1 Overview of forest products markets and policies, 2011-2012

Highlights

- Industrial roundwood production increased for the second year in a row, climbing by 2.4% over 2010, with harvests as much as 12% more than the lows of 2009, but still down 14% from 2007.
- The economic recovery in the UNECE region has been sluggish; a deepening eurozone crisis has added to the uncertainty in markets – with new construction, still well below pre-crisis activity.
- Exports of wood raw material and wood products to Asia continue to offset flat demand for forest products within the UNECE region.
- The demand for wood energy continues apace, especially within the EU-27, but tightening public budgets may well result in reduced support payments.
- The Russian Federation's acceptance as a member by the World Trade Organization (WTO) in December 2011 is expected to lead to significant reductions in export and import duties.
- The US Lacey Act Amendment and the EU Timber Regulation are placing new obligations on suppliers to demonstrate "low-risk" status with respect to illegal logging.
- Life cycle assessments (LCA) measuring the environmental impact of products should favour forest products, but are not yet widely adopted in green-building guidelines.
- After a promising start to 2011, sawn hardwood consumption across the UNECE region fell away in the second half of the year.
- The Russian Federation's wood-based panel sector continued to expand in 2011, with volumes of plywood and fibreboard production up by10% and particle board up by more than 20% over 2010.
- Market conditions for pulp, paper and paperboard were mixed from 2011 to early 2012, as prices peaked and then subsequently fell for most pulp, paper and paperboard commodities.
- The theme of sustainability continues to resonate among pulp and paper companies in the UNECE region, as firms develop pathways to help achieve product innovation and market growth, such as biorefining, biomass energy production, and development of nano-cellulosic fibres.
- The global area of certified forest increased 4% last year: almost 92% of the world's certified forests are in the northern hemisphere, contrasting with 2% of tropical forests that have been certified.
- The volume of carbon traded in the global markets grew by 17% to 10.2 billion tonnes of CO2e in 2011, with its value increasing to $175.6 billion, a 10% increase from 2010.
- Furniture markets have not yet seen a strong recovery, but the signs are positive. Global manufacturers are focusing on cost savings rather than capacity expansion.
- The wood-based products sector has been highly effective in promoting new product innovation, but will need to be equally effective in developing market and organizational innovation.

1.1 Introduction to the publication

This year's UNECE/FAO *Forest Products Annual Market Review* provides the first published comprehensive analysis of forest products market developments in the UNECE region in 2011, and the policies driving them. The UNECE region is made up of three subregions: Europe, North America and the Commonwealth of Independent States (CIS). It stretches from Canada and the United States of America in the west through Europe to the Russian Federation and to the Caucasus and Central Asian republics in the east. It covers almost the entire boreal and temperate forests of the northern hemisphere – about 1.7 billion hectares – just under half of the world's forest area and almost 38% of the land area of the UNECE region.

The *Review* serves as a background document for the annual UNECE Timber Committee Market Discussions, which will be held in Geneva, Switzerland, on 16 October 2012 during the 70th session of the UNECE Timber Committee.

The theme for this year's *Review* is "Sustainable Forest Products". This ties in with the theme of the workshop "The green life of wood: assessing wood's environmental impact from cradle to cradle," which will take place on 15 October, immediately before the meeting of the Timber Committee. The theme reflects well the myriad developments taking place in the forest sector. Forest products have a strong record in sustainability. The sector continually strives to improve its contribution to sustainability.

This chapter acts as the Executive Summary providing an overview of the following 12 chapters. While the *Review* is structured primarily by market sectors, it will become clear in reading the *Review* just how closely linked and interdependent the various sectors are.

The first two chapters on economic and policy developments are an essential foundation for the sector-by-sector analyses presented in the remaining chapters. The analysis period of 2011-2012 is based on the first available annual statistics collected by the UNECE/FAO Forestry and Timber Section from official country statistical correspondents or provided by Eurostat. Trade-flow information, unfortunately, lags behind by one year, so the most recent information on trade flows is from 2010.

Electronic annexes provide additional statistical information and the entire UNECE/FAO TIMBER Database, which was updated with statistics from national correspondents in July 2012, is also available through the website[2]. These comprehensive statistics, which form the basis of many of the chapters, provide a transparent background to the *Review*. References at the end of each chapter not only substantiate and give credit to the ideas within the chapter but also provide a wealth of information for further reading.

1.2 Market developments

1.2.1 The economic background

Global economic growth has been only moderate since the beginnings of an economic recovery that started in 2009. Growth is expected to further weaken in the second half of 2012. In the developing regions, however, it has continued, though at variable rates. Within the advanced economies, it has stalled in many cases and gross domestic product has yet to return to pre-crisis levels, especially in Europe. As a result, unemployment remains high in Europe and North America and is likely to stay that way for several more years.

With high unemployment, limited income growth, excessive numbers of unsold houses, and a financial sector still reeling from the crisis of 2008-2009, the foundations for a strong rebound in housing are not apparent.

Although a regionally coordinated fiscal expansion would accelerate growth, the ability to implement such a policy is constrained by rising debt levels, a lack of political feasibility, and disagreements about how its costs should be distributed. Thus, a significant turnaround in the sluggish recoveries in Europe and North America seems unlikely.

The recovery has been more solid in the transition economies, especially in the energy-rich countries in the CIS subregion. The developing economies, especially in Asia, have been the world's engine for growth in recent years but it appears their growth is likely to slow down somewhat in the coming year. Overall, the economic outlook remains more uncertain than usual, as it is dependent on many political choices that will be made in the second half of 2012.

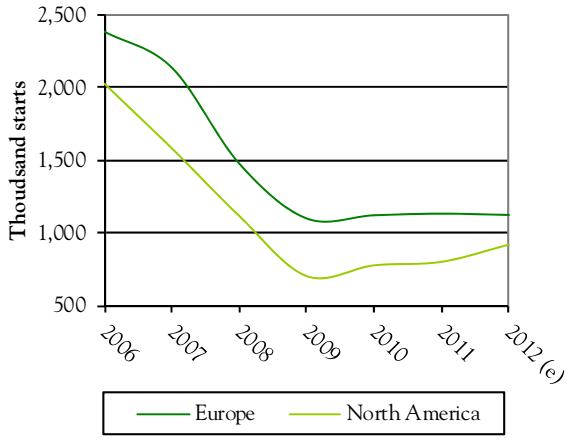
1.2.2 Construction sector

Historically, the construction sector has been the primary catalyst for the demand for forest products. In North America, the US housing market has not yet shown any strong recovery from the housing crash of 2006 and from the recession (graph 1.2.1). New housing starts and sales are at their lowest levels since modern records began to be kept in 1963. Spending on residential construction is at a record low; though spending on remodelling and multi-family dwellings is showing a slight increase (graph 1.2.2). It seems that even a modest housing recovery may still lie some years ahead. The housing market has recovered better in Canada than in the US, but starts are still well below the 2002-2008 levels.

[2] www.unece.org/fpamr2012

GRAPH 1.2.1

Housing starts in the UNECE region, 2006-2012

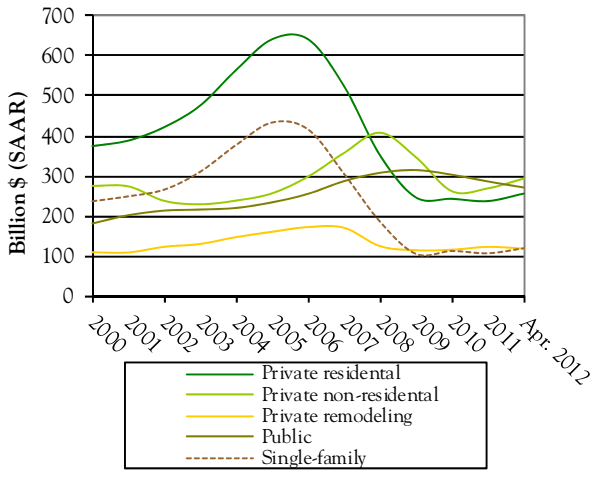


Note: e = estimate.

Sources: US DOC, Canada Housing and Mortgage Corporation, Euroconstruct, 2012.

GRAPH 1.2.2

US construction spending data, 2000-2012



Notes: Single-family expenditures are included with private residential spending. Single-family data were included here to illustrate the housing crash and "Great Recessions" effect on single-family expenditures.

SAAR = seasonally adjusted annual rate.

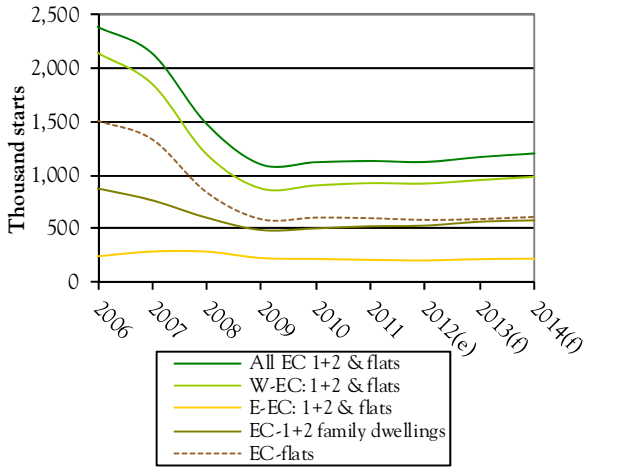
Source: US Census 2012a and US Department of Commerce-Construction (DOC) 2012a.

In Europe, a recovery in new home starts is being delayed by various economic conditions. These include weakened economies; high sovereign debt; bank solvency issues; high unemployment; consumer uncertainty; and in some countries a housing crash. At its peak in 2006, a record 2.38 million homes were completed (1.55 million multi-family (flats) and 837,000 1+2 family houses). By contrast, in 2012, only about 1.1 million units are forecast to be built (597,800 multi-family units and 521,600 1+2 family dwellings) (graph 1.2.3). The value of new residential construction is predicted to increase by 9.3% in 2014 to €253.1 billion from €231.5 billion in 2011.

The Russian Federal State Statistics Service (2012) reported that in 2009 just over 217,250 residential houses were constructed in 2009, compared with 201,758 houses in 2010 and 210,757 in 2011. Total dwelling floor space increased from 3,229 million m^2 in 2010 to 3,272 million m^2 in 2011. The country's 2011-2015 Housing Programme projects an increase in annual construction levels, aiming to reach 90 million m^2 per year of residential construction by 2015. By 2016, residential construction is projected to reach 100 million m^2 and by 2020 is expected to increase to 140 million m^2. Russian housing officials state that 67 million m^2 of housing will be built in 2012, almost 3 million m^2 more than the record level reached in 2008. In the first quarter of 2012, some 111,800 new housing units with a floor space of 9.8 million m^2 were built, a 5.7% increase over the first quarter of 2010 (Obetkon, 2012).

GRAPH 1.2.3

Euroconstruct region housing starts, 2006-2014



Notes: e = estimate, f = forecast.

Source: Euroconstruct 2011.

1.3 Policy and regulatory framework development

The International Year of Forests 2011 helped promote awareness of the world's forests and their potential for sustainable use. In that context, climate- and energy-related policies continue to gain momentum, in particular those that address and promote sustainable forest management, including measures to combat illegal logging, the use of renewable energy and "green building".

1.3.1 Trade-related policies

In the near future, Russia's log exports are likely to be influenced by the change of its export duties as the

country cleared the final hurdle to become a WTO member. Import duties to the Russian Federation are expected to fall, along with duties on most exported wood raw material.

The Softwood Lumber Agreement (SLA) between Canada and the US, which regulates lumber exports from Canada to the US, was renewed in January 2012, as both countries saw value in extending the agreement for an additional two years. It will expire in 2015. Related to this, the London Court of International Arbitrations considered the US claim that the province of British Columbia (BC) breached the Softwood Lumber Agreement by making changes to the system by which logs are graded. The changes led to a significant increase in the volume of logs from the BC interior being priced at the lowest permissible stumpage (Grade 4). Canada asserted that the rise in Grade 4 timber was the result of the mountain pine beetle infestation. In July 2012, the London Court ruled that there had been no contravention of the agreement.

The EU FLEGT (Forest Law Enforcement Governance and Trade) Action Plan has several measures for banning illegal timber from markets, to advance the supply of legally sourced wood products and to increase the demand for responsibly-sourced timber.

Voluntary Partnership Agreements (VPAs) are a vital part of the FLEGT Action Plan. These bilateral agreements between the EU and timber-exporting countries aim (a) to guarantee that the wood exported to the EU is from legal sources and (b) to support partner countries in improving their own regulation and governance of the sector. Six countries are currently developing VPAs, and a further six are in negotiation with the EU. The second key factor of the EU FLEGT Action Plan is the EU Timber Regulation 995/2010. The Regulation will take effect from 3 March 2013 with the aim of preventing illegally sourced wood products from entering the European market by requiring "due diligence" by operators and "traceability" through a "chain of custody"

It covers a broad range of timber products, including solid wood products, flooring, plywood, pulp and paper. Not included are recycled products, as well as printed papers such as books, magazines and newspapers. The product scope can be amended if necessary.

The US Congress proposed amendments to the Lacey Act in 2011, called the "Retailers and Entertainers Lacey Implementation and Enforcement Fairness Act". The amendments would provide limitations on applications, reduced penalties, changes to reviewing and reporting, and establish standard certification processes. In 2011, the Russian Federal Forestry Agency published the first version of the State "Forestry Development Programme 2012-2020" and drafted a legal text, the "State regulation on the production of roundwood", aiming at improving sustainable forest management, taking measures against illegal logging, improving the transparency and legality of timber trade and reforestation. This is also seen as a necessary step in the development of forest law enforcement and to ensure compliance with the EU Timber Regulation and the US Lacey Act.

1.3.2 Climate and energy-related policies

Phase 1 of the Kyoto Protocol expires at the end of 2012. Until a new agreement is reached, the Protocol is under "provisional application". Fewer countries are expected to participate in the second commitment period than in the first (which were mainly European). Australia and New Zealand are yet to commit. One of the major outcomes of the climate conference COP-17 in Durban, South Africa, was that countries agreed to negotiate a legally binding agreement by 2015. A new set of forest carbon accounting rules for developed countries was decided on at the meeting, which will give full credit to the contribution of harvested wood products in mitigating climate change.

The general economic situation and vague results of climate change negotiations resulted in low activity on carbon markets. Within voluntary carbon markets, activity remained relatively sluggish. Efforts are nevertheless being made to revive and improve these markets. For example, the Reducing Emissions from Deforestation and Forest Degradation (REDD) programme issued credits to the voluntary carbon markets for the first time in 2011. REDD continue to be high on the international agenda. A number of key mechanisms for the implementation of REDD+ are still under discussion.

In 2010, the US Environmental Protection Agency issued new regulations under the Clean Air Act and the Resource Conservation and Recovery Act that cover emissions of hazardous air pollutants from incinerators and boilers. However, these policies have become highly controversial.

1.3.3 International and government policies support alternative wood-based energy and fuel sectors

In 2011, the International Energy Agency started developing a roadmap for some of the most important technologies to achieve a 2050 global energy-related CO_2 target of 50% below current levels. It will provide additional focus and urgency to international discussions about the importance of biofuels to a low CO_2 future.

In the United States, the Department of Agriculture has allocated $6.1 billion in renewable and clean energy and environmental improvements to spur the creation of high-value jobs, make the US more energy independent,

and drive global competitiveness in the sector. In addition, the Department of Energy provided $27.2 billion in discretionary funds, a 3.2% increase above the 2012 enacted level.

1.3.4 Environment-related policies

The International Green Construction Code (IgCC) was issued in early 2012 following a period of public comment and feedback, and revision to the text. Most green building programmes increasingly focus on environmental aspects of construction materials. Life cycle assessment studies have consistently found that wood products require substantially less energy to manufacture, transport, construct and maintain than other materials. Although the use of wood and other agricultural fibres is favoured by the IgCC bio-based materials selection requirements, wood is the only material that is singled out as needing to be certified and third-party audited to obtain recognition.

This year's update of the Leadership in Energy and Environmental Design (LEED) rating system, coined LEED 2012, is the next step in the continuous improvement process and ongoing development cycle of LEED. LEED projects are in progress in 120 countries.

The Energy Efficient Buildings Association partnered with the European Commission in the Energy-efficient Buildings research programme to develop a multi-annual roadmap with research priorities identified until 2013.

The European Commission sees climate change as a pressing challenge, with science and technology playing a central role in combating it. Research and development will benefit from €54 billion to €80 billion, mainly focusing on improving energy efficiency.

For the first time in modern Russian history, a draft "National Forest Policy" was formulated by the Federal Forest Agency. This policy would increase the emphasis on sustainable forest management, the strengthening of the wood-processing sector and the active participation of citizens in management of forest resources.

The North American timber supply will be affected by the reductions of the annual allowable cut foreseen in British Columbia (as a result of the mountain pine beetle epidemic) and in eastern Canada (to align harvest with improved sustainability). These effects will be more visible in the future, as demand increases and the salvaging of beetle-killed trees runs its course. Across the border in the US, where most of the North American demand for wood products occurs, the harvest on United States government forest lands (which has half of the country's standing softwood timber inventory) has been reduced to less than 20% of what it was 25 years ago; further adding to the questions surrounding future timber supply.

1.4 Sustainable forest products

Sustainable forest products is a wide concept. Not only does it mean that forest products are durable and recyclable, but also that wood is a renewable material. Harvested wood products store carbon, and forests have a crucial role in carbon sequestration and in replacing products such as fossil fuels, concrete and steel, which have higher carbon emissions than wood. This stresses the role of forest products in fighting climate change.

Forest certification was originally introduced to prevent illegal logging, especially in tropical countries, and to develop forest management in those countries in a more sustainable direction. Most certified forests are in temperate and boreal forests. The failure of forest certification to address many of the problems in tropical forests has led the EU and the United States to introduce legislation to eliminate trade in illegally harvested wood.

Forest certification and legislation to combat the illegal timber trade are important steps towards improving the image of wood as sustainably produced material. Illegal logging and non-sustainable forest management has harmed wood's image. The role of certified forest products has increased significantly during the past two decades, and this trend is continuing.

Nevertheless, public awareness of forest certification is limited, and many end-users do not understand the meaning of certified forest products. As end-users become more aware of certified forest products, the more they can be expected to demand certified or otherwise sustainably proven wood products.

1.5 Regional and subregional markets

Economic conditions remain difficult in the UNECE region and the associated uncertainty has affected markets for forest products. After promising signs of growth in demand in early 2011, the picture in the second half of 2011 became less clear.

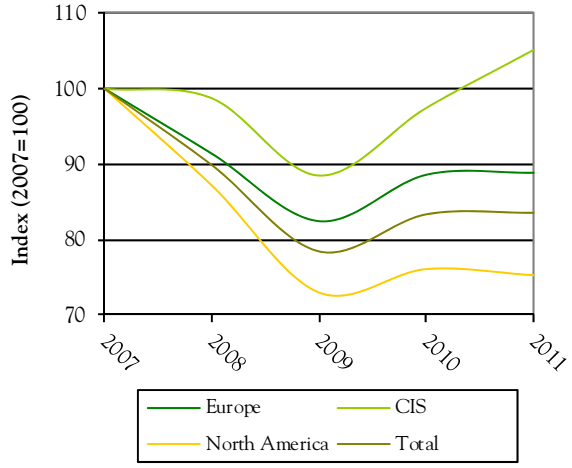
In spite of the continuing uncertainty and the difficult economic conditions, the consumption of many forest products showed slight growth in 2011. Overall, consumption remained flat, except in the CIS, where the Russian Federation showed good growth (graph 1.5.1). Sawnwood and wood-based panel markets increased in 2011 over 2010 figures, but the paper and paperboard markets suffered from lower demand and overcapacity. In North America, forest products markets have been suffering as well, and the overall consumption of forest products decreased slightly in 2011 (table 1.4.1).

The Russian Federation's accession to the World Trade Organization in late August 2012 should have a positive effect on global forest products trade.

Global trade continues to thrive. China continues to be an important forest products market for the UNECE region. Rising Chinese demand is partly responsible, as is further manufacture and export back to the UNECE region. In fact, many influences from outside the UNECE region affect its markets. There is strong demand for wood products in the Asian-Pacific rim, often remanufactured into value-added products and exported back to the UNECE region. North Africa continues to be an important importer of European wood products, despite the effects of the "Arab Spring". North America has become an increasingly important supplier of wood pellets for Europe. In addition, South America is producing many products that directly or indirectly compete with products from the UNECE region.

GRAPH 1.5.1

Consumption of forest products in the UNECE region, 2007-2011



Note: Based on roundwood equivalent for sawnwood, panels and paper and paperboard.

Source: UNECE/FAO TIMBER database, 2012.

1.5.1 Wood raw material markets

Removals of industrial roundwood in the UNECE region increased by 2.4% in 2011 reaching 970 million m^3, with harvests of hardwood logs showing a slightly bigger increase than those of softwood logs, in percentage terms. Higher demand for logs by the sawmills within the region and a substantial increase in the export of logs to China from North America and the Russian Federation contributed to higher harvest levels in 2011. Since 2009, industrial roundwood harvests have risen by 12%, a significant recovery after the more than 30% plunge that occurred between 2007 and 2009.

Consumption of industrial roundwood in the UNECE region was up for the second year in a row in 2011, but was still 14% lower than before the global financial crisis. The biggest increase in log consumption in 2011 was in the CIS region, where higher production at sawmills and plywood plants in the Russian Federation and Ukraine, resulted in an increase in demand for industrial roundwood of 14%.

Source: UNECE/FAO, 2011.

Trade of logs by the UNECE countries in 2011 continued the recovery that began in 2010, with Europe and North America expanding exports by 12% and 25 %, respectively: over the same period exports from the CIS declined by 2%.

Despite the recovery in demand, prices for softwood sawlogs fell in virtually all major markets worldwide in late 2011 and early 2012. The Global Sawlog Price Index (GSPI) fell 9% between the peak of the first quarter of 2011 and the first quarter of 2012. The weakening pulp markets and lower prices for market pulp resulted in lower wood chip and pulp log prices in early 2012 and, as a consequence, the global wood fibre price indices declined to their lowest levels in more than a year.

The prolonged crisis in Europe and the uncertainty about the US recovery, as well as the possible slowdown of the Chinese economy, are casting dark clouds over wood raw material markets in the region.

1.5.2 Sawn softwood markets

Consumption of sawn softwood posted modest gains (+2.3%) totalling almost 181million m^3. Consumption in North America and Europe increased by 1.0% and 2.8%, respectively, but the largest increase was in the CIS (+5.8%). The positive development of demand for sawn softwood resulted in increases in terms of production and trade, Demand and prices continued to pick up slowly and steadily in the first half of 2012.

TABLE 1.4.1

Apparent consumption of sawnwood [a], wood-based panels [b], and paper and paperboard in the UNECE region, 2007-2011

							Change 2010 to 2011	
	Thousand	*2007*	*2008*	*2009*	*2010*	*2011*	*Volume*	*%*
Europe								
Sawnwood	m^3	127 327	101 895	90 737	101 466	104 893	3 427	3.4
Wood-based panels	m^3	74 548	67 892	59 585	63 134	65 816	2 682	4.2
Paper and paperboard	tonnes	101 067	99 693	90 020	93 907	93 675	232	-0.2
Total	m^3 EQ[c]	726 749	662 820	593 282	633 377	643 415	10 038	1.6
of which: EU27								
Sawnwood	m^3	113 230	88 315	78 263	88 554	91 522	2 968	3.4
Wood-based panels	m^3	65 487	58 478	51 623	53 594	55 334	1 740	3.2
Paper and paperboard	tonnes	92 070	88 024	78 604	81 688	81 808	120	0.1
Total	m^3 EQ[c]	652 856	579 705	515 552	549 339	558 231	8 892	1.6
CIS								
Sawnwood	m^3	17 421	16 304	17 843	17 561	18 381	820	4.7
Wood-based panels	m^3	13 720	15 561	11 045	12 897	15 158	2 261	17.5
Paper and paperboard	tonnes	9 176	9 099	8 572	9 329	10 048	719	7.7
Total	m^3 EQ[c]	88 461	89 091	82 695	87 925	95 774	7 849	8.9
North America								
Sawnwood	m^3	134 146	110 386	83 456	89 023	88 658	365	-0.4
Wood-based panels	m^3	61 639	51 454	47 196	47 453	45 249	2 204	-4.6
Paper and paperboard	tonnes	96 187	88 296	77 232	80 009	79 367	642	-0.8
Total	m^3 EQ[c]	700 898	610 879	513 167	534 109	527 494	6 615	-1.2
UNECE region								
Sawnwood	m^3	278 895	228 585	192 036	208 051	211 932	3 881	1.9
Wood-based panels	m^3	149 907	134 907	117 825	123 484	126 223	2 739	2.2
Paper and paperboard	tonnes	206 430	197 089	175 823	183 245	183 091	154	-0.1
Total	m^3 EQ[c]	1 516 108	1 362 791	1 189 145	1 255 411	1 266 683	11 272	0.9

Notes: a/ Excluding sleepers, b/ Excluding veneer sheets, c/ Equivalent of wood in the rough (EQ). 1 m^3 of sawnwood=1.89,wood-based panels = 1.64, 1 m.t. paper = 3.60 m^3 of roundwood equivalent, based on UNECE/FAO Discussion Paper 49.

Source: UNECE/FAO TIMBER database, 2012.

Raw material costs remain a cause for concern for many sawmills in parts of Europe as well as the US west coast, where competition for logs from China is affecting prices. Europe faces a bleak short-term outlook as the fundamental drivers lack strength, and because of the poor state of the European economy. European sawmills continue to find themselves squeezed between a persistently high raw material cost and depressed global market prices for sawnwood.

Exports of Russian sawn softwood increased by 10.1% in 2011over 2010 to reach almost 19 million m^3. China accounted for 37% of all Russian exports, an increase of 39% in one year.

US consumption improved in 2011, by 4.8% to just over 58 million m^3, driven by a steady but modest recovery in housing, improved repair and remodelling activity but reduced exports from Canada (-2%). Canadian and US sawmills continued to increase exports to offshore markets due to low costs and/or favourable currency-exchange rates with the Chinese market, creating an important benefit for west coast exporters.

US sawmills are expected to see substantial production gains in 2012, whereas mills in eastern Canada face lower outputs and weaker margins. Mills in western Canada will have to deal with a dwindling fibre supply, as the mountain pine beetle outbreak reduces growing stock into the future.

1.5.3 Sawn hardwood markets

After a promising start in 2011, sawn hardwood consumption across the region fell in the second half of the year as austerity measures and the eurozone crises undermined economic confidence in Europe and the recovery in the US housing sector was slow to gain traction. Supply and demand in the region are now, however, finely balanced at levels that are low compared

with before the economic crisis; and prices are more stable. In 2011, consumption across the region was roughly 31 million m³, a 2% increase over 2010, and production was a little over 33 million m³, an increase of 2.4% over 2010. The increases in consumption and production were driven by growth in North America and the CIS. Stagnant Europe reported negative figures in both categories, with rising production in Croatia and Germany offset by declines in Romania and Slovakia.

Globalization in the furniture sector combined with weakness in the construction and housing sectors has led to a decline in demand for appearance-grade sawn hardwood and increasing exports of these grades to other markets, particularly to China. However, there are early signs of a trend towards "reshoring" of furniture and cabinet manufacturing within the UNECE region, which might revive demand for appearance-grade sawn hardwood. Oak continued to consolidate its dominant market position in the European flooring and joinery sectors.

The US Lacey Act Amendment and the EU Timber Regulation are placing new obligations on suppliers to demonstrate "low-risk" status with respect to illegal logging and should benefit hardwood supplies in regions where there is strong evidence of good forest governance.

1.5.4 Wood-based panel markets

In 2011, the wood-based panel market in North America was essentially flat. Despite a modest increase in housing starts in both the US (+3.5%) and Canada (+2.1%), demand for structural panels actually declined slightly, by 0.4% in the US and 0.2% in Canada. The continued weak demand for structural panels was especially difficult for the plywood industry, with six plywood mills closing in the US and one in Canada. Responding to the weak domestic markets, producers looked to offshore markets: exports of North American structural panels increased by 14%, with oriented strand board (OSB) recording the biggest increase at +16.5%, followed by plywood with +8.1%. A projected increase of 11.5% in the housing market in 2012 is expected to lead to increased demand for structural panels (+4.6%) in North America, with domestic production expected to increase by 7%. Demand for non-structural panels is expected to increase substantially in 2012, led by medium-density fibreboard (MDF).

The year 2011 was a challenging year for the European wood-based panel industry, with the decline in particle board production (-1.5%) and OSB (-5.2%). In contrast, MDF production rose by 3.7% and plywood production by more than 10%. The outlook for the European wood-based panel sector is gloomy, as the debt crisis continues to plague the entire region. With no long-term solution in sight in mid-2012, consumption is projected to decline by a further 2.6%.

Stronger economic growth and continued infrastructure investment led to a rise of around 21% in wood-based panel consumption in the Russian Federation in 2011. All the major panel categories recorded increases in production, with particle board (+22.2%) recording the biggest rise. Investment in the wood-based panel sector also continued strongly that year. The outlook for 2012 is bullish, with overall consumption of wood-based panels expected to grow by a further 6.9%.

1.5.5 Paper, paperboard and woodpulp

Generally, 2011 and the first half of 2012 proved difficult for paper and paperboard producers in all markets, as the recovery from the 2008 financial crisis stalled. Pulp producers enjoyed stronger production and higher shipments, almost all of which was due to growing demand from China.

Paper and paperboard mill closures in 2011 and 2012 resulted in a loss of production capacity of over 7.4 million tonnes in North America and Europe. This was a consequence of the continuing decline in demand for paper as electronic media, including the Internet, continue their rise. Major investment in large paper machines in China is another factor, enabling China to become a world powerhouse in the paper industry.

Paper and paperboard production in 2011 decreased by 0.6% in Europe over 2010, while in North America the decline was 1.0%. Apparent consumption in Europe was lower by 1.2%, while in North America the decline was 2.9%. In the CIS, production was higher by 1.7%, and apparent consumption was up by 2.7%.

Pulp production in Europe in 2011 was almost unchanged from 2010 (+0.2%): apparent consumption fell by 3.2% but exports soared by 9.9%. In the United States, pulp production rose slightly, aided by strong Chinese demand. In the CIS, production fell by 0.2% and apparent consumption fell by 2.6%, but exports rose by 8.9%.

Capacity expansion in South American chemical market pulp continued to make headlines in 2011 and 2012, with an additional 30 million tonnes either now being built or planned over the next 10 years. If this expansion takes place, it would increase global chemical market pulp capacity by 50% probably causing higher-cost mills to close or to convert their production to innovative or value-added grades.

The pulp, paper and paperboard industry in 2011 and 2012 has faced the dual challenge of overcapacity, coupled with falling demand, with China being the principal exception to this. Adding to the financial difficulties faced by the sector is the need for capital

investment for greener energy, environmentally friendly practices and innovative products such as nano-cellulose.

1.5.6 Wood energy markets

In the UNECE region, wood energy is the principal source of renewable energy and most of the demand is concentrated in the EU. Prices for wood energy feedstocks exhibit annual and seasonal fluctuations and these may increase as competition for raw material becomes more intense.

Greater price transparency in global markets is expected with the emergence and establishment of a global trading market in the APX-Endex and other regional initiatives. Discussions continue over the environmental credentials of using wood for energy, in particular the greenhouse gas neutrality of different types of woody feedstock.

Wood pellets dominate international wood energy trade, with Canada, the United States and the Russian Federation being the main exporters to the EU. Certification programmes for wood pellet quality and environmental stewardship have emerged and are expected to be widely adopted. Global forecasts for future wood energy use suggest that consumption will continue to rise, though any change to existing public support, such as the reduction of feed-in-tariffs or preferential taxation, could affect the situation significantly.

The low price of competing energy sources, especially natural gas, is likely to be a major barrier to greater investment in wood energy. Technological developments may make transport and storage of wood for energy easier and cheaper, as well as improve energy conversion and enhance cost efficiency. Whether wood energy consumption in the UNECE region increases or remains at current levels, it will continue to be an important component of a diverse portfolio of renewable energy sources.

1.5.7 Certified forest products markets

By May 2012, the global area of certified forest was 394 million hectares, a 4% increase over May 2011. Globally, the certified area is not evenly distributed. More than half (51%) the certified forest area is in North America, one quarter (25%) in the EU/EFTA region and 12% in other Europe and the CIS. The remaining 13% is across the southern hemisphere. Chain-of-custody (CoC) certification has continued to grow but more slowly.

The continuing development of green building codes should help to reinforce wood's position as the environmentally sound construction material of choice. In particular, the release of the International Green Construction Code (IgCC) in March 2012, with its emphasis on the use of materials that are recyclable or reusable, and bio-based and certified wood products, may provide a further boost for wood in construction.

While certification programmes provide a detailed and comprehensive structure for evaluating the full spectrum of forest management, it is difficult for them to focus on few key indicators of sustainability.

Key indicators, including legality, responsible bioenergy and fuel efficiency are examples of areas where government standards may provide better tools for ensuring sustainability.

It seems likely that existing certification programmes will be challenged to define their niche in the light of the continued development of more targeted standards that address specific market issues, such as climate change policies, illegal-logging controls, and bio-based material assurances.

1.5.8 Carbon markets

Carbon markets continued to grow in total volume and value in 2010-2011. The amount of carbon traded in the global markets grew by 17% to more than 10 billion tonnes of CO_2e in 2011. The value increased to $175.6 billion (a 10 % increase over 2010). Primary Clean Development Mechanism (CDM) markets (pre-2013) declined from 124 million tonnes of CO_2e to 91 million tonnes of CO_2e, while the post-2012 primary Certified Emission Reduction (CER) market grew to 173 million tonnes of CO_2e in 2011 (worth $1,990 million). Only 11 new afforestation/reforestation projects were approved under CDM since the *Review 2011-2012*. The interest in secondary CER was maintained in the markets because the delivery risk is smaller and the credits are easy to obtain compared with the project-based primary CERs.

Despite its overall growth, thanks primarily to the EU Emissions Trading System (EU-ETS), which covers 78% of all trade, the carbon trade has suffered from the prolonged financial and economic crises in Europe, the political obstacles in the US, slow progress in the United Nations Framework Convention on Climate Change (UNFCCC) negotiation process, and the absence of full operation details for REDD+.

In the forest carbon segment of the voluntary carbon markets, eight new Verified Carbon Standard projects appeared, as well as 21 new Climate, Community and Biodiversity Alliance (CCBA) projects, since the second quarter of 2011. The first REDD credits entered voluntary carbon markets in February 2011, and these were followed by the first REDD credits issued in Brazil as temporary CERs, in April 2012. REDD projects accounted altogether for 7.3 million tonnes of CO_2e in 2011.

Several countries, including Australia, China and the Republic of Korea, are preparing to launch national emission trading schemes with full market mechanisms

adopted by 2015. California's Air Resources Board formally adopted the State's greenhouse cap-and-trade programme, which started in January 2012.

The future of the climate change negotiations now hinges on the success of the Durban Platform for Enhanced Action, which pledged to create a legally binding climate treaty applicable for all countries. The second compliance period of the Kyoto Protocol starts as a voluntary agreement in 2013 and is characterized by falling interest in a binding treaty outside Europe. Currently, Canada, Japan, the Russian Federation and the US have no intention to commit.

1.5.9 *Value-added wood products markets*

Global furniture production continued to recover and was valued at $370 billion in 2011, a little lower than earlier expectations. The value of global furniture trade in 2011 at $109 billion is still below the pre-crisis peak level of $118 billion. The United States is the largest furniture-importing country, with imports valued at $12.4 billion in 2011.

Builders´ joinery and carpentry markets showed signs of recovery in 2011. The drop from pre-crisis levels was exceptionally hard, averaging 20% to 30%, though the US suffered a fall of roughly 60% between 2006 and 2011. German and French imports grew in 2011, while UK imports remained almost flat. Imports to the US decreased surprisingly.

Overall production of North American glulam timber declined steadily from 750, 000 m^3 in 2006 to 285, 000 m^3 in 2009. Modest growth was seen in 2011 to 312, 000 m^3. Laminated veneer lumber production peaked along with the US housing market in 2005 at 2.6 million m^3 but since then has declined, along with I-beam production. An estimated 1.2 million m^3 is forecast to be produced in 2012. I-beam production has seen a modest increase in 2010 and 2011 and is forecast to rise to 155.2 million lineal metres in 2012.

Glulam is the largest segment of the engineered wood products in Europe and has shown significant growth from 2000. Germany and Austria are the biggest producing countries in Europe. In addition to glulam, finger-jointed structural sawnwood has a significant market share in central Europe. The growth of finger-jointed structural sawnwood production has averaged about 17% per year since the mid-1990s.

Cross-laminated timber is also a prominent value-added wood product. This structural panel consists of several layers of cross-glued sideboards. Static loads can be transferred to all directions and openings, e.g. windows can be cut at the plant or at the construction site. The production capacity has increased rapidly since 2006, in accordance with high market demand and now totals 200,000 m^3 to 300,000 m^3.

1.5.10 *Innovative wood products*

The wood-based products industries continue to perform well in terms of innovation: new materials and composites come on the market every year. Process innovation also continues to improve, with bio-refineries in particular, innovating cheaper, more streamlined production methods. Despite this, there is patchy take-up by different countries of these innovative, cheaper products.

In the bioplastics industry, new products are finding markets in the packaging and hygiene sectors, especially the latter with its emphasis on biodegradable, sustainably sourced materials. Innovative marketing strategies are also finding new niches in the electronics industry, with a range of paints, cover materials and even conducting materials being developed. There are also encouraging signs of an increased use of new bioplastics in the automotive industry.

For bio-based materials, the focus has principally been on market innovation. While new materials (such as foamed wood-plastic composites) have been successfully developed, the real achievement has been in getting market penetration for these products in Europe, with indicators that a similar success could also be achieved in Asia.

New engineered wood products, including lighter, stronger cross-laminated timbers and plies are finding innovative uses, notably in Europe where they adapt more easily to existing building methods than traditional wood-build houses. There are pilot multi-storey cross-laminated-timber buildings in several cities, and market and organizational innovation (notably government-backed projects) should see an increase in these in the near future due to advantages in carbon sequestration and low greenhouse emissions during the life of the building.

Finally, bio-refineries, themselves something of an innovation, are starting to move out of their niche markets as providers only of expensive chemicals and are likely to expand as other sources of chemicals (notably oil) become scarce.

In conclusion, the different wood-based products industries have shown a range of innovative strategies in promoting themselves, using all four methods of innovation. However, for success to continue, there will need to be a focus on marketing and organizational innovation, and not just on producing new products.