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Annual Market Review 2016-2017



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NOTE

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The views expressed in this paper are those of the authors and do not necessarily reflect the views or carry the endorsement of the United Nations.

ABSTRACT

The *Forest Products Annual Market Review 2016-2017* provides a comprehensive analysis of markets in the UNECE region and reports on the main market influences outside the UNECE region. It covers the range of products from the forest to the end-user: from roundwood and primary processed products to value-added and housing. Statistics-based chapters analyse the markets for wood raw materials, sawn softwood, sawn hardwood, wood-based panels, paper, paperboard and woodpulp. Other chapters analyse policies, forest products trade barriers affecting the UNECE region, and markets for wood energy. Underlying the analysis is a comprehensive collection of data. The *Review* highlights the role of sustainable forest products in international markets. Policies concerning forests and forest products are discussed, as well as the main drivers and trends. The *Review* also analyses the effects of the current economic situation on forest product markets.

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FOREWORD

Forest products contribute to addressing environmental issues and to achieving sustainable societies. The forest sector has been saying this for a long time, but now it is finally accepted by society at large.

There are many logical reasons for this paradigm shift, but arguably, it may have been a rather small forest product, accounting for less than three-tenths of a percent of solid wood products in the UNECE region, that made all the difference. Cross-laminated timber (panels made of layers of sawnwood bonded together) has captured the imagination of architects, city planners, researchers and journalists. It has also attracted the attention of an urban population who had thus far shown little interest in forest products. It remains to be seen whether cross-laminated timber will significantly change the urban skyline from one dominated by steel and concrete to one where wooden high-rise buildings are commonplace. It is, however, certain that this product has had a major impact on changing the narrative of the forest products sector.

Cross-laminated timber is just one of the success stories discussed in this year's *Forest Products Annual Market Review*. A healthy and sustainable forest products sector is vital for achieving many of the 17 Sustainable Development Goals. It is our hope and belief that readers will not only get a taste for the significant contribution of the forest products sector to the sustainability of society, but also an understanding of the policy and market dynamics that influence the sector.

Wood is one of the world's oldest materials used by humans; in recent times, progress in information and communication technologies has had both positive and negative impacts on its use: The consumption of paper for printed materials has diminished because of online communication and media, whereas the increase in online shopping has led to a higher demand for packaging paper. The industry itself is becoming increasingly dependent on technology to make mills and harvesting of timber more efficient. This requires large investments and has implications on the forest sector workforce, requiring fewer workers with different skills.

The forest industry has encountered many obstacles in the past decade, but this year's *Market Review* clearly shows the vast potential of the sector, which is probably best described by quoting the title of a recent Popular Science article: "*The World's Most Advanced Building Material Is... Wood: and it is going to remake the skyline*".

Many thanks to those experts, contributors, partner organizations, information suppliers, governments and staff in our two organizations that have played a role in preparing this joint publication.



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¹ *Forest Products Statistics* is available at: www.unece.org/forests/fpm/onlinedata.html

DATA SOURCES

The data on which the *Forest Products Annual Market Review* is based are collected from official national correspondents through the FAO/UNECE/Eurostat/ITTO Joint Forest Sector Questionnaire, distributed in April 2017. Within the 56-country UNECE region, data for the 32 EU and EFTA countries are collected by Eurostat and for other UNECE countries by UNECE/FAO Geneva. All data are validated by UNECE/FAO Geneva.

The statistics for this *Review* are from the TIMBER database system. Because the database is continually updated, any single publication provides only a snapshot of the database. Data quality differs between countries, products and years. Improving data quality is a continuing task of the secretariat.

With our partner organizations and national correspondents, we strongly believe that the quality of the international statistical base for analysis of the forest products sector is improving steadily. The goal of the partner organizations is to have a complete and current database, validated by national correspondents, available at FAO in Rome, Eurostat in Luxembourg, ITTO in Yokohama and UNECE/FAO in Geneva. We are convinced that the dataset used in the *Review* is the best available anywhere, as of August 2017.

The data in this publication form only a small part of the total data available. *Forest Products Statistics* will include all available data for the years 2012-2016. The TIMBER database is available on the website of the joint UNECE Committee on Forests and the Forest Industry and FAO European Forestry Commission at www.unece.org/forests/fpm/onlinedata. More complete trade flow information is available at www.unece.org/forests/fpm/onlinedata/forest-products-trade-flow

The secretariat is grateful that correspondents provided actual statistics for 2016 or, in the absence of formal statistics, their best estimates. Following a recommendation from the Team of Specialists on Forest Products Statistics, in some cases data from the Timber Forecast Questionnaire have been used – these are marked as national estimates (N). All statistics for 2016 are provisional and are subject to revision at a later date. The responsibility for national data lies with the national correspondents. The official data supplied by correspondents account for the great majority of records. In some cases, where no data were supplied, or where data lacked internal consistency or were confidential, the secretariat estimated figures to keep regional and product aggregations comparable and to maintain comparability over time. Estimates are flagged in this publication, but only for products at the lowest level of aggregation.

Despite the best efforts of all involved, some significant problems remain. Chief among these are differing definitions, especially when these are not specified in the data, and unrecorded removals and production. For wood fuel removals, for example, the officially reported volumes may be as low as 20% of actual removals in some countries. The Joint Wood Energy Enquiry (JWEE) has gone some way towards improving the quality and coverage of data for wood energy. Conversions into the standard units used here are also not necessarily done consistently. The Joint FAO/UNECE Working Party on Forest Statistics, Economics and Management and its Team of Specialists on Forest Products Statistics is carrying out work to increase awareness of the problems in measurement and how to deal with these.

In addition to the official statistics received through the Joint Forest Sector Questionnaire (JFSQ), statistics from trade associations and governments have been used to complete the analysis for 2016 and early 2017. Supplementary information was obtained from experts, including national statistical correspondents, trade journals, the United Nations trade database (COMTRADE) and websites. These sources are given in the text.

EXPLANATORY NOTES

“Apparent consumption” is calculated by adding imports to a country’s production and subtracting exports. Apparent consumption volumes are not adjusted for levels of stock. “Apparent consumption” is synonymous with “demand” and “use” and often referred to as “consumption”. Consumption is a sum of a country’s (or subregion) production, imports and exports.

“Net trade” is the balance of exports and imports and is positive for net exports (i.e. when exports exceed imports) and negative for net imports (i.e. when imports exceed exports). Trade data for the 28 European Union countries include intra-EU trade, which is often estimated by the countries. Export data usually include re-exports. Subregional trade aggregates in tables include trade occurring between countries of the subregion.

For ease of reading, the publication mostly provides value data in US dollars (indicated by the sign “\$”). Unless specific for a given period, the applied exchange rates for 2016 are: euro (€) 0.904 = \$1; Russian rouble (RUB) 67.06 = \$1. Both these exchange rates are based on the annual average rate provided by UNECE (<http://w3.unece.org/PXWeb/en>).

For a breakdown of the region into its subregions, please see the map in the annex. References to EU28 refer collectively to the 28 country members of the EU. The term Commonwealth of Independent States (CIS) refers collectively to 12 countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan. It is used solely for the reader’s convenience.

The term “softwood” is used synonymously with “coniferous”. “Hardwood” is used synonymously with “non-coniferous” or “broadleaved”. “Lumber” is used synonymously with “sawnwood”. More definitions appear in the electronic annex.

Due to rounding, numbers presented throughout this publication may not add up precisely to the totals provided and percentages may not precisely reflect the rounded figures.

All references to “ton” or “tons” or “tonnes” in this text represent the metric unit of 1,000 kilograms (kg) unless otherwise indicated.

A billion refers to a thousand million (10^9).

Please note that all volumes of US and Canadian sawn softwood production and trade are given in solid m^3 , converted from nominal m^3 .

The use of the term “oven-dry” in this text is used in relation to the weight of a product in a completely dry state: e.g. an oven-dry tonne of wood fibre means 1,000 kg of wood fibre containing no moisture at all.

The term “chemical pulp” refers to semi-chemical woodpulp, chemical woodpulp and dissolving grades, unless otherwise indicated.

ACRONYMS, ABBREVIATIONS AND SYMBOLS

(Infrequently used abbreviations spelled out in the text may not be listed here)

€	euro	LEED	Leadership in Energy and Environmental Design
\$	US dollar unless otherwise specified	LERs	log export restrictions
APA	The Engineered Wood Association	LCA	lifecycle assessment
BC	British Columbia, Canada	LVL	laminated veneer lumber
BJC	builders' joinery and carpentry	LSL	laminated strand lumber
CEPI	Confederation of European Paper Industries	m.t.	metric ton or tonne
CHP	combined-heat-and-power	m²	square metre
CIF	cost, insurance and freight	m³	cubic metre
COFFI	Committee on Forests and the Forest Industry	MDF	medium-density fibreboard
CIS	Commonwealth of Independent States	MFN	most favoured nation
CLT	cross-laminated timber	MWe	megawatt electrical
CoC	chain-of-custody	MWth	megawatt thermal
CSA	Canadian Standards Association	NTM	non-tariff measure
DACH	(Germany, Austria and Switzerland)	OSB	oriented strand board
EFC	European Forestry Commission	OSL	oriented strand lumber
EFTA	European Free Trade Association	PEFC	Programme for the Endorsement of Forest Certification
EU	European Union	PJ	petajoule
EUTR	European Union Timber Regulation	PSL	parallel stand lumber
EWPs	engineered wood products	REDD+	reducing emissions from deforestation and forest degradation and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries
FLEGT	Forest Law Enforcement, Governance and Trade	SAAR	seasonally adjusted annualized rate
FSC	Forest Stewardship Council	SAR	special administrative region
FOB	free on board	SFI	Sustainable Forestry Initiative
GDP	gross domestic product	TTIP	Transatlantic Trade and Investment Partnership
GHG	greenhouse gas	UK	United Kingdom of Great Britain and Northern Ireland
Gj	gigajoule	US	United States of America
GWh	gigawatt hour	VAT	value-added tax
ha	hectare	VPA	voluntary partnership agreement
HDF	high-density fibreboard		
IMF	International Monetary Fund		
ITTO	International Tropical Timber Organization		
kWh	kilowatt hour		

A detailed close-up photograph of a tree trunk, showing the intricate patterns and textures of the wood grain. The colors range from light tan to dark brown, with prominent vertical and diagonal lines. The texture is rough and natural, with some knots and imperfections visible.

Chapter 1

OVERVIEW OF FOREST PRODUCTS MARKETS AND POLICIES

Author of economic overview: José Palacín

Highlights

Amid a global recovery, **overall economic trends were positive in the UNECE region in 2016**, although significant differences persisted between countries.

A decline in global certified forest area has become apparent following research into overlaps in the reporting of forests certified under more than one scheme.

Tariffs are not particularly high in the UNECE region for forest products originating in the UNECE region. On the other hand, non-tariff measures are becoming increasingly important for environmental reasons and to ensure legality and protect domestic industries.

The total consumption of roundwood – comprising logs for industrial uses and fuel – in the UNECE region was estimated at **1.3 billion m³ in 2016, an increase of 1.7% over 2015.**

For the first time in about a decade, all the major sawn-softwood producing and consuming regions in the UNECE recorded **improved demand and production in 2016.**

Preliminary countervailing and antidumping duties on Canadian softwood lumber imported into the US came into effect in 2017, but final duties will not be announced until early January 2018.

After five years of growth, **the apparent consumption of sawn hardwood decreased by 1.2% in the UNECE region in 2016, to 35.4 million m³.** Falling consumption in North America in 2016 was offset only partially by a slight rise in consumption in Europe and the CIS.

Growth in the production and consumption of wood-based panels slowed in Europe in 2016. **The production of wood-based panels increased by 8.4% in the CIS and by 3.0% in North America.**

The production of paper and paperboard edged 0.1% higher in Europe in 2016, increased by **5.5%** in the CIS, and dropped by **0.8%** in North America.

Wood pellet consumption reached **22.3 million tonnes in Europe** in 2016, **up by 6.6%** over 2015. Total wood pellet production in the CIS **increased by 2%, to 2 million tonnes.** The total production of wood pellets in North America was about **9.2 million tonnes in 2016, up by 6.7%.**

The production of cross-laminated timber is still concentrated in Europe and, within Europe, in the DACH countries, which together accounted for about 80% of global production in 2015. European production was estimated at **680,000 m³ in 2016**, and this is forecast to **increase to about 1.25 million m³ by 2020.** Five cross-laminated-timber plants are in operation in North America.

The European and North American housing markets have recovered partially from the 2008–2009 global financial crisis but have not yet attained their historical averages. The number of completed houses in the Russian Federation declined by 3.4% in 2016.

1.1 Introduction to the publication

The 2017 edition of the UNECE/FAO *Forest Products Annual Market Review* provides a comprehensive review of market developments in the UNECE region in 2016 and the first half of 2017 and of the policies driving those developments. The UNECE region is made up by three subregions: Europe, the Commonwealth of Independent States (CIS) and North America. It stretches from Canada and the United States of America (US) in the west through Europe to the Russian Federation and the Caucasus and Central Asian republics in the east. It encompasses about 1.7 billion hectares of forest. This is almost all boreal and temperate forests in the Northern Hemisphere and covers just under half the world's total forest area.

The *Review* provides a background for the Market Discussions, held during the joint session of the UNECE Committee on Forests and the Forest Industry (COFFI) and the FAO European Forestry Commission (EFC), which will take place on 9-13 October 2017 in Warsaw, Poland.

This chapter acts as an executive summary, providing an overview of the ensuing ten chapters. Section 1.2, which follows this section, gives a background on the macro-economic health of the region.

Chapters 2-11 outline the impacts of the economic situation on particular sectors and geographical regions. Chapter 2 provides background on the policies and market tools influencing the forest products sector, including those related to trade, energy and the environment (e.g. certified forest products, carbon accounting and markets, and green buildings).

Chapter 3 is a special chapter on trade measures affecting forest products in the UNECE region, and the seven following chapters cover the major forest product sectors. The *Review* closes with a chapter on housing, which is a leading driver of wood consumption in the UNECE region.

The *Review* presents and analyses the best available annual statistics for the period 2016-2017 collected by the UNECE/FAO Forestry and Timber Section from official country statistical correspondents and expert estimates.

Note that the trends discussed in this publication comprise a mix of data from the UNECE/FAO Forestry and Timber database (presented for the UNECE region as a whole and for each of the three subregions) and author-provided data, which may be derived from various sources, including the authors' own market intelligence. A strong effort has been made to reconcile data and trends, but occasionally there are differences between sources. Additionally, there are times when authors may point to trends or data for different geographic aggregations than the standard subregions. References to "Europe", "CIS" and "North America" in this publication always pertain to the standard subregions.

Electronic annexes² provide additional statistical information, and the full UNECE/FAO TIMBER database is also available on the web.³ These comprehensive statistics, which form the basis of many of the chapters, ensure data transparency in the *Review*. References at the end of each chapter not only support and give credit for the ideas expressed in the chapter but also provide sources for further reading and research.

The 2017 edition of the *Review* also provides an analysis of markets outside the region. Forest products are increasingly traded at the global level, with pronounced effects on markets inside the UNECE region.

1.2 Economic developments with implications for the forest sector

Amid a global recovery, overall economic trends were positive in the UNECE region in 2016. Although significant country differences persisted, the pace of expansion was sustained and became more synchronized. In the US, steady consumption growth supported activity, but the negative impact of dollar appreciation on exports dampened economic performance. In contrast, the euro area showed signs of increased dynamism, driven by the lagged effects of euro depreciation, relatively low oil prices, and a policy mix that has become more conducive to growth. The decision by the United Kingdom of Great Britain and Northern Ireland (UK) to leave the European Union (EU) did not derail the growing confidence. In the new EU member countries, an economic slowdown was temporary and related to the pattern of disbursement of EU funds, following years of very strong activity. After the output contraction in 2015, growth started to return to the CIS as oil prices bottomed out and the macro-economic framework became less volatile.

In the US, unemployment declined further and the rapid pace of job creation continued into early 2017. Wages have been growing more slowly than employment in the post-crisis period, but improvements in the labour market have eventually translated into moderately rising wages. In the euro area, employment creation accelerated significantly, but unemployment is still high in some European countries, in particular for the young and the low-skilled. Job creation was supported by limited wage increases and, in some countries, by labour market reforms. Overall, the recovery of the labour market remained uneven and was characterized by growing job polarization and precarious forms of unemployment in some countries. Labour market dynamics were relatively resilient in the CIS, despite weak output trends. A sharp

2 www.unece.org/forests/fpamr2017-annex

3 www.unece.org/forests/fpm/onlinedata.html

adjustment of real wages, combined with underemployment, prevented unemployment figures from climbing higher.

Lending to households and non-financial corporations continued to grow in the euro area, amid declining interest rates and a reduction in financial fragmentation. The banking sector has increased its capacity to support the recovery, but country fragilities remain. In the CIS, on the other hand, poor economic performance and the impact of past currency depreciations have constrained lending, although the worst is now behind.

In some advanced economies, the extended period of low financing costs has led to rapid growth in asset prices, including housing. Relatively weak demand continued to dampen overall investment in the euro area, but rising incomes and low mortgage rates have supported a more dynamic housing sector, with increases in construction output and house prices. Much faster price increases have been observed in other European countries and the US.

Following a rapid expansion, gross residential fixed investment slowed in the US; on the other hand, such investment picked up in many European countries. After returning to growth in 2015, construction investment accelerated further in the euro area in 2016. In contrast, it contracted sharply in the new EU member countries, resulting in a slowdown in the EU as a whole.

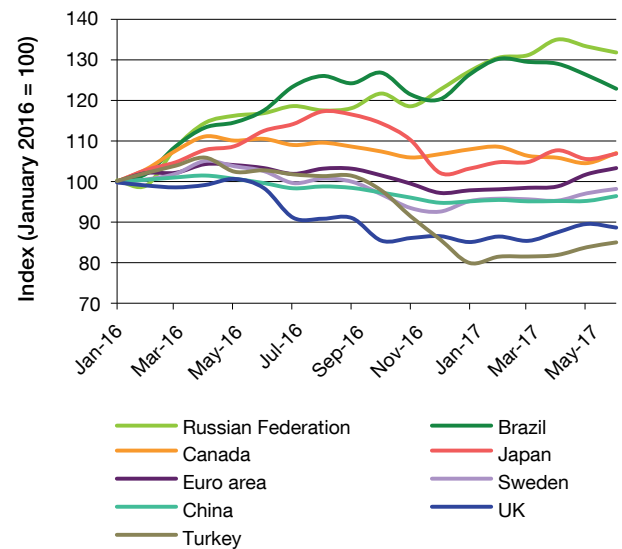
Rising but still moderate inflation, prompted by growing demand and higher energy prices, led the US Federal Reserve to hike interest rates in 2016 and early 2017. Additional rate increases are expected, but a rapid tightening of monetary policy is unlikely because price pressures remain moderate. A very loose monetary policy continued in the euro area, but deflation is no longer a concern there and, given the improved economic prospects, the monetary authorities have signalled a change in tone. The appreciation of the US dollar versus the euro in late 2016 was reversed in the first half of 2017 as the European recovery firmed and expectations of monetary policy divergence receded (graph 1.2.1). Inflation declined in the CIS as the impact of past currency depreciations wore off, exchange rates recovered and demand remained weak. This allowed monetary authorities to cut interest rates gradually.

Fiscal policy was broadly neutral in the US in 2016, but some loosening is anticipated, which would be delivered through a combination of increased spending and lower taxes. In the euro area, improved economic performance and very low interest rates supported public finances amid a broadly neutral fiscal policy stance. In contrast, fiscal consolidation was widespread in the CIS. Energy producers, including those that started the downturn with significant buffers, have undertaken measures to put public finances on a sustainable path.

The economic outlook in the region remains positive. Although the US economy underwent a soft patch in early 2017, growth is projected to accelerate despite significant

GRAPH 1.2.1

Major currencies used to trade forest products indexed against the US dollar, January 2016-June 2017



Source: IMF, 2017.

Note: A diminishing index value indicates a weakening of the currency value against the US dollar; an increasing index value indicates a strengthening of the currency value against the US dollar.

policy uncertainty. The recovery appears well entrenched in the euro area, but persistent fragilities remain in some countries. Increased investment will again be a major driver of economic activity in the new EU member countries in the new financing cycle. The expansion is likely to be modest in the CIS, amid continued downside risks. Energy-exporting countries are facing the reality of protracted low energy prices and the need to search for new engines of growth.

Although economic performance is expected to remain favourable, certain risks and challenges cloud the horizon. Low levels of investment in the post-crisis period have contributed to the sluggish productivity growth observed across the UNECE region, limiting economic potential. The expected gradual normalization of monetary policies may expose hidden vulnerabilities in financial sectors. In some advanced economies, future policies – including on international trade – are hard to predict while geopolitical tensions persist.

1.3 Policy and regulatory developments affecting the forest products sector

Governmental and non-governmental actions continue to have significant impacts on forests and forest product markets. New challenges and opportunities are arising in many areas of forest policy and environmental programmes.

A referendum was held in the UK on 23 June 2016 in which a majority of voters voted to leave the EU. As a result, the UK government activated Article 50 of the Lisbon Treaty, the official mechanism for withdrawing from the EU, on 29 March 2017, in a process generally referred to as Brexit. If no agreement is reached within two years and if no extension is agreed, the UK will leave the EU automatically, and all existing agreements – including access to the single market – will cease to apply to the UK from 29 March 2019. In North America, the Softwood Lumber Agreement (SLA) between Canada and the US expired on 12 October 2015. In April 2017, the US government announced tariffs of 3-24% on imported lumber from Canada.

This edition of the *Review* reports, for the first time, a decline in global certified forest area, which has become apparent following an investigation of overlaps in the reporting of forests certified under more than one scheme. Although the overall decline in certified area is small (3 million hectares), it may be an early indication that participation in forest certification has peaked and that actions to reduce barriers and increase benefits will be essential for future growth. Given the significant area of forest with multiple certificates (i.e. 16% of certified forests globally), the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC) have committed to reporting estimates of these overlaps annually to help improve data accuracy. Similar transparency in the reporting of market and trade activities is also needed to provide reliable estimates of the economic impacts of certified wood products.

The Paris Agreement on climate change, which aims to accelerate action to mitigate climate change, entered into force on 4 November 2016. As of 31 May 2017, 147 countries had ratified the agreement, although the US has indicated an intention to withdraw. The EU and its member states have committed to a binding minimum target of a 40% domestic reduction in greenhouse gas (GHG) emissions from 1990 levels by 2030, as well as to renewable energy and energy-efficiency targets.

To continue efforts to combat illegal logging, the European Commission reported on 22 February 2017 that 27 EU member states (all current members except Slovakia) had complied with obligations in the EU Timber Regulation to appoint competent authorities, establish penalties for non-conformance, and start carrying out checks of operator compliance.

There is continued policy action and growing interest in innovations in tall wood buildings. The US Green Building Council reported that 84 projects have registered to use the new pilot credit in the LEED green-building programme designed to address illegal wood and promote the use of verified-legal, responsible and certified wood in buildings.

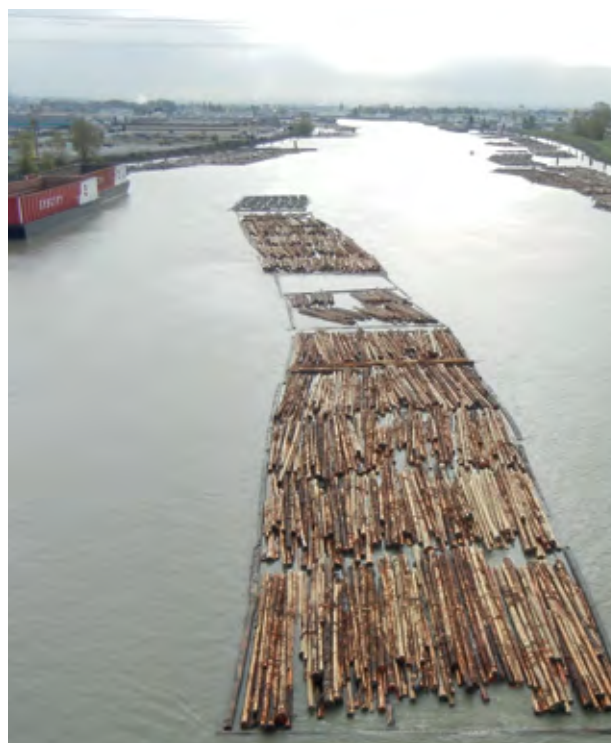
There are increasing organizational commitments to combating deforestation. The principal aim of the New York Declaration on Forests, which was released at the UN Climate Summit in September 2014, is to halve natural forest loss by 2020 and end it by 2030. In September 2016, the Declaration had 190 endorsers comprising 40 governments, 20 subnational governments, 57 multinational companies, 16 groups representing indigenous communities, and 57 non-governmental organizations.

Significant and diverse opportunities exist for forests and forest products to provide environmental and societal benefits; fully realizing these benefits, however, requires a supportive political and economic environment.

1.4 Forest product trade barriers affecting the UNECE region

In 2016, the cross-border trade in primary products (excluding roundwood) in the three UNECE subregions, as measured by the share of imports in total consumption, ranged from 16% (for paper and paperboard from North America) to 62% (for paper and paperboard in Europe). The share of industrial roundwood imports in total consumption was lower, ranging from negligible in the CIS to 13% in Europe.

UNECE countries account for more than 60% of the world trade in forest products. However, the UNECE region's share of world forest product exports has decreased steadily in the last decade, losing market share to emerging economies.



Source: UNECE/FAO, 2017.



Source: UNECE/FAO, 2017.

Overall, furniture, secondary products and panels have higher tariffs because they are seen as making bigger contributions to domestic economies through value-added processing and employment; roundwood, pulp and sawnwood have among the lowest tariffs.

The softwood lumber dispute between Canada and the US is probably the most visible tariff-related dispute over forest products in the UNECE region. The US Department of Commerce announced countervailing duties on Canadian sawn softwood imports in 2017 (ranging from about 3% to more than 24%, depending on the producer). One of the biggest elements in the allegation by the US Department of Commerce, and a basis for subsidy rates, is the issue of log export restrictions (LERs) on Canada's government-owned forestlands countrywide and, notably, on private lands in British Columbia.

The most noteworthy recent example of an export tariff related to forest products was in July 2007, when the Russian Federation raised its export tariff on roundwood exports from 6.5% to 20%, followed by an increase to 25% in April 2008. The tax was scheduled to increase to 80% by January 2009, but this was put off indefinitely due to the global financial crisis. The net result of the export tax was a steep reduction

in Russian log exports, with importers – namely China and Finland – having to look for alternate sources of logs. When the Russian Federation became a member of the World Trade Organization in 2012, it agreed to allow the tax to fall progressively to less than 10%. The Russian Federation then implemented a tariff-related, species-specific quota system, which has trigger points beyond which exports attract higher tariffs. In Canada, British Columbia also has an export fee ("fee in lieu of manufacture"), whereby exporters who have permission to export must pay a fee based on the difference between domestic and export values.

Non-tariff measures (NTMs) are generally defined as policy measures other than ordinary customs tariffs that can potentially have an economic effect on international trade by changing the quantities of goods traded, or their prices, or both. NTMs are prevalent among forest products because pathogens can easily be transported across borders; governments and consumers do not want to contribute to deforestation and illegal logging; and the protection of rural livelihoods often has a high policy profile.

In the UNECE region, LERs are perhaps the most discussed and debated of all trade measures. They are widely used within and outside the region, including by key trading partners of UNECE member countries. The three biggest roundwood producers in the UNECE region (Canada, the Russian Federation and the US) have LERs; together, these countries account for about two-thirds of the region's industrial roundwood harvest.

The cross-border trade of forest products is increasing. Tariffs are not particularly high in the UNECE region for forest products originating in the region, but NTMs are becoming increasingly important. Many are put in place for environmental reasons and to address legality, and others are used to protect domestic industries.

1.5 Summary of regional and subregional markets

The general condition of forest product markets in the UNECE region improved in 2016, with all major subsectors (industrial roundwood, sawnwood, wood-based panels, and paper and paperboard) showing higher consumption levels and growth rates. There were slight contractions in the consumption of wood-based panels in the CIS (-0.6%) and of paper and paperboard in North America (-0.1%), but these were offset by gains in those subsectors in the other subregions. In 2016, the aggregated year-on-year growth rates in consumption in the UNECE region ranged between 0.9% (for paper and paperboard) and 4.0% (for sawnwood) (table 1.5.1), with differences between subregions.

TABLE 1.5.1

Apparent consumption of industrial roundwood, sawnwood, wood-based panels, and paper and paperboard in UNECE region, 2012-2016

	Thousand	2012	2013	2014	2015	2016	Change (volume) 2015- 2016	Change (%) 2015- 2016	Change (%) 2012- 2016
EUROPE									
Industrial roundwood	m ³	375,656	381,804	394,701	401,131	407,108	5,978	1.5	8.4
Sawnwood	m ³	97,040	96,898	101,386	104,172	106,966	2,794	2.7	10.2
Wood-based panels	m ³	64,670	66,323	68,125	70,667	72,545	1,877	2.7	12.2
Paper and paperboard	m.t.	90,852	89,568	89,835	89,165	90,277	1,112	1.2	-0.6
CIS									
Industrial roundwood	m ³	173,690	175,075	182,423	184,992	192,043	7,051	3.8	10.6
Sawnwood	m ³	19,717	20,356	19,247	17,837	18,081	243	1.4	-8.3
Wood-based panels	m ³	17,702	17,839	17,530	17,561	17,452	-109	-0.6	-1.4
Paper and paperboard	m.t.	9,366	9,388	9,397	9,103	9,617	514	5.6	2.7
NORTH AMERICA									
Industrial roundwood	m ³	481,158	486,764	490,150	494,222	501,502	7,280	1.5	4.2
Sawnwood	m ³	95,467	101,090	106,274	112,603	119,028	6,425	5.7	24.7
Wood-based panels	m ³	46,391	47,968	49,889	52,010	53,768	1,758	3.4	15.9
Paper and paperboard	m.t.	77,095	74,954	76,053	75,651	75,598	-54	-0.1	-1.9
UNECE REGION									
Industrial roundwood	m ³	1,030,503	1,043,642	1,067,274	1,080,345	1,100,653	20,308	1.9	6.8
Sawnwood	m ³	212,224	218,345	226,907	234,612	244,075	9,462	4.0	15.0
Wood-based panels	m ³	128,762	132,130	135,544	140,239	143,764	3,526	2.5	11.7
Paper and paperboard	m.t.	177,313	173,910	175,285	173,919	175,492	1,573	0.9	-1.0

Note: Sawnwood does not include sleepers.

Source: UNECE/FAO TIMBER database, 2017.

1.5.1 Wood raw materials

The total consumption of roundwood – comprising logs for industrial uses and fuel – in the UNECE region was estimated at 1.3 billion m³ in 2016, an increase of 1.7% from 2015 and the fourth consecutive year of growth. The apparent consumption of logs for industrial purposes has trended upward in the past five years, reaching 1.1 billion m³ in 2016, a 1.9% increase over

2015 and 6.8% higher than in 2012. Woodfuel consumption increased by 1.0 million m³ in 2016, to 204.0 million m³.

Of the total roundwood harvested in the UNECE region in 2016, about 15% was used for fuel (204.0 million m³), a share that was unchanged from 2012. In 2016 Europe accounted for almost 57% of total woodfuel consumption in the UNECE region. Estimates of roundwood volumes removed from forests for fuel are highly unreliable because few countries

have consistent methods for collecting relevant data on this increasingly important end use. Nevertheless, it is clear that a fairly large share of forest removals is used for energy purposes.

The UNECE region is a net exporter of both softwood and hardwood logs, with total net exports of 24.1 million m³ in 2016. The biggest shipments from countries in the UNECE region were from the Russian Federation to China and Finland and from the US to Canada and to China.

Sawlog costs for lumber producers have declined faster in the past few years in Europe than in most other world regions. The Russian Federation is one of the few places in which coniferous sawlog prices have not trended downward in recent years. Sawlog prices have been relatively flat in the southern states of the US but have almost doubled in the western US since the lows of 2009. The biggest price increases (in local currency) in North America have been in western Canada, where average sawlog prices were 21% higher in early 2017 than in the three previous years and 56% higher than in early 2012. Over the same time, sawlog values have trended slowly downward in eastern Canada.

Softwood-fibre costs have declined for pulpmills worldwide since 2011. This trend continued in 2016 and early 2017.

1.5.2 Sawn softwood

In 2016, for the first time in about a decade, all the major sawn-softwood producing and consuming regions recorded increased demand and production. Total apparent consumption in the UNECE region was 208.7 million m³, up by 5.0% over 2015. The recovery in North America continued for the seventh consecutive year, with sawn softwood consumption there increasing by 8% in 2016. Sawn softwood consumption was up by 2.8% in Europe, and the stabilization of economic conditions in the CIS enabled an increase in consumption there of 0.9%.

Sawn softwood production increased in North America by 4.7% (+6.2% in Canada and +3.4% in the US) in 2016, in Europe by 2.9% and in the CIS by 6.7%. Total sawn softwood production in the UNECE region was 250.7 million m³ in 2016, up by 4.2% compared with 2015.

European sawn softwood exports increased by 3.8% (at a total volume of 49.5 million m³) in 2016, compared with only a 1.0% gain in 2015. This increase is remarkable given that exports decreased by 10% to North Africa and by 7% to the Middle East. European sawn softwood exporters gained in other key markets, including China (+37%), Japan (+15%) and the US (+31%, on small volumes).

Sawn softwood production in the Russian Federation increased by 6.7% in 2016, to 34.3 million m³. Over the same

period, Russian sawn softwood exports increased by 7.9%, to 24.9 million m³.

US housing starts increased by 5.6% in 2016, to 1.17 million units, and are expected to increase again in 2017, to about 1.22 million units.



Source: Port of Kokkola, 2017.

There were no export duties on Canadian lumber exports to the US in 2016, and Canadian exports soared by 13.5%.

US sawnwood prices (in US dollars) gained 4% in 2016 and were higher by 19% in the first half of 2017. The US introduced countervailing export duties of 19.9% on Canadian exports to the US in late April 2017. Antidumping duties of 6.9% were initiated in late June 2017. This was the main reason for higher sawnwood prices in the first half of 2017, although market conditions were also very good.

The countervailing and antidumping duties on Canadian lumber are preliminary, and final duties will be announced in early January 2018. The duties will change global sawnwood trade, with fewer Canadian exports to the US (and more European exports to the US) meaning more offshore exports from Canada, especially to Asia.

1.5.3 Sawn hardwood

After five years of growth, the apparent consumption of sawn hardwood decreased by 1.2% in the UNECE region in 2016, to 35.4 million m³. Falling consumption in North America in

2016 was offset only partly by a slight rise in consumption in Europe and the CIS.

Sawn hardwood production was flat in the UNECE region in 2016, at 41.2 million m³. Production was stable in Europe, and a fall in North America was offset by an increase in the CIS.

After two years of growth, sawn hardwood imports decreased by 0.6% in the UNECE region in 2016, to 6.5 million m³. Countries in the UNECE region exported 12.3 million m³ of sawn hardwood in 2016, up by 3.4% when compared with 2015.

The strong fashion for oak, combined with the slow recovery of consuming sectors and the relative weakness of the euro against the dollar (which has encouraged exports and increased prices for imported American alternatives), put pressure on supply and increased prices for European oak in 2016 and during the first half of 2017.

The weakness of the rouble encouraged a 6% increase in sawn hardwood exports from the Russian Federation in 2016, to 1.46 million m³. Exports to China were 1.27 million m³, an increase of 9% over 2015 and the largest quantity of Russian sawn hardwood ever shipped to China.

China accounted for 51% of US sawn hardwood exports in 2016, Canada for 13%, Southeast Asia for 12%, Europe for 9% and Mexico for 8%. The US imported 356,000 m³ of sawn hardwood from Canada in 2016, down by 2% compared with 2015. Canada imported 521,000 m³ of sawn hardwood from the US in 2016, down by 0.7%.

1.5.4 Wood-based panels

Trends in the production and consumption of wood-based panels were mixed in 2016, although they generally showed continued growth across the UNECE region.

Growth in the production and consumption of wood-based panels in Europe was somewhat slower in 2016 than in 2015. Both the plywood and oriented strandboard (OSB) subsectors rebounded strongly, with production increasing by 5.3% and 9.6%, respectively. Particle board production was stagnant for the second consecutive year, increasing by just 0.5% in 2016.

The production of wood-based panels (WBP) increased by 8.4% in the CIS in 2016, with an even stronger increase in exports. The resultant apparent consumption of wood-based panels in the CIS subregion decreased slightly (-0.6%) in 2016 compared with 2015. There were large production increases in the OSB (+32%) and fibreboard (+12.2%) subsectors in the CIS as new plants continued to expand production and exports began to take off.

The market for wood-based panels in North America increased by a robust 3.4% in 2016 (the same rate as in 2015). Wood-based panel production was mixed in the subregion, with particle board production declining by 2.2% and

plywood and fibreboard remaining fairly stable (at +1.6% and +0.3%, respectively). In contrast, OSB production in North America jumped by 7.5% in 2016.

In all three subregions, the trade (both imports and exports) of wood-based panels increased in 2016. Europe had a slight trade surplus; the CIS has a substantial trade surplus; and North America has a substantial trade deficit, notably the result of US imports of plywood from China, which now account for about half of all plywood imports into the US.

1.5.5 Paper, paperboard and woodpulp

Paper and paperboard production increased in Europe and the CIS in 2016 but declined in North America. Production of paper and paperboard edged 0.1% higher in Europe, increased by 5.5% in the CIS, and dropped by 0.8% in North America.

The industry was again challenged due to overcapacity in graphic papers and chemical woodpulp throughout the UNECE region. Capacity closures and conversions (e.g. to packaging-grade paper) in the graphic-paper segment continued in Europe and North America as prices remained under pressure. Production and apparent consumption of sanitary and household papers, along with packaging grades, were stronger in 2016 than in 2015. Packaging-paper production was generally higher in the UNECE region, aided by stronger apparent consumption in Europe and in the CIS. Woodpulp production was stronger across the UNECE region in 2016 due to growth in the apparent consumption of packaging and tissue, as well as a growth in exports.

Chemical market woodpulp capacity continued to expand, primarily in low-cost regions outside the UNECE region. Prices for chemical pulps were challenging in mid-2016 but began to improve thereafter as a result of stronger Chinese imports and a series of unplanned outages that caused a curtailment of supply. Prices improved in all global markets in early- to mid-2017, despite a series of planned capacity additions that will mainly begin to enter the market in the second half of the year.

China's economic output continued to hover at about 7% in 2016, as it had done in the previous four years, despite government policies aimed at combating lethargic domestic consumption and exports. Economic and social reforms – including looser credit markets – implemented in 2014, 2015 and 2016 have resulted in modest growth; however, excess manufacturing capacity and weak exports (negatively affected by lacklustre global economic growth) continued in 2016 and early 2017.

Electronic communication continues to play a major role in the evolution of the pulp and paper segments, while paperboard has benefited from increased use of online

shopping. The rationalization of capacity through the closure and conversion of high-cost mills continues in the pulp, paper and paperboard segments. However, low-cost chemical woodpulp, tissue and packaging capacities continue to be added.

In the pulp sector, the expansion of bleached hardwood kraft capacity in South America and Asia continued to be the most important factor by far influencing the market in 2016 and the first half of 2017.

1.5.6 Wood energy

Wood energy markets in the UNECE region are dynamic, being significantly affected by public policies, weather fluctuations and changes in production capacity, particularly for wood pellets.

The most recent available data show that the primary production of “solid biofuels (excluding charcoal)” in the EU28 grew by 6% in 2015 compared with 2014, to about 3,829 petajoules (PJ). Wood pellet consumption reached 22.3 million tonnes in the European subregion in 2016, a 6.6% increase over 2015. Wood pellet production increased by 2.5% and imports grew by 4.4%.

Demand for wood energy is increasing in the CIS as the consumption of pellets, briquettes, wood chips and other feedstocks grows in the subregion and among neighbouring countries. Wood energy consumption increased in the CIS in 2016 but at a slower pace than in 2015. Total wood pellet production in the CIS increased by 2% in 2016, reaching 2 million tonnes. Half of this production was in the Russian Federation, whose production output surpassed 1 million tonnes in 2016.

The total production of wood pellets in North America was estimated at about 9.2 million tonnes in 2016, up by 6.7% over 2015. Canada consumed about 536 PJ of wood energy in 2016, which was 1% less than in 2015; of this, 225 PJ was derived from solid wood waste, 273 PJ from spent pulping liquor, about 30 PJ from fuelwood and 9.0 PJ from wood pellets. Wood energy consumption accounted for about 4.5% of Canada’s total primary energy supply in 2016. The US consumed 2,066 PJ of wood energy in 2016, down by about 6% from 2015.

Prices for wood pellets traded across the Atlantic show an overall declining trend, possibly reflecting ample supply as well as demand that has not grown at expected rates (except in the UK). Nonetheless, the share of solid-biofuel (excluding charcoal) imports in the EU28’s primary production has grown threefold since 2005. In 2016, North American wood pellet exports to the EU28 reached 6.6 million tonnes. The Dutch “stimulation of sustainable energy production incentive scheme” (SDE+) – an incentive scheme for the production

of renewable energy in the Netherlands – might spur a new market for industrial wood pellets in the EU28.

Changes in public policy remain one of the largest sources of uncertainty in wood energy markets. The planned withdrawal of the UK from the EU could affect the role played by wood pellets in the UK’s renewable energy portfolio, thereby affecting trade. The announcement by the US of its intention to withdraw from the Paris Agreement on climate change and to begin negotiations either to re-enter the agreement or on a new agreement could affect US domestic wood energy consumption and pellet exports by the US to the EU. The proposal for a revised Directive of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources (RED II) could affect the eligibility of biomass sourcing and the establishment of risk assessments, with uncertain consequences for established interregional supply chains.



Source: Aarni, 2017.

1.5.7 Value-added wood products

Global furniture production was worth \$420 billion in 2016, up moderately from 2015. The value of global furniture trade was estimated at \$140 billion, with France, Germany, the UK and the US the largest import markets.

Furniture has become a large global trade flow as the industry has globalized and production has moved to lower-cost countries. China is now the world’s largest furniture producer and exporter. There are some diverging trends, however, with increasing consumer awareness of locally produced furniture.

Furniture companies in the UNECE region are looking for ways to expand furniture production in their home countries, exploring design, service and custom-made concepts, such as integrated electronic features, as ways of competing with imported Asian furniture. Traditional furniture stores with display rooms are finding it difficult to compete with internet-based stores, the overhead costs of which are a fraction of those of traditional stores. The

furniture giant IKEA was the largest single buyer of wood in Europe in 2015, consuming 16.2 million m³ of solid-wood equivalent and an estimated 3.8 million m³ of paper and paperboard for packaging.

The market for builders' joinery and carpentry products (BJC) has developed strongly in the US in the last five years. This market is expected to continue developing in North America as its housing markets continue to strengthen (the value of imports of BJC in the US alone now exceeds \$2.1 billion per year). In contrast, there has been no significant change in import volumes for BJC in the last several years in the largest European countries.

Profiled-wood imports to the US declined in 2016, despite the strengthening housing market. Profiled-wood markets in Europe, serviced mainly by European producers, also declined slightly in 2016.

North American production of glulam, wooden I-beams and laminated veneer lumber (LVL) made consistent gains in the period from 2010 to 2017 (forecast), mainly the result of increased new housing construction. Glulam data are unavailable for Europe, but there has been significant growth in production in Austria, the subregion's largest producer. Italy is the largest consumer. Europe provides the majority of Japan's 771,000 m³ of imports of glulam and cross-laminated timber (CLT). In descending order by volume, Finland, Romania, Austria, Estonia and Sweden were the biggest suppliers.

CLT production is still concentrated in Europe and, within Europe, in the DACH countries (i.e. Austria, Germany and Switzerland) accounted for about 80% of global production in 2015 (Austria alone produced about 60%). European production was estimated at 680,000 m³ in 2016. By 2020 this is forecast to increase to about 1.25 million m³. Despite the hype around the use of CLT in the construction of tall wooden structures, small and medium-sized buildings remain the main market for most value added producers in Europe.



Source: APA, 2017.

CLT has become increasingly popular in North America, echoing the long-established trend in Europe. Production in North America, which, to date, has been oriented more towards platforms used in mining and the oil industry, is expected to increase significantly in coming years, with greater use in the building sector. Five CLT plants are in operation in North America (two in Canada and three in the US). It is estimated that the potential market for CLT in the US alone could be 2 million-6 million m³, far outstripping the current global supply.

1.5.8 Housing

Housing markets in the Euroconstruct⁴ region and North America have partially recovered from the 2008-2009 global financial crisis. However, housing construction and sales have not yet attained their historical averages. Gross domestic product (GDP) forecasts for many advanced economies in the UNECE region hint that housing construction and sales in 2017 and beyond might be at similar levels to those reported in the past few years.

In the US, housing construction and sales continue to improve from the lows of 2009, but aggregate new single-family housing construction remains below its historical average. All sectors of the US housing market improved in 2016. However, beginner or starter housing remains subdued, and the quantity of dwellings constructed is insufficient to meet increasing demands due to population growth. Residential investment accounted for 6.1% of US GDP in 2005 but for only 3.8% in 2016, a sign that the new-housing construction market has additional opportunity to grow. The Canadian housing sector remains stable, but there is growing concern about rapidly escalating housing prices in Vancouver and the greater Toronto area.

The Russian Federation experienced a modest decline (of nearly 3.4%) in completed houses in 2016, to 1.15 million units. Overall, 79.3 million m² of floor space was put in place, a decrease of 6.7% compared with 2015. Two agencies in the Russian Federation are addressing performance and regulatory issues in wooden housing construction. The near-term goals are that wooden housing should achieve a 30% share of new-housing construction and the total value of wooden housing construction should comprise 1.0% of Russian GDP.

Construction in the euro area increased by 7.1% between February 2016 and February 2017, due primarily to

⁴ The Euroconstruct region comprises 19 countries. The western subregion consists of Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the UK. The eastern subregion comprises the Czech Republic, Hungary, Poland and Slovakia.

improvements in the building construction and civil engineering sectors. Residential remodelling was the largest component (about 58%) of euro-area residential construction expenditures in 2016, although new residential construction is forecast to increase at higher rates than remodelling to 2019. New residential spending (new residential construction + residential renovation) is

forecast to increase by 8.0% from 2016 to 2019, with civil engineering construction increasing by 9.4% and non-residential construction by 5.4% (euro basis). It is estimated that there will be robust demand in Europe in the near term due to revived consumer confidence, increasing household incomes, demographic growth, and meeting the housing needs of asylum seekers.





Chapter 2

POLICIES SHAPING FOREST PRODUCTS MARKETS

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Highlights

The 15th round of negotiations between the EU and the US on the Transatlantic Trade and Investment Partnership (TTIP) took place in October 2016. In May 2017, **the two parties agreed to set up a joint delegation to increase trade cooperation**, including consideration of the future of the TTIP.

The European Parliament approved the Comprehensive Economic and Trade Agreement (CETA) between Canada and the EU in February 2017; the agreement will be applied provisionally as soon as Canada ratifies it and notifies the EU. **Both the TTIP and CETA should encourage transatlantic trade**, especially in value-added forest products, which are subject to tariffs of up to 10%.

In June 2016, the UK voted in a referendum to leave the EU. On 29 March 2017, the UK government activated Article 50 of the Lisbon Treaty, the official mechanism for withdrawing from the EU. In value terms, **the UK was the EU's second-largest importer of forest products in 2016 and its largest importer from non-EU countries**. The introduction of new trade barriers may affect regional trade flows, both within and outside the EU.

The US government announced proposed **tariffs of 3-24% on imported lumber from Canada in April 2017**.

The two major certification schemes – the Forest Stewardship Council and the Programme for the Endorsement of Forest Certification – reported a combined global total of 497 million hectares of certified forest in May 2017, a year-on-year increase of 35 million hectares (7.5%). Nearly 69 million hectares are certified under more than one scheme. **The total global certified area is estimated at 429 million hectares, a decline of 3 million hectares from the previous reporting period**.

The Paris Agreement on climate change, which aims to accelerate action to mitigate climate change, entered into force on 4 November 2016. As of 31 May 2017, **147 countries had ratified the agreement**, although the US has recently indicated its intention to withdraw.

The European Commission reported that **27 EU member countries** (all current members except Slovakia) **have complied with obligations in the EU Timber Regulation** to appoint competent authorities, establish penalties for non-conformance, and start carrying out controls of operator compliance.

The US Green Building Council reported that **84 projects have registered to use the new pilot credit** in the LEED green building programme which is designed to address illegal wood and promote the use of verified-legal, responsible and certified wood in buildings.

Resolute Forest Products, Inc. has filed a suit against Greenpeace International in a US court. The suit includes claims of federal racketeering, defamation and tortious interference. **Resolute asserts that actions by Greenpeace have had a negative impact on its forest products business**.

2.1 Introduction

Governmental and non-governmental actions continue to have significant impacts on forests and forest product markets. Continued trade negotiations and recent actions by the UK and US governments have created uncertainty for international traders in forest products and in a range of related initiatives. Moreover, after years of decline in illegal logging and growth in certification, green building and biomass energy, new challenges are arising in each of these arenas. For the first time, for example, this edition of the *Review* reports a decline in global certified land area. This became apparent following an investigation of overlaps in the reporting of forests certified under more than one scheme. Although the overall decline in certified area is small, it may be an early indication that participation in forest certification has peaked and that actions to reduce barriers and increase benefits will be essential for future success.

Significant and diverse opportunities exist for forests and forest products to provide environmental and societal benefits; fully realizing these benefits, however, requires a supportive political and economic environment. This chapter addresses trade policies, due diligence and legal wood supplies, bioenergy policies, forest certification, climate change and carbon markets, green building, environmental product declarations, and deforestation-free policies.

2.2 Trade-related

2.2.1 Transatlantic free trade

Canada and the EU concluded negotiations on the Comprehensive Economic and Trade Agreement (CETA) in September 2014. The European Parliament approved the CETA on 15 February 2017. The agreement will be applied provisionally as soon as Canada ratifies the CETA according to its domestic procedures and notifies the EU. National parliaments in the EU must approve the CETA before it can take full effect (European Commission, 2017a).

The 15th round of negotiations between the EU and the US on the Transatlantic Trade and Investment Partnership (TTIP) took place in October 2016 in New York, where good progress was made on the text (European Commission, 2016a). The EU and the US also agreed on 25 May 2017 to set up a joint delegation to increase trade cooperation, including consideration of the future of the TTIP (EURACTIV, 2017).

Both the CETA and the TTIP should encourage transatlantic trade, especially in value-added forest products such as prefabricated buildings, wood veneers and plywood, which currently are subject to tariffs of up to 10% (many log and sawnwood products are already tariff-free) (GAC, 2016). In addition to addressing

tariffs, the two agreements include provisions to remove barriers to market access in public procurement procedures that go beyond the existing World Trade Organization Government Procurement Agreement rules, with potential implications for government timber-purchasing policies on both sides of the Atlantic. There are also provisions for greater cooperation on phytosanitary issues, which are becoming increasingly relevant in forest products trade.

2.2.2 US and Canada forest trade and policy

The Softwood Lumber Agreement (SLA) between Canada and the US expired on 12 October 2015. In place since 2006, this agreement addressed tariffs on lumber traded between the two countries as part of a decades-long trade dispute covered in earlier editions of this *Review*. In April 2017, the US government announced tariffs of 3-24% on imported lumber from Canada. Rates are applied based on the relative amount of provincial government subsidy. The highest rates generally apply to western Canada (Dattu *et al.*, 2017). The tariffs are derived from an investigation by the US Department of Commerce, which made a preliminary determination that countervailable subsidies are being provided to producers and exporters of certain Canadian softwood lumber products (US Department of Commerce, 2017a). In 2016, imports of softwood lumber from Canada to the US had an estimated value of \$5.66 billion (US Department of Commerce, 2017b). The National Association of Home Builders estimates that the prices paid by US consumers could rise by 6.4% as a result of the new tariffs (Emrath, 2017).

There is ongoing interest in a dispute between a Canadian timber company and an international environmental organization. Resolute Forest Products, Inc., and Greenpeace have been engaged in a disagreement since December 2012 stemming from conflicts related to protections for woodland caribou, the certification of lands managed by Resolute, and the rights of First Nation peoples (Greenpeace, 2017; Ontario Superior Court of Justice, 2016). Resolute claims that actions taken by Greenpeace have resulted in lost trade because its customers have been targeted by Greenpeace and have shifted their purchases of forest products to other suppliers of forest products. Resolute has also incurred costs associated with responding to and managing the impacts of Greenpeace actions. Resolute filed suit against Greenpeace Canada in 2013. In May 2016, they filed suit in US court against Greenpeace International, including claims of federal racketeering, defamation and tortious interference (Adler, 2016; US District Court, 2016). As of May 2017, both cases were ongoing in the courts.

2.2.3 Brexit

A referendum was held in the UK on 23 June 2016 in which a majority of voters voted to leave the EU. As a result, the UK government activated Article 50 of the Lisbon Treaty, the official mechanism for withdrawing from the EU, on 29 March 2017, in a process generally referred to as Brexit. The timeframe for withdrawal from the EU under Article 50 is two years. This is only extendable by unanimous agreement of all EU countries. If no agreement is reached within two years and no extension is agreed, the UK leaves the EU automatically, and all existing agreements – including access to the single market – would cease to apply to the UK from 29 March 2019.

The implications of Brexit could be significant for forest products trade and policy, not only in the UK but also in the wider EU and in other regions. The UK is the second-largest net contributor to the EU budget, and withdrawal from the EU will affect financing for forest-relevant policy areas such as the Common Agricultural Policy (CAP), the European Regional Development Fund, and Horizon 2020, a fund for research and innovation.

In 2016, the UK was the EU's second-largest importer of forest products in value terms, after Germany. In addition it was the largest importer of forest products from non-EU countries. The introduction of new trade barriers between the EU and the UK would affect regional trade flows within and outside the EU. Independent research indicates that leaving the single market will be associated with a long-term reduction in total UK trade of at least 22%, irrespective of whether the UK concludes a free-trade agreement with the EU (Ebell, 2017). The long-term effects on trade will also be strongly influenced by the impacts of Brexit on exchange rates and on the wider economy.

The UK has been a leading advocate and financial supporter within the EU of the EU Forest Law Enforcement, Governance and Trade (FLEGT) Action Plan, playing a prominent role in negotiations of voluntary partnership agreements (VPAs) between the EU and tropical timber-supplying countries and in encouraging implementation of the EU Timber Regulation (EUTR). The UK is the largest market in the EU for forest products from Indonesia, the only country (as of May 2017) to have issued FLEGT licences. A preliminary analysis suggests that the UK's commitment in these policy areas is unlikely to be affected by Brexit. However, the exact role of the UK in future VPA negotiations remains uncertain (TFT, 2016). Within the EU, the focus on market-based mechanisms, championed by the UK, may lose importance compared with more hierarchical and regulatory approaches, which Germany prefers (Winkel and Derks, 2016).

2.2.4 CIS forest trade and policy

The Ministry of Natural Resources and the Environment of the Russian Federation introduced significant changes to legislative frameworks for the protection, defence and regeneration of Russian forests in 2016. Changes included addressing forest and wildland fires, with a focus on prevention (Rossiyskaya Gazeta, 2016a). Additional actions were taken to address the research needs regarding forest pathology and special forest management areas close to cities in the Russian Federation (Rossiyskaya Gazeta, 2016b).

The Russian government continues to emphasize the development of the forest sector and to reform forestry and forest-related policies. The Russian timber harvest of 214 million m³ in 2016 was a 20-year record high volume. The Russian government expects the country's timber harvest to increase by 50% by 2050, and it has declared its intention of increasing the contribution of the forest sector to annual GDP by up to 250 percent by 2030. Logging volumes in forest areas leased for use by the forest products sector are targeted to increase by 15% by 2020 and by 50% by 2030 (Ministry of Natural Resources and Environment of the Russian Federation, 2016).

The Federal Forestry Agency declared 2016 as the Year of Reforestation in the Russian Federation. An area of 781,100 hectares replanted in that year (Rosleskhoz, 2016a). In 2017, which has been designated the Year of Ecology, forest management is tasked with replanting an area of 1 million hectares (Rosleskhoz, 2016b).



Source: UNECE/FAO, 2017.

It is anticipated that the Russian government will use policy to increase domestic wood processing. In particular, it plans to impose export duties on unfinished wood products and unprocessed timber, differentiate wood-processing products by the degree of processing, and add sawnwood products to timber accounting (Government of the Russian Federation, 2016). In January 2017, a list of products which are eligible for temporary export bans was completed (Government

of the Russian Federation, 2016). This includes birch logs (with a minimum diameter of at least 15 cm and a length of at least 1 m), in response to the shortage of raw materials experienced by birch plywood producers.

2.2.5 Due diligence and legal wood supply

2.2.5.1 EU Forest Law Enforcement, Governance and Trade Action Plan

The EU FLEGT Action Plan has been in force for 14 years. One of its key features is the negotiation of VPAs that engage partner countries in the development of legality licensing systems for exported timber. As of May 2017, 15 tropical countries were negotiating or implementing VPAs (EU FLEGT Facility, 2017). On 15 November 2016, Indonesia became the first country to issue FLEGT licences. Indonesia supplies 33% of the EU's tropical timber imports, by value. (European Commission, 2016b).

On 22 February 2017, the European Commission reported that 27 EU member countries (all current members except Slovakia) had complied with the obligations of the EUTR to appoint competent authorities, establish penalties for non-conformance, and start carrying out checks of operator compliance. In December 2016, the European Commission issued a formal notice to Slovakia to provide evidence that sanctions for EUTR non-conformance were being enacted into national law (European Commission, 2017b).

Efforts to ensure compliance with the EUTR are ongoing at the national level. In Romania, new, more stringent rules on penalties for EUTR violations were adopted in September 2016 in response to a European Commission infringement procedure. Setting a new legal precedent, a Swedish court ruled in November 2016 that a company importing timber from Myanmar was in breach of the EUTR. Fines were also imposed in the Netherlands in November 2016 for companies which did not meet the EUTR due-diligence requirement for timber imported from Cameroon (Client Earth, 2017).

Over the period 2013-2015, there has been a slow start in most EU member countries in the first two years of EUTR implementation. In 2016, there was, in some member countries, an increase in the number of EUTR enforcement checks which were carried out. In France, for example, 103 checks were carried out in the first half of 2016 by the two ministries in charge of enforcing the EUTR. By March 2016, the Dutch Competent Authority had checked approximately 150 operators for compliance with the EUTR. Between mid-2013 and January 2016, the German Competent Authority checked approximately 370 timber operators. The Danish Competent Authority carried out 46 checks in 2016. Between March 2015 and November 2016, the Finnish Competent Authority undertook 32 checks on imported timber and 19 on domestic timber (Client Earth, 2017).

In January 2017, the European Commission published a preliminary assessment of the impact of extending the product scope of the EUTR to include printed books, newspapers, manuscripts, musical instruments and seats with wooden frames. In 2017, a more detailed assessment and draft delegated Act is planned to be put online for public consultation (Client Earth, 2017). Article 20 of the EUTR includes a requirement that all member countries submit reports on how the EUTR was applied in the previous two years. The next round of biennial reports was due to be submitted to the European Commission by 30 April 2017. The European Commission will provide a summary of these to the European Parliament and to the Council of the European Union later in the year (Client Earth, 2017).

2.2.5.2 Lacey Act

The US Lacey Act, enacted in 1900, addresses trafficking in wildlife, fish and plants that have been illegally taken, possessed, transported or sold. After a series of amendments in 2008, the Act requires that import declarations accompany certain plants and plant products, including a wide range of forest and wood products (USDA, 2015). Effective from November 2016, all plant and plant product shipments entering or leaving the US are subject to Lacey Act declaration requirements (USDA, 2017a). It is anticipated that these requirements will be integrated into the US Custom and Border Protection's Automated Commercial Environment (ACE) in 2018 to provide a streamlined digital process (CBP, 2017).

2.2.6 Wood high on national and international agendas

The Russian government is developing measures to stimulate wood-housing construction. These include changes in design standards and construction rules. Among the most important of these changes are the possibility of using new wood materials, enabling the construction of wooden buildings above three stories, and development of "green" energy consumption standards (Ministry of Construction, Housing and Utilities of the Russian Federation, 2016).

In 2016, the Timber Innovation Act (S. 538 and H.R. 1380) was introduced to the US Congress. This is intended to accelerate the use of wood in buildings, including the construction of tall wooden buildings (i.e. six stories or more). The policy would provide funding for research into, and the development of, construction technologies for tall wooden buildings and mass timber (Senate of the United States of America, 2016). Since 2009, at least 21 wooden structures more than six stories in height have been built worldwide. Many of these have been enabled by wooden-building initiatives and supportive policies (Bowyer *et al.*, 2016).

In April 2017, the UN General Assembly adopted the UN Strategic Plan for Forests 2017-2030. This supports six

Global Goals on Forests (UN, 2017). Many of these goals are relevant to forest products and their relationship with the UN Sustainable Development Goals (SDGs). These include SDG on affordable clean energy (SDG 7), growth and infrastructure (SDGs 8 and 9), sustainable cities and communities (SDG 11), responsible consumption (SDG 12), action on climate change (SDG 13), and notably sustainable forest management (SDG 15). Forests and forest products have a strong role to play in achieving the SDGs, both from a policy development standpoint and as an opportunity for the forest products sector to capitalize on the sustainability and green credentials of wood. The forest related SDGs will require cross sectoral approaches for implementation. These take into account, for example biodiversity, agriculture and water) giving credence to landscape approaches to certification (see section 2.3.5).

2.2.7 Bioenergy, biomass and biofuels

According to data from the European Biomass Association (AEBIOM), bioenergy accounts for 61% of all renewable energy consumed in the EU28. It is estimated that 70% of the total bioenergy feedstock delivered in Europe originates in the forest sector. Therefore, wood-based fuels account for 40-45% of all renewable energy, with the remainder coming from waste and agriculture. Over the period 2000-2014, bioenergy consumption in the EU almost doubled to 105.5 million tonnes of oil equivalent (Mtoe). According to the projections of EU member countries, bioenergy consumption is set to grow to at least 140 Mtoe by 2020 (AEBIOM, 2016).

In November 2016, the European Commission published proposals for establishing pan-European sustainability criteria for woody biomass and the bioenergy sector (SBP, 2016a). It is anticipated that the Commission's Clean Energy package will use a regional risk-based approach for assessing sustainability compliance that is consistent with the mechanisms used by voluntary certification programmes (SBP, 2016b).

The Sustainable Biomass Partnership changed its name to the Sustainable Biomass Program (SBP) in December 2016, and its certification system recently achieved 100 active SBP certificates (SBP, 2017). The SBP certification system is accepted in Denmark and the UK for documenting compliance with sustainability criteria. The SBP continues to pursue acceptance for its certification scheme under the requirements in place in Belgium and the Netherlands (SBP, 2016a).

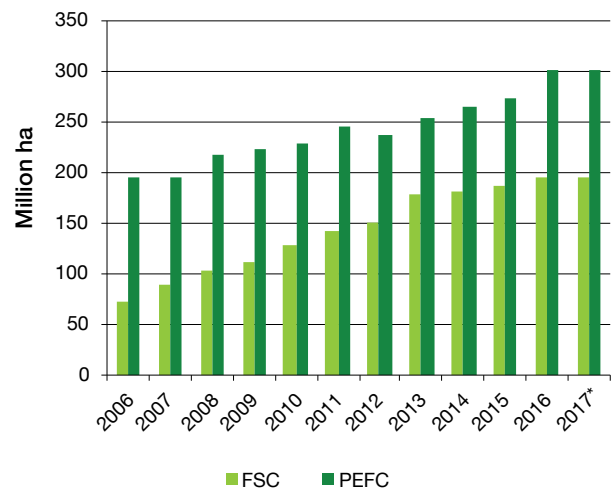
The SBP recently launched a digital data transfer system for tracking biomass supply chains. It includes data to calculate energy and carbon savings associated with bioenergy production. Further development is anticipated in 2017 (SBP, 2016b). In January 2017, Enviva, a large wood-pellet producer with six plants in the southeastern US, released the first data from its own tracking system (Enviva Holdings, LP, 2017).

2.3 Certified forest area

The two major certification schemes – the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC) – reported a combined global total of 497 million hectares of certified forest, as of May 2017 (FSC, 2017a; PEFC, 2017b) (graph 2.3.1).

GRAPH 2.3.1

Forest area certified by major certification schemes, 2006-2017



Note: *FSC data as of June 2017; PEFC data as of March 2017.

Sources: FSC, 2017a; PEFC, 2016b, 2017b.

PEFC is an umbrella system with an established procedure for endorsing independently developed schemes. Graph 2.3.2 indicates the coverage of the different schemes endorsed by the PEFC globally.

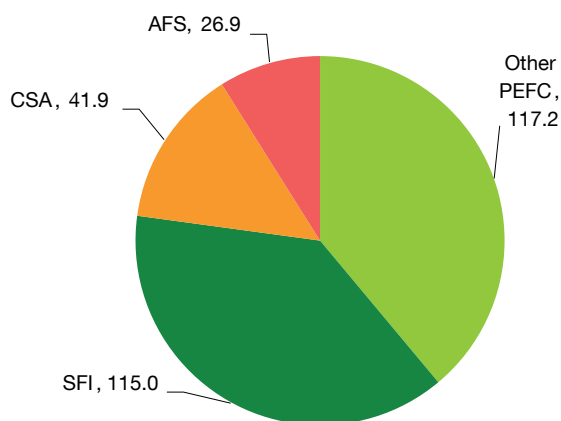
The FSC system also includes a procedure for the approval of national standards. In countries where FSC national standards have not been approved, the FSC issues certificates through the use of standards that certification bodies have developed through an accreditation process. It is reported that the FSC has issued certificates for certified forest areas in 83 countries. 56 countries have FSC approved national standards.

As reported in previous editions of the *Review*, the majority (85%) of the world's certified forest area is in the UNECE region, with the combined total for Africa, Latin America, Asia and Oceania amounting to only 15% (graph 2.3.3).

The reported increase in total certified forest area in the 12 months to May 2017 of 35 million hectares initially amounts to a year-on-year increase of 7.5%. However, the

GRAPH 2.3.2

Forest area certified by top the three PEFC-endorsed systems and other PEFC-endorsed national systems, 2017 (Million ha)

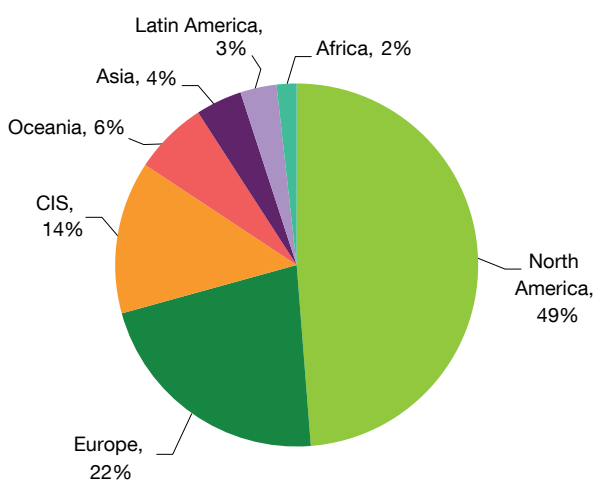


Notes: "Other PEFC" consists of PEFC national certified and PEFC-Notes: "Other PEFC" consists of PEFC national certified and PEFC-endorsed schemes other than the top three; Sustainable Forest Initiative (SFI) (PEFC-endorsed since 2005); CSA (Canadian Standards Association) (PEFC-endorsed since 2008); Australian Forestry Standard (AFS) (PEFC-endorsed since 2004).

Sources: PEFC, 2017b; SFI, 2017; MTCC, 2017.

GRAPH 2.3.3

Share of certified forest area, by region, 2017



Sources: FAO, 2010, 2015; FSC, 2017a; PEFC, 2017a, b

area of forest certified by more than one scheme must also be considered. Last year's Review reported an estimated 29.5 million hectares of forest certified under more than one scheme, based on data from the FSC and the PEFC. Given that overlap, the adjusted total forest area certified globally in 2016 was estimated at 432 million hectares (11% of the global forest area). The forest area certified under more than one scheme has been further researched for this edition of the Review and is now estimated at nearly 69 million hectares. Adjusting for this overlap in certification, the total global certified area in 2017 is estimated at 429 million hectares, a decline of 3 million hectares compared with 2016. This may be a first indication that the global certified forest area has peaked. Efforts to reduce barriers and to increase the benefits of forest certification are increasingly important to the future growth of certification of forests in the UNECE region.

Twenty-eight countries have forests certified under more than one scheme. These include Canada (with more than 16 million hectares of overlapping certificates), the Russian Federation (nearly 9 million hectares), the US (more than 8.3 million hectares), Belarus (7.7 million hectares), Sweden (7.2 million hectares), and Poland (6.9 million hectares). In eight countries (i.e., Belarus, Denmark, Estonia, Ireland, Poland, Portugal, the UK and Chile), the area of overlap is 65% or more of the certified area. To help to improve data accuracy, and given the significant area of forests with multiple certificates (i.e. 16% of certified forests globally), the FSC and the PEFC have committed to reporting their estimates of these overlaps on an annual basis.

2.3.1 Internal developments in certification schemes

The FSC's international generic indicators (IGIs) were approved in March 2015. In March 2016, the FSC announced that Portugal was the first national initiative to use the IGIs in the revision of its national standard (FSC, 2016). The FSC standard in Canada is being revised to align with the IGIs, with a final version expected to be completed later in 2017 after field-testing in 15 diverse forest management units in Canada (FSC Canada, 2017). The most complex aspects of the new FSC Forest Management Standard in Canada are expected to be the addition of a guidance document addressing free, prior and informed consent; a working document related to intact forest landscapes; and a paper on the topic of indigenous cultural landscapes (FSC Canada, 2017). These new documents represent significant changes compared with the current standard and have raised concerns among existing certificate-holders and other stakeholders (FSC Canada, 2016a). More than 500 pages of comments were received in the first consultation period of the revision process (FSC Canada, 2016b).

FSC US advanced its development of supplementary certification requirements for national forests in 2016 (FSC US, 2017). The final approval of the supplementary requirements could be obtained in 2017. If so, it will represent the completion of a process outlined in the FSC US Federal Lands Policy, which was established in the late 1990s which has prevented the certification of lands managed by the US Forest Service (Fernholz *et al.*, 2012).

At the international level, the FSC’s International Board of Directors approved strategies for addressing misleading and false claims in the marketplace in January 2017. Beginning in 2017, the FSC will use various sampling, testing and investigative approaches to increase system integrity (FSC, 2017b).

The SFI (Sustainable Forest Initiative) continues to be the largest certification programme in North America, with the area certified to the SFI standard doubling since 2007 (SFI, 2016). The SFI continues to differentiate itself from other certification systems by maintaining requirements for training and research. Since 1995, SFI Program participants have invested nearly \$1.6 billion in forest research, almost 75% of which has been in support of conservation objectives (SFI, 2016).

PEFC working groups undertook review processes throughout 2016, including reviews of the PEFC’s standard-setting requirements and endorsement process. It is expected that these efforts will be completed in 2017 (PEFC, 2017a).

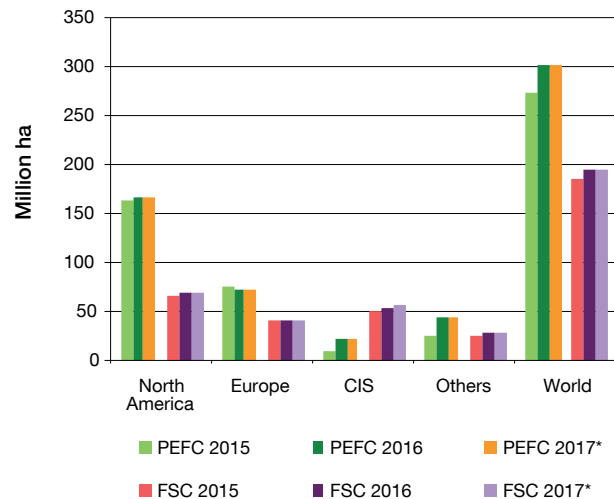
2.3.2 Regional aspects

The PEFC reported a certified forest area of 301.6 million hectares in 35 countries, as of March 2017. This is an increase of 26.3 million hectares (9.6%), year-on-year. This is double the increase over the previous period. In addition to the Russian Federation, there was a significant increase in PEFC-certified forest in Australia associated with a large state-owned forest becoming PEFC certified. The PEFC also reported an increase of more than 8 million hectares of SFI-certified forest in the US and Canada (PEFC, 2016a).

As of May 2017, the FSC reported a worldwide certified forest area of 195.6 million hectares (83 countries). The Dominican Republic and Guyana were added since the 2016. Graph 2.3.4 shows the area of the world’s forests which are certified area by the FSC and the PEFC, by region, in 2015-2017. Over this period, the growth in certified forest area in Australia doubled Oceania’s share of the total. There were also increases in the Russian Federation and North America but declines in the shares of Europe and in Latin America.

GRAPH 2.3.4

Certified forest area by region and certification scheme, 2015-2017



Notes: Data for systems endorsed by the PEFC (i.e. the American Tree Farm System, the Canadian Standards Association, the Malaysian Timber Certification Scheme and the Sustainable Forest Initiative) are included in the PEFC data after the date of endorsement. The data do not take into account overlaps due to double certification. *FSC data are as of May 2017; PEFC data are as of March 2017.

Sources: FSC, 2017a; PEFC, 2017b.

2.3.3 Certified forest production

In previous editions of the Review, this chapter provided estimates of roundwood production in certified forests. Last year, the estimated production was 511 million m³, which was 29% of global production. However, the ongoing evaluation of the impact of overlapping certified areas has introduced considerable uncertainty to these estimates. As such, these estimates, are not included in this year’s Review. The individual certification schemes continue to report growth in their own market activities. However, the lack of transparency and consistency in the various reporting mechanisms raises concern about the accuracy of regional and global estimates. Given that third-party certification is intended as a market-based initiative, it behoves all certification initiatives and associated stakeholders to continually improve their tracking and reporting mechanisms to ensure that they give reliable estimates of the trade activities and a realistic economic analysis of the market and impacts of certified wood products.

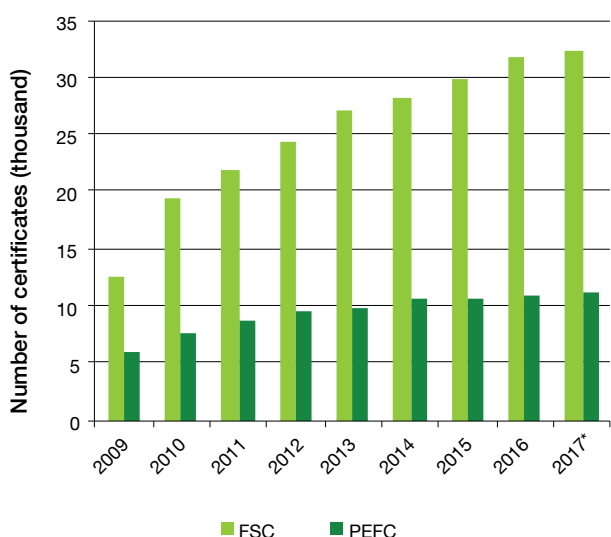
2.3.4 Chain-of-custody certification

The reported participation in chain-of-custody (CoC) certification continues to grow; however, this dataset is known to include overlaps of companies with multiple

certificates. Based on FSC data, the most significant growth in FSC CoC certification in the 12 months to June 2017 was in Asia, where 1,057 FSC CoC certificates were added (constituting 12.4% growth, year-on-year). There was an increase of 927 FSC CoC certificates (up by 5.7%) in Europe but a decline of 136 (down by 3.7%) in North America. Similar declines were reported in 2015 and 2016 (FSC, 2017a). The reasons for these declines are unclear. They could include factors such as business closures and consolidations and varied causes for the discontinuation of participation in certification. As of June 2017, the FSC reported 32,400 CoC certificates, an increase of 6%, year-on-year. The number of CoCs certificates in the PEFC scheme grew by 2.2% in 2016 reaching almost 11,000 by December 2016. The number of PEFC CoC certificates increased by 129 in the period from December 2016 to March 2017 (graph 2.3.5).

GRAPH 2.3.5

Number of chain-of-custody certificates issued globally by the FSC and the PEFC, 2009-2017



Notes: Numbers denote CoC certificates irrespective of the size of the individual companies or of production or trade volumes. *FSC data are as of April 2017; PEFC data are as of March 2017.

Sources: FSC, 2017a; PEFC, 2016b, 2017b.

2.3.5 Landscape certification

Landscape approaches to certification are gaining attention, partly in response to policy developments such as an increased focus on REDD+ and on due diligence and national governance through FLEGT, and partly because of growing interest in the corporate sector in deforestation-free procurement policies. There is also increasing recognition that an enterprise-by-enterprise (i.e., individual management unit) approach is often ineffective and inefficient. Approaches

to landscape certification vary, but generally they offer management processes in a geographically defined area that support a coherent set of activities to bring about more sustainable land use. In landscape approaches, the idea is to find measurable indicators that are applicable across a landscape and which give an indication of the general progress being made (ISEAL Alliance, 2016). Technological advances, notably in remote sensing and social media, offer new opportunities for near-real-time information that may provide more cost-effective and equitable access to certification frameworks, particularly among farmers and smaller non-industrial forestry operators (ISEAL Alliance, 2016).

A move towards landscape-based approaches would have important implications for the practice and functioning of certification systems. Although there would be a continuing need for the verification of product origin, it would be less important to be able to trace products to their origin (e.g. the farm or forest management unit) than to know that it is sourced from a specific region. The incentives could also change, with expanded opportunities for direct payments to operators for the provision of ecosystem services, notably carbon but also potentially water and biodiversity conservation. Financial instruments such as green bonds could also operate at a landscape or jurisdictional level (ISEAL Alliance, 2016).

Although still conceptual, efforts to develop practical frameworks for landscape-based certification are underway. For example, GreenBlue’s Forest Product Working Group and the American Forest Foundation are working jointly on a new evaluation tool to assess forest sustainability at the landscape level in US regions with a high proportion of family forest owners (American Forest Foundation, 2016).

2.4 Carbon-related

2.4.1 Climate change and carbon markets

The aim of the Paris Agreement on climate change, an outcome of the 21st Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC), is to accelerate actions to mitigate climate change. The Paris Agreement entered into force on 4 November 2016 after ratification by at least 55 countries representing at least 55% of global greenhouse gas (GHG) emissions. As of 31 May 2017, 147 countries had ratified the agreement. However, the US government has since indicated its intention to withdraw from the Paris Agreement (Washington Post, 2017).

Key features of the Paris Agreement include the goal of limiting global warming to less than 2 degrees Celsius above pre-industrial levels; a global transition away from fossil fuels,

and enhanced transparency, accountability and tracking. The Paris Agreement is built on the commitment of signatories to make “intended nationally determined contributions” (INDCs) to reduce GHG emissions. The Paris Agreement recognizes explicitly that cutting land-based emissions – including from deforestation and by promoting sustainable forestry – is one of the most efficient ways to address climate change. Consequently, more than 100 countries commit to pursuing actions in the land-use sector in their INDCs.

Negotiations at UNFCCC COP 22 in Marrakech, Morocco, in November 2016, and discussions in UNFCCC subsidiary technical bodies (SBSTA) and working groups in Bonn, Germany, in May 2017, focused on developing a rule book for implementing the Paris Agreement, much of which relates to forests and other land uses. Several ongoing negotiations, due to be finalized in 2018, are relevant to forest policy. These include “Sustainable Development Mechanism” which replace the Clean Development Mechanism (the existing UN GHG emission offsets scheme); negotiations on land-use carbon accounting; the development of procedures to ratchet up the ambition in the INDCs; negotiations on agriculture; and improving the system of reporting (Leonard, 2016, 2017).

The Green Climate Fund (GCF) is a financial institution within the UNFCCC designed to mobilize and provide funding for global climate change mitigation and adaptation efforts. In 2016, the GCF agreed to develop procedures for results-based payments for REDD+, to be completed in 2017. If the GCF enables results-based payments, it will join a diverse public funding landscape for REDD+ that amounted to about \$8.7 billion between 2006 and 2015. The GCF is an important addition to REDD+ because it is the only institution with direct responsibility for implementing the mandate of the UNFCCC (Busch, 2017).

The EU and its member countries have committed to a binding minimum target of a 40% reduction in domestic GHG emissions from 1990 levels by 2030, as well as to renewable energy and energy-efficiency targets. On 20 July 2016, the European Commission presented a legislative proposal to integrate GHG emissions and removals from land use, land-use change and forestry (LULUCF) into the 2030 climate and energy framework. The proposal sets a binding commitment for each EU member country to ensure that accounted emissions from land use are entirely compensated by the removal of an equivalent quantity of atmospheric carbon dioxide (CO₂). This is known as the “no debit rule”. The legislative proposal would also require member countries to comprehensively account for all emissions from biomass used in energy production (European Parliament, 2017a).

The European Parliament and Council are also considering a legislative proposal to reform the EU Emissions Trading System (ETS) (European Parliament, 2017b). The EU ETS target of a 21% reduction of emissions compared with 2005 levels by

2020 is ahead of schedule. By the end of 2015, emissions have already fallen by 24% across the covered sectors (Marcu *et al.*, 2017). Preliminary numbers for 2016 indicate a continued decrease in emissions, but the EU is not on track to reach a 90% reduction by 2050 (Marcu *et al.*, 2017). The EU ETS is still affected by a surplus of allowances, which declined from a peak of more than 2.1 billion EU allowances (EUAs) in 2013 to 1.45 billion EUAs at the end of 2016. Some analysts predict that prices will rise slightly in 2018 and 2019, to €8.78 per tonne (Marcu *et al.*, 2017).

2.4.2 Green building

The European Commission's 2014 Communication on Resource Efficiency Opportunities in the Building Sector identified the need for a common EU framework of indicators for assessing the environmental performance of buildings. The European Commission launched a three-year project to develop this approach in 2015 and, in July 2016, it published a proposal identifying indicators for the environmental performance of EU office and residential buildings. The proposal is likely to be significantly amended following public consultation, which revealed strong support for aligning the framework more closely with cradle-to-grave life cycle assessment (LCA) and for all environmental indicators to be LCA impact categories, as specified in EN 15978 (Dodd *et al.*, 2016).



Source: APA, 2017.

The EU is also focusing on improving the energy efficiency of existing buildings, which are estimated to account for 36% of the EU's total carbon emissions. The EU Energy Efficiency Directive required member countries to submit long-term strategies by 30 April 2017 for mobilizing investments in the renovation of existing residential and commercial properties to high energy-efficiency standards. The EU commissioned the "BUILD UPON" project⁵ to support member countries, bringing together 2,000 organizations at over 100 events across 13 countries in 2016-2017.

LEED ("Leadership in Energy and Environmental Design") is a building rating and certification programme developed by the US Green Building Council (USGBC). In April 2016, the USGBC announced a new credit in LEED which is designed to address illegal wood and promote the use of verified-legal, responsible, and certified wood in buildings (Holowka, 2016). The pilot Alternative Compliance Path (ACP) credit categorizes the various forest certification schemes based on the ASTM D7612-10 standard "Categorizing wood and wood-based products according to their fiber sources", and it provides a tiered structure for evaluating wood products that are legal (e.g. non-controversial), responsibly sourced, and certified. The pilot ACP credit recognizes the use of certified wood products from all major certification programmes, and it is applicable to the LEED 2009 and LEED v4 systems (Long, 2016). Since its announcement in 2016, there have been early indications that the pilot credit (i.e. Credit MRpc102) is of interest to, and is being used in, LEED projects (LEEDuser, 2017). The USGBC reports that 84 projects have registered to use the pilot ACP credit, and two projects have qualified for it. Most of the registered projects are in the US, but some also exist in Austria, Finland, France, Germany, Italy, the Russian Federation, Switzerland and the UK (B. Owen, personal communication, 16 May 2017). Since the pilot credit was announced, it has been recognized that reliance on the ASTM standard may be inappropriate for products sourced outside North America, and an amendment of the credit may be necessary to support alignment with the EUTR and other policies addressing legal sourcing (LEEDuser, 2017).

The Canada Green Building Council (CaGBC) has taken a major step toward achieving Canada's climate change commitments with the launch of the country's first Zero Carbon Building Standard (CaGBC, 2017). At the same time, the City of Vancouver has implemented its Net Zero Energy/Net Zero Carbon policy for the City's buildings and those of the Vancouver Affordable Housing Authority. This policy includes a requirement to report the embodied impact of designated projects (City of Vancouver, 2016). This is a first for North America, and other Canadian cities have shown interest in it.

⁵ <http://buildupon.eu>

A Joint ECE Task Force on Energy-Efficiency Standards in Buildings was put in place in 2016 with representatives of the housing and energy sectors. In 2017, the Joint Task Force, together with a group of experts from academia, developed the ECE Framework Guidelines for Energy Efficiency Standards in Buildings. By following the guidelines, it is expected that the energy required by buildings can be reduced to 25 kWh per m² floor area. Over time, with improvements in technology and materials, such as wood, and with enhanced connections to the built environment, these targets could be improved further.

2.4.3 Environmental product declarations

As of January 2017, an estimated 6,000 environmental product declarations (EPDs) had been published globally for construction products. An EPD is a standardized report of environmental impacts linked to a product or service. Of the published EPDs, around 3,500 have been verified to the EN 15804 standard for construction product EPDs developed by the European Committee for Standardization Technical Committee 350, which is mandated to develop harmonized standards for assessing the sustainability of buildings in the EU. Between March 2016 and January 2017, national EPD programmes in Italy, Poland and Slovenia published their first EN 15804-verified EPDs, and a new EPD programme was launched in Ireland. Germany and Austria are the leading countries for EN 15804 EPDs, accounting for nearly 1,000 of them (as of January 2017), followed by the UK, Turkey and Italy (ConstructionLCA, 2017).

In addition to EN 15804 EPDs, another 2,400 EPDs for construction products had been published globally as of January 2017 that were either verified using the international standards ISO 14025 and ISO 21930 in sectors and regions where EN 15804 is not dominant or were unverified or not publicly available. Of the latter, by far the largest contingent comprises over 1,400 environmental and health production declarations issued in France (referred to locally as FDES). It has been mandatory in France since January 2014 for any environmental claim in relation to a construction product to be supported by an FDES registered in the national database (ConstructionLCA, 2017).

The BioPreferred programme of the US Department of Agriculture (USDA) was launched in 2011. It is estimated that 3,000 products now carry the USDA Certified Biobased Product label, including 97 product categories (USDA, 2017b). Forest products such as lumber, papers, packaging and tissues are included in the BioPreferred catalogue (USDA, 2016a). Rulemaking is underway to further expand the product categories in the programme to include plastic resins; chemicals; paints and coatings; textile processing materials; foams; fibres and fabrics; rubber materials; and other materials. This expansion would include establishing

minimum biobased content for each new category (USDA, 2017).

The USDA completed an economic impact analysis of the US biobased products industry in 2016, including the sectors of agriculture and forestry; biorefining; biobased chemicals; enzymes; bioplastic bottles and packaging; forest products; and textiles (USDA, 2016b). The total reported contribution of the biobased products industry to the US economy in 2014 was \$393 billion and 4.2 million jobs, up from \$369 billion and 4 million jobs in 2013 (USDA, 2016b). The forest products component of the biobased products industry contributed \$93.3 billion and 1.1 million direct jobs in 2014 (USDA, 2016b). The USDA estimates that the use of biobased products displaced up to 6.8 million barrels of petroleum in 2014.

2.4.4 Deforestation-free policies

The principal aim of the New York Declaration on Forests, which was released at the UN Climate Summit in September 2014, is to halve natural forest loss by 2020 and end it by 2030. There were 190 endorsers by September 2016, comprising 40 governments, 20 subnational governments, 57 multinational companies, 16 groups representing indigenous communities, and 57 non-governmental organizations (ETFRN, 2017). Two years after its release, 415 companies had made more than 700 public commitments to address deforestation but the wide range of the pledges make analysis of progress difficult, and the majority of companies are yet to take essential steps toward implementing their pledges. Most commitments address palm oil (59%) and wood products (53%), with soy (21%) and cattle (12%) lagging behind. Most involve

manufacturers and retailers, but producers are also making commitments (ETFRN, 2017; Streck *et al*, 2016).

The Amsterdam Declaration “Towards Eliminating Deforestation from Agricultural Commodity Chains with European Countries”, issued in December 2015, set a yet more ambitious objective. It aims to eliminate all deforestation in agricultural commodity chains by no later than 2020, with a strong focus on the responsible private-sector management of supply chains and trade. The governments of Denmark, France, Germany, the Netherlands and the UK endorsed the declaration. The same governments also released a second sector-specific declaration in support of a fully sustainable palm-oil supply chain by 2020, followed up by a supportive EU resolution on oil palm in April 2017 (ETFRN, 2017).

2.5 Conclusion

Markets for forest products are strongly influenced by governmental policies and non-governmental activities. International agreements and private-sector initiatives are contributing to innovations as well as giving rise to new challenges and barriers. Some activities, such as forest certification, carbon markets and green buildings, have encountered challenges to their continued growth. Emerging opportunities include landscape certification and deforestation-free policies. Forests provide significant benefits in the form of products and services, but concerted and collaborative efforts, including a supportive economic and political environment, are needed to realize their full potential.

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Chapter 3



FOREST PRODUCT TRADE
RESTRICTIONS AFFECTING
THE UNECE REGION

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Highlights

The UNECE countries constitute the main market for forest products, with trade flows originating or arriving in the region accounting for more than 60% of world trade.

The UNECE region's share of world exports of forest products has decreased steadily in the last decade, with countries losing market share to emerging economies.

For the major primary forest products (excluding roundwood), **the share of imports in total consumption in the UNECE region was 16-62%** (depending on product and subregion) in 2016.

Industrial roundwood is the least-exported major primary product in all three UNECE subregions, as measured by the share of total production exported.

Although slow reductions in tariff averages for forest products are evident, **many tariff peaks remain**.

Contrary to tariffs, **non-tariff measures have been gaining in significance** as a determinant of international market access for forest products. They comprise a host of rules and procedures, such as phytosanitary measures, sustainability certification, legality assurance, and log export bans.

The EUTR and certification schemes could have unintended effects on timber trade flows. Such examples include encouraging European timber purchasers to avoid tropical suppliers in favour of using temperate timber, and by causing producers in tropical countries to avoid complex administrative requirements for exports to the EU in favour of supplying large markets elsewhere.

Log export restrictions are perhaps the most discussed and debated of all trade measures. They are widely used within and outside the UNECE region, including by key trading partners of UNECE member countries.

3.1 Introduction

This chapter provides an overview of trends in the cross-border trade of forest products in the UNECE region, which is crucial for the region's forest sector. It also reviews tariff-based and non-tariff measures that are restricting trade, with an emphasis on non-tariff measures, including log export restrictions (LERs). The chapter reviews trade measures with the most significant current impacts in the UNECE region. Chapter 2 ("Policies shaping forest products markets") contains further information on this topic, as do chapters on individual forest products.

3.2 Forest products trade in the UNECE region

Despite relatively low value-to-volume ratios, primary forest products (industrial roundwood, sawnwood, wood-based panels and paper and paperboard) are widely traded, an indication that transport logistics have become much more efficient and the global economy more interlinked. In 2016, the cross-border trade in primary forest products (excluding roundwood) in the three subregions of the UNECE region (i.e. Europe, the CIS and North America), as measured by the share of imports in total consumption, ranged from 16% (for paper and paperboard from North America) to 62% (for paper and paperboard in Europe) (table 3.2.1). The share of industrial roundwood imports in total consumption was lower, ranging from negligible in the CIS to 13% in Europe in 2016.

TABLE 3.2.1

Production, trade and consumption of industrial roundwood, sawnwood, wood-based panels, and paper and paperboard in UNECE region, 2016

		Volume			Apparent consumption	million \$		% of production	% of consumption
		Thousand	Production	Imports		Exports	Imports	Exports	exported
INDUSTRIAL ROUNDWOOD									
Europe	m ³	392,413	54,863	40,168	407,108	3,746	3,105	10%	13%
CIS	m ³	218,005	470	26,432	192,043	33	1,675	12%	0%
North America	m ³	514,356	5,554	18,408	501,502	373	2,352	4%	1%
UNECE region	m ³	1,124,775	60,887	85,009	1,100,653	4,152	7,132	8%	6%
SAWNWOOD									
Europe	m ³	121,522	40,705	55,261	106,966	11,017	13,146	45%	38%
CIS	m ³	42,474	5,233	29,627	18,081	578	3,715	70%	29%
North America	m ³	127,875	31,077	39,924	119,028	7,107	11,094	31%	26%
UNECE region	m ³	291,872	77,015	124,812	244,075	18,701	27,955	43%	32%
WOOD-BASED PANELS									
Europe	m ³	74,749	33,986	36,190	72,545	13,337	13,956	48%	47%
CIS	m ³	21,072	4,945	8,565	17,452	1,429	2,124	41%	28%
North America	m ³	48,145	16,271	10,648	53,768	6,811	3,495	22%	30%
UNECE region	m ³	143,966	55,202	55,403	143,764	21,577	19,575	38%	38%
PAPER AND PAPERBOARD									
Europe	m.t.	98,200	56,239	64,161	90,277	44,857	52,302	65%	62%
CIS	m.t.	10,272	2,549	3,204	9,617	2,852	1,981	31%	27%
North America	m.t.	82,002	11,927	18,331	75,598	11,076	14,037	22%	16%
UNECE region	m.t.	190,474	70,714	85,696	175,492	58,785	68,321	45%	40%

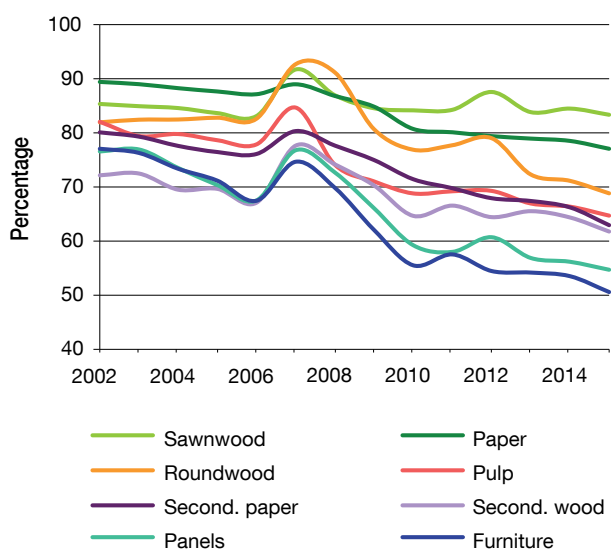
Source: UNECE/FAO, 2017.

The UNECE countries constitute the main market for forest products, with trade flows originating or arriving in the region accounting for more than 60% of the world trade in forest products. The UNECE region's share of world exports has decreased steadily in the last decade; the region has lost market share to emerging economies that are strong in the manufacture of secondary wood products (furniture, flooring, etc.) or which have invested heavily in wood harvests. The share held by the UNECE region of global furniture and panel exports has fallen by more than 20 percentage points in recent years, from above 70% before 2008 to about 50% in 2015. In the same period, UNECE exports of pulp and secondary paper products (magazines, containers, etc.) lost 17-18 percentage points of market share (graph 3.2.1). In 2015, China was the world leader in exports of furniture, panels and secondary products (both paper- and wood-based). In 2002, in contrast, the world leaders in exports of these products were Italy (furniture), Canada (panels), Germany (secondary paper) and Canada (secondary wood products). In 2015, Brazil was the largest exporter of wood pulp (20% share) while in 2002, it ranked third (8% share) behind Canada and the US.

The fall in UNECE wood product exports reflects a global trend in which the importance is rising of emerging markets in merchandise trade and particularly the trade of manufactured goods with a low level of technical input, including forest products.

GRAPH 3.2.1

UNECE share of global exports of forest products, 2002-2015



Source: UN COMTRADE, 2017.

Canada, China, the EU, Japan, the Republic of Korea and the US have been the major importers of forest products for many years, but the nature of their imports has changed considerably. In the period 2002-2015, Germany, Japan and the US all increased their imports of manufactured goods, especially furniture and secondary paper. In the same period, China increased its imports of pulp and sawnwood but significantly decreased its imports of panels and paper (table 3.2.2).

TABLE 3.2.2

Share of all forest product imports, by product type, 2002 and 2015, for leading import countries (Percentage)

	US		China		Japan		Germany	
	2002	2015	2002	2015	2002	2015	2002	2015
Furniture	19.8	32.0	0.4	2.4	10.8	13.3	11.8	17.8
Panels	9.4	9.5	6.8	1.2	17.8	13.0	6.0	7.1
Paper	25.4	16.0	35.8	19.2	12.5	10.4	39.5	30.8
Pulp	5.6	5.8	19.5	29.6	9.5	7.9	11.7	11.1
Roundwood	0.5	0.2	19.2	18.6	13.7	4.8	1.3	2.4
Sawnwood	16.5	10.0	10.4	17.4	20.8	12.4	5.1	4.2
Secondary paper	10.4	15.2	7.6	5.6	4.2	8.8	15.1	16.2
Secondary wood	12.1	11.2	0.3	1.8	10.0	15.2	9.3	9.6

Source: UN COMTRADE, 2017.

3.3 Tariffs

The Uruguay Round, which concluded in 1994, led to significant reductions in trade tariffs on forest products.

Forest products fall under the non-agricultural market access negotiations of the Doha Development Agenda, the aim of which is to reduce or eliminate tariffs for a range of products. Although slow reductions are evident in average tariffs, many tariff peaks remain. Non-tariff measures for forest products grew in importance in the UNECE region in 2002-2015.

Today, tariffs on forest products are not particularly high and have been relatively stable for the last ten years. Table 3.3.1 shows, for selected countries, the average Most Favoured Nation tariffs on wood and paper. Emerging economies, such as India, Mexico and the Russian Federation, have significantly reduced their import tariffs since 2005, while leading importers among developed economies have maintained a stable (and generally low) tariff profile.



Source: UNECE/FAO, 2017.

TABLE 3.3.1

Most Favoured Nation tariffs on wood and paper products for selected countries, 2005 and 2015

Import duty fee (%)

	2005			2015		
	Avg	Duty free %	Max	Avg	Duty free %	Max
EU28	0.9	80	10	0.9	81	10
US	0.4	92	14	0.5	90	14
Japan	0.9	79	10	0.8	81	10
China	4.9	32	20	4.5	36	20
Canada	1.1	84	16	0.9	88	16
Rep. of Korea	2.4	64	8	2.2	67	10
India	13.5	2	15	9.0	4	10
Mexico	12.3	7	33	4.4	51	15
Switzerland	3.9	16	22	9.8	2	20
Australia	3.4	32	10	3.3	33	5
Russian Fed.	15.4	5	79	9.8	6	18

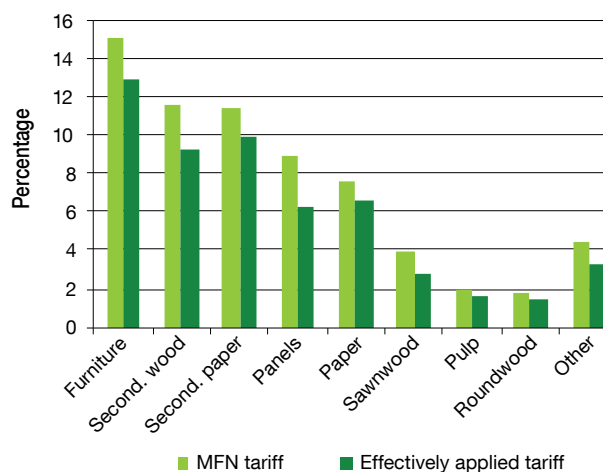
Notes: The wood and paper product group includes the Harmonized System nomenclature codes 44, 45, 47, 48, 49, 9401-04 (except 940490) and 961900. The average (Avg) import duty is a simple average of Most Favoured Nation applied ad valorem tariffs for these products. Duty free % is the share of duty-free sub-products under these codes. This dataset does not show duties imposed bilaterally.

Source: WTO, UNCTAD, ITC, 2006. WTO, UNCTAD, ITC, 2016.

Overall, furniture, secondary products and panels have higher tariffs because they are seen as making larger contributions to domestic economies through value-added processing and employment, and roundwood, pulp and sawnwood have among the lowest tariffs (graph 3.3.1).

GRAPH 3.3.1

World average Most Favoured Nation tariffs, and effectively applied tariffs, by product line, 2015



Notes: The wood and paper product group includes the Harmonized System nomenclature codes 44, 45, 47, 48, 49, 9401-04 (except 940490) and 961900. MFN = Most Favoured Nation.

Source: UNCTAD, 2017.

BOX 3.3.1

Softwood lumber dispute between Canada and the US

The softwood lumber dispute between Canada and the US is likely the most visible current tariff-related dispute over forest products in the UNECE region. The dispute, which has been ongoing since 1982, concerns the allegation by the US that Canada subsidizes its sawn softwood industry and that this is damaging the industry in the US (Canada disagrees with this allegation). In the course of its 35-year history, the dispute has involved various countervailing duties, temporary agreements, quotas and surge penalties. The latest temporary resolution, in 2006, involved a number of measures aimed at constraining the export of sawn softwoods from Canada to the US. The 2006 agreement expired in October 2015, with both countries agreeing to a one-year period in which to negotiate a new agreement. Officials from Canada and the US failed to reach agreement in this period, however, and the US Department of Commerce announced countervailing duties on Canadian sawn softwood imports in 2017 (ranging from 3.02% to more than 24%, depending on the producer).

One of the main elements in the allegation by the US Department of Commerce, and a basis for applied subsidy rates, is the issuance of log export restrictions (LERs) on government-owned forestlands Canada-wide and, notably, on private lands in British Columbia (Swick and Ujcz, 2017). The assumption is that LERs in Canada artificially depress prices. In particular, the LER regime in British Columbia was cited because it requires private forest owners to first offer their timber to domestic processors; only if logs are considered surplus may an export permit be granted (Swick and Ujcz, 2017).

3.3.1 Export tariffs

The most notable recent example of an export tariff related to forest products was in July 2007, when the Russian Federation raised its export tariff on roundwood exports from 6.5% to 20%, followed by an increase to 25% in April 2008. The tax was scheduled to increase to 80% by January 2009, but this was put off indefinitely due to the global financial crisis. The net result of the export tax was a steep reduction in Russian log exports, with importers – namely China and Finland – having to look for alternate sources of logs. When the Russian Federation became a member of the World Trade Organization (WTO) in 2012 it agreed to allow the tax to fall progressively to less than 10%. However, the Russian Federation then implemented a tariff-related quota system, which is species-specific and has trigger points at which exports exceeding a quota result in a higher tariff (Simeone, 2013).



Source: UNECE/FAO, 2017.

In Canada, British Columbia also has an export tariff (fee-in-lieu of manufacture) whereby exporters who have permission to export must pay a fee based on the difference between domestic and export values (Miller, 2016).

3.4 Non-tariff trade restrictions

Non-tariff measures (NTMs) are generally defined as policy measures other than ordinary customs tariffs that can potentially have an economic effect on international trade by changing the quantities of goods traded, or their prices, or both. NTMs are used to control the trade in forest products for a number of reasons, including the following: forest products are closer to agricultural products than to manufactured goods (so pathogens might be transported across borders); governments and consumers don't want to contribute to deforestation or illegal logging; and the protection of livelihoods in rural regions is important to policy-makers (given the lower diversity of economic opportunities in rural

areas). NTMs tend to be most prevalent for less-processed wood products.

NTMs are much more complex and difficult to recognize and therefore assess than tariffs, especially in quantitative terms. Unlike tariffs, NTMs are not mere numbers – they are complex legal texts not easily amenable to quantification, comparison or even standard formatting. Eight international organizations⁶ have been working together since 2006 in the Multi-Agency Support Team (MAST) to define the taxonomy of NTMs and address difficulties in collecting and analysing information on them.

TABLE 3.4.1

Non-tariff measures classification

Technical measures	A	Sanitary and phytosanitary measures (SPS)
	B	Technical barriers to trade (TBT)
	C	Pre-shipment inspection and other formalities
Imports	D	Contingent trade-protective measures
	E	Non-automatic licensing, quotas, prohibitions and quantity-control measures other than for sanitary and phytosanitary or technical barriers to trade reasons
	F	Price-control measures, including additional taxes and charges
	G	Finance measures
	H	Measures affecting competition
	I	Trade-related investment measures
	J	Distribution restrictions
	K	Restrictions on post-sales services
	L	Subsidies (excluding export subsidies under)
	M	Government procurement restrictions
	N	Intellectual property
O	Rules of origin	
Exports	P	Export-related measures

Source: UNCTAD, 2015.

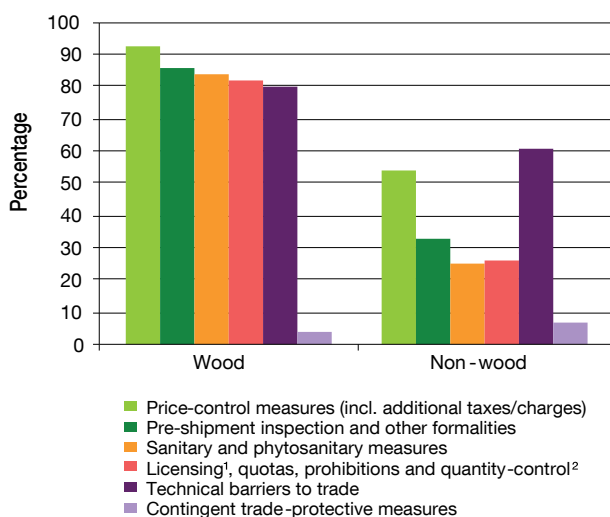
The recent (2012) UNCTAD/MAST NTM classification covers technical and non-technical import measures and export-related measures (table 3.4.1). The classification organizes NTMs into chapters, each comprising measures with similar purposes. The effects on trade of each chapter varies

⁶ The membership of MAST comprises the following organizations: FAO, the International Monetary Fund, the International Trade Centre, the Organisation for Economic Co-operation and Development, the United Nations Conference on Trade and Development (UNCTAD), the United Nations Industrial Development Organization, the World Bank, and the World Trade Organization.

considerably, with some having clear restrictive impacts and others producing uncertain effects.⁷ For example, the subset of measures in categories A, B and C (technical measures) are largely regulatory policies in response to concerns raised by society in areas such as the environment, animal welfare, food safety and consumer rights.

GRAPH 3.4.1

Coverage of non-tariff measures for wood products and non-wood products, 2012-2016



Notes: Data in this figure is from database of 56 countries plus the European Union between 2012 and 2016. Average coverage ratios is the percentage of imports that are subject to one or more NTMs.¹ Non-automatic licensing.² Other than for sanitary and phytosanitary or technical barriers to trade.

Source: UNCTAD TRAINS database, 2017.

Graph 3.4.1 contrasts the coverage ratio (expressed as the percentage of imports affected by one or more NTMs) for wood products versus non-wood products in six categories of NTMs (classifications A through F, as shown in table 3.4.1). The coverage ratios show that forest products are more affected than non-forest products by NTMs. With the exception of contingent trade measures (classification D), wood products have much higher coverage ratios (80% or higher) than other traded goods for technical measures (classifications A, B and C), licensing, quotas and quantity controls (classification E), and price controls (classification F).

⁷ NTMs are commonly but erroneously referred to as non-tariff barriers (NTBs). The difference between the two terms is that NTMs include a wider set of measures than NTBs, the latter term being used only to describe discriminatory NTMs imposed by governments to favour domestic over foreign suppliers. In the past, most NTMs took essentially the form of quota or voluntary export restraints – so-called “core NTMs”.

These measures have the potential to restrict trade, but they are not necessarily restrictive because they can also increase consumer demand for goods by enhancing quality attributes (Fugazza, 2013). Nevertheless, research on the impact of NTM suggests that they can have a bigger impact on forest products trade than tariffs (Sun, *et al.*, 2010). Many such measures require domestic institutional capacity for implementation, however, and are likely to distort trade by increasing trade costs (e.g. for certification and inspections) (Gourdon, 2014).

3.4.1 Phytosanitary-related NTMs

NTMs such as the International Standards for Phytosanitary Measures No. 15 (ISPM 15) and the EU Plant Health Directive 2000/29/EC (box 3.4.1) exist to address the risk of spreading harmful pests and diseases across borders by ensuring that forest products undergo heat treatment, the removal of bark or sapwood, or fumigation (or are prohibited). ISPM 15 was developed by the International Plant Protection Convention, which is overseen by FAO. Despite the need for phytosanitary regulations, there is no question that they have the potential to restrict trade.

BOX 3.4.1

EU Phytosanitary Directive 2014/78/EU relating to ash and birch wood from North America

A recent phytosanitary non-tariff measure affecting the UNECE region was the European Commission Implementing Directive 2014/78/EU, which amended the annexes of the European Health Directive 2000/29/EC. The aim of Directive 2014/78/EU is to strengthen the earlier directive by addressing specific pests, in particular the emerald ash borer (a beetle from Asia), which affects imports of ash wood (*Fraxinus* spp.), and the bronze birch borer (a beetle from North America) affecting birch (*Betula* spp.). These beetles are severe threats and it is undoubtedly very important to limit their spread. Nevertheless, there were many critics of the technical requirements of the directive, including the American Hardwood Export Council, which cited the requirement that ash obtained in the affected area and all birch must have no remnants of bark on the wood and, additionally, that at least 2.5 cm of the outer sapwood should be removed. Such restrictions, although aimed at addressing a serious problem, could have financial consequences for producers of forest products by limiting their market access. Most phytosanitary measures are aimed at less-processed wood products, and the most severe such measures are aimed at wood products that do not undergo extensive heat treatments.

Pallets and wood packaging are particularly sensitive to phytosanitary regulations due to their extensive use in moving cargoes internationally and for transporting food. This category of forest products is extremely important globally and in the UNECE region. In Europe, for example, pallet production

consumed 20 million m³ of wood in 2015. In addition to ISPM 15, other requirements affect pallets and wooden packaging, often related to sanitation. Experts in the industry have noted that, as treatment requirements for pallets and wooden packaging have increased, plastic and metal replacement products have grown their market share (UNECE, 2016).

3.4.2 Assurance of legality and sustainability

NTM category B includes certified forest products and due-diligence and legal wood-supply regulations such as the EUTR and the US Lacey Act, which aim to prevent the trade in illegally sourced wood products. Certification is voluntary and market-driven; certified forest products provide consumers with third-party verification that the forest products they purchase conform with commonly held concepts of sustainability and legality.

The EUTR and the Lacey Act are intended to go beyond certification by providing legal regulation. Certification is not a requirement of either the EUTR or the Lacey Act; nor is it considered to provide proof of legality (although it is a useful tool for indicating legality). Both regulations constitute legal barriers to the trade of illegally harvested timber by obligating importers to undertake due diligence when buying imported wood. Penalties have been put in place for operators who violate the law.

There is evidence that the EUTR and the Lacey Act have changed the operating behaviour of timber traders. In a survey of timber traders undertaken for the EUTR review in 2015, about one-third of respondents reported changing their sourcing strategies. The survey also indicated that the cost and administrative burden of meeting EUTR requirements was discouraging exports by small and medium-sized enterprises in producer countries (UNECE, 2015).

According to Giurca *et al.* (2013), the EUTR, which is one of two parts of the EU's FLEGT Action Plan (the other part being VPAs), together with certification schemes, could have unintended implications for timber trade flows. One effect could be that European timber purchasers avoid tropical sources in favour of temperate timber. A second could be that producers in tropical countries avoid the complex administrative requirements for exporting to the EU in favour of supplying their forest products to large markets elsewhere.

3.4.3 Export measures

Export controls include total bans, export quotas and selective bans based on species; indirect quantitative restrictions due to controls on harvest levels; and direct and indirect charges and administrative controls, such as permits and licences (usually for monitoring purposes). Most such measures are formally prohibited by trade agreements but may be applied in specific situations when countries want to ensure adequate

wood supplies for domestic woodworking and other wood-based industries (especially in competition with international log buyers) or to protect forests from overuse.

The most common forms of export measures applied to forest products are licensing or permit requirements for exports. Others include non-classified export measures; export taxes and charges; export technical measures such as inspection requirements and certification; non-classified export technical measures; and export registration requirements.

3.4.3.1 Log export restrictions

LERs are typically aimed at protecting domestic wood-product manufacturers by preventing or limiting the export of raw materials. They also exist to provide incentives for investments in manufacturing capacity in a country when the supply of raw materials exceeds demand from domestic manufacturers. In the UNECE region, LERs are perhaps the most discussed and debated of all trade measures. They are widely used within and outside the UNECE region, including by key trading partners of UNECE member countries. Covering all these is outside the scope of this chapter; table 3.4.2 provides a summary of known LERs in countries in the UNECE region. Note that although the table presents information for only seven countries in the region, three of those (i.e. Canada, the Russian Federation and the US) have the region's largest volumes of roundwood removals and, combined, account for almost 67% of all industrial roundwood harvested in the UNECE region and 33% of global trade in industrial roundwood.

TABLE 3.4.2

Known log export restrictions in the UNECE region

EUROPE
Albania: Total moratorium on logging in all forests and the export of logs for the next ten years (BalkanInsight, 2015)
Croatia: Ban on the export of oak logs for two years starting on 1 June 2017 (Fordaq, 2017)
CIS
Belarus: Ban on all log exports starting on 1 January 2016, unless otherwise stated by the President (Global Wood Markets Info, 2016a)
Russian Federation: Proposed ban on exports of birch logs with a diameter of 15 cm or larger and a length of 1 m or longer (Government of the Russian Federation, 2016)
Ukraine: Total ban on all log exports starting on 1 November 2015 (the pine ban starts on 1 January 2017) for ten years from the date of implementation (Global Wood Markets Info, 2016b)
NORTH AMERICA
Canada: Restrictions on log exports from British Columbia. There is a variety of federal and provincial regulations regarding log exports (World Resources Institute, 2017)
US: Ban on exports of logs harvested in federal forestlands west of the 100th meridian (World Resources Institute, 2017)

Note: The information in the table is not exhaustive and is subject to change.

3.5 Conclusion

It is not within the scope of this publication to quantify the effectiveness of trade restrictions in achieving desired outcomes; nevertheless, it is clear that the cross-border trade of forest products is increasing. Tariffs are not particularly high in the UNECE region for forest products originating in the region. NTMs are becoming increasingly important, however; many are put in place for environmental reasons and to address legality, and others are used to protect domestic industries.

There is often a link between NTMs and tariffs. For example, a country deciding to ban log exports in the hope of capturing value added by processing logs domestically may expose themselves to import tariffs on their processed/value-added forest products.

Unintended consequences are always a concern. Although it is laudable to demand sustainability and legality for imported forest products, operators in export countries could be incentivized to shift exports to other, less-discerning countries simply because the cost of administering due diligence is too high. In a similar vein, phytosanitary and other regulations have the potential to encourage the use of less-sustainable products (e.g. plastic pallets and packaging) as alternatives to wood when inspection and administration regimes are considered too burdensome or result in excessive delays.

Cross-border trade is increasingly important for the forest products industry in the UNECE region. The industry has been subjected to a prolonged period of instability and financial strain (e.g. due to the global financial crisis and changing demand for paper products). Long-term solutions to trade barriers that give the industry ample time to adapt business plans and investments could help increase stability in the industry.



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Chapter 4

WOOD RAW
MATERIALS

Author: Håkan Ekström

Highlights

The UNECE region consumed an estimated 1.1 billion m³ of industrial roundwood in 2016, 1.9% more than in 2015. Log consumption has gone up for four straight years and is at its highest level since 2005.

Woodfuel consumption in the UNECE region increased by **1.0 million m³ in 2016, to 204.1 million m³**.

In the five years to 2016, **industrial roundwood consumption increased most in the CIS subregion**, at 10.6%, followed by Europe at 8.4% and North America at 4.2%.

Of total roundwood removals in the UNECE in 2016, about 15% was used for fuel (a share that was unchanged from five years earlier). Europe accounted for almost 57% of total woodfuel consumption in the UNECE region in 2016.

An estimated 85 million m³ of coniferous industrial roundwood was traded internationally in 2016, up by 1.6% from 2015 but down by almost 7% from 2014. Exports from UNECE countries accounted for about 73% (62.2 million m³) of the total internationally traded volume in 2016, an increase of 3.2%, year-on-year

The timber harvest rose in Europe in 2016 for the fifth consecutive year, to 392 million m³, comprising 302 m³ of coniferous species and 90 million m³ of non-coniferous species.

The global trade of wood chips in 2016 was estimated at 35 million oven-dry tonnes, with **the majority being hardwood chips to China and Japan**.

Despite a major drop, **Turkey remained the major wood chip importer in the UNECE region in 2016**, primarily for its expanding MDF and particle board industries. The main suppliers were Canada, Latvia, Ukraine and the US.

The timber harvests **increased by 3.7%** in the CIS subregion in 2016, **to 218 million m³**.

Most recent investments in the Russian forest products industry have been in the provinces of **Siberia and Russia Far East**, where log production and consumption have increased most.

The North American timber harvest increased in 2016, by 4.2% in Canada and by 0.5% in the US (unofficial estimates put the latter figure significantly higher), with the total estimated North American harvest at 514 million m³, **the highest volume since 2007**.

New Zealand and the Russian Federation continued as the world's two largest industrial roundwood exporting countries in 2016, increasing shipments by 7% and 6.3%, respectively.

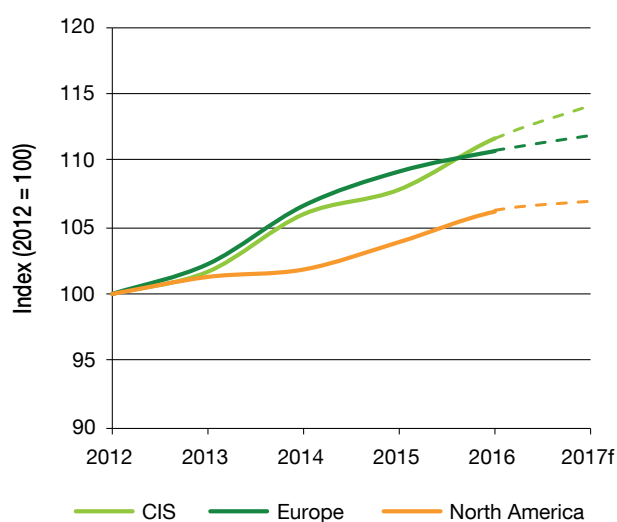
4.1 Introduction

The UNECE region consumed an estimated 1.3 billion m³ of roundwood in 2016. This was 1.7% more than in 2015, and log consumption has now gone up for four straight years to reach its highest level since 2005. The use of logs for industrial purposes has trended upward in the past five years, reaching 1.1 billion m³ in 2016, a 1.9% increase over 2015 and 6.8% higher than in 2012 (graphs 4.1.1 and 4.1.2). Woodfuel consumption increased by 1.0 million m³ in 2016, to 204.1 million m³.

Industrial roundwood removals have increased by 11.1% in the CIS subregion in the past five years, by 8% in Europe and by 4.2% in North America. In line with the recent trend, removals of coniferous roundwood have risen more quickly than those of non-coniferous roundwood.

GRAPH 4.1.1

Apparent consumption of softwood industrial roundwood in the UNECE region, by subregion, 2012-2017



Note: f = 2016 Committee on Forests and Forest Industry forecast.

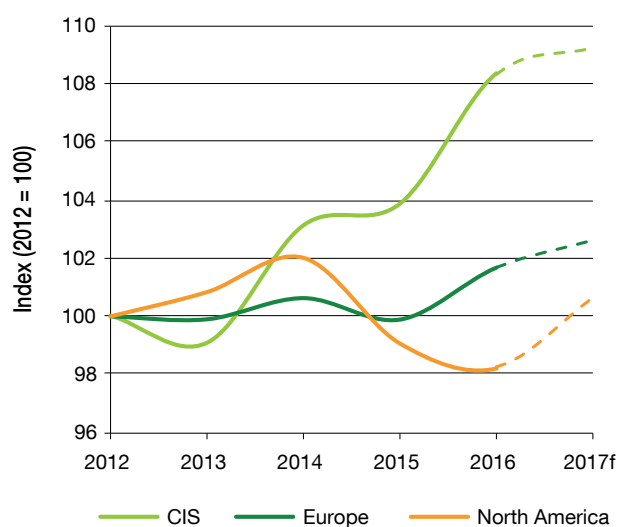
Source: UNECE/FAO, 2017.

Of total roundwood removals in the UNECE region in 2016, about 15% (204.1 million m³) was used for fuel, a share that was unchanged from 2012. Europe accounted for almost 57% of total woodfuel consumption in the UNECE in 2016. Estimates of roundwood volumes removed from forests for fuel are highly unreliable because few countries have consistent methods for collecting relevant data for this increasingly important end use; nevertheless, it is clear that a fairly large share of forest removals are used for energy purposes. This chapter focuses on the production, consumption, trade and prices of industrial

roundwood and wood chips for material use (sawnwood, pulp, paper and wood based panels), rather than total roundwood (which would include woodfuel). See Chapter 9 of this publication for insights into trends in the wood energy sector.

GRAPH 4.1.2

Apparent consumption of hardwood industrial roundwood in the UNECE region, by subregion, 2012-2017



Note: f = 2016 Committee on Forests and Forest Industry forecast.

Source: UNECE/FAO, 2017.

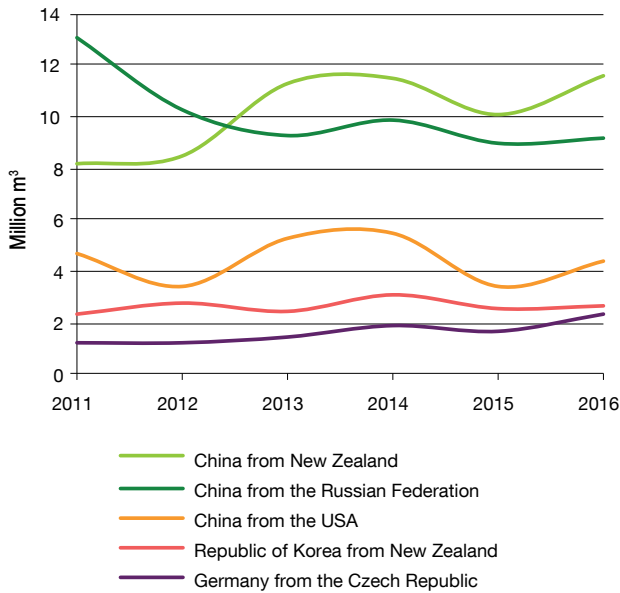
Higher demand for wood raw materials by the world's lumber sector led to an increase in the trade of logs in 2016. Wood Resources International estimated that 85 million m³ of softwood logs were traded internationally in that year, up by 3.3% from 2015 but down by almost 5% from 2014. Exports from UNECE countries accounted for about 73% (62.2 million m³) of the total internationally traded volume, up by 3.2%, year-on-year.

Imports of softwood and hardwood logs to China reached their second-highest level on record in 2016; China was the main destination of globally traded softwood logs in 2016 (accounting for 42% of the trade by volume), followed by Germany, Austria, Sweden and the Republic of Korea. Four of the world's five major trade flows of softwood logs are in the Pacific Rim region, and one is in Europe (graph 4.1.3).

The UNECE region is a net exporter of both softwood and hardwood logs, with total net exports of 24.1 million m³ in 2016, down from 27.3 million m³ in 2015 and still significantly lower than the 28.8 million m³ recorded in 2014. The biggest export shipments from the UNECE region were from the Russian Federation to China and Finland and from the US to Canada and to China.

GRAPH 4.1.3

Top five international trade flows of softwood roundwood, 2011-2016



Source: World Resources International, 2017a.

4.2 Europe

4.2.1 Industrial roundwood markets

Timber harvests rose in Europe in 2016 for the fifth consecutive year. The increase from 2015 was led by Finland and several countries in eastern Europe, notably Lithuania, Poland and Romania. Of the major forest-covered countries in Europe, only Austria and Germany reduced their harvests significantly in 2016 compared with 2015.

Total roundwood removals in Europe reached 392 million m³ in 2016 (table 4.2.1), comprising 302 million m³ of coniferous species and 90 million m³ of non-coniferous species. Coniferous harvests increased by 10% in the five years from 2012 to 2016, driven primarily by higher consumption in the sawmill sector.

Non-coniferous removals increased by only 1% from 2012 to 2016 because of limited changes in demand for small-diameter logs in the forest industry in Europe. Although harvests of non-coniferous species have increased in recent years in countries such as Estonia, Finland and Portugal, there have also been major harvest reductions in some countries, because of reduced demand for small logs by the pulp and panel industries. The biggest declines in non-coniferous timber removals in the five years to 2016 were in Croatia, Germany, Latvia, Sweden and Turkey.



Source: UNECE/FAO, 2017.

Of the ten largest log-consuming countries in Europe, Finland increased consumption most (by 20%) from 2012 to 2016, followed by Portugal (+19.6%), Romania (+12.3%), Poland (+11.6%) and Turkey (+11.1%). No country in the top-ten list reduced log consumption from 2012 to 2016.

TABLE 4.2.1

Industrial roundwood balance, Europe, 2015-2017

(thousand m³)

	2015	2016	2017f	Change (%) 2015-2016
Removals	387,744	392,413	393,906	1.2
Imports	53,628	54,863	55,140	2.3
Exports	40,241	40,168	37,389	-0.2
Apparent consumption	401,131	407,108	411,656	1.5

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017.

4.2.2 Trade of roundwood and wood chips

The total volume of industrial roundwood imported into Europe in 2016 increased by 2.3% from 2015 reaching 54.9 million m³. Softwood log imports were up to 36.1 million m³ (a 3.5% increase), reaching the highest level since 2007, and hardwood log imports were unchanged at 18.7 million m³. Shipments of hardwood roundwood from outside of the subregion to Europe have declined for three consecutive years and were 19% lower in 2016 than in 2013.

There was a shift in softwood log flows in central Europe in 2016, with German sawmills reducing log imports by about 2% after a three-year period in which import volumes were up by more than 30%. Austrian sawmills

increased import volumes by 18% in 2016, reaching an all-time high. Higher log demand in Austria followed an increase in lumber exports from that country in the past few years, with its sawmill industry expanding sales to Germany and Slovenia.

Finland increased its imports of softwood sawlogs and pulplogs in 2016 by a substantial 31% (by volume). The biggest increase was in sawlog volumes (+44%), but pulplog imports also increased significantly, by 23%. The Russian Federation continues to be Finland's dominant log supplier, with shipments of softwood logs up by 46% in 2016. With the sharp weakening of the rouble in 2014, 2015 and early 2016, Russian exporters could increase their prices in rouble terms and the log costs were still lower for Finnish importers in euro terms. The Russian currency strengthened in the second half of 2016, however; the multiyear decline in import prices for Russian logs came to a halt in the fall of 2016, and prices started to increase slowly.

Import volumes of non-coniferous industrial roundwood to Europe continued to exceed export volumes, with net imports increasing by 9.2% in 2016, to about 7.2 million m³. The total import volume in 2016 was unchanged at 18.7 million m³, but hardwood exports were down by 4.8%, at about 11.6 million m³. The biggest change in trade flow in Europe in 2016 was the substantial decline in shipments of birch pulplogs from Latvia to Sweden. This was the second consecutive year of falling import volumes, resulting in a 36% decline from 2014 to 2016. Sweden's overall non-coniferous industrial roundwood import volume fell by 23% in the two-year period because of the increased use of domestically sourced logs by the pulp industry.

The global trade of wood chips has increased slowly in the past two years, reaching an estimated 35 million oven-dry metric tonnes in 2016, according to estimates by Wood Resources International. A large majority of the chip trade comprises hardwood chips to China and Japan. Approximately 30% of the global chip trade occurs outside the Pacific Rim, with Turkey, Finland, Sweden and Portugal (in descending order, by volume) the major destinations. Turkey, which has become a major chip destination in just five years, remained the leader in 2016, despite a significant drop in imports. Turkey is the only major chip-importing country not importing wood fibre for the manufacture of wood pulp. Instead, imported wood chips are consumed by the country's large and expanding MDF (medium-density fibreboard) and particle board industry. The US, Canada, Ukraine and Latvia (in descending order, by volume) are among the countries supplying the majority of chips to Turkey.

The other major chip flow outside Asia is that of softwood chips to pulpmills in the Nordic countries. This region has long been reliant on both logs and wood chips from Norway, the Russia Federation and the Baltic States.

A clear majority of wood chips on the European continent is destined for pulpmills, but there has been an increase in shipments of energy chips in recent years. A dramatic surge in chip imports by Sweden in 2016 was the result of the start-up, in Stockholm, of one of the world's largest biomass-fuelled combined-heat-and-power plants. The plant is supplied with large volumes of energy chips delivered by ship and train, domestically and from abroad. Monthly chip shipments to Sweden have almost doubled in the last two years, from about 70,000 tonnes per month in early 2015 to 150,000 tonnes per month in early 2017. A majority of the imported chips originate in countries around the Baltic Sea, with Latvia the major supplier, followed by Norway, Estonia and Finland.



Source: Stora Enso, 2017.

4.2.3 Consumption of wood fibre by the pulp industry

After two years of declining wood-fibre use, the European pulp industry increased its consumption of wood fibre in 2016 to the highest level in five years. It consumed just over 147 million m³ of logs and chips in 2016, which was almost 3 million m³ more than in 2015 (CEPI, 2017). The biggest year-on-year increases were in Finland, Austria, Norway, Poland and Spain (in descending order, by volume).

There was a slight shift in fibre use in Europe in the two years to 2016, with softwood consumption increasing by 1.4% and demand for hardwood fibre declining by 1.8%. Most of the increase in softwood fibre was in the form of residual chips from the continent's sawmills. The increase in production of softwood lumber in four consecutive years increased the availability of lower-cost sawmill chips to the pulp industry. In 2016, the pulp industry consumed an estimated 34.5 million m³ of softwood chips, up from 32.3 million m³ in 2012.

4.3 Commonwealth of Independent States

4.3.1 Industrial roundwood markets

Timber harvests in the CIS subregion increased by 3.7% in 2016, to 218 million m³ (table 4.3.1). Only the Russian Federation reported data for 2016, however, and harvest data for Belarus and Ukraine have not been updated since 2014. According to UNECE estimates, roundwood removals have increased in the CIS every year since 2009, reaching the highest levels in at least 15 years in 2016. The Russian Federation is the second-largest log producer worldwide behind the US. Its official harvest of coniferous roundwood in 2016 was 132 million m³ (up by 4% compared with 2015), while the harvest of non-coniferous roundwood was 67 million m³ (+4%).

The increase in timber removals was distributed unevenly across the Russian Federation. Although forest product production is higher in the northwestern provinces than in eastern Russia, most investments in industry capacity in recent years have been in the provinces of Siberia and Russia Far East, which is also the region in which log production and consumption have increased most (WhatWood, 2017).

The accuracy of Russian harvest data remains uncertain because, in addition to official estimates, the Russian Government acknowledges the existence of “undocumented” timber harvesting.

TABLE 4.3.1

Industrial roundwood balance, CIS, 2015-2017
(thousand m³)

	2015	2016	2017f	Change (%) 2015-2016
Removals	210,286	218,005	221,034	3.7
Imports	541	470	470	-13.1
Exports	25,835	26,432	26,082	2.3
Apparent consumption	184,992	192,043	195,423	3.8

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017.

4.3.2 Trade of roundwood

Five of the six largest log-exporting countries worldwide increased export volumes in 2016, led by Australia, New Zealand and the Russian Federation (in descending order, by rate of change). Russian softwood log exports were up by more than 6% due to an increase in shipments to China and

especially Finland, which imported over 30% more softwood logs (estimated at 50% sawlogs and 50% pulplogs) from the Russian Federation in 2016 than in 2015. Almost all Russian logs exported to China were destined for sawmills.

About 92% of softwood logs exported from the Russian Federation in 2016 was shipped to just two countries, China and Finland, with the remainder exported to Japan, Germany and other CIS countries, including Kazakhstan and Uzbekistan. Exports of hardwood logs showed a similar pattern, with Finland and China being the destination for 92% of the export volume in 2016, with smaller volumes going to Sweden, Poland, Latvia and Belarus (in descending order), among others.

The Ukrainian government has had major concerns about illegal logging and the large volumes of unprocessed logs exported from the country. It implemented a decree in 2015 in an attempt to restrict log exports in which, as of 1 November 2015 and for the next ten years, no exports of logs will be allowed from Ukraine (excepting pine logs, which were banned from export from January 2017). The European Commission has attempted to stop the export ban in Ukraine, but negotiations so far have been unsuccessful. According to a report from the European Parliament, Ukraine is in breach of the regulations of both the EU and the World Trade Organization (in accordance with the liabilities of the Ukraine-EU Association Agreement) by restricting free trade in the form of log exports (De Micco, 2015).

There is anecdotal evidence that the log-export ban has not been as successful as envisioned. To avoid export restrictions, some exporters have cut the logs into squares and cants, which are classified as sawnwood for export. In addition, the ban did not include firewood, and increased exports of “firewood” were reported in 2016.

According to official Ukrainian customs reports, softwood log exports fell from 3.1 million m³ in 2014 to 2.1 million m³ in 2016, with the major destinations being China, Romania and Turkey. Softwood lumber exports increased from 1.6 million m³ to 2.2 million m³ in the same period (Ukraine State Customs Service, 2017).

4.4 North America

4.4.1 Industrial roundwood markets

The total estimated industrial roundwood harvest in North America was 514 million m³ in 2016, the highest since 2007 (table 4.4.1). Improved housing markets, healthy log and lumber exports, the increased production of pellets, and strong pulp and paper demand worldwide have all been factors behind the increasing demand and supply of

roundwood in North America since the 2008-2009 global financial crisis.

Total industrial roundwood removals in Canada reached 158 million m³ in 2016 (up by 4.2%), of which about 84% was coniferous species. The softwood lumber industry is by far the biggest consumer of softwood logs in Canada, and this subsector has been on the rise for more than five years. Lumber production in Canada was up by 22.6% in 2016 compared with 2012, resulting in a sharp increase in demand for wood raw materials. Other forest industry subsectors that have improved in recent years include OSB (hardwood), pulp (softwood) and hardwood lumber.

According to official statistics, the US timber harvest was up slightly (+2.7%) in 2016 compared with 2012, at 357 million m³. This seems low: the timber harvest in 2016 might have been expected to be significantly higher than in 2012 because forest industry production increased noticeably over the five-year period. In contrast to the official data, expert analysis based on derived log consumption by the forest industry and net log trade indicates that actual removals of industrial roundwood were closer to 394 million m³ in 2016. The major reason for the increase in log consumption over the five-year period was higher lumber and OSB production. Softwood lumber production was up by as much as 14% in 2016 compared with 2012, and the production of hardwood lumber increased by 20% over the same period. The OSB industry, which has benefited from an improved housing market, increased production by 26% over the period.

TABLE 4.4.1

Industrial roundwood balance, North America, 2015-2017 (thousand m³)

	2015	2016	2017f	Change (%) 2015-2016
Removals	506,036	514,356	520,203	1.6
Imports	5,807	5,554	5,554	-4.4
Exports	17,621	18,408	18,408	4.5
Apparent consumption	494,222	501,502	507,348	1.5

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017.

4.4.2 Trade of roundwood

Shipments of softwood logs from the US West Coast to Asia have had their ups and downs in the past 15 years, with a high of 12.2 million m³ in 2011 and a low of 4.7 million m³ in 2005. Log exports from the US West Coast to Asia fell substantially – by 33% – from 2013 to 2015, to 6 million m³.

Reduced demand for US logs in recent years has not been limited to China, with demand also falling in Japan and the Republic of Korea. A combination of lower demand for logs by sawmills in Asia and a strong US dollar resulted in US log shipments falling to their lowest levels in five years in 2015. US exports to China increased by 11% in 2016, however, with China buying more logs from the western US.



Source: UNECE/FAO, 2017.

Historically, the US South has exported only minimal volumes of logs. This started to change in 2011, when about 160,000 m³ of pine logs were shipped to China. The log export volume from the US South had almost quadrupled by 2014, with India, the Dominican Republic and Viet Nam added to the list of destinations. After a slow year in 2015, export volumes from the region picked up again in 2016, reaching the second-highest volume on record, at 560,000 m³. Although log shipments from the southern states have increased dramatically in the past five years, the total volume is small compared with shipments from the US West Coast.

Coniferous log exports from Canada jumped by 14.5% in 2016, to 6.4 million m³, due to sharply higher demand in China and Japan. Border trade between the US and Canada declined in 2016, with Canadian log export volumes falling by 16% and Canada's log imports from the US declining to their lowest level in more than five years. Canada's net imports of softwood logs from the US fell by 22% from 2013 to 2016, to 2.1 million m³.

4.4.3 Wood feedstock for the pellet industry

There has been a shift in fibre-sourcing in the last ten years for pellet manufacturers in British Columbia and the US South, which are North America's two major producing regions. There have been two clear trends:

- In British Columbia, pellet companies have moved from relying entirely on inexpensive sawdust from local sawmills for their fibre furnish to increasingly supplementing this dominant fibre source with forest residues in the form of tree tops and branches left after harvest operations. In early 2017, pellet plants in British Columbia consumed just over 82% of sawmill residues, and forest residues accounted for about 17%.
- In the US South, there has been an increase in the use of residuals at the expense of roundwood. Usage of industry and forest residues in the pellet industry increased from 33% to 47% of the total fibre furnish between the first quarter of 2013 and the first quarter of 2017 (Wood Resources International, 2017a).

4.5 Extraregional influences affecting the UNECE

The global trade of softwood logs rose by 1.6% in 2016 after a decline of almost 8% in 2015, according to estimates by Wood Resources International. Total global trade reached almost 85 million m³ in 2016, the third-highest level in ten years. Most of the increase was in shipments from Australia, New Zealand and the US (in descending order, by volume) to the growing Chinese market. Austria, Finland and Japan also imported higher log volumes in 2016, but import volumes declined in Canada, Germany, the Republic of Korea and Poland.

Softwood log imports to China fell in late 2016 but were still substantially higher than in the same period in 2015. After a slow-down in log imports in 2015 and early 2016, demand in China picked up at record pace in the second half of 2016. China imported a total of 32.5 million m³ of softwood logs in 2016, the third-highest volume on record.

A noteworthy development in the past decade or so has been that imports of softwood logs to China have grown much more slowly (in percentage terms) than imports of softwood lumber. Lumber imports increased from about 2 million m³ in 2006 to more than 21 million m³ in 2016, and log import volumes increased from 20 million m³ to 34 million m³ over the same period.

New Zealand and the Russian Federation continued as the world's two largest softwood log-exporting countries in 2016, increasing shipments by 6.3% and 7%, respectively. Almost all New Zealand's exports of softwood logs went to sawmills and veneer mills; the Russian Federation exports both sawlogs and pulplogs. The biggest change in competition for market share in the Asian log market in the past few years has been the Australian expansion of log exports. Australia exported about 1 million m³ of coniferous industrial roundwood in 2006. It exported almost 3.6 million m³ in 2016, however,

making it the world's fifth-largest softwood log exporter. Almost 15% of Australia's total timber harvest was exported in log form in 2016. Almost all those logs were shipped to China, with only a small percentage going to the Republic of Korea; in previous years, some logs also went to India.

4.6 Wood raw-material costs

According to Fisher International, wood-fibre costs accounted for approximately 58% of average production costs in the global pulp industry in 2016. This percentage varied substantially between countries, however, from a low of about 42% in Canada, Norway and the Russian Federation to a high of 65% in China and Japan.

The raw-material cost (at mill gate) is typically higher (in percentage terms) for the production of lumber and wood pellets than for wood pulp, often reaching 65-75% of the total production cost.

4.6.1 Sawlog prices

Although European softwood lumber production and coniferous sawlog demand increased by about 3% in 2016, sawlog prices fell in local currencies and, in many countries, were the lowest they had been for five years. In the first quarter of 2017, the European Sawlog Price Index (ESPI-€) was €83.12 per m³, which was almost 7% lower than in the same quarter of 2015. The ESPI-€ has fallen by 8.3% since the record high in the first quarter of 2014, with the biggest declines occurring in central and northern Europe.

Wood raw-material costs for European lumber producers (which typically are in the range of 60-70% of the total production cost) have declined faster than in most other world regions in the past few years, and sawmills on the continent have become more competitive. Although European sawmills continue to have some of the world's highest raw-material costs, the discrepancy between the Global Sawlog Price Index (GSPI) and the European Sawlog Price Index (in US dollar terms) has fallen, bottoming out in the first quarter of 2017 to reach its lowest level in more than ten years.

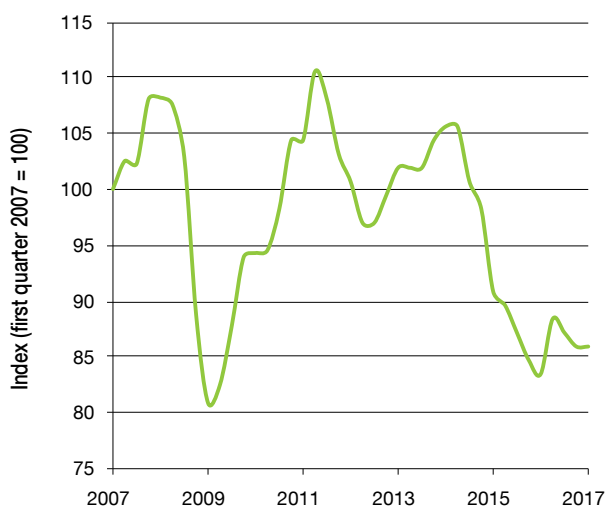
The GSPI, which is a volume-weighted price index comprising average coniferous sawlog prices in 20 of the world's largest sawlog-consuming regions, trended downward for three years after it reached a six-year high in early 2011 (graph 4.6.1). Average European sawlog prices fell by 22% from 2014 to 2016, and sawlog prices in North America and Latin America declined by 7% and 17%, respectively, over the same period.

The Russian Federation is one of the few places in which coniferous sawlog prices have not trended downward in recent years (graph 4.6.2). Although log prices in the Russian

northwest and Siberia followed the global trend in 2014 and 2015, they reached a 12-year low in early 2016 and surged by 40% in early 2017.

GRAPH 4.6.1

Global Softwood Sawlog Price Index, 2007-2017

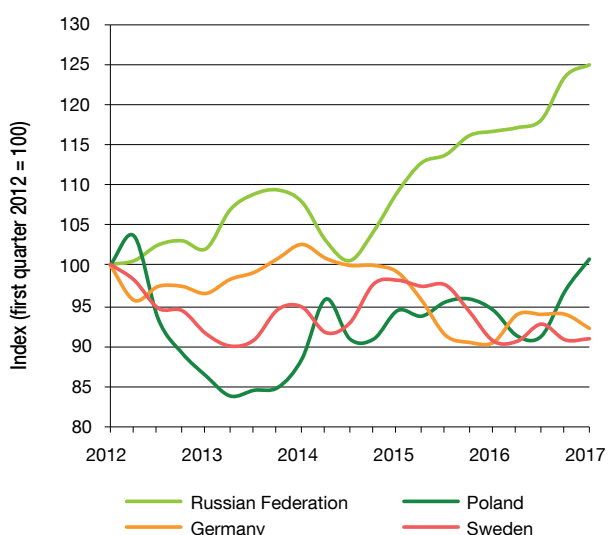


Note: Price index based on delivered sawlog prices in 20 key regions worldwide.

Source: Wood Resources International, 2017b.

GRAPH 4.6.2

Softwood Sawlog Price Index, selected European countries and the Russian Federation, 2012-2017

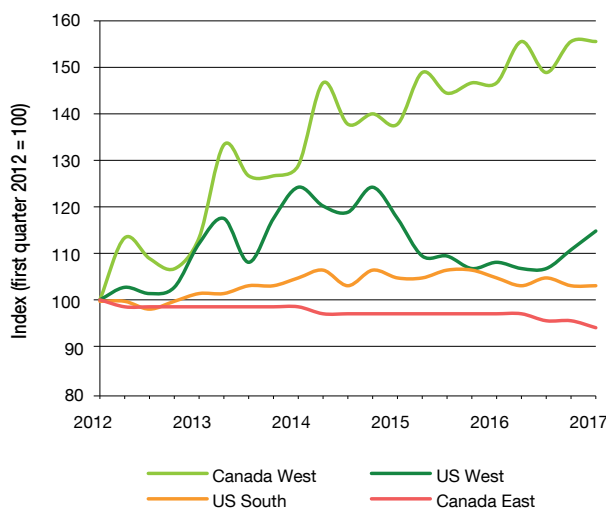


Note: Index based on delivered log price per m³ under bark in the local currency.

Source: Wood Resources International, 2017b.

GRAPH 4.6.3

Coniferous Sawlog Cost Index, North America, 2012-2017



Note: Index based on delivered log price per m³ under bark in local currency.

Source: Wood Resources International, 2017b.

Although average North American sawlog prices were stable in 2015 and 2016, there have been mixed regional price fluctuations in the past few years (graph 4.6.3).

Average sawlog costs have been remarkably stable in the US South for almost six years. Contrary to the low-cost southern states, prices have fluctuated substantially in the western US and have almost doubled since the global financial crisis. The market in the western US is highly influenced by the health of the log and lumber export market in Asia. The biggest price increase in local currency in North America has been in western Canada, where average sawlog prices were 21% higher in early 2017 than in the three previous years and 56% higher than prices in early 2012. Sawlog values have trended slowly downward in eastern Canada and, as a result of the weakening Canadian dollar, prices in US dollar terms there are among the lowest in North America.

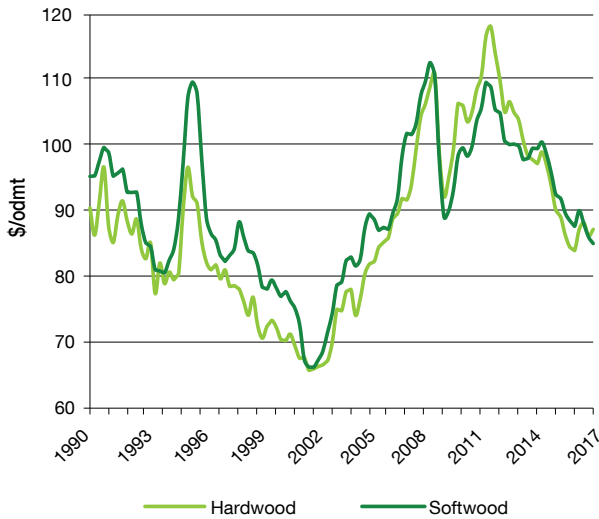
4.6.2 Pulpwood prices

Softwood-fibre costs have been declining for pulpmills worldwide since 2011, and this trend continued in 2016 and early 2017. The Global Softwood Fiber Price Index, which tracks pulpwood costs on four continents, fell by 3% in 2016; in the first quarter of 2017 it reached its lowest point since the third quarter of 2004 (graph 4.6.4). The biggest declines in softwood-fibre costs in 2016 were in Germany, Japan, Spain, Sweden and the US; pulpmills in Brazil, Chile and the Russian

Federation bucked the trend by experiencing rises in wood costs in 2016 (graphs 4.6.5 and 4.6.6).

GRAPH 4.6.4

Global wood-fibre price indices for softwood and hardwood, 1990-2017

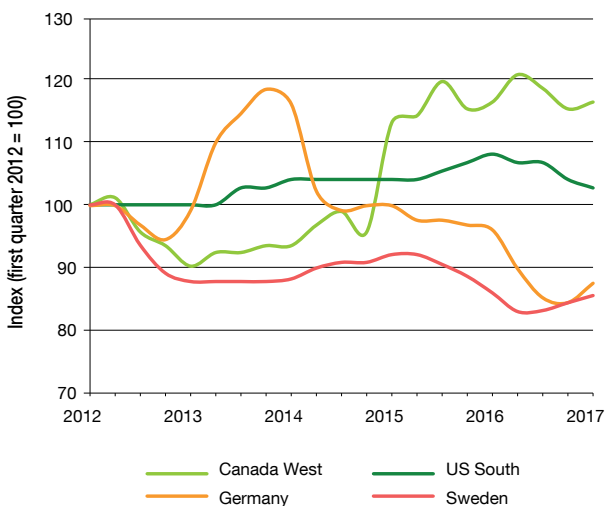


Note: odmt = oven dried (metric) tonne.

Source: Wood Resources International, 2017b.

GRAPH 4.6.5

Coniferous Wood Chip Price Index, North America and Europe, 2012-2017



Note: Index based on delivered wood chip price per oven-dry metric tonne in local currency.

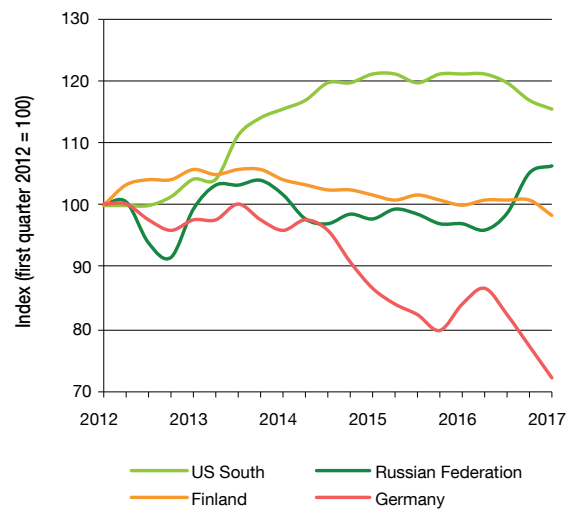
Source: Wood Resources International, 2017b.

An estimated 40% of the world's wood-fibre consumption by the pulp sector is hardwood, mostly roundwood. In contrast to prices for softwood fibre, global hardwood-fibre prices generally moved slightly upward in 2016 and early 2017, with the Global Hardwood Fiber Price Index up by 4% in the first quarter of 2017 compared with the same quarter in 2016. In US dollar terms, prices rose most between the first quarters of 2016 and 2017 in Australia, Brazil, Chile and the Russian Federation. Although the global trend has been for the cost of hardwood pulplogs and chips to increase, pulpmills in some regions experienced lower fibre costs in 2016, including most countries in Europe and the US South (graph 4.6.5).

Wood-fibre prices in Europe were generally lower in US dollar terms in the fourth quarter of 2016 than in the third quarter. The major factor in the price declines in Europe was the stronger US dollar, but prices also fell in local currencies, particularly in Finland, France and Germany. In Central Europe, price reductions occurred mainly because of an oversupply of pulplogs, unchanged demand for wood fibre from the pulp industry, and the reduced use of raw materials in the wood-pellet sector.

GRAPH 4.6.6

Coniferous Pulplog Price Index, Europe and North America, 2012-2017



Note: Index based on delivered log price per oven-dry tonne in local currency.

Source: Wood Resources International, 2017b.

Pulpmills in the Nordic countries have become more competitive on the global scene in recent years, with substantially lower manufacturing costs thanks to lower wood-fibre prices. Wood costs in Finland and Sweden reached their lowest levels in about ten years in the first

quarter of 2017 and were about 40% lower than in 2008 (in US dollar terms).

After three years of rising prices for both softwood and hardwood fibre, wood-fibre costs in the US South – the world’s largest pulpwood-consuming region – fell by 6-8% in 2016 and reached their lowest level in three years in the first quarter of 2017. Increased lumber production across the South, which has generated additional volumes of residual chips and an ample supply of small-diameter logs, has been the driving factor in lower wood-fibre costs in the region. Pulpmills in the US South have among the lowest wood costs in North America and worldwide.



Source: UNECE/FAO, 2017.

4.6.3 Fibre feedstock prices for pellet manufacturers

Pellet manufacturers in North America consume wood fibre from a mix of sources with varying prices and trends. The pellet feedstock price indices, the PFPI-US (for the US) and the PFPI-CA (for Canada) estimate the quarterly volume-weighted price of wood fibre consumed by the wood pellet sector. Each facility’s estimated mix of fibre (e.g. roundwood, sawdust, shavings and microchips) is combined with local fibre pricing to determine a weighted price. This is further

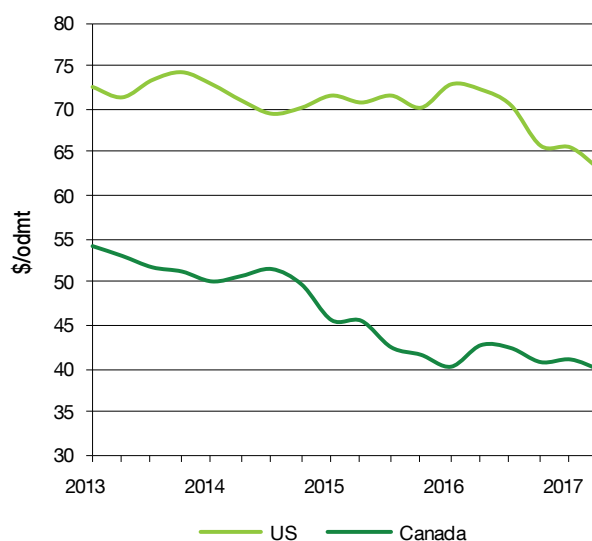
combined with production capacity and operating rate to calculate the final regional index price. The two indices have trended downward in the past few years, reaching record lows in both Canada and the US in the first quarter of 2017 (graph 4.6.7).

The PFPI-US fell by 15% between its peak in the third quarter of 2013 and the second quarter of 2017. The decline was the result of reduced costs for small-diameter logs and sawmill residuals, plus a change in the feedstock mix towards lower-cost residuals.

The PFPI-CA has fallen more than the PFPI-US (in US dollar terms), mostly because of the weaker Canadian dollar, but wood-fibre costs for pellet manufacturers have also fallen slightly in Canadian dollar terms because of the lower cost of logs in recent years. The PFPI-CA declined by 26% from its record high in early 2013 to the second quarter of 2017.

GRAPH 4.6.7

Wood Pellet Feedstock Prices Indices, Canada and the US



Source: Wood Resources International. 2017a.

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Chapter 5

SAWN

SOFTWOOD

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Highlights

Demand and production increased in all the major sawn softwood markets in 2016, the first year in a decade this has occurred.

Apparent sawn softwood consumption rose by 8% in North America in 2016 and **by 2.8% in Europe**. There was a small gain in consumption (0.9%) in the CIS subregion.

Some European countries recorded strong increases in apparent sawn softwood consumption, including Turkey (+10.1%), Austria (+7.4%) and the UK (+4.5%). Germany is the largest market in the European subregion, with a 20% share of consumption, followed by the UK (10%).

Europe's sawn softwood production increased by 2.9% in 2016, to 107.8 million m³. Notable gains were in Finland (+0.8 million m³), Turkey (+0.7 million m³), Germany (+0.7 million m³) and Austria (+0.5 million m³).

European sawn softwood exports increased by 3.8% (to a total volume of 49.5 million m³) in 2016, compared with only 1% growth in 2015. **This increase was remarkable considering that exports decreased** by 10% to North Africa and by 7% to the Middle East. European sawn softwood exporters made gains in the key markets of China (+37%), Japan (+15%) and the US (+31%, on small volumes).

The leading sawn softwood trade flow in Europe in 2016 was UK imports from Sweden, which accounted for 10% of imports in the European subregion and 3.1% of sawn softwood imports globally.

Sawn softwood production in the Russian Federation increased by 6.7% in 2016, to 34.3 million m³. Larger export-oriented mills were generally able to increase production due to recent mill modernization projects, despite a strengthening rouble.

Russian sawn softwood exports increased by 7.9% in 2016, to 24.9 million m³.

US housing starts increased to 1.17 million units in 2016 (up by 5.6%) and are expected to increase again in 2017, to 1.22 million units.

Sawn softwood production **grew by 6.2% in Canada** in 2016 and **by 3.4% in the US**.

US sawnwood prices (in US dollars) gained 4% in 2016 and were up by 19% in the first half of 2017, the result mainly of US duties levied against Canadian exports, which started in April 2017.

US preliminary countervailing duties (starting in late April 2017) **and antidumping duties** (starting in late June 2017) **are in effect on Canadian lumber**, with final duties to be announced in early January 2018. These duties will affect global sawnwood trade, with fewer Canadian exports to the US (and more European exports to the US) likely to mean more offshore exports from Canada, especially to Asia.

5.1 Introduction

All three UNECE subregions recorded gains in consumption and production in 2016, the result of favourable global economic trends and improving markets worldwide. The recovery in North America continued for the seventh consecutive year, and sawn softwood consumption increased by 8% there. Sawn softwood consumption also increased in Europe by 2.8%, and in the CIS by 0.9% (table 5.1.1). Currency exchange rates were stable in 2016 and the first half of 2017, relative to the volatility of 2015. Sawn softwood production increased by 4.7% in North America in 2016, 2.9% in Europe, and 6.7% in the CIS.

TABLE 5.1.1

Apparent consumption of sawn softwood in the UNECE region, by subregion, 2015-2016 (thousand m³)

	2015	2016	m ³ /capita (2016)	Change (%) 2015-2016
Europe	91,631	94,174	0.15	2.8
CIS	16,504	16,656	0.06	0.9
North America	90,648	97,858	0.28	8.0
Total	198,783	208,687	0.17	5.0

Source: UNECE/FAO, 2017a.

5.2 Europe

5.2.1 Consumption

The European market performed well in 2016 despite a negative forecast, with apparent consumption rising by 2.8%, to 94.2 million m³ (table 5.2.1). Consumption increased in most European countries; only a few reported decreases, and most anticipate growth in 2017.

TABLE 5.2.1

Sawn softwood balance, Europe, 2015-2017 (thousand m³)

	2015	2016	2017f	Change (%) 2015-2016
Production	104,759	107,837	108,090	2.9
Imports	34,569	35,855	36,079	3.7
Exports	47,697	49,518	49,752	3.8
Apparent consumption	91,631	94,174	94,418	2.8

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017a.

One of the highlights of 2016 was the increase in consumption in France after years of decline. Consumption picked up by 1.8%, although the volume was still about 1 million m³ less than the volume consumed in 2012. Signs are also encouraging in southern Europe, with both Spain (+5.5%) and Italy (+2.2%) increasing consumption in 2016. The northern European countries of Estonia (+3.0%), Finland (+3.1%) and Norway (+2.4%) also performed well.

The most remarkable developments in the European market in 2016 were in Austria (where consumption increased by 7.4%), Turkey (+10.1%) and the UK (+4.5%), which collectively added 1.4 million m³ to total European sawn softwood consumption. Consumption growth slowed in Germany, to 1.0%, but the increment there was still sizeable (+0.2 million m³).

Some of the lowlights in the European market were Denmark (a decline in sawn softwood consumption of -24%), Slovakia (-21%), Switzerland (-2.1%) and Sweden (-5.7%), with all except Slovakia reporting declining consumption for the second year in a row. Sweden still consumed considerably more sawn softwood in 2016 than in 2012.

Germany is still the largest consumer of sawn softwood in Europe, at 18.7 million m³ in 2016, which was 20% of total consumption in the European subregion. The UK is a clear number two, at 9.6 million m³ (10% of total consumption in the subregion) in 2016, ahead of France, at 7.6 million m³. Austria took fifth position from Sweden, behind Turkey in fourth place. The five largest consumers of sawn softwood in Europe account for 52% of total consumption in the subregion. Estonia, Austria, Finland, Norway and Latvia (in descending order) have the highest per capita consumption of sawn softwood.

5.2.2 Production and capacity change

There was a healthy increase (2.9%) in sawn softwood production in Europe in 2016, driven by growing consumption in the subregion and by increasing overseas exports. European production has grown steadily since 2012, reaching 107.8 million m³ in 2016. Production increased in nearly all major producing countries.

Finland contributed most to the increase in European production in 2016, up by 0.8 million m³, followed by Turkey (+0.7 million m³), Germany (+0.7 million m³) and Austria (+0.5 million m³). All these countries had strong demand from export markets. With its consumption increasing, Turkey has become a major producer of sawn softwood in the subregion; its production grew by 14% in 2016, to 5.8 million m³.

Romania was the only significant European producer to report a major drop in sawn softwood production (down by 0.5 million m³, or 10.9%) in 2016. Production declined

marginally (1%) in Sweden, which, nevertheless, is still clearly the second-largest producer in Europe. Sawn softwood production is highly concentrated in Europe, with Finland, Germany and Sweden accounting for 47% of production in the subregion.

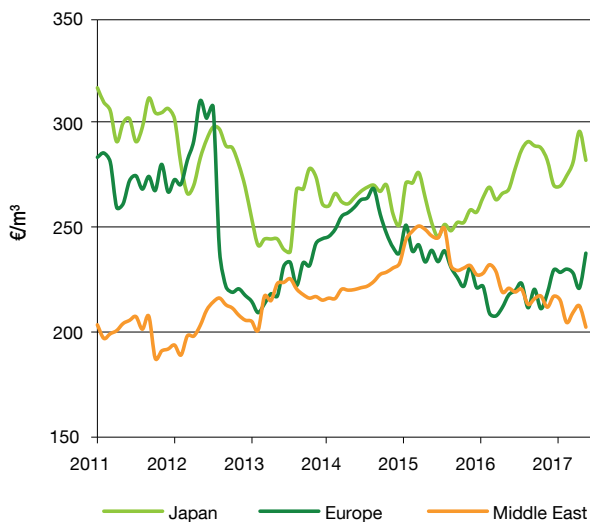
There were no major capacity changes in the European sawmill industry in 2016-2017, although some smaller mills closed (e.g. in the Nordic countries) for profitability reasons. Investments are focusing on replacements and increasing capacity in existing sawmills rather than on greenfield ventures.

5.2.3 Prices

The declining price trend for European sawn softwood continued in the Middle East in 2016 (graph 5.2.1). The price for Finnish spruce (cost & freight; C&F) in Europe was down by 7% (in euros per m³) compared with 2015, and the price of pine in the Middle East fell by 8%. Spruce prices recovered in Europe in the first five months of 2017, but pine's negative trend in the Middle East continued. The low price of pine is affecting the profitability of pine mills, especially in the Nordic countries.

GRAPH 5.2.1

European sawn softwood prices in Japan, Europe and the Middle East, 2011-2017



Notes: Data to May 2017. Japan: European whitewood lamina, KD rough FOB truck port yard. Europe: Finnish whitewood sawfalling, C&F. Middle East: Scandinavian/Baltic whitewood and red pine, sixths, CIF.

Sources: Japan Lumber Report, 2011-2017; Wood Markets, 2011-2017.

The price trend in Japan for European sawn softwood was slightly negative in the local currency (yen) in 2016, but it was favourable for European exporters because the euro continued to weaken against the yen. Free-on-board (FOB truck Japanese port) prices (euros per m³) increased by 7% in

2016. Prices in Japan started to fluctuate in December 2016 as the yen weakened against the euro and prices increased in the local currency.

5.2.4 Trade

5.2.4.1 Imports

European imports of sawn softwood grew by 3.7% in 2016, to 35.9 million m³. Most of these were intrasubregional, but extrasubregional imports increased at a slightly faster rate (4.4%), reaching 7.1 million m³.

Most imports from outside the European subregion originate in Belarus, the Russian Federation and Ukraine. Imports from Belarus and Ukraine combined increased by 0.5 million m³, with both countries exporting more than 1 million m³ of sawn softwood to Europe in 2016. On the other hand, imports from the Russian Federation decreased by 0.2 million m³, to 3.3 million m³. Overseas imports to Europe were marginal in 2016, and there was little change in volume (COMTRADE, 2017; Eurostat, 2017).

The two largest sawn softwood importers in Europe – the UK and Germany – both increased imports by more than 5% in 2016. The UK consistently imports half its sawn softwood from Sweden; this is the largest trade flow of this product in Europe, accounting for more than 10% of Europe's imports and for 3.1% of imports globally (UNECE/FAO, 2017b). Overall, sawn softwood imports grew faster than consumption in Europe in 2016, with intrasubregional imports increasing as markets in traditional importing countries recovered.



Source: Stora Enso, 2017.

5.2.4.1 Exports

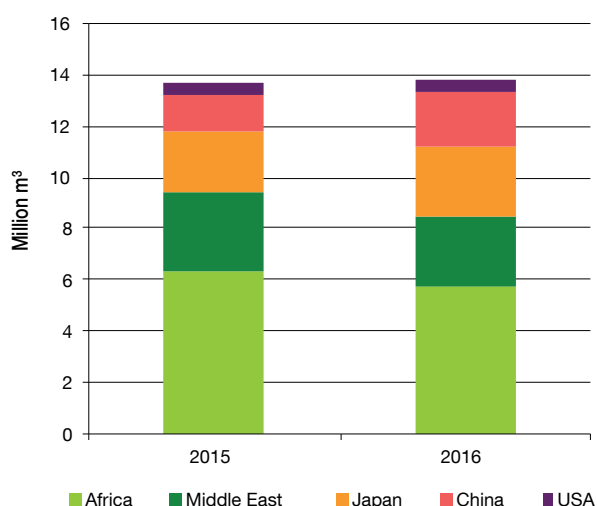
European sawn softwood exports grew by 3.8% in 2016 (compared with 1% in 2015), to 49.5 million m³. The increase was driven mainly by growing intraregional exports in Europe;

demand in the main overseas export markets increased by only 1.2%.

European overseas exports showed strong regional variation in 2016, but the overall development was positive (graph 5.2.2). Exports to North Africa decreased by 10% in 2016, to 5.7 million m³, due to declining demand in most countries in that region, with exports falling for all European exporting countries except Finland. The situation was similar in the Middle East, where European exports decreased by 7%, to 2.8 million m³.

GRAPH 5.2.2

Main European sawn softwood overseas exports, 2015-2016



Source: Random Lengths, 2017; Woodstat, 2017.

The decline in sawn softwood exports to North Africa and the Middle East was offset by strong demand in Asia. Exports to China grew by 37%, to 2.1 million m³, with most of the additional volume supplied by Finland and Sweden. Egypt and Japan are still the largest overseas markets for European exporters, despite the phenomenal growth in exports to China. European sawn softwood exports to Japan increased by 15% in 2016, to 2.7 million m³. European exports to the US also grew rapidly (by 31%) in 2016, although the total volume was small (0.6 million m³).

In the first four months of 2017, European exports grew rapidly in China (+75%, year-on-year) and the US (+83%, year-on-year); were similar to the previous year in Japan, year-on-year; and continued downward in North Africa and the Middle East. The spruce export market is developing well overseas, but weakness in the traditional pine markets of North Africa and the Middle East is presenting a challenge to Nordic sawmills because demand for spruce and pine is out of balance.

5.3 CIS, with a focus on the Russian Federation

5.3.1 Consumption

Apparent sawn softwood consumption increased by 0.9% in the CIS subregion in 2016, to 16.7 million m³ (table 5.3.1).



Source: UNECE/FAO, 2017.

5.3.2 Production/capacity change

The CIS subregion produced more than 39 million m³ of sawn softwood in 2016, up by 6.7% over 2015. The Russian Federation accounted for almost 88% of the CIS total, with production of 34.3 million m³.

In 2016, large Russian sawmilling companies continued to implement their strategy of increasing export sales and selling in the lower-priced domestic market on a more restricted basis.

Kraslesinvest, a large plant in Siberia's Krasnoyarsk region with a capacity of 400,000 m³ of sawn softwood per year, officially opened in 2016. The company, which is fully owned by the

TABLE 5.3.1

Sawn softwood balance, CIS subregion, 2015-2017
(thousand m³)

	2015	2016	2017f	Change (%) 2015-2016
Production	36,618	39,056	39,586	6.7
Imports	5,196	5,125	5,125	-1.4
Exports	25,311	27,525	28,034	8.8
Apparent consumption	16,504	16,656	16,677	0.9

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017a.

state via Vneshekonombank, plans to construct, on the same site, a pellet plant with a capacity of 105,000 tonnes and a pulpmill with a capacity of 750,000 tonnes.

Several greenfield projects, and the modernization of existing plants, are continuing in the Russian Federation, with the potential to add about 3 million m³ of sawn softwood to production (WhatWood, 2017).

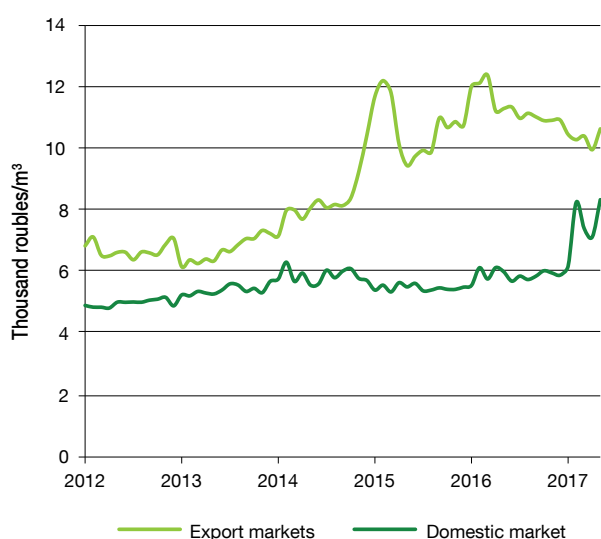
5.3.3 Prices

According to Rosstat (2017), the weighted average price for Russian sawn softwood in 2016 was 5,907 roubles per m³ (\$88 per m³) in the domestic market (up by 7.4%, year-on-year) and 11,284 roubles per m³ (\$168 per m³) in export markets (up by 6.4%, year-on-year) (graph 5.3.1).

The exchange rate of the Russian rouble to the US dollar and the euro decreased over 2016 and into 2017, which was unexpected by exporters. Mills increased production and exports to compensate for lower net prices in roubles.

GRAPH 5.3.1

Sawn softwood prices in the Russian Federation, 2012-2017



Note: Data to May 2017.

Source: Rosstat, 2017.

5.3.4 Trade

Russian sawn softwood exports set another volume record in 2016, increasing by 7.9% to 24.9 million m³. China continued to increase its share of total Russian exports, from 44% in 2015 to 54% in 2016. According to Russian customs data, the Russian Federation exported 13.4 million m³ of sawn softwood to China in 2016, up by 37%, year-on-year (note,

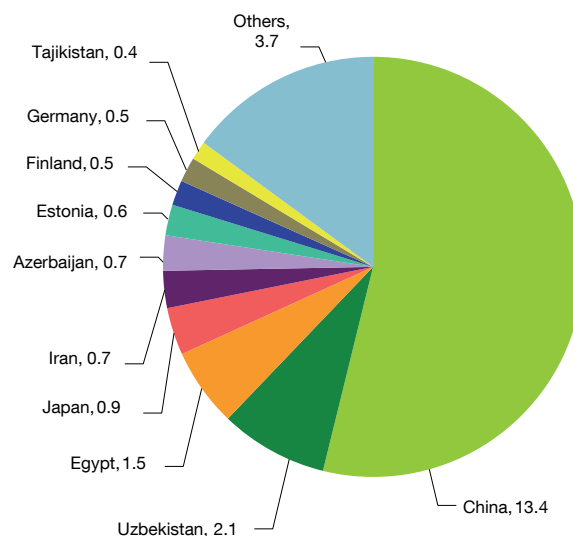
however, that Russian export data are normally about 10% higher than Chinese import data due to product classification issues) (WhatWood, 2017).⁸

Trade flows of Russian sawn softwood changed in 2016 due to market conditions and prices. Producers reoriented parts of their product lines from markets in Egypt and Uzbekistan to the Chinese market. The difficult economic situation in Egypt created unprofitable trading conditions, especially for Siberian plants. The volume of Russian sawn softwood sold to Egypt in 2016 was similar to that sold in 2014, at 1.5 million m³ (down by 24% from 2015). Sales fell by 13.5% to Uzbekistan (to 2.1 million m³), by 28% to Turkmenistan (to 238,000 m³), and by 47% to Tajikistan (to 359,000 m³) (graph 5.3.2).

A steady rate of house construction increased demand for Russian sawn softwood in Japan, with sales there increasing by 7.4% (to 910,000 m³) in 2016.

GRAPH 5.3.2

Russian Federation sawn softwood exports by market, 2016 (million m³)



Source: WhatWood, 2017.

Demand for Russian sawn softwood in Europe increased by 7% in 2016, to 3.5 million m³. The Baltic States constitute the largest European customer for Russian sawn softwood, purchasing 73% of Russian exports of rough-sawn Siberian spruce to Europe in 2016. Imports increased in Estonia by 9.8%, to 590,000 m³; in Latvia by 42%, to 288,000 m³; and in Lithuania by 34%, to 143,000 m³. There was a noticeable (20%) reduction in exports to Belgium in 2016, to 137,000 m³ (graph 5.3.3).

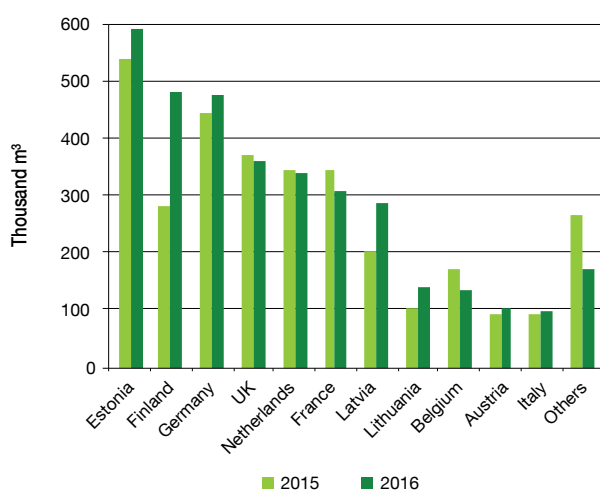
⁸ According to Chinese customs data, China imported 11.8 million m³ of sawn softwood in 2016 (+38%, year-on-year).



Source: E. O'Driscoll, 2017.

GRAPH 5.3.3

Russian Federation sawn softwood exports to Europe, 2015 and 2016



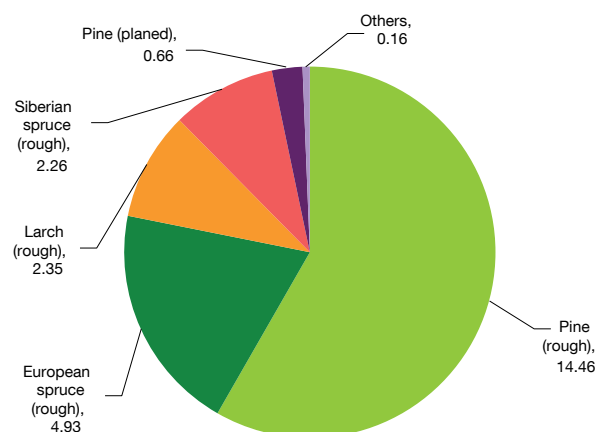
Source: WhatWood, 2017.

The largest increase in exports of sawn softwood in 2016 was for rough-sawn Siberian spruce, which increased by 32%, to 2.3 million m³. Sales of rough-sawn European spruce increased by 20%, to 4.9 million m³, but the largest sales continued to be in rough-sawn red pine (up by 4.8% in 2016, to 14.5 million m³; graph 5.3.4).

Belarus more than doubled its exports of sawn softwood in two years, from 667,000 m³ in 2014 to 1.6 million m³ in 2016. Germany was the main market destination, importing 451,000 m³ (29%) of the total export volume in 2016 (International Trade Centre, 2017).

GRAPH 5.3.4

Russian Federation sawn softwood exports by species, 2016 (million m³)



Source: WhatWood, 2017.

5.4 North America

5.4.1 Consumption

Demand in North American sawn softwood markets increased steadily in 2016 and the first half of 2017. US housing starts continued to be the primary driver of consumption, reaching 1.17 million units in 2016 (up by 5.6% compared with 2015; US Census Bureau, 2017). Single-family housing grew quickly (by 9.4%) in 2016, but multifamily starts declined by 1%. This is good news for the wood industry because single-family houses consume three times more sawnwood (and structural panels) than multifamily houses. Indications are that there will be 1.22 million housing starts in 2017. Industry-based promotional efforts such as the Softwood Lumber Board initiative to increase wood use (including cross-laminated

TABLE 5.4.1

Sawn softwood balance, North America, 2015-2017 (thousand m³)

	2015	2016	2017 ^f	Change (%) 2015-2016
Production	99,153	103,788	102,467	4.7
Imports	24,011	29,498	29,511	22.9
Exports	32,517	35,429	34,153	9.0
Apparent consumption	90,648	97,858	97,825	8.0

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017a.

timber) in taller/larger apartment and non-residential buildings are attracting interest in North America and around the world and should lead to further increases in North American sawnwood consumption.

The US economic outlook is relatively healthy, and GDP growth should remain in the range of 2.0-2.2% per year through 2019. Apparent North American sawn softwood consumption was 97.9 million m³ in 2016, up by 8%, year-on-year (table 5.4.1). Of the total consumption, 81.7 million m³ was in the US (up by 10%, year-on-year) and 16.2 million m³ was in Canada (down by 0.6%).

5.4.2 Production/capacity change

US sawn softwood output was 55.6 million m³ in 2016, an increase of 3.4% compared with 2015. Production gains were highest in the US South (+4.1%), followed by the Midwest and Northeast regions (+3.1%) and the US West region (+2.5%). Depressed timber prices since 2009 due to excess log supplies, coupled with strong housing demand, put the South – which accounts for more than 50% of US production – in the lead among US sawn-softwood-producing regions. The US West region faced a tight log supply, with strong export log prices keeping coastal log prices high and sawnwood production in check.



Source: UNECE/FAO, 2017.

In 2016, Canadian sawn softwood production increased by 6.2%, to 48.2 million m³. Production increased in the British Columbia Interior – Canada's leading region for sawn softwood production, accounting for 42.5% of national production in 2016 – by 3.6% compared with 2015 (Statistics Canada, 2017). Output increased by 4% in Alberta, Manitoba and Saskatchewan in 2016, due to increases at existing mills in those provinces. Sawn softwood production surged by 15% in eastern Canada (dominated by Quebec, Ontario, New Brunswick and Nova Scotia) in 2016 (Statistics Canada,

2017). Quebec, the highest-producing province in the east, accounted for 60% of that region's output.

For the first time since a brief window in 2001, there were no export duties on Canadian lumber exports to the US in 2016, following the expiry of the nine-year Softwood Lumber Agreement in October 2015. Coupled with a low Canadian dollar relative to the US dollar, Canadian mills were highly competitive in the US in 2016, and exports to the US soared by 13.5%. New duties on Canadian lumber exported to the US started in late April 2017. It is widely expected that both Canadian lumber production and exports to the US will decline slightly in 2017 and by 5-10% in 2018.

5.4.3 Prices

Prices in major global markets all increased in US dollar terms in 2016, continuing a positive cycle that started in late 2015. European prices were more subdued in 2016 but were on the upswing in 2017 (graph 5.4.1). Overall market demand was favourable in all major markets except those in the Middle East and North Africa, where governments in countries like Egypt and Algeria dealt with financing issues for importers.

GRAPH 5.4.1

Quarterly prices for sawn softwood in China, Europe, Japan and the US, 2005-2017



Notes: Data to June 2017, delivered-to-market prices. Japan: BC W-SPF 2x4, J-grade, C&F; Europe: Swedish spruce 47x100, C&F; US: W-SPF grade #2&Btr, 2x4, delivered to Chicago; China: SPF/Hem-Fir, green, grade #3&Btr 1-7/8x4-12, C&F.

Sources: Wood Markets, 2005-2017a; Wood Markets, 2005-2017b.

The bellwether structural framing lumber composite price in the US gained 4% in 2016 and was up by 19% in the first half of 2017, year-on-year (Random Lengths, 2017), with US countervailing duties on imported sawn softwood from Canada starting in April 2017 mainly responsible for the

higher prices. There are favourable demand forecasts in the US for the rest of 2017; coupled with tightening sawnwood supply factors and with punitive duties on Canadian lumber exports now in place, US lumber prices are forecast to stay high.

5.4.4 Trade

The end of the nine-year US–Canada Softwood Lumber Agreement in mid-October 2015 resulted in an 18-month window of duty-free Canadian lumber exports to the US. Preliminary countervailing duties on Canadian lumber came into effect in late April 2017 and antidumping duties in late June 2017, with final duties due to be announced in early January 2018. These duties will change global sawnwood trade flows because a drop in exports from Canada to the US will mean an increase in Canada's offshore exports, especially to Asia. Because of expected greater competition in many offshore markets, the US is unlikely to make up shortfalls from Canada, thereby creating opportunities for European exporters to replace Canadian volumes.

Despite improving demand in China in 2016 (imports were up by 21% in 2016, to 21.1 million m³), North American exports to China were lower for the third consecutive year, with returns in the US market better than those in China. Canadian exports to China dropped by 6%, year-on-year, to 5.2 million m³; US exports to China increased by 8% but on much smaller volumes, to 640,000 m³. Canadian exports to China fell by a further 15% in the first four months of 2017, but US exports to China increased by 30% in the same period.

Japan's sawn softwood imports from all countries increased by 5.7% in 2016, to 6.2 million m³, but North American exports to Japan declined by 4% (to 2.2 million m³).

5.4.4.1 Imports

Canada continued to dominate US imports, with a near 96% share in 2016. Canadian shipments to the US were up by a whopping 3.0 million m³ (13.5%) in 2016, to 25.5 million m³, with exporters taking advantage of the lack of duties. US imports from Europe soared in the first three months of 2017, however, increasing by 350%, year-on-year, to 520,000 m³. European exports could reach 3 million m³ in 2018, given the new duties on imported Canadian sawnwood.

5.4.4.2 Exports

US sawn softwood exports were relatively flat in 2016 at 2.8 million m³. The most significant reductions were to Japan (-17%), Asian countries other than China and Japan (-15%), and Canada (-4%).

Canadian sawn softwood exports to all overseas markets declined by 7.6% in 2016, to 7.3 million m³; only shipments to the US increased (+13.5%). Canadian exports to China

declined for the third consecutive year, to 5.2 million m³, and were lower again (-15%, year-on-year) in the first four months of 2017.

Canadian sawn softwood exports to the US fell by 2.5% in the first three months of 2017, year-on-year. The potential impact of 90 days of retroactive US duties (imposed following the preliminary countervailing duty ruling of 19.9% in late April) caused some Canadian producers to shift production away from the US market, starting in February 2017. With the antidumping duty of 6.9% also in effect for 90 days before the late-June ruling, Canadian exports to the US are expected to fall for the rest of 2017 and into 2018. It is expected that Canada will increase its offshore exports in the second half of 2017 and into 2018 as companies avoid US export duties.

The continuation of positive economic drivers and the potential for a tightening of the sawnwood supply–demand balance suggest an optimistic outlook for sawn softwood markets to the end of 2017. For North American producers, the key metrics to watch are rising US consumption (housing starts, and repair and remodelling), currency rates, the impact of US duties on Canadian shipments to the US, and potential increases in offshore export markets.



Source: UNECE/FAO, 2017.

5.5 Extraregional influences affecting the UNECE region

China continued to dominate sawn softwood imports outside the UNECE region, importing 21.1 million m³ in 2016,⁹ destined mainly for housing, construction and furniture production (table 5.5.1). China's imports had decreased by

⁹ Wood Markets Monthly reported an error in data on Russian exports provided by China Customs, which should reduce the estimate of China's imports in 2016 to 21.1 million m³ from the reported 21.6 million m³.

1% in 2015, but they rebounded in 2016 by 21%. Although China's GDP growth has been slowing, government policies have cushioned the impacts of the planned economic slowdown by targeting domestic consumption and thereby pushing up domestic demand for wood-based products.

China's construction industry continued to develop rapidly in 2016, growing by 17% in industry value, compared with 12% in 2015. This strong growth has been attributed to central-government fiscal stimulus in the form of infrastructure investments to sustain economic growth and to the gradual local-government relaxation of real estate regulations, purchase criteria and credit availability, resulting in a boost to the domestic real estate market (Shan, 2017). Total investment in real estate development increased by 9.1%, year-on-year, in the first three months of 2017, with investment in residential buildings growing by 11.2% in the same period, accounting for 67% of all real estate development investment (National Bureau of Statistics of China, 2017). Demand in China is being driven by rising personal incomes, expanding foreign investment funding, rapid urbanization, and population and household growth. The steady growth in housing development, however, has raised concerns that the property market is overheated, and many top-tier Chinese cities have introduced measures to curb the pace of growth.

China's residential construction activity is expected to benefit from government efforts to improve living conditions for low-income earners – such as the construction of affordable and low-rent houses in urban areas and subsidies for alterations to dilapidated farmhouses in rural areas. The 13th Five-Year plan (2016-2020) calls for an increase in the urbanization rate from 56.1% of the population in 2016 to 60% in 2020. Wood product demand is expected to be boosted by plans to increase the number of "green" buildings from the current 2% of new buildings to 50% of all new construction by 2020, which will require upgrades to construction building materials.

China's imports of sawn softwoods in 2016 were predominantly from UNECE sources, particularly the Russian Federation (54% by volume in 2016) and Canada (22%), with the Russian Federation's exports assisted by the weak rouble. Argentina, Brazil, Chile and New Zealand were the only significant competitors outside the UNECE region, together supplying about 9% of China's total sawn softwood import volume.

Japan's sawn softwood imports rebounded in 2016 in response to rising housing starts, although import prices fell in the second half of 2016, mostly because of a weaker yen. The increase in housing starts was mostly of "built for rent" apartments; it was attributed to changes to Japan's inheritance tax laws – whereby building a property on a plot of land lowers the assessed land value and associated inheritance tax liability – in addition to the very low interest

rates offered by commercial banks for home building. The surge in supply of apartments is expected to distort the housing market, which is already regarded as oversupplied (ITTO, 2017). Japan's housing starts have recovered nicely since the slump in 2014, which was caused by an increase in consumption tax in April 2014.

In 2016, record low lending rates and the postponement of an additional hike in the consumption tax (now scheduled for 2019) helped propel Japan's housing starts to 967,705 units, a 6.4% increase compared with 2015. Wooden housing was particularly strong, growing by 8.3%, to 546,336 units.

Housing construction is expected to decline in the longer term in line with a decline in the number of Japanese households, with activity increasingly restricted to the rebuilding of ageing infrastructure. Non-residential construction is also expected to remain static, with population decline and ageing also constraining the availability of labour in the construction sector. The Japan Forestry Agency recently forecast a decline in housing starts in 2017, to 920,000 units (ITTO, 2017). Japan's sawn softwood imports were predominantly (94%, by volume) from North American and EU sources in 2016.

North African and Middle Eastern countries – particularly Algeria, Egypt, Saudi Arabia and the United Arab Emirates – continued to provide major markets for sawn softwoods in 2016, although the volume of imports declined in response to political instability and falling oil revenues. Sawn softwood imports declined by nearly 25% in Egypt – the region's largest sawn softwood importer – between 2014 and 2016, primarily in response to political unrest.

TABLE 5.5.1

Major importers and exporters of sawn softwoods outside the UNECE region, 2014-2016 (thousand m³)

	2014	2015	2016	Change (%) 2015-2016
MAJOR IMPORTERS				
China	14,546	17,466	21,100	20.8%
Japan	5,989	5,770	6,099	5.7%
Egypt	5,896	5,127	4,390	-14.4%
Republic of Korea	1,724	1,861	1,835	-1.4%
Mexico	1,134	1,371	1,514	10.4%
MAJOR EXPORTERS				
Chile	3,596	3,139	3,307	5.4
Brazil	993	1,304	1,859	42.6
New Zealand	1,700	1,774	1,731	-2.4
Australia	363	297	270	-9.1

Sources: COMTRADE, 2017; ITTO, 2017; Woodstat, 2017; Wood Markets, 2017.

The only significant country exporters of sawn softwoods outside the UNECE region in 2016 were Chile, Brazil and New Zealand (in descending order, by volume). Chile's export markets are diversified, with significant volumes shipped to Asian, Latin American and Middle Eastern markets. Chile's exports to China – the largest country market – rebounded in 2016 after a significant decline in 2015. Although Brazil's wood-processing industry has been challenged by an economic recession and weak domestic demand, exports of sawn softwoods increased strongly in 2016 in response to recovery in sawn softwood demand in the US, Brazil's major export market. New Zealand's major markets in 2016 were predominantly in the Asia-Pacific region – China, the US, Australia, Viet Nam, Thailand and the Republic of Korea (in descending order, by volume).

5.6 Policy and regulatory influences on the sector

The nine-year US–Canada Softwood Lumber Agreement expired in mid-October 2015. Based on US trade law procedures for the subsequent 18 months, the US Department of Commerce was finally able to initiate a preliminary 19.9% countervailing duty starting in late April 2017 and 6.9% antidumping duty starting in late June on Canadian sawnwood exports to the US. Final duties will be announced in early January 2018 after further appeals and investigations.

This situation last arose between Canada and the US in 2001 when the initial "import duty rates on Canadian shipments to the US" totalled 32%. The maximum duty rate (tied to

sawnwood prices) under the previous nine-year agreement was 15% for companies in Alberta and British Columbia and 5% (and some quota volume restrictions) for the rest of Canada.

Efforts continue in North America to promote wood as a building material of choice. The Softwood Lumber Board was established in 2011 and is a mandatory promotion fund, or "check-off", authorized under the US Farm Bill. The goals are to increase construction demand for sawn softwood, change attitudes and buyer perceptions on wood, and convert projects from steel and concrete to wood. Recent activities include the promotion of six-storey wood-frame apartment buildings and multi-storey cross-laminated timber buildings. The Softwood Lumber Board operates with an annual budget of about \$15 million funded by the industry, with a tariff of 35 cents per 1,000 board feet (approximately \$0.22 per m³, net size) levied on all suppliers to US markets, including importers, on volumes exceeding 15 million board feet (24,000 m³) per supplier.

In the European subregion, the most significant policy issue with the potential to affect sawn softwood is the looming Brexit, which could significantly affect imports of EU sawn softwood to the UK market. The UK is second only to Germany in imports of forest products (on a value basis). The impacts of Brexit on sawn softwood producers in the EU will depend on its terms and on potential changes to the exchange rate between the pound and the euro.

Note: The statistical annex of the *Forest Products Annual Market Review 2016-2017* is available at: www.unece.org/forests/fpamr2017-annex

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Chapter 6

SAWN
HARDWOOD

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Highlights

Apparent **consumption of sawn hardwood declined by 1.2% in the UNECE region in 2016**, to 35.4 million m³, ending a five-year period of growth.

Falling sawn hardwood consumption in North America in 2016 was offset only partly by rising consumption in Europe and the CIS.

Sawn hardwood production in the UNECE region was flat in 2016, at 41.2 million m³, falling in Europe and North America but rising in the CIS, due mainly to Ukraine's log export ban and good export demand elsewhere.

EU furniture output is recovering slowly, rising by 1% in 2016. In large western European manufacturing countries, however, **output was still 20% below levels seen before the 2008-2009 global financial crisis**.

Hardwood traders in Europe are becoming more concerned about reliance on oak and are keen to promote demand for a wider range of species. **Oak was used in more than 80% of wood flooring manufactured in Europe** in 2016.

Sawn hardwood consumption increased by 6.9% in the CIS in 2016, to 1.4 million m³, after a 33% fall in 2015. Sawn hardwood production increased by 5.7% in 2016, to 3.4 million m³.

The weak rouble encouraged a 6% increase in sawn hardwood exports by the Russian Federation in 2016, to 1.46 million m³. Exports to China were 1.27 million m³, an increase of 9% over 2015 and **the largest quantity of Russian sawn hardwood ever shipped to China**.

North American sawn hardwood consumption decreased by 3.6% in 2016, to 21.1 million m³, as hardwood lost share to substitute materials in key market segments, notably pallets and furniture.

After declining by 8.4% in 2015, US sawn hardwood exports to countries outside North America **increased by 14.3% in 2016**, to 3.1 million m³, **the highest level ever recorded**. Exports increased by 24% to China, which – for the first time – accounted for over half of all US sawn hardwood exports.

Outside the UNECE region, China imported **4.81 million tonnes of tropical sawn hardwood** in 2016 and **3.18 million tonnes of temperate sawn hardwood**, increases of 21% and 10%, respectively, compared with 2015; the domestic interiors sector drove demand.

Policy issues significantly affecting the sawn hardwood sector in 2016 and 2017 include plant health, endangered species legislation, legality due diligence, and workers' protection from dust exposure.

Innovations in the hardwood sector – such as new hardwood cross-laminated timber, glulam and laminated veneer lumber products – **aim to extend the use of hardwood into new** (notably structural and high-exposure) **applications**.

6.1 Introduction

After a five-year period of growth, the apparent consumption of sawn hardwood decreased by 1.2% in the UNECE region in 2016, to 35.4 million m³. Falling consumption in North America in 2016 was offset only partly by a slight rise in consumption in Europe and the CIS.

Sawn hardwood production was flat in the UNECE region in 2016, at 41.2 million m³. Production was stable in Europe, but a fall in North America was offset by an increase in the CIS.

After two years of growth, sawn hardwood imports decreased by 0.6% in the UNECE region in 2016, to 6.5 million m³. Countries in the UNECE region exported 12.3 million m³ of sawn hardwood in 2016, up by 3.4% compared with 2015.

6.2 Europe

6.2.1 Consumption

European apparent consumption of sawn hardwood increased by 2.0% in 2016, to 12.8 million m³ (table 6.2.1). Consumption was stable in Turkey, the subregion's largest national market for sawn hardwood, which is fed almost exclusively by domestic production. Consumption in EU28 countries increased by 1.6% in 2016, to 8.8 million m³, benefiting from (albeit slow) growth in key sectors of the EU economy, including construction and furniture.

TABLE 6.2.1

Sawn hardwood balance, Europe, 2015-2017

(thousand m³)

	2015	2016	2017f	Change (%) 2015-2016
Production	13,629	13,685	13,689	0.4
Imports	4,771	4,850	4,907	1.7
Exports	5,859	5,743	5,546	-2.0
Apparent consumption	12,541	12,792	13,050	2.0

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017.

Total construction output increased by 2.5% in the EU in 2016 and is forecast to grow by 2-3% annually in the period 2016-2018. New residential construction expanded by 8.8% in 2016. Growth is expected to remain very strong in 2017, but a significant slowdown in new residential construction is expected in 2018 and 2019. Growth in residential renovation and maintenance has been slower. It is expected to remain consistent at about 1.5% per year in 2017-2019. Non-

residential construction is forecast to grow only modestly in coming years – by 2.3% in 2017, 1.8% in 2018 and 1.2% in 2019 (Euroconstruct, 2017).

The European furniture market – another key source of demand for sawn hardwood – has been recovering only slowly, growing by 1% in 2016. The output of the furniture industry was stagnant in large western European manufacturing countries in 2016. This was 20% below the levels seen before the 2008-2009 global financial crisis. In contrast, the output of the furniture industry has been rising in parts of eastern Europe, notably in Lithuania and in Poland. European furniture sales in major export markets, including the Middle East, the Russian Federation and North America, slowed in 2016 (ITTO, 2017).



Source: AHEC, 2017.

The consumption of “real wood” flooring (i.e. not including laminate flooring) in the 17 countries covered by the European Federation of the Parquet Industry (FEP) increased by 1.7% in 2016, building on 0.5% growth in 2015. Demand for hardwood flooring increased in most European markets in 2016, particularly in Belgium, France and Sweden. Competition from flooring alternatives remains fierce, however, especially laminates and other products with a wood-look surface (FEP, 2017).

There was no change in European hardwood fashion trends in 2016, which remain heavily oriented towards the “oak look”. Oak was used in over 80% of wood flooring manufactured in Europe in 2016; the share of tropical woods continued to decline, and other temperate species accounted for only a small share (FEP, 2017). Hardwood traders in Europe are concerned about reliance on oak, and they are keen to promote demand for a wider range of species (AHEC, 2017). Multilayer parquet floors are increasingly dominant, accounting for around 80% (by volume) of the European wood-flooring market, while solid hardwood accounts for 18% (FEP, 2017). Vintage-look materials remain in fashion,

along with knot holes, core splits and traces of the saw blade (ITTO, 2017).

6.2.2 Production and capacity change

European sawn hardwood production increased by 0.4% in 2016, to 13.7 million m³; EU28 production decreased by 0.2%, to 10.1 million m³. Rises in production in Croatia, France and Germany in 2016 were offset by larger declines in Romania and Slovakia. Log shortages are an increasing problem, compounded by the heavy reliance on European oak.

6.2.3 Prices

The strong fashion for oak, combined with the slow recovery of consuming sectors and the relative weakness of the euro against the dollar (which has encouraged exports and increased prices for imported American alternatives), put pressure on supply and increased prices for European oak in 2016 and the first half of 2017. Supply constraints were exacerbated by competition for raw materials between sawmills, log exporters, veneer producers (who saw demand grow in 2015 and 2016), and the booming barrel-stave sector (AHEC, 2017).

The limited supply of oak encouraged rising demand and prices – in both domestic markets and Asia – for European ash in 2016 and the first half of 2017 because its light colour, coarse texture and grain pattern are similar to oak (AHEC, 2017).

After rising for most of 2016, demand for superior colour grades of steamed beech weakened slightly in the last quarter of 2016 and the first quarter of 2017. Demand was still stronger than supply, however, and prices remained stable at the higher level (Brooks Bros, 2017).



Source: AHEC, 2017.

6.2.4 Trade

6.2.4.1 Imports

Total imports of sawn hardwood by European countries increased by 1.7% in 2016, to 4.9 million m³, and the dollar value increased by 3.3%, to \$2.94 billion. Belgium's imports increased in 2016 as a larger share of tropical hardwood supplied to the EU was channelled through the country. Imports in Austria, Lithuania, Poland and Spain also increased in 2016 in response to improving domestic consumption. These gains offset a continuing long-term decline in Italy, which nevertheless remains Europe's largest import market. Imports by the Netherlands slowed sharply in 2016. Over the same period, there were slight downturns in imports by Germany, Italy and Turkey.

The strength of the US dollar relative to European and CIS currencies in 2016 and the first half of 2017 generally favoured trade in European hardwoods at the expense of American hardwoods. Rising sawn hardwood imports from the CIS have also been encouraged by tightening controls on log exports in several CIS countries and by a general shift in EU wood-manufacturing activities from western to eastern regions that are less dependent on Atlantic trade (AHEC, 2017).

Trade continued to rise in sawn ash and oak from Ukraine (destined mainly for Italy and Poland) and sawn aspen and birch from Belarus and the Russian Federation (destined mainly for Estonia, Germany and Lithuania). US sawn hardwood exports to Europe increased by 2.5% in 2016, to 356,900 m³, after falling by 11% in 2015 (Global Trade Atlas, 2017).

The EU imported 1.2 million m³ of tropical sawn hardwood (excluding intra-EU trade) in 2016, an increase of 2.2% over 2015. The share of tropical in total EU sawn hardwood imports declined from 46.5% in 2015 to 45.6% in 2016, continuing a long-term downward trend. Tropical hardwoods sourced from African countries, where prices are quoted in euros, were more competitive than Asian hardwoods in Europe in 2016 (ITTO, 2017). Asian suppliers are also reorienting away from European markets for sawn lumber in favour of emerging markets and value-added products such as laminated veneer lumber, doors and other joinery products (MTC, 2017).

6.2.4.2 Exports

Following significant increases in 2014 and 2015, sawn hardwood exports by European countries declined by 2.0% in 2016, to 5.7 million m³. Exports by Croatia, the leading exporter among European countries, increased by 2%, to 920,000 m³; exports by Romania fell by 22.1%, to 627,000 m³, due mainly to a significant decline in shipments to Egypt; and exports by Latvia fell by 15.3%, to 471,000 m³. Exports to China and European markets were more stable (Global Trade Atlas, 2017).

German sawn hardwood exports increased by 0.4% in 2016, to 704,000 m³, with rising sales to North America and Viet Nam offsetting declining sales to China.

6.3 The CIS subregion

Sawn hardwood consumption in the CIS increased by 6.9% in 2016, to 1.4 million m³, following a 33% fall in 2015, and hardwood production increased by 5.7%, to 3.4 million m³. Continuing currency weakness, combined with only a slow recovery in domestic consumption and increased controls on log exports, led to a 5.7% rise in sawn hardwood exports from the subregion in 2016, to 2.1 million m³, following a 41% increase in 2015. Sawn hardwood imports by CIS countries increased by 22% in 2016 but remained negligible, at 108,000 m³ (table 6.3.1).

TABLE 6.3.1

Sawn hardwood balance, CIS, 2015-2017 (thousand m³)

	2015	2016	2017 ^f	Change (%) 2015-2016
Production	3,233	3,418	3,525	5.7
Imports	88.49	108.26	108.26	22.3
Exports	1,988	2,101	2,155	5.7
Apparent consumption	1,333	1,425	1,479	6.9

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017.

Apparent consumption of sawn hardwood in the Russian Federation increased by 7.2% in 2016, to 1.06 million m³, following a 38% decline in 2015. Production increased by 6.7%, to 2.51 million m³, recovering the ground lost in 2015. The Russian Federation's GDP contracted by 0.2% in 2016 after a decline of 2.8% in 2015, with the economy bottoming out in the first quarter of 2016. In 2017, the economy is showing signs of overcoming the recession it entered in 2014, boosted by rising oil prices and growing macro-stability in response to the government's policy package of a flexible exchange rate, expenditure cuts, and bank recapitalization (World Bank, 2017a). The weakness of the rouble encouraged a 6% increase in sawn hardwood exports by the Russian Federation in 2016, to 1.46 million m³. Exports to China were 1.27 million m³, an increase of 9% over 2015 and the largest quantity of Russian sawn hardwood ever shipped to China. Exports also increased to Kazakhstan, Latvia, Lithuania and Poland (Global Trade Atlas, 2017).

Ukraine's economy grew by a moderate 2.3% in 2016 after a 16% cumulative contraction in the previous two years (World Bank, 2017b). In 2016, Ukraine's sawn hardwood consumption recovered some of the ground lost during the recession. The weak hryvnia, combined with measures to restrict log exports from Ukraine, contributed to an 8.7% increase in exports of sawn hardwood in 2016, to 475,000 m³. Ukraine's

sawn hardwood exports, now strongly oriented towards EU countries, increased in all three of its leading markets (Lithuania, Poland and Romania) (Global Trade Atlas, 2017).

Exports of sawn hardwood from Belarus, mainly of lower-grade alder, aspen and birch for pallets and other industrial applications, declined by 21% in 2016, to 113,000 m³, driven by a 31% fall in exports to Germany, the largest export market (Global Trade Atlas, 2017).



Source: UNECE/FAO, 2017.

6.4 North America

6.4.1 Consumption

North American sawn hardwood consumption decreased by 3.6% in 2016, to 21.2 million m³ (table 6.4.1). Although the North American market continued to benefit from moderate but consistent economic growth and rising new-home construction in the US in 2016, sawn hardwood lost share to substitute materials in key market segments. Following four years of growth, North American sawn hardwood production fell by 1% in 2016, to 24.1 million m³. Exports rebounded by 10%, to 4.5 million m³, after a downturn in 2015 due to the slowdown in the Chinese economy and the strong US dollar. North American imports declined by 8.1% in 2016, due mainly to a fall in the large cross-border trade between Canada and the US, although imports from outside the subregion also fell slightly (table 6.4.1).

Sawn hardwood consumption decreased by 3.1% in the US in 2016, to 19.5 million m³. The use of saw hardwood in the pallet, furniture and board road subsectors declined. However, these losses were partly offset by increases in the consumption of hardwood cabinets, millwork and flooring (Hardwood Market Report, 2017) (graph 6.4.1).

TABLE 6.4.1**Sawn hardwood balance, North America, 2015-2017**
(thousand m³)

	2015	2016	2017 ^f	Change (%) 2015-2016
Production	24,323	24,087	24,404	-1.0
Imports	1,718	1,578	1,708	-8.1
Exports	4,086	4,495	4,571	10.0
Apparent consumption	21,955	21,171	21,541	-3.6

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

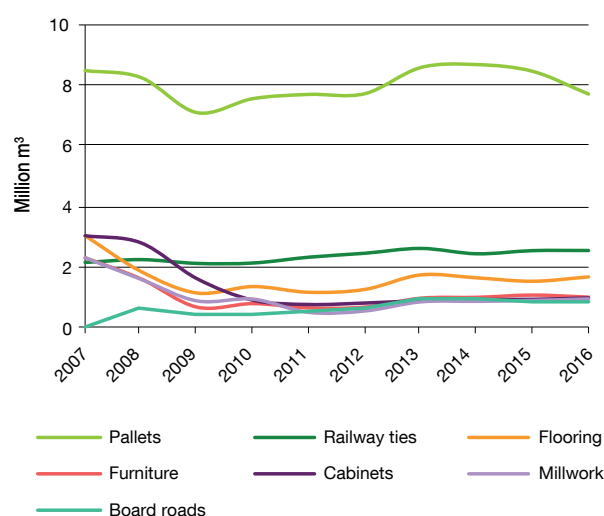
Source: UNECE/FAO, 2017.

US housing starts increased by 10.8% in 2015, but the pace of growth moderated in 2016, to 5.6% (see chapter 11). The rate of increase in demand for hardwood in related subsectors, such as millwork, flooring, furniture and cabinets, has consistently fallen short of the pace of overall construction-sector growth due to competition from imported products and other materials that can take the place of hardwood. Most furniture consumed in the US is now imported. Domestic furniture manufacturers are increasingly substituting sawn hardwood with cheaper panel products and with metal. There is also substitution between hardwood products: for example, tulipwood has become by far the highest-volume hardwood species used by domestic manufacturers for mouldings and millwork, overtaking red oak (Hardwood Market Report, 2017).

Since 2014, the hardwood industry has been losing market share in the pallet industry, notably to softwood, due to uncompetitive prices and an increased emphasis on uniform appearance and the reduced risk of mould. Despite an increase in the construction of oilfields and gasfields in the US in 2016 and the first half of 2017, the demand for sawn hardwood in the board roads¹⁰ segment was slow to respond due to a glut in the supply of used boards. Reduced railroad maintenance and construction projects lowered the demand for railroad ties in 2016. Railroads and treatment plants implemented strict purchasing quotas in early 2017 in response to high inventories. As a result, no significant consumption growth is

expected for sawn hardwood in the US in the second half of 2017 (Hardwood Market Report, 2017).

Sawn hardwood consumption in Canada decreased by 9% in 2016, to 1.7 million m³, in a year in which construction starts fell by 25.2%. Residential starts posted a shallower contraction, at 0.7%, but non-residential building starts fell by a steep 37.5%, mainly in response to shrinking oilfield investment.

GRAPH 6.4.1**US sawn hardwood consumption, by segment, 2007-2016**

Source: Hardwood Market Report, 2017.

6.4.2 Production and capacity change

US sawn hardwood production decreased by 0.2% in 2016, to 22.5 million m³, ending a five-year period of growth. Growth was curtailed in 2016 in response to a downturn in domestic demand for pallets, board roads and railway ties. Sawmills, concentration yards and distributors actively prohibited unwanted inventory growth. These efforts to control inventories were aided by a particularly wet spring, with poor logging conditions continuing into early summer in 2016. Sawmills also had production limitations due to declining demand for co-products, including hardwood pulpwood, forest and sawmill residuals, and processed woodfuel (Hardwood Market Report, 2017).

6.4.3 Prices

Prices for white oak increased consistently through 2016 and remained at the upper level in the first half of 2017, driven by strong demand in Asia and Europe and by shortages of European oak. Red oak prices also increased in this period but

¹⁰ A board road comprises sawn hardwood constructed as a mat (often interlocking) that enables heavy equipment to operate on unstable or soft soil conditions.

more slowly than those for white oak, leading to a widening price gap between the two species. Lower prices meant that red oak substituted for white oak in certain applications – such as joinery in Europe – where previously it was not preferred. Maple prices weakened in the period from mid-2016 to the first quarter of 2017 but have recovered since (graph 6.4.2) (Indiana DNR, 2017).

Strong export demand in both Asia and Europe led to rising tulipwood prices in 2016, which stabilized in the first half of 2017. Prices for ash and cherry weakened in the second half of 2016 but began to recover in 2017, mainly in response to increased demand in China. By early 2016, walnut prices had descended from the heights achieved in the previous two years and were stable at the lower level into the first half of 2017 (Indiana DNR, 2017).

6.4.4 Trade

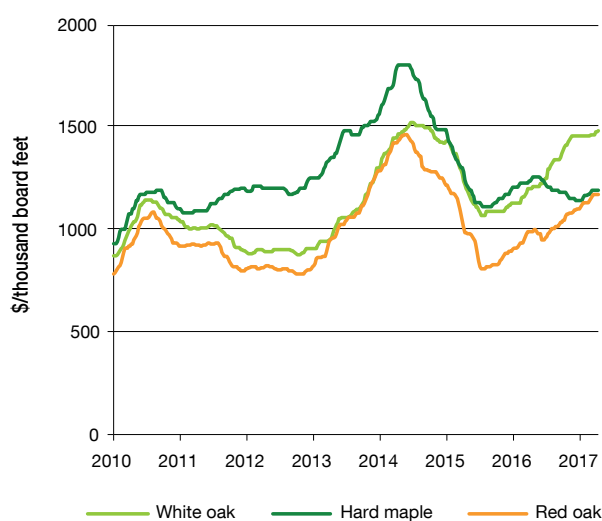
6.4.4.1 Imports

The significant cross-border trade in sawn hardwood between Canada and the US was relatively stable in 2016 after declining in 2015. The US imported 356,000 m³ of sawn hardwood from Canada in 2016, down by 2% compared with 2015. Canada imported 521,000 m³ of sawn hardwood from the US in 2016, down by 0.7% (Global Trade Atlas, 2017).

US imports of temperate sawn hardwood from outside North America increased by 13% in 2016, to 139,440 m³, driven by a significant rise in imports (mainly of beech) from France,

GRAPH 6.4.2

Prices for selected hardwood species in the US, 2010-2017



Note: Nominal prices. Data to 19 May 2017.

Source: Weekly Hardwood Review, 2017.

Germany and Slovenia. The US imports 250,000-350,000 m³ of tropical sawn hardwood per year,¹¹ consisting mainly of decking and flooring species from Brazil, Cameroon and Malaysia, and balsa from Ecuador.

Canadian imports of sawn hardwood from outside North America decreased by 30% in 2016, to 37,000 m³, contributing only a small share of total consumption. An increase in imports from Ecuador (primarily balsa), Canada's leading supplier, was offset by declining imports from Brazil, Cameroon, the Congo and Poland (Global Trade Atlas, 2017).

6.4.4.2 Exports

After declining by 8.4% in 2015, US sawn hardwood exports to countries outside North America increased by 14.3% in 2016, to 3.1 million m³, the highest level ever recorded. Exports increased by 24% to China, 15% to Germany, 11% to the UK and 8% to Viet Nam. These gains offset declining exports to Indonesia, Italy, Japan and Spain.

In volume terms, China accounted for 51% of US sawn hardwood exports in 2016, Canada for 13%, Southeast Asia for 12%, Europe for 9% and Mexico for 8%. Red oak was the leading export species in 2016, accounting for 27% by volume, followed by tulipwood (17%), white oak (15%) and ash (11%). The share of red oak, tulipwood and ash in exports increased in 2016 and the share of white oak declined (US Department of Agriculture, 2017).

US sawn hardwood exports were up by 12% in the first five months of 2017, year-on-year. Exports increased by 21% to China, 13% to Viet Nam and 8% to Mexico and were stable to Canada, Germany, Italy, Japan and the UK (Global Trade Atlas, 2017).

Canadian sawn hardwood exports to countries outside the subregion increased by 7% in 2016, to 174,000 m³, including 88,000 m³ to China/Hong Kong SAR (up by 10%) and 29,000 m³ to the EU (down by 2%). Canada's total sawn hardwood exports were up by 10% in the first five months of 2017 compared with the same period in 2016, with rising shipments to China, the UK, the US and Viet Nam (Global Trade Atlas, 2017).

¹¹ The actual volume varies within these bounds and is uncertain due to irregular large volumes reported in US official data under harmonized trade schedule code 4407.99.01.93 as imported from tropical countries in the form of "other non-coniferous" sawnwood. Unit values of sawn hardwood imports from tropical countries reported under this code are frequently very low, and the volumes are not mirrored in the sawn hardwood export data of partner tropical countries. Correcting for irregular data under 4407.99.01.93, it is estimated that US tropical sawn hardwood imports increased by 10% in 2016, from 286,800 m³ in 2015 to 314,700 m³ in 2016.

6.5 Extraregional influences affecting the UNECE region

Outside the UNECE region, China continued to dominate the sawn hardwood trade, influencing the direction of trade of both hardwood logs and sawnwood. China imported 4.81 million tonnes of tropical sawn hardwood (up by 21%) in 2016 and 3.18 million tonnes of temperate sawn hardwood (+10%) (Global Trade Atlas, 2017).

Sawn hardwood demand in China is increasingly driven by domestic consumption. For example, it is estimated that 80-85% of the US hardwood lumber volume exported to China is consumed in the domestic market, and only 15-20% is used in manufactured goods exported from China. Demand is driven by China's interior joinery and furniture sectors, which are servicing a rapidly expanding middle class. Rising labour costs in China, which increase the cost of wood processing, are also encouraging a shift in procurement away from logs in favour of sawn timber, including higher grades. US exporters report that sales to China overwhelmingly comprise higher-value qualities and species used in appearance applications, similar to materials consumed by domestic US furniture, cabinet, millwork and flooring manufacturers (Hardwood Market Report, 2017).

Viet Nam is also emerging as an important market for hardwoods, importing 1.9 million m³ of hardwood logs and 1.8 million m³ of sawnwood in 2016. Logs came mainly from Cambodia, Cameroon, the Lao People's Democratic Republic, Malaysia and Papua New Guinea, with smaller quantities from Belgium, Germany and the US. Sawnwood came primarily from the US, with smaller quantities from Cambodia and New Zealand. Unlike China, much of the imported wood in Viet Nam is used in products for export. Logs imported from neighbouring countries and from Cameroon are converted to sawnwood, a rising proportion of which is exported to China. Imported US hardwood is used for furniture exported to Europe and the US (Tran Le Huy, 2017).

The total value of the global trade in tropical sawnwood decreased by 7.2%, from \$5.04 billion in 2015 to \$4.68 billion in 2016. The decline was due primarily to a 56% fall in imports by Viet Nam, from \$0.68 billion to \$0.30 billion, due to tightening export controls in Cambodia and the Lao People's Democratic Republic. The value of China's tropical sawnwood imports increased by 5.9% in 2016, to \$2.34 billion. The EU's imports increased by 1.4%, to \$0.86 billion (Global Trade Atlas, 2017; Tran Le Huy, 2017).

Thailand and Malaysia were the two largest exporters of tropical sawnwood in 2016, by a significant margin. Thailand's exports, which increased by 36% in 2016, to more than \$1.15 billion, go overwhelmingly (99%) to China and consist primarily of rubberwood. Malaysia's exports increased by

0.7% in 2016, to \$0.81 billion, destined for a wide range of markets, notably (in descending order, by value) Thailand, China, the Philippines, Sri Lanka, India and the Netherlands (Global Trade Atlas, 2017).

African sawn hardwood exports, which had shifted sharply to China before 2015, recovered some lost ground in Europe in 2016, benefiting from exchange-rate trends and the commitment of large concessionaires to FSC certification. Total exports from Africa declined in 2016, however, partly in response to rising domestic consumption and reduced access to good-quality timber resources (ITTO, 2017).

6.6 Policy and regulatory influences

Plant health is becoming a prominent issue in the hardwood trade. Trade in American ash has been affected by restrictions designed to control the spread of the emerald ash borer (EAB). In January 2016, new rules came into force for the treatment of ash imported into the EU from North America, with zero tolerance for residual bark and wane on any ash wood sourced from an area not listed as EAB-free in EU legislation. The rules caused a significant decrease in the availability of American ash to EU importers in 2016. In 2017, however, the EU adapted the rules to allow imports of American ash subject to a certified kiln-drying regime, increasing supply to the EU (AHEC, 2017).

On 1 June 2017, the Croatian government introduced a two-year ban on the export of oak logs and oak timber with a moisture content greater than 20%, designed to prevent the spread of the bark beetle *Corythucha arcuata*, which had already infested 14 Croatian counties (TTJ, 2017).

Endangered species regulations affected the sawn hardwood trade in 2016. All species of rosewood in the genus *Dalbergia*, three bubinga species (*Guibourtia* spp.) and *Pterocarpus erinaceus* (African rosewood) were added to Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, Appendix II in September 2016 (Reverb, 2017). This came after a massive surge in the global rosewood trade in 2014 and 2015, driven by speculative purchasing in China, where rosewood (referred to as "hongmu") is used for traditional furniture. In the US, the northern long-eared bat was listed as threatened under the Endangered Species Act in April 2015, and measures to protect the species were published under the "4(d) rule" in January 2016. The 4(d) rule establishes new controls on tree removals in 2,005 counties in 37 US states and the District of Columbia (Hardwood Market Report, 2017).

Discussions are underway in the EU to revise Directive 2004/37/EC on the protection of workers from risks of exposure to carcinogens and mutagens at work, including a proposal for a new threshold limit on hardwood dust of 3 mg

per m³. The European Organisation of the Sawmill Industry (EOS) welcomed the proposed threshold as a safe and adequate level of protection but indicated that any further reduction would require significant changes in manufacturing processes. EOS also called for the harmonization of calculation and testing methodologies for exposure limits across the EU before the introduction of the threshold (TTJ, 2017).

Laws such as the EU Timber Regulation (EUTR), which has been in force since March 2013, and the US Lacey Act amendment of May 2008, have heightened the sensitivity of the sawn hardwood sector to illegal harvesting and have encouraged measures to demonstrate a negligible risk that wood has been obtained from illegal sources. The overall impact on the trade of timber harvested in the UNECE region has been minimal to date. It has been more significant for tropical hardwoods, for example by focusing procurement on a narrower range of tropical suppliers who can provide credible assurances of legal origin. There were signs in 2016 and during the first half of 2017 that regulatory authorities in Europe and in North America were ramping up enforcement activities (Client Earth, 2017). The laws are expected to have an increasing impact on trade.

6.7 Innovation in the sector

Innovations in the sawn hardwood sector aim to extend uses into new applications, notably structural applications, through the development of new products made of hardwood cross-laminated timber, glulam and laminated veneer lumber. Work continues in both Europe and North America to broaden the use of temperate hardwoods in external environments through thermal and (various forms of) chemical modification. Another innovation has been to increase the efficiency of wood processing. For example, computed tomography (CT) scanning technology is now in daily routine use at the US operations of the hardwood company Danzer. CT scans draw on computer-processed combinations of many X-ray images taken from different angles to produce cross-sectional images of the logs so that processing can be customized to optimize yield (Danzer, 2016).

Note: The statistical annex of the *Forest Products Annual Market Review 2016-2017* is available at: www.unece.org/forests/fpamr2017-annex



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Chapter 7

WOOD-BASED PANELS

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Highlights

Reflecting the European economic recovery, **European wood-based panel production increased by 2.8% in 2016**, to 74.7 million m³, despite lower production of wet process hardboard and stagnant particle board production (increasing by just 0.5% in 2016, year-on-year).

Two-thirds of overall particle board production in Europe was **consumed in the furniture sector**.

European production of softboard **increased in 2016 for the fifth year in a row**.

The European wood-based panels market is expected to **remain positive overall in 2017**.

Wood-based panel markets in Europe continued their recovery in 2016, **with particular growth in structural panels**.

There have been **significant investments** in panel production facilities in both **Belarus and the Russian Federation**.

In the CIS, **the OSB market continues to grow** and production capacity continues to expand. Apparent OSB consumption in the subregion was 1.78 million m³ in 2016, up by 21.7% from 2015.

Production of wood-based panels in North America **increased by 1.2% in 2016**.

North American consumption of non-structural panels fell slightly (-0.9%) in 2016. Particle board consumption fell by 1.4% and fibreboard consumption fell by 0.1%.

North American exports of OSB **increased sharply in 2016**.

Apparent consumption of wood-based panels in the CIS subregion decreased slightly (by 0.6%) in 2016, to 17.5 million m³.

Japan continued to be the major market for plywood outside the UNECE region, although Japan's tropical plywood imports remained low as the market moved to increase the use of plywood constructed from domestic species.

Plywood exports from Indonesia and Malaysia were affected by log-supply shortages and increasing manufacturing costs in 2016, with manufacturers in Sarawak, Malaysia, curtailing production in response to **weak demand and low prices in Japan, the major market**.

7.1 Introduction

Trends in the production and consumption of wood-based panels were mixed in 2016, although they generally showed continued growth across the UNECE region.

Growth in the production and consumption of wood-based panels in Europe was somewhat slower than in 2015. Both the plywood and OSB subsectors rebounded strongly in 2016, with production increasing by 5.3% and 9.6%, respectively. Particle board production was stagnant for the second consecutive year, increasing by just 0.5% in 2016. The production of wood-based panels increased by 8.4% in the CIS, with an even stronger increase in exports. The resultant apparent consumption of wood-based panels in the CIS decreased slightly (by 0.6%) in 2016 compared with 2015. There were large production increases in the OSB (+32%) and fibreboard (+12.2%) subsectors in the CIS in 2016 as new plants expanded production and exports began to take off. The market for wood-based panels in North America increased by a robust 3.4% in 2016 (the same rate as in 2015). Wood-based panel production was mixed in the subregion, with particle board production declining by 2.2% and plywood and fibreboard remaining fairly stable (+1.6% and +0.3%, respectively). On the other hand, OSB production jumped by 7.5% in North America in 2016.

The various fibreboard products (e.g. hardboard, MDF, high-density fibreboard – HDF – and insulating board) are easily misclassified in trade statistics; thus, this chapter presents general trends for fibreboard, although some subproducts are mentioned specifically.

7.2 Europe

Real GDP in the euro area has grown for 15 consecutive quarters (as of the second quarter of 2017) and unemployment has continued to fall, although it remains higher than it was before the 2008-2009 global financial crisis in 2008/2009. Private consumption is still the engine of the recovery and the most significant driver of wood-based panel consumption. Investment rose in 2016 but remained subdued. Economic growth in Europe is expected to continue at a moderate pace.

In total, wood-based panel production increased by 2.8% in Europe in 2016, to 74.7 million m³ (table 7.2.1) (UNECE/FAO, 2017). Production increased for all types of wood-based

panels except wet-process hardboard (European Panel Federation, 2017).¹²

TABLE 7.2.1

Wood-based panel balance, Europe, 2015-2017

(thousand m³)

	2015	2016	2017f	Change (%) 2015-2016
Production	72,690	74,749	75,713	2.8
Imports	32,073	33,986	34,213	6.0
Exports	34,096	36,190	36,342	6.1
Apparent consumption	70,667	72,545	73,584	2.7

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017.

7.2.1 Consumption

Particle board. Apparent consumption of particle board decreased by 0.4% in 2016, to 35.9 million m³, with Turkey experiencing the largest drop in demand (-7.2%) of any country in the European subregion (UNECE/FAO, 2017). Apparent consumption of particle board in European Panel Federation member countries is expected to increase by 1.2% in 2017 (European Panel Federation, 2017).

Two-thirds of overall particle board production in Europe was consumed in the furniture sector. The building industry, including doors and flooring applications, consumed 22%, and the remaining 12% of particle board production was consumed in applications such as packaging (European Panel Federation, 2017).

Fibreboard. The consumption of fibreboard in Europe increased by almost 1 million m³ (+5%) in 2016, with European MDF consumption rising by 4.6%, to 15.6 million m³. Turkey, Germany and the UK (in descending order by volume) were the largest consumers of MDF panels in Europe (European Panel Federation, 2017; UNECE/FAO, 2017).

12 Figures and trends provided by the European Panel Federation for its 27 member countries differ from those for the European subregion reported in the UNECE/FAO database (39 countries, including Israel, Serbia and Turkey). The European Panel Federation reports information on the following 27 European countries: Austria, Belgium, Bulgaria, Croatia, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the UK. In this chapter, data and trends attributed to the European Panel Federation pertain to these countries. The main differences stem from the varying country coverage and the inclusion of veneer sheets in wood-based panels in the UNECE/FAO database.

The MDF market in Europe is expected to grow by 1.2% in 2017. No decline is projected for any country. Significant increases in consumption are expected in Slovenia (+9.1%), Italy (+4.5%) and Poland (+4.2%) (European Panel Federation, 2017).

Furniture (45%) and laminate flooring (32%) were the main consumers of European MDF panels in 2016. Despite the popularity of renovation and do-it-yourself applications, sales to the building sector amounted to only 16% of total MDF consumption in 2016; the remaining 7% went to products such as mouldings and panelling (European Panel Federation, 2017).

OSB. After several years of contraction, building activity generally improved in Europe in 2016, which led to an increase in OSB consumption. Most European OSB is traded within Europe and with European Free Trade Association (EFTA) countries. Load-bearing panels suitable for structural uses in humid conditions, called OSB/3 panels, continue to be the major category of OSB produced (comprising 85% of European OSB output in 2016). OSB/2 panels – that is, panels suitable for structural and non-structural uses in dry conditions – constituted 10% of production, and the OSB/4 category (i.e. load-bearing panels suitable for heavy-duty structural uses in dry and humid conditions, where considerable swell resistance and strength are required) accounted for 4%. OSB production is mainly sold to the building industry and used in related applications such as subflooring, roof construction and load-bearing applications (walls and ceilings). The remainder of European OSB production in 2016 was destined for packaging applications, other uses, the flooring industry, the furniture industry and the do-it-yourself subsector, in decreasing order of importance (European Panel Federation, 2017).

Plywood. Overall plywood consumption in Europe was 8.1 million m³ in 2016, down by 1.9% compared with 2015. Expectations are generally positive, with plywood consumption in Europe expected to grow by 0.9% in 2017. The main plywood applications are construction (40%) and furniture (28%), followed by transport (14%), packaging (9%) and other uses (9%) (European Panel Federation, 2017).

7.2.2 Production and capacity utilization

Graph 7.2.1 shows that particle board comprised more than half of total wood-based panel production in Europe in 2016; fibreboard accounted for 30% and OSB for almost 9%.

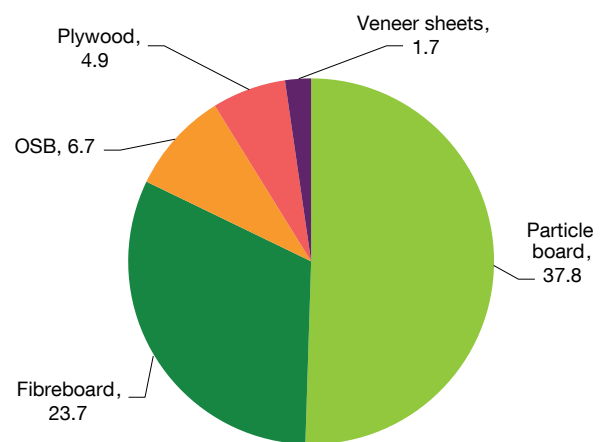
Particle board. Following an upturn in 2015, European particle board production increased by 0.5% in 2016, to 37.8 million m³, still far below the peak of 44.4 million m³ in 2007. The most significant increase in absolute terms in 2016 was in Poland, where production increased by 230,000 m³ (+5.2%) (UNECE/FAO, 2017).

Particle board production decreased in some countries, including Belgium and the UK (European Panel Federation, 2017); the largest decrease (159,000 m³) was in Turkey (3.6%).

Total particle board production capacity in European Panel Federation member countries decreased by 2.2% in 2016 (down by 820,000 m³), with adjustments in France, Portugal and Spain. Of these, the only closure was in France; other changes involved the restructuring of capacity. Total particle board production capacity in European Panel Federation member countries is expected to increase marginally (+0.8%) in 2017 (European Panel Federation, 2017).

GRAPH 7.2.1

Wood-based panel production, Europe, 2016 (million m³)



Notes: Total wood-based panel production in Europe = 74.7 million m³. "Fibreboard" comprises MDF (74%), hardboard (13%) and insulating board (13%).

Source: UNECE/FAO, 2017.

Fibreboard. The production of fibreboard increased by 739,000 m³ (+3.2%) in Europe in 2016, to 23.7 million m³. The top five producing countries were, in descending order, Germany, Turkey, Poland, Spain and France, together accounting for about 75% of production in the subregion.

MDF. Production in European Panel Federation member countries grew by 2% in 2016, to 12 million m³. Production in the broader European subregion grew by 2.6%, to 17.5 million m³. Turkey contributed a substantial 5.1 million m³ to total production in the European subregion and had the largest growth in volume (292,000 m³, +6.1%). Despite four years of growth, Europe's MDF production is still significantly lower than the peak of 21.6 million m³ in 2007.

MDF production capacity in European Panel Federation member countries declined slightly (by 150,000 m³) in

2016 due to restructuring in Spain, to about 15 million m³ (European Panel Federation, 2017).

European production of wet process hardboard decreased by 5.6% (542,000 m³) in 2016. Although it was a difficult year for all hardboard producers, the challenges were most pronounced in southern Europe. In 2016, the main end-use applications for hardboard were packaging (25%) and other uses (20%). Demand was constant for furniture applications, at 19% of output; do-it-yourself, construction and automotive uses accounted for 18%, 4% and 3%, respectively (European Panel Federation, 2017).

Total installed wet-process hardboard production capacity in EU28 and EFTA¹³ countries was 742,000 m³ in 2016, down from 803,000 m³ in 2015. This followed closures in Romania, where manufacturers are no longer thought to be producing. The main European producer of wet process hardboard in 2016 was Poland, followed by France and Bulgaria (European Panel Federation, 2017).

The European production of softboard increased (by 4%) in 2016 for the fifth year in a row, exceeding the 4.5 million m³ threshold. Rigid softboard accounted for 64% of softboard output and flex softboard for the remaining 36% (European Panel Federation, 2017).

The installed rigid softboard production capacity in Europe declined slightly overall in 2016, to 3.5 million m³; there was a decline in France and an increase in Poland. The production capacity of flex softboard grew sharply – from 1.6 million m³ to 2.2 million m³ (+42%) due to increases in Germany and Poland. For both softboard types, Poland, France and Germany are the main producers in Europe. Poland has the largest production capacity for rigid softboard, and Germany is the leader in flexible softboard. Switzerland also has significant production capacity for rigid softboard, although it is well below the level in 2014. In 2016, softboard sales consisted mainly of building shells, both rigid (45%) and flexible (31%). Rigid underlays maintained a stable share (at 10%), and standard boards represented 7% of total softboard sales (European Panel Federation, 2017).

OSB. OSB production increased in Europe by 9.6% in 2016, to 6.7 million m³. Romania and Germany are the two largest OSB producers in Europe. Poland became the third-largest following an expansion in 2015 (European Panel Federation, 2017).

European OSB production capacity increased significantly in 2016 thanks to the opening of a new OSB facility in Hungary

¹³ Official country-supplied data on wet process hardboard is not considered reliable because of misclassification between it and HDF (high density fibreboard), while producer data supplied to the EPF is considered reliable. Thus, the figures reported here are not for the entire European subregion.

and capacity expansions in Ireland and Belgium. Additional production expansion is expected in the UK in 2017 (European Panel Federation, 2017).

Plywood. European plywood production increased by 5.3% in 2016, to just less than 4.9 million m³. Finland – the most important producer in the subregion, accounting for more than 23% of production – reported a slight decrease (-0.9%) in 2016, the only country among the top five producing countries to do so. Slovakia, Poland, Romania and Spain (in descending order, by volume) reported positive trends in production, with an average growth of 5.4%. European Panel Federation (EPF) members forecast a continued increase (of 2.9%) in plywood production in Europe in 2017 (European Panel Federation, 2017).

7.2.3 Trade

7.2.3.1 Imports

Particle board. Europe's particle board imports totalled 12 million m³ in 2016. Despite a decrease of 5.8%, Germany remained the largest European importer, at nearly 2.1 million m³. Poland (+12.2%) was the second-largest importer in 2016, followed by Italy (+2.4%). European particle board imports are expected to flatten or even decrease slightly in 2017 (European Panel Federation, 2017).

Imports from non-EU countries were primarily from EFTA countries and other neighbouring countries. EU imports of particle board were primarily from Belarus, Ukraine, Switzerland, the Russian Federation and Norway (in descending order, by volume) (European Panel Federation, 2017).

Fibreboard. European imports of fibreboard increased by 4.4% in 2016, to 9.4 million m³. Germany remained the main importer, followed by France and the UK. When combined, these three countries accounted for more than 30% of



Source, APA, 2017.

imports. According to the European Panel Federation (2017) and Eurostat (2017), European MDF imports from non-EU countries in 2016 came mainly from Belarus, Switzerland, the Russian Federation, China, Ukraine and Norway (in descending order, by volume).

OSB. Imports of OSB increased significantly (+8%) in 2016, reaching 3.1 million m³. European Panel Federation member countries indicated that imports from the Russian Federation were a particular source of concern for European manufacturers in 2016 because the devalued rouble increased the competitiveness of Russian producers (European Panel Federation, 2017). EU imports of OSB in 2016 came mainly from Belarus, the Russian Federation, Ukraine, the US and China (in descending order, by volume) (COMTRADE, 2017).

Plywood. The value of non-EU plywood imports decreased by 5% in 2016, from €1.47 million in 2015 to €1.39 million in 2016. This decrease in value should not be confused with volume (which increased by 4.9% in 2016, to 7.9 million m³): value declined due to lower sales prices for both coniferous and hardwood plywood. Three countries – Brazil, China and the Russian Federation – accounted for 75% of European plywood imports (European Panel Federation, 2017).

Just over 1 million m³ of tropical plywood was imported into Europe in 2016. Two-thirds of this came from China. Indonesia and Malaysia each accounted for 11%; and the remainder came from Gabon, Uruguay, Morocco and other countries (European Panel Federation, 2017).

7.2.3.2 Exports

Particle board. Total European particle board exports (including country-to-country within the subregion) increased by 9.1% in 2016, to 13.9 million m³. Exports from Romania increased dramatically (by 71.3%), to 2 million m³, making Romania the largest exporter in 2016 (it was fourth-largest in 2015). Austria was the second-largest exporter of particle board in 2016, at 1.9 million m³ (up by 3.6%), followed by Germany at 1.7 million m³ (down by 0.7%) and France at 1.6 million m³ (down by 4.7%). The Czech Republic, Belgium, Spain, Turkey and Slovakia (in descending order, by quantity) were also major particle board exporters in 2016, with exports exceeding 500,000 m³ (UNECE/FAO, 2017).

An increasing share (4%) of all particle board was exported outside the EU region in 2016, with non-EU sales growing by 1%. China and Japan were the main destinations for particle board exports outside the subregion in 2016. Total particle board exports are expected to increase by 0.7% in 2017 (European Panel Federation, 2017).

Fibreboard. Exports of MDF rose by 5% in the EU in 2016, but non-EU MDF sales were flat. MDF exports went primarily to Africa (up by 1% compared with 2015) and to America and Oceania (up by 28% for the two combined) (European Panel Federation, 2017).

The main non-EU destinations for EU MDF exports in 2016 were in descending order by quantity, Tunisia, the US, Norway, Turkey and Canada (European Panel Federation, 2017).

According to Eurostat data, the top five non-EU destinations of EU wet-process hardboard and softboard exports in 2016 were (in descending order by quantity) Canada, Turkey, Switzerland, the Russian Federation and Ukraine (European Panel Federation, 2017).

OSB. Most European OSB is traded within Europe and with EFTA countries, but there is some non-European trade. Following a gain of 19% in 2015, exports from European Panel Federation member countries to the Far East (the main non-European destination for OSB exports) increased significantly (+44%) again in 2016. Exports also increased to the Middle East, North America and Africa (European Panel Federation, 2017).

According to Eurostat, the top five non-EU destinations for EU OSB exports in 2016 were Turkey, China, Switzerland, Japan and Norway (in descending order, by volume).

Plywood. Finland was by far the largest European plywood exporter in 2016, with a 20% share of the total. Exports of hardwood plywood accounted for 73% of the European total, largely from Finland and Latvia. Exports of coniferous plywood comprised 16% of the total, followed by tropical plywood (11%) (European Panel Federation, 2017). The US was the largest export destination for EU plywood in 2016, followed by Norway, Turkey, the Republic of Korea and Switzerland (in descending order, by volume) (European Panel Federation, 2017).



Source: APA, 2017.

7.3 Commonwealth of Independent States, with a focus on the Russian Federation

The wood-based panels industry in the CIS is changing. Companies have found new markets both within the CIS subregion and in non-CIS countries, and they have developed new specialized panel products. In response to a decline in construction activity and furniture production, manufacturers of OSB and MDF/HDF have transitioned through a phase of import substitution and are becoming more export-oriented by selling competitive products, both in the CIS market and to nearby European countries.

After the historic peak of the Russian rouble/US dollar exchange rate (83 roubles to the dollar) in January 2016, the rate had declined to 56 roubles to the dollar by the end of May 2017. Despite the stronger rouble, net sales of Russian OSB, MDF/HDF and wet-process fibreboard were steady in 2016. Companies obtained earnings growth rates of 12% by increasing their sales volumes.

Investments in capital stock of Russian wood-based panel enterprises continue to grow, although the rate of growth decreased in 2016 (to 7.6% in 2015/2016, compared with 24.2% in 2014/2015). Particularly high levels of investment were observed in the Smolensk region (more than 10 billion roubles), where GC Rusky Laminat and Egger are implementing investment projects. The overall investment in the wood-based panels industry reached 35.6 billion roubles in 2016 (24.2% higher than in 2015), including 9.7 billion roubles in the plywood industry (an increase of 55.1% over 2015) (WhatWood, 2017).

Belarus is becoming a more important player in the wood-based panels industry in the CIS following a plant modernization programme implemented over the period 2006-2016. Higher-quality Belarusian panels are replacing panel products imported from Europe (Bellesbumprom, 2017). Foreign investors are actively investing in the wood-based panels industry in Belarus. Kronospan invested more than \$870 million in Belarusian wood-processing projects between 2012 and 2016. These facilities representing more than 20% of total wood-processing production volumes in Belarus and 25% of Belarusian wood-based panel exports. Kronospan has announced plans to invest an additional \$50 million-\$200 million in Belarus in the next 12-18 months (Belta, 2017).

7.3.1 Consumption

Apparent consumption of wood-based panels in the CIS subregion decreased slightly (by 0.6%) in 2016, to 17.5 million m³ (table 7.3.1). The consumption of plywood

decreased by 4.3%, to 1.8 million m³, and the consumption of particle board fell by 3.3%, to 9 million m³. In contrast, OSB consumption increased by 21.7%, to 1.78 million m³, while fibreboard consumption fell by 0.4%, to 4.4 million m³. Russian consumption of wood-based panels declined by 3.3% in 2016, to 10.8 million m³. The domestic consumption of plywood and particle board declined, but the consumption of MDF/HDF and OSB increased.

TABLE 7.3.1

Wood-based panel balance, CIS, 2015-2017

(thousand m³)

	2015	2016	2017f	Change (%) 2015-2016
Production	19,444	21,072	21,607	8.4
Imports	4,826	4,945	4,884	2.5
Exports	6,708	8,565	8,986	27.7
Apparent consumption	17,561	17,452	17,506	-0.6

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017.

7.3.2 Production and capacity utilization

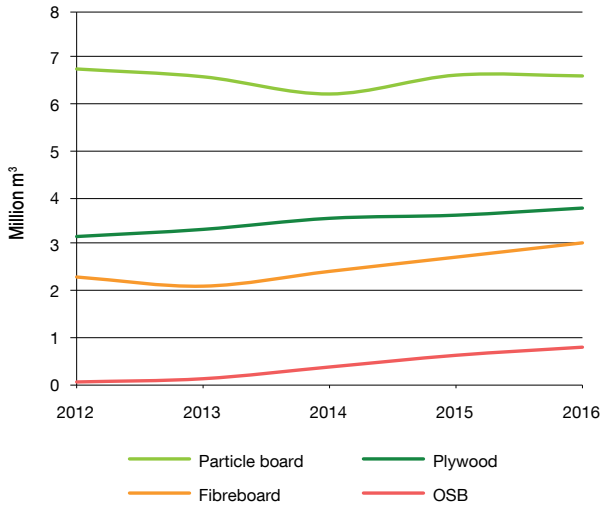
The production of wood-based panels in the CIS increased by 8.4% in 2016, to 21.1 million m³. There was a 5.3% increase in the Russian Federation, bringing production there to 15 million m³.

Plywood. Plywood production increased by 3.8% in the CIS in 2016, to 4.2 million m³. The Russian Federation produced 3.8 million m³, an increase of 4.2% over 2015 (graph 7.3.1; table 7.3.2). In late 2016, new investors restarted the Krasfan facility, a large softwood plywood mill in the Krasnoyarsk region (the former Yeniseysky FK mill). The current plywood production capacity of the plant is 100,000 m³, and there are plans to increase this to 200,000 m³ by 2021.

Particle board. Particle board production increased by 5.4% in the CIS in 2016, to 10.2 million m³. Production by Russian particle board manufacturers was almost flat in 2016, with a slight decrease of 0.3% to 6.6 million m³ (graph 7.3.1; table 7.3.2). The Kronospan Ufa facility reached full production (500,000 m³) in 2016. However, older particle board are becoming increasingly un-competitive. Their high production costs have led many older mills to reduce production or to close. In 2016, there was a reduction in production output and the closure of some enterprises. In 2016 (and continuing into 2017), there were production problems at Chaadaevsky Zavod DP (in the Penza region), Vokhtozhsky DOK (in the

GRAPH 7.3.1

Wood-based panel production in the Russian Federation, 2012-2016



Source: UNECE/FAO, 2017.

Vologda region), Ust-Ilimsky DZ (in the Irkutsk region), and DOK Krasny Oktyabr (in the Tyumen region).

OSB. Apparent OSB consumption in the CIS subregion was 1.5 million m³ in 2016, up by 32% from 2015. The OSB market in the CIS continues to grow, and the subregion's production capacity is expanding. The first small-scale OSB production facility – TOO Melissa (Ust-Kamenogorsk) – was launched in Kazakhstan in 2016, with an annual capacity of 30,000 m³. The STOD company launched the largest Russian OSB mill, Talion Arbor (in Torzhok in the Tver region) in 2016, with an annual production capacity of 500,000 m³. New Russian and Belarusian OSB capacities, and the unfavourable rouble exchange rate, has reduced the competitiveness of imported OSB. The volume of OSB imported from non-CIS countries (not including Belarus) fell by 80% (year-on-year) in 2015, to just 107,000 m³, followed by a further decline to 48,000 m³ in 2016. Canadian suppliers had largely withdrawn from the market by the second half of 2015.

Fibreboard. The production of fibreboard increased by 12.2% in the CIS subregion in 2016, to 4 million m³. Production in the Russian Federation grew by 11.4%, to 3.03 million m³ (table 7.3.2). Most (about 83%) fibreboard production is MDF/HDF.

The majority (63%) of MDF/HDF production in the Russian Federation is controlled by foreign companies such as Kastamonu, Kronostar, Kronospan, Egger and Roskitinvest. In April 2016, Egger launched a new MDF production line with a production capacity of 350,000 m³ (with the potential to increase to 600,000 m³ in the future) in the Smolensk region. Test production of a new MDF plant in the Tomsk region (Roskitinvest) began in 2016; the production capacity of this

mill will be 200,000 m³ when brought online in 2017. The Russky Laminat group commenced the reconstruction and expansion of its Igorevsky DOK mills (in the Smolensk region) in 2009. The company is installing a Siempelkamp MDF line with an annual production capacity of 396,000 m³, which is expected to open in 2017. It is part of a broader investment project that led to the launch of a new board laminating line in the fall of 2015.

TABLE 7.3.2

Wood-based panel production, Russian Federation, 2013-2016 (thousand m³)

	2013	2014	2015	2016	Change (%) 2015-2016
Plywood	3,303	3,540	3,607	3,759	4.2
Particle board	6,555	6,183	6,591	6,573	-0.3
Fibreboard	2,092	2,413	2,722	3,032	11.4
OSB	101	360	618	797	29.0

Source: UNECE/FAO, 2017.

7.3.3 Prices

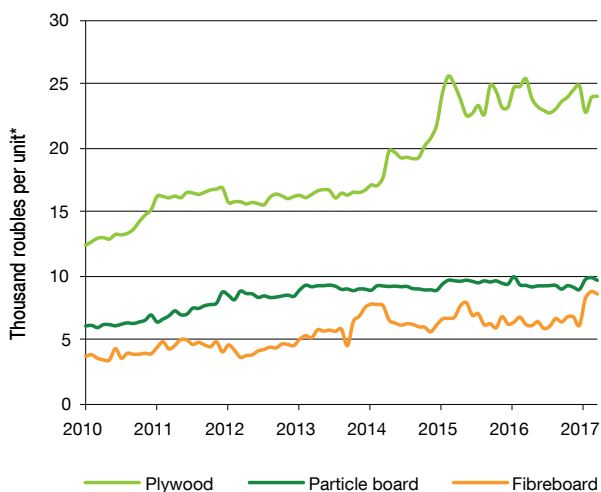
Plywood. Russian producer prices for plywood (averaged across all regions) were stable in 2016, at 24,015 roubles per m³ (up by 0.8% over 2015). Export prices dropped by 4%, to 26,134 roubles per m³, and domestic prices increased by 4.1%, to 21,098 roubles per m³ (graph 7.3.2). The largest decline in export price was in the Ural Federal District, where it fell by 16.3%, to 22,178 roubles per m³; the price in the domestic market rose by 9.1%, to 26,935 roubles per m³. Average plywood prices in both the domestic and export markets declined in the first three months of 2017.

Particle board. Prices for Russian particle board displayed little volatility in 2016 while following a slight downward trend. Strong competition and high production costs, especially for firms with older production lines, put pressure on manufacturers. The average price of particle board in the Russian Federation fell by 3.1% in 2016, to 9,305 roubles per m³. The average price in the domestic market was 9,418 roubles per m³ (down by 3.3% compared with 2015), and the average price for exported particle board (primarily shipped to CIS countries and exchanged in roubles) decreased by 4.3%, to 7,716 roubles per m³.

Fibreboard. The average price of fibreboard in the Russian Federation declined by 3.1% in 2016, to 63.4 roubles per m² (graph 7.3.2). The average export price rose by 2.2%, to 68.4 roubles per m², and the average price in the domestic market fell by 6.5%, to 62.8 roubles per m².

GRAPH 7.3.2

Monthly prices for wood-based panels, Russian Federation, 2010-2017



Notes: Sales for exports and domestic markets. * Russian wood-based panel prices (roubles per m³, except fibreboard, which is in roubles per 100 m²).

Source: Rosstat, 2017.

7.3.4 Trade

7.3.4.1 Imports

Plywood. The volume of plywood imported into the CIS decreased by 12.1% in 2016, to 474,000 m³; imports into the Russian Federation increased by 17.4% but were still very low compared with imports in 2012-2014 (graph 7.3.3).

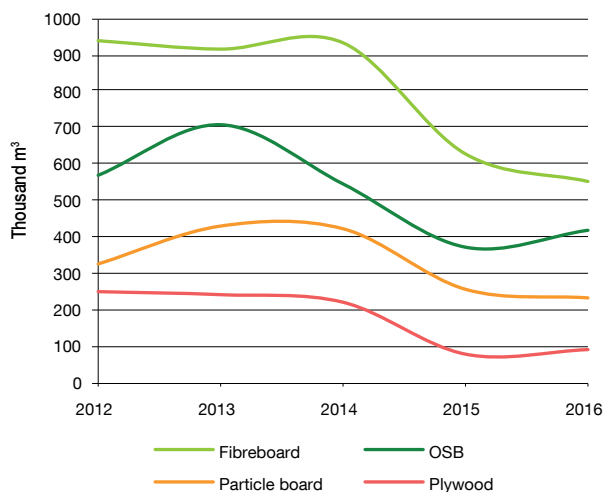
OSB. CIS imports of OSB started to grow in 2016, reaching 697,000 m³ (up by 7.9%), mainly comprising trade between CIS countries. The OSB market in the CIS is localizing and has become almost entirely self-sufficient. Europe and North America are no longer significant sources of supply.

Particle board. CIS imports of particle board increased by 2.4% in 2016, to 1.9 million m³. Imports into the Russian Federation fell by 9.5%, to 229,000 m³ (graph 7.3.3). About 88% of all particle board imports into the Russian Federation in 2016 were from Belarus, Poland and Germany (in descending order by volume).

Fibreboard. CIS fibreboard imports decreased by 2.4% in 2016, to 1.9 million m³. Imports into the Russian Federation fell by 12%, to 550,000 m³. Belarus, China, Germany and Poland were the largest suppliers of fibreboard to the Russian Federation, with a combined share of approximately 70%.

GRAPH 7.3.3

Fibreboard, OSB, particle board and plywood imports, Russian Federation, 2012-2016



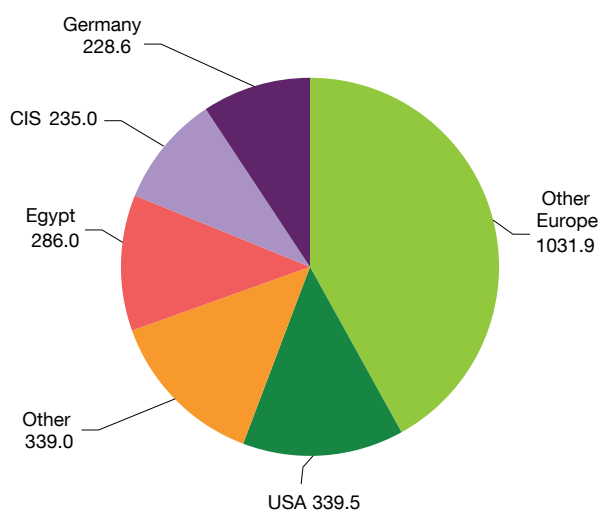
Source: UNECE/FAO, 2017.

7.3.4.2 Exports

Plywood. CIS plywood exports were up by 11.4% in 2016, to just over 2.8 million m³. Exports by the Russian plywood industry, which is traditionally export-oriented, reached almost 2.5 million m³ (up by 11.4% over 2015), with a value of \$945 million (graphs 7.3.4 and 7.3.5).

GRAPH 7.3.4

Plywood exports from the Russian Federation, 2016 (thousand m³)

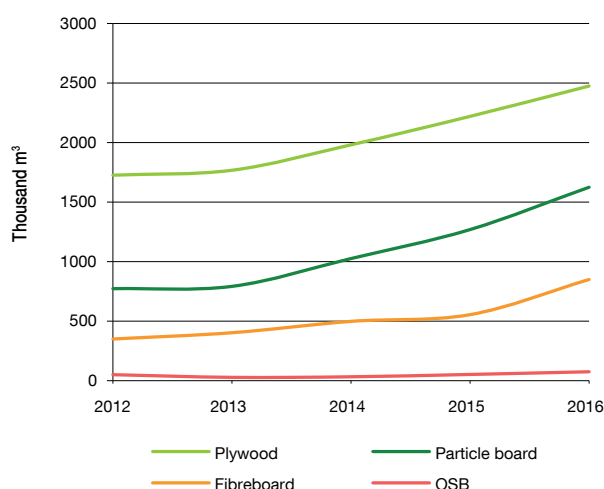


Note: The total volume of plywood exports from the Russian Federation in 2016 was 2.46 million m³.

Source: WhatWood, 2017.

GRAPH 7.3.5

Fibreboard, OSB, particle board and plywood exports, Russian Federation, 2012-2016



Source: UNECE/FAO, 2017.

Exports to the US increased by 14% in 2016, to 340,000 m³, making the US the largest purchaser of Russian plywood (comprising 100% birch plywood). Egypt and Germany ranked second and third, with imports of 286,000 m³ and 229,000 m³, respectively, in 2016 (graph 7.3.4; WhatWood, 2017).

Particle board. CIS exports of particle board increased by 39.4% in 2016, to 3.1 million m³. Russian exports grew by 28.1%, to 1.6 million m³, the majority (57%) of which went to Kazakhstan and Uzbekistan.

Fibreboard. Fibreboard exports from the CIS increased by 42% in 2016, to 1.5 million m³. Russian exports totalled 849,000 m³, up by 56.8% over 2015; the major markets were Uzbekistan (210,000 m³), Kazakhstan (131,000 m³) and Romania (113,200 m³).

OSB. The CIS exported 463,000 m³ of OSB in 2016 (+30.5%). Belarus is by far the biggest exporter of OSB in the subregion, accounting for an estimated 380,000 m³ in 2016 (up by 26.7% over 2015). Russian OSB manufacturers began to have an impact in European markets in 2016, with production volumes and product quality increasing. The total Russian export volume in 2016 was 68,000 m³. The primary markets supplied were: Kazakhstan (38,800 m³), Ukraine (5,700 m³), the UK (4,000 m³), Kyrgyzstan (3,200 m³) and Sweden (2,900 m³).

7.4 North America

7.4.1 Consumption

GDP growth picked up slightly in Canada in 2016, to 1.3% (up from 1.1% in 2015), and housing starts increased by 1.3%,

from 196,000 units in 2015 to 198,000 in 2016. The growth in GDP in the US slowed to 1.6% in 2016 (from 2.5% in 2015), but housing starts increased by 5.6%, to 1.17 million units. Apparent consumption of wood-based panels in North America increased by a robust 3.4% in 2016, led largely by strong growth in both exports and imports (up by 10.9% and 9.5%, respectively); total wood-based panel production in North America increased by 3.0% in 2016, to 48.1 million m³ (table 7.4.1).

TABLE 7.4.1

Wood-based panel balance, North America, 2015-2017 (thousand m³)

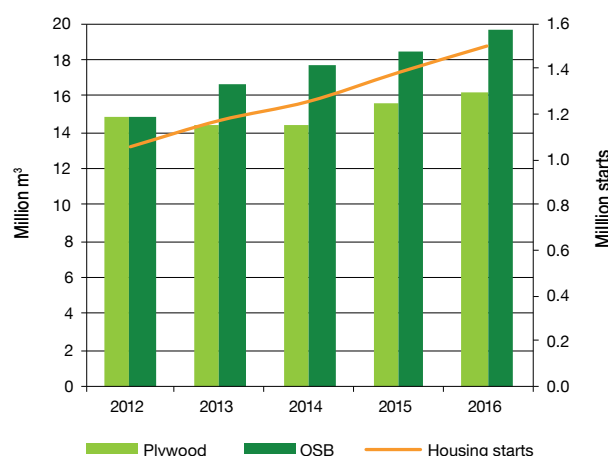
	2015	2016	2017 ^f	Change (%) 2015-2016
Production	46,751	48,145	47,837	3.0
Imports	14,864	16,271	16,627	9.5
Exports	9,605	10,648	10,784	10.9
Apparent consumption	52,010	53,768	53,681	3.4

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017.

GRAPH 7.4.1

Structural panel consumption and housing starts, North America, 2012-2016

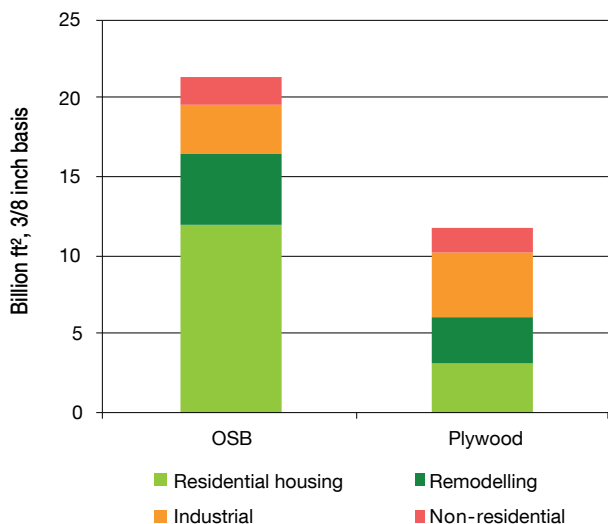


Sources: UNECE/FAO, 2017; APA, 2017.

The consumption of structural wood-based panels in North America increased by 5.1% in 2016 (graph 7.4.1), with demand for OSB and plywood increasing by 6.4% and 3.9%, respectively. Consumption increased across all four of the major end-use markets for structural panels – by 7.5% in the residential construction market, by 4.6% in the remodelling

GRAPH 7.4.2

Four main end-use markets for structural panels, North America, 2016



Note: Residential, non-residential and industrial are new construction.

Source: APA, 2017.

market, by 0.9% in the industrial market, and by 5.4% in the non-residential market (graph 7.4.2) (APA, 2017).

The largest market for OSB in 2016 was residential construction, which consumed 45.7% of total production. The strongest growth in demand for OSB was also in the residential housing sector, with an increase of 7.3% in 2016. Demand for OSB increased by 5.8% in the remodelling market and by 5.8% in the non-residential sector, but declined by 1.1% in the industrial market. The largest market for plywood in 2016 was in the industrial sector, which consumed 35.1% of total plywood production. Plywood demand grew in all the major markets – industrial (up by 2.4%), non-residential (+4.9%), residential housing (+8.2%) and repair and remodelling (+2.7%). North American demand for structural panels is expected to slow by 3.4% in 2017, with demand projected to grow by 4.3% for OSB and by 1.9% for plywood (APA, 2017). The total consumption of wood-based panels in North America is projected to increase by 3.4% in 2017 (UNECE/FAO, 2017).

North American consumption of non-structural panels (i.e. particle board and fibreboard) was stable in 2016. With North American housing starts projected to increase modestly in 2017, the production of non-structural wood-based panels is expected to pick up slightly (Composite Panel Association, 2017a, 2017b).

7.4.2 Production and capacity utilization

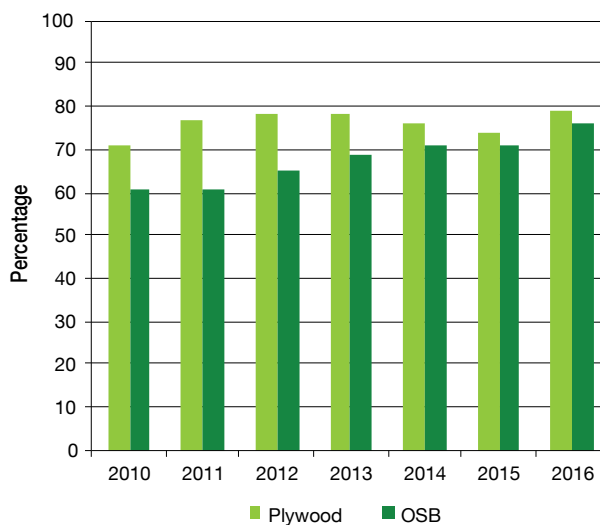
Production capacity in the North American structural panel subsector fell slightly in 2016, to 37.6 million m³, due largely to the closure of two plywood mills in the US. Capacity

utilization in the North American structural panel industry increased from 72% in 2015 to 77% in 2016, and is expected to increase to 78% in 2017. Capacity utilization in the plywood subsector increased from 74% in 2015 to 79% (77% in the US and 90% in Canada) in 2016. Capacity utilization in the OSB subsector was up substantially in North America in 2016, at 76% (graph 7.4.3), increasing from 74% to 77% in the US and from 66% to 73% in Canada.

North American production capacity for non-structural panels was up by 3.3% in 2016, to approximately 8.4 billion square feet (3/4 inch basis) (14.9 million m³) (Composite Panel Association, 2017b), with most of the increase occurring in Canada. The capacity utilization rate fell in the particle board subsector from 71.9% in 2015 to 68.6% in 2016, but it increased in the MDF subsector, from 81.0% in 2015 to 81.4% in 2016. Overall, 2016 capacity utilization rates were well below levels before the 2008-2009 global financial crisis (Composite Panel Association, 2017a, 2017b).

GRAPH 7.4.3

Plywood and OSB capacity utilization rates, North America, 2010-2016



Source: APA, 2017.



Source: UNECE/FAO, 2017.



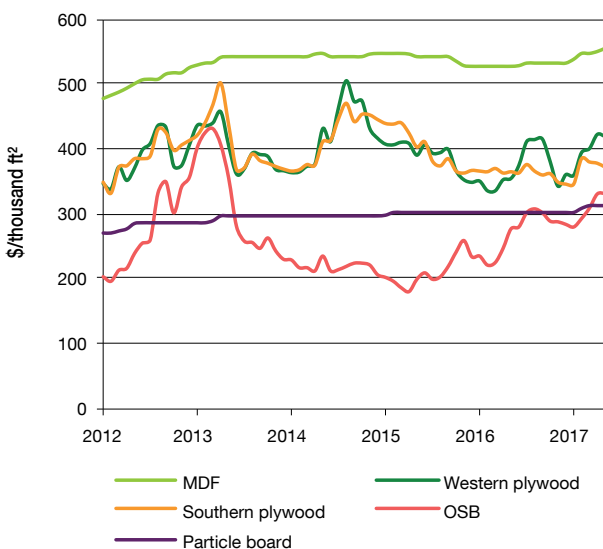
Source: UNECE/FAO, 2017.

7.4.3 Prices

The increased demand for structural wood-based panels in North America helped drive a substantial increase in capacity utilization rates for both OSB and plywood in 2016. Not surprisingly, the increase in demand helped firm-up product prices and contributed to price increases, particularly towards the end of 2016 and into the first quarter of 2017 (graph 7.4.4).

GRAPH 7.4.4

Wood-based panel prices, North America, 2012-2017



Notes: Western plywood (Coast), ½ inch, CD exterior, (3-ply); OSB (North Central), 7/16 inch; MDF (East) 5/8 inch; particle board (West) 5/8 inch industrial.

Source: Random Lengths, 2017.

OSB prices showed strong price growth throughout the year, increasing by 42% between January 2016 and May 2017. Similarly, plywood prices were up by 20% between January 2016 and May 2017. Of the non-structural panels, prices for both particle board and MDF were essentially unchanged throughout 2016, although both showed increases towards the end of the year. Overall, MDF prices increased by 5.3% between January 2016 and May 2017, and particle board prices rose by 3.3% (Random Lengths, 2017).

TABLE 7.4.2

Value of wood-based panel imports, North America, 2013-2016 (\$ million)

	2013	2014	2015	2016	Change (%) 2015-2016
US					
Plywood	2,072	2,314	2,681	2,774	3.4
Fibreboard	971	1,081	1,138	1,178	3.6
OSB	1,102	936	948	1,236	30.4
Particle board	251	289	289	321	11
US total	4,396	4,620	5,056	5,509	9
CANADA					
Plywood	370	354	334	329	-1.4
Fibreboard	439	454	411	430	4.7
OSB	39	36	28	29	1.3
Particle board	57	67	66	65	-1.5
Canada total	905	911	839	853	1.7
NORTH AMERICA					
Plywood	2,442	2,668	3,015	3,103	2.9
Fibreboard	1,411	1,535	1,548	1,609	3.9
OSB	1,141	972	976	1,265	29.6
Particle board	308	356	355	386	8.7
Total	5,301	5,531	5,895	6,362	7.9

Note: Does not include veneer sheets.

Source: UNECE/FAO, 2017.

7.4.4 Trade

7.4.4.1 Imports

The value of North American imports of wood-based panels increased by 7.9% in 2016, to \$6.4 billion (table 7.4.2). Imports by the US grew strongly (by 9.0%) and Canadian imports grew slowly (by 1.7%). Plywood had the largest share of imports to North America (49% of the total value of wood-based panel imports), followed by fibreboard (25%), OSB (20%) and particle board (6%). North American imports increased in 2016 for all four categories of wood-based panels.

Two import flows of wood-based panels to North America are of particular interest because of their overall size and structure. One is China's domination of plywood imports to the US, with a 50% share in 2016, followed by Canada (11%), Indonesia (8%) and Brazil (6%). The other is Canada's role as the almost exclusive source of OSB imports to the US; that country accounted for 99.8% of the \$1.2 billion worth of US OSB imports in 2016.

In late 2016, the Coalition for Fair Trade of Hardwood Plywood filed a petition with the US International Trade Administration, accusing Chinese hardwood plywood manufacturers of below-market pricing. As a result, the US International Trade Administration announced preliminary duties, as high as 111%, for 61 Chinese manufacturers of hardwood plywood products. These preliminary duties have been in effect since April 2017 (Russell, 2017).

7.4.4.2 Exports

The value of exports of wood-based panels from North America broke a two-year slide in 2016, growing by a strong 11.3%, to \$2.9 billion, with Canada accounting for 76% of the total (table 7.4.3). Structural panels constituted over two-thirds (70%) of the export value of panels in 2016. The value of exports from North America (including trade between Canada and the US) increased strongly for OSB (+28.4%), was flat for particle board (0.6%), declined for plywood (-1.2%) and was unchanged for fibreboard. The largest markets for US plywood exports in 2016 were Canada (40.5% by value), China (14.9%), Mexico (14.6%) and Australia (11%). Canada (74% by value) and Mexico (16%) were the main markets for US fibreboard, and the main markets for US particle board were Canada (57% by value) and Mexico (31%). Canadian wood-based panel exports went almost exclusively to the US – including 92% (by value) of plywood, 96% of fibreboard, 95% of particle board and 94% of OSB exports.

7.5 Extraregional influences affecting the UNECE region

Japan continues to be the major market for plywood outside the UNECE region (table 7.5.1). Tropical plywood accounted for more than 65% of Japan's total plywood imports in 2016. It is estimated that 53% of tropical plywood imports were sourced from Malaysia, 44% came from Indonesia, and the remainder was mainly from China and from Viet Nam.

Although the volume of domestically produced tropical plywood has declined in recent times, and Japan's housing starts improved slightly in 2015 and 2016, tropical hardwood imports plunged in 2015 and remained relatively low in 2016. A major trend in the Japanese plywood market has been an increase in the use of plywood manufactured from domestic

TABLE 7.4.3

Value of wood-based panel exports, North America, 2013-2016 (\$ million)

	2013	2014	2015	2016	Change (%) 2015-2016
US					
Plywood	410	385	346	344	-0.5
Fibreboard	264	246	219	213	-2.7
OSB	90	79	64	65	1.0
Particle board	99	116	110	97	-12.3
US total	863	826	739	719	-2.8
CANADA					
Plywood	214	243	348	341	-1.9
Fibreboard	234	263	291	296	2.0
OSB	1,237	1,039	1,010	1,314	30.1
Particle board	230	258	257	272	6.1
Canada total	1,915	1,803	1,905	2,224	16.7
NORTH AMERICA					
Plywood	624	628	693	685	-1.2
Fibreboard	498	510	510	510	0.0
OSB	1,326	1,118	1,074	1,379	28.4
Particle board	330	373	367	369	0.6
Total	2,778	2,629	2,644	2,943	11.3

Note: Does not include veneer sheets.

Source: UNECE/FAO, 2017.

species which has resulted in a corresponding decline in the use of imported tropical plywood.

With strong competition among flooring manufacturers in Japan, a strengthening yen in early 2016 narrowed the price differential between imported tropical plywood and domestic softwood plywood manufacturers, pushing up demand for the former. In late 2016, however, the composite flooring market had reportedly shifted from predominantly Indonesian plywood to the use of domestic cedar plywood in the construction of floor bases. The reasons for this included the relatively high prices of South Sea plywood; the risk of exchange-rate fluctuations, which affect imported plywood but not Japanese plywood manufactured from domestic raw materials; technical improvements in domestic floor bases, which can now be used in heated floors; government incentives for the use of domestic raw materials; and consumer concerns about the environmental consequences of using tropical hardwoods (ITTO, 2017a).

Log shortages and higher manufacturing costs in Indonesia and Malaysia have put upward pressure on tropical plywood prices, although major Sarawakian producers curtailed

production in 2016 until prices recovered in Japan. With weak domestic demand in Japan in 2016, the gap between the export prices of suppliers and depressed Japanese domestic market prices also limited the commitment of Japanese buyers to future purchasing. Despite steady housing starts and low inventories of imported plywood in 2016, tropical plywood demand did not increase and prices remained depressed. Exchange rates have had a major effect on demand and prices for imported plywood: the yen appreciated in the first part of 2016, increasing import demand, but depreciated in the last quarter of the year. Demand had slowed by early 2017 because of importer concerns about exchange-rate fluctuations caused by uncertainties around US policies. Although plywood demand is expected to increase in response to investment in infrastructure for the Olympic Games in 2020 in Japan, this will be constrained by a declining population as well as by continued substitution by domestic plywood as Japan targets 51% self-sufficiency in roundwood supply by 2025.

The Republic of Korea's tropical plywood imports continued to grow strongly in 2016, reaching 780,000 m³, with most of the supply coming from Viet Nam, Malaysia, Indonesia and China (in descending order, by volume). Tropical plywood imports were assisted by the appreciation of the Korean won in 2015 and 2016. The domestic housing market grew 41% in value in 2015, stimulated by government interventions, including reductions in the housing sales tax, the property transfer tax and mortgage rates. The building boom has been fuelled partly by large construction companies looking to offset a plunge in orders from overseas, particularly the Middle East. Government concerns about a resultant oversupply of houses and mounting household debt led to measures to rein in the latter, which is expected to dampen housing and plywood demand in 2017.

Indonesia and Malaysia were the largest tropical plywood exporters in 2016, although Malaysia's exports stayed low in 2016 after a significant (19%) drop in 2015, to 2.5 million m³. The decline was in response to the limited availability of raw material (peeler log) inputs to plywood mills and depressed demand and prices in Japan, the major market. Demand for Malaysian plywood logs in India increased in response to a log export ban in Myanmar in 2014, which decreased the log supply for Malaysian plywood mills and pushed up domestic log prices. Japan was the major destination for Malaysia's tropical plywood exports in 2015 and 2016, with significant volumes also shipped to the Republic of Korea, Taiwan Province of China, the US and the UK. In contrast to Indonesia, which mainly supplies Japan with floor-base plywood, Malaysia's exports are predominantly concrete formwork panels, a commodity item with many layers in the distribution channel and relatively unsteady demand. A recovery in Japan's demand for concrete formwork panels was expected in 2017 in response to construction activities

associated with the Olympic Games in 2020. Production curtailment in Sarawakian mills in 2016 and chronic log-supply shortages, however, are expected to restrict the ability of Malaysian exporters to increase its supply when demand recovers in Japan. Rising manufacturing costs have also been putting upward pressure on Malaysian plywood prices. Labour shortages in the plywood mills have been attributed to a rise in demand for workers in the growing palm-oil industry and an outflow of workers to Indonesia, pushing up wages in Sarawak to secure labour.

Although Indonesia's tropical plywood exports have plunged from highs of around 10 million m³ in the early 1990s, exports have risen slowly from a low in 2009, reaching 2.3 million m³ in 2015 and 2.6 million m³ in 2016, when Indonesia replaced Malaysia as the largest tropical plywood exporter. Indonesian exports went mainly to Japan (28%), the US (15%), the Republic of Korea (12%) and Malaysia (9%), with the remainder going to Taiwan Province of China and many EU destinations. In EU markets, Indonesian exporters are now supplying FLEGT-licensed plywood. This is expected to provide Indonesian exporters with a competitive advantage because EU importers are not required to conform to the due-diligence requirements mandated in the EU Timber Regulation. Indonesia's plywood production is also increasingly being diverted to the domestic market because the local furniture industry is growing significantly.

TABLE 7.5.1

Major importers and exporters of tropical plywood outside the UNECE region, by volume, 2014-2016
(thousand m³)

	2014	2015	2016	Change (%) 2015-2016
MAJOR IMPORTERS				
Japan	1,803	1,511	1,651	9.3
Republic of Korea	604	608	780	28.3
Taiwan Province of China	452	377	290	-23.1
Malaysia	238	291	291	0.0
Mexico	113	116	143	23.3
MAJOR EXPORTERS				
Indonesia	2,318	2,338	2,556	9.3
Malaysia	3,115	2,530	2,506	-0.9
China	431	491	606	23.4
Viet Nam	210	200	204	2.0

Source: ITTO, 2017b; COMTRADE, 2017.

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A large roll of white paper is being processed in a factory. The roll is mounted on a yellow frame and is being unwound. The paper is being fed into a machine with a large metal roller. The background shows other industrial equipment and a worker in a green shirt.

Chapter 8

PAPER, PAPERBOARD AND WOODPULP

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UPM Label

Highlights

Paper and paperboard production rose in Europe and the CIS in 2016 but fell in North America. Capacity closures continued, mainly in the graphic-paper segment.

Woodpulp production **rose across the UNECE region in 2016 due to stronger apparent consumption in the packaging**, sanitary and household segments and to increased exports. The year was characterized overall by fewer closures and shorter maintenance periods, following major bouts of capacity rationalization and industry-wide restructuring.

Graphic-paper capacity in the UNECE region fell by 1.5 million tonnes in 2016 and is expected to decline by another 2.0 million tonnes in 2017. Production also fell, by 1.9 million tonnes (-3.1%).

The decline in graphic-paper prices slowed or stopped in 2016 following years of capacity rationalization, but increases failed to materialize. Exports and apparent consumption weakened throughout the UNECE region as a result of the **continued growth in use of electronic communication, including increased internet use**.

In North America, **the apparent consumption of newsprint fell by 2.9% in 2016**. Production declined by 6.3% (4.8 million tonnes).

The production and apparent consumption of sanitary and household paper increased in Europe, the CIS and North America in 2016.

The production of packaging paper rose in Europe and the CIS in 2016, aided by stronger apparent consumption and higher exports, **but it fell in North America** due to capacity rationalization, increased paper imports and a reduction in exports.

A series of large expansions were made to hardwood kraft pulp capacity. This caused supply to exceed demand and prices to trend lower in mid-2016. Over the same period, **prices also trended lower** for softwood kraft grades due to a stronger US dollar and the closures of graphic-paper machines. **Prices for both hardwood and softwood kraft pulps recovered thereafter**, however, due to stronger Chinese imports and unplanned production outages.

Prices for recovered paper have been increasing due to increased demand and tighter scrutiny by Chinese customs agents to prevent contaminants from entering China. The European recovery rate is estimated to reach **74% by 2020**, up from **71-72% in 2014-2016**.

South American chemical market pulp expansions – leading to stronger exports – **continued in 2016**. Strong pulp demand for tissue production helped absorb increased production of hardwood kraft pulp. Global tissue capacity **increased by 12 million tonnes** from 2010 to 2016.

8.1 Introduction

The global pulp, paper and paperboard industry continued to suffer from excess capacity and low prices in most grades in 2016. Asian economies experienced weak export demand, which had a negative impact on demand for packaging paper, particularly in China, and ongoing trade sanctions against Asian paper exporters further reduced growth opportunities. Despite years of paper-machine closures, the printing-and-writing segment continued to suffer from declining demand, the result of ongoing growth in the use of electronic communication. Although pulp shipments continued to grow, prices suffered due to major low-cost expansions. Prices in the pulp-and-paper sector remained weak in 2016 and during the first half of 2017. Overcapacity in the pulp segment has led to consolidation and conversions to value-added grades. Capacity rationalization in the paperboard segment has enabled companies to increase efficiencies and productivity, thereby improving their financial performance.

High-cost producers in the pulp-and-paper sector with assets primarily in North America and Europe have been forced to further remove capacity. Years of attempted turn-around strategies have been unsuccessful in the face of competitive forces, changing consumer demand and a lack of financial liquidity; nevertheless, closures, conversions and the divestiture of assets have allowed much-needed consolidation.

There was still significant overcapacity in the printing-and-writing subsector throughout the UNECE region in 2016 and the first half of 2017 as consumers continued to shift to electronic communication. As a result, the graphic-paper industry is ripe for further consolidation. More companies in the subsector, primarily in Europe and North America, converted from graphic grades to specialty packaging papers and value-added market pulp output in 2016. A select few in the US have increased their output of specialty or fluff-pulp production. Consolidation in the market-pulp subsector in 2016 and 2017 marks the beginning of a much-needed strategy to increase competitiveness, maximize efficiencies, improve distribution and sales networks and minimize costs to better compete with global trade from low-cost producers.

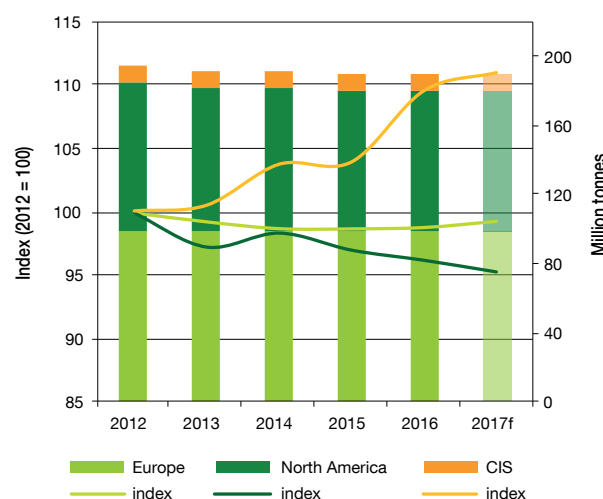
Paper and paperboard production increased in Europe and the CIS in 2016 but declined in North America (graph 8.1.1).

In the US, a stronger economic performance in 2016 led to interest rate hikes in December 2016 and March 2017. The US dollar was strong against the euro and the British pound in 2016 but lost ground in the first half of 2017 as jitters around the French and British elections and the fear of Brexit receded or were downplayed. In much of Europe, an economic recovery was elusive in 2016, despite quantitative easing and a weak euro against the US dollar, which propped

up the economy by favouring exports and caused import costs to rise. China's GDP grew by 6.7% in 2016 and a similar performance is expected in 2017 as exports and domestic consumption remain relatively weak, even with a weaker yuan against the US dollar.

GRAPH 8.1.1

Production of paper and paperboard, UNECE region, 2012-2017



Note: f = 2016 Committee on Forests and Forest Industry forecast.

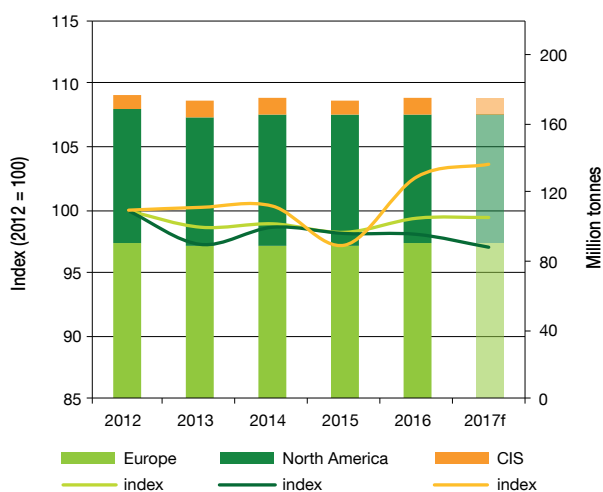
Source: UNECE/FAO, 2017.

In 2016, the capacity to produce graphic-paper in the UNECE region fell by 1.5 million tonnes. This is expected to decline by another 2.0 million tonnes in 2017. Over the same period, production fell by 1.9 million tonnes. Globally, 2.7 million tonnes of graphic-paper capacity was indefinitely or permanently removed from production in 2016. A further capacity decline of 2.5 million tonnes worldwide is expected in 2017 (Valois Vision Marketing, 2017a). Graphic-paper prices continue to be depressed, indicating a pressing need to remove inefficient capacity in key markets to further improve the industry's financial performance. On the other hand, lower raw-material prices in 2016 improved the operating profitability of most companies in the UNECE region. North American newsprint capacity was 4.7 million tonnes in mid-2017, down by 2.1 million tonnes from 2014. Graph 8.1.2 shows subregional trends in paper and paperboard consumption in 2012-2017. Paperboard machine closures in the UNECE region amounted to 669,000 tonnes in 2016, with further closures of 95,000 tonnes scheduled in 2017 following years of significant capacity rationalization. Globally, closures reached 982,000 tonnes in 2016, and another 773,000 tonnes of capacity is expected to go offline in 2017.

A state-of-the-art pulp mill capable of producing 1.3 million tonnes of softwood kraft annually, an extensive range of bioproducts and 1.8 TWh of electricity per year is expected to begin operating in Finland in the third quarter of 2017. This will be the largest and first new market pulp line to be built in the UNECE region in over 20 years. Pulp capacity continues to increase outside the UNECE region. In Brazil, a large bleached eucalyptus/softwood kraft line with a production capacity of 1.5 million tonnes started up in March 2016. Another line with a potential output of 1.95 million tonnes is expected to begin production in September 2017. In Indonesia, a single mill with two hardwood kraft pulp lines capable of producing 2.8 million tonnes per year began operating in late 2016.

GRAPH 8.1.2

Apparent consumption of paper and paperboard, UNECE region, 2012-2017



Note: f = 2016 Committee on Forests and the Forest Industry forecast.

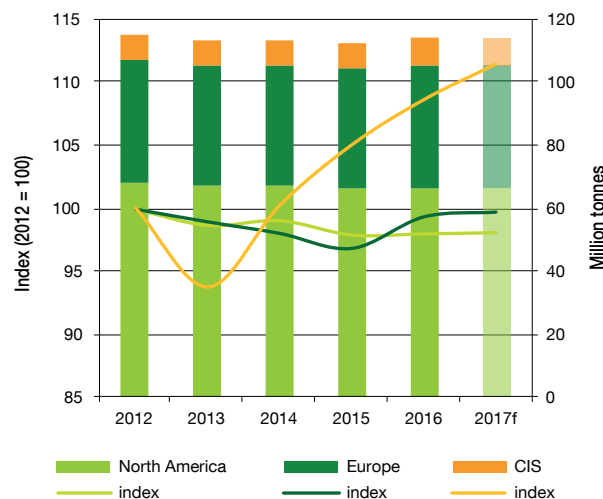
Source: UNECE/FAO, 2017.

The expansion of woodpulp production in 2012-2017 was concentrated in hardwood grades and in low-cost countries outside the UNECE region. A series of investments in the UNECE region in softwood kraft pulp production, however, will see the region's capacity grow by 1.6 million tonnes in 2017 (Valois Vision Marketing, 2017b); this is in stark contrast to the stagnation of softwood kraft capacity globally in 2013-2015 and growth of only 450,000 tonnes in 2016. Significant large-capacity expansion in the bleached hardwood kraft pulp segment – mainly bleached eucalyptus kraft in Brazil – caused prices to decline, leading to the closure or conversion of relatively high-cost capacity in the UNECE region in the five years to 2017. As a result, aggregated woodpulp production in the UNECE region trended slightly lower in 2012-2017 (production gains in the CIS were insufficient to offset the downward trends in Europe and North America) (graph 8.1.3).

Despite the closure and conversion of pulp mills in 2012-2016, pulp prices declined due to large-scale hardwood kraft capacity expansions in low-cost regions and to a slowdown in China's economy in 2015 and 2016.

GRAPH 8.1.3

Production of woodpulp, UNECE region, 2012-2017

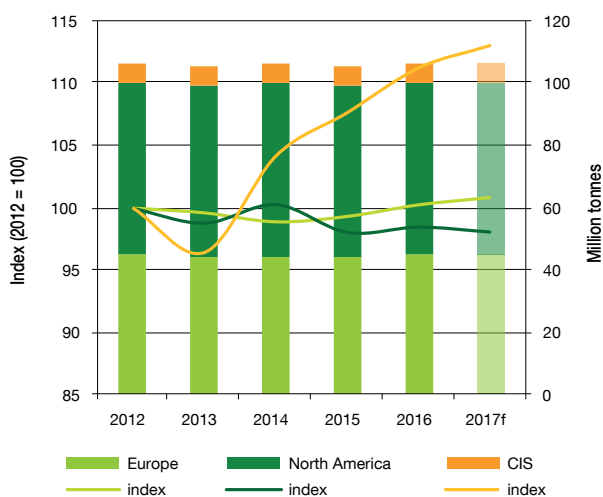


Note: f = 2016 Committee on Forests and Forest Industry forecast.

Source: UNECE/FAO, 2017.

Capacity rationalization in the pulp-and-paper subsector continued in Europe, Japan, North America and South America in 2016 and during the first half of 2017. Some newsprint and publishing-paper machines were closed or converted to packaging grades. Others were converted from wood-free paper to fluff pulp. Conversions from paper-grade pulp to dissolving pulp continued in Europe and South America, with Chinese demand remaining strong. China continues to impose import duties on dissolving pulps originating in Brazil, Canada and the US, leading to an increase in domestic prices (Valois Vision Marketing, 2017c).

Global prices for softwood and hardwood kraft pulps increased in early 2017 as unplanned downtime curtailed production in several mills and Chinese buyers reloaded their depleted stocks (Valois Vision Marketing, 2017d). Prices for market pulp fell to unprofitable and unsustainable levels in mid-2016, a result of overcapacity that manifested in 2015 following growth in new and expanded capacity and as China's economy slowed. Although printing-and-writing and newsprint prices were weak in global markets, demand for tissue and specialty paper packaging continued to increase, aided by new product development and as the standard of living of consumers increased in emerging markets. Global tissue capacity increased by 12 million tonnes between 2010 and 2016. Graph 8.1.4 shows overall trends in demand for woodpulp in the UNECE subregions in 2012-2017.

GRAPH 8.1.4
Apparent consumption of woodpulp, UNECE region, 2012-2017


Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017.

8.2 Europe

8.2.1 Paper and paperboard production

The production of paper and paperboard edged 0.1% higher in the European subregion in 2016 (table 8.2.1)¹⁴. The production of paperboard continued to grow as graphic-paper machines were converted. Following years of numerous paper-machine closures, the decline in capacity slowed as supply better-matched demand. Closures meant declines in production of 4.3% for coated wood-free papers and 3.7% for uncoated wood-free papers (table 8.2.2). The production of uncoated mechanical papers edged higher by 0.4%, while newsprint decreased by -1.6%.

TABLE 8.2.1
Paper and paperboard balance, Europe, 2015-2017
 (thousand tonnes)

	2015	2016	2017f	Change (%) 2015-2016
Production	98,085	98,200	98,717	0.1
Imports	55,859	56,239	56,311	0.7
Exports	64,780	64,161	64,694	-1.0
Apparent consumption	89,165	90,277	90,334	1.2

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017.

TABLE 8.2.2
Production and apparent consumption of paper and paperboard, Europe, 2012, 2015 and 2016 (thousand tonnes)

	Production				Apparent consumption			
	2012	2015	2016	Change (%) 2015-2016	2012	2015	2016	Change (%) 2015-2016
Graphic papers	42,024	36,958	35,586	-3.7	35,893	30,864	29,959	-2.9
Newsprint	8,792	6,911	6,804	-1.6	8,443	6,821	6,662	-2.3
Uncoated mechanical	7,355	6,104	6,129	0.4	5,870	4,590	4,512	-1.7
Uncoated wood-free	9,333	9,507	9,158	-3.7	8,701	8,595	8,631	0.4
Coated papers	16,544	14,436	13,496	-6.5	12,880	10,859	10,154	-6.5
Sanitary and household papers	7,340	7,732	7,868	1.8	7,449	7,799	7,991	2.5
Packaging materials	45,671	49,667	50,877	2.4	43,111	46,768	48,395	3.5
Case materials	26,594	28,848	29,373	1.8	26,790	29,598	30,402	2.7
Cartonboard	10,028	10,707	11,220	4.8	8,355	8,231	8,624	4.8
Wrapping papers	5,205	5,620	5,522	-1.7	4,346	4,635	4,758	2.6
Other papers, mainly packaging	3,844	4,493	4,762	6.0	3,621	4,304	4,611	7.1
Other paper and board	4,390	3,728	3,868	3.8	4,398	3,734	3,932	5.3
Total paper and paperboard	99,426	98,085	98,200	0.1	90,852	89,165	90,277	1.2

Sources: UNECE/FAO, 2017.

¹⁴ Figures for CEPI member countries (18 EU member countries plus Norway) differ slightly from those for the European subregion (39 countries, including Israel and Iceland).

The production of sanitary and household papers rose by 1.8% in the European subregion in 2016, to 7.9 million tonnes. Over the same period, the production of packaging grades increased by 2.4%, to 50.9 million tonnes, due to debottlenecking projects and conversions from newsprint to paperboard. The production of wrapping papers decreased by 1.7%, to 5.5 million tonnes. The production of case materials increased by 1.8%, to 29.4 million tonnes, and cartonboard production grew by 4.8%, to 11.2 million tonnes.

8.2.2 Paper and paperboard consumption and prices

In 2016, the apparent consumption of paper and paperboard in Europe rose by 1.2% (table 8.2.2) due to stronger economic performance. The consumption of packaging materials increased by 3.5%, to 48.4 million tonnes, the consumption of wrapping papers was 2.6% higher, at 4.8 million tonnes, and cartonboard consumption was up by 4.8%, at 8.6 million tonnes. Apparent consumption of case materials grew by 2.7%, to 30.4 million tonnes. Graphic-paper consumption declined by 2.9%, led by declines of 6.5% in coated papers, 1.7% in uncoated mechanicals and 2.3% in newsprint. The consumption of uncoated wood-free showed a minor increase (+0.4%). In 2016, Europe's consumption of sanitary and household papers increased by 2.5%.

8.2.3 Market and integrated pulp production

Woodpulp production in Europe increased by 2.6% in 2016, to 38.8 million tonnes, due largely to debottlenecking projects and less downtime (table 8.2.3). Imports were up by 1.8%, to 20.3 million tonnes. The weaker Euro favoured exports, which rose by 6.8%. Apparent consumption was 1.0% higher, at 44.8 million tonnes.

TABLE 8.2.3

Woodpulp balance, Europe, 2015-2017

(thousand tonnes)

	2015	2016	2017 ^f	Change (%) 2015-2016
Production	37,781	38,778	38,928	2.6
Imports	19,964	20,313	20,435	1.8
Exports	13,398	14,315	14,315	6.8
Apparent consumption	44,347	44,777	45,048	1.0

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017.

The production of mechanical pulp rose by 1.9% in 2016 due to increased domestic demand for packaging materials.

Softwood- and hardwood-based pulp prices either declined or remained low in Europe through 2016 due to the weakening of the euro against the US dollar and as a result of supply exceeded demand. Demand was strong in tissue and certain packaging and specialty grades but was weaker for printing and writing and newsprint.

Prices began to recover in early 2016 as buyers decided that it was time to rebuild depleted inventories and as suppliers redirected tonnage to Asia (primarily China). The price differential between hardwood and softwood kraft pulp was as high as \$150 (in favour of softwood) in 2014, following years of capacity expansions in the hardwood kraft segment outside Europe. After recovering in 2015, prices for hardwood kraft pulp fell in the first part of 2016. Towards the end of the year, this changed as prices began to increase due to unplanned downtime, increased demand from Chinese traders wanting to replenish depleted stocks, and the refusal of Brazilian suppliers to sell below the cost of production.

8.2.4 Use of paper for recycling

The use of paper for recycling (recovered paper) in member countries of the Confederation of European Paper Industries (CEPI)¹⁵ rose by 0.1% in 2016, to 47.8 million tonnes. Over the same period, collection of recovered paper in CEPI countries increased by 1.0%, to 56.4 million tonnes. Exports of paper for recycling to non-CEPI countries increased by 5.6%, to 10.7 million tonnes; 91.7% of these exports went to Asian markets.

Paper for recycling comprised 46.2% of the fibre used for papermaking in CEPI countries in 2016. Woodpulp accounted for another 39.7%, and the remainder (14.1%) comprised non-woodpulp and non-fibrous materials (CEPI, 2017). By 2020 CEPI has set a target of recovering 74% of all post-consumer paper for recycling.

8.2.5 Innovation and decarbonization agenda

Technological innovation and product enhancements offer ways of differentiating European production from global competition with value-added and tailor-made solutions.

CEPI has set an objective of reducing the European paper industry's carbon emissions by 80% by 2050. In 2015, total direct and indirect emissions by pulp-and-paper operations in Europe were 49 MtC, compared with 60 MtC in 1990. A combination of specific measures will be required to reduce emissions by 37 MtC to reach 12 MtC by 2050 in the paper

¹⁵ Through its 18 member countries (17 EU members plus Norway), CEPI represents 495 pulp, paper and paperboard companies in Europe.

industry. Such measures include increased energy efficiency, increasing the use of alternative fuels, allowing flexibility among end-use customers, and developing breakthrough technologies.



Source: Stora Enso, 2017.

8.3 Commonwealth of Independent States

8.3.1 Paper and paperboard production and apparent consumption

The production of paper, paperboard increased by 5.5% and chemical woodpulp rose by 3.8% in the CIS in 2016 (table 8.3.1).

TABLE 8.3.1

Production of chemical woodpulp, paper and paperboard, CIS, 2015-2016 (thousand tonnes)

	2015	2016	Change (%) 2015-2016
Chemical woodpulp	5,965	6,192	3.8
Paper and paperboard	9,740	10,272	5.5

Source: UNECE/FAO, 2017.

Paper and paperboard production rose by 5.5% in 2016, to 10.3 million tonnes, aided by higher domestic consumption driven by stronger economic growth (table 8.3.2). Exports were flat in 2016, at 3.2 million tonnes, and more expensive imports fell by 1.0%. The production of packaging material rose by 8.8% in 2016, and the apparent consumption of packaging material also increased, by 8.9%.

TABLE 8.3.2

Paper and paperboard balance, CIS, 2015-2017

(thousand tonnes)

	2015	2016	2017f	Change (%) 2015-2016
Production	9,740	10,272	10,408	5.5
Imports	2,574	2,549	2,554	-1.0
Exports	3,211	3,204	3,249	-0.2
Apparent consumption	9,103	9,617	9,713	5.6

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017.

8.3.2 Chemical woodpulp production and apparent consumption

Chemical woodpulp production in the CIS increased by 3.8% in 2016. The weak rouble kept imports relatively flat, at 246,000 tonnes, but enabled exports to grow by 3.3%, to 2.3 million tonnes. Apparent consumption of chemical woodpulp was up by 3.8% in 2016 (table 8.3.3). Woodpulp production for all assortments (e.g. mechanical, chemical semi-chemical and dissolving) was 3.8% higher.

TABLE 8.3.3

Chemical woodpulp balance, CIS, 2015-2016

(thousand tonnes)

	2015	2016	Change (%) 2015-2016
Production	5,965	6,192	3.8
Imports	248	246	-0.6
Exports	2,227	2,300	3.3
Apparent consumption	3,985	4,138	3.8

Source: UNECE/FAO, 2017.

8.3.3 Russian Federation

8.3.3.1 Production and capacity

The production of market pulp, paper and paperboard increased by 3.4% in the Russian Federation in 2016, to 11.0 million tonnes (Rosstat, 2017), in the wake of targeted investment by the private sector, including foreign capital. Virtually the entire Russian pulp-and-paper industry is privately owned, although Russian forests remain the property of the state. Investments were aimed at increasing efficiency, achieving incremental capacity increases, and

developing new production facilities to reduce dependence on high-cost imports. The ongoing weakness in the rouble has been the economic driver for much of the investment, and the weak rouble also favours exports.

8.3.3.2 Imports

The Russian Federation's annual trade of paper and paperboard produced a surplus in 2016 for the first time since 2000, with the weak rouble discouraging imports and favouring exports and following investment in incremental capacity, including in higher-value-added products. The surplus was \$259 million in 2016, compared with a deficit of \$30 million in 2014 (State Customs Committee, 2017). Deficits fluctuated significantly in the decade from 2006 to 2015, reaching as high as \$391 million in 2013.

Russian imports of paper and paperboard were worth \$1.3 billion in 2016, down by 32% from 2014.

8.3.3.3 Exports

Despite investments in incremental capacity and a favourable exchange rate, Russian exports of paper and paperboard were flat in 2016 (COMTRADE, 2017) due to declining prices of paper and paperboard in Asian markets (Valois Vision Marketing, 2017d).

The Russian Federation exported 2.06 million tonnes of market pulp in 2016. This was almost the same quantity as in 2015 (2.07 million tonnes) but somewhat less as a percentage of production (79.0%, down from 82.9% in 2015), with domestic demand increasing due to a series of private-sector investments in value-added products.

The major export destinations in 2016 for Russian pulp, paper and paperboard were: China, India, Ukraine, Kazakhstan and Belarus (in descending order, by value). China was the market for 70% of the Russian Federation's exports of market pulp (State Customs Committee, 2017).

8.4 North America

There were fewer closures of integrated pulp operations in North America in 2016 than in previous years, but conversions were made to value-added grades such as fluff to combat overcapacity in the paper-grade market pulp segment. There were also fewer closures in the printing-and-writing-paper, newsprint and paperboard segments than in previous years, but the industry continued to remove high-cost capacity.

8.4.1 Production and apparent consumption

North America's production of paper and paperboard continued to trend lower in 2016, dropping by 0.8% (table 8.4.1). Closures of high-cost capacity in the graphic-paper segment continued, along with a conversion to fluff-pulp production.

North America's apparent consumption of paper and paperboard, which had been trending lower for years, fell only slightly (0.1%) in 2016, to 75.6 million tonnes (table 8.4.1).

TABLE 8.4.1

Paper and paperboard balance, North America, 2015-2017 (thousand tonnes)

	2015	2016	2017 ^f	Change (%) 2015-2016
Production	82,697	82,002	81,202	-0.8
Imports	12,181	11,927	11,855	-2.1
Exports	19,226	18,331	18,283	-4.7
Apparent consumption	75,651	75,598	74,774	-0.1

Note: f = 2016 Committee on Forests and the Forest Industry forecast.

Source: UNECE/FAO, 2017.

There was sustained demand for paperboard and profit growth in the subsector following industry consolidation and capacity rationalization in 2012-2016 and as a result of growth in online shopping, which boosted the consumption of packaging and shipping cases. Demand for graphic paper suffered from the increased use of electronic communication, including the internet.

The printing-and-writing-paper and newsprint segments continued to suffer from overcapacity and from low prices in 2016 due to falling paper demand caused by the increasing use of electronic communication. Newsprint consumption continued to decline due to decreasing newspaper circulations, reduced advertising, lower basis weights, and the impact of the internet. As a result, 190,000 tonnes of newsprint capacity (4% of total capacity), as well as 520,000 tonnes of printing-and-writing-paper capacity (3% of total capacity), were idled indefinitely or closed permanently in North America in 2016 (Valois Vision Marketing, 2017e).

Overcapacity continued in the North American newsprint subsector in 2016 due to a 2.9% decline in demand (to 3.3 million tonnes). Demand by daily newspapers fell by 8.3% in 2016 (after declines of 12.7% in 2015 and 12.4% in 2014), and demand for non-newspaper applications, such as flyers and inserts, fell by 2.5% (after a decline of 2.4% in 2015 and an increase of 2.5% in 2014) (Valois Vision Marketing, 2017d). Newsprint demand was down by 12.3% in the first five months of 2017, with dailies down by 17.2% and inserts and flyers up by 1.2%.

North American tissue production was 1.1% higher in 2016 compared with 2015, following the final stages of major investments in 2012-2016. These were primarily in the US, which increased its capacity by 1.9%, to 9.95 million tonnes. Tissue capacity is forecast to increase further in North America

TABLE 8.4.2

Production and apparent consumption of paper and paperboard, North America, 2012, 2015 and 2016

(thousand tonnes)

	Production				Apparent consumption			
	2012	2015	2016	Change (%) 2015-2016	2012	2015	2016	Change (%) 2015-2016
Graphic papers	26,198	22,735	22,240	-2.2	24,635	22,032	21,685	-1.6
Newsprint	6,748	5,158	4,835	-6.3	4,663	3,419	3,320	-2.9
Uncoated mechanical	3,652	3,310	3,249	-1.9	3,664	3,316	3,344	0.9
Uncoated wood-free	8,847	8,486	8,420	-0.8	8,782	8,754	8,554	-2.3
Coated papers	6,951	5,781	5,736	-0.8	7,526	6,544	6,467	-1.2
Sanitary and household papers	7,270	7,524	7,578	0.7	7,330	7,649	7,770	1.6
Packaging materials	48,662	50,664	50,424	-0.5	42,261	44,494	44,633	0.3
Case materials	32,838	34,445	34,332	-0.3	28,681	30,419	30,176	-0.8
Cartonboard	7,045	12,024	11,930	-0.8	5,374	10,404	10,820	4.0
Wrapping papers	3,179	1,890	1,877	-0.7	2,609	1,371	1,407	2.7
Other papers, mainly packaging	5,600	2,305	2,286	-0.8	5,597	2,300	2,229	-3.1
Other paper and board	3,118	1,774	1,759	-0.8	2,869	1,476	1,510	2.3
Total paper and paperboard	85,248	82,697	82,002	-0.8	77,095	75,651	75,598	-0.1

Sources: UNECE/FAO, 2017.

in the short term, driven by increased demand for private brands, product-line extensions, and an estimated growth in demand for premium hygienic tissue.

Domestic North American demand for graphic paper continued to decline in 2016, with a drop of 1.6% (table 8.4.2). Since 2012, the apparent consumption of graphic paper has declined by 3 million tonnes to 21.7 million tonnes. This is a result of lower budgets for print advertising and ongoing growth in the use of electronic media. Further paper-machine closures are anticipated, including conversions to other grades such as pulp and packaging. Restarts are highly unlikely. This pattern is being replicated in mature markets worldwide.

The production of paper and paperboard fell by 0.8% in North America in 2016 as graphic-paper capacity continued to be permanently shut or converted to fluff pulp.

Paper-and-paperboard import tonnage declined by 2.1% in North America in 2016 due to the imposition of antidumping duties on cut-size office and copy paper imports, as well as on uncoated publication papers (also known as supercalendered grades). Export tonnage fell by 4.7% due to idled capacity and a stronger US dollar.

The production of graphic paper in North America fell by 2.2% in 2016 (table 8.4.2) as capacity was permanently removed due to falling demand and competition from imports, continuing a decline that has seen a fall of more than 20%

since 2010. Exports of printing and writing paper fell by 11.3% in 2016 (Valois Vision Marketing, 2017d). The production of packaging materials fell by 0.5% following the closure of high-cost capacity and as price increases forced consumers to reduce the amount of packaging material used in retail packaging (Valois Vision Marketing, 2016e).

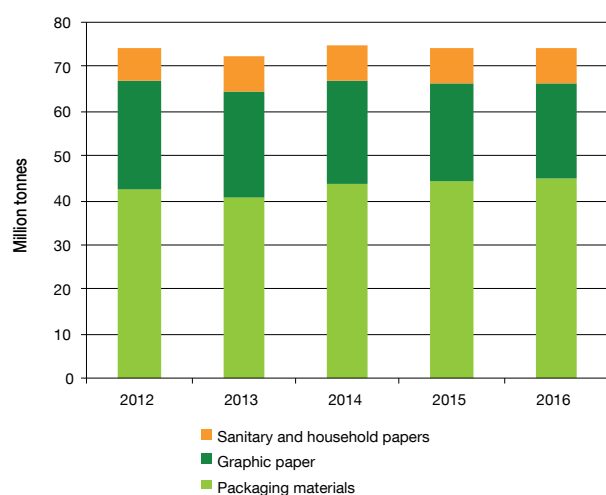
The production of newsprint fell by 6.3% in North America in 2016, to 4.8 million tonnes, driven by capacity rationalization, including conversions to packaging grades for which margins tend to be higher. The production of uncoated mechanical paper fell by 1.9% as high-cost capacity closed. The production of uncoated wood-free and coated papers each fell by 0.8% in 2016, but the production of sanitary and household papers rose by 0.7%.

North America's apparent consumption of graphic papers dropped by 1.6% in 2016, to 21.7 million tonnes (table 8.4.2 and graph 8.4.1), as the digitalization of communication, including the Internet, continued to have a negative impact on the segment. Apparent consumption of newsprint declined by 2.9% in 2016, to 3.3 million tonnes (it has fallen by 7.8 million tonnes since January 2004). Apparent consumption of uncoated wood-free paper fell by 2.3% in 2016 and the consumption of coated papers declined by 1.2%. In contrast, apparent consumption of uncoated mechanical paper rose by 0.9% as end-users continued to swing away from more expensive coated papers. The consumption of sanitary and

household papers grew by 1.6% in 2016, to 7.8 million tonnes. Over the same period, apparent consumption of packaging materials in North America increased by 0.3%, to 44.6 million tonnes.

GRAPH 8.4.1

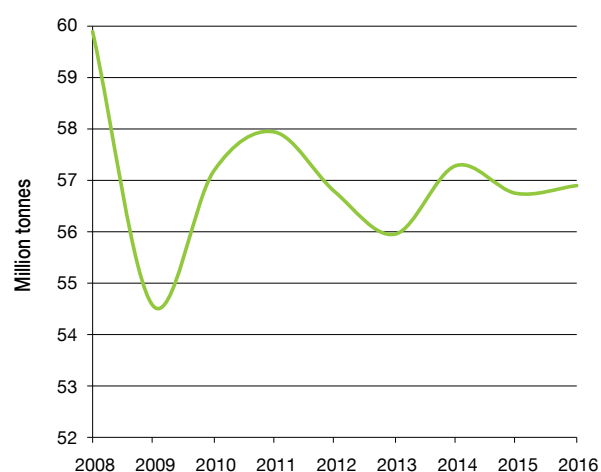
Apparent consumption of paper and paperboard, North America, 2012-2016



Source: UNECE/FAO, 2017.

GRAPH 8.4.2

Production of chemical woodpulp, North America, 2008-2016



Source: UNECE/FAO, 2017.

The production of chemical woodpulp increased by 0.8% in North America in 2016 (graph 8.4.2). There were several reasons for the increase: market pulp producers battled offshore competitors for market share, ultimately resulting in higher stocks of finished goods; demand grew from sanitary

and household papers; and exports strengthened (Valois Vision Marketing, 2017d). Apparent consumption rose by 0.8% as imports – mainly from South America – grew by 4.1% (Valois Vision Marketing, 2017d).

8.5 Extraregional influences affecting the UNECE region

8.5.1 South America

8.5.1.1 Brazil

Brazil continues to hold the number one position in chemical market pulp capacity, at 15.7 million tonnes. The country added 1.6 million tonnes of capacity in bleached softwood and hardwood grades in 2016, a growth of 13.6%, year-on-year. Planned further expansions will add another 3.5 million tonnes to Brazil's bleached chemical market pulp capacity by the end of 2018, an increase of more than 22% compared with end 2016 (Valois Vision Marketing, 2017b).

The country's pulp production increased by 8.1% in 2016, to 18.8 million tonnes, due to the start-up of yet another new pulp line and the final ramp-up of an expansion project (table 8.5.1). There was a 0.2% decline in Brazil's paper and paperboard production in 2016, however, due to lacklustre economic conditions (table 8.5.2).

TABLE 8.5.1

Woodpulp balance, Brazil, 2015-2016 (thousand tonnes)

	2015	2016	Change (%) 2015-2016
Production	17,366	18,773	8.1
Exports	11,528	12,901	11.9
Imports	407	356	-12.5
Apparent consumption	6,245	6,228	-0.3

Source: Ibá, 2017.

Brazil exported 12.9 million tonnes of pulp in 2016, which was 68.7% of the country's total production (table 8.5.1). The export volume was up by 11.9% compared with 2015, when 11.5 million tonnes – 67% of that year's production – were exported (Ibá, 2017).

Unlike pulp, most paper and paperboard produced in Brazil is consumed internally. Exports accounted for 20.3% of production in 2016, up from 19.9% in 2015 (table 8.5.2).

TABLE 8.5.2

Paper and paperboard balance, Brazil, 2015-2016
(thousand tonnes)

	2015	2016	Change (%) 2015-2016
Production	10,355	10,335	-0.2
Domestic sales	5,445	5,429	-0.3
Exports	2,058	2,103	2.2
Imports	866	668	-20.6
Apparent consumption	9,163	8,920	-2.7

Source: Iba, 2017.

8.5.1.2 Chile

In 2016, Chile's exports of pulp, paper and paperboard increased by 6.7% (table 8.5.3). This was due to incremental capacity growth throughout bleached kraft grades and stronger demand, particularly in the fourth quarter of 2016. A surge in demand from China at the end of 2016 enabled an increase in Chile's aggregate pulp exports of 7.7%. However, paperboard exports fell by 2.5% in 2016 due to lower demand in Latin America.

TABLE 8.5.3

Pulp, paper and paperboard exports, Chile, 2015-2016
(thousand tonnes)

	2015	2016	Change (%) 2015-2016
Bleached radiata kraft	1,869	2,083	11.5
Bleached eucalyptus kraft	2,028	2,144	5.7
Unbleached radiata kraft	420	426	1.2
Newsprint paper	54	57	5.6
Paperboard	479	467	-2.5
Total	4,851	5,176	6.7

Source: Infor, 2017.

8.5.2 Asia

8.5.2.1 China

China's economic growth was subdued again in 2016, with fewer exports but also lower prices for pulp, paper and imported recovered fibres.

China's pulp production fell by 0.4% in 2016 (table 8.5.5) as bleached kraft pulping capacity swung to dissolving grades (Valois Vision Marketing, 2017f), aided by a 20% surge in price in the last year.

TABLE 8.5.4

Production and apparent consumption of pulp, paper and paperboard, China, 2016 (thousand tonnes)

	Production		Apparent consumption	
	2016	Change (%) 2015-2016	2016	Change (%) 2015-2016
Pulp	81,350	-0.4	100,070	0.9
Paper and paperboard	108,550	1.4	104,190	0.7

Note: The pulp production figure includes 63.3 million tonnes of pulp made from recovered paper

Source: China Paper Association, 2017; RISI, 2017.

China's apparent consumption of pulp (woodpulp and recovered fibre pulp) rose by 0.9% in 2016, driven mainly by growth in tissue and specialty paper production. China's overall paper and paperboard production increased by 1.4% as several new tissue and specialty paper machines started up (Valois Vision Marketing, 2017f). The country's apparent consumption of paper and paperboard grew by only 0.7% in 2016. Stronger demand in the packaging and tissue segments was largely offset by a drop in newsprint and coated papers as the economy increasingly moved to electronic communication and advertising, including the Internet. Significant investment continues to be made in the industry, with tissue machines leading the field. Several tissue-machine expansions – albeit scaled back from previously announced overambitious plans – were further implemented in 2016, and this will continue to 2018.

China's kraft pulp imports reached a record 17.0 million tonnes in 2016, a 7.8% increase over 2015, while mechanical pulp imports were virtually unchanged at 1.73 million tonnes (table 8.5.5). Total pulp imports grew by 6.2%, to 21.1 million tonnes.

Despite its slower economic growth, China continues to source large volumes of recovered paper to feed its growing paper and paperboard industry, with recovered paper

TABLE 8.5.5

Pulp imports, China, 2015-2016 (thousand tonnes)

	2015	2016	Change (%) 2015-2016
Kraft	15,783	17,015	7.8
Mechanical	1,733	1,732	0
Dissolving	2,247	2,246	-0.1
Other	76	68	-11.1
TOTAL	19,839	21,061	6.2

Source: China Customs Bureau, 2017.



Source: E. O'Driscoll, 2017.

representing the industry's largest source of fibre by far. The possible extension of a ban on certain mixed-paper imports to curb pollution from deinking and processing plants has sent shockwaves through the papermaking industry. China imported 5.7 million tonnes of mixed papers in 2016, which was 20% of the country's total wastepaper imports. Once treated, this amount yields 3 million to 4 million tonnes of usable fibre, depending on losses due to coatings, chemicals, impurities and fibres too small to keep out of wastewater. This wastewater is a major source of pollution: it contains losses from the feedstock of up to 2.7 million tonnes that need to be removed, treated and sent to landfill and not allowed to run into rivers and streams. The implications for the industry of an extension of the ban on mixed-paper imports are potentially huge because the gap in fibre supply would have to be filled by either virgin fibre or other recovered papers (Valois Vision Marketing, 2017f). China's recovered-paper imports fell by 2.7% in 2016, to 28.5 million tonnes, as customs officials continued to enforce quality controls (table 8.5.6).

An estimated 46% of Chinese recovered-paper imports were sourced from the US in 2016 (US Census Bureau, 2017). This proportion was virtually unchanged from 2015 despite an overall decline in imports of 2.7% because most of that decline was due to a 2.6% drop in imports from the US, year-on-year.

TABLE 8.5.6

Recovered paper imports, China, 2015-2016

(million tonnes)

	2015	Share (%) of total	2016	Share (%) of total
Imports in China	29.3	100	28.5	100.0
Of which from the US	13.6	46.3	13.2	46.4
US exports	19.5	100	19.7	100.0
Of which to China	13.6	70.0	13.2	67.0

Sources: China Customs Bureau, 2017; US Census Bureau, 2017.

8.5.3 Dissolving-pulp demand in emerging markets

Global demand for dissolving pulp remains strong and continues to grow, aided by the development of new end uses and rapid economic growth in emerging markets. The increased consumption of dissolving pulp is being driven by consumers in emerging markets looking to improve their standard of living. Applications include personal-care products, packaging, detergents, foods, textiles and car parts. There has been very strong growth in rayon, a major subcategory of dissolving pulp, as clothing manufacturers abandon expensive natural fibres such as cotton.

The expansion of dissolving-pulp capacity has slowed considerably worldwide in recent years following a period of overbuilding and low prices. China's import demand was very strong in 2015 and 2016, however, at nearly 2.2 million tonnes (table 8.5.5), up from 1.8 million in 2013 and 2.1 million in 2014. The increased demand was enough to tighten the global supply-demand balance for the category, and prices jumped by more than 20% between 2015 and early 2017 (Valois Vision Marketing, 2017f).

Capacity additions in Brazil and Sweden – the result of conversions from paper-grade market pulp production – have largely been absorbed, thereby opening up opportunities for further capacity additions in Latin America and Asia via conversions, enabling use of the swing capacity of paper-grade pulps. Estimated dissolving-pulp capacity was 8.7 million tonnes in December 2016, and demand was 7.4 million tonnes.

China imposed duties on hardwood-based dissolving-pulp imports from Brazil, Canada and the US in 2014; these are in place for a minimum of five years and could be extended following a review of market conditions and domestic producers. Despite the duties, global capacity expanded further and prices fell to around \$800 per tonne, down from \$860 when the duties were imposed. Strong demand – mainly from China – in mid-2016 meant that import prices reached

\$1,000 per tonne in the second half of 2016, although the price of imported hardwood dissolving pulp had fallen to an average of \$830 by June 2017.

As the dissolving-pulp market expands and a select few pulp producers delve into nano-cellulosic fibres, the quest to develop niche markets will be the modus operandi for improving financial results. Nano-cellulose pulp is a highly refined material that can be used to strengthen products such as paper, plastics and other composites and also as

an improved barrier film for food packaging. The nano-cellulose pulp industry is in its infancy, and several companies worldwide are involved in research into, and the development of, new applications.

Note: The statistical annex of the *Forest Products Annual Market Review 2016-2017* is available at: www.unece.org/fpamr2017-annex



8.6 References

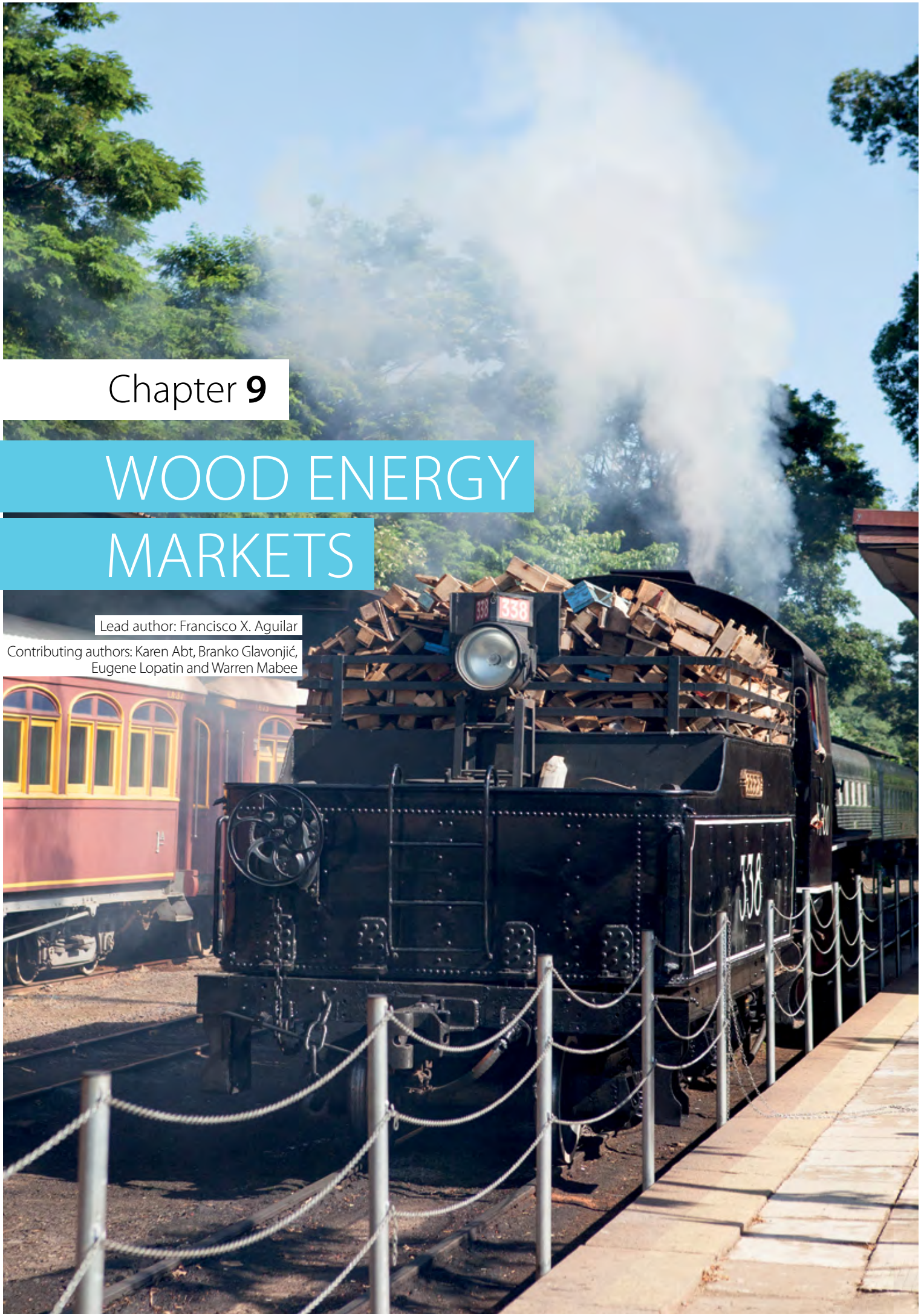
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Chapter 9

WOOD ENERGY MARKETS

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Highlights

Primary production of solid biofuels (excluding charcoal) **grew by 6% in the EU28** in 2015, to 3,829 PJ.

Europe consumed **20.9 million tonnes of wood pellets** in 2015 and **22.3 million tonnes** in 2016.

European imports of wood pellets increased by 4.4% in 2016, to 14.4 million tonnes.

Serbia experienced a shortage of wood pellets in January 2017 due to harsh winter conditions, causing a demand spike that triggered prices exceeding €300 per tonne over a four-week period.

Serbia lowered its value-added tax on woodfuels to 10%, as of 1 January 2017 – **the lowest rate in the Western Balkans**.

In the CIS, the depreciation of the rouble and other regional currencies supported **greater exports of wood pellets to the EU in 2016**.

Wood pellet production in the Russian Federation **increased by 4% in 2016**, exceeding 1 million tonnes. Pellet production in the Western Balkans also exceeded 1 million tonnes in 2016 (**up by 19% over 2015**).

Canada consumed 536 PJ of wood energy in 2016, slightly less than in 2015. **Canada is developing a national carbon pricing policy**, which could lead to greater domestic use of renewable energies, including wood energy.

Canadian production of wood pellets rose to 2.8 million tonnes per year in 2016, **operating at an estimated 73% of total installed capacity**.

The US consumed 2,066 PJ of wood energy in 2016, which was about 6% less than in 2015. The future use of wood energy for electricity and combined heat and power in the US is uncertain given the public policy environment and low prices for natural gas.

9.1 Introduction

Wood energy markets in the UNECE region are dynamic; they are significantly affected by public policy, weather and changes in production capacity, particularly wood pellets. Prices for wood pellets traded across the Atlantic show an overall declining trend, possibly reflecting ample supply and demand that has not grown at expected rates (except in the UK). Nonetheless, the share of solid-biofuel (excluding charcoal) imports in the EU28's primary production has grown threefold since 2005, and North American wood pellet exports to the EU28 reached 6.6 million tonnes in 2016. The Dutch "stimulation of sustainable energy production incentive scheme" (SDE+) – an incentive scheme for the production of renewable energy in the Netherlands – might spur a new market for industrial wood pellets in the EU28.

There is little indication of major price changes in wood pellet residential heat markets due to a combination of adequate supply, relatively stable demand in developed markets, and mild winters. The exception might be the Western Balkans, where prices spiked as a result of extremely cold weather coupled with a shortage of wood pellets.

Changes in public policy remain one of the largest sources of uncertainty in wood energy markets. The planned withdrawal of the UK from the EU could affect the role played by wood pellets in the UK's renewable energy portfolio, thereby affecting trade. The announcement by the US of its intention to withdraw from the Paris Agreement on climate change and to begin negotiations either to re-enter the agreement or on a new agreement could affect US domestic wood energy consumption and pellet exports to the EU. The proposal for a revised Directive of the European Parliament and of the Council on the Promotion of the Use of Energy from Renewable Sources (RED II) could affect the eligibility of biomass sourcing and the establishment of risk assessments, with uncertain consequences for established interregional supply chains. In the Western Balkans, the homogenization of value-added tax rates across wood energy sources might increase the price competitiveness of wood pellets. Canada is developing a national carbon pricing policy, which could drive greater domestic use of renewable energies, including wood energy. Pilot projects producing torrefied biomass have been established, although low fossil fuel prices – particularly in the US – continue to hamper commercial adoption.

9.2 Europe

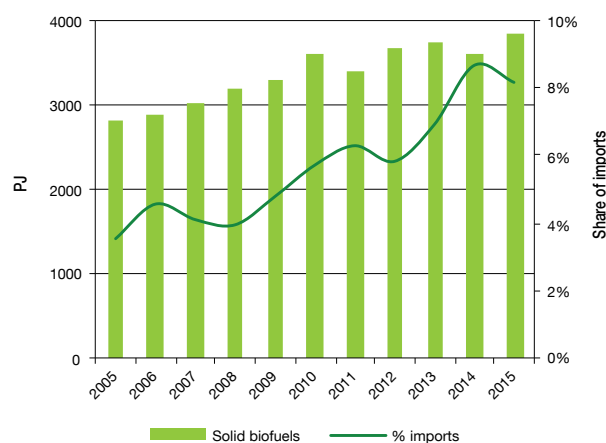
9.2.1 Consumption and production

The most recent available data show that the primary production of "solid biofuels (excluding charcoal)" in the EU28

grew by 6% in 2015 compared with 2014, to 3,829 petajoules (PJ) (Eurostat, 2017b). This is a higher growth rate than that for overall primary energy production from renewables, which increased by 4.3% in 2015, year-on-year, and which increased by 36% in the EU28 from 2005 to 2015 (graph 9.2.1). Solid biofuels accounted for 44.6% of primary energy production from renewable sources in 2015, constituting the largest source of renewable energy in the EU28, followed by hydro (14.3%) and wind (12.7%). EU28 imports of solid biofuels have increased three-fold since 2005 (Eurostat, 2017b). The consumption of solid biofuels (excluding charcoal) in the EU28 in 2015 was 1,761 PJ by the residential sector, 495 PJ by the paper, pulp and print sector, and 195 PJ by the wood and wood products sector (Eurostat 2017b). Of the EU28's total consumption of solid biofuels (excluding charcoal) in the residential sector, France and Italy accounted for 15% each and, Germany for 13%. Leading consumers of solid biofuels (excluding charcoal) in the paper, pulp and print sector were Sweden and Finland at 33% and 27% of EU28-wide consumption, respectively. The largest consumers of energy from solid biofuels (excluding charcoal) in the EU28's wood and wood products sector were Germany (26%) and Poland (12%).

GRAPH 9.2.1

EU28 total primary energy production from solid biofuels, and share of imports, 2005-2015



Note: Excluding charcoal.

Source: Eurostat, 2017b.

Wood pellet consumption was 22.3 million tonnes in Europe in 2016, an increase of 6.6% over 2015. Wood pellet production increased by 2.5% and imports grew by 4.4% (table 9.2.1). The UK was by far the biggest consumer of wood pellets in Europe in 2016, accounting for 7.5 million tonnes, which was one-third of consumption the Europe subregion. The UK led the consumption of wood pellets for power generation and had the fastest annual growth rate of any European country.

TABLE 9.2.1

Wood pellet production and trade, Europe, 2015-2016
(thousand tonnes)

	2015	2016	Change (%) 2015-2016
Production	14,620	14,982	2.5
Imports	13,742	14,352	4.4
Exports	7,454	7,046	-5.5

Source: UNECE/FAO, 2017.

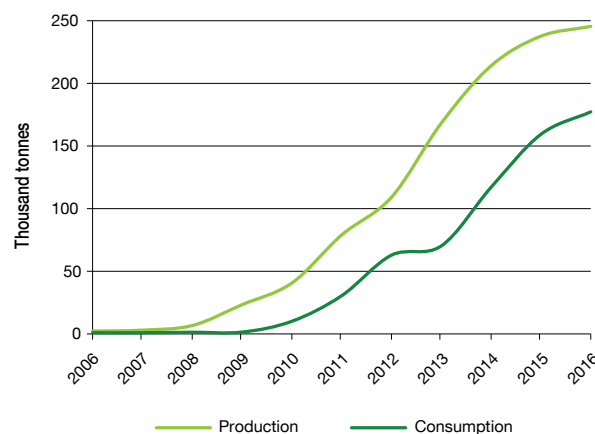
About 42% of pellets consumed in Europe in 2016 were used for residential heating, 36% for power production, 16% for commercial heating and 6% in combined-heat-and-power (CHP) systems. Italy is the leading European consumer of wood pellets for heating, consuming an estimated 3.1 million tonnes in 2015, with residential consumption representing 92% of the total end use (AEBIOM, 2016). Italy's consumption of wood pellets could reach 5 million tonnes in 2020. One of the main drivers of consumption there is the high tax on competing fuels such as natural gas and light heating oil. Most wood pellets consumed in Italy (85%) are imported from Austria, Germany and Croatia (in descending order, by volume) (Bettini, 2016). Other top European countries in the consumption of wood pellets in 2016 (after the UK, as described above) are Germany (2.0 million tonnes in 2016), Denmark (1.9 million tonnes) and Sweden (1.7 million tonnes). Residential heating accounts for most consumption in Germany (58%) and France (98%), while CHP is the main use (56%) in Denmark.

Wood energy consumption in the Western Balkans¹⁶ continued an increasing trend in 2016, reaching an estimated 203 PJ, up by nearly 10% compared with 2015. A severe winter, with an above-average number of days with temperatures below -15 °C, influenced growth in consumption. Wood pellets led the way, accounting for 38.5% of wood energy consumption in the Western Balkans, reaching an all-time high of 743,000 tonnes in 2016, up by more than 200,000 tonnes over 2015. Wood pellet consumption in Serbia reached 170,000 tonnes in 2016; consumption there grew by an average annual rate of 28.4% in 2012-2016 (graph 9.2.2).

Increases in consumption in Bosnia and Herzegovina and Serbia drove the rising trend. Although technically excluded from the Western Balkans, Slovenia is the largest consumer of wood pellets of the countries that were formerly part of Yugoslavia.

¹⁶ The Western Balkans comprises Albania, Bosnia and Herzegovina, Croatia, The former Yugoslav Republic of Macedonia, Montenegro and Serbia.

GRAPH 9.2.2

Production and consumption of wood pellets in Serbia, 2006-2016

Source: Glavonjić, 2017b.

The consumption of wood chips for wood energy also grew strongly in 2016, to 642,000 tonnes driven by increases in consumption in biopower plants in Croatia and in district heating systems in Bosnia and Herzegovina and Slovenia. Despite several initiatives, there has been no increase in the consumption of wood chips in district heating systems in Serbia. Firewood consumption increased by 7.8% in the Western Balkans in 2016, to 19.4 million m³. Bosnia and Herzegovina and Serbia led total consumption, accounting for 64%. Firewood consumption is met from domestic sources, with the exception of the former Yugoslav Republic of Macedonia, which imported 43,000 m³ of fuelwood in 2016. Wood briquettes maintained their market share, at 1.1% of total wood energy consumption. There are two main reasons for the relative stability of the share of total consumption held by wood briquettes: lower prices compared with pellets, and the relatively high cost of replacing older heating appliances made for traditional fuelwood (which can also use briquettes) with furnaces and boilers fuelled with pellets (Glavonjić et al., 2016). Bosnia and Herzegovina is the Western Balkan leader in consumption of wood briquettes, at about 45,000 tonnes.

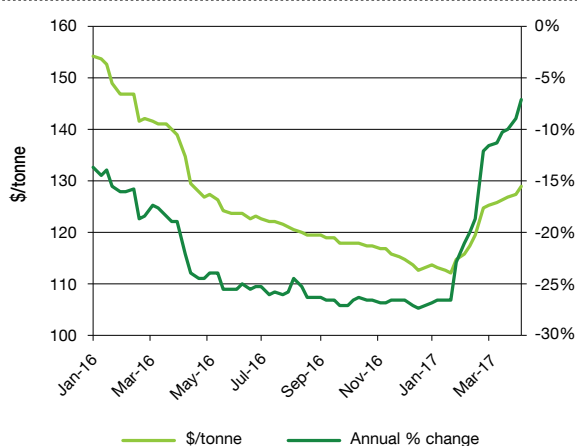
Wood energy production in the Western Balkans was 233 PJ in 2016, about 8% higher than in 2015, due mostly to increases in fuelwood and wood pellet production. Fuelwood production increased by 8.7%, to 21.4 million m³, with Bosnia and Herzegovina and Serbia accounting for about 61% of total production. Wood pellet production exceeded 1 million tonnes in the Western Balkans in 2016, up by about 19% over 2015. This large increase was due to the expansion of production in Serbia (to 246,000 tonnes), which brought it closer to production levels in Bosnia and Herzegovina and Croatia, the leading producers in the Western Balkans.

9.2.2 Prices

Argus Media (2017) reported that cost, insurance and freight (CIF) spot prices for industrial wood pellets at Amsterdam, Rotterdam and Antwerp (ARA) declined steadily in 2016 through the first quarter of 2017, when they recovered (graph 9.2.3).

GRAPH 9.2.3

Wood pellet prices at Amsterdam, Rotterdam and Antwerp, January 2016-April 2017



Note: Spot CIF prices within 90 days.

Source: Argus Media, 2017.

Market prices for wood pellets in the Western Balkans vary by season and packaging, tending to be lowest at the end of the heating season (April/May). Prices per tonne are also lower when jumbo bags (1.1 tonnes) are purchased; in Serbia and Slovenia, for example, the price is about €15-16 lower per tonne for jumbo bags than for 15 kg bags. Prices for traditional fuelwood in most Western Balkan countries remained stable through 2016. In the former Yugoslav Republic of Macedonia, fuelwood prices in the 2016/17 heating season were in the range of €48-55 per m³ (Public Forest Enterprise Makedonski sumi, 2017). The average market price for wholesale imported fuelwood was €68 per m³ in January 2017, with higher prices driven by a supply shortage (Glavonjić, 2017a). Harsh winter conditions in Serbia in the second half of January 2017 caused a demand spike that triggered prices exceeding €300 per tonne over a four-week period. Prices dropped after four weeks but remained higher than in 2015. The market price of wood pellets in Serbia was 4.6% higher in May 2017 than in the same period in 2015.

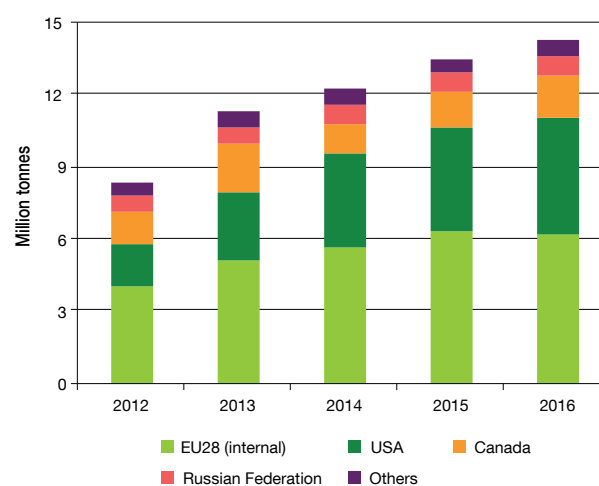
9.2.3 Trade

According to Eurostat (2017a), European imports of wood pellets (HS code 440131) from outside the subregion increased by 13% in 2016, to 8.1 million tonnes, of which

6.1 million tonnes were traded among member countries of the EU28 (graph 9.2.4). The value of imports from outside the EU28 increased by 9%.

GRAPH 9.2.4

EU28 imports of wood pellets, 2012-2016



Source: Eurostat, 2017a.

Exports of wood energy from the Western Balkans reached 39.9 PJ in 2016, up by 4.5% from 2015. Countries in the region exported 2 million m³ of fuelwood, 661,000 tonnes of wood chips and 624,000 tonnes of wood pellets.

9.3 The CIS subregion

9.3.1 Consumption and production

Demand for wood energy is increasing in the CIS as the consumption of pellets, briquettes, chips and other feedstocks grows in the subregion and among neighbouring countries. Wood energy production increased in 2016, due in part to record-low values of the Russian rouble, which also affected the currencies of other CIS states with close economic ties (for many post-Soviet states, trade with the Russian Federation represents more than 5% of their GDP). The low value of national currencies supported an increase in export sales of wood energy products, particularly wood pellets. Wood pellet exporters enjoyed large increases in revenue in 2016 – also linked to changes in exchange rates.

Wood energy consumption increased in the CIS in 2016, but at a slower pace than in 2015.

Total wood pellet production in the CIS increased by 2% in 2016, reaching 2 million tonnes (table 9.3.1). Half this production is in the Russian Federation; production there surpassed 1 million tonnes in 2016 (Rosstat, 2017).

Elsewhere in the CIS, wood pellet production in 2016 was reported at 300,000 tonnes in Belarus (double the production of 2013) and 706,000 tonnes in Ukraine (an increase of 236% compared with 2012).

TABLE 9.3.1

Wood pellet production and trade, CIS, 2015-2016
(thousand tonnes)

	2015	2016	Change (%) 2015-2016
Production	1,980	2,019	2.0
Imports	4	4	7.7
Exports	1,257	1,374	9.3

Source: UNECE/FAO, 2017.

Irkutsk is one of the most dynamic areas of pellet production in the CIS, and several new plants with annual pellet production capacities of 30,000-120,000 tonnes have opened there in the last few years. The second dynamic area in the subregion is Arkhangelsk, where big new producers started pellet production in 2014-2016. The goal in both Irkutsk and Arkhangelsk is to produce 500,000 tonnes of pellets per year (Rakitova, 2017).

9.3.2 Prices

Domestic wood pellet prices decreased in the Russian Federation in 2016 due to the rouble-denominated cost of wood energy products and increasing production. The US-dollar-denominated prices of wood pellets exported from the Russian Federation to Finland, Germany, Latvia and Italy decreased in January-August 2016 and increased in September-December 2016. The average annual price decreased in 2016.

9.3.3 Trade

The most recent data indicate that net exports of wood pellets from the Russian Federation increased by 15.4% in 2016 compared with 2015, to just over 1 million tonnes, with Europe the main destination (COMTRADE, 2017). Two-thirds of exported volumes were traded with the five biggest export partners in 2016 – Denmark, Sweden, the Republic of Korea, Belgium and the UK (in descending order). The Leningrad region exported most wood pellets (via the harbour), followed by the Republic of Karelia (the majority going to Finland) and Saint Petersburg. The depreciation of the rouble improved the competitiveness of Russian pellet producers in general and of those in remote areas in particular. The biggest growth in pellet exports in 2016 was in Irkutsk, where they increased almost twofold, and the biggest reduction in exports was in the Moscow area. The

export of wood chips continues to grow. Demand for wood energy feedstock (especially wood chips) will increase further in the Russian Federation due to positive export prospects.

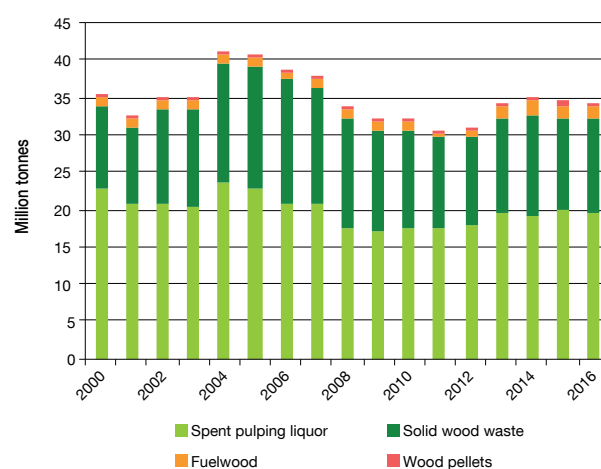
9.4 North America

9.4.1 Consumption and production

Canada consumed 536 PJ of wood energy in 2016, which was 1% less than in 2015; of this, 225 PJ was derived from solid wood waste, 273 PJ from spent pulping liquor, 30 PJ from fuelwood and 9.0 PJ from wood pellets (Statistics Canada, 2017a; Wood Pellet Association of Canada, 2017; FAO, 2017). Wood energy consumption accounted for 4.5% of Canada's total primary energy supply in 2016 (International Energy Agency, 2017). Industrial uses of biomass – consuming wood residues and spent pulping liquor – constitute the majority of wood energy use in Canada, and fuelwood and wood pellets have only minor impacts on the country's overall energy supply (graph 9.4.1). Spent pulping liquor contributes 57% of total wood energy consumed in Canada, a share that has risen by 10% since 2008. The rise is due partly to Canada's Pulp and Paper Green Transformation programme, which added 8,500 TJ of generation capacity to Canada's forest-sector mills in 2009-2012 (NRCan, 2012). Growth in the consumption of wood pellets has slowed, as has fuelwood consumption. In 2016, they provided only 7.3% of Canada's total wood energy consumption, possibly due to milder-than-normal winters in eastern Canada in 2015-16 and 2016-17. There is now more than 2 GW of biobased electricity generation capacity available for grid deployment in Canada, with the majority of this in British Columbia (827 MW) and Ontario (681 MW) (NRCan, 2016).

GRAPH 9.4.1

Consumption of wood energy in Canada by sector, 2000-2016



Source: FAO, 2017; Wood Pellet Association of Canada, 2017; Statistics Canada, 2017a.

With a production of 2.8 million tonnes, Canada remained the world's third-largest wood pellet producer in 2016, at 6.7% of global production. Nevertheless, the country's share of the global market has declined by 30% in recent years (FAO, 2017). Canadian wood pellet production lags behind capacity, but mill closures and idlings have closed the gap. At least five facilities were idled or shut down across Canada in 2016 and 2017, removing 0.7 million tonnes of annualized capacity, including Rentech's Wawa plant, which, at 0.45 million tonnes, was one of the largest in the country (Canadian Biomass Magazine, 2017). It is now estimated that Canada's production capacity is about 3.7 million tonnes per year (Canadian Biomass Magazine, 2017), suggesting that Canadian plants are operating at about 73% of total capacity. The availability of woodfuel for use in small-scale applications (particularly residential) and electricity generation continues to rise.

The US consumed 2,066 PJ of wood energy in 2016, down by about 6% from 2015 (US Department of Energy, 2017b). The industrial sector continued to dominate total wood energy use, accounting for 65% of national consumption in 2016. Per capita wood energy use declined from 0.81 m³ per person in 2014 (a recent high) to 0.74 m³ per person in 2016.

A small (1%) increase in the commercial use of wood energy was insufficient to offset declines in other sectors (-9% in electric power, -2% in industrial use and -15% in residential use). Stagnation in the use of wood energy is explained partly by the lower cost of other energy sources, particularly natural gas in the commercial and power sectors. For example, biomass (including wood) represents about 13% of fuel used in CHP systems across the US. This is the same share as coal (Bloomberg, 2017), but it is a fraction of the 71% supplied by natural gas.

The US Department of Energy now collects monthly data on the production of densified biomass fuel products, including wood pellets (for domestic and export consumption) and compressed logs and bricks (briquettes) (US Department of Energy, 2017a). According to these data, the number of pellet mills increased from 86 to 88 in 2016, and the installed annual capacity grew from 10.5 million to 10.8 million tonnes. One industrial grade pellet mill opened in 2016 and one in 2017; a mill that shut down in 2016 is expected to re-open in 2017. In 2016, total densified biomass fuel production was 6.0 million tonnes, implying an average capacity utilization of 55%. An estimated 12.5 million tonnes of green wood inputs were used in 2016, and production sustained about 2,000 direct employees in operating manufacturing facilities. Records show that all exported industrial grade pellets were produced in mills in the US South.

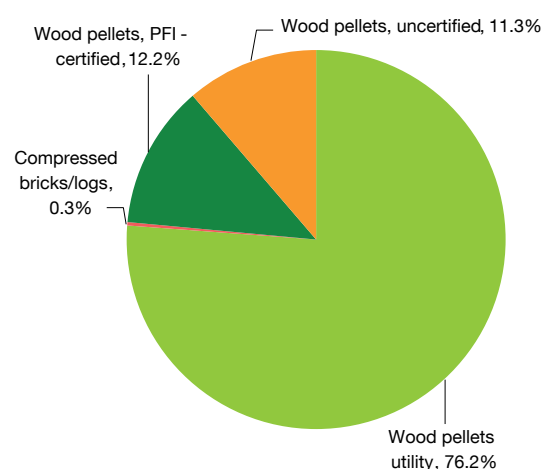
The total production of wood pellets in North America in 2016 was about 9.2 million tonnes, up by 6.7% over 2015 (table 9.4.1).

TABLE 9.4.1
Wood pellet production and trade, North America, 2015-2016 (thousand tonnes)

	2015	2016	Change (%) 2015-2016
Production	8,617	9,193	6.7
Imports	237	192	-18.9
Exports	6,297	7,082	12.5

Source: UNECE/FAO, 2017.

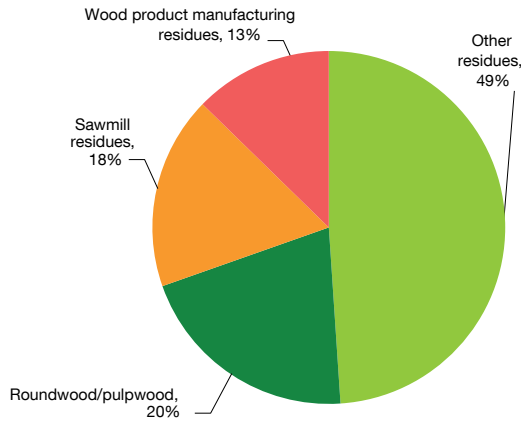
Utility-grade wood pellets account for more than 75% of densified biomass production in the US, with the remainder made up of premium pellets certified by the Pellet Fuels Institute (PFI), uncertified premium pellets, utility pellets and compressed bricks/logs (graph 9.4.2). Respondents to the US Department of Energy survey indicated the type of input forestry material used in the production of wood pellets (graph 9.4.3). The largest category was "other residues", which "includes bark, logging residues, wood chips, post-consumer wood, unmerchantable wood, and other". Roundwood timber mostly comprises logs harvested for industrial use from sustainably managed forests (US Department of Energy, 2017a). Pellets produced in the US West generally have higher heat and lower ash and moisture contents than products produced in other US regions. On the other hand, pellet mills in the US South produce nearly twice as much product per employee as mills in the US North and West, possibly due to more efficient production processes.

GRAPH 9.4.2
US densified biomass products, 2016


Source: US Department of Energy, 2017a.

GRAPH 9.4.2

US forest inputs to densified biomass products, 2016



Source: US Department of Energy, 2017a.

9.4.2 Prices

In Canada, the price of bagged wood pellets for domestic use is in the range of CAD 5-7 per 18.1 kg (40 lb) bag, which is equivalent to CAD 275-385 per tonne. The average export price of wood pellets was CAD 173 per tonne FOB in 2016 (Statistics Canada, 2017b), a slight decline from 2015. Fuelwood for export was priced similarly, at around CAD 172 per tonne FOB (Statistics Canada, 2017b). Domestic prices for fuelwood were variable in the range of CAD 340-400 per cord, which is approximately CAD 200-235 per dry tonne of biomass.

In the US, the average price of exported pellets was reported at \$164 per tonne FOB and the average price of domestic pellets at \$177 per tonne FOB (US Department of Energy, 2017a). Domestic wood pellet retail prices (excluding delivery from sellers to homeowners) reported by the State of Massachusetts (2017) for winter 2017 were \$256 per tonne (bulk) and \$6.77 per 18.1 kg (40 lb) bag, indicating minimal change, year-on-year – bulk prices were \$260 per tonne in winter 2016 and \$6.73 per 18.1 kg bag. In the US Midwest, the price of premium wood pellets ranged from \$239 to \$249 per tonne in spring 2017, and the price of super premium pellets¹⁷ were in the range of \$275-297 per tonne (BT Enterprises, 2017), which was about \$10-15 lower than in 2016.

¹⁷ Super premium pellets are intended for applications where a very low ash content (less than 0.5%) is desirable.

9.4.3 Trade

North American wood pellet exports to the world totalled 7.1 million tonnes in 2016, up by 12.5% over 2015. The increase was only 2% in trade value (CIF), however, due to lower prices. Total exports of wood pellets (UN commodity code 440131) in 2016 were 2.4 million tonnes from Canada and 4.7 million tonnes from the US. The biggest market in the UNECE region for North American exports was the UK, at 83% of all weight-based wood pellet trade, followed by Belgium, at 6.4%. Outside the UNECE region, Japan and the Republic of Korea were the destinations of 3.9% and 0.7%, respectively, of all North American wood pellet exports. The rising importance of Japan and the emergence of Belgium as significant markets for Canadian wood pellets represent opportunities for exporters. Increased exports to new Asian markets have come with a proportional reduction in the importance of the UK market for Canadian exporters. Over the period 2015-2016, the importance of the UK declined from 73% to 70%. Over the same period, there was a slight reduction in the quantity of pellets exported from Canada to the US (from 0.2 million tonnes in 2015 to 0.17 million tonnes in 2016) (Statistics Canada, 2017b). Ninety percent of US wood pellet exports are destined for the UK (COMTRADE, 2017).

9.5 Policy, standards and regulatory influences

In Europe, the UK's decision to leave the EU could have implications for policies on, and the trade of, commodities such as wood pellets. The effects of secession negotiations and outcomes on exchange rates will likely have an influence on the competitiveness of wood pellet suppliers in Europe and the US-to-UK market. For example, a strong dollar versus the euro reportedly benefited suppliers in Portugal and the Baltic States to the UK's marginal and spot demand in the first half of 2016 (Tovey-Fall, 2016). The potential development of new environmental policies in the UK could have an impact on future demand for wood pellets (Snook, 2016).

As a result of the Dutch SDE+ subsidy, which is expected to support up to 3.5 million tonnes of wood pellet demand per year for power generation, the biggest new source of European demand might be the Netherlands (Tovey-Fall, 2016). Under the SDE+, which is an operating (feed-in-tariff) subsidy, producers receive a guaranteed payment for the energy generated from renewable sources. A key change since 2016 is that the subsidy's maximum base amount of €0.15 per kWh was reduced to €0.13 per kWh in 2017. In the case of thermal conversion for heat, the minimum capacity for boilers for the production of industrial steam from wood

pellets has been lowered from ≥ 10 MWth to ≥ 5 MWth (Netherlands Enterprise Agency, 2017).

In the CIS, Russian wood energy export companies have joined various associations to consolidate their activities. The reliance of CIS wood pellet producers on exports to the EU has encouraged the adoption of wood pellet certification. Major pellet export companies in the Russian Federation are involved in certification in line with the standards of the Sustainable Biomass Partnership and ENplus.

Canada's move towards a greener economy is being defined through a series of policy initiatives, two of which could have significant impacts on the wood energy sector. The first is the emerging development of a clean fuels standard to augment the existing Renewable Fuel Regulation, which applies to liquid fuels for transport but which could be extended to all fuels (solid, liquid and gaseous) with the goal of reducing carbon intensity. A discussion paper has been released on the proposed standard, and the government is reviewing public inputs to the proposed legislation (ECCC, 2017). The second major policy move is the development of a pan-Canadian carbon pricing strategy, which will complement the carbon taxes or cap-and-trade systems that now exist in the Canadian provinces of Alberta, British Columbia, Ontario and Québec. The government strategy – referred to as “the backstop” – will include a carbon levy (applied to fossil fuels) and a pricing system for industrial facilities. The backstop will be applied across the country from 2018 to 2022 to ensure that a minimum carbon price is met in every province and territory – starting at CAD 10 per tonne of carbon dioxide-equivalent in 2018 and increasing by CAD 10 per tonne per year to reach CAD 50 per tonne in 2022 (Government of Canada, 2017).

In the US, the 2017 Consolidated Appropriations Act (US Public Law 115-31) directs the US departments of Energy and Agriculture, in conjunction with the US Environmental Protection Agency (EPA), to ensure that US federal policies on wood energy are consistent across agencies. These departments are also been instructed that policies must recognize the carbon-neutrality of wood energy, provided there is no conversion of forests to non-forest uses. However, there are currently no US federal policies that encourage or require the use of wood for energy. State policies, such as renewable portfolio standards, will not be affected by this regulation. The US announcement to withdraw from the Paris Agreement on climate change (The White House, 2017), and the current review of the Clean Power Plan to reduce carbon emissions from power plants (US Environmental Protection Agency, 2017), brings uncertainty to the role that wood energy could play in contributing to non-fossil fuel energy portfolios at a federal level. Moreover, a proposal (known as RED II) to revise the Directive of the European Parliament and of the Council of the European Union on the Promotion of the

Use of Energy from Renewable Sources regarding renewable energy and biomass sustainability (European Commission, 2017) would require that biomass is sourced from a country that is a party to, and has ratified, the Paris Agreement. The inclusion of a risk-based approach to proving sustainability could affect US wood pellet supply chains. Views diverge on the impact that potential new requirements by the EU would have on Canadian and US exports (Ginther, 2017; Murray, 2017), and the likely consequences might not be known until RED II is finalized.

In the Western Balkans, the most significant policy affecting wood energy markets is in Serbia, where the value-added tax (VAT) rate was reduced from 20% to 10% for all woodfuels, as of 1 January 2017. This levelled VAT rates for fuelwood and other woodfuels. The measure, which means that Serbia now has the lowest VAT on woodfuels in the Western Balkans, followed two years of discussions among government officials, producers, traders and the academic community on the expected impacts of the reduction on the Serbian wood energy market. The VAT on woodfuels is 17% in Bosnia and Herzegovina; 18% in the former Yugoslav Republic of Macedonia; 18% in Montenegro; 20% in Albania and 25% in Croatia (Glavonjić, 2017a).

Policies in other Western Balkan countries have focused on incentives (e.g. feed-in tariffs) for electricity generation using biomass. In Croatia, the number of CHP plants burning woody biomass increased from four in 2014 to ten in 2015, reaching an installed capacity of 24.6 MWe (Ecological Economics, 2017). One CHP plant started operations in 2016, another in 2017, further increasing total installed capacity to 32.6 MWe (Drvo & namještaj, 2017). Another 53 contracts are in place in Croatia for the purchase of electricity from biomass cogeneration plants which are now under construction. These have a total capacity of 90.7 MWe (Ecological Economics, 2017).



Source: UNECE/FAO, 2017.

9.6 Innovation in the sector

Two projects in Canada aim to achieve commercial scale for liquid biofuel production. Bioénergie La Tuque (BELT), a forest biorefinery project, was launched in La Tuque, Québec, with a technical and economic feasibility study. A detailed economic analysis will follow, leading to the expected construction of a demonstration plant with a capacity of 200 million litres of biodiesel per year to be generated from forest residues. Neste Corporation recently announced a research-and-development collaboration with BELT to study the feasibility of producing renewable diesel from forest harvest residues (FPInnovations, 2017; Neste, 2017). Another Québec-based project is Côte Nord, which is under development by Ensyn, Arbec Forest Products and Groupe Rémabec (Ensyn, 2017). This project, which is expected to be commissioned in late 2017, could see the production of 40 million litres of biocrude

per year for use in heat and electricity generation, as well as downstream refining. The development of these projects will accelerate the adoption of technologies that facilitate new wood-to-energy pathways.

In the US, the Boardman Power Plant in the state of Oregon managed by Portland General Electric (PGE) has chosen to either convert the station to cleaner-burning biomass or shut it down by 2020. PGE is considering using torrefied biomass from agricultural and woody biomass as feedstocks in the plant, which currently uses pulverized coal. PGE has partnered with a newly incorporated company called Oregon Torrefaction, which will use small-diameter and beetle-killed trees, mostly from national forests, to help supply the estimated 8,000 tonnes per day needed while also reducing the risk of wildfire near forest communities. Oregon Torrefaction is in the process of installing a large torrefier at a chipping yard eight miles from the Boardman Coal Plant (Plaven, 2016).

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Chapter **10**

VALUE-ADDED
WOOD PRODUCTS

Authors: Chris Gaston, Tapani Pahkasalo

Highlights

Digitalization and “smart-home solutions” are entering homes and furniture. Furniture manufacturers are looking for ways to integrate new technologies into products, and **consumers are upgrading their homes with digital control systems.**

The US Department of Commerce renewed antidumping duties on Chinese bedroom furniture in 2017 after its latest review. A new antidumping case on hardwood plywood has started and is already shaping trade in furniture parts, with the US imposing **preliminary tariffs on 61 Chinese manufacturers of hardwood plywood products.**

US imports of wooden furniture grew solidly in 2016 for the seventh consecutive year, reflecting the strength of the US economy and housing markets. **European markets remained stagnant**, with mixed signals.

Global furniture production amounted to \$420 billion in 2016, and the global furniture trade volume was estimated at \$140 billion. **Industry expectations are for another year of stable growth in 2017.**

Austria was the largest producer of glulam in Europe in 2014 (the most recent year for which production data could be found), at roughly 1.5 million m³. Austria exported 1.1 million m³ of glulam and cross-laminated timber (CLT) (mostly glulam) in the first 11 months of 2016.

Glulam production in North America declined steadily from 750,000 m³ in 2006 to 285,000 m³ in 2009. Since then, however, it has showed consistent, **significant annual gains**, with production forecast at 449,000 m³ in 2017.

Wooden I-beam production in North America is forecast to reach 232 million linear metres in 2017, which would be roughly **double the quantity produced in 2009.** **Laminated veneer lumber (LVL)** production in North America is forecast to reach 2.1 million m³ in 2017, more than **double the volume produced in 2009.**

Cross Laminated Timber (CLT) is garnering global attention, with production plants and tall wooden buildings made of CLT appearing in Europe, North America, Asia and Oceania. In the US alone, the potential market for CLT has been estimated at 2 million-6 million m³, far more than the entire current global supply.

10.1 Introduction

Value-added wood products are primary wood products that have been further processed into secondary products such as furniture, builders' joinery and carpentry (BJC), profiled wood, and engineered wood products (EWPs).

BJC comprises a wide array of wood products, including wooden windows and doors; pre-assembled wooden flooring; posts and beams; shakes and shingles; and products that fall into the category of EWPs (e.g. glulam and cross-laminated timber – CLT). EWPs include I-beams (also called I-joists), with their I-shaped cross-sections; finger-jointed sawnwood; glulam (sawnwood glued into beams); laminated veneer lumber (LVL), which is formed by gluing together sheets of veneer and resawing to desired dimensions; and CLT, which comprises panels made up of sawnwood in cross-laminated plies. Profiled wood is wood shaped by machines to create, for example, moulding, tongue-and-groove, and lap siding.

Most of the value-added products covered in this chapter are highly dependent on residential construction (new and, just as importantly, repair and renovation) and increasingly on non-residential building construction, including schools, restaurants, stores and warehouses.

The favourable growth in housing starts and repair and remodelling is expected to continue in North America, which bodes well for the trade of value-added wood products there (Harvard, 2017; APA, 2017). Growth in Europe has been below expectations. It can be summarized as positive on the whole, but some European markets have reverted to negative growth. The forecast for 2017-2019 is positive but relatively flat, with a forecast growth of around 2% (Euroconstruct, 2016). Chapter 11 presents more information on the outlook for construction and renovation.

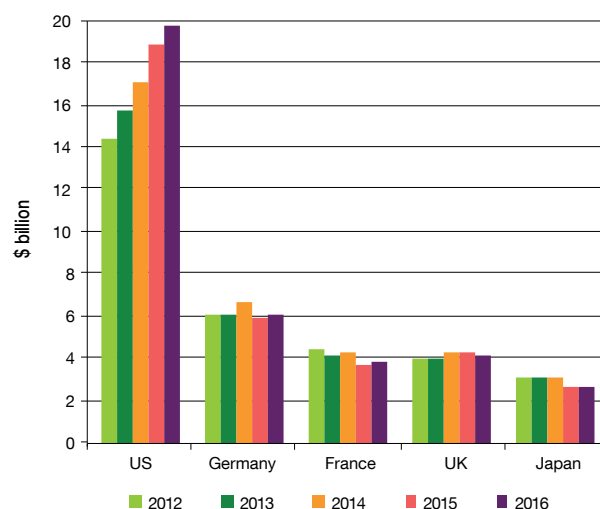
10.2 Wooden furniture trade in major markets

The value of global furniture production was estimated at \$420 billion in 2016, up moderately from 2015 (CSIL, 2017). The value of global furniture trade was estimated at \$140 billion in 2016, with France, Germany, the US and the UK the largest import markets (graph 10.2.1). Furniture has become a large global trade flow as the industry has globalized and production has moved to lower-cost countries, and China is now the world's largest furniture producer and exporter. There are, however, some diverging trends, with increasing consumer awareness of locally produced furniture.

Market news indicated an increase of 3.8% in the largest import market for wooden furniture, the US, in April 2017, compared with the same month in 2016. Data for earlier in

GRAPH 10.2.1

Wooden furniture imports, top five importing countries, 2012-2016



Sources: Eurostat, 2017; Trade Statistics of Japan, 2017; US International Trade Commission, 2017.

2017 showed a similar trend, signalling continued growth in the market, year-on-year. Sales declined by 0.5% from March to April 2017, suggesting a slowdown in furniture markets to mid-2017. Some producers are reporting large variations in inventories, indicating uncertainty in the market, and vendors are not taking high risks. Nevertheless, the traditional furniture trade shows, such as the High Point Market in North Carolina in April, have been optimistic in tone, and the industry is expecting a year of stable growth.

Furniture companies in the UNECE region are looking for ways to expand furniture production in their home countries, exploring design, service and custom-made concepts as ways of competing with imported Asian furniture. Shorter delivery times would mean keeping stock, and high-end customers increasingly want their furniture customized. Traditional furniture stores with display rooms are finding it difficult to compete with Internet-based stores, the overhead costs of which are a fraction of those of traditional stores; moreover, the new generation of customers perceives the level of service and delivery times of online stores as "good enough".

Digitalization is advancing inside homes, creating "smart homes" via the Internet of Things (IoT).¹⁸ Many smart-home solutions involve lighting, heating and cooling, and they

¹⁸ The Internet of Things consists of both simple and complicated devices and sensors that connect and communicate with each other to increase efficiency (e.g. save time and reduce energy consumption and greenhouse gas emissions).

can also be integrated into furniture. For example, kitchen lights are being combined with kitchen shelves, and it is also happening in other parts of the home. Integrating entertainment, music and device-charging with furniture not only saves floor space, it also makes interior designs more versatile and spacing more flexible. Such functions, connected to the IoT, can be controlled by the user or automated to offer the best user experience while also saving energy and reducing clutter. The integration of services, such as touch-screen displays on tables, will require furniture manufacturers to acquire new skills and work closely with technology companies. The first movers in nascent “smart-furniture” markets are technology companies, who have subcontracted furniture companies to produce the furniture structures they need for integration.

US imports of wooden furniture grew solidly in 2016 for the seventh consecutive year, reflecting the strength of the economy and housing markets. Furniture consumption is linked closely to housing markets because households usually change or increase the quantity of their furniture at the time of home purchase. US imports of wooden furniture have now almost doubled from the low of 2009, with imports of \$19.7 billion in 2016 representing a 5% increase compared with 2015. European furniture markets remained stagnant, however: France and Germany recorded moderate growth in 2016, but the UK market declined. The share of imports from Asia to the US is high, at 74% of all imports; in contrast, markets in continental Europe are much more local, with Asian producers holding a 15–21% market share (table 10.2.1).

Discussion on wooden furniture, particularly in Europe, would be incomplete without mentioning IKEA. IKEA had sales of

\$37.6 billion in 2016, a 7.9% increase over 2015 (adjusting for currencies) (IKEA, 2017). IKEA was the largest single buyer of wood in Europe in 2015, consuming 16.2 million m³ of solid-wood equivalent and an estimated 3.8 million m³ in paper and paperboard for packaging. Of the wood component, approximately 60% was solid wood and 40% was boards made with wood particles (e.g. particleboard and fibreboard). The majority of the wood consumed by IKEA comes from Europe, with Poland supplying about 25%, Lithuania 7.5%, the Russian Federation 7% and Sweden 6.5%. To a large degree, IKEA’s strength in Europe has been a driving factor in maintaining furniture production in Europe and even reducing the share of furniture imported from outside the subregion (this has not been the case in North America) (Bonnet, 2016).



Source: APA, 2017.

TABLE 10.2.1

Value of furniture imports, and market share of supplying regions, top five importing countries, 2015 and 2016

Value (\$ billion)

	US		GERMANY		FRANCE		UK		JAPAN	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Total value of imports	18.9	19.7	5.9	6.1	3.7	3.8	4.3	4.2	2.6	2.7
Of which furniture parts	2.7	3.0	1.2	1.3	0.7	0.7	0.8	0.8	0.5	0.5
Market share of exporters (% of value)										
Asia	74.3	74.0	16.1	14.8	21.9	21.3	51.2	51.1	88.7	89.3
Europe	9.0	9.6	0.1	0.2	0.7	1.2	1.0	1.1	0.8	0.6
North America	10.1	9.8	83.4	84.7	76.5	76.7	45.6	45.7	10.4	10.0
Latin America	6.4	6.5	0.2	0.2	0.5	0.5	2.2	2.0	0.1	0.1
Others	0.1	0.1	0.2	0.2	0.4	0.3	0.0	0.0	0.0	0.0

Sources: Eurostat, 2017; Trade Statistics of Japan, 2017; US International Trade Commission, 2017.

10.3 Trade policy issues in markets for value-added wood products

More than a decade ago, Chinese-made bedroom furniture made news when US-based manufacturers claimed unfair pricing, an issue covered in this Review since 2004. In 2005, the US Department of Commerce issued antidumping duties ranging from 0% to more than 200% for Chinese-made bedroom furniture products. These duties have changed the way the industry operates, directly affecting trade between the US and China. Industry experts believe the duties are outdated because a large part of the production has moved from China to Viet Nam, with trade from Viet Nam to the US operating without the antidumping duties, which apply only to products made in China (Russell, 2017).

The US International Trade Commission (USITC) decided to conduct a full five-year “sunset” review of the antidumping duty order on wooden bedroom furniture from China. Views were solicited from domestic furniture companies, but none of the Chinese companies participated in the review. The World Trade Organization’s (WTO) General Agreement on Tariffs and Trade (GATT) requires the US Department of Commerce to revoke the antidumping duty after five years unless the US Department of Commerce and USITC determine that revoking the order would likely lead to the continuation or recurrence of dumping or subsidies within a reasonably foreseeable time. In February 2017, USITC determined that revoking the existing antidumping duty order on wooden bedroom furniture from China would likely lead to the continuation or recurrence of material injury. Therefore, the existing antidumping duty order on imports of this product from China will remain in place.

In late 2016, a group called the Coalition for Fair Trade of Hardwood Plywood filed a petition with the US International Trade Administration, accusing Chinese hardwood plywood manufacturers of below-market pricing. As a result, the US International Trade Administration announced preliminary duties, as high as 111%, for 61 Chinese manufacturers of hardwood plywood products, including hardwood and decorative plywood and certain veneered products. These preliminary duties, designed to address allegations of unfair trade practices by Chinese producers, have been in effect since April 2017. They exclude fully assembled wooden furniture and also flat-packed furniture but are applicable to veneer, plywood and panels imported for assembly (Russell, 2017). The direct impacts of this move on the furniture industry are unknown, but it could open up another long case of antidumping duties. Industry experts are sceptical that the duties will help the furniture industry gain competitiveness.

10.4 Builders’ joinery and carpentry, and profiled-wood trade

The market for BJC has developed strongly in the US in the last five years. The value of the import market now exceeds \$2.1 billion, although this is still 25% below the nominal value in 2006, the peak year for BJC imports. The BJC market in North America is expected to continue developing solidly as housing markets strengthen. In contrast, there has been no significant change in import volumes in the last several years in the largest European BJC import markets, Germany and the UK, and the French market has declined in value. The competitiveness of Asian BJC producers has declined in the European import market, with trade becoming more intra-European. Similarly, the role of North American subregional trade has strengthened in the US market at the cost of Asian producers. The Japanese market grew by almost 20% in 2016, year-on-year, after years of decline (graph 10.4.1 and table 10.4.1).

Profiled-wood imports to the US declined in 2016 despite the strengthening housing market. The market for profiled-wood imports had strengthened for several years, reaching \$1.2 billion in 2015, which, however, was still far below the peak in 2006. Several large profiled-wood producer companies in the Southern Hemisphere (namely in Brazil and Chile) that manage their own pine plantations have permanently shifted production to other, mainly Asian, markets, closing down or modifying production facilities and even changing forest management regimes. If a pine plantation is not pruned at the right age it cannot produce clear pine sawnwood and consequently clear mouldings. Painted or coated mouldings, often made of medium-density fibreboard, have replaced clear, knot-free pine moulding in some markets. US softwood moulding import markets are serviced almost entirely by a few producers – Brazil (34% of the total), Chile (24%), Canada (14%) and China (13%) (the latter using imported New Zealand pine as the raw material). Profiled-wood markets in Europe continued to decline slightly in 2016, serviced mainly by other European producers (graph 10.4.2 and table 10.4.2).

TABLE 10.4.1

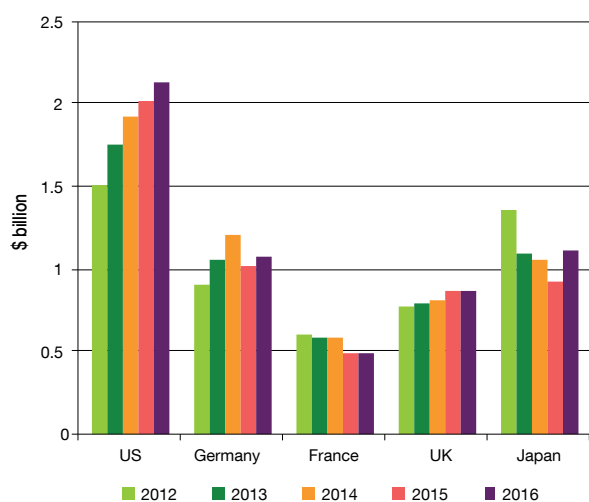
Value of builders' joinery and carpentry imports, and market share of supplying regions, top five importing countries, 2015-2016 - Value (\$ billion)

	US		GERMANY		FRANCE		UK		JAPAN	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Total value of imports	2.0	2.1	1.0	1.1	0.5	0.5	0.9	0.9	0.9	1.1
<i>Market share of exporters (% of value)</i>										
Asia	33.1	31.8	7.5	7.4	8.7	8.0	37.9	37.0	93.1	93.9
Europe	48.7	50.6	0.2	0.2	0.8	0.8	2.0	1.6	2.6	2.4
North America	4.7	4.8	91.5	91.2	88.6	89.0	56.3	57.6	2.7	2.1
Latin America	13.0	12.3	0.0	0.0	0.8	0.9	2.3	2.0	0.0	0.0
Others	0.5	0.5	0.8	1.2	1.1	1.2	1.4	1.8	1.5	1.6

Sources: Eurostat, 2017; Trade Statistics of Japan, 2017; US International Trade Commission, 2017.

GRAPH 10.4.1

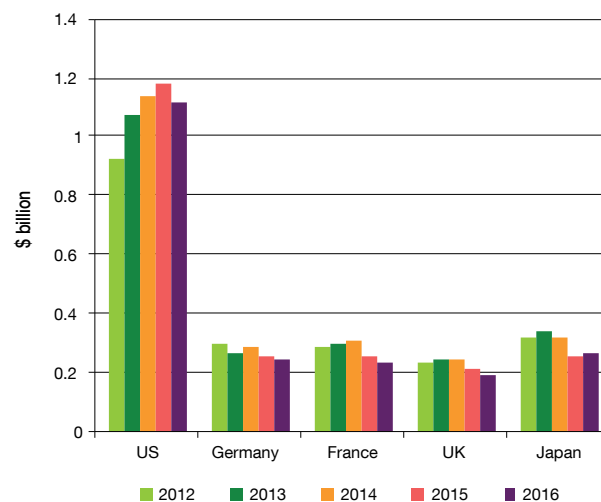
Builders' joinery and carpentry imports, top five importing countries, 2012-2016



Sources: Eurostat, 2017; Trade Statistics of Japan, 2017; US International Trade Commission, 2017.

GRAPH 10.4.2

Profiled-wood imports, top five importing countries, 2012-2016



Sources: Eurostat, 2017; Trade Statistics of Japan, 2017; US International Trade Commission, 2017.

TABLE 10.4.2

Profiled-wood imports, top five importing countries, 2015 and 2016 - Value (\$ billion)

	US		GERMANY		FRANCE		UK		JAPAN	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Total value of imports	1.2	1.1	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.3
<i>Market share of exporters (% of value)</i>										
Asia	22.4	23.1	22.0	19.2	8.8	10.2	63.3	53.2	78.3	75.9
Europe	11.6	13.1	0.9	1.0	0.4	0.5	3.4	3.6	7.6	7.8
North America	3.6	3.6	70.4	73.2	63.3	68.5	31.4	41.2	8.0	9.0
Latin America	61.8	59.5	4.4	3.7	26.5	19.7	1.7	1.6	4.2	5.1
Others	0.7	0.8	2.2	2.9	1.0	1.0	0.2	0.4	1.8	2.2

Sources: Eurostat, 2017; Trade Statistics of Japan, 2017; US International Trade Commission, 2017.

10.5 Engineered wood products

Engineered wood products (EWPs) covered in this section are glulam timber/beams, I-beams (also called I-joists) and LVL. All three products are highly dependent on residential construction – new, and just as importantly, repair and renovation – and on non-residential building construction such as offices, schools, restaurants, stores and warehouses¹⁹.

Although non-residential construction is dominated by concrete and steel (even in North America, only one-quarter of this construction is wood-framed), there is considerable room for growth in EWPs, especially with the emergence of new products and systems such as cross-laminated and heavy timber, and more recently tall buildings of ten storeys or more.

It is estimated that one-third of housing starts in the US today are multifamily, compared with as little as 13% in the decade before the 2008-2009 global financial crisis. This is a significant change because multifamily units use less wood product per start but also tend to use more prefabricated construction and EWP components. EWPs have shown modest recovery in North America since the bottoming out of building construction activity.

10.5.1 Glulam timber

10.5.1.1 Europe

Comprehensive data on the production and consumption of glulam in Europe are unavailable, but some information exists on trade and production at the country level.

Austria was the largest producer of glulam in Europe in 2014 (the most recent year for which production data could be obtained), at roughly 1.5 million m³ (Timber-online, 2015); the country exported 1.1 million m³ of glulam and CLT (mostly glulam) in the first 11 months of 2016, an increase of 10% compared with the same period in 2015²⁰. Italy was the most significant importer of Austrian glulam and CLT in the first 11 months of 2016, at 535,000 m³ (up by 3%, year-on-year), followed by Germany (189,000 m³, up by 31%) and Japan (128,000 m³, up by 10%) (Timber-online, 2017).

The majority of Japan's 771,000 m³ of glulam and CLT imports in 2016 were from European sources, with Finland, Romania, Austria, Estonia, the Russian Federation and Sweden (in descending order of magnitude) the biggest suppliers, accounting for 95% (735,000 m³) of the total. Of that group, only Sweden saw a decrease (-32%). Exports increased substantially from Finland (+17%) and Romania (+14%) (Timber-online, 2017a).

¹⁹ The information presented on North America in this section is primarily adapted from APA (2017). Data are difficult to obtain on EWP production and consumption in Europe but are provided where available.

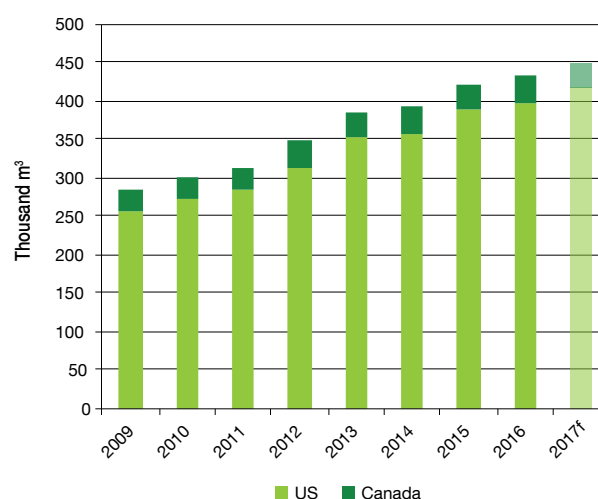
²⁰ Unless otherwise noted in this chapter, glulam data is separate from CLT.

10.5.1.1 North America

Overall production of glulam declined steadily in North America between 2006 and 2009, from 750,000 m³ to 285,000 m³. Production has increased consistently since then, however, and is forecast to reach 449,000 m³ in 2017 (graph 10.5.1 and table 10.5.1).

GRAPH 10.5.1

Glulam production, North America, 2009-2017



Note: f = forecast.

Source: APA, 2017.

TABLE 10.5.1

Glulam production and consumption, North America, 2015-2017 (thousand m³)

	2015	2016	2017f	Change (%) 2015-2017
US				
Production	387.7	395.4	415.4	7.1
Total consumption	378.5	400.0	421.5	11.4
Residential	216.9	230.8	246.2	13.5
Non-residential	144.6	149.2	153.8	6.4
Industrial, other	16.9	20.0	21.5	27.3
Inventory change	9.2	-4.6	-6.2	-166.7
CANADA				
Production	32.3	35.4	33.8	4.8
NORTH AMERICA				
Total production	420.0	430.8	449.2	7.0

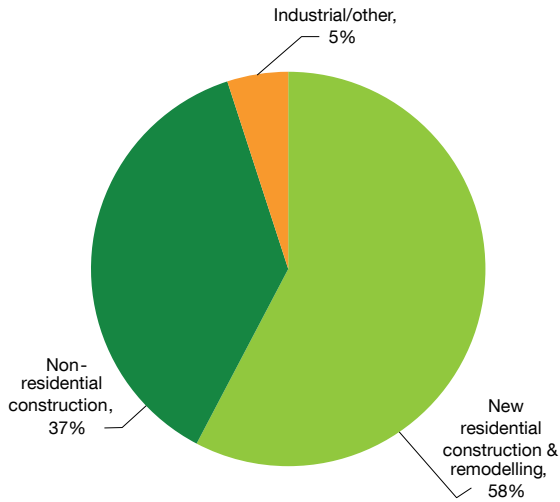
Notes: f = forecast. Conversion factor: 1 m³ = 650 board feet. Canadian imports are assumed to be minimal.

Source: APA, 2017.

Glulam consumption in North America is highly dependent on new-building construction and renovation, with only about 5% used for industrial and other applications (graph 10.5.2).

GRAPH 10.5.2

Uses of glulam, North America, 2016



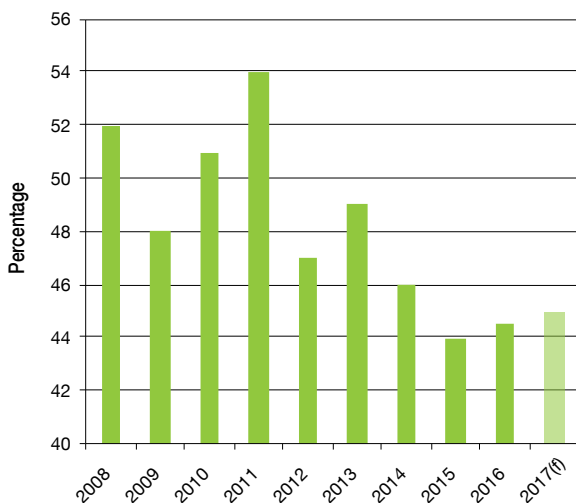
Source: APA, 2017.

10.5.2 I-beams

I-beams are more than 80% dependent on new-home construction, mostly for single-family dwellings. Builder surveys indicate that I-beams had a 44-49% share of raised wood-floor area (not including concrete floor area) in the period 2012-2017 (graph 10.5.3); the market share was only 16% in 1992.

GRAPH 10.5.3

I-beam market share of total raised wood-floor area, single-family homes, US, 2008-2017



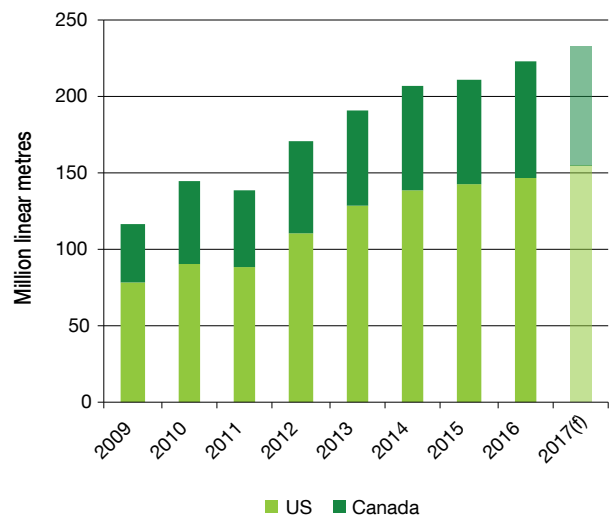
Note: f = forecast.

Source: Home Innovation Research Lab, 2016, surveys.

I-beam production peaked in 2004 at 394 million linear metres, which represented the capacity of I-beam plants at that time. Housing starts were so high that manufacturers were producing all they could. I-beam demand and production declined when the US housing bubble burst, with roughly 115 million linear metres produced in 2009 in North America (of which 75 million were produced in the US). There have been significant increases since. However, the forecast of production for 2017 is 232 million linear metres (about double the quantity in 2009) (graph 10.5.4 and table 10.5.2).

GRAPH 10.5.4

I-beam production, North America, 2009-2017



Notes: f = forecast. Conversion factor: 1 linear metre = 3.28 linear feet.

Source: APA, 2017.

TABLE 10.5.2

Wooden I-beam consumption and production, North America, 2015-2017 (million linear metres)

	2015	2016	2017f	Change (%) 2015-2017
US				
Production	141.8	147.0	154.0	8.6
Total consumption	173.2	187.2	197.3	13.9
New residential	151.2	164.6	173.8	14.9
Repair, remodelling	11.0	11.3	11.6	5.6
Non-residential, other	11.0	11.3	11.9	8.3
CANADA				
Production	68.0	75.6	78.0	14.8
Consumption	31.7	31.4	31.4	-1.0
Inventory change	1.2	2.1	0.0	-100.0
NORTH AMERICA				
Total production	209.8	222.6	232.0	10.6

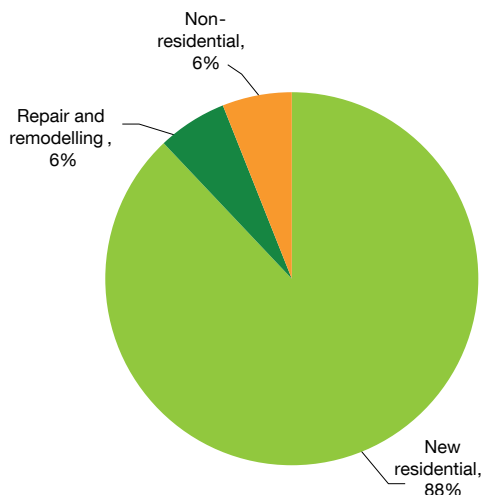
Notes: f = forecasts. Conversion: 1 linear metre = 3.28 linear feet.

Source: APA, 2017.

Most I-beams (88%) are used in new residential construction (graph 10.5.5). The balance is used in non-residential building construction and in repair and remodelling.

GRAPH 10.5.5

I-beam end-uses, North America, 2016



Source: APA, 2017.

10.5.3 Laminated veneer lumber

Ultimately, most LVL is used in new-home construction. In 2016, 72% of LVL production in North America was used in beams and headers, rim boards and like applications, and the balance was used in I-joist flanges. Rim boards are used on the perimeters of I-beam floor systems to provide fastening points for the I-beams and to assist in distributing wall loads. North American production peaked with the US housing market in 2005, at 2.6 million m³, and declined thereafter to 2009, along with I-beam production and the housing market. According to forecasts, 2.15 million m³ of LVL will be produced in North America in 2017, up by more than 130% from the 2009 trough (graph 10.5.6 and table 10.5.3).

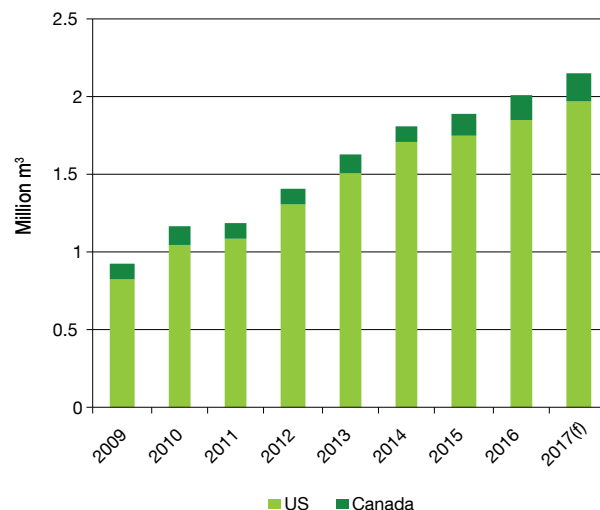
LVL is well accepted for use in beams and headers, and consumption should grow as the housing market improves. Like other EWPs, LVL allows the use of longer spans and fewer pieces to carry the same loads, compared with conventional wood products.

In addition to the EWPs discussed in this chapter, a number of other structural composite lumber products are manufactured in North America, including parallel strand lumber (PSL), laminated strand lumber (LSL) and oriented strand lumber (OSL). These products are made from strands of wood of varying lengths and widths to achieve differing strength and stiffness properties. PSL and LSL have been manufactured for several years, primarily by one company,

and production volumes are low compared with other EWPs. Uses for OSL are expected to be the same as for solid sawn lumber and glulam – posts, beams, headers, rim boards and structural framing lumber.

GRAPH 10.5.6

Laminated veneer lumber production, North America, 2009-2017



Notes: f = forecast. Conversion factor: 1 m³ = 35.3137 cubic feet.

Source: APA, 2017.

TABLE 10.5.3

Laminated veneer lumber consumption and production in North America, 2015-2017 (thousand m³)

	2015	2016	2017 ^f	Change (%) 2015-2017
CONSUMPTION				
I-beam flanges	527	569	598	13.4
Beams, headers, others	1,356	1,495	1,552	14.4
Total consumption	1,883	2,064	2,149	14.1
PRODUCTION				
US	1,739	1,841	1,968	13.2
Canada	144	170	181	25.5
Total production	1,883	2,011	2,149	14.1

Notes: f = forecast. Conversion: 1 m³ = 35.3137 cubic feet.

Source: APA, 2017.

10.5.4 Cross-laminated timber

CLT production and use is not new, especially in the DACH countries (i.e. Germany, Austria and Switzerland), where CLT has been manufactured and produced for over 20 years. Today, however, there is tremendous interest in, and enthusiasm for, CLT globally (transcending its current impact) because it enables completely different methods of building design and construction. In addition, it can be used instead of concrete and steel in the construction of tall and large buildings. Architects and engineers can design buildings in different ways using CLT compared with traditional wood construction techniques. Components can be custom-made with computer numerical control (CNC), almost eliminating the need to fabricate components during construction (thereby expediting assembly and drastically cutting waste). Moreover, the seismic resilience of CLT buildings is an important attribute in earthquake-prone regions. Finally, CLT has comparatively low carbon emissions – both embodied and operational – over the lifecycle of buildings and is seen, therefore, as a strong step towards sustainability. Global production of CLT in 2015 was estimated at 650-700,000 m³. A production volume of 1 million m³ was projected for 2016 as investments in Finland, Japan, Latvia and the US came online (Plackner, 2015).

Outside the UNECE region, Japan, which produced about 10,000 m³ of CLT in 2015, has taken on an ambitious process called the CLT roadmap. Among the goals of the roadmap are: obtaining a 6% share for CLT of buildings up to four stories high; the use of subsidies to offset up to 50% of the investment costs of new CLT plants; an increase in domestic CLT production capacity to 60,000 m³ by 2016 and 500,000 m³ by 2024; and a reduction in CLT production costs of more than 50% (Eastin, 2016).

New Zealand has been producing CLT commercially since 2013. Two plants are planned in Australia (Muszynski *et al.*, 2017).

Below, we summarize CLT developments in Europe and North America.

10.5.4.1 Europe

CLT production is still concentrated in Europe and, within Europe, in the DACH countries, which together accounted for about 80% of global production in 2015 (Austria alone produced about 60% of global production). European production was estimated at 680,000 m³ in 2016. This is forecast to increase to about 1.25 million m³ by 2020 (table 10.5.4). Despite hype around the use of CLT in the construction of tall wooden structures, small and medium-sized buildings are still the main focus of most producers (Muszynski *et al.*, 2017).

TABLE 10.5.4

Cross-laminated timber production, Europe, 2016 and 2020 (thousand m³)

ENTERPRISE	LOCATION	2016	2020f
Binderholz	Unternberg, Austria; Burgbernheim, Germany	145	210
Stora Enso	Bad St. Leonhard, Austria; Ybbs, Austria	130	210
Legal & General	UK	–	120
KLH Massivholz	Katsch a. d. Mur, Austria	88	110
Pfeifer Holz	Lauterbach, Germany	–	100
Hasslacher Norica Timber	Stall im Mölltal, Austria	40	80
Mayr-Melnhof Holz	Gaishorn, Austria	60	80
CLT Finland	Hoisko, Finland	5	40
Eugen Decker	Morbach, Germany	25	30
Züblin Timber	Aichach, Germany	30	30
Lignotrend	Weilheim-Bannholz, Germany	25	25
Cross Timber Systems	Jelgava, Latvia	–	25
X-Lam Dolomiti	Castelnuovo, Italy	20	23
Weinberger Holz	Reichenfels, Austria	6	20
Martinsons	Bygdsiljum, Sweden	–	20
W.u.J. Derix	Niederkrüchten, Germany	13	15
Schilliger Holz	Küssnacht, Switzerland	13	13
Other producers		81	99
TOTAL		680	1,250

Notes: f = forecast. Data provided by named enterprises; the estimate for “other producers” is by Timber-online.

Source: Holzkurier, 2017.



Source: APA, 2017.

10.5.4.2 North America

CLT has become increasingly popular in North America, echoing the long-established trend in Europe. Production in North America, which, to date, has been oriented more towards platforms used in mining and the oil industry, is expected to increase significantly in coming years, with increased use in the building sector.

Due largely to the emergence of CLT, increasing numbers of tall wooden structures are being erected around the world. The Brock Commons student residence – an 18-storey, wood-hybrid high-rise – was completed at the University of British Columbia, Vancouver, Canada, in 2017. At 53 metres, this is the world's tallest wood building, consisting of a mass wood superstructure (CLT and glue-laminated timber) on top of a

concrete base and central concrete towers. The mass wood structure and façade were erected four months faster than for a typical building project of that size, an improvement of 18% – showcasing one of the advantages of building with wood. The structure was completed less than 70 days after the prefabricated components were delivered on site. The building is expected to accommodate more than 400 students from September 2017 (University of British Columbia, 2016).

Five CLT plants are in operation in North America (two in Canada and three in the US), with 2015 production capacity in Canada estimated at 110,000 m³. Production figures for the US are not available. It is estimated that the potential market for CLT in the US alone could be 2 million-6 million m³, far outstripping the entire current global supply (Espinoza *et al.*, 2016).

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Chapter **11**

HOUSING AND
CONSTRUCTION

Lead author: Delton Alderman

Highlights

European and North American house prices have recovered from the global financial crisis in 2008-2009 to the extent that, in Austria, Belgium, Canada, Germany and the US, there are concerns about rapidly rising house prices.

In aggregate, **OECD economies are improving**, albeit incrementally. **Unemployment and underemployment remain high** in several OECD countries. This has also been reflected in the **slow recovery** of housing and construction markets in the UNECE region.

The value of construction increased by 7.1% in the euro area and by 5.2% in the EU28 between February 2016 and February 2017, **due primarily to improvements in the civil engineering sector**, followed by the building construction sector.

On a monetary basis, **remodelling is the largest component of euro-area residential construction**. New residential construction is forecast to grow at a faster rate than remodelling in the immediate future.

Housing completions in the Russian Federation achieved a near-record level in 2015, with 286,129 new residential dwellings put in place.

All sectors of the US housing market improved in 2016. Beginner or starter housing remains weak, however, and the number of dwellings built is insufficient to match population growth.

US household formations are improving but remain below the historical average.

Canada's economy improved in 2016 and is expected to continue to grow in 2017 and 2018. Forecasts suggest modest housing demand and starts in Canada in 2017 and 2018.

There is increasing concern about escalating housing prices in Vancouver and the Greater Toronto Area.

11.1 Introduction

In most countries, remodelling²¹ and new housing construction and sales are essential components of the economy, and therefore much research is directed towards the housing sector. Housing is usually considered a primary indicator and driver of the overall economy. In this context, subdued housing markets are, in part, culpable for the overall fragility of many economies in the past few years.

The World Bank (2017a), the International Monetary Fund (IMF, 2017a, b) and the Organisation for Economic Co-operation and Development (OECD, 2017a, b) all project an increasingly positive outlook for global GDP through 2019, which is expected to increase steadily from 2.5% to 3.5%. Although positive, the outlook for countries in the UNECE region is less dynamic; economic projections for the US and the euro area may reflect the sluggishness of past housing markets.

Residential property prices are a component of GDP and also a metric for estimating homeowner wealth. In Canada and the US, briskly rising house prices are a concern because they may portend overvaluation – and houses are becoming unaffordable for many consumers. According to Szemere (2017), house prices continued to increase rapidly in “almost all advanced economies” through the fourth quarter of 2016. Residential prices rose robustly in Australia, Canada and Germany and moderately in the UK and in the US.

11.2 European construction market

11.2.1 Review and outlook

The Euroconstruct²² region's construction industry endured very harsh years after the 2008-2009 global financial crisis, with new residential and non-residential construction declining by more than 40%. Total construction output began to increase in 2014 and, since then, new residential buildings have been the primary contributor to an overall (albeit weak) improvement. The Euroconstruct region's construction industry is now 25% smaller than it was at its peak in 2007 (Euroconstruct (2017)).

Residential construction, including renovation, comprised about 47% of total production in 2016 (of which 42% was new construction); the non-residential construction sector made

up 32% (of which 17% was new work); and civil engineering²³ production constituted 21% (Euroconstruct, 2017). Allen (2017) reported that construction increased by 7.1% in the euro area and by 5.2% in the EU28 between February 2016 and February 2017. The gains in both categories were due primarily to improvements in the civil engineering and building construction sectors.



Source: E. O'Driscoll, 2017.

In the Euroconstruct region, the residential construction sector serves about 472 million people in 206 million households. The housing stock is about 233 million units, of which nearly 8% are second homes and 6% are vacant. Homeownership rates vary extensively between countries and regions; for example, it is 38% in Switzerland, 45% in Germany, 50% in Denmark and 54-80% in the remainder of the western subregion countries. Eastern subregion countries typically have greater homeownership rates; for example, Hungary's rate is 90%. The type of structure also varies; for example, apartments comprise 24% of total residential units (including 1+2 family houses²⁴) in the UK and 77% in Switzerland (Euroconstruct, 2017).

From 2017 through 2019, new residential spending (new residential construction + residential renovation) is forecast to increase by 2.6% per year, with expenditure on civil engineering expected to increase by 3.1% per year and non-residential by 1.9% per year.

Spending on residential construction is projected to slow in the euro region in the longer term as markets mature in the largest euro-area countries. Structure type has changed recently (e.g. appartments versus 1+2 family dwellings). The share of completed apartments is projected to increase in 12 of the 19 Euroconstruct countries in the period 2016 to 2019. New housing completions are forecast to increase, with

21 The terms remodelling and renovation are used synonymously in this chapter.

22 The Euroconstruct region comprises 19 countries. The western subregion consists of Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the UK. The eastern subregion comprises the Czech Republic, Hungary, Poland and Slovakia.

23 Civil engineering includes large infrastructure projects such as roads, bridges, large buildings and other large public service projects.

24 1+2 family dwellings are detached or semidetached single or multi-unit structures for families.



Source: UNECE/FAO, 2017.

variations by country. France, Germany, Spain, Sweden and the UK are projected to account for 59% of total residential completions in 2017. These countries are forecast to lead housing starts in the near term. Renovation is a bright spot – especially due to the relatively high inventory of older houses in western and northern Europe. Houses typically are renovated because of antiquated fixtures; i.e. poor energy efficiency; fashion; ageing (i.e. converting homes for “ageing-in-place”); and typical repairs (Euroconstruct, 2017).

11.2.2 New housing

There were an estimated 1.59 million new housing permits and 1.22 million new housing starts in the Euroconstruct region in 2016 (Euroconstruct, 2017). By comparison, a record 2.78 million homes were permitted in 2006. An estimated 688,000 apartments and 518,000 1+2 family dwellings were started in 2016, and 796,000 apartments and 674,000 1+2 family dwellings were completed (graph 11.2.1) (Euroconstruct, 2017).

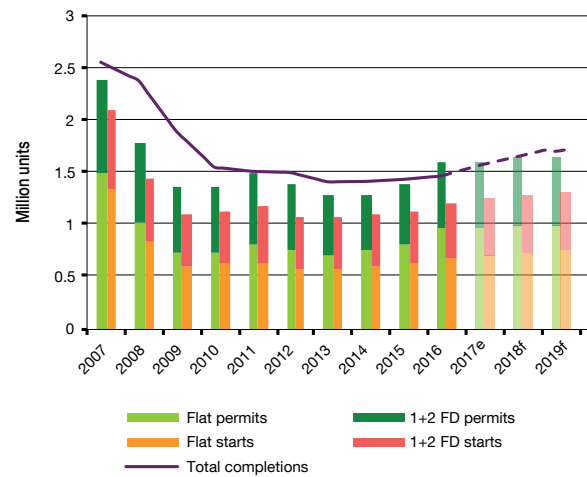
Of countries in the Euroconstruct region, Germany ranks first in both new construction and renovation in the period 2016-2019 (Euroconstruct, 2017). Switzerland makes the top five, despite its relatively small population (table 11.2.1).

11.2.3 Non-residential buildings and civil engineering

Non-residential construction is the second most important sector in the Euroconstruct region, accounting for 32% of total construction value. Demand is affected by overall economic conditions and government funding (e.g. for buildings for education and health). Non-residential construction is forecast to expand by 1.9% annually from 2017 to 2019. In the same period, construction output is projected to comprise 20% commercial construction; 17% office buildings; 16% industrial buildings; 12% miscellaneous construction; 13% buildings for education; 8% health buildings; 8% storage buildings; and 6% agricultural construction.

GRAPH 11.2.1

Building permits, housing starts and completions, Euroconstruct region, 2007-2019



Notes: FD = family dwellings; e = estimate; f = forecast. Permit data for UK not available. Housing starts of Germany, Netherlands, Portugal, and Hungary not included.

Sources: Euroconstruct, 2012, 2017.

TABLE 11.2.1

Top five Euroconstruct region countries for new residential construction and renovation expenditure, 2016-2019 (€ billion)

	2016	2017e	2018f	2019f
New residential construction				
Germany	58.2	62.9	64.7	65.1
UK	48.3	50.5	51.7	52.6
France	39.3	43.1	45.8	46.6
Spain	25.1	27.6	29.4	30.9
Switzerland	21.2	21.3	21.4	21.4
Residential renovation				
Germany	118.2	117.6	117.0	116.4
Italy	66.8	68.9	70.2	70.9
France	60.5	62.7	64.9	66.9
UK	39.3	38.7	38.5	38.5
Netherlands	18.1	18.9	19.3	19.6

Notes: 2016 prices; e = estimate; f = forecast.

Sources: Euroconstruct, 2012, 2017.

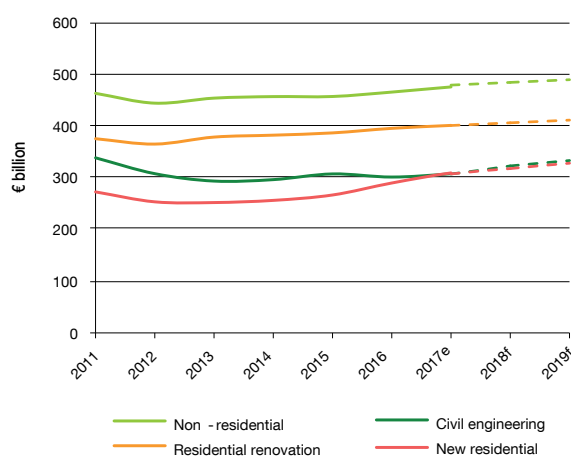
Growth in new non-residential construction in the Euroconstruct region in various subsectors in 2017-2019 is forecast at 9.1% for health; 7.0% for industrial; 6.0% for commercial; 6.1% for storage; 6.0% for agriculture; 5.8%

for office; 4.2% for miscellaneous; and 2.6% for education (Euroconstruct, 2017).

European construction spending is forecast to increase modestly between 2017 and 2019, with non-residential construction forecast to increase by 2.3% in 2017, 1.8% in 2018 and 1.2% in 2019 (graph 11.2.2). New non-residential construction is predicted to increase by 2.8% in 2017, 1.9% in 2018 and 1.0% in 2019 (table 11.2.2). The UK, Germany, France, Spain and Italy (in descending order, by value) were the five largest non-residential markets in 2016 (Euroconstruct, 2017).

GRAPH 11.2.2

European construction spending, 2011-2019



Notes: 2016 prices; e = estimate; f = forecast.

Sources: Euroconstruct, 2012, 2017.

TABLE 11.2.2

Non-residential construction spending forecast, Euroconstruct region, 2017-2019

	€ billion			Change (%)		
	2017e	2018f	2019f	2016-2017	2017-2018	2018-2019
New construction	250.4	255.2	257.7	2.8	1.9	1.0
Renovation	225.8	229.7	233.2	1.7	1.7	1.5
Total	476.2	484.9	490.9	2.3	1.8	1.2

Notes: 2016 prices; e = estimate; f = forecast.

Source: Euroconstruct, 2012, 2017.

The volume of civil engineering construction is still less than it was at the onset of the global financial crisis in 2008. Various factors are affecting civil engineering projects in different countries. Civil engineering output has improved in the euro area since 2009 (the low point of construction spending in the Euroconstruct region). Modest spending increases are forecast through 2019 (table 11.2.3). In 2016, Germany, France, Italy, the UK and Spain (in descending order, by value) were the five largest civil engineering markets (Euroconstruct, 2017).

TABLE 11.2.3

Civil engineering construction spending forecast, Euroconstruct region, 2016-2019 (€ billion)

	New civil engineering construction	Civil engineering renovation	Total civil engineering
2016	171.7	130.9	302.6
2017e	174.9	133.8	308.7
2018f	181.6	138.1	319.7
2019f	189.5	141.7	331.2

Notes: 2016 prices; e = estimate; f = forecast.

Source: Euroconstruct, 2017.

11.2.4 Residential construction and renovation

According to the 83rd Euroconstruct conference, the total value of the residential market (new construction and renovation) improved minimally in 2016, although it was still higher than the combined value of the non-residential and civil engineering markets. Residential construction increases are being driven primarily by new housing construction, which is recovering after several years of stagnating and declining volumes. The value of new residential construction is projected to increase by 3.7% in 2017, 2.4% in 2018 and 1.7% in 2019. The forecast value of total residential construction in 2017 is €706.5 billion, increasing to €723.4 billion in 2018 and to €735.8 billion in 2019 (table 11.2.4). On average, total new residential construction is forecast to increase by 4.1% (in nominal terms) annually from 2017 to 2019 (Euroconstruct, 2017).

New residential construction is a vital sector in the euro area. This is projected to increase from €307.1 billion in 2017 to €325.9 billion in 2019. New residential construction is forecast to increase 6.8% in 2017, 3.7% in 2018 and 2.4% in 2019 (Euroconstruct, 2017).

Residential renovation is forecast to remain the principal construction activity in the euro region, increasing from €399.4 billion in 2017 to €409.9 billion in 2019. Housing renovation is forecast to increase by 1.5% in 2017, 1.4% in

2018 and by 1.2% in 2019. Home renovation projects have historically been supported by government programmes (Euroconstruct, 2017).

TABLE 11.2.4

Residential new construction and renovation spending forecast, Euroconstruct region, 2017-2019 (€ billion)

	<i>New construction</i>	<i>Renovation</i>	<i>Total residential</i>
2017e	307.1	399.5	706.5
2018f	318.3	404.9	723.3
2019f	325.9	409.9	735.8

Notes: 2016 prices; e = estimate; f = forecast.

Source: Euroconstruct, 2017.

11.2.5 Construction sector shares and growth: contrasting western and eastern Europe

In the Euroconstruct's western subregion, total residential construction expenditure is predicted to increase from €686.0 billion in 2017 to €712.4 billion in 2019. Total residential construction spending in the Euroconstruct's eastern subregion is forecast to increase from €20.5 billion in 2017 to €23.4 billion in 2019 (Euroconstruct, 2017).

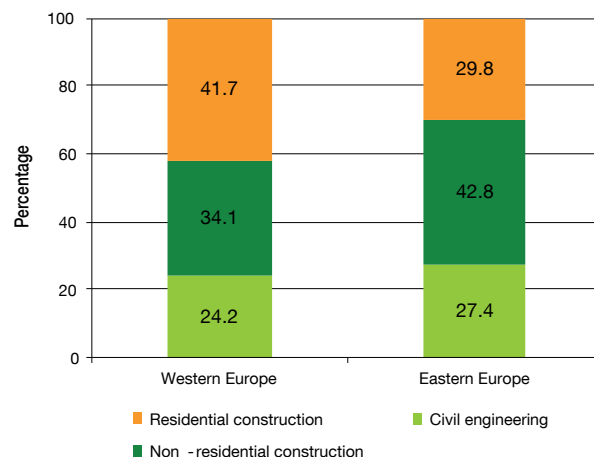
In spending terms, new residential construction is the leading sector in the Euroconstruct's western subregion (41.7% of total construction spending), followed by new non-residential building (34.1%) and civil engineering (24.2%). Spending in the eastern subregion amounted to 6.5% of total European new construction expenditure in 2016. New civil engineering and new non-residential construction accounted for 70.2% of new construction expenditure in the eastern subregion, with new residential construction making up the remainder (29.8%) (graph 11.2.3) (Euroconstruct, 2017).



Source: AHEC, 2017.

GRAPH 11.2.3

Share of new construction, by Euroconstruct subregion and sector, 2016



Source: Euroconstruct, 2017.

11.3 CIS construction market, with a focus on the Russian Federation

11.3.1 Housing construction in the Russian Federation, 2015-2017

Wooden housing construction made up 15.7% of total housing construction volume in the Russian Federation in 2015 and 35% of low-rise construction, according to Oleg Panitkov, General Director of the Association of Wooden Housing Construction (Chernakov, 2016). The total volume of the wooden housing construction market was estimated at 536 billion roubles (\$8.8 billion²⁵) in 2015.

According to Lulkin (2016), there are several reasons for the wooden house construction sector's diminished share of housing construction in the Russian Federation, including product standards and land-use and technical regulations. Gurvich (2017) voiced similar concerns and stated that the construction industry foresees minimal prospects for wooden housing because there is insufficient demand for it to enter the market, and credit is lacking.

To address performance and regulatory issues, the Russian Federation Ministry of Construction, Housing and Utilities is addressing housing standards, land-use and technical regulations, energy efficiency, multi-storey structures, and green construction requirements to increase the demand

²⁵ Converted to US dollars using the UNECE Statistical Database 2015 annual exchange rate of 60.94 roubles to the US dollar.

for wooden structures (Construction.RU, 2017). In addition, the Russian Federation Ministry of Industry and Trade has set objectives that include achieving a 30% share of new housing for wooden housing construction and for the total value of wooden housing construction to comprise 1.0% of Russian GDP (Gurvich, 2017). The Federal State Statistics Service (2017) reported that 286,129 new residential dwellings, and a total of 306,391 buildings, were put in place in the Russian Federation in 2015, an increase of 1.1% over 2014. Overall, 415.7 million m² of residential floor space was put in place in 2015, an increase of 2.8%, year-on-year.

Approximately 1.19 million apartments were constructed in the Russian Federation in 2015, with 71.4 million m² of residential space constructed, a decrease of 4.7% compared with 2014. Private developers built 272,000 units of the total, with an area of 35.8 million m², which was nearly 3.1% more than in 2014 (Federal State Statistics Service, 2017).

According to PMR (2017), the number of new homes commissioned in 2016 decreased by nearly 3.4%, year-on-year, to 1.15 million units; despite the drop, this was the second-highest number of commissioned houses recorded in one year in the Russian Federation, with the highest-ever number recorded in 2015. PMR (2017) reported that total residence floor space decreased by 6.7% in 2016, to 79.3 million m², which was the third-highest quantity ever reported in the Russian Federation.

PMR (2017) noted that the growth of multi-dwelling buildings was driven by a rapidly developing mortgage market. Mortgage-backed transactions may have accounted for nearly 30% of all home sales in the Russian Federation in 2016, up from 27% in 2015. PMR (2017) projected that the mortgage market would continue to grow in 2017, by nearly 20% (PMR, 2017).

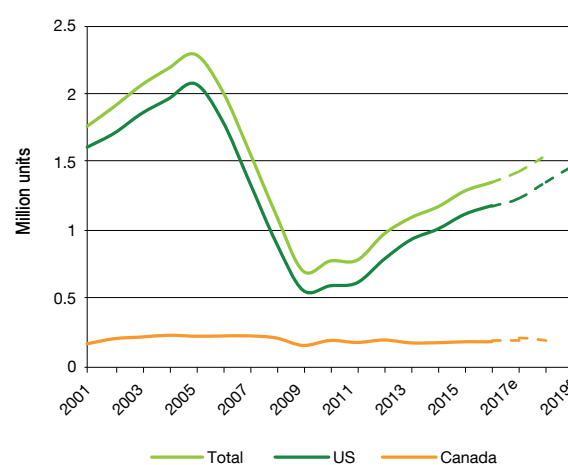
According to the World Bank (2017b), "Russia has entered a path to recovery and (...) Russia's economy showed signs of overcoming the recession caused by the shocks of low oil prices and economic sanctions". The projected growth rate in the Russian Federation is 1.3-1.4% for the period 2017-2019 (World Bank, 2017b). This is based on increasing oil prices and stable macroeconomic conditions.

11.4 North American construction market

The US housing market continues to improve from a low point in 2009, and the Canadian market remains steady (graph 11.4.1). Although the overall US housing market has recovered, new single-family house construction and sales are still far below their historical averages. The primary concern in Canada is valuation, or overvaluation, with housing prices at historic highs, even after adjusting for inflation.

GRAPH 11.4.1

Housing starts, North America, 2001-2019



Notes: e = estimate; f = forecast. No forecast is available for Canada for 2019.

Sources: US Census Bureau, 2017a; CMHC, 2017; Mortgage Bankers Association, 2017.

11.4.1 The US housing market

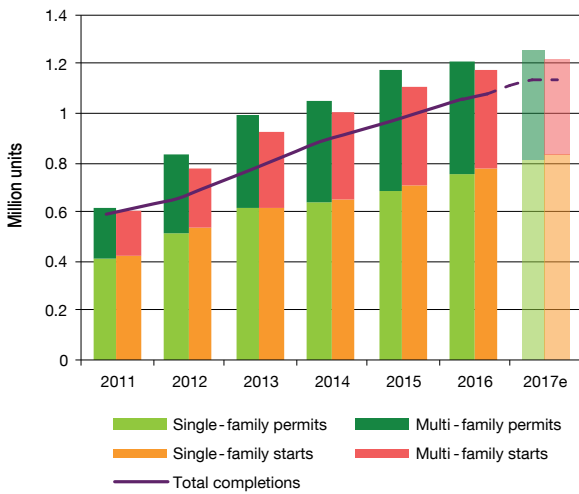
The US housing market experienced moderate growth in 2016 – although there were fewer starts than the 1959-to-2007 average of 1.55 million total units and 1.10 million single-family units. On a per capita basis, new single-family starts in 2016 were 40.9% lower than the 1959-to-2007 average. Housing starts were estimated at a seasonally adjusted annualized rate (SAAR) of 1.16 million in April 2017, a decrease of 2.4% from April 2016, year-on-year (graph 11.4.2) (US Census Bureau, 2017a).

New single-family sales were 24.2% lower in 2016 than the 1963-to-2007 average of 697,000 units, on a per capita basis. New single-family sales and starts are crucial for the wood products industry because new single-family units consume more value-added products than any other wood-consuming sector. There were 561,000 new-home sales (i.e. sales of newly constructed homes) in 2016, SAAR (US Census Bureau, 2017b). The volume of new single-family house sales in 2016 was similar to the average in 1963-1970, when the civilian noninstitutional population averaged 129.3 million, compared with 253.5 million in 2016 (Federal Reserve Bank of St. Louis, 2017). The number of single-family units being built is insufficient to cater for population growth.

The median price for single-family units was \$316,200 in 2016, up by 6.7% from 2015 (\$296,400). The mean price was \$372,500, an increase of 3.3% over 2015 (\$360,600). The completed median house size in the US was 225 m² in 2016, down from 229 m² in 2015. Over the same period, the

GRAPH 11.4.2

US housing permits, starts and completions, 2011-2017



Notes: e = estimate (January-April 2017 data); SAAR = seasonally annualized adjusted rate.

Sources: US Census Bureau, 2017a; Mortgage Bankers Association, 2017.

average square area also decreased, from 250 m² to 245 m² (US Census Bureau, 2017b, c).

Sales of existing (i.e. previously owned) homes increased by 3.8% in 2016, from 5.3 million in 2015 to 5.5 million in 2016. The median existing-house sale price in April 2017 was \$252,800, which was 5.8% higher than in April 2016 (\$238,900; National Association of Realtors, 2017). The rapid increase in house prices – both new and existing – is raising concerns that housing affordability may be a problem in the future (Joint Center for Housing, 2017a).

Total private residential construction spending (i.e. single-family, multi-family and remodelling) increased by 5.5% in 2016, year-on-year, to \$457.8 million (graph 11.4.3). New single-family construction spending increased by 4.3%, to \$243.0 million; multi-family expenditure increased by 15.7%, to \$60.4 million; and house renovation spending increased by 4.0%, to \$154.4 million (all SAAR; nominal US dollars and euros). Spending on remodelling was estimated at \$221.1 million in 2015 (Joint Center for Housing, 2017b), and this is projected to rise to \$243.0 million by 2020 (US Census Bureau, 2017d).

Private non-residential spending increased by 8.0% in 2016, year-on-year, to \$421.1 million (graph 11.4.3). Public expenditure decreased by 2.2%, to \$279.2 million (nominal US dollars) (US Census Bureau, 2017d).

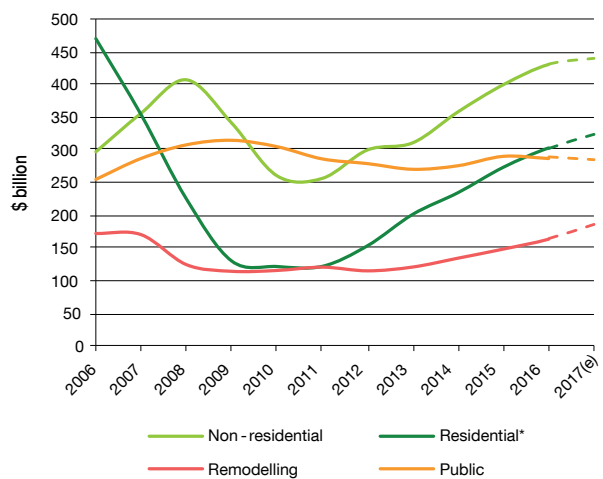
Historically, US housing construction and sales have been a major component of US GDP. Housing's contribution to GDP includes: residential investment (construction of new single- and multi-family houses, residential remodelling,



Source: APA, 2017.

GRAPH 11.4.3

US construction spending, 2006-2017



Notes: *Private residential spending less remodelling expenditure (SAAR); nominal values; e = estimate (January-April 2017 data).

Source: US Census Bureau, 2017b.

the production of manufactured homes, and brokers' fees); housing services spending (rent, owner's equivalent rent, and utilities); and expenditure on furnishings and durable goods. Before the housing crash and the global financial crisis, the

contribution of housing to GDP averaged 17-19%; it was 15.3% in 2015, compared with 18.6% in 2005. Residential investment is the crucial component: it peaked in 2005 at 6.5% of total GDP and averaged 4.9% from 1963 to 2006. Residential investment was 3.6% in 2015 and 3.8% in 2016 – another indication that the new-housing construction sector has further room to expand (US Bureau of Economic Analysis, 2017).

11.4.2 United States construction outlook

The US housing market continues to improve; all housing subsectors have progressed since 2009, the market's low point. According to many housing analysts, a robust housing construction and sales market is hindered by a deficiency of inventory for sale (new and existing houses); a lack of land or lots available for new construction; a dearth of construction workers in some locations; regulatory burdens; a lack of financing for builders and potential buyers; student debts from higher education; changing attitudes towards house ownership; underemployment and stagnant-to-declining median incomes; and the lack of starter houses being built for first-time buyers (regarding the latter, it should be noted that several construction firms have begun targeting this demographic). There is also a tendency for "millennials" (i.e. adults born in 1982 or later) to live with their parents. An additional factor is the low level of household formations: although improvement was reported in 2016, household formations remain below their historical average.

The Mortgage Bankers Association (2017) projected single-family housing starts in the US at 865,000 units in 2017, 965,000 in 2018 and 1,075,000 in 2019. Total starts are projected at 1,263,000 units in 2017, 1,360,000 in 2018 and 1,465,000 in 2019. The Mortgage Bankers Association (2017) also forecast new single-family sales at 630,000 units in 2017, 695,000 in 2018 and 729,000 in 2019. Existing sales are projected at 5,741,000 units in 2017, 6,038,000 in 2018 and 6,218,000 in 2019.

11.4.3 Canadian housing construction market

Concerns are being raised in Canada about rising house prices, particularly in greater Toronto and Vancouver. Specifically, the Royal Bank of Canada has warned that the probability of a precipitous decline "... has increased due to increasing evidence of overheating in Ontario" (RBC, 2017a). Caranci *et al.* (2017a) stated that, "Home prices across the Greater Toronto Area and surrounding areas appear to be detaching from fundamentals and are simply unsustainable".

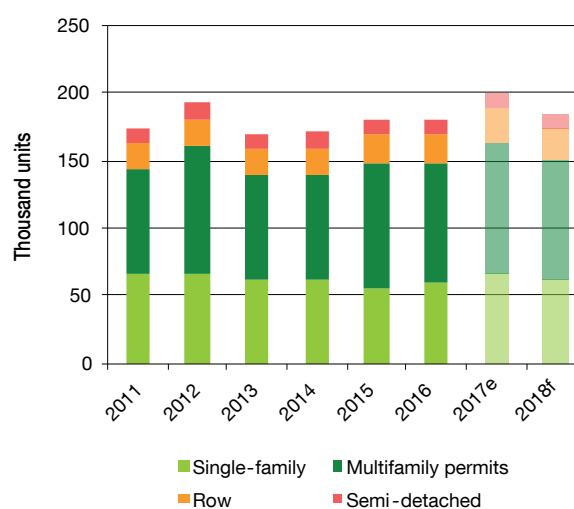
The Canadian new construction housing market was estimated at 198,000 starts in 2016 and 190,000-201,000 starts in 2017, and the forecast is for 180,000-187,000 starts

in 2018 (Scotia Bank, 2017; Caranci *et al.*, 2017a). Of the projected starts in 2016, 60,544 were single-family; 9,942 were row house units; 22,075 were semidetached units; and 87,975 were multi-family. In 2017, starts are estimated at 66,955 for single-detached units; 25,393 for row house units; 10,804 for semidetached units; and 96,598 for multi-family units (graph 11.4.4) (CMHC, 2017). House sales were estimated at 525,400 units in 2016 and 507,500 units in 2017, and the forecast is for 485,300 units in 2018 (RBC, 2017b). The Canadian Real Estate Association (2017) projected sales at 527,400 units in 2017 and 523,200 units in 2018.

According to Caranci *et al.* (2017b), the Canadian economic forecast is for a continuation of solid economic growth in 2017 and a moderate pace in 2018. The reduction in growth in 2018 is due to a shift towards economic growth arising from "business investment, government spending, and international trade", which is expected to offset constrained consumer spending and residential investment growth. The team also noted that "the improved outlook does not diminish the amount of risks. A disorderly correction of housing markets would have far-reaching implications, while the renegotiation of NAFTA remains the key external risk".

GRAPH 11.4.4

Housing starts, Canada, 2011-2018



Notes: e = estimate; f = forecast.

Sources: CMHC, 2017; Scotia Bank, 2017; Caranci *et al.*, 2017.

11.5 Conclusions

Housing construction in the UNECE region is incrementally increasing in both the European and North American subregions. In Canada, and in cities such as San Francisco and Los Angeles in the US, there is growing concern about escalating house prices. Some analysts think that the increases are unsustainable and might result in unaffordable housing options for many potential house buyers. According to PMR (2017), there was a contraction in the CIS (in the Russian Federation) in 2016, and the CIS economic situation appears

to be improving. Additionally, there is pent-up demand for housing in the Russian Federation, both in renovation and in the replacement of ageing structures.

In the UNECE, the overall economies of individual countries can be used as indicators of current and future housing construction. As such, the World Bank, the IMF, and the OECD project constrained GDP growth for the aggregate UNECE region, where construction and renovation are major components of economies. Slow-growth economies are challenging for housing construction; a lack of improvement in construction, in turn, is challenging for economic growth.

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A detailed close-up photograph of weathered wood, showing various textures, grain patterns, and colors ranging from light tan to dark brown and black. The wood is heavily textured with deep grooves and ridges, suggesting it has been exposed to the elements for a long time. A green horizontal bar is overlaid on the left side of the image, containing the word 'ANNEXES' in white capital letters.

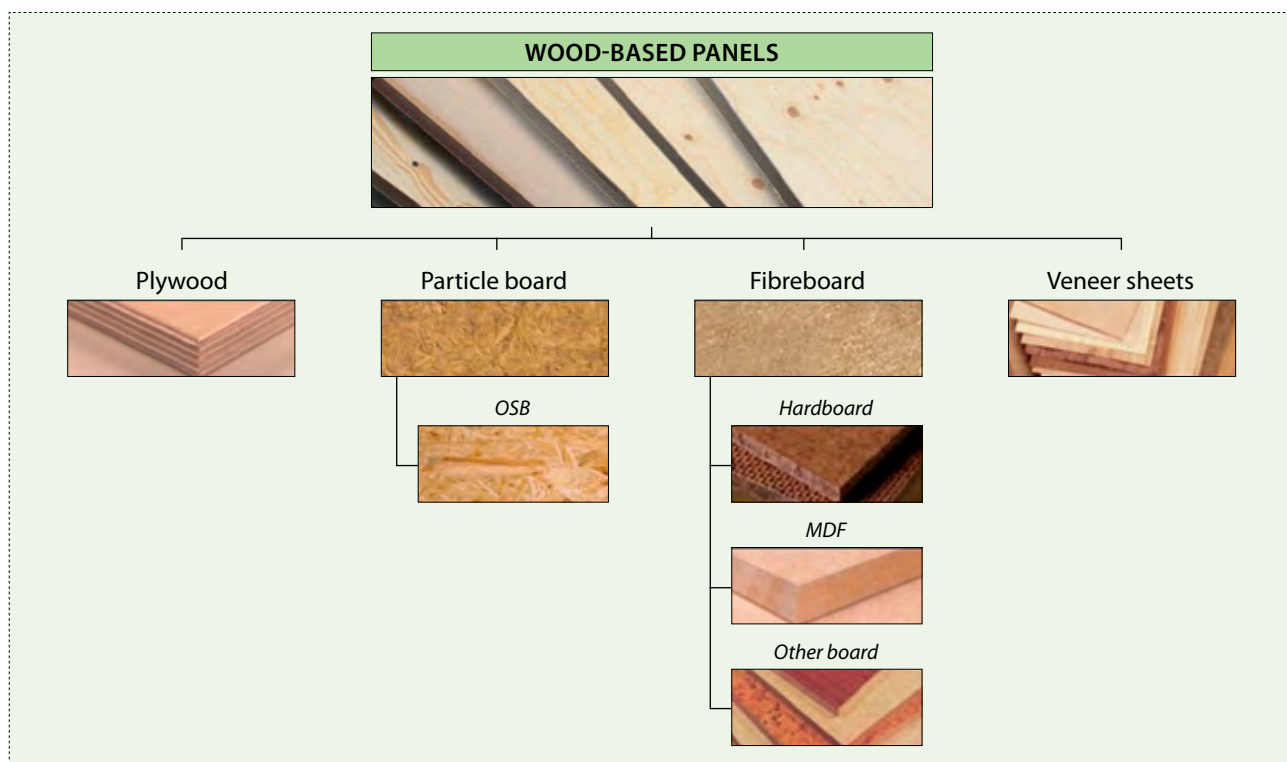
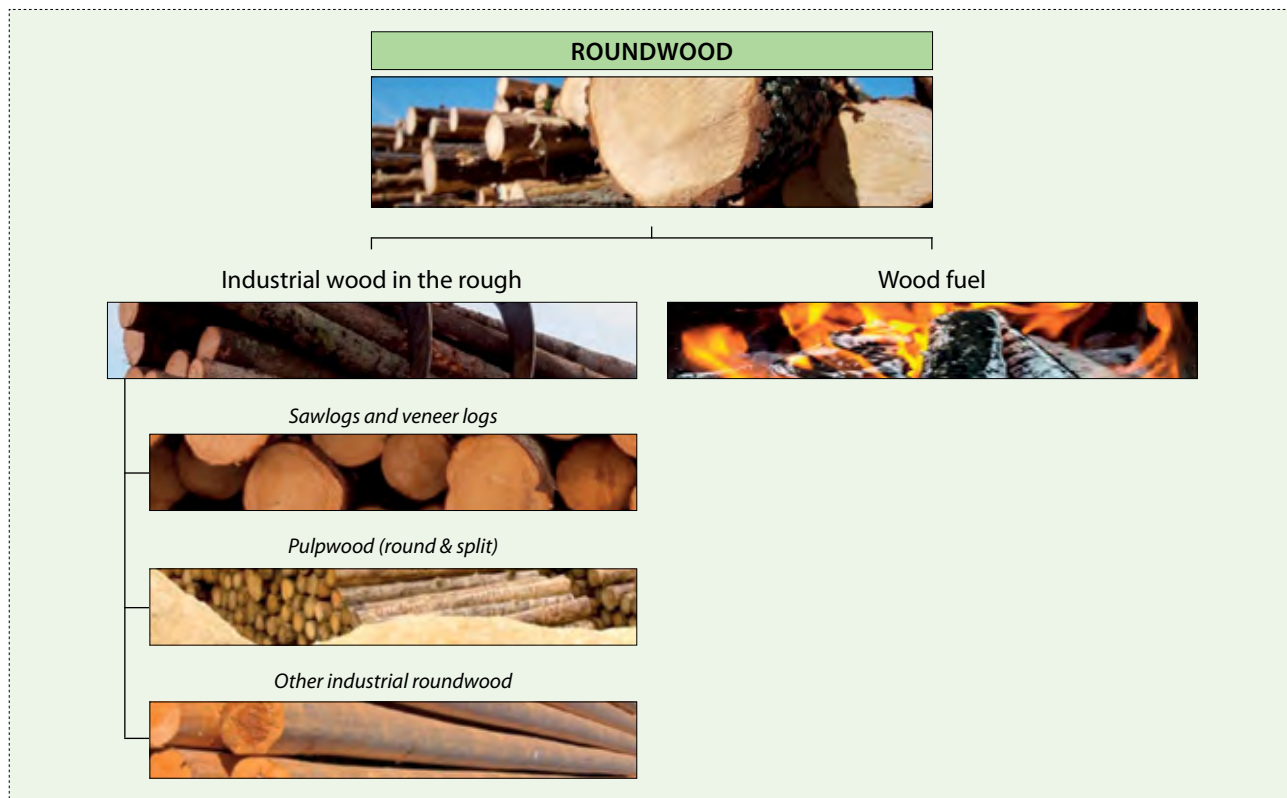
ANNEXES

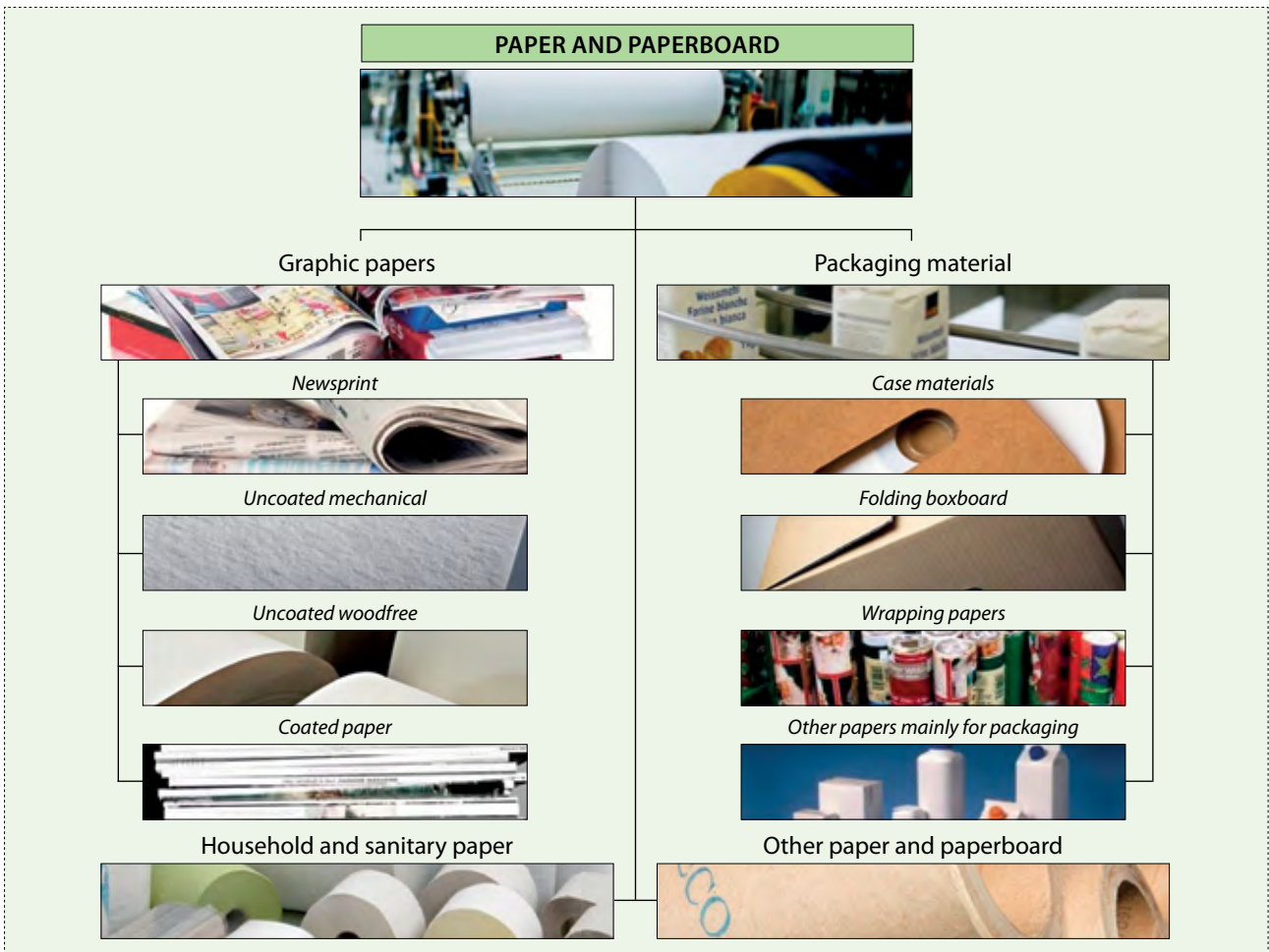
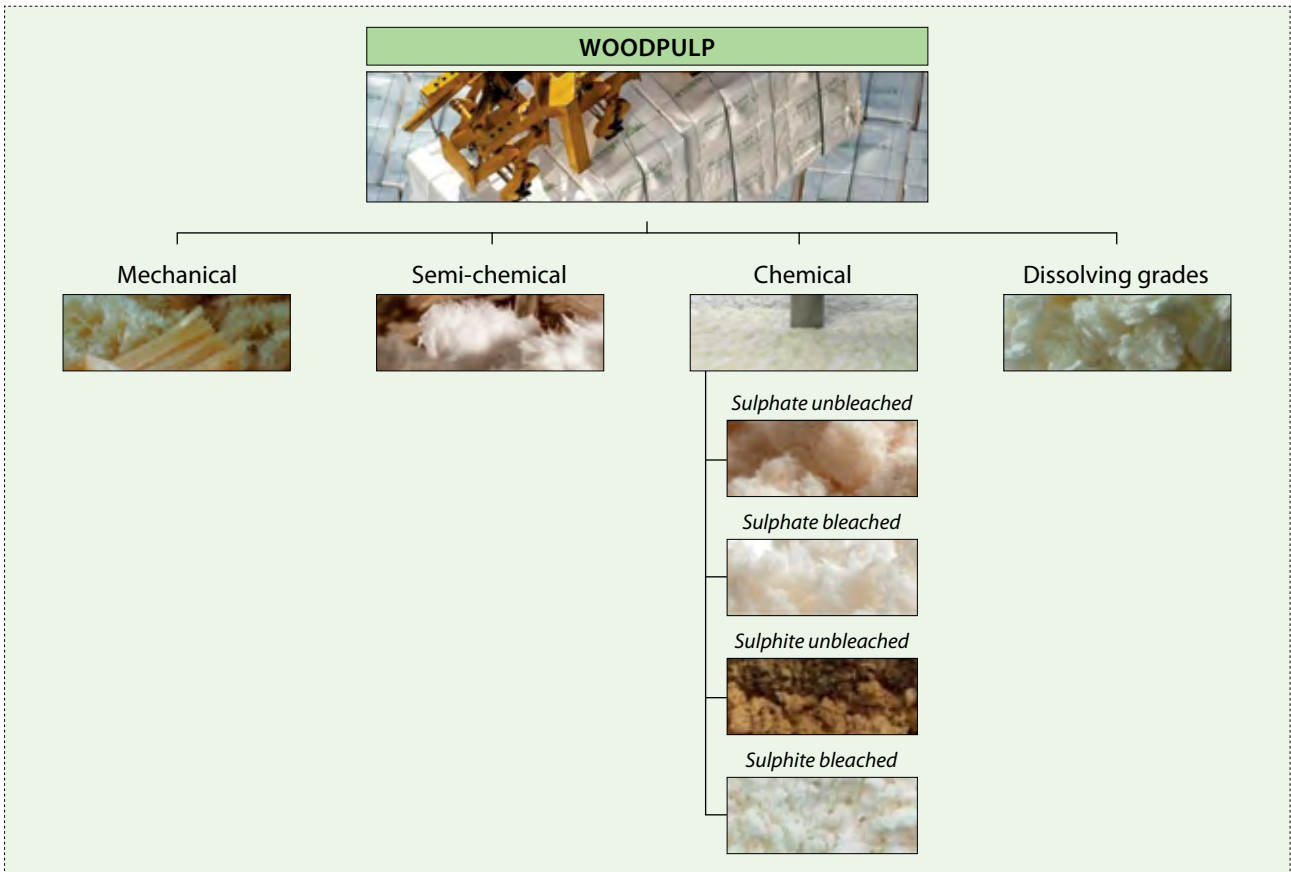
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COMPONENTS OF WOOD PRODUCTS GROUPS

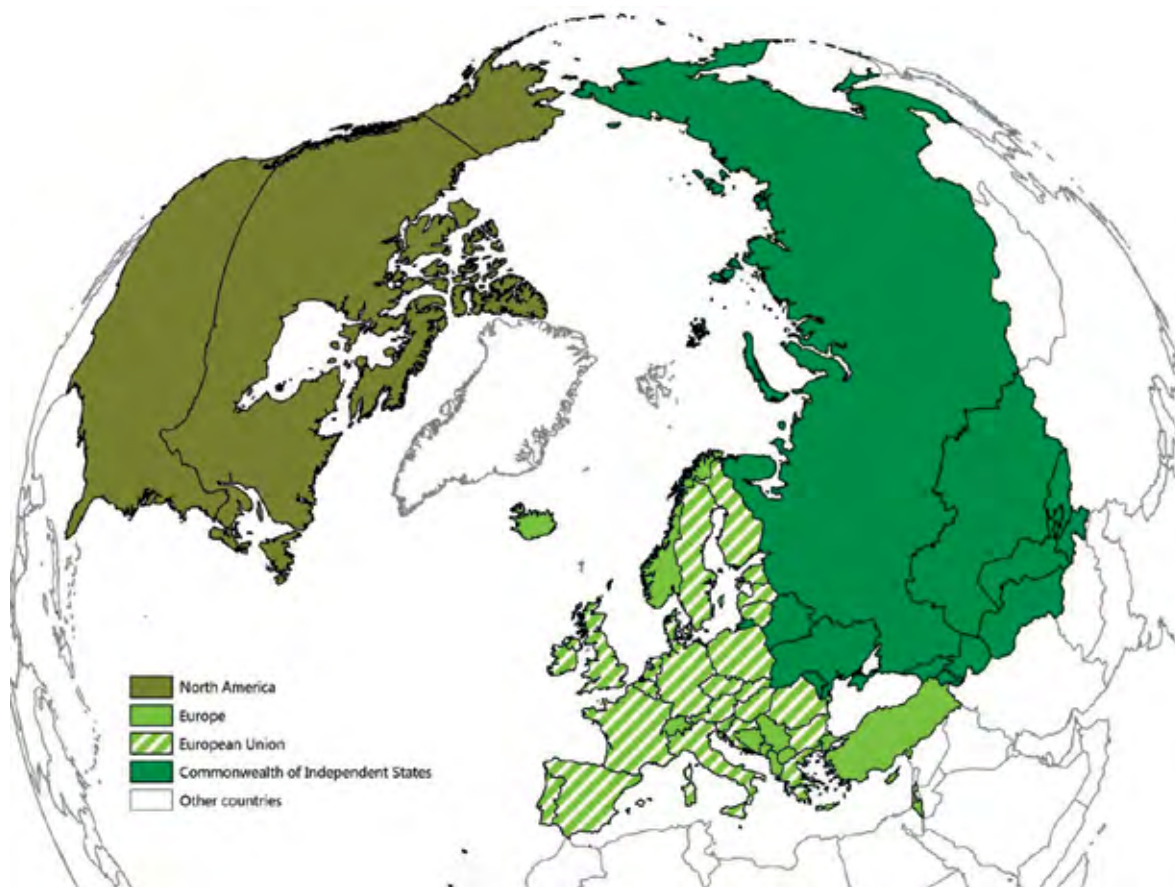
(Based on Joint Forest Sector Questionnaire nomenclature)

The important breakdowns of the major groups of primary forest products are diagrammed below. In addition, many sub-items are further divided into softwood or hardwood. These are: all the roundwood products; sawnwood; veneer sheets; and plywood. Items that do not fit into listed aggregates are not shown. These are wood charcoal; wood chips and particles; wood residues; sawnwood; other pulp; and recovered paper. The sources for pictures used in these diagrams are databanks of Metsä Group (2012), Raunion Saha (2012), Stora Enso (2012) and UPM (2012).





COUNTRIES IN THE UNECE REGION AND ITS SUBREGIONS



Commonwealth of Independent States

Armenia
 Azerbaijan
 Belarus
 Georgia
 Kazakhstan
 Kyrgyzstan
 Republic of Moldova
 Russian Federation
 Tajikistan
 Turkmenistan
 Ukraine
 Uzbekistan

North America

Canada
 United States of America

Europe

European Union

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 Belgium
 Bulgaria
 Croatia
 Cyprus
 Czech Republic
 Denmark
 Estonia
 Finland
 France
 Germany
 Greece
 Hungary
 Ireland
 Italy
 Latvia
 Lithuania
 Luxembourg
 Malta
 Netherlands
 Poland
 Portugal
 Romania
 Slovakia
 Slovenia
 Spain
 Sweden
 United Kingdom

Other countries

Albania
 Andorra
 Bosnia and Herzegovina
 Iceland
 Israel
 Liechtenstein
 Monaco
 Montenegro
 Norway
 San Marino
 Serbia
 Switzerland
 The former Yugoslav Republic of Macedonia
 Turkey

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The UNECE Committee on Forests and the Forest Industries is a principal subsidiary body of the UNECE (United Nations Economic Commission for Europe) based in Geneva. It constitutes a forum for cooperation and consultation between member countries on forestry, the forest industry and forest product matters. All countries of Europe, the Commonwealth of Independent States, the United States of America, Canada and Israel are members of the UNECE and participate in its work.

The UNECE Committee on Forests and the Forest Industries shall, within the context of sustainable development, provide member countries with the information and services needed for policymaking and decision-making with regard to their forest and forest industry sectors, including the trade and use of forest products and, where appropriate, will formulate recommendations addressed to member governments and interested organizations. To this end, it shall:

1. With the active participation of member countries, undertake short-, medium- and long-term analyses of developments in, and having an impact on, the sector, including those developments offering possibilities for the facilitation of international trade and for enhancing the protection of the environment;
2. In support of these analyses, collect, store and disseminate statistics relating to the sector, and carry out activities to improve their quality and comparability;
3. Provide the framework for cooperation e.g. by organising seminars, workshops and ad hoc meetings and setting up time-limited ad hoc groups, for the exchange of economic, environmental and technical information between governments and other institutions of member countries required for the development and implementation of policies leading to the sustainable development of the sector and to the protection of the environment in their respective countries;
4. Carry out tasks identified by the UNECE or the Committee on Forests and the Forest Industries as being of priority, including the facilitation of subregional cooperation and activities in support of the economies in transition of central and eastern Europe and of the countries of the region that are developing from an economic perspective;
5. It should also keep under review its structure and priorities and cooperate with other international and intergovernmental organizations active in the sector, and in particular with the FAO (the Food and Agriculture Organization of the United Nations) and its European Forestry Commission, and with the ILO (the International Labour Organisation), in order to ensure complementarity and to avoid duplication, thereby optimizing the use of resources.

More information about the Committee's work may be obtained by contacting:

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The UNECE/FAO Geneva Timber and Forest Study Paper series contains annual and periodic analyses of the forest and forest industries sector. These studies are the official outputs of regular activities conducted within the Integrated Programme of Work of the UNECE Committee on Forests and the Forest Industry and the FAO European Forestry Commission and as such should contribute to policy formation. Target audiences are governments, industry, research institutions, universities, international organizations, non-governmental organizations and experts from other sectors. These publications often form the basis for discussions of the UNECE Committee on Forests and the Forest Industry and the European Forestry Commission and their subsidiary bodies.

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7 AFFORDABLE AND CLEAN ENERGY



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



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Forest Products Annual Market Review 2016-2017

The *Forest Products Annual Market Review 2016-2017* provides a comprehensive analysis of markets in the UNECE region and reports on the main market influences outside the UNECE region. It covers the range of products from the forest to the end-user: from roundwood and primary processed products to value-added and innovative wood products.

Statistics-based chapters of the *Review* analyse the markets for wood raw materials, sawn softwood, sawn hardwood, wood-based panels, paper, paperboard and woodpulp. Other chapters analyse policies, trade measures, markets for wood energy, value-added wood products and housing. Underlying the analysis is a comprehensive collection of data.

The *Review* highlights the role of sustainable forest products in international markets. Policies concerning forests and forest products are discussed, as well as the main drivers and trends. The *Review* also analyses the effects of the current economic situation on forest products markets.

The *Review* provides a foundation for the Market Discussions held at the annual session of the UNECE Committee on Forests and the Forest Industry, and it also provides valuable and objective information for other policymakers, researchers and investors.

Further information on forest products markets, as well as on the UNECE Committee on Forests and the Forest Industry and the FAO European Forestry Commission, is available at: www.unece.org/forests.

The *Review* has a statistical annex, which is available at: www.unece.org/forests/fpamr2017

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