stands and the creation of large clearings that will take many years to regenerate. The problems of expenditure and reduced economic results have already been reflected in the forestry sector. The year 2021 has seen the deepest economic downturn in the forestry sector since the creation of the Czech Republic.

Profits for forest owners have fallen significantly due to increased costs and heavily increasing volumes of silvicultural activities on plots affected by outbreaks. In addition, there were higher costs of investment, especially the financial needs for maintenance and construction of forest roads and logging roads. The state budget subsidies to tackle the bark beetle outbreak, as well as the forest management allowance and other support and payments from EU funds, have contributed significantly to profitability. If the subsidies had not been provided in 2021, the economic result would have fallen and would not have allowed the creation of financial resources for forest regeneration.

The total financial support per 1 ha of forest in the Czech Republic in 2021 was on average CZK 1,465 for state forests, CZK 4,662 for forests owned by towns and municipalities and CZK 4,641 for private forests. This has clearly made it possible to ensure sufficient financial resources for Czech forests, especially to finance the increase in the volume of silvicultural activities in forest regeneration, in particular after the bark beetle outbreak, and other necessary expenses. Without these subsidies, many forest enterprises would have serious existential problems.

The final economic results of forest owners in the Czech Republic were favourably influenced by the rise in timber prices in 2021. This was reflected year-on-year in 2021 for domestic spruce roundwood logs of grade III. C, where the price increase was 76.5%, while for III. D the increase was 95.2% and for III. A/B 61.4%. The year-on-year increase was smaller for pulp, with spruce pulpwood increasing by 28.5% and pine pulpwood by 14.5%. There was a smaller increase in broadleaved pulpwood, namely for logs grade III. C in oak and beech by 10.1% and 5.7% respectively. The average price in 2021 was CZK 1,106/m³ for beech and CZK 1,126/m³ for oak. The average price for coniferous fuelwood reached 503 CZK/m³ and there was a slight increase of 2.7% in broadleaved fuelwood, with an average price amounting to 1,132 CZK/m³.

However, the situation concerning prices in the Czech Republic's foreign trade in wood was not good in 2021, as import prices exceeded export prices. The annual average price of one cubic metre of roundwood in exports in 2021 reached CZK 1,938 against CZK 1,208 in 2020; in imports, its price reached up to CZK 2,051 in 2021 against CZK 1,817 in 2020. For industrial timber, roundwood and pulpwood, the total (industrial) annual average in imports in 2021 was CZK 2,107 against CZK 1,877 in 2020.

3. DEVELOPMENTS IN CZECH FORESTRY IN 2021 AFFECTED BY BARK BEETLE OUTBREAK

High proliferation of bark beetle presented a **special chapter in the management of forest enterprises in the Czech Republic**. In 2021, but rather towards the end of the year, the bark beetle outbreak was already slowed down in most of the country and almost stopped in some areas. Nevertheless, it continued especially in the forests of North Bohemia. This was the third year that bark beetle had been destroying forests and the consequences were alarming. The course of the bark beetle outbreak in the Czech Republic proves that the area of the related logging decreased from 50,000 ha to 46,000 ha nationwide.

The volume of 14.2 million m³ of spruce timber affected by bark beetle was recorded, which is a decrease of approximately one third compared to 2020. This is almost exclusively wood infested by the spruce bark beetle, usually accompanied by the six-toothed spruce bark beetle and, in most of the Czech Republic, the double-spined bark beetle. On spruce, the beetle occurred in a form of outbreaks, so that on average the harvested bark beetle wood represents an alarming 11 m³ per 1 ha of spruce stands of all age classes. In the long term, the total amount of reported wood affected by bark beetle in 2021 was close to the situation in 2018. After the record years 2019 and 2020, this was the third highest volume of processed bark beetle wood ever recorded.

The achieved state shall also be attributed to improved weather conditions, the professional work of foresters, but above all to the measures taken by the forestry sector of the Ministry of Agriculture of the Czech Republic. These included support or just simplification of administration and other necessary assistance for small non-state forest owners, but also for large enterprises. Higher rainfall during the 2021 growing season increased the vigour of stands and the resistance of individual trees. A total of 49.8 thousand ha were reforested, i.e. a year-on-year increase of 20.8%. It is expected that after 2021, forestry could slowly return to positive figures.

The annual timber harvest per capita in the Czech Republic between 2000 and 2010 was between 1.4 and 1.6 m³. During the bark beetle outbreak, it was 3.1 to 3.4 m³, even approaching the annual per capita harvest in the USA.

4. OUTBREAK, DAMAGE, BIOTIC AND ABIOTIC EFFECTS IN FORESTRY

In the case of abiotic damage, the situation in forestry is practically stable and the volume of damaged timber in recent years has ranged from 6.1 million m³ to 6.5 million m³. Windthrow accounts for the largest proportion, almost 60%, followed by drought, which amounts to about 30%. Damage caused by wet snow and ice, as well as frost and fires, is not as significant. Traditionally, coniferous stands are the most affected.

In terms of biotic impacts in forests, 14.2 million m³ of the total spruce harvest was recorded as due to bark beetle infestation, with a decrease of one third compared to 2020. The occurrence of leaf-eating insects was registered in negligible quantities on an area of 1.3 thousand ha.

The extreme infestation of forest stands by wood borers has been recorded in recent years at altitudes of up to 800 m, so the mountain areas continue to be much less affected. The southern, central and northern parts of Bohemia are currently much more infested. The outbreak is clearly moving north-westwards, while in the north-east of the Czech Republic, where the situation was worst in previous years, the situation is improving.

5. FOREST AREA, SPECIES AND AGE COMPOSITION

The area of forest land amounted to 2,678,804 ha, compared to 2,677,329 ha in 2020. The growth is caused by the increase in the area of newly afforested (formerly non-forest) land and partly the result of the constantly refining data in the land register.

The species composition of forests continues to show a reduction in the total area of coniferous stands. In contrast, the proportion of broadleaved trees is steadily, albeit slowly, increasing, particularly as to beech, oak and maple. In terms of species biodiversity of Czech forests, the occurrence of stand mixtures within the units of spatial distribution is also an important indicator. The proportion of mixtures of individual tree species within these units is steadily increasing in favour of mixed stands and stands dominated by broadleaves. This trend was also observed in 2021. This is thanks to a continuous effort by foresters to achieve an optimal species composition of forests, supported by a targeted state subsidy policy over the long term.

The age structure of forest stands is uneven. In recent years, the area of over-aged stands over 120 years old has been increasing. This may represent economic losses in the future, caused by the forest management regime in protected areas and protection forests, but also by postponing the regeneration of economically unattractive, less accessible and lower quality stands. The area of stands under 60 years of age is significantly below normal.

The data on the total growing stock in Czech forests show an increase in the stock of timber, more than doubling compared to 1930. This is partly the result of higher growth, and partly of the refinement of stock survey methods by the introduction of new methods and instruments in the 1960s and 1970s. In direct comparison with previous years, there has been a slight decrease in the total growing stock. The growing stock is not available for logging at full scale. The harvestability of the growing stock in protection and special purpose forests is limited by the fulfilment of protective functions or by specific management for the purposes of nature conservation. In the Czech Republic, logging is almost excluded in reserves and in the first zones of national parks. The average growing stock per 1 ha of forest land is 267.7 m³.

6. RESULTS OF FORESTRY IN THE CZECH REPUBLIC

The area of regenerated forest stands in the Czech Republic is a record 49,790 ha and shows a significant increase compared to previous years. As opposed to 2020, the total regenerated area increased by 9,504 ha. This is an expected consequence of reforestation of clear-cuts after large-scale salvage cutting. The increase in the area of natural regeneration by 2,496 ha is considered positive. The share of broadleaves in total artificial regeneration reached a relative value of 52.1%.

After a significant drop between 2018 and 2020, there was an increase in average raw timber prices for all coniferous species. For example, the average price of spruce assortment grade III A/B (spruce logs), at CZK 2,215/m³ in 2021, increased by CZK 843/m³, i.e. by 61% year-on-year. The overall economic situation of forest owners improved significantly year-on-year, mainly as a result of the increase in prices of raw timber and subsidies paid from the state budget (in particular the contribution to mitigate the impacts of the bark beetle outbreak). The average economic result of forest owners for state forests, forests of towns and municipalities and private forests (including contributions - subsidies for forest management) for 2021 was CZK 4,488/ha of forest land, being one of the best in the long time.

The fact that the Ministry of Agriculture provided financial contributions for forest management from its budget in accordance with the government regulation was significant. This was a record amount of CZK 1,793.8 million, an increase of CZK 613.7 million compared

to 2020. The Ministry of Agriculture also continued to provide financial contributions to mitigate the impacts of the bark beetle outbreak and paid CZK 3,299 million by the end of 2021.

7. MEASURES IN FORESTRY RELATED TO CLIMATE CHANGE

Activities related to climate change have focused on the impacts of bark beetle infestation, forest protection, the creation of new forest areas, the conservation of genetic resources, as well as the modernisation of forestry machinery, equipment and new technologies. Measures to support the timber market were based on previously adopted government resolutions and are being addressed not only by the Ministry of Agriculture but also by the respective faculties, e.g. the Faculty of Forestry and Wood Sciences of the Czech University of Life Sciences in Prague or the Faculty of Forestry and Wood Technology of Mendel University in Brno, and others, in cooperation with other universities or relevant ministries and institutions.

The measures to mitigate the impacts of climate change on forest protection continue mainly from 2019 and include the promotion of sustainable forest management and increasing the resilience of forest ecosystems, the ecological value, the potential of forest stands, soil protection and the regulation of water quality and quantity. They also address the growing pressure to use renewable resources, where timber has the desired potential for development, and are also implemented using Earth remote sensing methods.

Investments have been increased in the production of quality reproductive material, in the protection of soil improving and stabilising tree species, and to increase support for the environmental and social functions of forests. These measures are still proving insufficient while funding for further measures is lacking.

8. LEGISLATION AND MEASURES TO EXPAND THE MARKET FOR TIMBER AND WOOD-BASED PRODUCTS IN THE FORESTRY SECTOR IN THE CZECH REPUBLIC

The basic legislation governing forest management is Act No 289/1995 Coll., on Forests and on Amendments to Certain Acts (Forest Act), as amended.

In 2021, this Czech Forest Act was amended in connection with the implementation of European Union regulations concerning non-native invasive species. This, among other things, brings the responsibility and control related to the expansion of European larch and Douglas fir under the provisions of the Forest Act, and establishes provisions regarding the share and collection of information on non-native invasive tree species. In connection with the implementation of European Union legislation on invasive non-native species, the Game Management Act was also amended, establishing the conditions for killing animals requiring regulation. The legal provisions on game management are contained in Act No 449/2001 Coll., on Game Management, as amended.

Government Decree No. 30/2014 Coll., on establishing binding rules for the provision of financial contributions for forest management and selected game management activities, was amended by Government Decree No. 455/2021 Coll. This stipulated, in particular, new contributions for mechanical land preparation prior to forest regeneration and for the deposition of slash on piles or mounds with its retention for decomposition in the forest stand. It abolished the existing contribution for repeated artificial regeneration by planting and increased the rates of all contributions for forest management.

9. ENERGY PRODUCTION AND CONSUMPTION, ENERGY PRODUCTION FROM RENEWABLE SOURCES, WOOD AND BIOMASS

Electricity production decreased by 6.4% to 81.4 TWh. The drop was due to the COVID-19 pandemic. Although household consumption increased by +4.7%, the consumption by businesses in particular decreased significantly. The most pronounced decline was seen in the spring, when a number of large enterprises were temporarily closed. In the last quarter of the year, electricity generation grew slightly and **final consumption recorded its highest level since 1983**. The largest increases were recorded at the high and very high voltage levels, i.e. the more energy demanding operations. In contrast, consumption fell for households and small businesses. The industrial sector accounted for the largest share of consumption, at more than 30%, followed by households, at almost 25%, and the trade, services, education and health sectors, which accounted for about 20%. The difference between the fall in production and consumption at the national level was largely due to lower exports of electricity from the Czech Republic to other countries, which were down by more than 20% at 10.2 TWh.

In 2021, 9,321 new photovoltaic power plants were connected in the Czech Republic. This was 3,028 more than in 2020. Smaller rooftop installations continue to dominate, so that just under 400 of these with a total capacity of 19.2 MWh were built on the roofs of companies and commercial buildings in 2021.

In terms of energy generation from wood as a renewable source, biomass dominates; energy derived from wood chips, pellets, wood, straw, biogas and biofuels. It accounts for between 80 and 85% of total renewable energy, but only represents approximately 18% of energy consumption. Electricity production from biomass increased by 100 GWh, which was +4.2%.

10. FLUCTUATIONS IN CURRENCY EXCHANGE RATES, RESTRICTIONS ON EXPORTS OF UNPROCESSED TIMBER AND EXTRA-REGIONAL CONSUMPTION OF FOREST PRODUCTS

The issue of exchange rate fluctuations depends mainly on the inflation growth in recent years. The primary causes of high inflation are the huge government budget deficits of the past two years, labour shortages and possibly other influences. Nevertheless, these are more likely to be factors for higher interest rates as the economy "overheats".

The issues of unprocessed timber following the bark beetle outbreaks did not really need to be addressed. Partly unprocessed timber remained in stockpiles, mainly at sawmills, and was used in the years of increased economic growth, as was unprocessed timber that remained for a shorter period at logging decks in forests.

There was also no need to address regional consumption of forest products as it remained rather stable from year to year, although the 2021 result was lower. The time period and methodology of data collection was similar to previous years and provided a solid input data and information base even in 2021 in time series with previous years. Overall, 35.22 thousand tonnes of forest crops were harvested in 2021, which was slightly lower compared to the long-term average of 38.82 thousand tonnes.

11. FORESTRY RESEARCH AND RAISING AWARENESS TOWARDS MORE EFFICIENT MARKET FOR TIMBER AND WOOD-BASED PRODUCTS

The area of forestry research and education for higher efficiency of the market for timber and wood-based products was mainly the responsibility of the Government of the Czech Republic. Government documents were developed and put into practice by the relevant ministries and selected central authorities. Public research institutions, relevant faculties of universities, and companies dealing with this issue are also directly involved in this issue. The respective companies normally submit impulses and proposals to support research, development and innovation.

Among public research institutions, the Forestry and Game Management Research Institute is involved in applied and basic research projects in the forestry sector. The authority of the Institute is the Ministry of Agriculture. The main focus of the Institute's activities is on applied and basic research projects in the forestry sector, but also in the sector of game management. It deals with the implementation of research results into practice, provides expert and advisory services for the state administration, owners and managers of forests of all categories regardless of ownership and legal form.

The main activity of the Institute was the implementation of 16 projects of the National Agency for Agricultural Research and 10 projects of the Technology Agency of the Czech Republic. In the field of international cooperation, the activities of the International Cooperative Programme on forest health monitoring by ICP Forests continued. With the support of the EEA and Norway Grants programme, two international projects were carried out and the issues were addressed as to fulfilment of forest production and regulation functions from the past to the future and what can be expected from forest ecosystems affected by climate change.

Activities were also concentrated in the international organisations IUFRO (International Union of Forest Research), EFI (European Forest Institute) and EUFORGEN (European Forest Genetic Resources Programme).

Furthermore, there were projects solved for the city of Ostrava and 8 projects solved for the Grant Agency of the state enterprise Lesy České republiky. The institution contributed significantly to the development of legislative measures and conceptual materials in connection with the bark beetle outbreaks and climate change.

The Faculty of Forestry and Wood Technology of Mendel University in Brno is a leading institution in the fields of forestry, game management, landscaping, arboriculture, technical biology of trees, technology and management of wood processing, wood construction and furniture manufacture. In these fields, it is engaged in research, development and expert activities.

The Faculty is very successful in projects of national providers, especially in the field of applied research, experimental development and innovation. Total 47 projects have been solved for the Technology Agency of the Czech Republic, the National Agency for Agricultural Research, the Ministry of Industry and Trade, the Ministry of Culture, the Ministry of Education, Youth and Sports, the Ministry of the Environment and the Czech Science Foundation.

The Faculty of Forestry and Wood Sciences of the Czech University of Life Sciences in Prague covers the whole area of education, science and cooperation with practice in the field of forestry and wood science and technology. One of the long-term and strategic goals is to create excellent outputs in science and research that will also bring benefits for practice and for society. The results from these outputs are gradually transferred to practice and also implemented in teaching at the Faculty. For the application of science and research results into practice, 54 applied outputs intended for practice and society were addressed.

Research activities were funded within research projects from national and international grant agencies. There were 68 projects, 55 of a national character (or funded from EU structural funds) and 13 international projects funded by foreign providers. There was ongoing work on the implementation of EXTEMIT-K project, aimed at creating an excellent scientific team that shall address current and future issues in forest ecosystems in the Czech Republic caused by climate change and seek scientific solutions for the protection of forests as carbon sinks. The excellent EVA4.0 research project, aimed at building a Centre of Excellent Research, continued to be implemented. It is primarily about finding excellent, scientifically validated results for the involvement of forestry and wood science in Industry 4.0.

Important foreign projects included (I) RESONATE (Horizon 2020 programme), (II) SUPERB (Horizon 2020 programme) with lead partner European Forest Institute, CLIMAFORCEELIFE (LIFE programme), WWF Slovakia, (II) TEACHER-CE (Interreg CENTRAL EUROPE), University of Ljubljana, (III) Fem4Forest (Interreg Danube Transnational Programme), Slovenian Forestry Institute, (IV) HUNTOUR (ERASMUS+), Czech University of Agriculture in Prague and (V) FRAME (ERASMUS+), University of Helsinki. The Faculty of Environmental Sciences of the Czech University of Life Sciences in Prague addressed current issues of man-used landscape in Central Europe, in particular the protection and enhancement of ecological stability of the landscape, biodiversity, ecology of populations and communities, nature conservation, care of protected areas, landscape ecology, optimization of water regime in landscape, impacts of climate change on the hydrological conditions of watersheds, soil vulnerability to droughts and floods, reclamation processes, landscape space organisation, waste management, old environmental burdens, application of geoinformation technologies in environmental sciences and spatial planning, pollution transport, as well as environmental impact assessment (EIA and SEA), environmental geochemistry, hydrogeology, geology and paleoecology, environmental management systems and environmental education. The focus is thus on the environmental-ecological field.

It has carried out a total of 74 basic and applied research projects. The participating foreign agencies were the European Commission (4 projects), INTERREG (4 projects), Norwegian Funds (2) and Viegard Fund (1). Funding for the projects is provided by the Government of the Czech Republic as well as by individual state and private companies and organisations.

12. RESULTS OF THE CZECH MANUFACTURING INDUSTRY

For the Czech manufacturing industry as a whole, the IPI (industrial production index) in 2021 represented an annual growth of +6.6% against a reduction of -7.2% in 2020.

Wood processing (NACE 16 CZ) showed a loss-making annual IPI growth of -5.5% and sales growth of +27%, while in 2020 a growth of +4.1% was achieved and sales grew by only 1%. Wood processing in this sector in 2021 was lower year-on-year due to decreased **raw timber harvests, namely by up to -5,613 thousand tonnes**. Specifically, coniferous roundwood production fell by -2,985 thousand m³ per year, coniferous pulpwood production by -1,196 thousand m³ and coniferous sawn wood by -198 thousand m³. In 2021, 8,900 thousand m³ of roundwood was processed by sawing, while in 2020, this was 9,700 thousand m³. There was also a decline in the export of roundwood, from 15,993 thousand m³ in 2020 to 12,949 thousand m³ in 2021, which represents a decrease of -19%. The reason for this reduction in exports was the current situation on the coniferous roundwood market in Europe. Import prices were rising faster than export prices. An increase in annual production occurred for plywood, particle boards, OSB and fibre boards, by about 2%. Other production remained slightly above or at 2020 levels, with the exception of wood pellets, which recorded annual

growth of 2.7%. Domestic consumption showed an annual decline, except for consumption of particle boards, which was affected by higher imports.

Pulp and paper manufacture (NACE 17 CZ) increased its IPI growth by +9% against +3.9% in 2020, while sales were up by 15%. The year 2021 was a successful year for pulp and paper production in the Czech Republic, with output actually exceeding the 2019 level. The overall pulp production increased by 20 thousand tonnes year-on-year, to a total of 614 thousand tonnes. With an annual increase in imports of **11.9%**, **this allowed exports to grow by 36%. For paper, paperboard and cardboard – other pulp, production was up 4.6%, imports almost 10 times and exports almost 7 times. New industrial orders in this sector increased by 4%.**

Printing and reproduction of recorded media (NACE 18 CZ) increased annual IPI growth by up to +10.2% against -4.2% in 2020. Sales were up +10% against a decline of -4.4% in 2020. This sector has long been showing IPI increases in the lower growth ranges or below the plus level.

Manufacture of furniture (NACE 31 CZ). In the Czech furniture industry, IPI increased by +11.4% against a decline of -6.3% in 2020. In absolute terms, it was CZK 54.6 billion compared to CZK 49 billion in 2020. Sales were up by 13% against -4.8% in 2020. There was also an increase in exports of Czech furniture of around CZK 36 billion. A further higher and otherwise possible annual expansion of production in 2021 was facing shortages of required materials, components and delivery delays. Also in 2021, a significant share of sales of imported furniture was recorded in the Czech Republic, mainly as a result of price developments in the lower segments of the furniture market.

13. FOREST AREA, GROWING STOCK AND MARKET FOR RAW TIMBER

The forest area in the Czech Republic has been estimated at 2,923.2 thousand ha and the forest cover is currently 37.1%. In the period 2016-2020, the forest cover increased by +0.6% and the total forest land increase was +58.4 thousand ha. A total of 49,790 ha were reforested by artificial and natural regeneration, compared to only 40,286 ha in 2020. At the end of the year, the area of clear-cuts to be reforested was 76,592 ha and the year-on-year increase reached 8%.

The growing stock in the forests of the Czech Republic is given in m³ without bark (mass of timber to the top 7 cm o.b.). The stock has been gradually increasing over the long term, despite the fact that some changes have occurred as a result of the bark beetle outbreak. The total stock of timber in forests in 2000 was 630.5 million m³, while in 2020, it was 701.1 million m³ and in 2021, there was a slight decrease to 698.8 million m³. Thus, in direct comparison with previous years, there was a slight decrease in the total growing stock of timber in forests.

Raw timber harvest totalled 30,256 thousand m³, of which 28,714 thousand m³ of coniferous timber and 1,542 thousand m³ of broadleaved timber were harvested. The excess stocks at logging decks from the previous years 2019-2020 were successfully sold. The volume of coniferous roundwood delivered to the market was total 17,301 thousand m³, which was -14.7% less than in 2020. Coniferous pulpwood was delivered in total 6,841 thousand m³ and coniferous fuelwood in total was only 4,463 thousand m³, which is -27.6% less than in 2020. As regards broadleaves, 438 thousand m³ of roundwood were delivered to the market, 453 thousand m³ of pulpwood and 647 thousand m³ of fuelwood. The share of salvage cutting in total logging decreased to 86.9%, compared to 95% in 2020.

14. HARVEST AND MARKET FOR ROUNDWOOD IN THE CZECH REPUBLIC

Total 30 256 million m³ of raw timber were harvested, i.e. a decrease of 15.4% or 5,498 million m³ compared to the previous year. Per capita harvest was 3.34 m³ in 2020, but 2.88 m³ in 2021. Processing of salvage cutting accounted for a significant share of this volume, amounting to 26.28 million m³ of timber. The proportion of salvage cutting was 86.9%, which means that the unfavourable initial conditions for planned forest management persist. In terms of the composition of timber harvest by species, the volume of coniferous timber decreased by 5.77 million m³ compared to 2020 to a total of 28.72 million m³. The volume of harvested broadleaved timber was 0.28 million m³ higher than in 2020 and totalled 1.54 million m³. The share of coniferous timber in overall harvest was approximately 95%, compared with 86.9% between 2011 and 2015. The disproportion between broadleaved and coniferous timber harvesting is mainly due to the processing of salvage cutting, in particular brought about by bark beetle outbreaks.

Total coniferous and broadleaved roundwood harvested in 2021 amounted to 17,739 thousand m³ against 20,678 thousand m³ in 2020, representing an annual reduction in harvesting of up to -16.6%. It should be noted, however, that between 2011 and 2015, the average annual harvest totalled 22.9 million m³, of which conifers accounted for 86.9% and broadleaves 13.1%. In 2021, the volume of harvested coniferous roundwood was 17,301 thousand m³, compared to 20,286 thousand m³ in 2020. For broadleaved roundwood, the reported harvest was 438 thousand m³ in 2021, compared to 392 thousand m³ in 2020.

Exports of raw timber were reduced by up to 3,236 thousand m³ year-on-year to a total of 14,836 thousand m³. Imports of raw timber decreased year-on-year by 203 thousand m³ to a total volume of 2,014 thousand m³.

The active balance of foreign trade with raw timber in 2021 was increased year-on-year by CZK 4,968 million to total CZK 23,599 million. As recorded, 89% of the total export value was exported to EU-27 countries. Most exports were made to Austria (39.3%), Germany (16.7%), Poland (11.8%), Slovakia (11.5%) and Romania (5.8%). Outside the EU-27, most raw timber was exported to the People's Republic of China, worth CZK 2,733 million. The volume of wood harvested in the EU amounted to CZK 772 million and 984 thousand m³. Imports of raw timber were mainly from EU-27 countries, accounting for 96.2% of the total import value, with the largest share coming from Slovakia (30.8%), Poland (22.0%) and Germany (26.9%).

Resulting from lower exports, domestic consumption of coniferous roundwood was increased to 8,801 thousand m³ compared to 2020, while in 2020 it was only 6,969 thousand m³. Domestic consumption of broadleaved roundwood was 305 thousand m³ while in 2020 it was 315 thousand m³. Despite the strong demand for coniferous roundwood, pulpwood and fuelwood on the domestic market, which led to an increase in domestic consumption, a significant part of this raw material continued to be exported, accounting for up to 53.5% of the coniferous roundwood and 45.7% of domestic coniferous sawn wood production.

15. PRODUCTION AND MARKET FOR PULPWOOD

Total coniferous and broadleaved pulpwood production was reported at 7,294 thousand m³ against 8,359 thousand m³ in 2020. Of this, coniferous pulpwood production was 6,841 thousand m³ in 2021 but 8,036 thousand m³ in 2020. Broadleaved roundwood production was 453 thousand m³ in 2021 and 323 thousand m³ in 2020.

The volume of imported coniferous pulpwood was 270 thousand m³ against 166 thousand m³ in 2020. Imports of broadleaved pulpwood amounted to 2 thousand m³ against 1 thousand m³ in 2020. Coniferous pulpwood was exported in the volume of 3 thousand m³, i.e. almost half of its annual production. In 2020, exports of coniferous pulpwood were 1,545

thousand m³. Broadleaved pulpwood was exported in the volume of 90 thousand m³ compared to only 1 thousand m³ in 2020.

Domestic consumption of coniferous pulpwood reached 4,111 thousand m³ against 6,657 thousand m³ achieved in 2020. Domestic consumption of broadleaved pulpwood reached 365 thousand m³ against 323 thousand m³ in 2020.

16. CONIFEROUS AND BROADLEAVED SAWN WOOD BY SAWMILLS

The timber industry processes almost exclusively domestic renewable raw material, mostly coniferous and broadleaved roundwood. Despite certain progress, the main problem for the timber industry remains to be the lack of capacity, particularly in smaller plants for the cutting of coniferous roundwood and, above all, for the further processing of sawn wood. The production of coniferous and broadleaved sawn wood by domestic sawmills decreased by 198 thousand m³ year-on-year to a total of 5,160 thousand m³. This was a result of a decline in the cutting capacity of small, inefficient sawmills in connection with a significant increase in the price of coniferous roundwood, which was more than 50%. Increased demand for sawn wood continued in Europe, both for national consumption and for further export to more distant territories (USA, China, Japan, etc.). A significant increase in the consumption of sawn wood was also recorded in the Czech Republic, with a year-on-year increase of 934 thousand m³, mainly as an effect of an increase in construction activities. Reflecting the partial year-on-year decline in coniferous roundwood harvest and the more than 50% increase in the price of coniferous roundwood in the entire Central European area (Germany, Austria, Poland, the Czech Republic and Slovakia), and especially of spruce and pine roundwood of inferior quality, large and medium-sized wood processing companies in this area have generally reached their optimum processing capacities and reflected the increased costs in the price of sawn wood. Sawmills in Germany and Austria still have higher prices than sawn wood producers in northern and eastern Europe. Therefore, even large sawmills with an annual log cut exceeding 300 thousand m³ (Stora Enso Timber, s. r. o, Ždírec nad Doubravou, Stora Enso Timber Planá s. r. o, Mayr-Melnhof Holz Paskov, Pila Lukavec, Pila Javořice, Labe Wood sawmill in Štětí) are still heavily dependent on the export of sawn wood. Thus, out of the total production of coniferous sawn wood of 5,015 thousand m³, the export amounted to 2,291 thousand m³. To cover the domestic consumption of 3,250 thousand m³, it was necessary to import 526 thousand m³ of coniferous sawn wood from abroad.

The total coniferous and broadleaved sawn wood produced amounted to 5,160 thousand m³ compared to 5,358 thousand m³ in 2020. A total of 864 thousand m³ was imported compared to 771 thousand m³ in 2020. Coniferous and broadleaved sawn wood exports reached 2,358 thousand m³, while in 2020 it was up to 3,397 thousand m³. Domestic consumption of coniferous and broadleaved sawn wood was 3,666 thousand m³ compared to 2,732 thousand m³ in 2020.

Coniferous sawn wood production was 5,015 thousand m³, compared to 5,213 thousand m³ in 2020. The volume of 526 thousand m³ was imported in 2021, but only 483 thousand m³ in 2020. Coniferous sawn wood exports amounted to 2,291 thousand m³, as opposed to 3,352 thousand m³ in 2020. Domestic consumption of coniferous sawn wood was 3,250 thousand m³, in comparison with 2,344 thousand m³ in 2020.

For broadleaved sawn wood, the production volume was reported at 145 thousand m³, similar to 2020. Imports of broadleaved sawn wood amounted to 338 thousand m³ against 288 thousand m³ in 2020. Domestic consumption of broadleaved sawn wood was 416 thousand m³, while in 2020, it was 388 thousand m³.

17. PRODUCTION AND MARKET FOR FUELWOOD

The production of all fuelwood showed a decline of -31.4%, representing a production of 5,110 thousand m³ against 6,717 thousand m³ in 2020. The production of coniferous fuelwood alone reached 4,463 thousand m³, against 6,165 thousand m³ in 2020; the annual growth rate falling by -38.89%. The volume of produced broadleaved fuelwood amounted to 647 thousand m³ against 552 thousand m³ in 2020. The annual growth rate was 17%.

A total of 344 thousand m³ of coniferous and broadleaved fuelwood was exported, compared to 234.5 thousand m³ in 2020. The volume of 290 thousand m³ of coniferous fuelwood alone was exported, while it was only 166 thousand m³ in 2020. Of broadleaved fuelwood, 54 thousand m³ were exported, compared to 68.2 thousand m³ in 2020.

Imports of coniferous and broadleaved fuelwood totalled 50 thousand m³ against 48.7 thousand m³ in 2020. The volume of 21 thousand m³ of coniferous fuelwood was imported against 17.9 thousand m³ in 2020. Imports of broadleaved fuelwood totalled 29 thousand m³ against 30.8 thousand m³ in 2020.

Total domestic consumption of coniferous and broadleaved fuelwood was 4,816 thousand m³ compared to 6,531 thousand m³ in 2020. Domestic consumption of coniferous fuelwood was 4,194 thousand m³ and of broadleaved fuelwood 609.6 thousand m³.

18. PRODUCTION AND MARKET FOR OTHER WOOD-BASED PRODUCTS

The production and market for other wood-based products in the Czech Republic have remained broadly in line with the normal trend of recent years. This is a selection of wood-based products such as particleboard, OSB, fibreboard, plywood, wood chips and particles and wood residues, wood pellets and other agglomerates.

a) **Particleboard, including OSB.** The production reached 1,710 thousand m³ against 1,711 thousand m³ in 2020. Exports were 1,321 thousand m³ against 1,566 thousand m³ in 2020. Imports amounted to 705 thousand m³ compared to 471 thousand m³ in 2020. Domestic consumption was 1,094 thousand m³, but only 616 thousand m³ in 2020. The year-on-year increase in domestic consumption growth was 77.6%.

b) **OSB.** The production totalled 745 thousand m³, while in 2020, it was 937 thousand m³. The annual decline was -25.8%. Exports were 517 thousand m³ compared to 691 thousand m³ in 2020, i.e. an annual decrease of -33.7%. Imports amounted to 126.5 thousand m³ against 155 thousand m³ in 2020, a decrease of -22.5%. Domestic consumption amounted to 354.5 thousand m³ against 401 thousand m³ in 2020, with an annual reduction of -13.1%.

(c) **Fibreboard.** The production was 45 thousand m³, compared to 44 thousand m³ in 2020, an annual increase of 0.23%. Exports were 156 thousand m³, but 247 thousand m³ in 2020, with an annual drop of -58.3%. Imports reached 574 thousand m³ against 493 thousand m³ in 2020, which is an annual increase of 16.4%. Domestic consumption was 463 thousand m³; in comparison with 290 thousand m³ in 2020, this was an increase of 59.7%.

(d) **Plywood.** The production was 260 thousand m³ against 263 thousand m³ in 2020, with an annual decrease of -0.12%. Exports totalled 245 thousand m³ against 186 thousand m³ in 2020, with an annual increase of 31.7%. Imports were 186 thousand m³ against 129 thousand m³ in 2020, i.e. an annual increase of 44.2%. Domestic consumption was recorded at 201 thousand m³ while it was 206 thousand m³ in 2020, i.e. a drop of -0.7%.

(e) **Wood chips, particles and residues.** The production totalled 1,733 thousand m³ against 1,727 thousand m³ in 2020. Exports were 257 thousand m³, but in 2020, they were 436 thousand m³, which is a decline of -69.6%. Imports were quantified at 202.5 thousand m³ against 202.4 thousand m³ in 2020. Domestic consumption was 1,678.5 thousand m³ compared to 1,490.4 thousand m³ in 2020, thus representing an annual growth of 12.6%.

(f) **Wood Pellets and other Agglomerates.** The production totalled 634 thousand m³ against 629 thousand m³ in 2020. Imports were reported at 85 thousand m³, compared to 74 thousand m³ in 2020, i.e. an increase of 14.9%. Exports amounted to 475 thousand m³, while in 2020, they were 384 thousand m³, representing an annual growth of 23.7%. Domestic consumption was 244 thousand m³ against 319 thousand m³ in 2020.

(g) **Wood Pellets.** The production was 490 thousand m³ against 477 thousand m³ in 2020. Exports were 403 thousand m³ against 329 in 2020, showing a growth of 22.5%. Imports were reported at 39 thousand m³ against 32 thousand m³ in 2020, i.e. an increase of 21.8%. Domestic consumption was 126 thousand m³, while it was 180 thousand m³ in 2020, representing a decrease of -42.9%.

19. PULP AND PAPER PRODUCTION

For the production of paper and dissolving pulp (viscose), 4,632 thousand m³ of raw softwood were consumed, which was 141 thousand m³ less than in 2020, while in 2019 the consumption of this wood was 4,417 thousand m³. Of the total volume of raw coniferous wood, 3,018 thousand m³ of coniferous pulp and 1,614 thousand m³ of coniferous wood chips and particles were consumed.

The pulp and paper industry produced 614 thousand tonnes of paper pulp, of which 611 thousand tonnes of chemical pulp and 3 thousand tonnes of other pulp. Paper pulp production thus increased by 20 thousand tonnes year-on-year. Production of dissolving pulp was similar to 2020, at around 285 thousand tonnes. Since 2010, dissolving pulp has been produced by the Austrian company Lenzing at its subsidiary Biocel Paskov. The dissolving pulp produced in the Czech Republic is processed by Lenzing company in Austria for the textile industry, but also in its companies in Indonesia and China.

As regards paper, paperboard and cardboard, according to the CEPI classification, production increased by 8 thousand tonnes to a total of 901 thousand tonnes, i.e. by 0.9%. Imports of printing and writing paper accounted for 483 thousand tonnes while imports of wrapping and packaging paper amounted to 1,010 thousand tonnes. In 2020, this was 450 thousand tonnes of printing and writing paper and 861 thousand tonnes of wrapping and packaging paper. Exports of these products totalled 900 thousand tonnes. Total domestic consumption of paper, paperboard and cardboard was 1,624 thousand tonnes, which was 173 thousand tonnes more than in 2020. Subsequently, to meet the demand in terms of product mix and the volume of overall consumption of paper products, a total of 1,623 thousand tonnes had to be imported.

The disparity between production and domestic consumption of the required assortments always results in a significant loss in the foreign trade balance.

The consumption of paper is obviously still increasing. The annual consumption of paper in the Czech Republic is about 155 kg per inhabitant. A total of 1,107 thousand tonnes of recovered paper was used for recycling, representing 68.2% of the domestic consumption of all paper, cardboard and paperboard. In 2020, this was 4 thousand tonnes less, but 0.9% more in relation to domestic consumption. Total 973 thousand tonnes of recovered paper were exported, but 87 thousand tonnes were imported. Thus, only 221 thousand tonnes of recovered paper were consumed domestically.

20. FOREST CERTIFICATION

Certification of forest estates is not necessary in the Czech Republic, but it is a voluntary administrative tool for the forest owner to promote sustainable management of Czech forests. Forest certification is proof that the respective forest management units in the Czech Republic are part of a certified region, which is managed in accordance with the approved standards of sustainable forest management according to the Czech Forest Certification Scheme.

By means of the certificate, the forest owner declares its commitment to manage the respective forest according to predefined criteria. Obtaining the certificate also gives forest owners the right to use the FSC or PEFC logo. The current requirements regarding the use of forests involve not only the issues of timber harvest, but also the broad complex of social, ecological and economic functions of forests related to the sustainable use of natural resources.

In the Czech Republic, we currently use two certification systems - the FSC (Forest Stewardship Council) and PEFC (Programme for the Endorsement of Forest Certification schemes).

FSC ® Czech Republic. FSC Czech Republic is the Czech representative of the international organization Forest Stewardship Council® (FSC), which has created and manages a certification scheme for the certification of forests and wood-based products in the world. The FSC is certified by Mendel University in Brno – Masaryk Forest Training Enterprise at Křtiny, the Prague City Council, the Krkonoše National Park Administration, the Brno City Forests (Forest Administration Lipůvka) and other organisations. The total area of FSC certified forests reached 135,420 ha.

PEFC Czech Republic. PEFC Czech Republic is an independent organisation whose aim is to promote sustainable forest management and the consumption of wood as an environment friendly renewable resource, and to protect nature and sustainable development. PEFC Czech Republic is part of the globally most widespread forest certification system PEFC based in Geneva. The area of forests certified within the PEFC system reached 1,780,126 ha.

21. GROSS VALUE ADDED IN INDUSTRY AND IN THE WOOD PROCESSING SECTOR IN THE CZECH REPUBLIC

According to the statistical data of the Czech Statistical Office, gross value added (GVA) in industry reached CZK 5,550,548 million in current prices, while it was CZK 5,196,179 million in 2020. The annual growth of GVA in industry reached +6.8%.

The wood processing sector generated GVA of 97,833 million CZK, compared to CZK 89,331 million in 2020. The year-on-year growth represented an increase of +9.5%. The annual growth rate of GVA of the sector against GVA in industry was +2.7% higher.

22. HOUSING AND CONSTRUCTION

The Czech construction sector has increased its output in current prices (CZK) by 24.9% over the past ten years. However, there came a turning point in 2020. Mainly due to a decline in civil engineering caused by the COVID-19 pandemic, the construction output fell, which became more pronounced in the second half of the year. However, by that time, the Czech industry was already on the road to recovery, which did not happen in the construction sector. It was not until 2021 that the construction industry saw an increase in output. Year-on-year, the construction industry as a whole increased its growth by 1.4%, with building construction and civil engineering increasing by 1.5% and 1.0% respectively. The improvement in performance occurred only at the end of the second half of the year. Construction output growth was up 3.7% in October, only 2.0% in November but 8.1% in December. The total value of construction

contracts rose by 14.7% year-on-year, of which building construction by 10.2% and civil engineering by 18.4%.

The Czech construction industry achieved good results in residential construction. While this type of construction fell by -6.5% year-on-year in 2020, again due to the COVID-19 impacts, in 2021, it was up 28.3% year-on-year for initiated housing and 0.7% for completed housing. Despite the above-mentioned facts, 34,641 flats were completed in that year. There were 18,998 family houses built in 2021. Family houses are traditionally built mainly of clay brick. Although there is an abundance of quality timber on the market for the construction of family houses, the interest of investors in the construction of wooden houses has not been significantly raised, despite the use of awareness and advertising tools.