

**UN Economic Commission for Europe
Committee on Forests and the Forest Industry**

79th session

22 - 25 November 2021 **in Roma**

MARKET STATEMENT OF THE CZECH REPUBLIC 2021

1. Economy in the Czech Republic in COVID-19 pandemics in 2020 and development prognosis in 2021.
2. Factors influencing forest economy in the Czech Republic in 2020.
3. Trends in Czech forestry: drought and bark beetles and in logging timber in 2020.
4. Timber afforestation, regeneration and biotic agents within forest management in the Czech Republic in 2020.
5. Results of wood-processing industry and C-industry in the Czech Republic in 2020.
6. Economic stimuli and forestry-related legislation under COVID-19 and measures adopted to boost timber and timber-based products market in the Czech Republic in 2020.
7. Climate change, and new concepts for forests in the Czech Republic in long-term.
8. New incentives and benefits to producing energy from timber adopted by the Czech Government in 2020.
9. Support and measures related to research and development contributing to higher timber and timber based market efficiency in the Czech Republic in 2020.
10. Measures for increasing responsibility of social associations within forestry in the Czech Republic in 2020.
11. Stock, harvest and market with raw timber in the Czech Republic in 2020.
12. Harvest and market with roundwood in 2020.
13. Production and market of pulp wood in the Czech Republic in 2020.
14. Coniferous and broad-leaved sawn wood by Czech sawmills in 2020.
15. Production and market with fuel wood in the Czech Republic in 2020.
16. Market with other wood based products in the Czech Republic in 2020.
17. Production of pulp and paper in the Czech Republic in 2020.
18. Forest certification in the Czech Republic in 2020.
19. WPI contribution to C-industry development in the Czech Republic in 2020.
20. Gross value added in WPI and C-industry in the Czech Republic in 2020.
21. Electricity and energy from timber in the Czech Republic in 2020.
22. Carbon trace in the Czech Republic in 2020.

BASIC TRENDS OF ECONOMY DEVELOPMENT IN THE CZECH REPUBLIC IN 2020

1. ECONOMY IN THE CZECH REPUBLIC IN COVID-19 PANDEMICS IN 2020 AND DEVELOPMENT PROGNOSIS IN 2021

Czech economy had predicted an **annual GDP growth** by +2.4%, so a seventh year in a row.

However, unpredicted changes incurred under painful, COVID-19 related circumstances and the economy was not ready for that 2020 was a year of extremely deep depression for the Czech Republic, human lives were lost and economy declined. Only in Q2 2020, the capacity use in industry dropped by 70% and the state debt skyrocketed.

Hence, the 2020 GDP decline has predicted to reach -15%. The total GDP decline declined by -5.8% in 2020, as compared to the growth +3.0% and 3.2% in 2019 and 2018 respectively.

2020 gross value added (GVA) declined from +3.0% in 2019 by -5.6% due to reduced working hours by -6.0%. The GVA decline was the highest among the EU countries. As for agriculture, forestry and fishery, GVA grew by almost 5% (same as in 2019).

The revenues of Unipetrol, refinery and petrol group, and one of the biggest companies in the Czech Republic plummeted by half. Its operational profit declined by 2/3. The biggest domestic steel mill of Liberty Ostrava, OKD or Sokolovská uhelná, companies generating billions in profit, were hit by major losses and well as questions regarding the future. Similarly, SME enterprises both within industry and other sectors suffered high losses. Big enterprises coped better with economic loss as compared to SME as they generated provisions, and therefore they were able to face the issues even though with lower profit.

Medium economy, highly open, in debt due to COVID-19 (national debt of CZK 1,640,185m in 2019 grew to CZK 2,049,731m in 2020, i.e. 36% of GDP) could not cope with growing declines.

The prediction for the years to come is rather difficult. COVID-19, debt, growing prices, clean energy issues and the situation worldwide make it difficult to provide a reliable prognosis. Nevertheless, Czech economist estimate that GDP will grow by +4.2% in 2022 as compared to the prognosis of +3.2% in 2021. Nominal currency exchange rate CZK/EUR should move from CZK 25.7 in 2021 to 25.3 in 2022. In forestry, the total harvest is expected to drop by 26% in 2021 and by further 10% in 2022. The harvest decline concerns mainly coniferous timber. In 2022, roundwood production is expected to decline by 27% year-on-year; pulp wood production is expected to grow only by 1.2% due to sales issues.

2. FACTORS INFLUENCING FORESTRY ECONOMY IN THE CZECH REPUBLIC IN 2020

The forest management was negatively influenced by the decline of overall economy during COVID-19 pandemic and bark beetle situation. The forestry economy was hit badly too. All forest owners i.e. state, municipal and private forests, suffered a loss of -2,407 CZK/ha (profit before taxes excl. Government forest management subsidies) as compared to the loss of -750 CZK/ha in 2019. If including the Government subsidy per 1 ha of forest amounting to 2,207 CZK/ha, 4,918 CZK/ha and 5,764 CZK/ha to state, municipal and private forests respectively, the profit amounted to +1,291 CZK/ha in 2020; but it was not in line with the reality. However, in 2017 the profit under same circumstances totalled to 2,711 CZK/ha of forest. In 2020, the losses were record breaking. By the way, only expenses for reforestation 1 ha of forest grew by +23.1% in 2020 when compared to 2017; expenses for tending young trees grew by 35.3%; for pruning +47.9%, forest protection by +202%, timber harvest +14.6%, and for timber transportation +11.2%. Even though the industrial roundwood harvest had to be increased by 8.9% as compared to 2019 due to bark beetle outbreak, saw mills and logging companies suffered from employees shortage due to closed borders. Cross-border commuters could not enter the Czech Republic and forestry and wood-based companies were forced to reduce or totally stop their operation. Similarly to 2019, roundwood and other timber harvested due to bark beetle outbreak was exported to China. China suspended the export greatly due to the unwillingness to return containers due to incomplete fumigation.

Czech building industry, after growing for five years, declined by -6.2% year-on-year and the decline continued also in 2021 due to lack of labour force due to closed border. This is serious, especially as the building industry is connected with over 250k different companies, suppliers to other sectors of Czech industry incl. wood-based sector.

Except for necessary subsidies, Czech Republic does not regulate the market with forest-based products, as the market has been basically stable recently. CS NACE 16, 17, 18 and 21 experienced the same development as wood-processing industry. The former contributed to GDP by 2.18% in 2020 as compared to 2.29% in 2015. As for forestry, 2020 cannot be seen as a successful one when compared to the past.

3. TRENDS IN CZECH FORESTRY: DROUGHT AND BARK BEETLES AND IN LOGGING TIMBER IN 2020

After several years of drought, 2020 was a more favourable and wetter year. As for bark beetles, oscillating temperatures with many cold spells lasting differently long both slowed down their swarming and development and they influenced the speed of their development. Higher precipitation during the vegetation season increased forest stands vitality and hence the resilience of individual trees. After 2019, there were many bark beetles left able to attack new forest stands. The comparison of records of timber harvested due to bark beetles in 2019 and 2020 show that the volumes are basically the same. The 2H 2020 was warmer which deteriorate the situation.

Similarly to 2019, the harvest of coniferous trees continued to grow due to fast logging of trees affected by bark beetles. The production of coniferous roundwood and pulp wood grew by +8.4% +11.6% respectively; the harvest of broad-leaved timber dropped slightly. One has to stress that the harvest of broad-leaved timber is almost always 52-times lower than coniferous timber.

Economic impacts such as changing unit prices demonstrated as follows: price for imported coniferous roundwood dropped by almost 22% year-on-year, however, for broad-leaved roundwood the prices grew by 15.3%. Coniferous pulp wood experienced similar development: average import prices grew by 48.2% and broad-leaved pulp wood dropped by 7%. On contrary, export prices for coniferous roundwood grew by 17% year-on-year, but prices for coniferous pulp wood dropped by 58.5% and pulp wood could not be sold. There was basically no change in prices for imported coniferous sawn wood year-on-year. The annual increase of average export prices for coniferous sawn wood amounted to 12.5%; prices import for broad-leaved sawn wood dropped by 19.4% and grew by 40.2% for export.

Almost 4m m³ of timber were exported to Austria, Germany, Poland, Slovakia and Romania and 3m m³ of timber were exported to China.

4. TIMBER AFFORESTATION, REGENERATION AND BIOTIC AGENTS WITHIN FOREST MANAGEMENT IN THE CZECH REPUBLIC IN 2020

One third of the country is covered by forest and the Czech Republic remains the 20th country with highest forest coverage in Europe. The stock per hectare amounts to 268.64 m³. In spite of large clear areas caused by calamities, the stock in forests increased as compared to the previous years. As for annual increment, the Czech Republic ranked 6th place in Europe. Based on the records, the timber stock without bark exceeded 700m m³ in 2020. The same records show that the annual increment amount to 18m m³ per year. The National Inventory showed that the stock of Norway spruce dropped between 2011-2014 and 2019 dropped from the original 510.7m m³ to 430.2m m³.

Czech forests cover 2.667m ha. Coniferous species take up 70.4%; thereof 48.8% Norway spruce; broad-leaved species cover 28.2%. Czech foresters doubled the beech population and

reduced the spruce coverage by 15 p.p. and they strive to quadruple coverage of fir and pine. The Czech Republic has been trying to achieve correct species composition that is the key for forest resilience against insects and natural disasters.

The total harvest amounted to 35,753m m³, i.e. an annual increase by 3,168k m³. The harvest of coniferous and broad-leaved timber amounted to 34.486m m³ and 1.267m m³ respectively. The majority of harvested timber originated from salvage felling – 33.912m m³, thereof spruce 90.3%, pine 4.2%, beech 1.6% and larch 1.5%. Coniferous timber amounted to 96.5% of the total harvest. Timber harvested due to insects and natural disasters amounted to 26.243m m³ and 4.6m m³ respectively. Timber harvested due to bark beetles amounted to 21,904k m³.

As for abiotic factors, timber damaged by wind amounted to 60% of timber, i.e. 3.96m m³. Wet snow and frost damaged 175k m³ and 40k m³. Coniferous stands, mainly spruce and pine, were damaged by falling trees due to wind. Abiotic factors caused 6.5m m³ of salvage felling, i.e. the same value as in the previous year.

In 2020, damage inflicted by insects and the volume of thereof depended on individual groups and regional localisation in 2020. While the damage by insects destroying foliage was marginal with local exceptions, the damage by bark beetle grew in the past years. The damage inflicted by insects did not deviate from the past trends. Basically, the entire country suffered from the bark beetle outbreak on spruce. The recalculation shows alarming trend that over 17 m³ of spruce timber damaged by bark beetles per hectare were harvested in all age categories.

Reforested area (planting and sowing) recorded a major growth. The area of regenerated forests amounted to 40,286 ha, i.e. a year-on-year increase by 6,392 ha. The positive increase of area regenerated naturally by 1,391 ha in spite of deteriorated conditions for natural regeneration on calamity areas.

Artificial regeneration increased by 5,001 ha. Majority of areas was regenerated by broad-leaved species, i.e. 51.3%, thereof 23.8% by beech and 16.4% by oak. As for coniferous species, spruce and pine amounted to 30.7% and 7.4% respectively. 205.6m of plants were used for forest regeneration, thereof 62.6% of broad-leaved species. The area reforested by natural regeneration amounted to 6,615 ha, i.e. by 26.6%.

Average prices of spruce roundwood to but cut in sawmills were dropping since 2015. In 2015, the price amounted to CZK 2,256 per m³ and in 2017, 2019 and 2020 to CZK 2,072, 1,550 and 1,372 respectively. Spruce roundwood of III C, III D and III A/B prices dropped by -7.8%, -5.0% and -11.5% year-on-year respectively. Spruce and pine pulp wood prices dropped by -23.4% and -20.5% respectively in 2020. The average coniferous and broad-leaved fuel wood dropped as well by -24.9% to CZK 441 per m³ and -0.5% to CZK 1,102 m³.

In Czech Republic there are major issues with covering expenses for harvesting timber and regenerating forests.

5. RESULTS OF WOOD-PROCESSING INDUSTRY AND C-INDUSTRY IN THE CZECH REPUBLIC IN 2020

Czech processing industry ("C") the IPI (industrial production index) and revenues dropped by -7.0% and -6.7% respectively. Timber processing (NACE 16) grew year-on-year by +4.0 %, but revenues dropped by -0.9%.

Paper production (NACE 17) grew year-on-year by +3.9% but revenues dropped only by -0.2%. Print production (NACE 18) decreased year-on-year by -4.3% and revenues dropped by -4.4%. Furniture production (NACE 31) decreased year-on-year by -6.2% and revenues by -4.7%.

As for industry owned by Czech companies that process timber, we have been experiencing certain issues for several years. Labe Wood sawmill based in Štětí increased capacities and the breakdown has been growing since Q4 2020 to 250k m³ per quarter of a year; similarly Pfeifer Holzna sawmill located in Plzeň region increased breakdown by 800k m³ and Pila Javořice sawmill based in Prostějov district introduced new technologies and hence increased breakdown. Hence, the coniferous sawn wood production grew by 11.5% year-on-year to 5,213 k m³.

9,500k m³ of roundwood were processed in sawmills. Even though the export percentage of roundwood in the rough has been dropping since 2016, the export persists without major growth of value added which has no benefit for the Czech economy. Similar situation is with export of sawn wood. IPI of wood-processing sectors is not satisfactory.

IPI CZ in real prices of **NACE 16** grew by 4.0% as compared to the decline of -3.4% in 2019. The steady improvement was reached due sales to places that were not that useful in the past. The index of year-on-year revenue growth in wood-processing industry grew by 0.9%, contrary to decline of 3.8% in 2019.

IPI CZ in real prices of paper and pulp industry, **NACE 17**, grew year-on-year by 3.9% as compared to the growth of 3.4% in 2019. Nevertheless, the index of year-on-year revenue growth did not grow and the annual revenues in r.p. dropped by -0.2%.

IPI CZ in r.p. of printing industry, **NACE 18**, declined year-on-year by -4.3% as compared to the decline of -3.4% in 2019. The performance of this industry has been lacking behind since 2018. The index of year-on-year revenue growth dropped by -4.4% year-on-year and annual revenues in r.p. dropped by -0.7% in 2019.

Furniture industry, **NACE 31**, reported a major decline by -6.2% as compared to growth by 1.2% in 2019. As for revenues growth from industrial activities, the sector reported a year-on-year decline by -4.47% as compared to growth by 2.1% in 2019.

Growing number of boilers and heaters burning pellets in homes, the pellet production grew to the total of 629k tons, i.e. a year-on-year growth by 3.4% as compared to 2019.

6. ECONOMIC STIMULI AND FORESTRY-RELATED LEGISLATION UNDER COVID-19 AND MEASURES ADOPTED TO BOOST TIMBER AND TIMBER-BASED PRODUCTS MARKET IN THE CZECH REPUBLIC IN 2020

There were no stimuli in this area in form of legislation. However, some areas were regulated in relation to effective EU rules, such as:

1. 17 February 2020, the Government adopted resolution no. 116 regarding the concept of national forestry policy by 2035. The objective is to reach sustainable multi-functional forests and forest management that reflects current and expected social needs as well as current situation. This applies to consequences of climate change, rapidly changing environment and to extreme natural or anthropogenic influences. The resolution focuses on state-owned forest as well as on forest management in general.
2. Ministry of Agriculture enhanced its strategy by Ministry Strategy Implementation Plan by 2030. This comprises activities relating mainly to long-term subsidies among others compensation and services provided to forest according to Forest Act, subsidies from Rural Development Fund in order to provide for sustainable forest management while improving their condition. Subsidies were paid from these titles in 2020.
3. Government Decree no. 297/2020 Coll. extended the timber market, modified contributions to building new fences in forests, to planting forests and acquisition of cooling boxes for harvested game.
4. New legislation measures regarding the concept in relation with bark beetle calamity and climate change were issued in cooperation with selected central bodies, universities and Forestry and Game Management Institute.

7. CLIMATE CHANGE, AND NEW CONCEPTS FOR FORESTS IN THE CZECH REPUBLIC IN LONG-TERM IN 2020

New concept adopted by the Government focused mainly on achieving sustainable multifunctional forests and forest management and on mitigating adverse impacts of climate change on forest development to 2035.

The objective of this concept is to provide for balanced forests or future generations that provide all their functions regardless their owner. Defined tasks should increase the biodiversity and ecological stability of forest ecosystems while maintaining commercial function also with regard to potential impacts of climate change. These procedures should gradually increase the competitiveness of forest management incl. related sectors as well as their importance for regional development. It should also support consultancy, education, research and innovation in forestry and the entire wood-processing sector.

Based on the indicative indicators of strategic goals of this concept, the forest coverage should grow by further 1.2%, tree species composition should be more favourable and spruce

share should be reduced by 1%, roundwood in rough export should be reduced by 0.75% and wood consumption should grow by 1.04% as compared to 2020-2021 figures. The tasks also reflect current and expected social needs as well as current situation in forest management in the Czech Republic, which is extremely serious both due to climate change and hence rapidly changing environment and to extreme natural influences or impacts caused by human influence of forest stand structure.

In parallel, measures for regenerating forests damaged by imissions and by anthropogenic influence were implemented; nutrition of forest tree species was boosted by compensating lack of magnesium and calcium. Moreover, mainly investments into production of high-quality reproduction material, protection of amelioration and re-enforcing species as well as into support of environmental and social forest functions were increased. It transpired that these measures are not sufficient as is funding to low.

8. NEW INCENTIVES AND BENEFITS TO PRODUCING ENERGY FROM TIMBER ADOPTED BY THE CZECH GOVERNMENT IN 2020

Energy production from renewable resources grew by 265GWh year-on-year in 2020, i.e. by significant +2.6%. The share of energy from renewable resources hence grew to 13% in the Czech Republic, which is a significant percentage. Energy produced from biomass, from biogas from dump gas and from biodegradable waste grew by 100 GWh year-on-year, i.e. by +4.2%, +2.7% and 13.9%, respectively. Energy produced from other renewable resources grew year-on-year; the biggest growth as recorded in small hydroelectric power station by 15.1%. In 2020, energy product by photovoltaic power plants dropped by -2.3% whereas the installed output grew slightly, by 0.2%. Energy produced from big hydroelectric power station and wind mills decreased by -2% and -0.1% respectively. This has caused by long winter and water runoff.

Renewable energy resources comprise non-fossil natural energy resources in the Czech Republic. It means energy from water, wind, sun radiation, biomass, bio-gas and biologically degradable hard waste. Energy from biomass amounts to approx. 22% every year and its share on the entire renewable energy amounts to 2.5%. Bio-gas produces approx. 28% and its share totals to 3%. Biologically degradable hard waste produces only marginal part of energy. Hydroelectric power station totals to approx. 6.5% and its share on the gross energy production totals to 0.7%; photovoltaic energy to 25% and its share to 2.7%. Gross renewable energy may grow year-on-year by 7.6 – 8.0%.

9. SUPPORT AND MEASURES RELATED TO RESEARCH AND DEVELOPMENT CONTRIBUTING TO HIGHER TIMBER AND TIMBER BASED MARKET EFFICIENCY IN THE CZECH REPUBLIC IN 2020

In 2020, same as in the past, research and development concept for higher market efficiency, incl. timber and wood-based products was managed by the Czech Government. All measures listed in adopted documents are further elaborated and implemented by respective central administration bodies. The Czech Academy of Science joined the programme for the period of **2021 – 2027**. The Academy will cooperate directly with companies in order to inspire in long term. Therefore, companies' interest to cooperate with the Czech Academy of Science was growing. Support and measures related to research and development remains in hands of researches at universities and research institutes as well as to companies and non-governmental and non-profit organisations.

The **Forestry and Game Management Research Institute** (FGMRI) was set up that handle not only projects of applied and basic research. It is a public institute established by the Ministry of Agriculture of the Czech Republic. The Institute also introduces verified results into real life and it provides expertise and consultancy to state administration, forest managers and forest owners regardless their ownership and legal form.

In 2020, the Institute handled 13 partial research intents on forest and forest-base product market efficiency. These intents covered basically the scope of the Institute. Nevertheless, topics relating to with current forestry situation, i.e. negative impacts of meteorological factors on forest ecosystems, forest protection, reforestation of calamity-induced clear areas incl. best practices for reproduction material, silvicultural procedures to increase forest stands vitality, biodiversity and influencing the quality of produced timber.

As for contracted research, the Institute handled 8 projects in 2020, namely for Grant Agency of Czech State Forests. 8 activities assigned by the Ministry of Agriculture concerned expert and consultancy services for forest owners. FGMRI contributed greatly to drafting legislation measures and concepts relating to bark beetle outbreak and climate change in forestry in the Czech Republic.

Also the **Faculty of Forestry and Wood Sciences of the Czech University of Life Sciences Prague** is involved in the research and development of timber market. Along with research it plays a major role in education. The Faculty comments regularly significant legal and forest-policy related documents for the Ministry of Agriculture and Government. It discusses publicly forestry related issues as well as issues of related sectors. Faculty academics publish articles or appear in media, which helps to improve the perception of forestry and timber-based sector with public. In 2020, they published 81 articles related to forestry, i.e. the main focus of the Faculty.

As for application of the results of science and research into real life, there were 74 application outputs for practices for timber and timber processing. E.g. TreeZ web portal with mobile applications (for Android and OS) that allows determination, localization and monitoring of factors damaging trees. Another example are patents that handle the use of entomopatogenic fungi of *Beauveria bassiana* as the medium for combating pine weevil,

development of tablets with hydrophilic polymers and other substances improving the success of planting trees in areas with lack of precipitation and verification of declared origin of reproduction material by genetic markers.

Faculty of Environmental Sciences of the Czech University of Life Sciences Prague focuses mainly on environmental and ecological topics. There are 6 departments providing for research and main research streams are represented by 8 research (profile) teams.

The Faculty solves issues of man-used landscape in Central Europe, mainly the protection and increase of ecological stability of the landscape, biological diversity, and population and association ecology. It also deals with nature conservation, care for protected areas, landscape ecology, optimisation of water regime in landscape and impacts of climate change on hydrological balance of catchment area. It also handles topics such as flood and drought endangering the soil, re-cultivation processes, and organisation of landscape space, waste management, old ecological burdens, and application of geo-information technologies within environmental sciences.

Another institution active in the field is the **Faculty of Forestry and Wood Technology at Mendel University in Brno** (LDF MENDELU). It has 100 years of tradition and it develops creative activities in relation to education in context of sustainable timber production and its processing while respecting the needs of nature conservation and landscape care. In 2020, the Faculty has accredited to provide pre-graduate and post-graduate programmes within forestry and timber processing.

Major outputs comprise 176 original papers published in impact journals on Web Science (i.e. almost 30% more than in 2019).

10. MEASURES FOR INCREASING RESPONSIBILITY OF SOCIAL ASSOCIATIONS WITHIN FORESTRY IN THE CZECH REPUBLIC IN 2020

Same as in 2019, there have been no major changes like in the past years. Measures for increasing social responsibility of social associations are handled according to the effective legislation all over the country. As for forestry, these issues are incorporated in the National Forestry Programme as a task to support the improvement social situation of forestry workers and employees. The Government does neither regulate, nor steer towards any activities incl. social agenda.

Forest Management Entrepreneurs' Association with the Agrarian Chamber of the Czech Republic remains the major association. It provides legal consultancy, represents its members v legal issues and – under National Forestry Programme II – it set the tasks to monitor all employees in forestry sector, to maintain and develop their social securities, maintain and improve performance on forestry market, develop professional forest management as such while managing forest sustainably and duly.

Czech Academy of Agricultural Sciences – Forest Management unites employees within forestry research and university education. It has various expert committees used both by the Ministry of Agriculture and other central bodies and mainly employees in forestry sector.

Association of Communal and Private Forest Owners in the Czech Republic enforces ownership rights of its members, boosts the prestige of foresters, use of biomass and other social activities. It activates cooperation with local authorities as well as issues Ministry and other central bodies and institutions.

Important is also the Czech Forest Management Entrepreneurs' Association that enforces interests of SME incl. social issues. The Forestry Self-Employed Persons' Association that tries to create best conditions for employees and forest management development in the Czech Republic and supports trade, intermediates contacts among self-employed persons and provide legal defence to its members.

Activities of the associations above are evaluated annually in public material of the Ministry of Agriculture.

11. STOCK, HARVEST AND MARKET WITH RAW TIMBER IN THE CZECH REPUBLIC IN 2020

The total of 40,286 ha of new areas were afforested, thereof 5,865 ha of clear areas by natural regeneration and 750 under the canopy, i.e. 6,615 ha in total. 205,557k of plants were used for regeneration.

19,918 ha and 20,368 ha were regenerated by coniferous and broad-leaved species respectively. The clear cut area amounted to 70,912 ha, i.e. a growth by 30.1%.

The timber stock in forests total to 700m m³, i.e. the double of 2019.

The total timber harvest in Czech forests, i.e. the supply to internal market (excl. import), of coniferous and broad-leaved roundwood, pulp wood and fuel wood amounted to 35,754k m³, i.e. a year-on-year growth by 9.7%. This can be credited to higher salvage felling that total to 33,912k m³.

The total trade with roundwood in the rough coniferous and broad-leaved roundwood, pulp wood and fuel wood outside the Czech Republic with amounted to 15,757.4k m³, as compared to 14,145.8k m³ in 2019, i.e. an increase by 11.4%. In 2020, the import amounted to 995.1k m³ as compared to 1,353.1k m³ in 2019.

12. HARVEST AND MARKET WITH ROUNDWOOD IN 2020

The harvest of coniferous and broad-leaved roundwood, , i.e. the supply to internal market, totalled to 20,678k m³ as compared to 19,115k m³ in 2019, i.e. an increase by 8.2%.

The supplies of coniferous roundwood amounted to 20,286k m³ as compared to 18,714k m³ in 2019; the supplies of broad-leaved roundwood amounted to 392k m³ as compared to 401k m³ in 2019. Hence the harvest of coniferous roundwood increased by 8.4% year-on-year and of broad-leaved roundwood dropped by -2.2%.

The export of coniferous and broad-leaved roundwood amounted to 11,921k m³, i.e. an annual increase by 1.8%. The export of coniferous roundwood amounted to 11,741.3k m³, i.e. an annual increase by 2.3%; export of broad-leaved roundwood decreased by -22.4% year-on-year.

The import of coniferous and broad-leaved roundwood amounted to 675.5k m³, as compared to 1,111k m³ in 2019, i.e. an annual decline by -39.2%. The import of coniferous roundwood amounted to 555.1k m³, as compared to 966k m³ in 2019. The import of broad-leaved roundwood totalled to 120.4k m³ as compared to 145k m³ in 2019.

Domestic consumption of coniferous and broad-leaved roundwood amounted to 9,432k m³ as compared to 8,520k m³ in 2019, i.e. an annual growth by 10.7%. Domestic consumption of coniferous roundwood amounted to 9,100k m³ as compared to 8,206k m³ in 2019. Domestic consumption of broad-leaved roundwood amounted to 332k m³ as compared to 314k m³ in 2019.

The Czech Republic traded timber mainly within EU-28 countries, mainly with Germany, Austria, Slovakia and Poland.

13. PRODUCTION AND MARKET OF PULP WOOD **IN THE CZECH REPUBLIC IN 2020**

The total harvest of coniferous and broad-leaved pulp wood amounted to 8,359k m³ as compared to 7,549k m³ in 2019, i.e. an annual increase by 10.7%. The export of coniferous and broad-leaved pulp wood amounted to 3,836k m³ as compared to 2,440k m³ in 2019, i.e. an annual growth by 57.2%. The import of coniferous and broad-leaved pulp wood amounted to 279.6k m³ as compared to 242.1k m³ in 2019, i.e. an annual growth by 15.5%.

In 2020, the total harvest of coniferous pulp wood amounted to 8,036k m³ as compared to 7,203k m³ in 2019, i.e. an annual increase by 13.3%. The export of coniferous pulp wood amounted to 3,772.3k m³ as compared to 2,400k m³ in 2019, i.e. an annual growth by 57.2%. The import of coniferous and broad-leaved pulp wood amounted to 263k m³ as compared to 221k m³ in 2019, i.e. an annual growth by 19%.

The production of broad-leaved pulp wood amounted to 323k m³ as compared to 346k m³ in 2019, i.e. an annual decrease by 6.6 %. The export of broad-leaved pulp wood amounted to 64.2k m³ as compared to 40.1k m³ in 2019, i.e. an annual growth by 60.1%. The import of broad-leaved pulp wood amounted to 16.6k m³ as compared to 21.1k m³ in 2019, i.e. an annual decline by 21.3%.

Domestic consumption amounted to 4,803k m³ as compared to 5,351k m³ in 2019, i.e. an annual decline by -10.3%. Domestic consumption of coniferous pulp wood amounted to 4,527k m³ as compared to 5,024k m³ in 2019, i.e. a decline by -9.9%. Domestic consumption of broad-leaved roundwood amounted to 276k m³ as compared to 327k m³ in 2019, i.e. a decline by -15.9%.

14. CONIFEROUS AND BROAD-LEAVED SAWN WOOD **BY CZECH SAWMILLS IN 2020**

The share of export of coniferous and broad-leaved sawn wood in domestic production amounted to 63.4% due to problems with export not in Europe only. In 2019, this share amounted to 81.6%, and in 2016, it reached even 90.5%. Sawn wood is mainly produced by big, foreign producers such as Stora Enso Timber, s.r.o., Ždírec nad Doubravou, Stora Enso Timber Planá s.r.o., Mayer-Melnhof Holz Paskov and the domestic saw mills of Pila Lukavec and Pila Javořice.

In 2020, Czech saw mills had ready 9,500k m³ of coniferous and broad-leaved roundwood ready for breakdown, i.e. a year-on-year growth by 11.8%, caused by growing harvest due to combating the bark beetle outbreak. Saw mills broke down 5,358 k m³ of coniferous and broad-leaved sawn wood, i.e. a year-on-year increment by 11.3%, i.e. a double growth as compared to 2019 (542k as compared 266k m³ in 2019).

The production of coniferous sawn wood totalled to 5,213k m³ as compared to 4,675k m³ in 2019, i.e. a year-on-year growth by 11.5%. The production of broad-leaved sawn wood totalled to 145k m³ as compared to 141k m³ in 2019.

The problems in export demonstrated in 2020. The export of coniferous and broad-leaved sawn wood amounted only to 3,397k m³ as compared to 3,929k m³ in 2019, i.e. a year-on-year decrease by -13.5%. The export of coniferous sawn wood amounted only to 3,352k m³ as compared to 3,850k m³ in 2019, i.e. a year-on-year decline by -12.9%. The export broad-leaved sawn wood amounted to 45k m³ as compared to 79k m³ in 2019, i.e. a year-on-year decrease by -43%.

The import of coniferous and broad-leaved sawn wood amounted to 771k m³ as compared to 890k m³ in 2019, i.e. a year-on-year decrease by -13.4%. The import of coniferous sawn wood amounted to 483k m³ as compared to 563 m³ in 2019. The import broad-leaved sawn wood amounted to 288k m³ as compared to 327k m³ in 2019, i.e. a year-on-year decrease by -11.9%.

Domestic consumption of coniferous and broad-leaved sawn wood amounted to 2,731.9k m³ as compared to 1,777.3k m³ in 2019, i.e. an annual improvement by 53.7%. Domestic consumption of coniferous sawn wood copied the same growing trend and amounted to 68.9%; the domestic consumption of broad-leaved sawn wood decreased slightly by -0.4%.

15. PRODUCTION AND MARKET WITH FUEL WOOD **IN THE CZECH REPUBLIC IN 2020**

The total production of fuel wood amounted to 6,717k m³ as compared to 5,922k m³ in 2019. Due to bark beetle outbreak and long winter the year-on-year growth of production and domestic consumption amounted to 13.4% and 13.9%, respectively. The production of coniferous fuel wood amounted to 6,165k m³ as compared to 5,396k m³ in 2019, i.e. a year-

on-year increase by -14.3%. The production of broad-leaved fuel wood amounted to 552k m³ as compared to 526k m³ in 2019, i.e. a year-on-year increase by -4.9%.

In 2020, the export of coniferous and broad-leaved fuel wood amounted only to 234.5k m³ as compared to 239.2k m³ in 2019, i.e. a year-on-year decrease by -2%. The export of coniferous fuel wood amounted to 166.3k m³ as compared to 138.7k m³ in 2019, i.e. a year-on-year growth by 19.9%. The export broad-leaved fuel wood amounted to 68.2k m³ as compared to 100.5k m³ in 2019, i.e. a year-on-year decrease by -32.1%.

In 2020, the import of coniferous and broad-leaved fuel wood amounted only to 48.7k m³ as compared to 50.7k m³ in 2019, i.e. a year-on-year decrease by -3.9%. The import of coniferous fuel wood amounted to 17.9k m³ as compared to 17.8 m³ in 2019, i.e. a year-on-year growth by 0.6%. The import broad-leaved fuel wood amounted to 30.8k m³ as compared to 32.9k m³ in 2019, i.e. a year-on-year decrease by -6.4%.

Domestic consumption of coniferous and broad-leaved fuel wood amounted to 6,531.2k m³ as compared to 5,733.4k m³ in 2019, i.e. a year-on-year increase by 13.9%. Domestic consumption of coniferous and broad-leaved fuel wood grew 14.1% and 12.3%, respectively.

16. 16. MARKET WITH OTHER WOOD-BASED PRODUCTS IN THE CZECH REPUBLIC IN 2020.

The production and market with other wood-based products depends on the wood-processing industry that falls under NACE 17. The production development does not deviate from the standard development in the past years.

a) Market with particle boards incl. OSB. The production amounted to 1,711.1k m³ as compared to 1,285.6k m³ in 2019, i.e. a year-on-year growth by 33.1%. The export amounted to 1,586.8k m³ as compared to 1,411k m³ in 2019, i.e. a year-on-year increase by 11%. The import amounted to 470.7k m³ as compared to 864k m³. The domestic consumption amounted to 616k m³ as compared to 738k m³ in 2019, i.e. a year-on-year decrease by -16.6%.

b) Market with OSB. The production amounted to 936.7k m³ as compared to 905.5k m³ in 2019, i.e. a year-on-year increase by 3.4%. The export totalled to 757.4 k m³ as compared to 650.8k m³ in 2019, i.e. a year-on-year increase by 16.4%. On contrary, the import amounted to 155.4k m³ as compared to 295.3k m³ in 2019, i.e. a year-on-year decrease by 139.9k m³ i.e. -47.4%. Hence, the domestic consumption of 550k m³ in 2019 dropped to 334.7k m³ in 2020.

c) Market with fibreboard. The production amounted to 43.9k m³ as compared to 42.4 m³ in 2019, i.e. a year-on-year increase by 3.5%. In 2020, the export amounted to 247.13k m³ as compared to 244.21k m³ in 2019, i.e. a year-on-year growth by 1.2%. The import amounted to 376.67k m³ as compared to 493.4k m³ in 2019. The domestic consumption amounted to 290.17k m³ as compared to 175.1 k m³ in 2019.

d) Market with plywood and batten plywood. The production of plywood and batten plywood amounted to 263k m³ as compared to 254k m³ in 2019, i.e. a year-on-year increase

by 3.5%. The export totalled to 186k m³ as compared to 187k m³ in 2019, i.e. a year-on-year decrease by 0.5%. The import amounted to 129k m³ as compared to 84k m³ in 2019, i.e. 1.5 times more in year-on-year comparison. The domestic consumption amounted to 207k m³ as compared to 151k m³ in 2019.

e) Market with wood chips, particles and residues. The production amounted to 1,727.6k m³ as compared to 1,676k m³ in 2019, i.e. a year-on-year increase by 3.1%. The export totalled to 435.5k m³ as compared to 507.3k m³ in 2019, i.e. a year-on-year decrease by -14.1%. The import amounted to 202.4k m³ as compared to 399.6k m³ in 2019, i.e. a year-on-year decrease by -49.3%. The domestic consumption of wood chips, particles and residues amounted to 1,494k m³ as compared to 1,569k m³ in 2019, i.e. a year-on-year decrease by -4.8%.

f) Market with wood pellets and other agglomerates. The production of wood pellets and other agglomerates amounted to 629k m³ as compared to 608k m³ in 2019, i.e. a year-on-year increase by 3.5%. The export totalled to 387.2k m³ as compared to 354.4k m³ in 2019, i.e. a year-on-year increase by 9.3%. The import amounted to 73.9k m³ as compared to 74.5k m³ in 2019, i.e. a year-on-year decrease by -0.8%. The domestic consumption amounted to 316k m³ as compared to 329k m³ in 2019, i.e. a year-on-year decrease by -3.9%.

g) Market with wood pellets. The production of wood pellets amounted to 477.2k t as compared to 466.1k t in 2019, i.e. a year-on-year increase by 2.4%. The export totalled to 329.1k t as compared to 304.7k m³ in 2019, i.e. a year-on-year increase by 8%. The import amounted to 32.2k t as compared to 33.4k t in 2019, i.e. a year-on-year decrease by -3.6%. In 2020, the domestic consumption amounted to 180.3k t as compared to 194.8k t in 2019, i.e. a year-on-year decrease by -4.7%.

17. PRODUCTION OF PULP AND PAPER IN THE CZECH REPUBLIC IN 2020

Under the pulp and paper production, the production of paper, paper-based products, cellulose, cardboard and paperboard, i.e. CZ NACE 17, is reported.

Since the critical year of 2008, the domestic market with paper has been growing and the paper production grew significantly after 2013. After that and since 2018, the development in paper and pulp industry has been characterised by several positive steps. Factories are producing mainly wrapping paper and material for cardboard. A major part of the production has been exported. E.g. a Czech family company of Krpa Paper from Hostinné with turnover around CZK 1b exports up to 90% of its production. The company produced fat-repellent paper for wrapping food and it has a subsidiary, the biggest producers of school notebooks, namely Papírny Brno.

The total consumption of wood for producing paper and viscous pulp amounted to 4,431k m³ of raw coniferous wood, thereof 2,957k m³ and 1,534k m³ of coniferous pulp wood and coniferous wooden chips and splinters, respectively. The cellulose and paper industry produced 594k t of paper pulp, thereof 591k t of chemical pulp. The paper pulp production grew by 37k t year-on-year. Moreover, 285k t of viscous pulp are produced by the Austrian company of Lenzing in its subsidiary Biocel Paskov since 2010. Viscous pulp produced in

Paskov is then processed by operation of this company in Indonesia, China or directly in Austria for textile industry, and therefore, it is reported under textile industry.

Paper, cardboard and paperboard production grew by 11k t to the total of 893k t, i.e. by 1.2%. The consumption of paper in the Czech Republic exceeds the capacity of paper mills and the produced assortments are not in line with the domestic demand. This deficit has compensated by import that amounts to 450k t of printing paper and 861k t of wrapping paper.

The situation should change greatly once the paper production is extended. It is the company of Mondi that intends to extend the paper production of whitened and non-whitened pulp in its operation in Štětí.

The total consumption of paper, cardboard and paperboard amounted to 1,451m t, i.e. a year-on-year grew by 2k t. The production amounted only to 893k t, but 878k t were exported. Hence, 1,436k t of paper-based products had to be imported to cover the domestic demand.

Per capita paper consumption amounts to 140 kg as compared to 155 kg in 2019. The paper recycling grew year-on-year as 1,003k t of paper were recycled, i.e. 69.1% of the domestic consumption of paper, cardboard and paperboard.

18. FOREST CERTIFICATION IN THE CZECH REPUBLIC IN 2020

Forest certification is necessary. It is forest owners' facultative tool (decision) very helpful for supporting sustainable forest management. Forest owners declare with the certificate their commitment to manage the forests according to pre-defined rules. Acquiring a forest certificate and using the logo may help forest owners to place their timber on the market, even though it is not the main market criterion.

In the Czech Republic, there are two certification systems - FSC (Forest Stewardship Council) and PEFC (Programme for the Endorsement of Forest Certification Schemes). Both systems have one thing in common: the sustainable forest management principle.

FSC® Czech Republic. FSC ČR is the Czech representative of the international organisation of Forest Stewardship Council® (FSC) that created and maintains the certification scheme for forest certification and wood-based products in forests worldwide. At YE 2020, the forests with FSC certificate covered 113,198 ha in the Czech Republic.

PEFC Czech Republic. PEFC Česká republika is an independent organisation that is to support sustainable forest management, use of wood as ecological, renewable source, nature conservation and sustainable development. In the Czech Republic, forests with PEFC certificate cover 1,771,054 ha.

19. WPI CONTRIBUTION TO C-INDUSTRY DEVELOPMENT IN THE CZECH REPUBLIC IN 2020

In 2020, WPI recorded a year-on-year decline by -2.1%. C-industry declined by -7.8%. The WPI contribution to C-industry was positive, even though the WPI production was 16.4 times lower as the one of C-industry.

As for WPI from 2016 to 2020, with its 4 CZ NACE sectors, it recorded an average growth by 1.9%. C-industry, with its 24 CZ NACE sector, recorded a growth only by +1.4% in the same period time. The dynamics of average production growth from 2016 to 2020 of WPD was again higher as compared to C-industry. The contribution of 4 sectors within WPI was higher as the one of C-industry.

Only if comparing 94 CZ NACE sectors with F WPI Sectors, the WPI contribution to dynamics of average production growth is negative. In the period above, the dynamics of 97 sectors recorded a growth of 3.9% as compared to 1.9% and 1.4% of WPI and C-industry respectively.

20. GROSS VALUE ADDED IN WPI AND C-INDUSTRY IN THE CZECH REPUBLIC IN 2020

The processing industry (C-industry) produced gross value added (GVA) in current prices of CZK 1,247,469m as compared to CZK 1,309,918m, i.e. a year-on-year decrease by -4.8%. On contrary, WPI – i.e. CZ NACE 16, 17, 18 and 31 – generated GVA of CZK 89,050m as compared to CZK 90,261m. As for annual GVA dynamics, the WPI declined by -1.3% year-on-year. The comparison of both figures shows that the decline of annual GVA growth dynamics was 3.7 times lower as in case of C-industry, hence it contributed more to the C-industry as it is usually the case. The comparison is based on 2020 data, the year of COVID-19 pandemic.

The average of annual GVA dynamics for WPI for individual years from 2016 to 2020 amounted to 4.8%; the same value for C-industry amounted to 2.5%. The GVA dynamics shows better results than C-industry for the longer period above and WPI contributed more to the Czech economy than C-industry.

If we compare the share of GVA in annual production of economic groups listed above from 2016 to 2020, one can conclude that WPI reported better results than C-industry and 97 sectors both in the period above and in individual years. GVA share of WPI in production was basically continuous. Annual GVA increments of WPI had no negative impacts. Even the results of average GVA values of WPI for the entire period amounted to 2.78 as compared to 2.62 and 2.32 of the C-industry and 97 CZ NACE sectors.

21. ELECTRICITY AND ENERGY FROM TIMBER IN THE CZECH REPUBLIC IN 2020

The wood-processing industry processed and used approx. 75% – 80% of energy derived from wood biomass, i.e. fuel wood, wood waste, saw dust, wood chips, residues, cellulose infusion, plant materials and liquid bio-fuel.

The total production of electricity amounted to 81.4 TWh, i.e. a year-on-year decrease of production by 5.5 TWh and -6.4% as compared to 2019. This is the lowest production in the Czech Republic over the past 18 years. The biggest year-on-year difference has recorded by steam power plants as they produced by 6.2 TWh, i.e.-15%, less as compared to 2019. Their installed output dropped to 10.1GW, i.e. a year-on-year decrease by -6.3%. Major development has recorded in energy from brown coal that dropped by -6.1 TWh. i.e. a year-on-year decrease by -17.3%. The electricity produced dropped by -10.9% year-on-year.

On contrary, the energy produced from natural gas and by hydroelectric power station grew by -19.4% and 6.7% respectively as compared to in 2019. The biggest growth was recorded in steam-gas power plants, namely by 9.5% as well as in pumped-storage hydroelectricity power station by 10.8%. In parallel, gas and incineration power stations produced more electricity, namely by 3.1%.

The total electricity use amounted to 71.4 TWh, i.e. a year-on-year decrease by -3.5%. This was the lowest value over the past five years.

22. CARBON TRACE IN THE CZECH REPUBLIC IN 2020

In the Czech Republic, the carbon footprint is anchored in the standard ČSN ISO 14064 – greenhouse gases, ISO 140067 Carbon trace of products, services and society. Along with the ČSN standard, the National programme, new Climate Protection Policy has drafted and the assessment of the environmental impact of the concept, so called SEA were created. It comprises also the strategy that leads to efficient reduction of emissions. The Czech Republic is taking nature conservation and climate change seriously. It is based on the presumption that task leading to its enforcement should be implemented in a reasonable, meaningful, economically feasible and not hasty way.

In the Czech Republic, the principle of responsibility and effectivity applies also to household. Upper class in the Czech Republic reported carbon trace from 5,463 to 5,487 kg CO₂e/year in 2019 and other classes measured the carbon trace of 4,636 to 4,186 CO₂e/year. The differences are based on transport, mainly by car and plain, rather than on food or energy used in homes. No major differences were recorded in public transport.

Forestry adopted concrete steps in terms of carbon trace. Along with the carbon trace itself, the assigned tasks aimed at creating new models for development of new species composition and age structure of forest stands that reflects the effect of climate change and forest stability. The task has assigned to Environmental Centre of Charles University Prague that cooperates on the "Forest composition influence on GHG balance as well as balance of

other components of carbon storage” project. The project should evaluate the forestry strategy, impacts on emission balance, energetics, and acceptability with public in order to identify the optimum fuel mix and technologies for producing electricity and heat.