



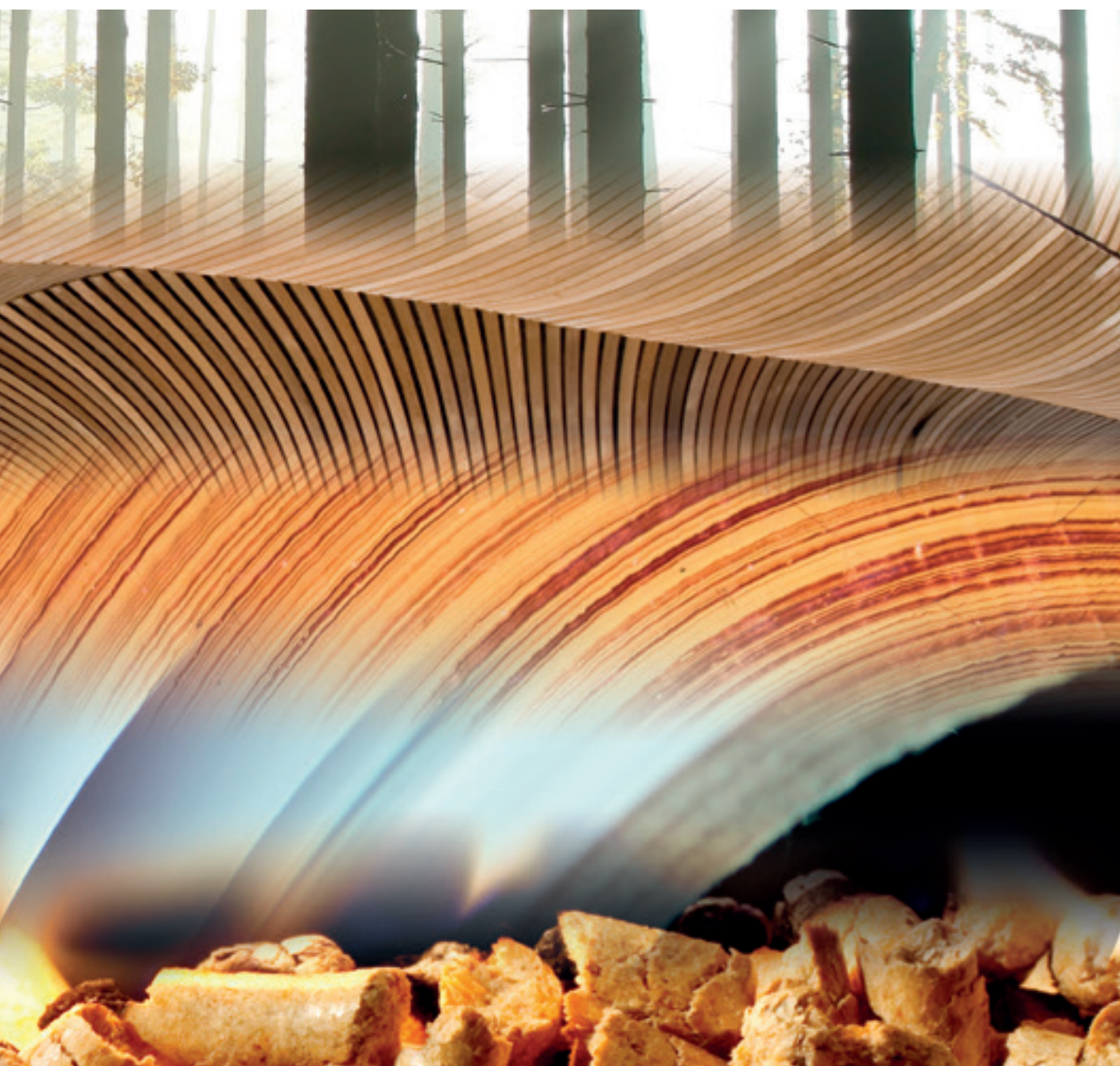
United Nations  
Economic Commission  
for Europe



Food and Agriculture  
Organization  
of the United Nations

# Forest Products

## Annual Market Review 2012-2013



UNITED NATIONS





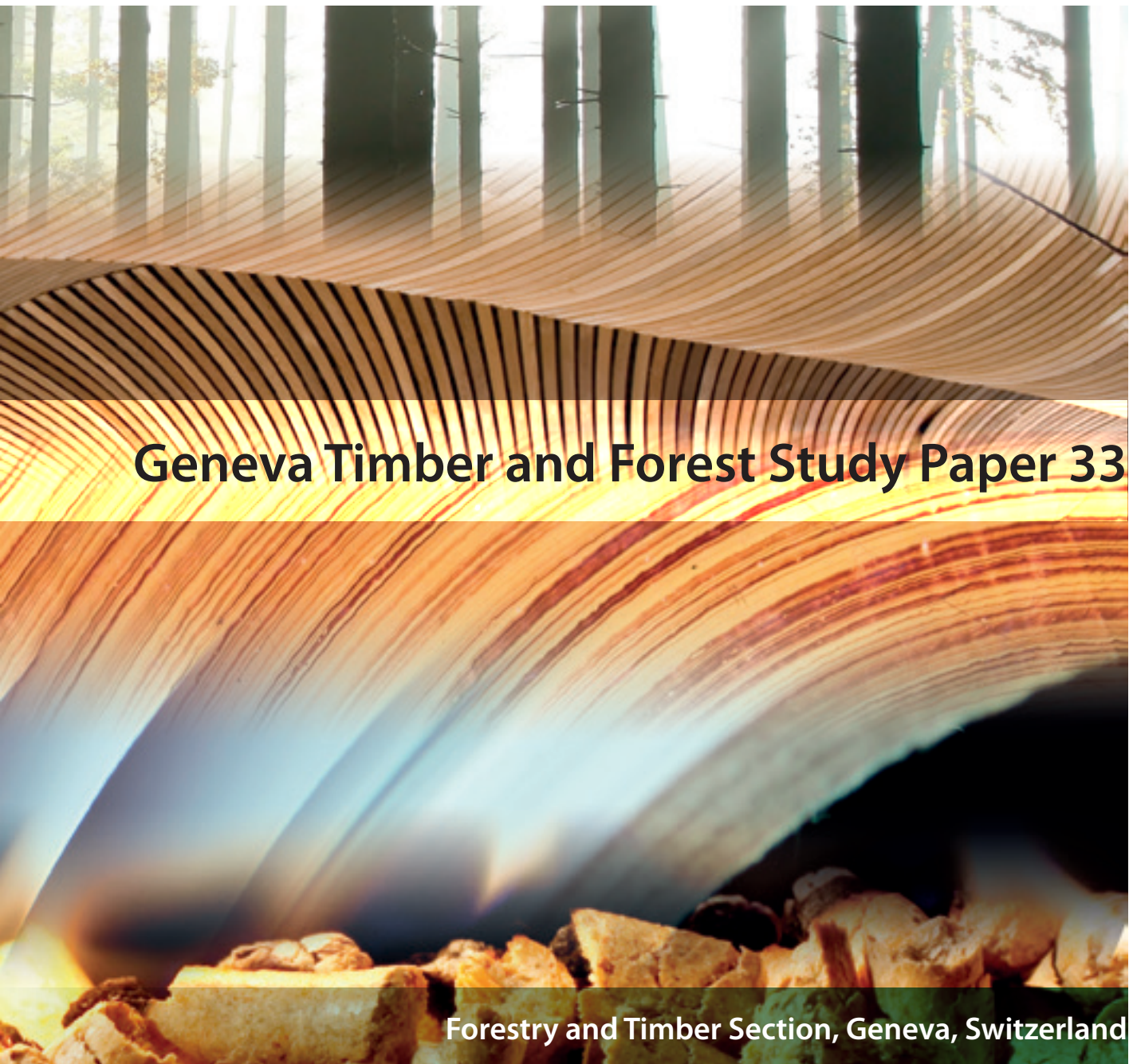
United Nations  
Economic Commission  
for Europe



Food and Agriculture  
Organization  
of the United Nations

# Forest Products

## Annual Market Review 2012-2013



Geneva Timber and Forest Study Paper 33

Forestry and Timber Section, Geneva, Switzerland

ECE/TIM/SP/33



UNITED NATIONS  
Geneva, 2013

## NOTE

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the secretariat of the United Nations concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries. Data for the Commonwealth of Independent States (CIS) is composed of these twelve countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.

## DISCLAIMER

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, 2012-2013* offers a comprehensive analysis of markets across the UNECE region, including North America, Europe, the Russian Federation and the Central Asian republics, as well as market influences from outside the UNECE region. It covers the range of products from the forest to the final end-user: from roundwood and primary processed products to value-added and innovative wood products. Statistic-based chapters of the Review analyse markets of wood raw materials, sawn softwood, sawn hardwood, wood-based panels, paper, paperboard and woodpulp. Other chapters analyse policies, innovative wood products, markets of 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 the international markets, policies concerning forest and forest products are broadly discussed, as well as the main drivers and trends. It also analyses the general economic situation and the general uncertainty on forest products markets in the difficult economic environment.

## KEYWORDS

Bioenergy, biomass, builders joinery, carbon, cardboard, carpentry, certification, certified forest products, climate change, China, construction, consumption, cross-laminated timber, engineered wood products, EWP, exports, fiberboard, fibreboard, Forest products markets, forestry industry, forestry statistics, fuelwood, furniture, housing market, imports, innovative wood products, lumber, market analysis, MDF, OSB, paperboard, particle board, particleboard, plywood, production, pulp and paper industry, pulplogs, pulpwood, REDD, roundwood, sawlogs, sawn hardwood, sawn softwood, sawnwood, sustainable forestry, timber, tropical timber, wood energy, wood fuels, wood industry, wood pellets, wood products, wood-based panels, woodpulp.

ECE/TIM/SP/33
---------------

UNITED NATIONS PUBLICATIONS
-----------------------------

Sales No. E.14.II.E.1
-----------------------

ISBN 978-92-1-117070-2
------------------------

eISBN 978-92-1-056398-7
-------------------------

ISSN 1020-2269
----------------

## FOREWORD

The UNECE/FAO *Forest Products Annual Market Review, 2012-2013* is the first comprehensive analysis of this year's forest products markets and policies for the UNECE region. The *Review* focuses on the various sectors of the industry, presenting market data and an analysis of the policy and economic factors that lie behind them in an effort to explain the changes that have been occurring in the market.

Forest products markets in this region are still reeling from the global economic crisis. Consumption in North America and the Commonwealth of Independent States is recovering; but in Europe, the continuing weak economy has resulted in an overall reduction in demand.

2013 witnessed two major milestones. First, the European Union Timber Regulation came into effect on 3 March. This Regulation is intended to prevent the circulation of wood from illegal sources across the EU Member States. Second, certified forest areas increased by 8%, and the percentage of world forest area has topped the 10% mark for the first time. In the UNECE region, 23% of the forest areas are now certified.

The forest sector has the capacity to play a more significant role in economic terms if governments and stakeholders seize the opportunity to use wood for green construction wherever possible and to take measures towards transitioning to a low-carbon, bio-based economy. Forests, when managed sustainably, can provide an infinite supply of raw materials to support the full range of essential human needs for food, shelter and energy. At the same time, the high-tech revolution in forest products, such as nanotech, bioplastics and bioengineering, has the potential for transforming the way we use wood.

Thanks to sustainable management, forest area and growing stock in the UNECE region are increasing and our forests can easily respond to the growing demand for biomass. However, we will need a rapid and broad upscaling of clean technologies, infrastructure, and a fundamental shift to sustainable production and consumption.

We take this occasion to express our appreciation to everyone who has played a part in the preparation of this joint publication – the experts, the many partner organizations, the information suppliers, the governments and the staff of our two organizations.



Eduardo Rojas-Briales  
Assistant Director-General  
Forestry Department  
Food and Agriculture Organization of the United Nations



Sven Alkalaj  
Executive Secretary  
United Nations Economic Commission for Europe



# CONTENTS

FOREWORD .....	III
ACKNOWLEDGEMENTS .....	X
CONTRIBUTORS TO THE PUBLICATION .....	XI
STATISTICAL CORRESPONDENTS .....	XII
DATA SOURCES .....	XIV
EXPLANATORY NOTES .....	XV
SYMBOLS AND ABBREVIATIONS .....	XVI
<b>1 Overview of forest products markets and policies .....</b>	<b>1</b>
1.1 Introduction to the publication .....	2
1.2 Economic developments with implications for the forest sector .....	2
1.3 Policy and regulatory developments affecting the forest products sector .....	3
1.4 Innovative wood-based products .....	5
1.5 Summary of regional and subregional markets .....	5
1.6 Housing .....	11
<b>2 How policies, market-based tools and the green economy influence forest products markets .....</b>	<b>13</b>
2.1 Introduction .....	14
2.2 Trade .....	14
2.3 Energy .....	16
2.4 Environment .....	17
2.5 Research on innovative uses for wood .....	21
2.6 Conclusions .....	21
2.7 References .....	22
<b>3 Innovative wood-based products .....</b>	<b>25</b>
3.1 Introduction .....	26
3.2 Innovation driven by cost .....	26
3.3 Innovation driven by legislation .....	27
3.4 Innovation driven by product replacement .....	29
3.5 Conclusions .....	32
3.6 References .....	33
<b>4 Wood raw material markets .....</b>	<b>35</b>
4.1 Introduction .....	36
4.2 Europe .....	37
4.3 Commonwealth of Independent States .....	38
4.4 North America .....	39
4.5 Extraregional influence on the UNECE region .....	40
4.6 Wood raw material costs .....	40
4.7 References .....	42

<b>5</b>	<b>Sawn softwood markets</b>	<b>43</b>
5.1	Introduction	44
5.2	Europe	44
5.3	Commonwealth of Independent States, with a focus on the Russian Federation	46
5.4	North America	47
5.5	Extraregional influence on the UNECE region	49
5.6	Policy and regulatory influences on the sector	50
5.7	References	50
<b>6</b>	<b>Sawn hardwood markets</b>	<b>51</b>
6.1	Introduction	52
6.2	Europe	52
6.3	Commonwealth of Independent States	53
6.4	North America	54
6.5	Extraregional influence on the UNECE region	56
6.6	Policy and regulatory influences on the sector	56
6.7	Innovation in the sector	57
6.8	References	57
<b>7</b>	<b>Wood-based panel markets</b>	<b>59</b>
7.1	Introduction	60
7.2	Europe	60
7.3	Commonwealth of Independent States, with a focus on the Russian Federation	61
7.4	North America	65
7.5	Extraregional influence on the UNECE region	67
7.6	Policy and regulatory influences on the sector	68
7.7	References	69
<b>8</b>	<b>Paper, paperboard and woodpulp markets</b>	<b>71</b>
8.1	Introduction	72
8.2	Europe	73
8.3	Commonwealth of Independent States, with a focus on the Russian Federation	75
8.4	North America	76
8.5	Extraregional influence on the UNECE region	79
8.6	References	81
<b>9</b>	<b>Wood energy markets</b>	<b>83</b>
9.1	Introduction	84
9.2	Consumption and production of wood energy in the UNECE region	84
9.3	Trade	86
9.4	Public policy, sustainability and technological developments	88
9.5	Conclusions and outlook	90
9.6	References	91



<b>10 Value-added wood products markets</b>	<b>95</b>
10.1 Introduction	96
10.2 Furniture	96
10.3 Engineered wood products	98
10.4 Builders' joinery, carpentry and profiled wood	102
10.5 References	104
<b>11 Housing and construction markets</b>	<b>105</b>
11.1 Brief overview of the economic situation in the UNECE region in 2012-2013	106
11.2 European construction market	106
11.3 Commonwealth of Independent States construction market, with a focus on the Russian Federation	109
11.4 North American construction market	109
11.5 References	112
<b>Annexes</b>	<b>113</b>
COMPONENTS OF WOOD PRODUCTS GROUPS	114
COUNTRIES IN THE UNECE REGION AND ITS SUBREGIONS	116
LIST OF AUTHORS	117
SOME FACTS ABOUT THE COMMITTEE ON FORESTS AND THE FOREST INDUSTRY	118
UNECE/FAO PUBLICATIONS	119



## LIST OF TABLES

1.5.1	Apparent consumption of industrial roundwood, sawnwood, wood-based panels and paper and paperboard in the UNECE region, 2008-2012 .....	6
2.2.1	Projected growth in trade in wood and paper products, based on potential trade expansions in the EU and US .....	14
2.2.2	Russian Federation roundwood export quotas, 2012-2013 .....	15
2.4.1	Potential global and regional supply of roundwood from certified resources, 2011-2013 .....	18
4.2.1	Industrial roundwood balance in Europe, 2011-2013 .....	37
4.3.1	Industrial roundwood balance in the CIS, 2011-2013 .....	38
4.4.1	Industrial roundwood balance in North America, 2011-2013 .....	39
5.1.1	Sawn softwood apparent consumption in the UNECE region, 2011-2013 .....	44
5.2.1	Sawn softwood balance in Europe, 2011-2013 .....	44
5.3.1	Sawn softwood balance in the CIS, 2011-2013 .....	46
5.4.1	Sawn softwood balance in North America, 2011-2013 .....	47
5.5.1	Major importers and exporters of sawn softwood outside the UNECE region, 2011-2012 .....	49
6.2.1	Sawn hardwood balance in Europe, 2011-2013 .....	52
6.3.1	Sawn hardwood balance in the CIS, 2011-2013 .....	53
6.4.1	Sawn hardwood balance in North America, 2011-2013 .....	54
6.5.1	Tropical sawn hardwood balance in Asia-Pacific, Latin America/Caribbean and Africa, 2010-2012 .....	56
7.2.1	Wood-based panel balance in Europe, 2011-2013 .....	60
7.3.1	Wood-based panel balance in the CIS, 2011-2013 .....	61
7.3.2	Wood-based panel production in the Russian Federation, 2009-2012 .....	62
7.4.1	Wood-based panel balance in North America, 2011-2013 .....	65
7.4.2	North American wood-based panel imports, 2009-2012 .....	67
7.4.3	North American wood-based panel exports, 2009-2012 .....	67
8.2.1	Paper and paperboard balance in Europe, 2011-2013 .....	73
8.2.2	Paper and paperboard in Europe, 2008-2012 .....	74
8.2.3	Woodpulp balance in Europe, 2011-2013 .....	74
8.3.1	Paper and paperboard balance in the CIS, 2011-2013 .....	75
8.3.2	Production of chemical woodpulp, graphic paper and paperboard in the Russian Federation, 2011-2012 .....	75
8.3.3	Woodpulp balance in the CIS, 2011-2013 .....	76
8.4.1	Paper and paperboard balance in North America, 2011-2013 .....	77
8.4.2	Paper and paperboard in North America, 2008-2012 .....	77
8.5.1	Woodpulp balance in Brazil, 2011-2012 .....	79
8.5.2	Printing and writing paper balance in Brazil, 2011-2012 .....	79
8.5.3	Pulp, paper and paperboard exports in Chile, by value, 2011-2012 .....	80
8.5.4	Pulp, paper and paperboard exports in Chile by volume, 2011-2012 .....	80
8.5.5	Pulp, paper and paperboard production and apparent consumption in China, 2012 .....	80
8.5.6	Pulp imports in China, 2010-2012 .....	80
8.5.7	Recovered paper imports in China, 2011-2012 .....	81
10.2.1	Furniture imports for the top five importing countries, 2011-2012 .....	97
10.2.2	Furniture balance in Italy, 2009-2012 .....	97



10.3.1	Glulam consumption, production and trade in North America, 2011-2013 .....	100
10.3.2	Wooden I-beam consumption and production in North America, 2011-2013 .....	101
10.3.3	LVL consumption and production in North America, 2011-2013 .....	102
10.4.1	Builders' joinery and carpentry imports for the top five importing countries, 2011-2012 .....	103
10.4.2	Profiled wood imports for the top five importing countries, 2011-2012 .....	103

## LIST OF GRAPHS

1.6.1	Housing starts in North America and Europe, 2006-2014 .....	12
1.6.2	US construction spending, 1993-2013 .....	12
1.6.3	Euroconstruct region housing starts, 2006-2015 .....	12
2.4.1	Forest area certified by major certification schemes, 2007-2013 .....	17
2.4.2	Chain-of-Custody certificates issued worldwide, 2007-2013 .....	18
3.4.1	Global production of WPC in 2010 and forecast for 2015 .....	29
3.4.2	Production and capacity of TMT in Europe, 2012-2013 .....	32
3.5.1	Breakdown in WPC production in South-East Asia, 2011 .....	32
4.1.1	Apparent consumption of softwood industrial roundwood in the UNECE region, 2008-2013 .....	36
4.1.2	Apparent consumption of hardwood industrial roundwood in the UNECE region, 2008-2013 .....	36
4.1.3	Top five global trade flows of softwood roundwood by volume, 2008-2012 .....	36
4.6.1	Global softwood sawlog price index, 2003-2013 .....	41
4.6.2	Softwood sawlog price indices in North America, 2008-2013 .....	41
4.6.3	Softwood sawlog price indices in three European countries and the Russian Federation, 2008-2013 .....	41
4.6.4	Global wood fibre price indices, 1989-2013 .....	42
4.6.5	Softwood wood chip price indices in Europe and North America, 2008-2013 .....	42
5.2.1	European sawn softwood prices in Japan, Germany and the Middle East, 2010-2013 .....	45
5.3.1	Russian Federation house construction by type, 2002-2012 .....	46
5.3.2	Sawn softwood prices in the Russian Federation, 2010-2013 .....	46
5.3.3	Russian Federation sawn softwood exports by market, 2012 (1,000 m <sup>3</sup> ) .....	47
5.4.1	Sawn softwood quarterly prices in Japan, Europe, US and China, 2005-2013 .....	48
6.4.1	US sawn hardwood consumption by sector, 2005-2012 .....	54
6.4.2	Price development for selected hardwood species in the US, 2008-2013 .....	55
7.2.1	Wood-based panel production shares in Europe, 2012 .....	60
7.3.1	Particle board, plywood and fibreboard production in the Russian Federation, 2007-2012 .....	63
7.3.2	Monthly prices for wood-based panels in the Russian Federation, 2010-2013 .....	63
7.3.3	Fibreboard, OSB and plywood imports into the Russian Federation, 2002-2012 .....	64
7.4.1	Demand for OSB and plywood in major North American market segments, 2012 .....	65
7.4.2	Apparent consumption of structural panels in North America compared with US housing starts, 2008-2012 .....	65
7.4.3	Plywood and OSB capacity utilization rates in North America, 2008-2012 .....	66
7.4.4	North American wood-based panel prices, 2008-2013 .....	66

8.1.1	Apparent consumption of paper and paperboard in the UNECE region, 2008-2013 .....	72
8.2.1	Production of paper and paperboard in Europe, 2008-2013 .....	73
8.4.1	Graphic paper and paperboard apparent consumption in North America, 2008-2012 .....	78
8.4.2	Woodpulp production in North America, 2008-2012 .....	78
9.2.1	EU27 primary energy production from wood and wood waste sources, 2002-2011 .....	84
9.2.2	Wood pellet production, export, import and consumption in top five South-East European countries, 2012 .....	85
9.2.3	Wood pellet production and capacity in Canada, 1998-2012 .....	86
9.3.1	Imports of wood pellets to EU27, 2009-2012 .....	87
9.3.2	Industrial wood pellet prices, 2009-2013 .....	87
10.2.1	Furniture imports for the top five importing countries, 2008-2012 .....	96
10.3.1	Consumption of glulam products in Europe, 2002-2012 .....	98
10.3.2	Global consumption of glulam products, 2002-2012 .....	99
10.3.3	Consumption of finger-jointed structural timber products in four countries in Europe, 1998-2012 .....	99
10.3.4	Nominal price in Germany and price difference between glulam and finger-jointed structural timber, 1998-2012 .....	99
10.3.5	Glulam production in North America, 2003-2013 .....	100
10.3.6	United States I-beam market share, 2003-2013 .....	101
10.3.7	I-beam production in North America, 2003-2013 .....	101
10.3.8	LVL production in North America, 2009-2013 .....	101
10.4.1	Builders' joinery and carpentry imports for the top five importing countries, 2008-2012 .....	102
10.4.2	Profiled wood imports for the top five importing countries, 2008-2012 .....	103
11.2.1	Euroconstruct-region building permits, 2006-2015 .....	107
11.2.2	Euroconstruct-region housing starts, 2006-2015 .....	107
11.2.3	European construction spending, 2006-2015 .....	108
11.2.4	Europeoconstruct region sector shares for new construction, 2012 .....	108
11.4.1	US housing units and starts (SAAR), 1943-2013 .....	110
11.4.2	US construction spending, 2002-2013 .....	110
11.4.3	US building material prices versus housing starts, 2002-2013 .....	111
11.4.4	Canada housing starts, 2006-2014 .....	111

## LIST OF FIGURES

3.2.1	Example of a wood-based biorefinery .....	26
3.2.2	Possible product paths for pyrolysis .....	26
3.3.1	The world's tallest modern timber residential building, Forté, under construction and finished, 2012-2013 .....	28
3.4.1	Injection moulded WPC chair .....	30
3.4.2	WPC toothbrush .....	30
3.5.1	Chinese WPC doors and different WPC profiles for interior uses .....	32
7.3.1	Top 15 plywood production regions in the Russian Federation, 2012 .....	62



## ACKNOWLEDGEMENTS

The UNECE/FAO *Forest Products Annual Market Review* is the result of a cooperative effort, involving a network of official country correspondents, authors, reviewers, editors, the UNECE/FAO Team of Specialists on Sustainable Forest Products and a team of people working in the Forestry and Timber Section in Geneva, together with colleagues in FAO, Rome. In combination, they provide an unrivalled source of expertise and knowledge, which is the hallmark of the *Review*.

Many of these people give freely of their time and expertise; others are supported by companies, universities or industry associations, institutions and a variety of other organizations. Without their help, it simply would not be possible to produce this valued annual publication. This particular edition could not have been published without the financial support of the Governments of Sweden and Switzerland.

The *Review* benefits from a longstanding partnership with the Department of Forest Sciences, University of Helsinki, which provides two marketing assistants every year. This year, Janne Antikainen and Arttu Malkamäki undertook market research; prepared price data; produced all the graphics and revised our Graphics Production System, and websites associated with the *Review*. Their input has been critical to the quality and timelines of the publication. Anne Toppinen, Professor, and Lei Wang, Researcher, at the Department facilitated these annual internships: we thank them and look forward to continuing this mutually beneficial arrangement. We thank also Igor Novoselov from Moscow for providing market intelligence for the author in writing the Wood Raw Materials chapter.

We want to acknowledge the authors who wrote the chapters and shared their expertise and knowledge. They not only provided the intelligence in each of their chapters, but they assisted with data and information that goes elsewhere in the publication, including the summarized information for the Overview chapter. You can find the contact details and affiliation for all of the authors listed in the annex.

The authors are as follows:

Francisco Aguilar	Kathryn Fernholz	Igor Novoselov
Eduard Akim	Christopher Gaston	Rupert Oliver
Delton Alderman	Branko Glavonjić	Tapani Pahkasalo
Peter Aurenhammer	Rens Hartkamp	Tomas Parik
Olin Bartlomé	Antti Koskinen	Helmuth Resch
Isabelle Brose	Florian Kraxner	Robert Shelburne
Douglas Clark	Bernard Lombard	Kenneth E. Skog
Ivan Eastin	Warren Mabee	Russ Taylor
Asta Eder	Frances Maplesden	Jukka Tissari
Håkan Ekström	Peter Moonen	Michel Valois

From the UNECE/FAO Forestry and Timber Section, Alex McCusker collected, validated and produced the statistics; Dominique Reeb and Arnaud Brizay contributed to the Policy Chapter, and David Ellul contributed to the Policy and Wood Energy Chapters. Karen Taylor and Christina Weimann dealt with administrative matters.

The project was managed by Florian Steierer and Matthew Fonseca. Douglas Clark reviewed the chapters, provided guidance on content and proofread the text. The chapters were reviewed at FAO by Arvydas Lebedys, Yanshu Li, Dominique Reeb, Jukka Tissari, and Adrian Whiteman. Final review in Geneva was done by Paola Deda, Section Chief, Forestry and Timber Section and Virginia Cram-Martos, Director, Trade and Sustainable Land Management Division. Finally, the manuscript was checked by Eoin O'Driscoll, Marketing Consultant, Drima Marketing Research and Jeremy Wall, Principal Administrator, DG Enterprise and Industry (European Commission). The text was edited by Christina O'Shaughnessy.

In all, 43 people worked directly in preparing this publication, not including the additional contributors and statistical correspondents listed separately on the next pages.

This manuscript was completed on 9 August 2013.

## CONTRIBUTORS TO THE PUBLICATION

The secretariat would like to express our appreciation for the information and assistance received from the following people in preparing of the *Forest Products Annual Market Review*. The base data for the *Review* were supplied by country statistical correspondents, who are acknowledged in a separate listing. We regret any omissions.

Yngve Abrahamsen, Euroconstruct, Swiss Economic Institute, Switzerland
Jean-Christophe Claudon, International Tropical Timber Organization, Japan
Ariane Crevecoeur, CEPI, Belgium
Nadia Dell'Orto, FederlegnoArredo, Italy
Tytti Hämäläinen, Metsä Group, Finland
Tiina Inget-Luikka, Pölkky Oy, Finland
Eric Kilby, CEPI, Belgium
Frederik Lauwaert, FEIC, Belgium
Arvydas Lebedys, FAO, Italy
Kaisu Lehtomaa, UPM, Finland
Vitaly A. Lipskiy, National Forest Development and Investments Agency, Russian Federation
William Luppold, USDA Forest Service, United States
Peter Moonen, Canadian Wood Council, Canada
Csaba Mozes, Eurostat, Luxembourg
Olga Rakitova, Infobio, The Bioenergy International and National Bioenergy Union, Russian Federation
Risto Raunio, Raunion Saha, Finland
Tanya Rosendahl, APA-The Engineered Wood Association, United States
Ekaterina Rozhkova, FederlegnoArredo, Italy
Carita Rönqvist, Port of Kokkola, Finland
Al Schuler, USDA Forest Service, United States
Ken Skog, USDA Forest Service, United States
Teemu Tervo, Vapo, Finland
Anne Toppinen, University of Helsinki, Finland
David Venables, American Hardwood Export Council, United Kingdom
Rich Vlosky, Louisiana State University, United States
Judith Wildling, proHolz Austria, Austria
Marilise Wolf-Crowther, Eurostat, Luxembourg



## STATISTICAL CORRESPONDENTS

The national statistical correspondents listed below are the key suppliers of data for this publication. We are grateful for their essential contributions and their significant efforts in collecting and preparing the data. Complete contact information for the correspondents is provided in the publication *Forest Products Statistics*.<sup>1</sup>

Mykola Afanasiev, International Cooperation Department, State Statistics Committee, Ukraine
Gagik Ananyan, State Council on Statistics, National Statistical Service, Armenia
Guilhemine Astrie-Péchin, Statistiques forestières, Ministère de l'agriculture, de l'agroalimentaire et de la forêt, France
Djanbulat Baijumanov, National Statistical Committee, Kyrgyzstan
Ramazan Bali, Forest Product Market Research, General Directorate of Forestry, Turkey
Anna Margret Björnsdóttir, Statistics Iceland, Iceland
Aija Budreiko, Forest Resources Department, Ministry of Agriculture, Latvia
Nikolay Burdin, OAO NIPIEllesprom, Russian Federation
Josefa Carvalho, National Forest Authority, Ministry of Agriculture, Rural Development and Fisheries, Portugal
Matthias Dieter, Federal Research Institute for Rural Areas, Forestry, and Fisheries, "Johann Heinrich von Thünen Institut (vTI)", Germany
Branko Glavonjić, Faculty of Forestry, Belgrade State University, Serbia
Hanne Haanaes, Division for Primary Industry Statistics, Statistics Norway - Statistisk sentralbyrå, Norway
Johannes Hangler, Forest Policy and Forest Information, Federal Ministry of Agriculture, Forestry, Environment and Water Management, Austria
James L. Howard, Forest Products Laboratory, USDA Forest Service, United States of America
Aristides Ioannou, Department of Forests, Ministry of Agriculture, Natural Resources and Environment, Cyprus
Surendra Joshi, Policy and Analysis Division, Swedish Forest Agency, Sweden
M. Bruno Kestemont, Statistique et information économique, Institut National des Statistiques, Belgium
Peter Kottek, Statistical Department, State Forest Service, Hungary
Boro Kovačević, Agency for statistics of Bosnia and Herzegovina, Bosnia and Herzegovina
Linda Langner, United States Department of Agriculture - Forest Service, United States of America
Angela Larabie, Canadian Forest Service / Service canadien des forêts, Natural Resources Canada, Canada
Elina Mäki-Simola, Forest Statistics Information Service, Finnish Forest Research Institute, Finland
Assem Manakova, International Communication Subdepartment, Agency on Statistics of the Republic of Kazakhstan, Kazakhstan
Angelo Mariano, National Forest Service, Ministry of Agricultural, Food and Forest Policies, Italy
Anthony Mifsud, Agricultural Services and Rural Development, Agricultural Research and Development Centre, Malta
Martin Moravčík, Department of Forest Policy and Economics, National Forest Centre, Slovakia
Darko Motik, Faculty of Forestry, Department for Production Organization, University of Zagreb, Croatia
Felix Naescher, National Office of Forests, Nature and Landscape, Ministry for Environment, Agriculture and Forestry, Liechtenstein
Ulrik Nielsen, Enterprise Policy Division, Danish Forest Association, Denmark
Olivian Nutescu, National Institute of Statistics, Romania
Eoin O'Driscoll, Department of Agriculture, Food and the Marine (DAFM), Ireland
Knut Oistad, Department of Forest and Natural Resource Policy, Ministry of Agriculture and Food, Norway
Jan Oldenburger, Probos Foundation, Netherlands
Tatiana Pasi, Forestry Division, Swiss Federal Office for the Environment, Federal Department of Environment Transportation, Energy and Communication, Switzerland.

<sup>1</sup> Forest Products Statistics is available at: [www.unece.org/forests/fpm/onlineadata](http://www.unece.org/forests/fpm/onlineadata)

Arsen Proko, Forests and Pastures, Ministry of Environment, Forests and Water, Albania.
Ewa Ratajczak, Wood Economics Department, Wood Technology Institute, Poland
Alisher Shukurov, Main Department of Forestry, International Projects, Ministry of Agriculture and Water Resources, Uzbekistan
Natalia Sokhadze, International Cooperation & Projects, Forestry and Wildlife Management Department, Natural Resources Agency, Georgia
Biljana Stefanova, Dissemination, State Statistical Office of the Republic of Macedonia, The former Yugoslav Republic of Macedonia
Václav Stránský, Conception and Economics of Forest Management Section, Forestry Department, Ministry of Agriculture, Czech Republic
Wladyslaw Strykowski, Wood Technology Institute, Poland
Rafael S. Suleymanov, Department of Trade, State Statistical Committee of Azerbaijan Republic, Azerbaijan
Irena Tomšič, Statistical Office of the Republic of Slovenia, Slovenia
Maria Torres-Quevedo Garcia de Quesada, Directorate-General of Rural Development and Forestry Policy, Ministry of Agriculture, Food and Environment, Spain
Mati Valgepea, Department of Forestry Statistics, Estonian Environment Information Centre, Estonia
Darius Vizlenskys, Forest management and forestry statistics department, State Forest Service (SFS), Lithuania
Sheila Ward, Economics and Statistics, Forestry Commission, United Kingdom
Frank Wolter, Administration de la nature et des forêts, Luxembourg



## 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 May 2013. Within the 56-country UNECE region, data for the 31 EU and EFTA countries are collected and validated by Eurostat, and, for other UNECE countries, by UNECE/FAO Geneva.

The statistics for this *Review* are from the TIMBER database system. As the database is continually being updated, any one publication's analysis is only a snapshot of the database at that particular time. Data quality differs between countries, products and years. Improvement of data quality is a continuing task of the secretariat, paying special attention to the CIS and South-Eastern Europe.

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 steadily improving. Our goal is to have a single, complete, current database, validated by national correspondents, with the same figures available from FAO in Rome, Eurostat in Luxembourg, ITTO in Yokohama and UNECE/FAO in Geneva. We're convinced that the data set used in the *Review* is the best available anywhere as of August 2013.

The data appearing here form only a small part of the total data available. *Forest Products Statistics* will include all of the data available for the years 2008-2012. The TIMBER database is available on the website of the joint Timber Committee and European Forestry Commission at [www.unece.org/forests/fpm/onlineadata.html](http://www.unece.org/forests/fpm/onlineadata.html).

The secretariat is grateful that correspondents provided up-to-date statistics for 2012 or, in the absence of formal statistics, their best estimates. Therefore all statistics for 2012 are provisional and subject to confirmation next year. The responsibility for national data lies with the national correspondents. The official data supplied by the correspondents account for the great majority of records. In some cases, where no data were supplied, or when data were confidential, the secretariat estimated figures to keep region and product aggregations comparable and to maintain comparability over time. Estimations are flagged within this publication, but only for products at the lowest level of aggregation.

In spite of everyone's best efforts, some significant problems remain. Chief among these problems are differing definitions and unrecorded removals and production. In certain cases, for example wood fuel removals, the officially reported data may be as little as 20% of actual figures. The Joint Wood Energy Enquiry 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 in a consistent manner. The Joint FAO/UNECE Working Party on Forest Statistics, Economics and Management is trying to increase awareness of problems in measurement and how to deal with these. Intra-EU trade is, for instance, less reliable than extra-EU trade.

Besides the official statistics received by questionnaire, trade association and government statistics are used to complete the analysis for 2012 and early 2013. Supplementary information came from experts, including national statistical correspondents, trade journals, the United Nations trade database (COMTRADE) and internet sites. These sources are cited where they occur in the text, and at the end of the chapters.





## 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 stocks. The term is synonymous with “demand” and “use” and often simply referred to as “consumption”.

Forest products here include primary products such as roundwood, sawnwood, wood-based panels, pulp and paper. Further processed products (e.g. builders’ joinery, windows, cut paper, boxes, engineered wood products) are excluded.

“Net trade” is the balance of exports and imports and is positive for net exports, i.e. when exports exceed imports, and is negative for net imports, i.e. when imports exceed exports. Trade data for the 27 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 a breakdown of the region into its subregions, please see the map in the annex. References to EU27 refer to the countries members of the EU in 2012 (prior to Croatia joining on 1<sup>st</sup> July 2013). The term Commonwealth of Independent States (CIS) refers to 12 countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, Ukraine, 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”. More definitions appear in the electronic annex.

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<sup>9</sup>).

All US and Canadian sawn softwood production and trade are in actual m<sup>3</sup>, converted from nominal figures.

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 metric 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.

The conversion of energy units (PJ or GJ) to solid wood equivalents (m<sup>3</sup>) is based on the assumption of 20 GJ/m.t.d.m. and the specific gravity of 0.5 m<sup>3</sup> /m.t.



## SYMBOLS AND ABBREVIATIONS<sup>2</sup>

...	not available
€	euro
\$	United States dollar unless otherwise specified
AHEC	American Hardwood Export Council
ATFS	American Tree Farm System
AWC	American Wood Council
B.C.	British Columbia, Canada
BJC	builders' joinery and carpentry
CAN	Canadian dollar
CFP	certified forest product
CHP	combined heat and power
CIS	Commonwealth of Independent States
CLT	cross-laminated timber
CO <sub>2</sub>	carbon dioxide
CoC	Chain-of-Custody
CSA	Canadian Standards Association
DDS	due diligence system
EFI	European Forest Institute
EFTA	European Free Trade Association
EQ	equivalent of wood in the rough
EU	European Union
EUTR	European Union Timber Regulation
EWPs	engineered wood products
FSC	Forest Stewardship Council
FOB	Free on board
GDP	gross domestic product
GHG	greenhouse gas
Gj	gigajoule
GWh	gigawatt hour
ha	hectare
IMF	International Monetary Fund
ITTO	International Tropical Timber Organization
JWEE	Joint Wood Energy Enquiry
kWh	kilowatt hour
LVL	laminated veneer lumber
LSL	laminated strand lumber
m.t.	metric ton or tonne
m <sup>2</sup>	square metre
m <sup>3</sup>	cubic metre
MBF	one thousand board feet

<sup>2</sup> Infrequently used abbreviations spelled out in the text may not be listed again here.

MDF	medium-density fibreboard
MSF	one thousand square feet
MWe	megawatt electrical
MWth	megawatt thermal
NGO	non-governmental organization
OSB	oriented strand board
OSL	oriented strand lumber
PEFC	Programme for the Endorsement of Forest Certification
PJ	petajoule
PoC	Province of China
PSL	parallel stand lumber
REDD	Reducing Emissions from Deforestation and Forest Degradation
SAR	Special Administrative Region (of China)
SFI	Sustainable Forestry Initiative
SFM	sustainable forest management
SWE	the equivalent volume to what it was in the solid green roundwood
TMT	thermally modified timber
VAWPs	value-added wood products
WPC	wood-plastic composites





# 1 OVERVIEW OF FOREST PRODUCTS MARKETS AND POLICIES

Synopsized from regular chapters with Robert Shelburne on Economic Developments

## HIGHLIGHTS

- The European Union Timber Regulation (EUTR) came into effect on 3 March 2013.
- Recent events that have a significant impact on forest policy in the Russian Federation include the country's entry into the World Trade Organization and roundwood export quotas.
- The world's certified forest area, as a percentage of total forest area, has topped the 10% mark.
- The biorefinery industry is innovating, using methods such as pyrolysis, hydrolysis and biomass gasification, all of which can transform wood into a range of valuable, bio-based products.
- Legislation drivers have spurred innovation in the cross-laminated timber (CLT) industry, with new firms developing products to meet the legislation-driven demand for "greener" materials.
- Total consumption of industrial roundwood was up in 2012 for the third consecutive year in the UNECE region, reaching almost 1 billion m<sup>3</sup>. Only North America increased consumption, while demand for roundwood fell in both Europe and the Commonwealth of Independent States.
- Compared with 2011, sawn softwood consumption in 2012 rose by 8.2% in North America, 2.9% in the CIS; while in Europe, the continuing weak economy resulted in 2.8% lower demand.
- There was solid growth in North American sawn hardwood consumption in 2012; growth slowed in the CIS; and in Europe, despite production growth in 2012, Europe's hardwood sawmilling sector is seeing declining domestic consumption of sawn hardwood.
- European consumption of panels fell in 2012; Russian panel consumption continued to increase, though at a slower rate than in 2011; and demand for wood-based panels increased considerably in North America for the first time since 2006.
- Graphic paper output across North America and Europe fell as a result of mill closures, while woodpulp production was flat. Paperboard output rose in all major markets with stronger online shopping in North America and as slight economic recovery continued.
- In just three years, imports of industrial wood pellets into the EU27 countries rose from less than 2 million tonnes a year to 4.5 million tonnes in 2012. The US was the largest exporter of industrial wood pellets, followed by Canada and the Russian Federation.
- Recovery of value-added wood products markets is uneven, as US imports are growing but Europe remains largely stagnant.
- The European housing construction market remains stagnant due to the ongoing sovereign debt crisis, with improvement in new housing not expected until 2014 at the earliest. The United States housing market is improving; yet, to place things in perspective, housing starts remain close to historically low levels.





## 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 2012, as well as the policies and trends that are driving them. The UNECE region has 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, the Caucasus and Central Asian republics in the east. It covers almost the entirety of boreal and temperate forests in the northern hemisphere – about 1.7 billion hectares – just under half of the world's forest area. Almost 38% of the land area of the UNECE region is covered by forest.

The *Review* is one background document for the joint session of the UNECE Committee on Forests and the Forest Industry and the FAO European Forestry Commission, which will take place from 9 to 13 December 2013 in Rovaniemi, Finland. The event is called Metsä2013 ("metsä" means forest in Finnish). A European Forest Week will be organized during Metsä2013 and will focus on how forests and forest products can and already do contribute to a green economy.

### 1.1.1 How the publication is structured

This chapter provides an Executive Summary and an overview of the following 10 chapters. The chapters in the *Review* are interrelated although structured primarily according to market sectors.

In Chapter 1, Section 1.2 gives some background on the macroeconomic health of the region. The remaining Sections summarize the other Chapters, as outlined below.

Policies and market tools that are influencing the forest products sector are described in Chapter 2. This includes trade, energy and environment related developments (certified forest products, carbon accounting and markets, and green building).

Chapter 3 focuses on innovative wood products. This is followed by seven chapters covering major forest product sectors. The last chapter of the *Review* is on housing, which is a leading driver of wood consumption.

This analysis of the period of 2012-2013 is based on the first available annual statistics collected by the UNECE/FAO Forestry and Timber Section from national statistical correspondents or provided by Eurostat. As trade-flow information lags behind by one year, the most recent information on trade flows is from 2011.

Electronic annexes<sup>3</sup> provide additional statistical information and the entire UNECE/FAO TIMBER Database, which was updated with statistics from national correspondents in July 2013, is

also available through the website<sup>4</sup>. These comprehensive statistics, which form the basis of many of the chapters, provide a transparent background to the *Review*. The references at the end of each chapter provide other sources for further reading and research.

## 1.2 ECONOMIC DEVELOPMENTS WITH IMPLICATIONS FOR THE FOREST SECTOR

Global growth has been moderate for the last two years (mid 2011 to mid 2013) and is expected to increase only slightly in 2014, remaining below the level attained in the five years before the 2008-2009 financial crisis. Since mid-2009, we've seen the emerging and developing economies grow solidly, although below recent trend levels, while North America has grown moderately but not fast enough to eliminate the large pool of unemployed that developed during the crisis. Western Europe, however, has stagnated with consistently increasing unemployment that has reached levels not seen in decades.

Total employment in the European Union in the first quarter of 2013 was still 3% below the level five years earlier; in the eurozone it was 4% lower. The economic situation in several countries of the eurozone is quite poor. In Greece and Spain in particular, GDP has collapsed, unemployment is over 25%, youth unemployment is over 50%, and social safety nets and pensions have been greatly scaled back.

During the second half of 2013, the world recovery should persist and Europe's contraction should bottom out, with a slow recovery beginning in early 2014. Although global growth is likely to be only moderate over the next two years compared with the years immediately before the crisis, it is still likely to be above the average global growth rate during the last 30 years.

The Eastern European emerging economies have been growing, are expected to continue to grow at about the same rate as the global economy: i.e. at about 3% in 2013 and 4% in 2014. Employment trends in this region have been mostly positive, with unemployment generally falling while labour force participation has been increasing.

These employment trends are forecast to continue over the next two years. Employment conditions have been especially positive in the resource-rich countries. In the Russian Federation, unemployment fell to a record low in 2012 before increasing slightly in 2013 (although youth unemployment remained high).

However, in South-East Europe, unemployment remains extremely high. The, very high overall unemployment has resulted in particularly high youth unemployment at about twice the general level.

<sup>3</sup> [www.unece.org/fpamr2013](http://www.unece.org/fpamr2013)

<sup>4</sup> [www.unece.org/forests/fpm/onlineadata](http://www.unece.org/forests/fpm/onlineadata)





The improving economic situation in the United States is both a result and a cause of the stabilizing US housing market. Prices have begun to increase, inventories and foreclosures have fallen significantly, and construction has picked up. A potential downside risk in the coming two years will be whether this market will be able to withstand the inevitable increase in interest rates that will occur as the economy strengthens. Canada, too, is subject to potential downside risks as its housing prices did not fall over the last five years but, on the contrary, increased significantly and by some measures appear to be currently overvalued. Higher interest rates could trigger a housing bust.

Because of the crisis and lacklustre recovery, the gross domestic product (GDP) in much of the region is much below where it would have been based upon pre-crisis trends. Although a portion of this can be made up in the coming years as resources (especially labour) become fully utilized, much of this decline represents output that has been lost forever.

For example, in the United Kingdom at present, GDP is 16% below what it would have been without the recent recession, and the IMF estimates that 4% of the output gap could be eliminated by reducing unemployment from the current 8% to about 4% or 5%. However, the other 12% of GDP represents a decline in yearly output that will persist indefinitely. Generally the longer an economy remains depressed, the lower the percentage of the lost output that can be recovered.

Because of the weak economic growth and high unemployment, inflationary pressures are weak and actual inflation rates are likely to stay below central bank targets levels (generally about 2%) for the next year or two. There are concerns, however, that the extraordinary monetary policies (i.e. quantitative easing) implemented by central banks may have resulted in the creation of excessively large base money supplies.

So far, this has not created inflation because the money is just sitting in the central bank as deposits by commercial banks. Only when the commercial banks begin to lend out the money will this pose any inflationary threat. The current belief is that when this time approaches, the central banks will be able to withdraw the money from the money supply as easily as they injected it. However, some argue that this may not be so easy and may result in inflation. Others argue that the interest rate increases that would accompany this process are likely to be de-stabilizing.

The financial crisis and the following, slow recovery from it have resulted in large increases in the sovereign debt of the United States and most of Europe. Attempts to address this problem by reducing spending and increasing taxes at a time when unemployment has been high have proven to be largely counterproductive.

In conclusion, while official forecasts indicate a continuing, slow recovery during 2013 and 2014, at the same time; there are still significant risks for the economy, employment and consumption. In addition, sub-regional economic conditions vary considerably. So, while the outlook for the next two years is, overall, cautiously optimistic, a constant monitoring of systemic risks is necessary.

## 1.3 POLICY AND REGULATORY DEVELOPMENTS AFFECTING THE FOREST PRODUCTS SECTOR

### 1.3.1 Trade

In 2013, the European Union and the United States began negotiations on a Transatlantic Free Trade Area in the hope of increasing overall trade between the two trading blocs, which today accounts for about 30% of world trade. Similarly, the EU is also negotiating a Comprehensive Economic & Trade Agreement (CETA) with Canada. Many opportunities for expansion exist through reducing or eliminating tariffs and non-tariff barriers (NTBs), as well as through improving the compatibility of regulations and standards (EU-US High Level Working Group on Jobs and Growth, 2013). Likely economic impacts of changes in non-tariff barriers for the wood and paper products sector illustrate the potential and appreciable trade benefits that such an agreement could bring to both the EU and the US.

The European Union Timber Regulation (EUTR), which came into effect on 3 March 2013, is intended to prevent illegally logged wood in all the EU Member States. The Regulation prohibits placing on the EU market wood and wood products derived from wood harvested in contravention of the applicable legislation in the country of origin.

The Member States are responsible for promulgating effective and dissuasive penalties and for enforcing the Regulation. Anyone placing wood on the market for the first time an operator must exercise due diligence to minimize the risk of introducing illegal wood. They can develop their own system or use one developed by a monitoring organization. Private entities, to be authorized by the European Commission, will be able to function as monitoring organizations and can provide EU operators with operational due diligence systems.

Complete implementation of the Regulation will still take some time, as not all of the necessary measures are yet in place. At the national level, there's still some work to be done on national sanction regimes, designating the control services, etc. At the private-sector level, operators need to have their due diligence system in place (with or without the assistance of a monitoring organization).



In Canada, during December 2012, a dispute arose in which Greenpeace accused the Resolute Forest Products of violating the Canadian Boreal Forest Agreement (CBFA). Greenpeace withdrew from the Agreement in protest. Following an investigation by Resolute, Greenpeace issued a statement, in March 2013, acknowledging the inaccuracy of its allegations. The Agreement expired on 18 May 2013. Talks aimed at extending the Agreement halted at the end of May 2013. Community leaders in the boreal areas of Canada are currently talking about renewing an agreement between industry, indigenous communities and environmental groups, as there's a strong need for certainty and sustainability for the forest industry, the local people and the ecosystem.



Source: UNECE/FAO, 2013.

Several developments in 2012 and early 2013 could have a major impact on forest policy in the Russian Federation. These include the country's accession to the World Trade Organization, the regulation of roundwood export quotas, and the approved State Programme on the Development of Forestry for 2013-2020.

The Russian Federation continues to pursue investment projects aimed at making use of its forest resources and creating forest-based products with more value-added. By the end of 2012, some 121 projects had been included in the Top-Priority Investment Project List, with total investment value of RUB 403.7 billion (\$12.5 billion<sup>5</sup>) and for implementation across 35 Russian regions.

The Lacey Act in the United States, which was first introduced and made into law in 1900, addresses trafficking in illegal wildlife, fish and plants. Following a series of amendments in 2008, the Act now requires that certain plants and plant products, including a wide range of wood and forest products, be accompanied by import declarations.

One high-profile case centred on the Lacey Act involved the Gibson Guitar Company of Nashville, Tennessee. The company was alleged to have imported wood in violation of the Act.

<sup>5</sup> 1 USD = 31 RUB

The US Department of Justice settled the case in August 2012, resulting in penalties and community service payments of \$350,000, as well as changes in internal operating procedures. The agreement defers prosecution for criminal violations of the Lacey Act. The company agreed to put in place a programme to strengthen its compliance controls and procedures. It has withdrawn its claim to the wood seized in the course of the criminal investigation, valued at \$261,844.

### 1.3.2 Environment

By May 2013, the global area of certified forest, as endorsed by the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (PEFC), amounted to 417 million hectares, up 8.5% (32.8 million hectares) since May 2012. The world's total certified forest area has, for the first time, topped the 10% mark in terms of the proportion of total forest area. In the 12 months prior to May 2013, some 3,766 more certificates of conformity were issued, representing an annual relative growth rate of 11.8%.

Carbon trading volume and pricing has suffered from the prolonged financial and economic crises in Europe, political obstacles in the US, slow progress in the negotiations on the United Nations Framework Convention on Climate Change, and the absence of full operational details for REDD+<sup>6</sup>. On a more positive note, more countries are establishing national emission trading schemes (ETS), including China and several other large emerging economies. Also, large corporate offset buyers are active in the Voluntary Carbon Market (VCM), where forestry projects are common.

In 2013, the ECO Platform advanced as an EU initiative to address sustainability in the construction products industry in member states. This initiative aims to ensure compliance with the new EU Construction Product Regulation (CPR) and standard (EN 15804). The standard sets mandatory information, requirements and indicators to be used in environmental product declarations (EPD) that support sustainability in the products used in the construction industry. These common indicators should allow purchasers to compare the environmental impact of products.

In the US, the American Wood Council (AWC) has made environmental product declarations (EPDs) available for specific wood product categories, including sawn softwood, softwood plywood, oriented strand board (OSB), and glued laminated timber (AWC, 2013). The life-cycle environmental impact information provided by an EPD is important for supporting the full potential of wood and wood products within responsible trade and green building.

Building codes are gradually moving away from prescriptive to performance-based parameters. With this shift comes greater

<sup>6</sup> Reducing Emissions from Deforestation and Forest Degradation; plus conservation and sustainable management of forests and the enhancement of forest carbon stocks.

opportunity to include wood in non-traditional structures, including mid-rise and high-rise commercial constructions. Innovations in several parts of the world, including Canada, Australia, Sweden, and the UK have demonstrated the capacity for wood and engineered wood products to provide advantages in diverse types of construction.

## 1.4 INNOVATIVE WOOD-BASED PRODUCTS

In the wood-based products industry, innovation tends to follow a classic pattern, driven by costs, legislation and product replacement.

Biorefineries offer an example, where the cost of oil, together with innovative processes that have increased the number of usable wood bio-feeds, has spurred exceptional innovation. The current process can turn more than 90% of the incoming biomass into marketable products, such as: construction materials, cosmetics, food, concrete additives, batteries, pharmaceuticals, paints and car-care products.

The following are among the (relatively) new processes, or established processes used in new ways or with innovative modifications that have been adopted by biorefineries: pyrolysis, hydrolysis and biomass gasification. All these processes have been cost-driven, where either the increased price of oil has helped to make them profitable or the ability to use a wider range of feedstocks has lowered the production costs and made them profitable.

A good example of where legislation has contributed to innovation is in the cross-laminated timber (CLT) industry. Despite the general slowdown in the construction industry, the CLT industry has continued to grow, with increased numbers of showcase buildings in more cities. CLT panels are used widely in the construction of wooden buildings--and increasingly in the construction of multi-storey timber structures.

CLT has many advantages over other construction materials. It has a high strength-to-weight ratio, and can be produced with the final design and application in mind. The result is designer friendly, easily assembled, strong (e.g. earthquake resilient), cost effective and thermally efficient buildings.

The innovation process may, of course, be driven by a more traditional industrial approach--that of identifying market opportunities and, based on these, developing a product that surpasses existing ones in terms of cost or performance.

There have been a variety of innovations in wood-based products intended to make them more attractive as replacements for existing materials, especially in construction. Innovations in the wood-plastic composites (WPC) industry serve as a good example. In 2010, global WPC production reached 1.5 million

tonnes, although this figure represents a small fraction of the overall market for wood-based products.



Source: UPM, 2013.

Wood-fibre insulation is produced in similar forms to mineral or glass wool insulation – namely rigid boards, semi-rigid boards and flexible rolls. Its thermal conductivity is comparable to that for mineral and glass fibre.

Thermally modified timber (TMT) is also a good example of innovation to replace existing products. It uses no dangerous chemicals, being the product of a form of mild wood pyrolysis. The resulting product is particularly well suited to outdoor applications, with a greatly reduced need for wood preservatives or expensive and over-harvested tropical timber (IHD, 2008). In 2012, European production of TMT reached 315,000 m<sup>3</sup>; North America produced about 100,000 m<sup>3</sup> of TMT.

All of the above products illustrate innovations in the sector, which not only meet the immediate needs of the consumer, but also support long-term strategies to reduce greenhouse gas emissions over the life-cycle of the various products.

## 1.5 SUMMARY OF REGIONAL AND SUBREGIONAL MARKETS

The overall situation of forest products markets in the UNECE region is mixed. European markets continue to suffer as a result of the prolonged recession and stagnation in the subregion. A notable exception to this trend in Europe has been Turkey, which has seen major growth in the consumption of most forest products.

In the CIS, growth has been moderate. Investment in new plants, the Russian Federation's accession to the WTO, stronger domestic consumption and the proximity of key export markets for most products have given the subregion grounds for optimism.



North America has seen fairly strong and positive movements in most markets. This is due to the recovering housing sector, the improved economic situation in the US and increased exports to Asia. However, in 2009 consumption fell the furthest in the North American subregion. Therefore, while there are strong signs of improvement, in 2012 the subregion consumed between 5% and 16% less of most forest products than in 2008. Conversely, the CIS has grown and Europe's losses in consumption have been about half as much as North America's during this same period (table 1.5.1).

There are signs that things may improve further in 2013. In Europe there is strong demand for wood energy and hopes are high that construction of housing and other buildings from wood will increase as a result of initiatives to construct "greener" buildings.

All of the UNECE region could benefit from the "supercycle", whereby demand from a reinvigorated US housing market and China's need for products made of wood fibre creates very high demand and higher prices. Several forest products analysts are forecasting that this will take place in late 2014.

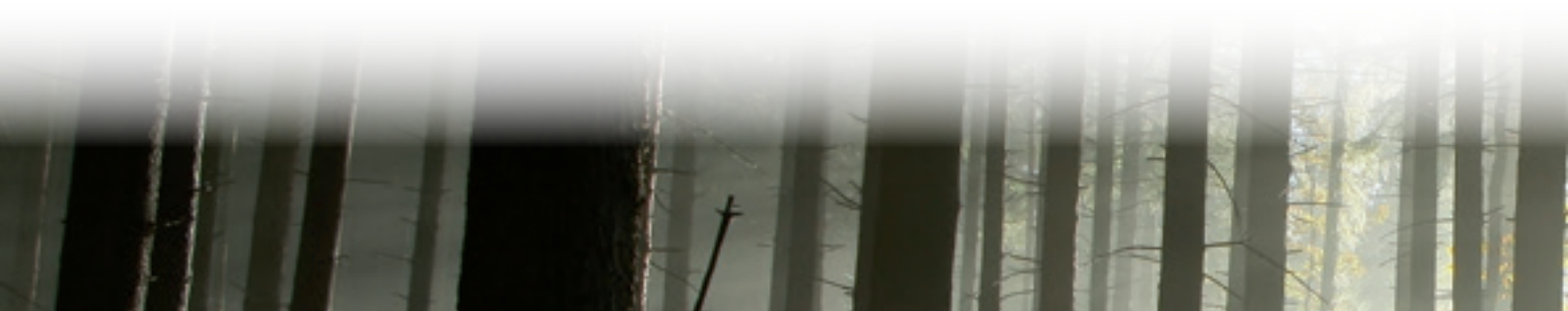
**TABLE 1.5.1**

**Apparent consumption of industrial roundwood, sawnwood, wood-based panels and paper and paperboard in the UNECE region, 2008-2012**

							Change 2008-2012		Change 2011-2012	
	Thousand	2008	2009	2010	2011	2012	Volume	%	Volume	%
Europe										
Industrial roundwood	m³	391 129	341 965	385 749	386 432	382 399	-8 730	-2.2	-4 033	-1.0
Sawnwood*	m³	101 682	92 204	101 865	101 475	98 575	-3 107	-3.1	-2 900	-2.9
Wood-based panels	m³	69 850	61 545	66 572	67 444	66 910	-2 940	-4.2	-534	-0.8
Paper and paperboard	m.t.	97 417	87 802	94 371	92 871	89 119	-8 298	-8.5	-3 752	-4.0
CIS										
Industrial roundwood	m³	112 176	100 916	126 271	172 122	171 894	59 718	53.2	-228	-0.1
Sawnwood*	m³	18 170	17 412	17 449	17 764	18 289	119	0.7	525	3.0
Wood-based panels	m³	14 367	10 531	12 661	15 432	15 814	1 447	10.1	382	2.5
Paper and paperboard	m.t.	9 120	8 466	9 363	9 594	9 248	128	1.4	-346	-3.6
North America										
Industrial roundwood	m³	465 990	398 388	414 253	433 392	444 936*	-21 054	-4.5	11 544	2.7
Sawnwood*	m³	110 386	83 456	87 308	87 039	93 176	-17 210	-15.6	6 137	7.1
Wood-based panels	m³	52 030	46 726	47 261	45 649	46 399	-5 631	-10.8	750	1.6
Paper and paperboard	m.t.	89 743	78 443	83 244	79 721	78 001	-11 742	-13.1	-1 720	-2.2
UNECE region										
Industrial roundwood	m³	969 294	841 269	926 273	991 945	999 229	29 934	3.1	7 283	0.7
Sawnwood*	m³	230 237	193 072	206 623	206 278	210 039	-20 198	-8.8	3 761	1.8
Wood-based panels	m³	136 247	118 802	126 493	128 525	129 123	-7 124	-5.2	598	0.5
Paper and paperboard	m.t.	196 280	174 710	186 977	182 185	176 368	-19 912	-10.1	-5 817	-3.2

**Notes:** \*Excluding sleepers. \*Estimate.

**Source:** UNECE/FAO TIMBER database, 2013.





Source: Raunion Saha, 2013.

## 1.5.1 Wood raw materials

### 1.5.1.1 Roundwood

Removals and consumption of industrial roundwood in the UNECE region reached the highest level seen since 2007. Consumption increased by roughly 20% since 2009 to reach a total of just under 1 billion m<sup>3</sup> in 2012. From 2011 to 2012, the increase was slightly less than 1%, with different trends in the three UNECE subregions.

In the CIS, consumption was practically unchanged from 2011, whereas log demand fell by about 1% in Europe and was up by almost 4% in North America. The dissimilar trends during the past year are mainly a reflection of the health of the sawnwood markets in the three subregions, with the US market improving significantly during 2012 (an 8.2% increase since 2011). In Europe, the demand for sawnwood has been stagnant in the past two years, even falling slightly in 2012.

With the exception of North America, where a substantial increase in log and sawnwood exports to Asia has increased the timber harvest levels in the western US and western Canada over the past four years, harvest trends in the rest of the UNECE region have mainly followed the changes in the region's roundwood consumption.

Net exports of logs from the UNECE region in 2012 reached the highest level since 2007, with total exports reaching 83 million m<sup>3</sup> and imports falling almost 5 million from 2011 to 58 million m<sup>3</sup> in 2012. The biggest changes in trade occurred in North America, where export volumes of logs to Asia were up over 30% and in Europe where demand for imported logs fell by 8% in 2012. The major global log trade flows continue to be from the Russian Federation, New Zealand and the US to China, although Russian shipments have fallen substantially over the past five years.

### 1.5.1.2 Fuelwood

In 2012, approximately 182 million m<sup>3</sup> of the total wood harvest, or about 15% of total removals, was estimated to have been wood fuel in the UNECE region.

### 1.5.1.3 Sawlog prices

The Global Sawlog Price Index fell by 12% from the second quarter of 2011 to the second quarter of 2012, but has since increased slowly by almost 5% to reach \$86.33/m<sup>3</sup> in the first quarter of 2013. The biggest log price increases in the UNECE region during 2012 and 2013 occurred in the western US, western Canada, the Nordic countries and the Baltic States.

### 1.5.1.4 Chip and pulpwood prices

The costs of wood fibre for the world's pulp mills trended downwards during much of 2011 and 2012 because of reduced pulp and paper production, and in some regions, as a result of a higher supply of lower-cost fibre.

The Hardwood Wood Fiber Price Index fell by 1.1% to \$103.66 per oven-dry tonne (odmt), which was 12% below the all-time high in the third quarter of 2011. The Softwood Wood Fiber Price Index in the first quarter of 2013 was practically unchanged from late 2012 at \$99.90/odmt.

## 1.5.2 Sawn softwood

In line with mixed global economic trends, 2012 was characterized by a nascent recovery in North America, recessionary conditions in most of Europe, and stable results in the CIS.

The continuing economic uncertainty in Europe took its toll on the construction market, which had a direct impact on the sawn softwood market, with consumption dropping by 2.8% in 2012 to about 85.7 million m<sup>3</sup>.

The European debt crisis was responsible for weak consumption, especially in the traditionally larger markets Germany (-6.1%), France (-6.7%), Italy (-13.7%), Netherlands (-13.8%), Sweden (-15.1%) and Finland (-18.9%), where the drop in consumption volume was far more severe than in the rest of Europe.

However, in some parts of Europe, there were also good signs that the worst could be over: consumption grew in the UK (+4.3%) in 2012; Turkey is growing rapidly (+3.2% in 2012) and is now the fifth largest market in Europe. Even Ireland (+17.2%) and Spain (+20.6%) had huge rebounds after suffering some of the greatest earlier consumption losses in Europe.

There's still oversupply in the European sawmill industry, which has resulted in low profitability, or in many cases, losses—this has led to some restructuring and a drop of 3.5% in output. With weak domestic demand, European overseas exports increased by 9% to roughly 18 million m<sup>3</sup> in 2012 – this is 42% of total European exports.

CIS output increased by 2.9% to 33.88 million m<sup>3</sup>, with the Russian Federation accounting for almost 89% of this—its sawn softwood production increased by 3.4% to reach 30.04 million m<sup>3</sup> in 2012. The three largest producing regions in the Russian Federation (Irkutsk, Krasnoyarsk and Arkhangelsk) accounted for more than 50% of the total output in 2012.

Sawn softwood exports from the Russian Federation in 2012 increased by 3.0% to 19.4 million m<sup>3</sup> - the highest volume since 2007. China was the destination for 6.2 million m<sup>3</sup> or 32% of all Russian exports, followed by Uzbekistan (2.1 million m<sup>3</sup>) and Egypt (1.7 million m<sup>3</sup>).

After a 28.5% gain in US housing starts in 2012, North American apparent sawn softwood consumption soared by 8.2% in 2012 over 2011, to reach 78.33 million m<sup>3</sup>. This was based on 7.6% growth in the US to 62.54 million m<sup>3</sup>; and Canada's even higher growth of 10.8%, to reach 15.79 million m<sup>3</sup>.

US sawn softwood output in 2012 was 48.75 million m<sup>3</sup> (+7.2%) as compared with 2011, with production gains being spread relatively evenly throughout the US. Canada's sawn softwood production rose more slowly, due to timber supply issues in BC and Québec, to reach 39.42 million m<sup>3</sup> (+5.4%).

The long-term trend in China is for rising dependence on imported sawn softwood from North America and the outlook is for stable to higher export volumes, as well as prices increasing in China.

Supply-chain dislocations in North America, coupled with strong demand in China and Japan, created soaring prices until early in the second quarter of 2013. But slowing demand and surging sawnwood production created an oversupplied market and prices crashed hard throughout the second quarter of 2013, to return to close to the levels seen during the second quarter of 2012, or in other words, back to where the cycle started.

Nonetheless, the expectations are for a gradual improvement in North American sawn softwood consumption and prices, led by US residential new construction growth. A "super-cycle" of much higher North American lumber prices (a function of tightening Canadian and Russian timber supplies coupled with the expectation of strong demand in the US and Chinese markets) is still expected to occur, but not before 2015.

### 1.5.3 Sawn hardwood

Total apparent consumption of sawn hardwood across the UNECE region was 29.6 million m<sup>3</sup> in 2012, a 0.7% decline over 2011. Consumption across the region fell in every year since 2007. In 2012, slight increases in consumption in North America and the CIS were offset by a fall in consumption in Europe.

In Europe, the economic and financial crises and a low level of construction activity led to a 3.4% decline in European consumption of sawn hardwood to 12.9 million m<sup>3</sup> during 2012. Although market conditions recovered in the first half of 2012, they deteriorated again in the second half and remained poor in the first six months of 2013.

Apparent consumption of sawn hardwood in the CIS increased by 2.8% in 2012 to 1.9 million m<sup>3</sup>. Production remained stable, while exports declined by 3.1%. Imports, although still negligible, increased by 5.3%.

In the Russian Federation in 2012, sawn hardwood production increased by 1.4% to 2.2 million m<sup>3</sup> and exports increased by 0.6% to 860,000 m<sup>3</sup>. Exports from the Russian Federation to China were 763,000 m<sup>3</sup> in 2012, very similar to the previous year. This follows a big rise in exports to China between 2009 and 2011, stimulated by the Russian Federation's introduction of log export taxes, which encouraged increased domestic processing.

North American sawn hardwood consumption increased by 1.3% to 14.8 million m<sup>3</sup> in 2012. In the US, low mortgage rates, a better jobs market and higher consumer confidence were bolstering home sales and leading the economic recovery. Growth continued in the first half of 2013, but may slow in the last six months of the year. During 2013, remodelling expenditures have fallen short of projections and the pace of residential construction growth is slowing.

The overall shift in sawn hardwood trade flows away from the UNECE region towards emerging economies continued into 2012. Sawn hardwood imports into the UNECE region fell considerably during 2012. But sawn hardwood production in all three UNECE subregions increased in 2012, driven mainly by rising export demand, particularly in Asia. In just five years, net trade in sawn hardwood by the UNECE region has increased from only 74,000 m<sup>3</sup> to 3.2 million m<sup>3</sup>!

### 1.5.4 Wood-based panels

Stronger housing starts in both Canada (+10.8%) and the US (+26.3%) drove increased demand for panel products in 2012. Total panel production within North America increased by 4.9% and structural panel production by over 6%. Despite this, capacity utilization rates remain relatively low, ranging from just 58.7% for the MDF sector to 78% for plywood.

By far the strongest growth in demand for structural panels occurred within the residential construction sector, which accounted for 83.4% of the total increase in demand. Imports of wood-based panels into North America declined slightly (-0.4%), with structural panel imports falling by 20%. Exports of wood-based panels grew for the second year in a row (+0.9%) although structural panel exports dropped by 16%. A projected increase of 18.3% in housing starts in 2013 should continue to support increased demand for wood-based panels within North America (although housing starts in Canada are actually projected to decline by 12%). In 2013, the demand for structural panels in North America is projected to increase by 9% and for non-structural panels by 7%.





The demand and consumption of wood-based panels fell in 2012 due to the economic turmoil in Europe, particularly in the south. Both production and imports of wood-based panels fell by about 0.5% in 2012, while exports remained almost unchanged. Increasing demand for wood-based panels in Turkey largely helped to offset weak demand within the rest of Europe. Particle board production fell by 3.1% in 2012, while both MDF (+4.2%) and OSB (+3.6%) production saw moderate growth. Demand for wood-based panels is projected to increase slightly in 2013 (+1.1%).

Slowing economic growth within the Russian Federation caused the production of wood-based panels to grow more slowly in 2012 (+4.4%) compared with the relatively high growth seen in 2011 (+17.5%). Panel production was up across all three sectors, led by MDF (+5.5%), while plywood production was up by 3.5% and particle board production by 1.8%.

The Russian Federation celebrated the opening of its first two OSB mills in 2012, with production beginning at mills in the Kirov region and the Vladimir region. Both mills operated at low capacity utilization rates in 2012 but are expected to reach full production in 2013. Russian panel exports surged in 2012 (+29%), following an 8.7% decline in 2011. The outlook for 2013 is moderate with consumption expected to increase slightly, by 3.4% over 2012.

### 1.5.5 Paper, paperboard and woodpulp

The pulp, paper and paperboard market remained in flux due to on-going large reductions in graphic paper capacity in Europe and North America. At the same time, South America continued to expand its chemical market pulp capacity and Southeast Asia increased the number of paper and paperboard installations in order to serve its rapidly growing economies. The ramifications of these and other changes are resulting in an unprecedented global shift in pulp and paper supply.

2012 was another challenging year for the global pulp, paper and paperboard industry. Despite major capacity closures across several pulp, paper and paperboard grades in Europe, Japan and North America, production capacity is still too high when measured against falling or static apparent consumption (table 1.5.1) which applies to most grades. In all major regions, only paperboard production and apparent consumption remained strong.

With much of Europe gripped by an economic recession during the mid-2012 to mid-2013 period and China's gross domestic product slowing to 7% in 2012 (from 9%-10% in 2007-2011), global demand for pulp, paper and paperboard remained largely static.

The popularity of the Internet and smart phones to transfer data and communicate continued the incentive to reposition advertising dollars from print media to electronic platforms. Thus demand for printing and writing grades of paper continued

to decline across western Europe, the Commonwealth of Independent States, North America and Japan. Stagnant or declining demand for paper in developed markets has forced all companies to take a fresh look at their operations

In the paper sector, the current trend in mature markets is to convert newsprint machines to paperboard and packaging grades, or to permanently idle machines or entire mills.

In general, prices for pulp and paper fell in mid-2012. Companies reacted quickly to try to reverse this by targeted capacity reductions. Market pulp prices fell mid-year. Those for printing and writing paper remained low after some failed attempts by companies to raise them. Major consolidation in the North American paperboard industry allowed a slight increase in prices. By mid-2013, market pulp producers managed to increase list prices, but heavy discounting meant that real prices barely changed. Printing and writing paper prices were still falling in the first half of 2013, forcing several producers to further curtail high-cost capacity.

With so much of the installed capacity in the developed world being old or inefficient, further rationalization is likely to occur across virtually all sectors of the vast pulp, paper and paperboard industry. In contrast, massive capital investment continues to find its way into emerging markets in South America, the Middle East, North Africa and Asia.

A long-awaited full recovery in output has failed to materialize. In Europe and North America, the sector has been advancing with green technology, such as wood-based biorefineries and biofuels, hoping to boost income by diversifying revenue streams, such as energy generation from biomass and black liquor.

Russian paper production in 2012 fell by 5% from 2011, whereas, during the same period, both chemical pulp and paperboard output grew by 2.2% and 0.5% respectively.

### 1.5.6 Wood energy

Wood energy markets in the UNECE region continued to grow in 2012. Whereas wood energy consumption in the industrial sector declined slightly, residential and power-sector demand expanded. The EU27 and the CIS are poised to see large growth in wood energy consumption partly driven by renewable energy targets and improvements in the investment climate, respectively.

The most recent data from the UNECE/FAO Joint Wood Energy Enquiry (JWEE 2011) show that in 2011 wood energy was the principal source of renewable energy, accounting for 38.4% of all renewables in 28 UNECE member countries (UNECE/FAO, 2013).

The EU is, and will continue to be, the world's largest market for energy from pelletized wood fuel. New growth may come, for example from countries including Belgium, the Netherlands and the UK. New markets in Asia will also drive higher consumption



of wood energy and, eventually, could create price pressures in the global wood energy market. However, for the time-being, new and excess capacity in Canada, the Commonwealth of Independent States, South-East Europe and the US should be able to match the growing demand. These expected increases in demand are also factors driving the continued investment in spite of the signs of current excess capacity in wood pellet manufacturing in North America and South-East Europe.

A key issue for the further development of wood pellet trading appears to be upcoming requirements for certification of the forests and wood used for pellets. Clear regulations about medium and long-term financial support for renewable energy projects and renewable energy mandates are a driving force for new investment in wood energy. Public policy debate in the EU over new targets to be set for the period beyond 2020 will also influence current developments and spur or limit investments primarily in power generation projects. Production of commercial-scale wood-based cellulosic transport biofuels continues, for both technical and commercial reasons, to miss public targets.

#### 1.5.6.1 Europe

Data from Eurostat (2013) show that the EU27 region produced 3,270 Petajoules (PJ) (327 million m<sup>3</sup>) of energy from wood and wood waste in 2011. This was a 3.1% decrease from 2010, but still represents a 45.6% rise in absolute wood energy consumption since 2002.

The top five wood energy producers in the EU27 are Germany (15.0%), France (11.4%), Sweden (10.5%), Finland (9.7%) and Poland (8.1%). The latest data from the Joint Wood Energy Enquiry show that the residential sector leads wood energy use in the European subregion (41%), followed by industry (29%), and the power-and-heat sector (28%). Use of wood energy in the power-and-heat sector continues to grow.

Wood pellets dominate trade in wood energy feedstocks with the EU27. The US was the main exporter of wood pellets to the EU27 in 2012, followed by Canada and the Russian Federation (graph 9.3.1). In 2012, total imports into the EU27 from Canada, the Russian Federation, the US and the rest of the world reached 4.5 million tonnes. However, trade within the EU27 is still the largest market in the world, accounting for about 4.7 million tonnes of pellets.

Production of wood energy feedstocks reached record levels in all South-East European<sup>7</sup> countries in 2012, driven by strong domestic and export demand. Wood chips, briquettes and pellets were mainly directed to export markets, while firewood dominated domestic household consumption for heating purposes.

<sup>7</sup> Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, Montenegro, Romania, Serbia, Slovenia, The former Yugoslav Republic of Macedonia.

#### 1.5.6.2 Commonwealth of Independent States

An increasing trend in foreign investment in wood pellet manufacturing in the Russian Federation, as well as in combined heat-and-power plants (CHP) reflect confidence in energy markets.

The Russian Federation's domestic consumption of different kinds of wood energy for heat production is growing, including the use of sawmill co-products, firewood, wood briquettes and pellets. Russian wood pellet production is reported to have increased by about 50% and may have reached 1.5 million tonnes in 2012. An estimated 96% of production was exported.

Wood briquette production has risen by 20% to approximately 300,000 tonnes a year, of which approximately 40% was sold domestically in 2012.

#### 1.5.6.3 North America



Source: UNECE/FAO, 2013.

Growth of wood energy production in Canada will continue to be linked to exports of wood pellets. Projections for the US show growth in wood energy use through 2030 but at a rate slower than in previous forecasts. One reason for this is that natural gas prices remain low because of the expansion of shale gas production in the US, coupled with Canada's sizeable production of natural gas.

Wood supplies only a fraction of residential heating in Canada (about 4.5% of homes). Canada had 49 wood pellet plants, with an estimated capacity of 3.4 million tonnes per year by May 2013. Some other facilities are in the planning phase, potentially adding capacity by as much as 2 million tonnes per year.

In the US, total wood used for energy consumption in 2012 was 26% below the 1985 high of 2,835 PJ (283m<sup>3</sup>). Wood energy continues to decline as a share of renewable energy consumption, contracting from 37% to 22% between 2000 and 2012. This was due to other forms of renewable energy having grown at a much faster pace.

According to Biomass Magazine, wood pellet production capacity in the US amounts to 8.2 million tonnes in 2012. The same source reports planned capacities of close to 15 million tonnes within the next four years. Actual wood pellet production is estimated at 1.7 and 4.0 million tonnes in Canada and the US, respectively.

### 1.5.7 Value-added wood products

#### 1.5.7.1 Furniture

Global furniture production was valued at \$450 billion in 2012. China was the largest furniture-manufacturing country, followed by the US, Italy and Germany. Furniture production in emerging-market countries has grown by 18% per year on average since 2003, due to the strategic repositioning of manufacturers and increased consumption in emerging markets.

Furniture production within the UNECE region as a whole has been largely flat, but with uneven results across countries and with some countries losing significant market share (Italy's declined by -10.5% from 2011 to 2012).

Global furniture trade value has finally exceeded the pre-crisis peak of 2008 by 3%, reaching \$122 billion in 2012. The Centre for Industrial Studies (CSIL) forecast is for \$130 billion worth in furniture trade in 2013. Globally the US was still the largest furniture importer in 2012, followed by Germany and France.

#### 1.5.7.2 Builders' joinery and carpentry

In 2012, builders' joinery and carpentry markets recovered rapidly in the US, with a 33% growth compared to 2011, but European markets declined. The total value of imports decreased in Germany, France, UK and Japan. Imports to the US are mainly covered by Asian exporters while European markets are mainly supplied by European producers.

#### 1.5.7.3 Profiled wood

Profiled wood markets did not see any drastic movements in 2012, although US imports increased some 28% over 2011. From 2006 to 2009, the US import market for profiled wood declined by more than 60% and the market is still smaller than in 2002. Other UNECE-region main markets declined during 2012. Consumption follows housing construction. No improvement can be expected before there is an improvement in general economic activity.

#### 1.5.7.4 Engineered wood products

The engineered wood products covered in this year's publication include: I-beams (also called I-joists) with their I-shaped cross section; finger-jointed sawnwood; glulam, made of sawnwood strips glued together into beams; and laminated veneer lumber (LVL), which is formed from gluing together sheets of veneer and then re-sawing the laminated sheets to desired dimensions.

Many of the engineered wood products have strong credentials for contributing towards a greener economy through wood construction systems that can compete with more carbon intensive non-wood systems. Engineered wood products have made wood a material suitable for large-scale modern buildings and, as a result, the design values and aesthetics of wood are increasingly reflected in areas such as Olympic venues and large multi-storey buildings.

Glulam continues to be the engineered wood product with the largest market share in Europe. Germany, Italy, France and Austria are still the four European countries with the largest consumption of glulam. Despite the growth potential in Eastern Europe, consumption remains low. In northern Europe laminated veneer lumber (LVL) competes with glulam. Germany is expected to start LVL production out of beech in 2013, starting with 150,000 m<sup>3</sup> of annual production capacity.

North American glulam production was 347,000 m<sup>3</sup> in 2012, showing a 21.8% increase since the market's collapse in 2009. Glulam production is forecast to reach approximately 380,000 m<sup>3</sup> in 2013.

In North America, laminated veneer lumber (LVL) is mostly used for beam and header applications in new home construction. LVL production in 2012 in North America was 1.4 million m<sup>3</sup>, a 20% increase over 2011. The trend is expected to continue and production is forecast to reach 1.6 million m<sup>3</sup> in 2013.

In 2012, wooden I-beam production in North America grew by 21.7% over 2011. Forecast for I-beam production in 2013 is 198.5 million linear metres, a 71% increase since 2009.

Cross-laminated timber is also an engineered wood product. It is covered in the sections dedicated to innovative wood products (chapter 3 and section 1.4 of this chapter).

## 1.6 HOUSING

Traditionally, the construction sector is the principal stimulus in the demand for forest products in the UNECE region. As housing is recovering in North America, the forest products industry is benefiting from this development.

In North America, the US housing market is in the early stages of a housing recovery (graph 1.6.1), yet starts are still near historically low levels. Though housing starts and sales are improving, but they remain at some of the lowest levels recorded since 1963.

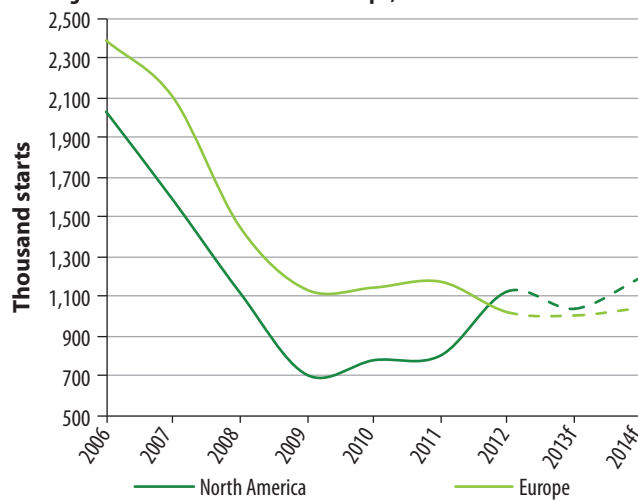
Spending on residential construction also is improving in all subsectors: single-family housing, remodelling, and multi-family dwellings (graph 1.6.2). Even with this improvement, a robust – housing recovery might be several years away.





GRAPH 1.6.1

## Housing starts in North America and Europe, 2006-2014

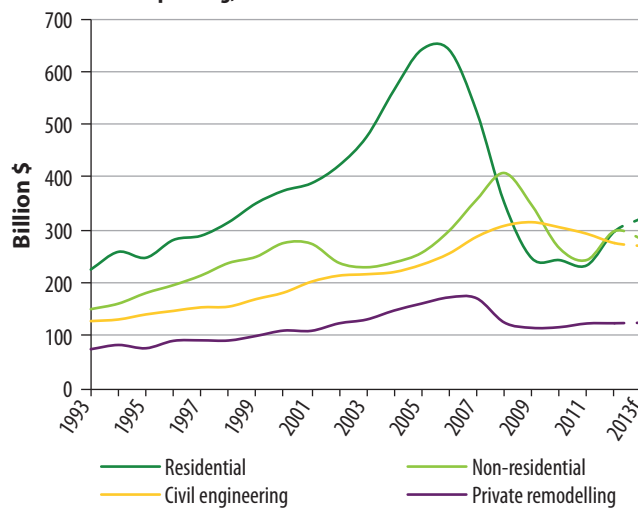


Note: f=forecast.

Sources: US Census-DOC, 2013b; CHMC (Canada Housing and Mortgage Corporation), 2013; Euroconstruct, 2013.

GRAPH 1.6.2

## US construction spending, 1993-2013



Note: f=forecast.

Source: US Census-DOC, 2013b.

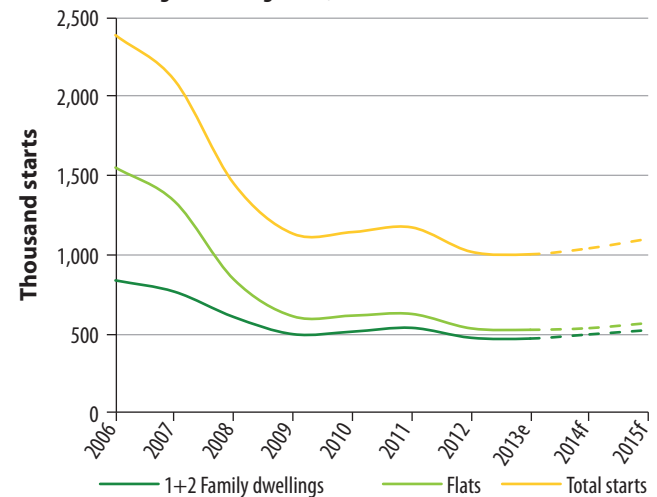
The Canadian housing market is healthy and 189,930 starts were projected for 2013. In the past year, several analysts have opined that Canada is in a housing bubble; however, if there is a bubble, it has not yet burst. As a result of economic uncertainty, forecasts are for between 171,200 and 217,000 units in 2014.

In Europe, a housing recovery is being delayed by several economic factors. These include weakened economies, high sovereign debt, bank solvency issues, high unemployment in several countries, and consumer and business uncertainty. At their peak in 2006, a record 2.38 million construction permits for homes were granted (for 1.55 million multi-family (flats) and 837,000 1+2 family houses) but in 2013, only about 1.02 million

units permits were granted (for 625,000 multi-family units and 534,000 1+2 family dwellings) (graph 1.6.3) – In other words, there was a 57.3% decrease between 2006 and 2013. The value of new residential construction is predicted to decrease through 2013 and is projected to increase beginning in 2014 – resulting in a rise from €235.3 billion in 2012 to €242.10 billion in 2015.

GRAPH 1.6.3

## Euroconstruct region housing starts, 2006-2015



Notes: 2013e is an estimate. 2014f and 2015f are Euroconstruct forecasts.

Source: Euroconstruct, 2013.

Housing completions in the Russian Federation have reached record levels. A total of 826,800 new dwellings were built in 2012 comprising 65.2 million m<sup>2</sup> of residential space. The average housing area per resident is estimated to have increased from 22 m<sup>2</sup> at the end of 2008 to about 23.4 m<sup>2</sup> at the end of 2012. Compared with the early 1990s, per capita housing space in the Russian Federation has increased by almost 7 m<sup>2</sup>.









# 2 HOW POLICIES, MARKET-BASED TOOLS AND THE GREEN ECONOMY INFLUENCE FOREST PRODUCTS MARKETS

Lead author: **Kathryn Fernholz**

Contributing authors:



*Florian Kraxner,  
Igor Novoselov,  
Helmuth Resch and  
Jukka Tissari*



## HIGHLIGHTS

- In 2013, the EU and the US started negotiations on the Transatlantic Free Trade Area. A wide range of opportunities for increased economic trade exist through reductions in or elimination of tariffs and non-tariff barriers (NTBs) as well as through enhanced compatibility of regulations and standards.
- The European Union Timber Regulation (EUTR) became effective on 3 March 2013 and is intended to prohibit placing on the EU market wood and wood products derived from wood harvested in contravention of the applicable legislation in the country of origin.
- In December 2012, a dispute arose between two of the signatories to the Canadian Boreal Forest Agreement (CBFA). The original CBFA expired on 18 May 2013.
- Recent events that have a significant impact on forest policy in the Russian Federation include the country's entry into the World Trade Organization, the regulation of roundwood export tariffs reduced quotas, and approval of the State programme, "Development of Forestry" for 2013-2020.
- In August 2012, the US Department of Justice reported a settlement of the Lacey Act case involving the Gibson Guitar company of Nashville, Tennessee. The settlement included a penalty and community-service payments, as well as corrective action.
- The world's certified forest area, as a percentage of total forest area, has topped the 10% mark.
- The voluntary carbon market (VCM) grew by 4% to 101 million tonnes of carbon traded in 2012 but prices fell, on average, to below \$6/tonne CO<sub>2</sub>e.
- Building codes are gradually moving to performance-based parameters, providing greater opportunity to include wood in mid- and high-rise construction. Innovations in several countries of the UNECE region are demonstrating the capacity of wood in diverse types of construction.
- For the benefits of wood to be realized, the forest products sector must capitalize on its green credentials while simultaneously addressing the concerns of the marketplace and consumers through the reporting of accomplishments, continuous improvement and accountability.

## 2.1 INTRODUCTION

Forest products markets are influenced by a large number and wide variety of policies. Several policies directly affect how wood is viewed as part of an emerging green economy. These include trade policies such as illegal logging regulations and trade-related agreements. Renewable-energy policies, greenhouse gas reduction targets, carbon accounting, and green-building policies also affect wood markets.

The potential for the wider use of life-cycle assessment (LCA) may increase those impacts. Forest-certification schemes often intersect with forest product policies. These various policies may be viewed as an opportunities or threats, placing the green credentials of wood products under intense scrutiny. This gives the forest sector the opportunity to adjust its practices so as to reduce impacts and to improve its methods of monitoring and reporting responsible behaviour.

## 2.2 TRADE

### 2.2.1 Transatlantic free trade

Several important trade-related developments occurred between May 2012 and May 2013. In 2013, the European Union and the United States started negotiations on a Transatlantic Free Trade Area to increase trade between the two trading blocs, which accounts for about 30% of today's world trade. Similarly, the EU is also negotiating a Comprehensive Economic & Trade Agreement (CETA) with Canada.

A wide range of opportunities for expansion exists through the reduction or elimination of tariffs and non-tariff barriers (NTBs), as well as through enhanced compatibility of regulations and standards (European Commission, 2013c). Given that tariffs are already low, the removal of various NTBs would have the most significant effect.

This may not be easily accomplished, however, as NTBs often exist for political or technical reasons. In trade talks, it's unlikely that all areas of regulatory disagreement can be negotiated, partly because regulations and standards aren't always harmonized across the EU, which can impede negotiations.

Projections of possible outcomes and benefits from trade negotiations can be of value and can be made through econometric modelling (Aguiar et al., 2012; Francois et al., 2012, 2013). In a comprehensive approach, two projections to the year 2027 were made, an "ambitious" option eliminating all tariffs and 25% of NTBs and a "less ambitious" one, eliminating 98% of tariffs and 10% of NTBs.

Also considered were agreements on some international rules and standards, as well as 20% of "spill-overs", e.g. countries that are not part of the free trade area were considered to benefit

from a 1% trade cost reduction for each 5% of NTB-related costs realized by the EU and US, as a result of simplified regulations. Likely economic impacts of changes in tariffs and NTBs for the wood and paper products sector are summarized in the following table and illustrate potential and appreciable trade benefits for both the EU and the US.

**TABLE 2.2.1**

**Projected growth in trade in wood and paper products, based on potential trade expansions in the EU and US**

	Less ambitious		Ambitious	
	(%)	€ billion	(%)	€ billion
<b>EU</b>				
Imports	5.7	3.7	11.2	7.3
Exports	2.2	2.9	4.2	5.7
<b>US</b>				
Imports	2.5	3.3	4.4	5.8
Exports	3.8	2.8	7.8	5.8

**Note:** Based on projections to a 2027 benchmark, including 20% direct spill-overs associated with other countries.

**Source:** Francois et al., 2013.

### 2.2.2 US and Canada forest trade and policy

The Softwood Lumber Agreement between Canada and the United States was extended in January 2012 to remain effective through 12 October 2015. In early 2013, US sawnwood manufacturers raised concerns about changes to the British Columbia log export policy and fee increases, which took effect on 1 March 2013. The US Lumber Coalition has called on the US Government to defend US rights under the 2006 US-Canada Softwood Lumber Agreement. Contrasting that argument, some of BC's forest products manufacturers are saying that the fee increase is too little to stem the flow of logs off-shore to China, given the prices that Chinese buyers are willing to pay (Fletcher, 2013).

Also related to Canada's forest policy are recent developments in the Canadian Boreal Forest Agreement (CBFA). The Agreement, signed in May 2010 by 21 forest companies and nine leading environmental organizations, aimed to conserve major areas of Canada's boreal region, protect threatened woodland caribou, and provide stability of timber supply for participating companies. It covered public forests licensed to industry signatories - which initially totalled 72 million hectares (Canadian Boreal Forest Agreement, 2013a).

In December 2012, a dispute arose in which Greenpeace accused the Resolute Forest Products company of violating the Agreement. Greenpeace withdrew from the Agreement in protest. Following an investigation by Resolute, Greenpeace issued a statement in March 2013 acknowledging the inaccuracy of its allegations. The Agreement expired on 18 May

2013, and talks aimed at extending it halted at the end of May (Canadian Boreal Forest Agreement, 2013b).

Community leaders in the boreal areas of Canada are currently discussing renewing the Canadian Boreal Forest Agreement between industry, indigenous communities and environmental groups, as there's a strong need for certainty and sustainability for the forest industry, local people and the ecosystem.

### 2.2.3 Russian forest trade and policy

Several developments in 2012 and early 2013 may greatly affect forest policy in the Russian Federation. These include the country's accession to the World Trade Organization; the regulation of roundwood export tariff-reduced quotas, and the approval of the State Programme "Development of Forestry" for 2013-2020.

On 22 August 2012, the Protocol of Accession to the WTO entered into force. Russian Government Resolution #779 established tariff-reduced quotas for exports of spruce, fir (*Picea abies*, *Abies alba*) and pine (*Pinus sylvestris*) roundwood. (Russian Federation Government, 2012) (table 2.2.2).

**TABLE 2.2.2**

**Russian Federation roundwood export quotas, 2012-2013**

	(1,000 m <sup>3</sup> )			
	<i>Picea abies</i> , <i>Abies alba</i>		<i>Pinus sylvestris</i>	
	2012	2013	2012	2013
EU	1 986.9	5 960.6	1 215.3	3 645.9
Other countries	95.3	285.9	4 130.8	12 392.3
Total	2 082.2	6 246.5	5 346.1	16 038.2

**Note:** 2012 quotas were prorated to the 22 August 2012 WTO entry.

**Source:** Russian Federation Government, 2012.

The Russian Federation continues to pursue forest utilization investment projects. By the end of 2012, 121 projects had been included in the Government's Top-Priority Investment Project List, with total investment valued at rouble 403.7 billion (\$12.5 billion<sup>8</sup>) and implemented across 35 Russian regions. To date, 24 new or improved facilities have been put into service, including modernization of cardboard and paper production, plywood mill construction, and the organization of timber-processing operations, with investment totalling 70 billion (\$2.7 billion). To support the forest industry, in 2012, the Russian Federation cancelled export duties for processed wood and import duties on foreign woodworking equipment.

In December 2012, the Government approved the State Programme "Development of Forestry" for 2013-2020, which includes four subprogrammes: "Security and protection of forests", "Provision of forests", "Reforestation" and "Ensuring the implementation of the State Programme Development of Forestry". Discussion about adopting a National Forest Policy has continued and a final text is expected by the end of 2013.

In September 2012, FAO released a Forest Sector Outlook Study for the Russian Federation up to 2030. The study examined three scenarios inertial (based on past trends), moderate (moderate economic growth), and innovation (high and stable economic growth) in the development of the sector and anticipates increased roundwood production under all three, ranging from +63% to +111% over the 2010 level (FAO, 2012).

### 2.2.4 Due diligence and legal wood supply

Global regulation to prevent trade in illegal timber and forest products is becoming more common, requiring the exercise of "due diligence" and "risk assessment". If these efforts enhance the value of wood products and support the growth of responsible trade, they could represent an opportunity for forest products and the green economy. However, if they lead to real or perceived risk, barriers to trade and/or additional costs, they could instead disadvantage wood products and hamper the growth of forest-based businesses and economies.

Stakeholders must, therefore, work together to ensure illegal-trade measures are applied evenly to all types of products and sectors to prevent imbalances and unintended consequences. It's also important to have policy stability and clear guidance on how to demonstrate conformance. Continued lack of clarity would not be in the best interests of responsible government or the affected trade partners and forests.

#### 2.2.4.1 European Union Timber Regulation

The European Union Timber Regulation (EUTR), which became effective on 3 March 2013 prohibits placing on the EU market wood harvested in contravention of the applicable legislation in the country of origin, as well as wood products derived from it. The Member States are responsible for promulgating effective and dissuasive penalties and for enforcing the Regulation. Anyone placing wood on the market for the first time must exercise due diligence to minimize the risk of introducing illegal wood. They can develop their own due diligence system or use one developed by a monitoring organization.

Private entities - to be recognized by the European Commission - will be able to function as monitoring organizations and can provide EU operators with operational due diligence systems (DDS) (European Commission, 2013b).

Under the EUTR, third-party certification of sustainable forest management is not alone sufficient to meet the requirements of a DDS and so ensure legality under the Regulation. Therefore, both the Programme for the Endorsement of Forest Certification schemes (PEFC) and the Forest Stewardship Council (FSC) have made changes to their schemes.

FSC has made changes to address many perceived weaknesses and is currently assessing options to address issues around the use of pre-consumer reclaimed materials (FSC, 2013b). PEFC

<sup>8</sup> 1 United States dollar=31 roubles.



recently released a revised Chain-of-Custody standard, focused on the Regulation's requirements (PEFC, 2013a).

Complete implementation of the Regulation will take some time, as all of the necessary measures are not yet operational at the national level. There's still some work to be done on national sanction regimes, designation of the control services, etc. In the private-sector, operators need to have their due diligence system in place (with or without the assistance of a monitoring organization).

Initial experience with the Regulation and the licensing system was discussed at the Global Timber Forum 2013 (FAO, 2013). Some participants explained that stocks might have been acquired from risk countries before the EUTR came into force. Merchants and retailers reported having extensive documentation requirements not only for wood products but also for other imported products. The Regulation appears to have shifted consumption to more reliance on wood harvested and manufactured in the EU, and firms appear to have moved away from sourcing from high-risk countries (FAO, 2013).

The two main components of the EU Forest Law Enforcement, Government and Trade (FLEGT) Action Plan of 2003 are EU TR and the Voluntary Partnership Agreement (VPAs), bilateral agreements with wood-exporting countries. These agreements promote forest governance by clarifying the country's legal framework and verifying its implementation.

As part of the overall VPA – which in fact becomes binding on both parties once they have ratified it, a FLEGT Licensing Scheme will ensure the legality of any wood or designated wood-based product exported to the EU, from the point of its harvest to its export port, and that this be traceable and verifiable. Accordingly, EU TR compliance is given for wood that carries a FLEGT licence – or a CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) permit.

The Regulation will most likely raise demand for wood from within the EU and other low risk regions and increase interest in FLEGT VPAs amongst wood exporting countries.

#### 2.2.4.2 Lacey Act

The Lacey Act, in the US, was first introduced and made into law in 1900. It addresses trafficking in illegal wildlife, fish and plants. Following a series of amendments in 2008, the Act now requires that import declarations accompany certain plants and plant products, including a wide range of wood and forest products (USDA, 2012). The amendment's provisions require increased due care by businesses that source and sell wood and wood products (Beveridge & Diamond, 2009).

One high-profile case centred on the Act involves the Gibson Guitar Company of Nashville, Tennessee. The company was alleged to have imported wood in violation of the Lacey Act. The Department of Justice settled the case in August 2012, with

a penalty and community service payments of \$350,000, as well as operational changes. The agreement deferred prosecution for criminal violations of the Act. The company agreed to implement a programme to strengthen its compliance controls and procedures and has withdrawn its claim to the wood seized in the course of the criminal investigation, valued at \$261,844 (US Dept of Justice, 2012).

Opposition to the Lacey Act has given rise to attempts to amend or repeal it such as the Retailers and Entertainers Lacey Implementation and Enforcement Fairness Act (the "RELIEF Act"), which appeared in 2011 and was debated in 2012 (Library of Congress, 2012). Although it didn't advance beyond the committee process, it's possible that this or similar legislation will continue to be pursued until measures are in place to limit the impact of the Lacey Act.

Proposed amendments have included: limits to the scope of the Lacey Act (e.g. further defining which plants and plant products are included), reduced penalties for first offences, establishing standard processes for compliance, making exemptions for imports and manufacturing processes occurring before amendments to the Act took effect on 22 May 2008; and a focus on solid wood products rather than composites or packaging materials. However, there's also significant support for the intent of the Lacey Act as an important tool for forest protection and prevention of illegal logging. While the law remains in effect, efforts continue in relation to the development of due care systems and best practice.

## 2.3 ENERGY

### 2.3.1 Biofuels

#### 2.3.1.1 Ethanol and liquid fuels

Wood is a potential feedstock for biofuels and related research has received large investment. At present, however, the largest portion of ethanol is obtained from agricultural feedstocks.

In the European Union, biofuels power 4.4% of all modes of transport. In October 2012, the European Commission proposed reducing the percentage of petrol to be replaced by biofuels for transport from 10% to 5%. Then it launched a changed "Clean Fuel Strategy" in January 2013. The strategy advocates support for sustainable advanced biofuels obtained from lignocelluloses but recommends cutting public support for first-generation biofuels from food crops (European Commission, 2013a).

In the US, the vast majority of the biofuel being produced now is corn-derived ethanol, on which the Renewable Fuels Standard (RFS) places a cap of 15 billion gallons (56.8 billion litres) by 2015. So to satisfy the federal mandate that 36 billion gallons (136.3 billion litres) of biofuel be blended into the overall supply by 2022, the US biofuels industry will have to produce a substantial amount of



other types of biofuels—especially cellulosic ethanol, which can be made from wood chips or grasses.

As of 2012, the US Environmental Protection Agency estimated that production capacity for wood-based biofuels that year would be as little as 10.5 million gallons (39.7 million litres); far short of the original goal (mandated by the US Congress in 2007) of 500 million gallons (1.9 billion litres) (US-EPA, 2012). More facilities will begin production during 2013; however, it doesn't look like production will come close to the billion-gallon goal set by Congress (Orcutt, 2012).

For more information on wood-based liquid biofuels, see the Wood Energy chapter, section 9.4.3.



Source: Vapo, 2013.

### 2.3.1.2 Wood pellets

Wood pellets are another important renewable biofuel. The European Union had set a target of obtaining 20% of its energy from renewable resources by 2020 but it will not be able to meet this by solar and wind power alone. EU member countries have different renewable energy targets and employ different policies and subsidy programmes to encourage the use of renewable energy, including that from biomass.

Subsidies for energy generation from biomass are the target of criticism from competitors for the raw material (such as manufacturers of wood composites and paper) and economists. The largest source of bio-energy today is wood, with much of it being in the form of chips and pellets. A large demand for pellets originates from European utilities that replace some coal with wood fuel (co-firing). There is not enough EU supply of pellet feedstock in many European countries (Mantau et al., 2010). Thus, wood pellet imports, mainly into Western Europe, are increasing substantially based on the expanding production in North America.

The European Commission (2013a) issued a Green Paper, "A 2030 framework for climate and energy policies", which outlines targets beyond 2020. It stresses that by 2030 greenhouse gas emissions should be reduced by 40% in the EU and between

80%-95% by 2050 to be consistent with the internationally agreed target to limit atmospheric warming to below 2°C. The Green Paper's proposed Energy Roadmap 2050 suggests a share of around 30% in 2030 for renewable energy of which wood energy in the form of pellets will likely play an important role. For more details, please see section 9.4.1.

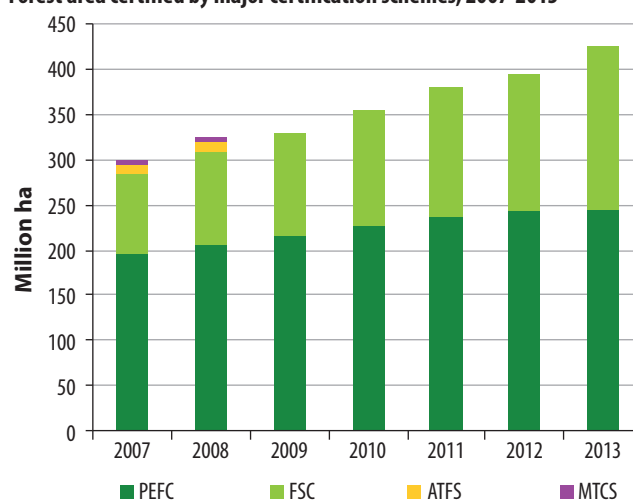
## 2.4 ENVIRONMENT

### 2.4.1 Certified forest products

By May 2013, the global area of certified forest, endorsed by FSC and PEFC amounted to 417 million hectares, up 8.5% (32.8 million hectares) since May 2012 (graph 2.4.1).

GRAPH 2.4.1

Forest area certified by major certification schemes, 2007-2013

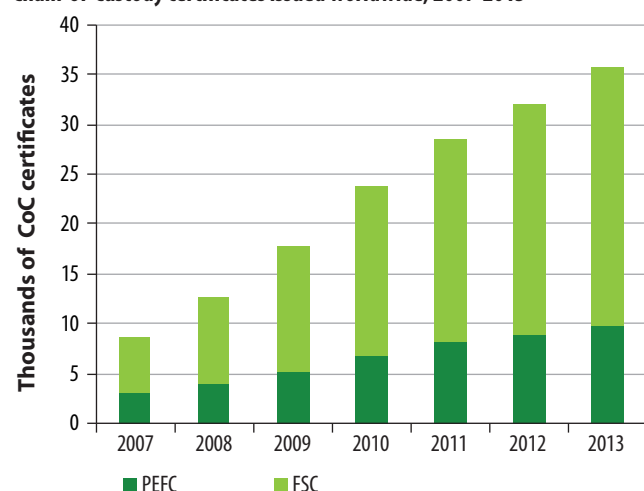


Notes: 2013=May 2013 data. Data for systems endorsed by PEFC (MTCS, ATFS, SFI, CSA) are amalgamated into the PEFC data following the date of endorsement. The shown statistics do not consider an estimated overlap of roughly 7.2 million hectares (by May 2013).

Sources: FSC, 2013c; PEFC, 2013b.

There's an estimated overlap of roughly 7.2 million hectares (half of which is in Europe) due to double certification.

The world's total certified forest area has, for the first time, topped the 10% mark as a proportion of total forest area. There has been a steady growth in the number of Chain-of-Custody (CoC) certificates issued, i.e. for wood traceable back to a certified forest. In the twelve months prior to May 2013, 3,766 more CoC certificates were issued, representing an annual relative growth rate of 11.8% (graph 2.4.2).

**GRAPH 2.4.2****Chain-of-Custody certificates issued worldwide, 2007-2013**

**Notes:** The numbers denote CoC certificates irrespective of the size of the individual companies or of volume of production or trade. Information valid as at May 2013.

**Sources:** FSC, 2013c; PEFC, 2013b.

From May 2012 to May 2013, the proportion of global roundwood supply from certified forests was estimated at 28.3%, meaning 501 million m<sup>3</sup> of roundwood. This was a 1.8% increase over the previous 12-month period.

**TABLE 2.4.1****Potential global and regional supply of roundwood from certified resources, 2011-2013**

	Total forest area (million ha)	Certified forest area (million ha)			Certified forest area (%)			Estimated industrial roundwood from certified forest (million m <sup>3</sup> )			Estimated share of total roundwood production from certified forests (%)		
		2011	2012	2013	2011	2012	2013	2011	2012	2013	2011	2012	2013
North America	614.2	201.0	198.0	215.8	32.7	32.2	35.1	227.5	224.0	244.2	12.8	12.7	13.8
Western Europe	168.1	85.3	95.4	100.2	50.8	56.7	59.6	201.0	224.7	236.1	11.3	12.7	13.3
CIS	836.9	44.3	47.5	53.4	5.3	5.7	6.4	8.5	9.1	10.2	0.5	0.5	0.6
Oceania	191.4	12.3	13.2	11.9	6.4	6.9	6.2	3.5	3.8	3.4	0.2	0.2	0.2
Africa	674.4	7.6	7.3	7.5	1.1	1.1	1.1	0.8	0.8	2.2	0.0	0.0	0.1
Latin America	955.6	16.1	14.7	15.7	1.7	1.5	1.6	3.2	2.9	1.2	0.2	0.2	0.1
Asia	592.5	8.1	9.5	12.5	1.4	1.6	2.1	2.8	3.2	4.0	0.2	0.2	0.2
World total	4 033.1	374.9	385.5	417.0	9.3	9.6	10.3	447.3	468.6	501.4	25.3	26.5	28.3

**Notes:** The reference for forest area (excluding "other wooded land") and estimations for the industrial roundwood production from certified forests are based on FAO's Forest Resource Assessment, 2010. The subregions' annual roundwood production from "forests available for wood supply" is multiplied by the percentage of the regions' certified forest area (i.e. it is assumed that the removals of industrial roundwood from each ha of certified forests is the same as the average for all forest available for wood supply).

**Sources:** FSC, 2013c; PEFC, 2013b; FAO, 2010; authors' compilation. Information valid at May 2013.

The subregion providing the largest amount of certified roundwood was North America and the second was Europe, covering most (95.8%) of the certified roundwood supply (Table 2.4.1). However, it should be noted that, even if it is from a certified forest area, wood cannot have CoC status unless it is verifiably traceable to a forest source certified as being under SFM. Therefore, without confidential business information, it is not possible to estimate the total volume of wood deliverable through CoC certificates but only the number of such certificates.

FSC has initiated a process to revise its Principles, Criteria and Indicators (the three levels of specificity in the FSC standard). The revised Principles and Criteria were approved by the FSC Board in late-2011 and approved through a membership vote in February 2012. Following initial meetings in 2012, the process of developing the FSC's International Generic Indicators (IGI) has progressed, with draft documents released in 2013. The first proposal included significant proposed changes (e.g. potentially increasing the number of indicators to be used in US-based assessments from 192 requirements to 340). To date, concerns about the proposed changes have been raised in a number of countries in the UNECE region, including Canada, Sweden, the UK and the US. The proposed schedule released by FSC outlines a completion timeline in 2014 (FSC, 2013d).





Source: M. Karppinen, 2012.

The Sustainable Forestry Initiative (SFI), the largest scheme in North America, began its next five-year standards review cycle in 2013. The new 2015-2019 version of the standard will have a launch date of 1 January 2015 (SFI, 2013).

The PEFC introduced its latest revisions to the PEFC Requirements for Sustainable Forest Management in May 2011 and systems under the PEFC umbrella had until May 2013 to come into compliance. In March 2013, the Canadian Standards Association (CSA) Sustainable Forest Management (SFM) Standard was reaffirmed (last revised in 2009) for another three-year period.

In May 2013, FSC announced a decision to stop certifying products from the Danzer Group (a global forest products company based in Switzerland). The direct result of this decision is that about 1 million hectares of forest in a concession in the Republic of the Congo would no longer be FSC certified (FSC, 2013a). In April 2013, FSC reported about 2.5 million hectares certified in the Republic of the Congo; this decision will reduce the certified area there by about 40%.

### 2.4.2 Carbon-related issues

Carbon trade volume and pricing has suffered from the prolonged financial and economic crises in Europe, political obstacles in the US, slow progress in the UNFCCC negotiations, and the absence of full operational details for REDD+. On a more positive note, more countries are establishing national emission trading schemes (ETS), including China and various other large emerging economies. Also, large corporate offset

buyers are active in the Voluntary Carbon Market (VCM), where forestry projects are quite common.

As Europe's economy has remained in stagnation for several years, the effectiveness of the EU-ETS scheme has come under scrutiny. While political backing for the scheme remains strong, it has become increasingly evident that the scheme isn't well suited to the current economic situation.

Generous allocation of free allowances to some energy-intensive industries has led to surpluses that these industries have been able to sell for a profit. The combined heat and power facilities, on the other hand, are short of allowances and continue to buy from the market.

Carbon prices are low due to oversupply of allowances. Carbon prices (EUAs) broke the "hamburger price tag" level with Euro 3.50 per tonne of CO<sub>2</sub>e in early 2013. The ETS industries can equally sell international credits through the Kyoto Protocol's Clean Development Mechanism (CDM). The price of Certified Emission Reductions (CERs) has fallen to below \$1/tonne.

The VCM grew by 4%—to 101 million tonnes of carbon traded in 2012—but prices fell on average below \$6/tonne CO<sub>2</sub>e. As a consequence, trade value declined to \$523 million. Private sector buyers preferred to buy offsets from renewable energy (34%), followed by forestry (32%) (Ecosystem Marketplace, 2013). In the forest carbon segment of the VCM, around fifteen new Voluntary Carbon Standard (VCS) projects have appeared since summer 2012. New REDD projects have been formulated to enter voluntary carbon markets, following the first REDD credits issued in Brazil as temporary CERs in April 2012. The market for REDD+ carbon credits fell however by 8% in 2012.

Several countries, including China, the Republic of Korea and Australia are preparing to launch their national emission trading schemes with full market mechanisms adopted by 2015. In the US, California's Air Resources Board formally adopted a greenhouse cap-and-trade programme, which started in January 2012.

The Durban Platform for Enhanced Action (ADP) pledged to create a legally binding climate treaty applicable to all countries. The Doha Gateway (2012) continued with decisions on an ADP work plan and on the second commitment period for the Kyoto Protocol (2013-2020), despite falling interest in a binding treaty outside Europe. Many parties and observers expressed concern over low levels of ambition on mitigation and climate finance in general.

### 2.4.3 Green building

The current and future use of wood products is greatly impacted by the green-building sector. Impacts are created via developments within voluntary green building programmes, as well as building codes. Traditionally, the elements of building

codes specific to a structure (as opposed to such things as siting and aesthetics) have dealt with building integrity and occupant health and safety. However, increasingly, codes and building regulations are addressing other issues related to environmental impact and material performance, including embodied environmental impacts created by the life cycle of the structure itself and its major components. Several of these elements could have significant benefits or negative consequences for wood in the built environment.



**Source:** proHolz Austria, 2013.

#### 2.4.3.1 Green building programmes and code development

Within US and Canadian green building, there continues to be debate and rapid convergence between the voluntary programmes and the adoption of codes or national standards that have achieved a higher level of standardization (e.g. ANSI, ISO accreditation).

For instance, the International Green Construction Code (IgCC) was finalized in March 2012 and has now been adopted in whole or in part by 10 States in the US, including areas with some of the most significant metropolitan areas. Cities incorporating the IgCC include Dallas (Texas) and Phoenix (Arizona). At the same time, California's CalGreen code continues to gain wider acceptance and influence in the practice of green building.

In some instances the IgCC is being adopted as a reference code rather than as a full conformance code. One compliance path for materials selection under the IgCC calls for 55% of construction materials (based on mass, volume or cost) to be recycled, recyclable, bio-based, and/or locally produced; alternatively, this requirement can be satisfied by performing a whole building life-cycle assessment.

The United States Green Building Council (USGBC) and its voluntary LEED programmes (Leadership in Energy and Environmental Design) continue to be widely recognized. LEED also continues to face attacks for the practices that are given recognition within their standards.

One important criticism of LEED that is sometimes made by the forest products sector is that, unlike most other programmes (including the IgCC and CalGreen), which recognize all major third-party forest certification programmes, the LEED standards only reward the use of wood certified by FSC.

This long-standing conflict has resulted in State actions and federal attempts to limit the use of LEED or to require that other alternative green-building systems also be accepted. Several States, including Alabama, Georgia, Maine, and Mississippi have enacted bans or other restrictions related to the use of LEED and other States are considering similar measures. In 2013, the first property in the Russian Federation that was certified under LEED was also, simultaneously certified under BREEAM (Building Research Establishment Environmental Assessment Method from the UK).

#### 2.4.3.2 Environmental product declarations

In 2013, the ECO Platform advanced as an EU initiative to address sustainability in the construction products industry. It aims to ensure compliance with the new EU Construction Product Regulation (CPR) and standard (EN 15804). The European standard sets mandatory information and indicators for environmental product declarations (EPD) for product sustainability used in the construction industry. It should provide comparability between environmental indicators.

In the US, the American Wood Council (AWC) has made EPDs available for specific wood product categories, including sawn softwood, softwood plywood, oriented strand board (OSB), and glued laminated timber (AWC, 2013). The life-cycle environmental impact information provided by an EPD is important to supporting the full potential of wood and wood products within responsible trade and green building.

#### 2.4.3.3 Energy performance of buildings

Building design and construction don't always capitalize on the energy-conservation potential of wood. However, if the construction and wood product sectors maintain efforts to develop and promote new ways of building with wood (e.g. thicker walls using I-joist, double studs, offset studs on 8- or 10-inch sill plates), there are great opportunities for expanded use of wood in residential and non-residential construction.

New functional requirements for better thermal efficiency could result in more and/or different wood products being used. These innovations can greatly reduce the environmental impact of the built environment while supporting innovation and business opportunities.

One of the innovation trends for the sector to be aware of is the possibility that higher performance requirements associated with green-building policies may shift manufacturing from site built to prefabrication plants, resulting in a change in the customer base and perhaps product needs, prices and delivery methods.

#### 2.4.3.4 Structural performance-based codes

Building codes are gradually moving away from prescriptive to performance-based parameters. With this shift comes greater opportunity to include wood in non-traditional structures, including mid-rise and high-rise commercial construction. Innovations in several parts of the world, including Australia, Canada, Sweden and the UK have demonstrated the capacity for wood and engineered wood products to provide advantages in diverse types of construction.

## 2.5 RESEARCH ON INNOVATIVE USES FOR WOOD

New opportunities are also emerging for enhancing wood recycling. Through innovative return and recycling programmes and expanded investment in recycling facilities, a full range of wood products, from pallets to railroad ties (sleepers) to flooring and construction debris are being diverted from landfill. There are also growing trends around the use and development of wood-based fabrics. Many companies and organizations are embracing the possibilities for wood as an important area of research investment. For instance in April 2012, the Prime Minister of the Russian Federation approved the State Programme for the Development of Biotechnology to 2020 - "BIO-2020" (BIO-2020, 2012). Its strategic objective is to create a globally competitive biotechnology sector (Biotech 2020). More information on innovation can be found in the chapter 3.

## 2.6 CONCLUSIONS

The forest sector scientific research is used to compare alternative materials and their environmental impact. The forest products sector can capitalize on its green credentials and simultaneously meet the concerns of the marketplace and consumers through the reporting of accomplishments, continuous improvement and accountability.

To secure wood's place within a green economy - including green energy, green building, green consumer goods and green trade - the forest products sector must renew its commitment to being at the leading edge of science. Even more importantly, the sector must rapidly enhance its capacity to effectively communicate scientific findings that address the needs, concerns, and interests of consumers and the marketplace.

It's not enough simply to do the research: the results must be shared in a way that can be applied to the development of

science-based policies, market-based initiatives, and the green economy activities that directly affect the choice of wood as a green material.

Growing interest in green issues provides opportunities for wood. Wood is an essential material in an era of real or perceived limits on supply. The products provided by forests are remarkably diverse and able to support a full range of needs - food, shelter, and energy. In the midst of revolutions in high-tech applications that include nanotech, bioplastics and bioengineering, it's also important to recognize that what's old is new again. Wood combustion may be one of the oldest ways of producing energy; however, new biomass fuel production systems, as well as better engineering of combustion technologies, can generate less waste, lower emissions and create greater efficiencies.

Actions towards further developing forest products include, adopting policies that support the expanded use of wood in the built environment, research to verify and report wood's durability and performance in these applications, and education and engagement campaigns with professionals within the building sector - such as architects and engineers - to increase their awareness and application of these concepts.

Quality design enables wood to offer significant benefits to building projects, including more efficient and faster construction; reduced costs; improved fire resistance and earthquake resilience ratings; and greater use of locally produced and carbon-storing materials.





## 2.7 REFERENCES

- Aguilar, A. H., McDougall, R. A., and Narayanan, Badri G. (ed.). 2012: Global Trade, Assistance, and Production: The GTAP 8 Data Base. CGTA, Purdue University.
- AWC. 2013. American Wood Council. Environmental Product Declarations (EPDs) for Wood. Available at: <http://awc.org/greenbuilding/epd.html> Accessed 18 May 2013.
- Beveridge & Diamond, P.C. 2009. Lacey Act Amendments Impact Wood Products. Available at: [www.bdlaw.com/news-511.html](http://www.bdlaw.com/news-511.html)
- BIO-2020, 2012. State Coordination Programme for the Development of Biotechnology in the Russian Federation to 2020 - "BIO-2020": Available at: [http://cedipt.spb.ru/upload/files/clusters/pharm/biotechdevelopcomprog\\_2020.pdf](http://cedipt.spb.ru/upload/files/clusters/pharm/biotechdevelopcomprog_2020.pdf) Summary in English available at: [http://owwz.de/fileadmin/Biotechnologie/Information\\_Biotech/BIO\\_Booklet\\_Block\\_A4\\_CS4.pdf](http://owwz.de/fileadmin/Biotechnologie/Information_Biotech/BIO_Booklet_Block_A4_CS4.pdf)
- Canadian Boreal Forest Agreement (CBFA). 2013a Date accessed 2013-7-1. Available at: [www.canadianborealforestagreement.com/](http://www.canadianborealforestagreement.com/)
- Canadian Boreal Forest Agreement (CBFA). 2013b. Date accessed 2013-7-1. Available at: [www.forest2market.com/uploads/Blog/documents/CBFA\\_Breakdown.pdf.pdf](http://www.forest2market.com/uploads/Blog/documents/CBFA_Breakdown.pdf.pdf)
- Ecosystem Marketplace and Bloomberg New Energy Finance. 2013. Maneuvering the Mosaic: State of the Voluntary Carbon Markets 2013. Available at: [www.forest-trends.org/vcm2013.php](http://www.forest-trends.org/vcm2013.php)
- European Commission. 2013a. 2013-1-24. Clean Power for Transport: A European alternative fuels strategy. Brussels COM (2013) 17 final. Available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2013:0017:FIN:EN:PDF>
- European Commission. 2013b. 2013-3-3. Available at: [http://ec.europa.eu/environment/forests/pdf/EUTR\\_Leaflet\\_EN.pdf](http://ec.europa.eu/environment/forests/pdf/EUTR_Leaflet_EN.pdf)
- FAO. 2010. Global Forest Resources Assessments (FRA). Rome. Available at: [www.fao.org/forestry/fra/fra2010/en/](http://www.fao.org/forestry/fra/fra2010/en/)
- FAO. 2012. The Russian Federation Forest Sector Outlook Study to 2030. Available at: [www.fao.org/docrep/016/i3020e/i3020e00.pdf](http://www.fao.org/docrep/016/i3020e/i3020e00.pdf)
- FAO. 2013. Global Timber Forum, 22-23 May 2013, Rome, Italy. Available at: [www.fao.org/forestry/trade/82078](http://www.fao.org/forestry/trade/82078)
- Fletcher, T. 2013. Mill owner protests log export change. Available at: [www.bclnews.com/business/192400791.html](http://www.bclnews.com/business/192400791.html)
- FSC. 2013a. Greenpeace Complaint against SIFORCO in the Democratic Republic of Congo. Available at: <https://ic.fsc.org/siforco-democratic-republic-of-congo.355.htm> Accessed 28 May 2013.
- FSC. 2013b. Implementation Guide for FSC Certificate Holders and Other Companies Selling FSC Products in the E.U. 14 March 2013. Available at: <https://ic.fsc.org/download/implementation-guide-for-fsc-certificate-holders-and-other-companies-selling-fsc-products-in-the-eu.a-1793.pdf>
- FSC. 2013c. Global FSC certificates: type and distribution. FSC Factsheet published May 2013.
- FSC. 2013d. FSC International Generic Indicators Process. Available at: <http://igi.fsc.org/principles-and-criteria.34.htm> Accessed 18 May 2013.
- Francois, J., Miriam, M. and Martin W. 2012. Market Structure in CGE Models of International Trade, in P. Dixon and D. Jorgenson, eds., Handbook of Computable General Equilibrium Modeling, 1st edition, Elsevier: Amsterdam.
- Francois, J., Manchin, M., Norberg, H., Pindyuk, O., Tomberger, P. 2013. Reducing Transatlantic Barriers to Trade and Investment - An Economic Assessment. Centre for Economic Policy Research, London. (European Commission Framework Contract TRADE10/A2/A16)
- Library of Congress. 2012. Bill Text. 112th Congress (2011-2012) H.R.3210.IH. Available at: <http://thomas.loc.gov/cgi-bin/query/z?c112:H.R.+3210>
- Mantau, U., Saal, U., Prins, K., Steierer, F., Lindner, M., Verkerk, H., Eggers, J., Leek, N., Oldenburger, J., Asikainen, A. and Anttila, P. 2010: Euwood - Real potential for changes in growth and use of EU forests. Hamburg/Germany
- Orcutt, M.: US Will Be Hard-Pressed to Meet Its Biofuel Mandates, MIT Technology Review, Available at: [www.technologyreview.com/news/427874/us-will-be-hard-pressed-to-meet-its-biofuel-mandates](http://www.technologyreview.com/news/427874/us-will-be-hard-pressed-to-meet-its-biofuel-mandates)
- PEFC. 2013a. PEFC Publishes 2013 Chain of Custody Standard, Aligned with EUTR. Available at: [www.pefc.org/news-a-media/general-sfm-news/1192-pefc-publishes-2013-chain-of-custody-standard-aligned-with-eutr](http://www.pefc.org/news-a-media/general-sfm-news/1192-pefc-publishes-2013-chain-of-custody-standard-aligned-with-eutr)



PEFC. 2013b. PEFC Council Information Register. Available at: <http://register.pefc.cz/statistics.asp>

Russian Federation Government. 2012. Decree of 30 July 2012, No. 779 On tariff quotas "Selected softwood timber exported outside the Russian Federation and the territory of states of the Customs Union". Available at: <http://government.consultant.ru/page.aspx?1622742>

SFI. 2013 Standard Review Process. Available at: [www.sfi-program.org/sfi-standard/introduction-to-the-standard/standard-review-process/](http://www.sfi-program.org/sfi-standard/introduction-to-the-standard/standard-review-process/)

US Department of Justice. 2012. Settlement of Gibson Guitar Case. Available at: [www.justice.gov/opa/pr/2012/August/12-enrd-976.html](http://www.justice.gov/opa/pr/2012/August/12-enrd-976.html)

USDA APHIS. 2012. Available at: [www.aphis.usda.gov/plant\\_health/lacey\\_act/](http://www.aphis.usda.gov/plant_health/lacey_act/)

US-EPA. 2012. Environmental Protection Agency Biofuels and the Environment: The first triennial report to Congress. EPA/600/R-10/183F.







# 3 INNOVATIVE WOOD-BASED PRODUCTS

Lead author: *Douglas Clark*

Contributing authors:



*Peter Aurenhammer,  
Olin Bartlomé and  
Asta Eder,  
Chris Gaston and  
Peter Moonen*



## HIGHLIGHTS

- Three main factors are driving the innovation process in the wood-based products industry: cost, legislation and the move to replace existing products.
- Cost drivers are exemplified by the biorefinery industry, with innovative methods such as pyrolysis, hydrolysis and biomass gasification, all of which transform wood into a range of valuable products.
- Legislation drivers have spurred innovation in the cross-laminated timber (CLT) industry, with new firms developing products to meet the legislation-driven demand for “greener” materials.
- Product replacement is evident in the wood-plastic composites (WPC) industry, with innovative diversification of materials and markets.
- The WPC industry is also innovating new products that replace traditional materials in furniture and other household goods.
- Innovation in the wood-fibre industry is increasing the amount of wood-based material in automobile manufacture and insulation used in construction; though, at present, high production costs limit the uptake of this new insulation material.
- Bioplastic innovations from wood-derived sources are replacing a large range of conventional oil-based polymer products.
- Thermally modified timber (TMT) is enabling product replacement in a variety of innovative uses, helping to replace for example, tropical hardwoods and thus helping to reduce the pressure on fragile forest ecosystems.
- Finally, new directions for future innovation are provided by the experience of firms supplying Asian markets with climate-proof and earthquake-safe wood-derived products.

### 3.1 INTRODUCTION

This chapter deals with innovations already brought to market, rather than the plethora of other exciting new products still under development that can be found on even the most cursory Internet search. While such products are certainly innovative, there is no way of telling which will find its way to the marketplace. By definition, an innovation can only be said to be successful if it is adopted in the marketplace, thus adding value for its end-user.

#### Drivers of innovation

Innovation drivers for most industries are highly variable, including what can seem like innovation for its own sake - creation of wholly new products that may come to dominate the market; Examples of this include innovations in information technology or mobile communications.

In the wood-based products industry, innovation tends to follow a more classic pattern, driven by the following three main factors:

**Cost:** changes in the cost of materials can lead to a wood-based product becoming more profitable, and therefore acting as an impetus to innovation.

**Legislation:** the introduction of “green” legislation may lead to increased profitability or acceptability of eco-friendly products, driving innovation in this area.

**Product replacement:** much innovation in the wood-based products industry involves finding products to replace existing materials in construction certainly, but also in automobile manufacture, as well as innovative applications of biorefinery products.

These three drivers frequently act in concert: legislative changes in, for example, insulation requirements in construction narrow the range of usable materials; which means that wood-based products may be among the best value of those now available. If this isn't the case, the opportunity can be used to innovate new products to replace those in the newly restricted pool. However, as the three drivers operate somewhat differently, it's worth examining them separately to follow the innovation process for each.

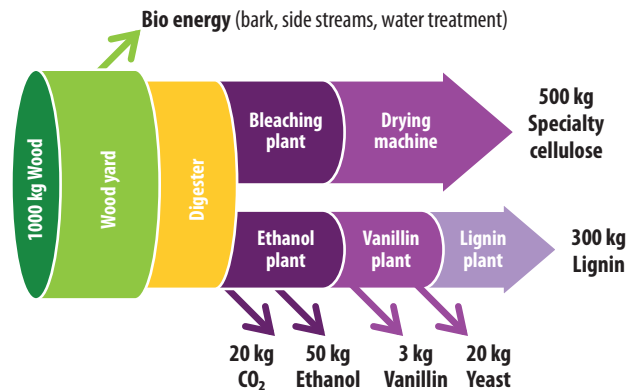
### 3.2 INNOVATION DRIVEN BY COST

When costs of production increase, existing products may become less viable, thereby creating an opportunity for innovative wood-based products to enter the market. Biorefineries offer an example, where the increased cost of oil, together with innovative processes that have increased the number of usable wood bio-feeds, has spurred exceptional innovation (figure 3.2.1). The process can turn more than 90%

of the incoming biomass into marketable products, such as: construction materials, cosmetics, food, concrete additives, batteries, pharmaceuticals, paints and car-care products (Rødsrud et al., 2008).

**FIGURE 3.2.1**

**Example of a wood-based biorefinery**



**Source:** Rødsrud et al., 2008.

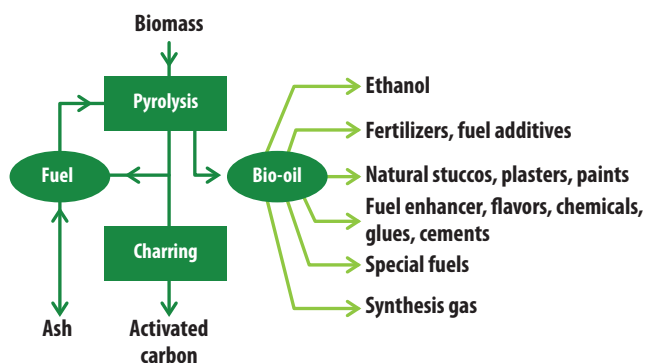
The following are among the (relatively) new processes, or established processes with new innovations, adopted by biorefineries:

- **Pyrolysis**
- **Hydrolysis**
- **Biomass gasification**

**Pyrolysis** refers to high thermal transformation ( $>300^{\circ}\text{C}$ ), specifically of wood in a biorefinery (figure 3.2.2). The process can use a range of feedstock (including forest residues, sawdust and bark), reducing cost as well as vulnerability to fluctuations in the cost of raw materials. It's particularly effective when integrated with palm oil, sugarcane ethanol or pulp and paper production. This integrated pyrolysis, or integrated thermal processing (ITP), has significant benefits over stand-alone production (Pöyry, 2007).

**FIGURE 3.2.2**

**Possible product paths for pyrolysis**



**Source:** Based on Radlein et al., 1999.

Some second-generation biofuel projects have recently been announced using this partnership. Most have been in Europe and include Stora Enso and Neste Oil (a Finnish oil company), Norske Skog and Norsk Hydro (a Norwegian aluminium and renewable energy company), UPM Kymmene and Carbona (a subsidiary of Andritz Corporation).

UPM is a firm that's shown how innovation may sometimes be cost-driven. Together with Metso, Fortum and VTT, it developed a woody biomass-based domestic bio-oil using fast pyrolysis. The consortium already had a 7 tonnes per day bio-oil plant in Tampere (Finland) (IEA Bioenergy, 2012). In 2012, Metso announced it would supply a bio-oil production demonstration plant to the Fortum power plant in Joensuu, Finland. This plant is scheduled to produce bio-oil from biomass, including forest residues, from late 2013. The bio-oil will provide an alternative to heavy fuel oil (Pöyry, 2007, 2012, 2013; European Biofuels, 2013).

**Hydrolysis** refers to water-treating wood feedstocks to produce, for example, second-generation ethanol from unconventional raw materials containing high amounts of cellulose, such as wood and its co-products. The process for ethanol is either based on enzymatic hydrolysis and fermentation or acid hydrolysis and fermentation. The use of cellulosic biomass requires pre-treatment of the feedstock to enable fermentation of the sugars in the biomass (Schenkelaars, 2007).

Compared with first-generation sugar bioethanol, it would offer many benefits, including:

- Access to a much wider array of potential feedstocks.
- Reduced conflict for land use with food and feed production.
- Greater potential to reduce net greenhouse gas emissions.
- Replacement of more fossil fuel (Schenkelaars, 2007).

Despite research and development, which has already yielded considerable progress, the production of second-generation ethanol faces problems such as raw material logistics and handling, the expensive enzymes it needs and the overall maturity of the technologies (Pöyry, 2007).

European pilot plants are already in operation in Norway, Sweden, Spain and Denmark (Pöyry, 2007; IEA, 2008). Borregaard (Norway) has operated a spruce-log biorefinery for many years, producing 50kg ethanol and 400kg of cellulose per tonne of dry woody biomass. The technology uses cellulosic biomass from agricultural and forest residues for producing green chemicals and sugars.

Cellulose is converted to sugars and then used for producing second-generation bioethanol, while other components such as lignin become advanced biochemicals. In April 2013, a biorefinery demonstration plant using this process was opened in Sarpsborg, Norway. In Sweden (Umeå University and Luleå University of Technology and SEKAB), a dilute acid hydrolysis

pilot plant in Örnsköldsvik has produced 18 million litres/year of ethanol since 2004 from forest feedstock (IEA, 2008). In 2013, Luleå University of Technology will take over the plant in Piteå, Sweden, previously operated by Chemrec, for gasification of green fuels.

**Biomass gasification** converts wood products to synthesis gas (syngas) containing carbon monoxide and hydrogen. As this gas mixes very well with air, syngas burns more cleanly and effectively than solid fuels, and gasification improves the efficiency of large biomass plants and even black liquor recovery boilers.

Syngas can also be burned in natural gas turbines, which are more efficient than steam boilers. Gas also mixes easily with catalysts, which makes it possible to further refine the syngas to products such as liquid fuels or chemicals. The best-known process, the Fischer-Tropsch (FT) process, makes it possible to convert syngas into liquid fuel. It is also possible to extract hydrogen to be used for fuel cells (Pöyry, 2007; Schenkelaars, 2007). The end product contains no sulphur, nitrogen or aromatic compounds (Pöyry, 2007; Schenkelaars, 2007).

An example of innovation in biomass gasification includes Metsä Fibre (Joutseno, Finland), which in 2012 added a wood-gasification unit to its 600,000 tonnes/annum softwood market pulp mill in Joutseno. The gasifier with a capacity of 48 MW will mainly run on bark and other co-products and makes the plant independent from fossil fuels (Pöyry, 2012).

All these innovative processes have been cost-driven, either because the increased price of oil has helped to make them profitable or the ability to use a wider range of feedstock has lowered the production costs.

### 3.3 INNOVATION DRIVEN BY LEGISLATION

Many organizations have successfully promoted changes in social attitudes about environmental issues, resulting in the adoption of tougher emissions standards, regulations that govern waste, and legislation aimed at increased energy efficiency, all of which have helped drive innovation in the wood-products industry.

A good example of where this has been a powerful driver of innovation is in the cross-laminated timber (CLT) industry. Despite the general slowdown in the construction industry caused by the global recession, the CLT industry has continued to grow, with increased numbers of showcase buildings in (especially European) cities.

CLT panels are used widely in the construction of wooden buildings - and increasingly in the construction of multi-storey timber structures. The advantages of CLT are:



- The flat structures are compatible with design methods used for brick, concrete and glass so the architect can continue to think in surfaces instead of a grid (typically necessary for timber frame construction).
- Using computer numerical controlled (CNC) joinery machines, elements can be assembled in the factory, expanding the range of possible designs.
- Buildings can be strong and well insulated despite being thin and light.
- High load-bearing and energy-dissipation capacity (e.g. earthquake-safe construction methods).
- Buildings erected with solid wood panels provide excellent environmental values (Aeschbacher et al, 2012).

CLT production is a young business. The world's biggest wood processor, Stora Enso, began to manufacture CLT only in 2010 and most other companies have just a few years' more experience.

Demand for CLT as a primary material in buildings has increased due to high-profile projects such as Murray Grove (in the UK, 2009), a nine-storey residential tower; Bridport House (in the UK, 2011), an eight-storey residential building, and a residential tower - the Forté apartment building completed recently in Melbourne, Australia, and which, at ten storeys, is the world's tallest CLT-building (figure 3.3.1).

These buildings show that multi-storey construction in timber is entirely possible, building standards permitting, but also that CLT-buildings are becoming taller and larger. Furthermore, there is considerable design innovation as a result of the architects of these projects working closely with the installation teams (Amrein, 2013).

In addition to developments in structural components, novel products using wood-based panels, reconstituted wood and complex re-bonded wood forms have recently been introduced, notably in the field of insulated panels, but also in lightweight panels for furniture and other applications. Products such as Steico, Pavatex, Dendrolight and Isovlas have all enjoyed increased activity in the market, providing an insulated solution suitable for timber frame or timber off-site construction methods.

Despite innovation in the industry, the short-term future for CLT within the UNECE region is mixed. Solid wood panels are widely used in Austria, the UK, Switzerland and Germany. Austria produces almost 70% of CLT (Plackner, 2012a), with Germany having great potential to increase in the short term (Plackner, 2012b). For example, in 2011 Germany imported almost 100,000 m<sup>3</sup> of CLT and glulam, a figure that in 2012 grew to almost 145,000 m<sup>3</sup> (Schatzl, 2013). Glulam, a glued laminated product, is not in itself an innovative material but is here being applied to new markets.

**FIGURE 3.3.1**

**The world's tallest modern timber residential building, Forté, under construction and finished, 2012-2013**



**Source:** Forté, 2013.

CLT is rarely used in Ireland, however, despite interest shown in 2012. This reflects the economic situation, with a housing market that is oversupplied in relation to present demand, and with few new buildings being erected. As those which were constructed had to be inexpensive, none featured CLT (Amrein, 2013).

Italy provides a good example of CLT use in southern Europe. Innovative wood products have increased significantly in Italy over recent years. In 2012, Italy imported 527,000 m<sup>3</sup>

of innovative wood products (glulam and CLT), though this was 12% less than in 2011, reflecting the difficult economic situation. Austrian exports increased by 5%, from 408,000 m<sup>3</sup> to 430,000 m<sup>3</sup>, but the volumes imported from Germany fell sharply, from 108,000 m<sup>3</sup> to 34,000 m<sup>3</sup> (- 68%).

The situation in the Balkans was no better in 2012. For example, Slovenia, a country in the euro zone, was considered as a candidate for a financial bailout, so there has been no large-scale or innovative construction activity.

Leaving aside current economic issues, countries in southern Europe are expected to use more CLT in the future for the following reasons:

- They have a culture of solid construction with masonry and concrete and thus, solid wood CLT construction finds more acceptance than traditional lightweight timber construction (Gardino, 2011).
- Knowledge of wood construction is limited and construction with solid wood elements is more akin to construction in concrete, and, therefore, more easily adopted (Gardino, 2011).

Uzbekistan provides an example of the situation in the Commonwealth of Independent States. A fact-finding mission in 2013 showed that the market for European-made innovative wood products is currently weak (Bartlomé and Racine, 2013). Not only are the costs of these products and their transport to the east expensive but the country has a long history of building with adobe and concrete, mainly due to the lack of suitable timber for the mass housing market. Therefore, people are not yet familiar with these products or their use in construction (Bartlomé and Racine, 2013).

Despite this “mixed bag” of likely current or future use of innovative wood-based products, it is apparent that the principal driver is a combination of cost with legal requirements. In many cases where countries have “green” legislation, CLT and similar products can be the answer to low-emission, low-energy-loss construction.



Source: UPM, 2013.

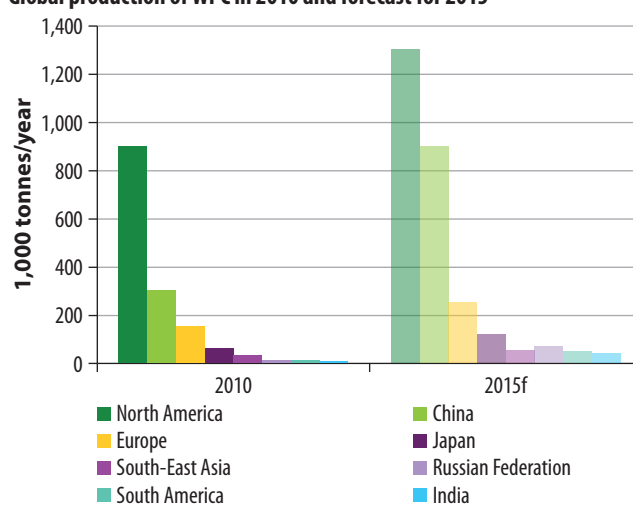
### 3.4 INNOVATION DRIVEN BY PRODUCT REPLACEMENT

The innovation process may, of course, be driven by a more traditional industrial approach; that of identifying market opportunities and developing a product that surpasses existing ones in terms of cost and/or performance.

There have been a variety of innovations in wood-based products intended to make them more attractive as replacements for existing materials, especially in construction. Innovations in the wood-plastic composites (WPC) industry serve as a good example. In 2010, global WPC production reached 1.5 million tonnes, though this figure represents a small fraction of the overall timber market (graph 3.4.1).

GRAPH 3.4.1

Global production of WPC in 2010 and forecast for 2015



Note: f=forecast.

Source: Eder, 2013.

The Russian Federation is expected to experience the highest growth within the UNECE region, albeit from a low base. Since 2010, 30 new companies have begun production, based on imported Chinese machinery. Most Russian WPC manufacturers use low-output Chinese extruders, which don't use the latest technology and therefore can't provide a stable output. This is predicted to lead to the phasing-out of Asian imports as Russian domestic production increases. Annual growth in Russian WPC production is predicted to increase by 48% every year until 2015.

Many other countries have shown similar process innovation, where increasingly efficient machinery is used to produce the same product, making it more competitive, and, thereby, more likely to replace an existing product, usually natural wood.

However, product innovation has also been encouraged by large companies such as IKEA. Though the first WPC chairs have been removed from the catalogue, after a gap of two years, IKEA has introduced a new model of WPC chair. Other

WPC innovations in furniture include injection-moulded parts for existing furniture units (figure 3.4.1). Other success stories of innovative WPC furniture include a Finnish school chair injection-moulded from pine pulp and polypropylene, and a chair by ARTEK made of paper-based WPC material.

**FIGURE 3.4.1**

**Injection moulded WPC chair**



Source: UPM, 2013.

Further market opportunities exist in consumer goods, as illustrated by the toothbrush made by the German company Tecnaro (figure 3.4.2).

**FIGURE 3.4.2**

**WPC toothbrush**



Source: Tecnaro, 2010.

Similarly, in the bioplastics industry, the main driver of innovation is replacement of existing materials or products. World biopolymer consumption in 2012 stood at 890,000 tonnes, and is expected to increase rapidly. This is partly due to lower cost feedstocks, but also process innovation by scaling up production technology.

Sources estimate that the bioplastics market may reach 1.9 million tonnes by 2017. Almost half of this is likely to be biopolymers, such as polyhydroxyalkanoates (PHA) and bio-derived polyethylene, replacing conventional packaging applications.

The biopolymer market is an obvious opportunity for innovative wood-derived plastics to replace oil-derived ones. The demand for biodegradable polymers in North America, Europe and Asia in 2012 was 269,000 tonnes, 126,400 of which were met by polylactic acid, and 110,300 were starch-based polymers, predominantly thermoplastic starch (TPS).

In addition to the established fully biodegradable thermoplastic aliphatic polyesters, such as polylactate (PLA), polyhydroxybutyrate (PHB) and polyhydroxybutyrate-valerate (PHBV), and TPS, a significant market exists for non-biodegradable biopolymers. An example of the interaction between innovation processes can be seen in the growth of the sales of bio-derived polyethylene, polypropylene and polyethylene terephthalate, due to demand for green branding on major products. Further growth is likely to be substantial. A compound annual growth rate of 83% to 2020 has been suggested for bio-PET.

Bio-PET is now available from several sources, and for a wide range of applications, from packaging and food contact, to domestic appliances. This, together with other high-performance biopolymers such as polyamides and polycarbonates, also has elevated glass transition and melting points, higher strength modulus and hardness, compared with conventional biopolymers, making it suitable to replace existing products in engineering applications.

Bio-derived thermosets have also seen sustained interest, especially within the composites sector, with 20% to 60% bio-resins available from several suppliers. In all these cases, the innovation driver is to replace an existing product with a better, or cheaper, wood-based or wood-derived one.

Another example of simple replacement of a traditional product by a wood-derived one is in the automobile industry where the quantity of natural fibre composite per car is now estimated at 16kg, resulting in an estimated 1.5 million tonnes market for natural fibre composite by 2017.

New wood-fibre products have also begun replacing products in the structural insulation market, most notably in central Europe. Since 1991, the manufacturing capability of the industry



has expanded from a single company to at least seven having a notable market presence. In particular, the wood-fibre-based insulation-board market in Europe, especially in Germany, is undergoing a surge both in interest and in production. Steico is the largest producer, with about 40% - 50% market share in Europe. The next largest competitor has an estimated market share of 17%.

Initial manufacturing processes typically used a wet-refining method process similar to that used in producing hardboard. Additional innovative dry processes include both a refining and - for coarser product lines - a mechanical shredding procedure.

Some manufacturers use a textile matrix to contain the wood fibre, whereas others prefer a heat-activated resin. The manufacture of very low density fibreboards in the dry process requires an activation of the resin over convective media such as hot-air, superheated steam or a mixture of both, and an adaptation of the pressing technique. These innovative light fibreboards clearly have better physical characteristics (thermal conductivity) than classical products such as fibreboards made in the wet process (>150 kg/m<sup>3</sup>).

Typically, wood-fibre insulation is produced in similar forms to mineral or glass wool insulation – namely rigid boards, semi-rigid boards and flexible rolls. Thermal conductivity in watts per metre Kelvin (W/m/K) of wood-fibre insulators are in the 0.038-0.050 range. This compares to similar values for mineral and glass fibre products which exhibit thermal conductivity in the 0.032-0.044 W/m/K range. Unfortunately, wood-based products are about twice as expensive as conventional products, which limits the opportunities for them to replace existing products (Barbu and Pieper, 2008).

Insulation produced from natural fibres has the following advantages and disadvantages:

#### Advantages

- High acoustic performance.
- Low to zero toxins, easy to reuse/dispose of, significant health benefits throughout life cycle.
- Offers some thermal mass.
- Protective clothing and masks are not needed, more comfortable (and cheaper) for people coming into contact with it.
- Renewable materials store carbon throughout usable lifespan.
- Robust in handling, transport and onsite construction.
- Vapour permeable, works well with other low-impact materials.

#### Limitations

- Product manufacturing is scattered and the low density of the material may increase transportation costs.
- Price currently much higher than oil- or mineral-based competitors (this may change as demand and supply increase).
- Requires thicker walls.
- Suitability of rendered external finishes limits application.
- Use limited to areas not prone to moisture infiltration (Sutton et al., 2011).

The market for structural insulation in the EU is approximately €7.8 billion. Mature markets (parts of Germany and Austria, for example) have market penetration in the 10%-12% range. Developing markets (France, Benelux) are estimated at closer to the 5% range, while in the UK penetration is approximately 1%. Interestingly, an innovation driver in the German and French markets has been government regulations, a further example of the interaction of innovation process factors.

The exposure in North America is negligible, although a few designers have begun exploring the use of wood-fibre insulation, especially those in the green building sector.

Another method for replacing existing products has been to use innovation to increase differentiation and standardization. The CLT industry has ensured that CLT-construction remains competitive in the somewhat traditional construction market by an agreement among the major CLT-manufacturers at the beginning of 2012 to produce the same standard CLT-thicknesses, meaning that architects can design without having to commit to particular suppliers of CLT.

Thermally modified timber (TMT) is also a good example of innovation to replace existing products. It uses no dangerous chemicals, being a form of mild wood pyrolysis. The resulting product is particularly well suited to outdoor applications, with a greatly reduced need for wood preservatives or expensive and over-harvested tropical timber (IHD, 2008).

New forms of TMT are used to replace conventional chemical-and-vacuum treated tanalised timber in building components but have also found uses as wall and ceiling panels, furniture, garden furniture, door and window components, sauna products, cladding, shutters, decking and exterior joinery.

The products have an increased durability (for example, against fungi), an increased dimensional stability, a darker colouring (homogeneous over the whole profile) and a reduced water absorption in humid conditions. The ability of these innovative products to replace existing materials is limited by their lower density, lower strength and higher brittleness of TMT (IHD, 2008, 2011).

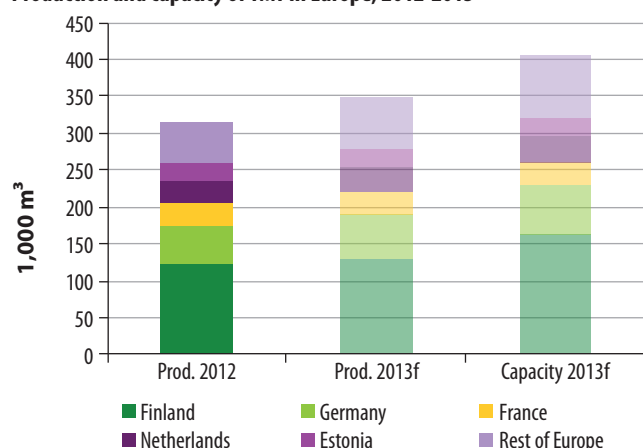
TMT itself is not a new process, but in 2010, globally, 189 institutes carried out research on it, creating a range of new TMT products (IHB, 2012). One obstacle to the innovation process has been the challenges of certification, standardization and quality assurance of TMT products (IHB, 2012).

In Europe, TMT is mainly produced in Austria, Estonia, Finland, France, Germany and the Netherlands and, to a lesser extent, in Croatia, Denmark, Romania, Sweden, Switzerland and Turkey. The largest producers are Lunawood (Finland), Tretimber (Estonia), Plato (Netherlands), Metsä Wood (Finland) and Stora Enso Timber (Finland), each with production of more than 20,000 m<sup>3</sup> per annum.

Europe is market leader in the production of TMT, but the US and Canada are also significant producers (about 100,000 m<sup>3</sup> together) (IHB, 2012). In 2012, European production of TMT reached 315,000 m<sup>3</sup>, the estimate for 2013 is 349,000 m<sup>3</sup> (+11%). The estimated European production capacity amounted to 405,700 m<sup>3</sup> in 2013 (graph 3.4.2).

**GRAPH 3.4.2**

**Production and capacity of TMT in Europe, 2012-2013**



**Note:** f=forecast.

**Sources:** EUWID, 2010, 2011, 2012; Holz, 2012; Holzkurier, 2013; IHD, 2011; IHB, 2012; ThermoWood, 2013; Pöyry, 2013.

In all the examples so far, innovation has made wood-based products more attractive product replacements, aiding them in achieving increased market sales despite a general world downturn in construction.

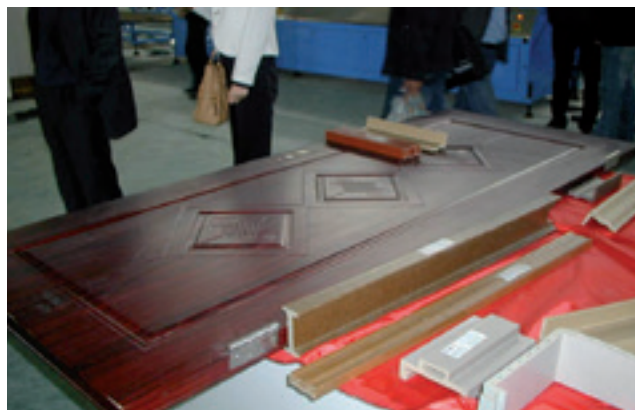
### 3.5 CONCLUSIONS

The innovation processes we have been discussing are so deeply ingrained in the UNECE region's wood products industry that it can be difficult to imagine any other approach. Useful examples of other innovation processes may be found outside the region. For example, in zones affected by earthquakes, there is increased interest in innovative CLT products, as these relatively light buildings are more likely to survive earthquakes and, if they collapse, are likely to cause much less damage.

The innovative expansion of WPC products in Asia is also a useful example of a different type of innovation process. Throughout Asia, higher heat and humidity tends to increase the attractiveness of WPCs, as opposed to conventional timber. China is the main producer of a diverse range of WPC products but WPC markets are also emerging rapidly in the Republic of Korea, Southeast Asia, the Russian Federation and India. Asian companies have innovated a large variety of WPC applications, such as door and window frames, interior wall panels and pallets (figure 3.5.1).

**FIGURE 3.5.1**

**Chinese WPC doors and different WPC profiles for interior uses**

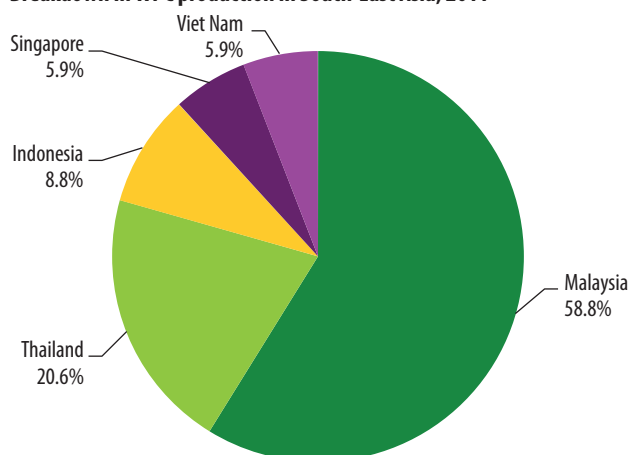


**Source:** Eder, 2013.

Since 2009, WPC-market innovation in Southeast Asia has achieved higher growth in imports, exports and production than Europe achieved during the period from 2000 to 2003. WPC production in Southeast Asia increased between 2008 and 2011 to 34,000 tonnes per annum. Europe took six years of market development to reach the same production figure in 2005 (Eder, 2012). Malaysia is today the largest producer of WPC in Southeast Asia, with well over half of the subregional production (graph 3.5.1).

**GRAPH 3.5.1**

**Breakdown in WPC production in South-East Asia, 2011**



**Source:** Eder, 2012.

The success of this type of innovation process in a wood-based products industry outside the UNECE region suggests that similar approaches may find application within the region in future.

The UNECE continues to take these types of innovation possibilities seriously, as indicated by the recent workshop, "Innovation in the Forest-Based Sector – Prerequisite for the Green Economy" jointly organized by the UNECE/FAO Forestry and Timber Section and InnovaWood in April 2013. This event showcased the current state of innovation in traditional product categories such as wood-based construction, furniture and packaging, and forward-thinking innovations in bio-materials, bio-chemicals and bio-energy. Expert presentations provided examples of forest-based sector innovation in business and participants discussed how to provide the right framework conditions to support knowledge transfer, policy options and instruments for financing innovation.



Source: UPM, 2013.

### 3.6 REFERENCES

- Aeschbacher, C., Bartlomé, O., Gehrig, R., Hofer, P., Knüsel, P., Luginbühl, U., Pfäffli, K., Plüss, I., Preisig, HR., Ragonesi, M. and Frank, W. 2012. Climate-friendly and energy-efficient construction with wood – Basic information and implementation. Lignum, Zurich.
- Amrein, F. 2013. Cost-efficient and structurally effective CLT-details in multi-storey buildings. Bern University of Applied Sciences, Biel/Bienne.
- Barbu, MC. and Pieper, O. 2008. Actual Developments of the Wood-Based Panels Industry, First Serbian Forestry Congress.
- Bartlomé, O. and Racine, D. 2013. In the context of the International Conference on Modern housing as an engine for comprehensive development and transformation of rural areas, enhancing living standards of population to Tashkent and Samarkand. 16.4.-17.4.2013, Tashkent, Uzbekistan.
- Eder, A. 2012. WPC Market in Southeast Asia 2011, Asta Eder Composites Consulting, Vienna.
- Eder, A. 2013. Development of WPC Markets outside of North America, the Advancements in Fiber-Polymer Composites: Wood Fiber, Natural Fibers, and Nanocellulose, Milwaukee, WI, USA.
- European Biofuels. 2013. Status report on Demonstration Plants for Advances Biofuels Production - Thermochemical Pathways. Ingvar Landälv, Luleå University of Technology and Chemrec AB, 5th Stakeholder Plenary Meeting, February 2013.
- EUWID. 2010. Europäische Thermoholzanbieter bauen weitere Kapazitäten auf. EUWID Holz Spezial Bau und Innenausbau 02.2010.
- EUWID. 2011. Jahresrückblick 2011. EUWID Holz und Holzwerkstoffe 51/52.2011.
- EUWID, 2012. Timura: Produktion wird nach Brand von Lagerhalle ausgesetzt. EUWID Holz und Holzwerkstoffe 34.2012.
- Forté. 2013. Available at: [www.forteliving.com.au](http://www.forteliving.com.au)
- Gardino, P. 2011. Il mercato italiano delle case in legno nel 2010. Promo Legno, Milano.
- Holz. 2012. Holz – Technik und Service für Holzbetriebe 04 / 2012. TMT Branche traf sich in Dresden.
- Holzkurier. 2013. Thermoholz-Produzenten. Heft 11, 14.03.2013, p. 10.
- IEA Bioenergy. 2012. IEA Bioenergy, Task 34 Pyrolysis, Country Update Finland, 12/2012.
- IEA. 2008. From 1st- to 2nd – Generation Biofuel Technologies. OECD/IEA November 2008.
- IHB. 2012. Thermoholz in Frankreich und Europa. Available at: [www.ihb.de/madera/news/TMT\\_Thermoholz\\_Frankreich\\_29275.html](http://www.ihb.de/madera/news/TMT_Thermoholz_Frankreich_29275.html)
- IHD. 2008. Merkblatt. Verfahren zur Herstellung von TMT. Ausgabe März 2008.
- IHD. 2011. Thermoholz aus Buche. 3N-Tagung Göttingen. 11. November 2011.



- IKEA. 2013. Available at: [www.ikea.com](http://www.ikea.com)
- Plackner, H. 2012a. Wieder 30 % mehr - Halbe million Kubikmeter BSP avisiert. Österreichischer Agrarverlag, Vienna. Available at: [www.timber-online.net](http://www.timber-online.net)
- Plackner, H. 2012b. BSP wird Standardbaustoff – das birgt auch Risiken. Österreichischer Agrarverlag, Vienna. Available at: [www.timber-online.net](http://www.timber-online.net)
- Pöyry. 2007, 2008, 2012 and 2013. Management Consulting Databases. Available at: [www.poyry.com](http://www.poyry.com)
- Radlein, D. 1999. The Production of Chemicals from Fast Pyrolysis Bio-oils. In Fast Pyrolysis of Biomass: A Handbook, Bridgwater et al, Eds., CPL Press, Newbury, UK, 1999, pp. 164-188.
- Rødsrud, G. 2008. Lignosulfonates - Existing use, future applications and possibilities for lignins from bio-fuel production. First Nordic Wood Biorefinery Conference, Stockholm 11-13.03.2008.
- Schatzl, M. 2013. Export BSH. With data from Fachverband der Holzindustrie Österreichs and Statistik Austria, Vienna.
- Schenkelaars, P. 2007. The Future of Biofuels global markets and forecasts to 2017. Pira International Ltd. Surrey, UK.
- Sutton, A., Black, D. and Walker, P. 2011. Natural Fibre Insulatino. An introduction to low-impact building materials.
- Tecnaro. 2010. Available at: [www.tecnaro.de](http://www.tecnaro.de)
- ThermoWood. 2013. Thermowood production statistics 2012. [www.thermowood.fi/latestnews/39](http://www.thermowood.fi/latestnews/39)









# 4 WOOD RAW MATERIAL MARKETS

Lead author: *Håkan Ekström*



## HIGHLIGHTS

- Timber harvests in the UNECE region reached the highest level in five years in 2012, mainly thanks to improved sawnwood demand in the US and China's continued need for imported logs and sawnwood.
- Softwood removals in Europe, which accounted for approximately 76% of the total removals in 2012, declined somewhat during 2011 and 2012 because of reduced demand for logs by Europe's sawmills.
- Removals of industrial roundwood increased by 4% in North America in 2012 over 2011, making 2012 the third consecutive year with higher removals.
- Removals of fuelwood were estimated to be just over 180 million m<sup>3</sup> in 2012, or about 15% of total removals.
- Total consumption of industrial roundwood was up for the third consecutive year in the UNECE region in 2012, reaching almost 1 billion m<sup>3</sup>. However, this was due entirely to increased consumption in North America, as roundwood demand fell from 2011 levels in both Europe and the CIS.
- A weaker pulp market resulted in reduced consumption of wood fibre by the European pulp industry in 2012. After having increased for two consecutive years, consumption fell by 3.9% in 2012 from the previous year, reaching the second lowest level in 10 years.
- Turkey has become the fourth largest wood chip importer in the world in a relatively short time.
- Net exports of logs from the UNECE region in 2012 reached their highest level since 2007, with North American exports to Asia 30% higher than in 2011.
- Log exports from the Russian Federation to China have fallen substantially during the past five years; and, instead, New Zealand and the US have become major log suppliers to the fast-growing Chinese market.
- Exports of logs from North America to Asia reached a record high of 22 million m<sup>3</sup>. In just four years, shipments from the US and Canada to Asia have gone up almost 80%.
- After having declined for much of 2011 and early 2012, sawlog prices have trended upwards in many parts of the UNECE region in 2012 and 2013, with the biggest price increases occurring in the western US, western Canada, the Nordic countries and the Baltic States.
- Lower product prices for many pulp and paper grades resulted in downward price pressure on both wood chip and pulp logs during 2012 and 2013 in most regions of Europe and North America.



## 4.1 INTRODUCTION

Total consumption of industrial roundwood in the UNECE region in 2012 reached the highest level seen since 2007, the year before the global financial crisis (graphs 4.1.1 and 4.1.2). Consumption has increased by 22% over the past three years to reach a total of just under one billion m<sup>3</sup> in 2012. From 2011 to 2012, the increase was just under 1%, with different trends in the three subregions of the UNECE region.

In the CIS, consumption was practically unchanged from 2011, while log demand fell slightly in Europe and was up by almost 4% in North America. The dissimilar trends during the past year are mainly a reflection of the health of the sawnwood markets in the three subregions, with the US market improving significantly during 2012 (8.2% increase from 2011). In Europe, the demand for sawnwood has been stagnant in the past two years, even falling slightly in 2012.

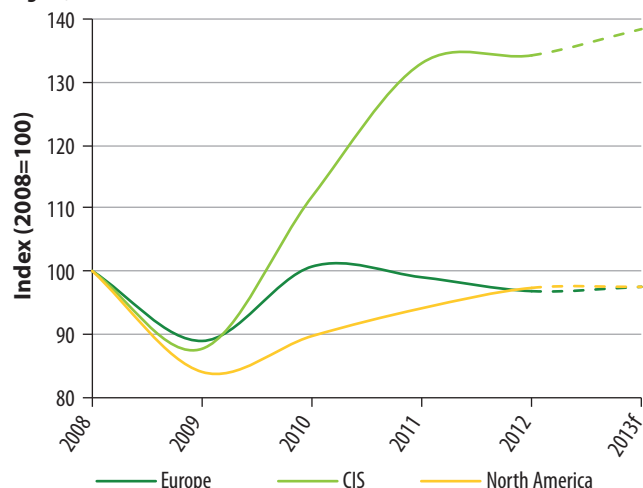
With the exception of North America, where a substantial increase in log and sawnwood exports to Asia has increased harvest levels in the western US and western Canada in the past four years, timber harvest trends in the UNECE region have, to a large extent, followed the changes in the region's roundwood consumption.

Harvests of industrial roundwood in 2012 increased for the third straight year in the UNECE region to 0.999 billion m<sup>3</sup>, which is the highest level in five years. Since 2009, total timber harvests in the UNECE region have gone up by 19%, a substantial recovery after the more than 23% plunge between 2007 and 2009.

Removals for the past four years have been biggest in North America and the CIS, while harvests in Europe have been fairly constant.

**GRAPH 4.1.1**

**Apparent consumption of softwood industrial roundwood in the UNECE region, 2008-2013**

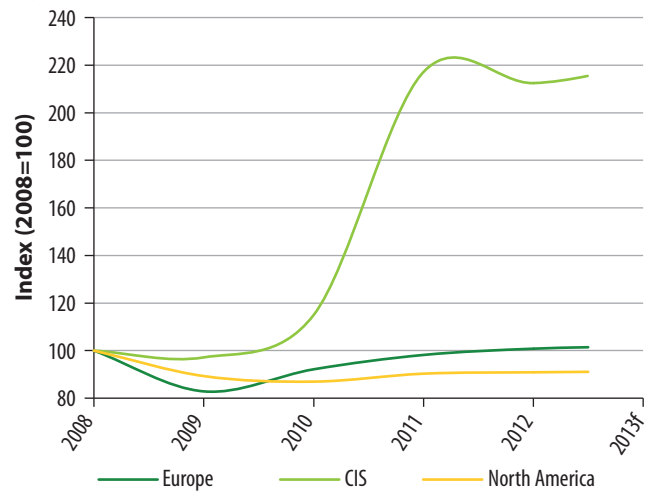


**Notes:** Industrial roundwood excludes woodfuel. f=Timber Committee forecast, October 2012.

**Source:** UNECE/FAO TIMBER database, 2013.

**GRAPH 4.1.2**

**Apparent consumption of hardwood industrial roundwood in the UNECE region, 2008-2013**



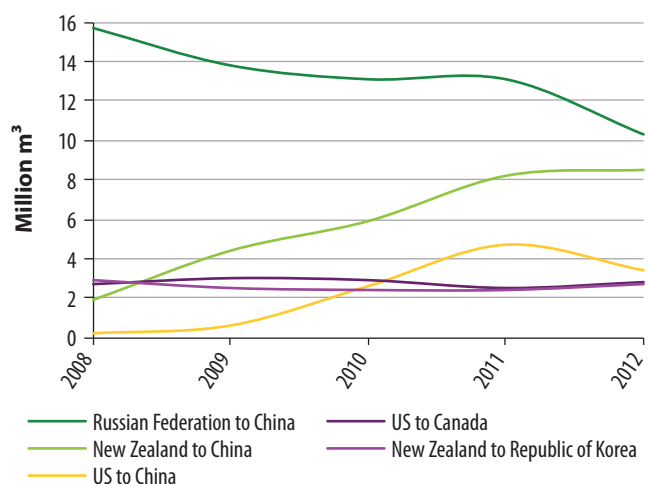
**Notes:** f=Timber Committee forecast, October 2012. Industrial roundwood excludes woodfuel.

**Source:** UNECE/FAO TIMBER database, 2013.

Net exports of logs from the UNECE region in 2012 reached the highest level since 2007, with total exports reaching 83 million m<sup>3</sup> and imports falling almost 5 million to 58 million m<sup>3</sup> since 2011. The biggest changes in trade occurred in North America, where export volumes of logs to Asia were up over 30% and in Europe where demand for imported logs fell by 5.5% in 2012. The major global log trade flows continue to be from the Russian Federation, New Zealand and the US to China; although Russian shipments have fallen substantially over the past five years (graph 4.1.3).

**GRAPH 4.1.3**

**Top five global trade flows of softwood roundwood by volume, 2008-2012**



**Source:** Wood Resources International database, 2013.

Approximately 182 million m<sup>3</sup> of the total timber harvest, or about 15% of total removals, was estimated to be as fuel in



the UNECE region in 2012. However, the data for roundwood volumes removed from forests for fuel are highly unreliable, as few countries have consistent methods of collecting relevant data for this increasingly important end use. Therefore, this chapter focuses on the production, consumption and trade of industrial roundwood rather than that of total roundwood (which would include fuelwood). Further insights into trends for wood raw materials in the wood energy sector, the reader is invited to review chapter 9 (on wood energy markets).

## 4.2 EUROPE

### Industrial roundwood markets

Harvests of industrial roundwood in Europe have remained practically unchanged for three years at around 370 million m<sup>3</sup> annually (table 4.2.1).

Softwood removals, which accounted for approximately 76% of the total removals in 2012, have declined somewhat during the past two years because of reduced demand for logs by European sawmills. For hardwood species, which are predominantly consumed by the pulp sector, the trend has been the reverse, with removals having increased by almost 20% from 2009 to 2012. In 2012, removals of hardwood roundwood reached just over 88 million m<sup>3</sup>, which was close to the highest level ever recorded.

The past four years in Europe have seen not only increasing timber harvest of hardwood, but also increasing importation of industrial hardwood logs. In 2012, net imports reached 7.2 million m<sup>3</sup>, up from 4.4 million m<sup>3</sup> in 2009. It's not quite clear why demand for hardwood logs has gone up so sharply over recent years, since the major user of hardwood fibre, the pulp industry, actually reported a decline in the usage of hardwood roundwood (CEPI, 2013). One explanation could be that an increasing volume of harvested logs is being consumed by the energy sector, including the wood pellet industry, and that these volumes are being classified as industrial roundwood rather than fuelwood.

The largest increases in the removals of industrial roundwood from 2011 to 2012 occurred in Romania (+2.2 million m<sup>3</sup>), Spain (+1.5 million m<sup>3</sup>), France (+1.4 million m<sup>3</sup>) and Turkey (+1.3 million m<sup>3</sup>). Except for Spain, all of these countries reached their highest harvest levels in over five years. The biggest reductions in harvest volumes were seen in the countries that have the highest industrial log removals on the continent: Sweden (-3 million m<sup>3</sup>), Germany (-2.5 million m<sup>3</sup>), Latvia (-1.5 million m<sup>3</sup>), Slovakia (-1.0 million m<sup>3</sup>) and Finland (-0.9 million m<sup>3</sup>). Much of the decline in these countries was the result of lower demand for sawlogs by domestic sawmills.

**TABLE 4.2.1**

**Industrial roundwood balance in Europe, 2011-2013**

	(1,000 m <sup>3</sup> )			
	2011	2012	2013f	Change (%) 2011-2012
Removals	373 627	369 449	371 676	-1.1
Imports	54 082	51 123	51 687	-5.5
Exports	41 277	38 174	37 991	-7.5
Net trade	-12 805	-12 949	-13 696	
Apparent consumption	386 432	382 399	385 372	-1.0

**Note:** f=Timber Committee forecast, October 2012.

**Source:** UNECE/FAO TIMBER database, 2013.

### 4.2.2 Trade in roundwood and wood chips

Industrial roundwood trade fell in Europe in 2012, mainly because of reduced activities in the sawmilling sector. Total import volumes dropped by 5.5% from 2011 to 51 million m<sup>3</sup>. Industrial roundwood exports were also lower, down by 7.5% to 38 million m<sup>3</sup>, resulting in net imports of 13 million m<sup>3</sup>. Practically all the decline in trade was in softwood logs, while hardwood log trade remained unchanged from 2011, as a result of stable demand for hardwood fibre by the region's pulp mills.



**Source:** UPM, 2013.

The largest log importers, Poland (-16%), Italy (-16%), Germany (-8%) and Finland (-5%) reduced their importation the most. In ranking order, the most important log-exporting countries in Europe during 2012 continued to be the Czech Republic, France, Latvia, Germany and Estonia.

At global level, wood chips are one of the few forest product commodities that have seen a steadily increasing trend in globally traded volumes during the past decade. With the exception of 2009, when global production of pulp fell by about 10% and the demand for wood fibre was down, international trade in wood chips increased every year from 2000 to 2011. In 2012, chip shipments were slightly lower than in the previous year, but they were still at the second highest level on record.



Chip trade in Europe has followed a similar trend with a decline in 2012. Practically all countries with a substantial importation activity reduced their reliance on imported wood fibre in 2012. The only exception was Turkey, which has become the fourth largest wood chip importer in the world in a relatively short time. In 2002, the country didn't import any wood chips, but as a result of limited availability of domestic wood, the expanding MDF industry has been turning mainly to the US (45% of total imports in 2012), Canada (14%) and Ukraine (13%) to meet its growing demand for wood fibre. In 2012, Turkey imported approximately 1.5 million tonnes (dry) of wood chips, most of which was softwood chips.

### 4.2.3 Consumption of wood fibre by the pulp industry

A weaker pulp market resulted in a reduced consumption of wood fibre in the European pulp industry in 2012. After having increased for two consecutive years, consumption fell by 3.9% from the previous year, in 2012, reaching the second lowest level in 10 years. Total virgin wood fibre consumption reached an estimated 143 million m<sup>3</sup> according to the Confederation of European Paper Industries (CEPI, 2013). This was down from an all-time high of 162 million m<sup>3</sup> in 2007.

The split between softwood and hardwood fibre has not changed much over the past 15 years, with softwood virgin fibre accounting for approximately 73%, and hardwood fibre 27%.

Most of the decline in consumption was in roundwood, which typically is costlier than residual chips from sawmills and plywood mills. Usage of roundwood for pulp was down 4.5 million m<sup>3</sup>, while chip consumption for pulp declined by 1.4 million m<sup>3</sup>.

Many pulp mills in Europe use a fairly high percentage of imported fibre, particularly in the form of roundwood, in their fibre usage. The total import share for the European pulp industry was just over 19% in 2012, with Finland, Sweden, Austria and Belgium (in ranking order) being the largest importing countries. The most important trade flow was that of hardwood pulplogs from the Russian Federation and the Baltic States to Sweden and Finland.

## 4.3 COMMONWEALTH OF INDEPENDENT STATES

### 4.3.1 Industrial roundwood markets

Timber harvests in the CIS were slightly lower in 2012 than in the previous year, with an estimated total volume of 194 million m<sup>3</sup> being cut. A clear majority of the removals were in the Russian Federation (177.5 million m<sup>3</sup>), with Belarus and

Ukraine each harvesting an estimated 8 million m<sup>3</sup> (table 4.3.1). Other countries in the CIS either have a limited area of actively managed forests, or lacking reliable forest resource data.

All of the three countries with substantial timber harvest in the CIS ship a fairly high percentage of their timber in unprocessed form to neighbouring countries. In 2012, the export share reached over 11%, which was down from 13% in the previous year. For Belarus and Ukraine, the log export share of total timber harvests was close to 30% and for the Russian Federation it was just under 10%.

The Russian Federation's consumption of logs in 2012 was practically unchanged from the previous year, while the harvest in 2012 was slightly lower than in 2011. Production of softwood logs continues to be approximately two thirds of the total log production, with most being consumed by the country's sawmilling sector. A big percentage of the softwood harvest in the Russian Federation occurs in the eastern provinces, while hardwood removals are more concentrated in the western provinces, according to the Russian market publication WhatWood.

In 2012, an estimated 44% of the country's softwood harvest took place in eastern Russia, and the logs were mainly used by the export-oriented sawmills and pulp mills in the region. Just over 20% of the harvest in this region was exported in log form to China, the Republic of Korea and Japan in 2012.

The accuracy of Russian harvesting data remains uncertain, since, in addition to the official estimate, the Russian Government acknowledges that "undocumented" timber harvesting also takes place. In 2009, the Head of the Federal Forestry Agency reported that illegal logging might well lie between 25 million and 30 million m<sup>3</sup> annually. Recent government reports say that illegally logged volumes are down to an estimated 2 million m<sup>3</sup>, whereas estimates from the WWF and the World Bank were at over 40 million m<sup>3</sup>.

**TABLE 4.3.1**  
Industrial roundwood balance in the CIS, 2011-2013

	(1,000 m <sup>3</sup> )			
	2011	2012	2013f	Change (%) 2011-2012
Removals	197 605	193 674	199 221	-2.0
Imports	470	497	497	5.8
Exports	25 953	22 277	22 582	-14.2
Net trade	25 483	21 780	22 085	
Apparent consumption	172 122	171 894	177 136	-0.1

**Note:** f=Timber Committee forecast, October 2012.

**Source:** UNECE/FAO TIMBER database, 2013.



### 4.3.2 Trade in roundwood

The Russian Federation was for a long time by far the largest exporter of softwood logs in the world, but after the introduction of a log export tariff of 25% in 2008, exports fell dramatically. From 2008 to 2012, shipments were down by half, from 25 million m<sup>3</sup> to 12.5 million m<sup>3</sup>. This decline has continued during 2013, with another 13% reduction in shipments during the first five months as compared with the same period in 2012. New Zealand replaced the Russian Federation as the leading log exporter in 2012, and in 2013 the US also surpassed the Russian Federation to become the second largest log-exporting country in the world.

The export tariff was introduced to lower domestic log prices, encourage increased wood products manufacturing in the Russian Federation and attract foreign investment. However, log prices in the western part of the country didn't decline in the long-term, as the Government had hoped. Initially, domestic log prices fell when the tariffs were implemented, but from the first quarter of 2009 to the first quarter of 2013, the average softwood sawlog price in rouble terms went up by 28%, according to the Wood Resource Quarterly.

The Russian Federation joined the World Trade Organization in August 2012 and, as part of the negotiations for accession to the WTO, the Russian Government lowered export taxes to 13% for spruce and 15% for pine logs. The new proposed tariff for birch logs will actually be higher than the current tariffs for small diameter logs at 7% (more details in section 2.2.3).

Despite these tariff adjustments, there hasn't been a major increase in the flow of logs from the west of the Russian Federation to Finland, the major destination for Russian hardwood logs or for softwood logs from the Russian Far East to China.

Both Finland and China have diversified their timber sourcing to include other regions and have, therefore, become less dependent on the Russian Federation for their wood raw-material needs.

Following the example of the Russian Federation, five years ago, the Government of Ukraine decided to implement an export tax on logs, wood chips and sawdust from 1 January 2014. The export duty on roundwood is proposed to be 40% of the value of the log (minimum €17 per m<sup>3</sup>), and the duty for wood chips and sawdust will be set to 20% of the value (minimum €7 per ton).

The purpose of this tax is also to encourage investments in the processing of wood products in the country, but if the Russian experiment is any guide, the outcome may be less successful than what the Government is hoping for. The countries that will be most affected by this planned export tax are Turkey, Romania, China, Austria and Poland. The fast-expanding MDF

industry in Turkey, the second largest producing country in the world after China, will be particularly hard hit, since Ukraine is the major supplier of both logs and wood chips to this industry.



Source: UNECE/FAO, 2013.

## 4.4 NORTH AMERICA

### 4.4.1 Industrial roundwood markets

Removals of industrial roundwood increased by 4% in North America in 2012 over 2011, making 2012 the third consecutive year with higher removals (table 4.4.1). The removals of an estimated 461 million m<sup>3</sup> in 2012 were 14% higher than in 2009, when harvest volumes reached their lowest levels since the early 1960s.

**TABLE 4.4.1**  
Industrial roundwood balance in North America, 2011-2013

	(1,000 m <sup>3</sup> )			
	2011	2012	2013f	Change (%) 2011-2012
Removals	444 388	461 151*	462 188	3.8
Imports	5 233	5 917	5 917	13.1
Exports	16 230	22 132	22 193	36.4
Net trade	10 997	16 215	16 276	
Apparent consumption	433 392	444 936*	445 912	2.7

Note: f=Timber Committee forecast, October 2012. \*Estimate.

Source: UNECE/FAO TIMBER database, 2013.

The biggest increase occurred in Canada, where harvest levels in 2012 were almost 34% higher than in 2009, while US removals were up only 7%. Much of this growth occurred in the western region of North America, where demand for sawlogs has been on the rise in recent years due to the substantial expansion in shipments of both sawlogs and sawnwood to China (see section 5.4.4).



Forest management in the province of Quebec, in eastern Canada, is currently undergoing significant changes which will have a considerable impact likely for the forest products industry. A 2004 report recommended reducing the overall annual allowable cut (AAC) in effect at the time by 10%, with a 20% reduction from the boreal forest type. In 2006, the new Chief Forester established a lower AAC for 2008 to 2013, and another reduction is planned to be fully in place by 2014. The provisions of the Act are now being implemented, although with some noteworthy last minute amendments. The two most significant changes have to do with reviewing and further reducing the AAC and establishing open market auctions.

#### 4.4.2 Trade in roundwood

The export of logs from North America to Asia continued to grow for the third consecutive year in 2012 to reach a record high of 22 million m<sup>3</sup>, according to UNECE data. In just four years, shipments from the US and Canada to Asia have gone up almost 80%. Log exports from the western US to China have jumped ten-fold in the past five years, which has had a major impact on the coastal log market in the western US. Despite relatively low production levels in the past five years, sawlog prices in the first quarter of 2013 were about 80% higher than in 2009, according to the North American Wood Fiber Review. This development coincides with the period when log exports to China expanded rapidly.

Although sawnwood price increases are good news for sawmills in the western States, the bad news is that the log prices are increasing as well, as mentioned above, and availability of logs will be a major concern in the coming year.

During the first half of 2013, the US has continued to increase shipments to China, with log volumes 50% higher than the same period in 2012. If this pace continues, 2013 will be a new record year for US log exporters.

#### 4.4.3 Woody biomass markets

Pellet exports from the two primary pellet-producing regions on the North American continent—the US south and British Columbia—showed no signs of slowing in early 2013, with the rate of growth likely to accelerate in the second half of the year. In the US south, pellet export volumes to Europe resumed their double-digit growth after a brief pause in the fourth quarter of 2012. Export volumes, based on information from industry sources as well as trade data in Europe and North America, showed exports in excess of 1.7 million tons in 2012, as reported in the North American Wood Fiber Review. Canadian exports also rose in 2012 to 1.5 million tons, but the increase was less than that seen in the US.

The increase in pellet production in western Canada has pushed sawdust prices upward the past few years, with 2013

prices being about 15% higher than they were in 2010. In the US south, where smaller logs from thinnings and treetops are commonly used for pellet manufacturing, there hasn't yet been any region-wide upward price pressure as the result of this new wood-consuming sector.

### 4.5 EXTRAREGIONAL INFLUENCE ON THE UNECE REGION

China's hunger for wood was less acute in 2012 than in the previous year. In particular, imports of softwood logs fell substantially from the record levels of 2011. Imports of sawnwood were also lower in 2012, but the decline was much less than that for logs. The biggest changes in wood imports between 2011 and 2012 were the sharp decline of Russian logs crossing the Chinese border and the reduced sawnwood volumes from the US entering Chinese ports. It's also interesting to note that New Zealand overtook the Russian Federation as the biggest supplier of softwood logs to China in the first half of 2013.

North America is a major supplier of softwood products to China, with the market share for logs and sawnwood in June 2013—accounting for 24% and 45%, respectively. In 2012, Canada and the US exported logs and sawnwood valued at 2.1 billion dollars, which was down by 17% from 2011. Despite the decline in shipments last year, it was still the second highest level on record and more than four times the level just three years earlier.

### 4.6 WOOD RAW MATERIAL COSTS

The largest cost component when manufacturing sawnwood and wood pulp is the cost of raw-material. During 2012 and 2013, these costs have trended upward for sawmills worldwide with the improved markets, particularly in North America, while they have fallen slightly for the world's pulp mills since the demand for pulp slowed in 2012 and 2013.

#### 4.6.1 Softwood sawlog prices

The Global Sawlog Price Index (GSPI) fell by 12% from the second quarter of 2011 to the second quarter of 2012, but has since increased slowly by almost 5% to reach \$86.33 per m<sup>3</sup> in the first quarter of 2013, as reported in the Wood Resource Quarterly (graphs 4.6.1-4.6.3). The biggest log price increases in the UNECE region during 2012 and 2013 occurred in the western US, western Canada, the Nordic Countries and the Baltic States.

Looking back over the past few years, sawlog price trends have been mixed. Prices have trended downward in most major markets in western Europe the past two years in US dollar terms, but this trend was broken in the fourth quarter of 2012 when

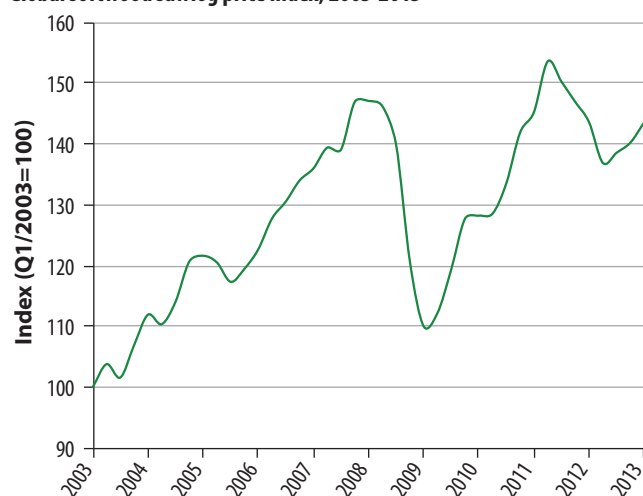




prices increased slightly mainly as a result of the weakening US dollar. In local currencies, log prices remained practically unchanged in late 2012 and early 2013.

**GRAPH 4.6.1**

**Global softwood sawlog price index, 2003-2013**

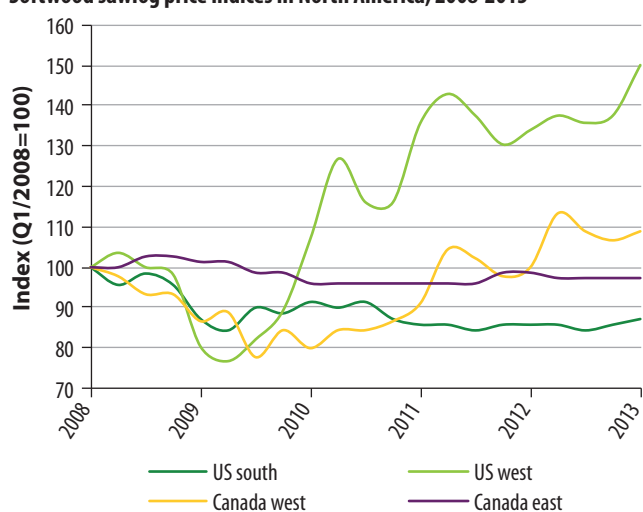


**Note:** Price index is based on delivered sawlog prices in \$/m³ in 19 key regions worldwide.

**Source:** Wood Resource Quarterly, 2013.

**GRAPH 4.6.2**

**Softwood sawlog price indices in North America, 2008-2013**



**Note:** Price indices are based on delivered log price per m³ in local currency.

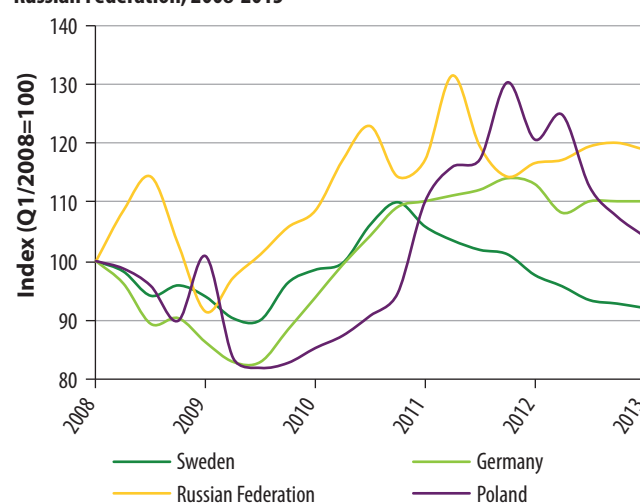
**Source:** Wood Resource Quarterly, 2013.

The biggest price declines were seen in Sweden, where pine sawlog prices fell by about 12% from the first quarter of 2011 to the first quarter of 2013 in both the local currency and in US dollar terms. Spruce sawlog prices declined over 25% during the same time period. In Austria, Germany, Finland and Norway, prices dropped a more modest 3%-10% during the same period. Sawlog prices fell during 2012 because sawmills were cutting production in response to weaker demand.

Prices for sawlogs in the first quarter of 2013 in some European countries, including Estonia, Latvia and the Czech Republic, were generally higher or unchanged from 2012. This development has mainly come as a result of the relatively strong sawnwood export market, which kept the log markets healthy. The only major market in Eastern Europe where log prices have fallen has been Poland where competition from German sawmills for logs fell during 2012. From the second quarter of 2011 to the fourth quarter of 2012, average prices fell over 20%, and the country has now some of the lowest conifer sawlog prices in Europe.

**GRAPH 4.6.3**

**Softwood sawlog price indices in three European countries and the Russian Federation, 2008-2013**



**Note:** Price indices are based on delivered log price per m³ in local currency.

**Source:** Wood Resource Quarterly, 2013.

## 4.6.2 Pulpwood prices

The costs of wood fibre for the world's pulp mills have trended downward during much of 2011 and 2012 because of reduced pulp and paper production, and in some regions, as a result of a higher supply of lower-cost fibre. The weakening pulp market forced the global pulp industry to undertake reductions in production costs to stay competitive. With wood fibre costs accounting for 55%-70% of the total production costs when manufacturing pulp, many pulp companies' strategy centred on reducing the costs for pulplogs and wood chips in 2012 and 2013.

This trend continued in early 2013 when the Hardwood Wood Fiber Price Index (HFPI) fell by 1.1% to \$103.66 per oven-dry tonne, which was 12% below the all-time high in the third quarter of 2011, as reported by the Wood Resource Quarterly (graph 4.6.4).

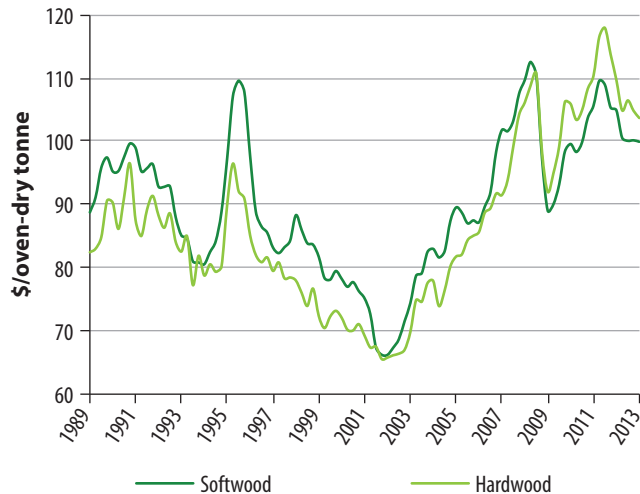
However, the price trends were mixed, with hardwood fibre prices lower in Asia and eastern Canada and slightly higher in Europe and Latin America as compared with 2012. Eucalyptus pulpwood prices in Brazil have fallen more than in most other



regions the past two years, with the first quarter of 2013 prices down more than 30% over 2011. This dramatic decline has resulted in Brazilian pulp mills now enjoying the fourth lowest wood fibre costs in the world, behind the Russian Federation, the US south and Chile, respectively.

**GRAPH 4.6.4**

**Global wood fibre price indices, 1989-2013**



**Note:** Price indices are based on delivered log price per oven-dry tonne in \$.

**Source:** Wood Resource Quarterly, 2013.

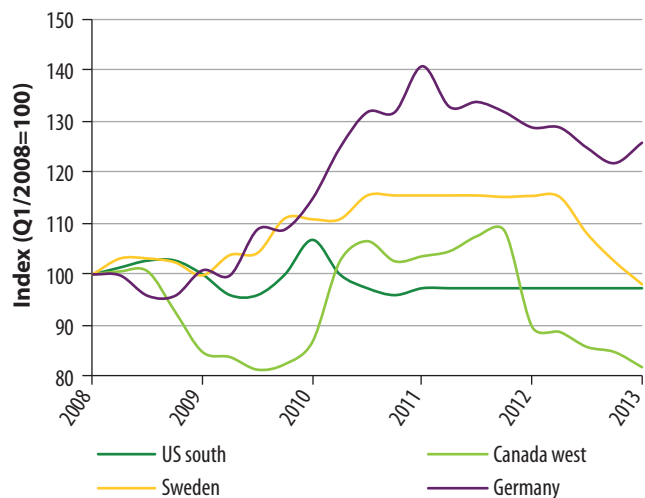
The Softwood Wood Fiber Price Index (SFPI) in the first quarter of 2013 was practically unchanged from late 2012 at \$99.90 per odmt. The SFPI has inched downward for seven consecutive quarters and is currently down 8.8% from the most recent peak in the second quarter of 2011, according to the Wood Resource Quarterly (graph 4.6.4). The biggest changes in early 2013, in US

dollar terms, were the declines in chip prices in eastern Canada, Japan, western Canada and the US northwest, while the biggest increases occurred in France and Germany.

There's been an increased supply of residual chips from the sawmilling sector, which has turned up production levels during the second half of 2012 and first half of 2013 in North America (graph 4.6.5). This is the major reason for the declining prices in western Canada and the US south. Prices for wood chips in Canada have fallen more than 15% in just over a year, according to the North American Wood Fiber Review.

**GRAPH 4.6.5**

**Softwood wood chip price indices in Europe and North America, 2008-2013**



**Note:** Price indices are based on delivered wood chip price per oven-dry tonne in local currency.

**Source:** Wood Resource Quarterly, 2013.

## 4.7 REFERENCES

Note: The Review has a statistical annex, which is available at: [www.unece.org/fpamr2013](http://www.unece.org/fpamr2013)

CEPI. 2013. Available at: [www.cepi.org](http://www.cepi.org)

North American Wood Fiber Review. 2013. Wood Resources International, LLC. Available at: [www.woodprices.com](http://www.woodprices.com)

UNECE/FAO TIMBER database. 2013. Available at: [www.unece.org/forests/fpm/onlineadata](http://www.unece.org/forests/fpm/onlineadata)

WhatWood. 2013. Available at: [www.whatwood.ru](http://www.whatwood.ru)

Wood Resource Quarterly. 2013. Wood Resources International, LLC. Available at: [www.woodprices.com](http://www.woodprices.com)

Wood Resources International database. 2013. Wood Resources International, LLC. Available at: [www.woodprices.com](http://www.woodprices.com)













# 5 SAWN SOFTWOOD MARKETS

Lead author: *Russ Taylor*



Contributing authors:

*Antti Koskinen,  
Frances Maplesden and  
Igor Novoselov*



## HIGHLIGHTS

- Sawn softwood consumption rose by 8.2% in 2012 in North America, benefiting from a stronger housing market. In the CIS, consumption was 2.9% higher than in 2011. In Europe, by contrast, the continuing weak economy resulted in reduced demand, and consumption in 2012 was 2.8% lower than in 2011.
- The European debt crisis produced weak consumption, especially in the traditionally larger markets of Germany (-6.1%), France (-6.7%), Italy (-13.7%), Netherlands (-13.8%), Sweden (-15.1%) and Finland (-18.9%).
- In some parts of Europe, consumption grew - by as much as 17% in Ireland and by almost 21% in Spain (albeit from low levels) - suggesting that the worst might be over.
- There's still oversupply in the European sawmill industry, which has resulted in low profitability or, in many cases, losses—and this has led to restructuring.
- Total capacity hasn't decreased in Europe despite many sawmill closures, as there was an investment boom before the financial crisis.
- Faced with weak domestic demand, European producers increased overseas exports by 9% to roughly 18 million m<sup>3</sup> in 2012, while intra-European exports declined significantly.
- In the wake of improving housing markets, North American sawn softwood consumption increased by 8.2% in 2012 over 2011 to reach 78 million m<sup>3</sup>.
- North American sawnwood prices surged between the third quarter of 2012 and the end of the first quarter of 2013, before strongly reversing direction by mid-2013.
- Russian prices were relatively stable in 2012 but increased 8% in the first six months of 2013.
- China has become a key alternative market for producers in western North America: in 2012, British Columbia shipped over 6 million m<sup>3</sup> to China and the western US exported 660,000 m<sup>3</sup>.
- In the Russian Federation, sawn softwood production, at 30 million m<sup>3</sup>, was 3.4% higher in 2012 than in 2011, with exports increasing by 3% to 19.4 million m<sup>3</sup>—the highest volume since 2007.
- The most remarkable change has been the growth of the Turkish market to become one the European top five markets for exports.

## 5.1 INTRODUCTION

In line with mixed global economic trends, 2012 was characterized by positive economic signals in North America recessionary conditions in most of Europe and a stable situation in the CIS countries.

Trends showing recovery in 2012 in the consumption of sawn softwood occurred in North America (+8.2%) in the wake of an improving housing market (see chapter 11) and in the CIS countries (+3.0%). Consumption in Europe suffered from the poor economic situation and weak demand and was 2.8% lower in 2012 than 2011 (table 5.1.1). The positive development of demand for sawn softwood resulted in increased production in North America (+6.4%) and the CIS subregion (+2.9%), while European output dropped by 3.5%.

**TABLE 5.1.1**

**Sawn softwood apparent consumption in the UNECE region, 2011-2013**

	(1,000 m <sup>3</sup> )			
	2011	2012	2013f	Change (%) 2011-2012
Europe	88 121	85 671	85 756	-2.8
CIS	15 939	16 413	16 425	3.0
North America	72 383	78 330	80 143	8.2
Total	176 443	180 414	182 324	2.3

**Note:** f=Timber Committee forecast, October 2012.

**Source:** UNECE/FAO TIMBER database, 2013.

## 5.2 EUROPE

### 5.2.1 Consumption

Moderate optimism in the European sawmill industry in 2011 turned into pessimism during 2012. The continuing economic uncertainty in Europe took its toll in the construction market, which had a direct impact on the sawn softwood market. In early 2012, the industry was expecting a slight improvement or, at least flat demand development in the European market. However, in 2012, consumption in Europe dropped by 2.8% to about 85.7 million m<sup>3</sup> (table 5.2.1), the second lowest level in this millennium and only 10% higher than the bottom in 2009. The impact of the weakening market was and still is severe, given that Europe consumes more than 80% of the European sawmill industry's output.

Consumption showed very weak signals, especially in the traditionally large markets such as Germany (-6.1%), France (-6.7%), Italy (-13.7%), Netherlands (-13.8%), Sweden (-15.1%) and Finland (-18.9%). In Finland, Sweden, Italy and the Netherlands, combined consumption fell by more than 2.6 million m<sup>3</sup>. In France and Germany, the markets weren't hit as hard, but their combined consumption fell 6-7% or 1.8 million m<sup>3</sup>.

**TABLE 5.2.1**

**Sawn softwood balance in Europe, 2011-2013**

	(1,000 m <sup>3</sup> )			
	2011	2012	2013f	Change (%) 2011-2012
Production	100 891	97 354	97 980	-3.5
Imports	33 266	32 788	32 975	-1.4
Exports	46 035	44 471	45 200	-3.4
Net trade	12 770	11 683	12 224	
Apparent consumption	88 121	85 671	85 756	-2.8

**Note:** f=Timber Committee forecast, October 2012.

**Source:** UNECE/FAO TIMBER database, 2013.

The fall in consumption was related to weak domestic consumption and to weak export markets in the value-added sawnwood industries. In recent years, European markets have lacked seasonal peaks (e.g. garden, decking, fencing markets) and this accounts for a further difference in total annual volume.

Despite the generally gloomy and negative market picture in 2012, there were also good signs that the worst could be over in some parts of Europe. Among the larger markets, the UK saw consumption grow by 4.3% in 2012, perhaps surprisingly given economic conditions. Turkey showed steady growth of 3.2% in 2012 and has become one of the key European markets, with a market size of more than 5 million m<sup>3</sup> and with good prospects for further growth. Having seen their markets halve since the start of the economic crisis, in 2012 Ireland grew by 17.2% and Spain by 20.6%.

There have been minor changes in the market structure in Europe in recent years. Germany is still the largest consumer of sawn softwood, followed by France and the UK. The most remarkable change has been the growth of the Turkish market to become one the European top five. Conversely, Finnish consumption has declined from more than 5 million m<sup>3</sup> in 2007 to 3.3 million m<sup>3</sup> in 2012.

### 5.2.2 Production and capacity change

As a result of poor demand, production in Europe has declined by 3.5% to 97.4 million m<sup>3</sup>. The fall in production was especially marked in countries such as Austria and Germany, which rely heavily on the European market, and which recorded falls of more than 7%. Austria's production was hit particularly by the dramatic reduction in consumption in the Italian market, which is the most significant for Austrian sawmills.

The positive exceptions in Europe were Poland, Romania, Turkey and the UK, all of which increased production. Increasing domestic demand in both Turkey and the UK drove production increases there; whereas in Poland, domestic production replaced imports. In Romania, the 17% increase in production resulted from investment and growing demand



in both domestic and export markets. Romania has been the recent hotspot for softwood sawmill investment, as well as value-added production, due to raw material availability and its favourable location vis-à-vis export markets.

There is still oversupply in the European sawmill industry, which has resulted in low profitability or even losses. Its poor financial performance has led to a restructuring of the sawmill industry. Some mills have closed due to bankruptcy or divestments and some have changed ownership. Many mills in Europe have been, for sale or are in insolvency; but it has been difficult to attract investors.

Total capacity has not decreased in Europe despite many sawmill closures, as there was an investment boom before the financial crisis. The sawnwood industry in Europe is fragmented and no dramatic change in the capacity is expected unless the tight market situation continues. Sawmills play an important role in rural economies where cities and communities often participate in refinancing mills in order to avoid closure.

### 5.2.3 Prices

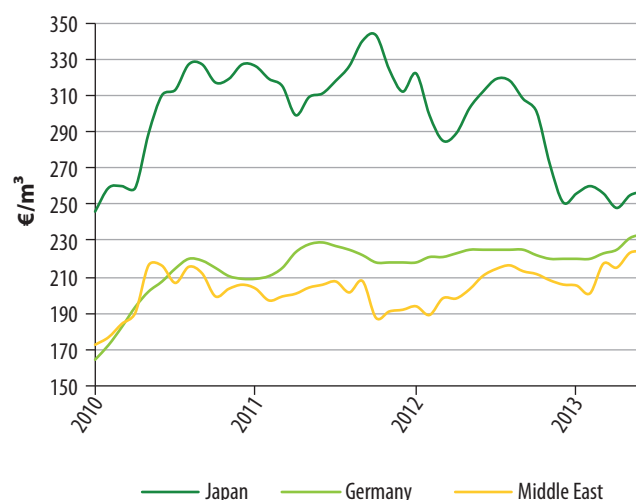
In Europe and the Middle East, prices in 2012 remained at around the same level as in 2011. The oversupply and falling demand in Europe didn't permit any price increases. At current prices, most sawmills are unable to make a profit. Even the rising price levels in China and the US in 2012 haven't been enough to attract European suppliers. Nevertheless, sawmills are actively following developments in other markets. The weakening of the Japanese yen and increasing supply from Europe impacted prices in Japan. However, the first half of 2013 has shown some positive price development in Germany and the Middle East (graph 5.2.1).



**Source:** Pölkky Oy, 2013.

**GRAPH 5.2.1**

**European sawn softwood prices in Japan, Germany and the Middle East, 2010-2013**



**Notes:** Japan: Finnish Whitewood KD Genban, #5&Btr, FOB. Germany: Roof Framing Lumber, delivered. Middle East: Scandinavian/Baltic whitewood and red pine, sixths, CIF.

**Sources:** EUWID Wood Products and Panels, 2013; Japan Lumber Report, 2013; Wood Markets Monthly, 2013.

### 5.2.4 Trade

#### 5.2.4.1 Imports

European imports are characterized by intraregional trade. European supply has grown faster than consumption, limiting the need for importing from outside Europe. Imports into Europe were 32.8 million m³ in 2012, a drop of 1.4% from 2011. In 2012, the EU27 imported around 5.9 million m³, more than half of which came from the Russian Federation, with roughly another 25% from Belarus and Ukraine.

#### 5.2.4.2 Exports

In spite of growing overseas trade, European exports, when intra-European exports are included, decreased by 3.4% to 44.5 million m³. The sawmill sector in Europe is now looking beyond Europe for export opportunities. Overseas exports increased by 9% to roughly 18 million m³ in 2012, which is around 42% of the combined export total (to Europe and overseas markets). Countries such as Finland and Romania, which have large shares of extra-EU shipments, were able to increase their exports. In 2012, the main export destination was Egypt, with a volume of 3 million m³, followed by Japan; but in terms of value, Japan is still the main overseas market for European sawn softwood.

The main overseas markets for European sawmills are in North Africa and the Middle East, where the political instability is a major concern. Potential growth of European sawn softwood exports to China has been limited, as the market is dominated

by Russian and North American suppliers. In 2012, European exports to China were approximately 400,000 m<sup>3</sup>, only 3% of total Chinese imports.

## 5.3 COMMONWEALTH OF INDEPENDENT STATES, WITH A FOCUS ON THE RUSSIAN FEDERATION

### 5.3.1 Consumption

In 2012, apparent sawn softwood consumption in the CIS increased by 3.0% (to 16.4 million m<sup>3</sup>) over 2011 (table 5.3.1). Recently, there has been a steady upward trend in consumption, which is due primarily to a recovery in demand from the construction industry.

TABLE 5.3.1

Sawn softwood balance in the CIS, 2011-2013

	(1,000 m <sup>3</sup> )			Change (%) 2011-2012
	2011	2012	2013f	
Production	32 937	33 880	36 530	2.9
Imports	3 561	3 566	3 579	0.1
Exports	20 559	21 033	23 684	2.3
Net trade	16 998	17 467	20 105	
Apparent consumption	15 939	16 413	16 425	3.0

Note: f=Timber Committee forecast, October 2012.

Source: UNECE/FAO TIMBER database, 2013.

### 5.3.2 Production/capacity change

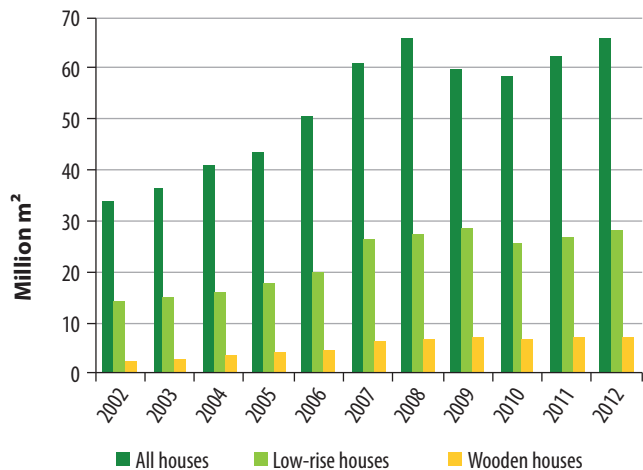
The results for 2012 showed considerable stability in softwood sawmill operations where total CIS output increased by 2.9%. The Russian Federation accounted for almost 89% of this, with its sawn softwood production increasing by 3.4% to reach just over 30 million m<sup>3</sup> in 2012. Its three largest producing regions (Irkutsk, Krasnoyarsk and Arkhangelsk) accounted for more than 50% of total output in 2012 (WhatWood, 2012). According to the results for 2012, the three largest mills in the Siberian Federal District produced 1.4 million m<sup>3</sup> of softwood, part of which came from new sawmill investments. This was 8.5% higher than in 2011 (WhatWood, 2012).

### 5.3.3 Housing construction in 2012

Over the period 2002 to 2012, housing construction was generally characterized by stable growth (graph 5.3.1). The total annual floor area of new housing for the period increased by 95% (averaging 7% a year), with low-rise housing units having almost doubled in floor area over the same period, an average of 8% per year.

GRAPH 5.3.1

Russian Federation house construction by type, 2002-2012



Source: Russian Association of Wood Housing, 2013.

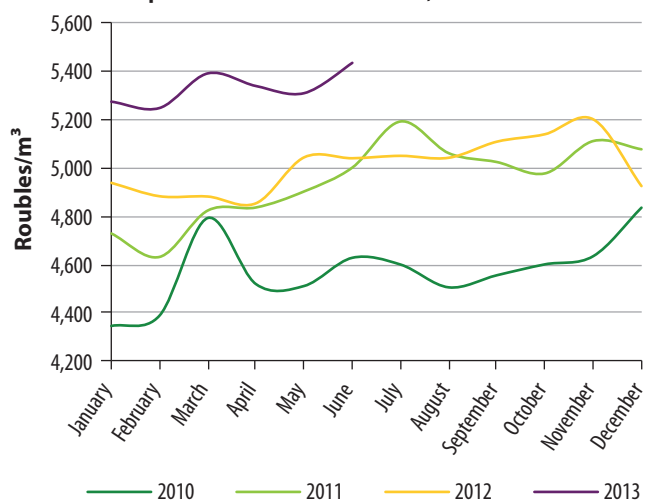
The most popular Russian building materials are still bricks and wood. Together they have accounted for more than 70% of low-rise house construction since 2009, with block, stone and other material making up the balance (Russian Association of Wood Housing, 2013).

### 5.3.4 Prices

According to Rosstat estimates, weighted average Russian sawnwood prices in December 2012 were rouble 4,923 per m<sup>3</sup> (\$107/m<sup>3</sup>), 3.0% lower than in December 2011 (graph 5.3.2). During 2012, the price dynamics were relatively stable, with little seasonal variation - less than rouble 200 per m<sup>3</sup> (\$7/m<sup>3</sup>). Prices in January have maintained an upward trend since January of 2010. So far, first data for the first half of 2013 indicate that prices are 5% to 10% higher than in the same months in 2012.

GRAPH 5.3.2

Sawn softwood prices in the Russian Federation, 2010-2013



Source: Rosstat, 2012.

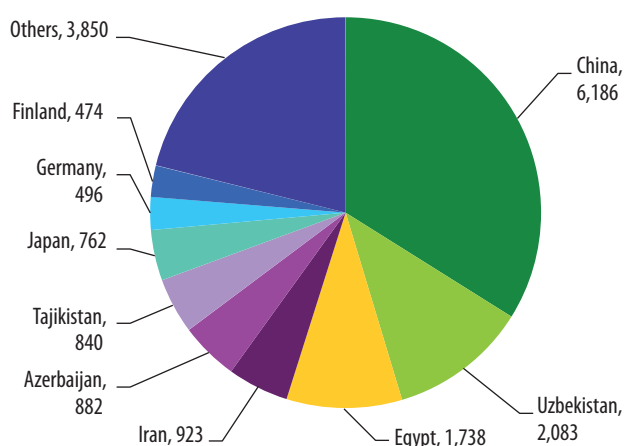
### 5.3.5 Trade

Sawn softwood exports from the Russian Federation in 2012 increased by 3% to 19.4 million m<sup>3</sup> – the highest volume since 2007.

In 2012, China imported 6.2 million m<sup>3</sup> of sawn softwood from the Russian Federation (32% of all Russian exports) and remained the largest market for Russian sawn softwood sales, despite a slight decline in volume (-2.1% compared with 2011). The Egyptian market strengthened in 2012 after a weak 2011 and Russian sawn softwood export deliveries increased by 18.2% to 1.7 million m<sup>3</sup> (graph 5.3.3).

**GRAPH 5.3.3**

**Russian Federation sawn softwood exports by market, 2012 (1,000 m<sup>3</sup>)**



**Sources:** Federal Customs Service of the Russian Federation, 2012; WhatWood, 2012.

## 5.4 NORTH AMERICA

### 5.4.1 Consumption

US housing starts peaked in 2005 at 2.07 million units and then plunged to near 80-year lows of 554,000 units in 2009. Since then, US housing starts have continued to rebound and increased for the third consecutive year in 2012 to reach 781,000 units (+28.5% over 2011; US Department of Census, 2013).

However, US economic growth continues to be muted as GDP growth in 2012 reached 2.2% compared with 1.8% in 2011. GDP growth in the fourth quarter of 2012 slowed to 0.4% and in the first quarter of 2013 came in at 1.8% (US Bureau of Economic Analysis, 2013). These lacklustre results are limiting job growth as the unemployment rate is coming down only slowly: it peaked at 10% in mid-2009 and averaged 8.1% in 2012 and 7.7% in the first half of 2013 (US Bureau of Labor Statistics, 2013). These levels compare to historical norms of between 5% and 6%.

Mainly on the strength of new residential housing starts, North American apparent sawn softwood consumption in 2012 increased by 8.2% over 2011 to reach just over 78 million m<sup>3</sup> (table 5.4.1). US consumption rose by 4.4 million m<sup>3</sup> (i.e. by 7.6%) to 62.5 million m<sup>3</sup>. Canada's growth in apparent consumption was even higher, increasing by 10.8% to 15.8 million m<sup>3</sup>.

**TABLE 5.4.1**

**Sawn softwood balance in North America, 2011-2013**

	(1,000 m <sup>3</sup> )			
	2011	2012	2013f	Change (%) 2011-2012
Production	82 891	88 163	90 450	6.4
Imports	16 247	17 813	18 256	9.6
Exports	26 754	27 645	28 563	3.3
Net trade	10 508	9 832	10 307	-6.4
Apparent consumption	72 383	78 330	80 143	8.2

**Note:** f=Timber Committee forecast, October 2012.

**Source:** UNECE/FAO TIMBER database, 2013.

### 5.4.2 Production/capacity change

US sawn softwood output in 2012 was 48.8 million m<sup>3</sup> (+7.2%) compared with 45.2 million m<sup>3</sup> in 2011. Production gains were fairly evenly spread across the US, with the West having a slight edge over the South. Stable sawnwood demand among pressure treaters (facilities that treat wood with decay resistant additives), DIY retailers and specialized wholesale dealers kept sawmills in the South running at levels well above those of 2011, with a 78% capacity utilization. (Wood Markets Monthly, 2013). Despite a rising trend in log costs, driven by log exports to China, rising domestic sawnwood demand and prices allowed sawmills in the US West to achieve a 79% capacity utilization.

Canada's sawn softwood production rose further in 2012 to 39.4 million m<sup>3</sup> from 37.4 million m<sup>3</sup> in 2011 (+5.4%), but was still well below the 2004 peak of 62.2 million m<sup>3</sup>. Despite ample export opportunities and rising sawnwood prices, the limitations to processing 10-year-old dead standing beetle-killed trees in the interior region of British Columbia allowed only for a slight increase in sawnwood production (0.3%) (Wood Markets Monthly, 2013).

Eastern Canada was also limited in its efforts to increase output – the region recorded a small increase of 1.2% in 2012 as poor sawmilling margins allowed only the better mills to operate until the second half of 2012 when prices started to improve. For Eastern Canadian mills, further pulp mill closures have created a glut of wood chips that are limiting both revenue and sales options as well as sawmill economics. Another challenge for Quebec producers has been the provincial government's ongoing reductions in the allowed sustainable timber harvest. Further reductions to the timber harvest were implemented on



the 1th of April 2013, resulting in a permanent reduction in the province's allowable timber harvest by 35% since 2004 (Wood Markets Monthly, 2013).



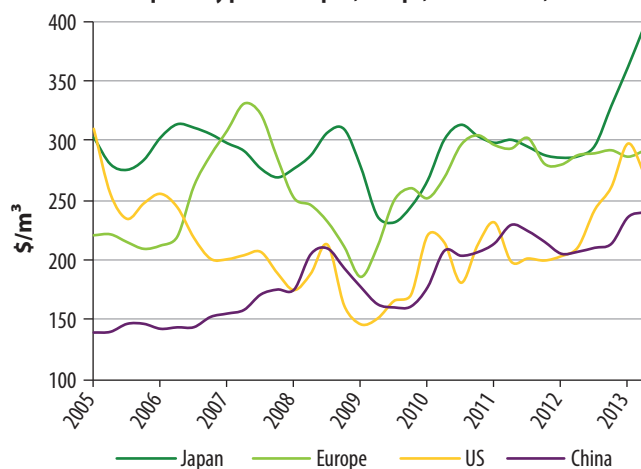
Source: Port of Kokkola, 2013.

### 5.4.3 Prices

Since hitting a low in the first three months of 2009, North American sawnwood prices climbed but remained subdued until the second half of 2012, after which they surged higher until March 2013 (graph 5.4.1).

GRAPH 5.4.1

Sawn softwood quarterly prices in Japan, Europe, US and China, 2005-2013



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

**Sources:** Wood Markets Monthly International Report, 2013; Wood Markets China Bulletin, 2013.

Supply-chain dislocations in North America (including railcar shortages in Canada, trucking shortages in the US, low inventories (stockholding), credit issues and numerous capacity limitations), coupled with strong demand in China and Japan, created soaring prices up until early in the second quarter of

2013. However, poor weather in the US northeast and wet conditions in the US mid-west in early 2013, coupled with surging sawnwood production created an oversupplied market and prices crashed throughout April – June, 2013. The July 2013 prices in the US and China (not reflected in graph 5.4.1) are dropping close to prices in April – June 2012, or back to where the cycle started. The prospects of a “super-cycle” with much higher North American sawnwood prices (as a function of tightening Canadian and Russian timber supplies coupled with the expectation of strong demand in the US and Chinese markets) remain. But it is not expected to occur until 2015 at the earliest (Wood Markets Monthly, 2013).

### 5.4.4 Trade

Following the tsunami in 2010, Japanese demand for reconstruction in 2012 gained momentum, with sawn softwood SPF (Spruce-Pine-Fir, grouped North American woods with similar characteristics) prices reaching all-time highs in the first three months of 2013 and remaining at this level from April to June 2013 because of tightening supply.

China has become a key alternative market for North American producers, especially for producers along the west coast. In 2012, British Columbia shipped about 6.3 million m<sup>3</sup> to China and the US West exported 660,000 m<sup>3</sup> (Wood Markets China Bulletin, 2013). The long-term trend in China is for an increasing dependence on imported sawn softwood from North America, despite various cycles of volatility that have been evident since late 2011. Thus the outlook is for stable to higher export volumes and prices in China (Wood Markets China Book, 2012).

#### 5.4.4.1 Imports

Canada dominates US imports with over a 97% market share in 2012. Canadian shipments to the US were 13.4 million m<sup>3</sup> in 2012, 7.7% more than 2011 (Wood Markets Monthly, 2013).

#### 5.4.4.2 Exports

North American producers' offshore exports were similar in 2012 to 2011 at 8.8 million m<sup>3</sup> and total exports, including trade between Canada and the US, increased by 3.3% to 27.6 million m<sup>3</sup> (table 5.4.1). With strong demand and much higher prices in 2012, most of the trade stayed within North America where the returns were highest.

However, rising demand and prices in Japan allowed for higher exports from the US (+15.2%) and Canada (+12.2%). Exports to China were lower from both the US (-37.2%) and Canada (-15.1%) following a mid-year slowdown, but this is considered a short term situation related to reducing stockpiled volume and from better returns in other markets.

The North American outlook for the second half of 2013 appears uncertain, as a major price correction – linked with numerous mill production curtailments - occurred in the second quarter of

2013. However, the expectations are for a gradual improvement in North American sawn softwood consumption and prices, led by growth in US residential new construction. Further growth may come from a resurgence in demand from China, Japan and other Asian markets.

## 5.5 EXTRAREGIONAL INFLUENCE ON THE UNECE REGION

Outside the UNECE region, China's importance in global sawn softwood production and trade has grown, although output and trade were lower in 2012 in sawn softwood imports (-4.7%), sawn softwood production (-3%) and softwood log imports, which declined by 15.1% compared with 2011 (Wood Markets China Bulletin, 2013).

GDP growth slowed in China in 2012 and government measures continued to cool the property market by keeping house-purchasing restrictions in place in the eastern provinces. In 2013, continuing urbanization and steady growth in incomes is expected to underpin strong demand for housing and construction (the major end-use for sawn softwood in China). Government policies aimed at rebalancing the economy from reliance on net exports and capital formation to domestic consumer demand is also driving housing growth.

The sustained recovery from a low in 2009 in sawn softwood imports into other major markets in the Asian region - Japan, Republic of Korea and Taiwan Province of China – generally stalled in 2012 due to an overbuilt construction market. In Japan, housing starts had continued at historically low levels but rose by 5.8% in 2012 as reconstruction and new construction resulting from the Great East Japan earthquake gained momentum.

A further surge in housing demand and sawn softwood demand is expected in 2013 before an increase in the consumption tax scheduled for 2014 occurs. Also expected in 2013 is an increase in sawnwood purchasing because inventory (stockholding) levels were low at the end of 2012. Japanese importers were anticipating higher imported sawnwood prices as the yen began to weaken in 2013 because of new government fiscal policies.

Demand for European sawnwood, mostly used in the expanding "pre-cut" industry (where sawnwood is pre-cut to finished profiles at the mill rather than at the construction site), is expected to continue increasing, as it did in 2012. Japan's "Law for promotion of wood in public buildings", introduced in 2010, and which heightened public awareness of energy efficiency and earthquake-resistant housing, is expected to provide opportunities for increased use of wood in public and private construction.

North African and Middle Eastern countries – particularly

Egypt, Saudi Arabia, and the United Arab Emirates continued to provide major markets for sawn softwood and had recovered from significant drops in 2008 and 2009. Egypt's imports rose in 2012, recovering from a low in 2011.

Chile, New Zealand and Brazil were the only significant exporters of sawn softwood outside the UNECE region, although Chile's exports haven't yet returned to pre-crisis levels and New Zealand's exports have been largely static, although increasing slightly in 2012 (table 5.5.1).



Source: Vapo, 2012.

**TABLE 5.5.1**  
Major importers and exporters of sawn softwood outside the UNECE region, 2011-2012

	(million m <sup>3</sup> )		
	2011	2012	Change (%)
<b>Major importers</b>			
China	14.93	11.91	-20.2
Japan	6.58	6.05	-8.1
Egypt	3.95	4.58*	15.9
Saudi Arabia	0.83	1.33	60.2
Republic of Korea	1.28	0.96	-25.0
<b>Major exporters</b>			
Chile	2.68	-	-
New Zealand	1.91	2.11	10.5
Brazil	0.71	0.68	-4.2
South Africa	0.36	-	-
China	0.22	0.19	-13.6

**Note:** \*Estimate based on reported exports to Egypt by exporting countries.

**Source:** UN Comtrade, 2013.

## 5.6 POLICY AND REGULATORY INFLUENCES ON THE SECTOR

The US-Canada Softwood Lumber Agreement signed in 2006 was extended in early 2012 and will remain in effect until 12 October 2015. For most of 2012, Canadian exporters to the US paid the maximum export duty (15% in British Columbia and Alberta and 5% in the rest of Canada) as the Framing Composite Index price remained below \$315 per thousand board feet (\$197 per m<sup>3</sup> net) threshold (Random Lengths, 2013).

However, starting in June 2012, lower export taxes were assessed when lumber sawnwood prices surpassed the threshold and duties were reduced. This was only the second time that the duties haven't been at their maximum since the Agreement was signed. If the index price rises above \$355 per thousand board feet, the duties fall to zero for all Canadian exporters to the US. With higher US sawnwood prices, the Composite Index rose above \$355 per thousand board feet (\$222 per m<sup>3</sup> net) in early 2013 and stayed there through July 2013, before dropping back.

Under the Softwood Lumber Agreement, the US and Canadian governments have established a fund through the Bi-National Softwood Lumber Council to support the promotion of sawn softwood so as to defend and increase wood's market share against steel, concrete, plastics and composites.

In residential construction, the Council supports efforts to foster new product or building-system development, such as cross-laminated timber technology and raised floor systems. In non-residential light commercial construction, it sponsors programmes to provide technical support and continuing education for architects, engineers, building officials and others who make decisions about building materials. It also supports efforts to strengthen the acceptance of solid wood by green-building certification bodies.

The EU Construction Products Regulation (CPR) entered into effect on 1st July 2013 and replaced the existing Directive. The CPR requires a CE-marking of sawnwood for construction (all construction products in general). The market impact from this initiative is expected to be small, limited to some exporters as well as small-scale sawmills that do not have the equipment or resources to maintain CE-marking.

## 5.7 REFERENCES

Note: The *Review* has a statistical annex, which is available at: [www.unece.org/fpamr2013](http://www.unece.org/fpamr2013)

EUWID Wood Products and Panels. 2010-2013. Various issues. Available at: [www.euwid.com](http://www.euwid.com)

Federal Customs Service of the Russian Federation. 2012. Available at: [www.customs.ru](http://www.customs.ru)

Japan Lumber Report. 2010-2013. Various issues. Available at: [www.n-mokuzai.com](http://www.n-mokuzai.com)

Random Lengths. 2013. Available at: [www.randomlengths.com](http://www.randomlengths.com)

Rosstat. 2012. Federal Service of State Statistics. Available at: [www.gks.ru](http://www.gks.ru)

Russian Association of Wood Housing. 2013. Available at: [www.npadd.ru](http://www.npadd.ru)

UN Comtrade. 2013. Available at: [www.comtrade.un.org](http://www.comtrade.un.org)

UNECE/FAO TIMBER database. 2012-2013. Available at: [www.unece.org/forests/fpm/onlineadata](http://www.unece.org/forests/fpm/onlineadata)

US Bureau of Economic Analysis. 2013. US GDP. Available at: [www.bea.gov](http://www.bea.gov)

US Bureau of Labor Statistics. 2013. Unemployment Rates. Available at: <http://data.bls.gov>

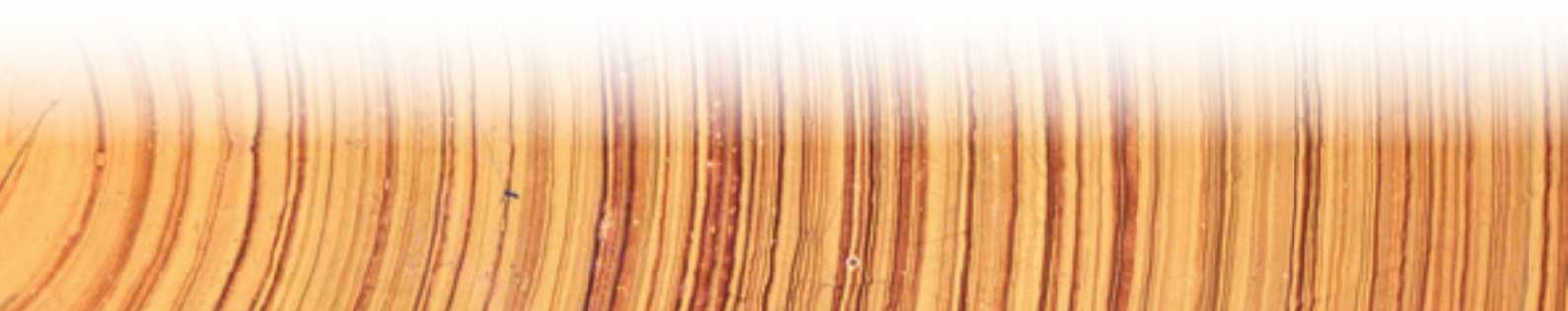
US Department of Census. 2013. US Housing Starts. Available at: [www.census.gov](http://www.census.gov)

WhatWood. 2012. Available at: [www.whatwood.ru](http://www.whatwood.ru)

Wood Markets China Book. 2012. Outlook to 2017. Available at: [www.woodmarkets.com](http://www.woodmarkets.com)

Wood Markets China Bulletin. 2013. Various issues. Available at: [www.woodmarkets.com](http://www.woodmarkets.com)

Wood Markets Monthly. 2012-2013. Various issues. Available at: [www.woodmarkets.com](http://www.woodmarkets.com)













# 6 SAWN HARDWOOD MARKETS

Lead author: *Rupert Oliver*



Contributing authors:



*Frances Maplesden*

## HIGHLIGHTS

- In Europe, the economic and financial crises and low level of construction activity has led to declining consumption of sawn hardwood.
- Despite production growth in 2012, Europe's hardwood sawmilling sector is seeing falling profitability and declining log availability, which is not helped by rising log exports to countries outside Europe.
- European imports of sawn hardwood decline in 2012, with tropical wood particularly losing market share, partly because more is being diverted to emerging economies.
- European exports of sawn hardwood increased in 2012, mainly due to strong growth of Romanian exports to Egypt and China.
- Growth in sawn hardwood exports from the Commonwealth of Independent States slowed due to a reduced availability of sawing quality logs in Ukraine and the eastern Russian Federation, the slower pace of growth in China's economy, and weak demand in the EU.
- There was solid growth in North American sawn hardwood consumption in 2012, bolstered by the economic recovery in the US.
- North American hardwood production is only at 50% of the peak levels before the economic crises, leading to supply shortages and rising prices during 2012-13.
- Exports of US sawn hardwood to countries outside the subregion increased by 9% in 2012 and were at the highest level ever recorded. Half the volume was destined for China.
- Key policy issues impacting on the sector include measures to tackle increasingly serious plant health concerns and consumer country laws to prevent the entry of illegal wood into international trade.





## 6.1 INTRODUCTION

Total apparent consumption of sawn hardwood across the UNECE region was 29.6 million m<sup>3</sup> in 2012, a 0.7% decline compared with 2011. Consumption across the region has fallen in every year since 2007. In 2012, a slight increase in consumption in North America and the CIS was offset by a fall in consumption in Europe.

The overall shift in sawn hardwood trade flows away from the UNECE region towards emerging economies continued into 2012. There was a significant fall in sawn hardwood imports into the UNECE region during 2012. However, sawn hardwood production in all three UNECE subregions increased in 2012, driven mainly by rising export demand, particularly in Asia. Over the last five years, net trade in sawn hardwood by the UNECE region has increased from only 74,000 m<sup>3</sup> to 3.2 million m<sup>3</sup>.

## 6.2 EUROPE

### 6.2.1 Consumption

The economic and financial crises and low level of construction activity led to a 3.4% decline in consumption of sawn hardwood to 12.9 million m<sup>3</sup> during 2012 (Table 6.2.1). Although market conditions improved in the first half of 2012, they deteriorated again in the second half of 2012 and remained poor during the first six months of 2013.

**TABLE 6.2.1**

**Sawn hardwood balance in Europe, 2011-2013**

	(1,000 m <sup>3</sup> )			Change (%) 2011-2012
	2011	2012	2013f	
Production	12 821	12 956	12 994	1.1
Imports	5 504	4 917	4 989	-10.7
Exports	4 970	4 970	5,040	0.0
Net trade	-534	53	51	
Apparent consumption	13 354	12 903	12 943	-3.4

**Notes:** f=Timber Committee forecast, October 2012.

**Source:** UNECE/FAO TIMBER database, 2013.

The downward trend in European construction during 2012 is mirrored by a slowdown in joinery and furniture, two sectors that drive sawn hardwood demand. Except for a slight increase in the third quarter of 2012, the Eurostat seasonally-adjusted index of wood joinery activity in the EU has declined in every quarter for the last three years. Activity in the first quarter of 2013 was only 86% of the average level in 2010. The Eurostat index of furniture production in the EU, which was rising in 2011, also fell throughout 2012 (Eurostat, 2013).

According to the European Federation of the Parquet Industry (FEP), wood-flooring production in the 17 FEP countries declined 4.7% to 68.3 million m<sup>2</sup> in 2012. This compares with peak levels of over 100 million m<sup>2</sup> in 2007. In 2012, oak accounted for close to 70% of all flooring produced by FEP members, up from 67% in 2011. During the same period, production of tropical wood flooring fell from 7.4% to 6.2%, while ash and beech accounted for 6.5% and 6.1% respectively. Maple and cherry are still out of fashion in Europe and accounted for only 2% and 1% respectively of flooring production in 2012 (FEP, 2013).

Hardwood sawmills in Germany report demand in the first half of 2013 to be at similar levels to the previous year. Buying is still slow in southern Europe, but demand is improving in Germany and Poland (EUWID, 2013a). French sawmills are less positive, reporting slow domestic demand and intense competition from German and American hardwoods in export markets (EUWID, 2013b).



**Source:** AHEC, 2013.

### 6.2.2 Production and capacity change

European sawn hardwood production increased 1.1% to 12.96 million m<sup>3</sup> in 2012. Production increased strongly in Romania and Croatia, with other, lesser gains in Turkey and Latvia. Production declined in France and was stable in Germany during 2012.

Europe's hardwood sawmilling sector continues to face major challenges. Exports of hardwood logs to countries outside Europe are having an impact on the sector, especially in Belgium, France, and Germany (EOS, 2013). Seven hardwood processing businesses with a combined cutting capacity of 300,000 m<sup>3</sup> per year were forced to close or file for insolvency in Germany and France between January 2011 and June 2013. In a highly competitive market, these sawmills were unable to cover rising log costs by increasing the price of sawnwood. However, closures in central Europe were partially offset by rising production capacity in eastern Europe, notably in Romania (EUWID 2013b).



### 6.2.3 Prices

Prices for sawn European hardwoods have remained stable for most species and specifications over the January 2012 to June 2013 period. Wholesale prices for “buon assortimento” (higher grades) of European ash, beech, and oak quoted in the Italian journal *Il Legno* didn't change between April 2012 and June 2013 (*Il Legno*, 2013). Due to slow consumption in Europe and weakening demand in Asia, buyers have been putting pressure on European sawmills to reduce prices. However, apart from occasional lower offers to offload excess stocks of some (usually lower grade material), sawmills have resisted this pressure in the face of rising costs and increasingly limited supply.

### 6.2.4 Trade

#### 6.2.4.1 Imports

In 2012, European countries imported 4.9 million m<sup>3</sup> of sawn hardwood, 11% less than in 2011. A significant proportion of this volume consists of intra-regional trade. The EU27 group of countries imported 2.3 million m<sup>3</sup> of sawn hardwood from non-EU countries, 12% less than in 2011.

EU imports of sawn temperate hardwood were 1.3 million m<sup>3</sup>, 11% down from 2011. Imports from both the US and Ukraine fell—the two largest non-EU suppliers. In 2012, EU imports of sawn tropical wood were just under 1 million m<sup>3</sup>, 13% down from 2011 and only half the volume in 2008 at the onset of the recession.

The share of tropical wood in EU sawn hardwood imports remained level at 43% in 2011 and 2012, but has fallen from 48% since 2008. Cameroon is increasing its share of exports of tropical sawn hardwood to the EU, largely at the expense of Brazil, Malaysia and Ivory Coast (FII, 2013).

Italy remained the largest single importer of sawn hardwood in Europe during 2012, importing 735,000 m<sup>3</sup>, despite a 25% decline compared with 2011. This is partly a result of a big drop in domestic consumption and their export oriented furniture industry. Belgium is now the second largest importer, mainly due to its central role as a distributor of sawn hardwood to other parts of Europe.

Imports into Germany, the third largest import market, declined 9% in 2012 due to reduced demand for tropical wood. The UK was one of the most robust EU markets for sawn hardwood during 2012, boosted by good demand for North American hardwoods.

#### 6.2.4.2 Exports

In 2012, European countries exported just under 5 million m<sup>3</sup> of sawn hardwood, the same volume as in 2011. Romania was the largest exporter in 2012, with 750,000 m<sup>3</sup>, a large proportion comprising beech destined for Egypt's large furniture manufacturing sector. Romania's exports to China increased by 17% in 2012.

Croatia was the second largest exporter with 667,000 m<sup>3</sup>, up 17% since 2011. Croatia is a major exporter of oak, particularly to Italy, from where much is redistributed to other European countries. Exports of sawn hardwood from Germany fell by 7.1% to 579,000 m<sup>3</sup> in 2012, mainly due to weaker demand in southern Europe and China (FII, 2013).

## 6.3 COMMONWEALTH OF INDEPENDENT STATES

Apparent consumption of sawn hardwood in the CIS increased by 2.8% in 2012 to 1.9 million m<sup>3</sup>. Production remained stable, while exports declined by 3.1%. Imports, although still negligible, increased by 5.3% (Table 6.3.1).

In the Russian Federation in 2012, sawn hardwood production increased by 1.4% to 2.2 million m<sup>3</sup> and exports increased by 0.6% to 860,000 m<sup>3</sup>.

Exports to China were 763,000 m<sup>3</sup> in 2012, very similar to 2011 (Global Trade Atlas, 2013). This follows a big rise in exports to China between 2009 and 2011 stimulated by the Russian Federation's introduction of log export taxes, which encouraged increased domestic conversion.

The recent stabilization in Russian production and export volumes is due both to the reduced pace of growth in China's economy and to limited oak and ash resources in the eastern Russian Federation. Recent reductions in the Russian Federation's log export tariffs following the country's entry into the World Trade Organization in August 2012, have not yet influenced the sawn hardwood trade. Tariff reductions have so far focused on softwood species and lower value hardwoods, destined mainly for paper rather than sawn wood (Simeone, 2013).

**TABLE 6.3.1**  
**Sawn hardwood balance in the CIS, 2011-2013**

	(1,000 m <sup>3</sup> )			
	2011	2012	2013f	Change (%) 2011-2012
Production	3 048	3 056	3 141	0.3
Imports	71	74	76	5.3
Exports	1 294	1 254	1 254	-3.1
Net trade	1 223	1 180	1 178	
Apparent consumption	1 825	1 876	1 964	2.8

**Note:** f=Timber Committee forecast, October 2012.

**Source:** UNECE/FAO TIMBER database, 2013.

Ukraine's production of sawn hardwood, mainly oak, fell 4.4% to 473,000 m<sup>3</sup> in 2012. Exports fell 12% to 340,000 m<sup>3</sup>. The share of Ukrainian sawn hardwood exports destined for EU countries declined from 90% to 76% as more volume is now being exported to Azerbaijan, China, the Russian Federation, Serbia and Turkey (Global Trade Atlas, 2013).





Source: UNECE/FAO, 2012.

Ukrainian oak is widely used for solid wood kitchen furniture in the EU, but this market is shrinking as more manufacturers are replacing solid-wood with alternative panel products. Ukrainian hardwood supply has been constrained during 2011 and 2012 partly because Ukraine exports 750,000 m<sup>3</sup> of hardwood logs every year – mainly to Bulgaria, Poland, Slovakia and Turkey

In April 2013, the Government of Ukraine proposed the introduction of a 40% export tax on all log exports for a period of five years starting on 1 January 2014. This is expected to reduce log exports, increase investment in domestic processing, improve tax receipts and reduce dependence on imports of finished wood products (EUWID, 2013d).

## 6.4 NORTH AMERICA

### 6.4.1 Consumption

North American sawn hardwood consumption increased by 1.3% to 14.8 million m<sup>3</sup> in 2012 (Table 6.4.1). Low mortgage rates, a better jobs market and higher consumer confidence were bolstering home sales and leading the economic recovery in the US. Growth continued in the first half of 2013, but may slow in the last six months of the year. During 2013, remodelling expenditures have fallen short of projections and the pace of residential construction growth is slowing (Hardwood Review, 2013).

TABLE 6.4.1

Sawn hardwood balance in North America, 2011-2013

	(1,000 m <sup>3</sup> )			Change (%) 2011-2012
	2011	2012	2013f	
Production	16 174	16 798	17 032	3.9
Imports	1 209	1 103	1 165	-8.7
Exports	2 727	3 056	3 137	12.1
Net trade	1 518	1 953	1 972	
Apparent consumption	14 656	14 845	15 059	1.3

Note: f=Timber Committee forecast, October 2012.

Source: UNECE/FAO TIMBER database, 2013.

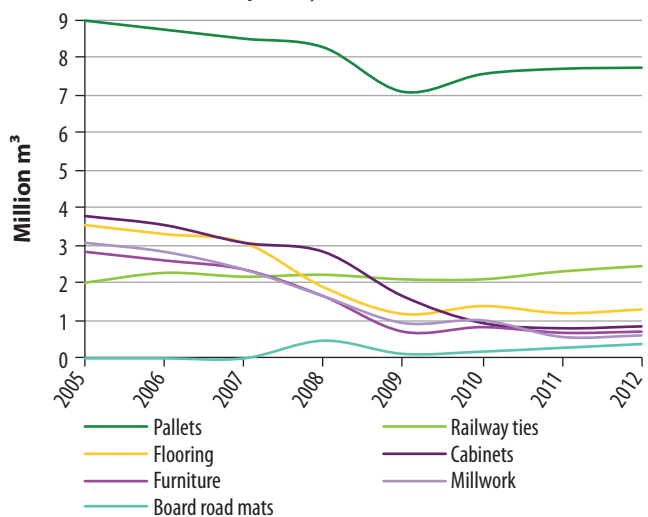
Sawn hardwood consumption in the United States was 13.5 million m<sup>3</sup> in 2012, 3.7% higher than in 2011 but below the level of 2010.

In 2012, improved construction and remodelling activity boosted US demand across all use categories. However, with the exception of railway ties and board road mats, consumption remained well below the levels before the financial crisis (Hardwood Market Report, 2013) (graph 6.4.1). US consumption may also have benefited from a recent trend towards “re-shoring” of some wood product manufacturing capacity from Asia back into the US.

Lack of large domestic markets for higher grade sawn hardwood remains a challenge for US sawmills and explains the continuing strong emphasis on export market development. Export markets now represent more than one half of all graded sawnwood production in the US.

GRAPH 6.4.1

US sawn hardwood consumption by sector, 2005-2012



Source: Hardwood Market Report, 2013.

### 6.4.2 Production/capacity change

In 2012, US sawn hardwood production was 16.8 million m<sup>3</sup>, a 3.9% gain on 2011. Production in 2012 was only half of the peak production in 1999 and two-thirds of the 2007 level. Although constrained by limited log supplies, sawmills continued to increase production in the first half of 2013.

The US hardwood processing sector has lost around 30% of capacity since 2007. Maximum mill capacity is now in the region of 20-25 million m<sup>3</sup>. However, supply is constrained in the short- to medium-term by lack of loggers and infrastructure for harvesting and transporting logs. Approximately 90% of the hardwood resource is owned by non-industrial private owners. Few of these private forest owners manage their forest resources primarily for timber and many have been reluctant to harvest at the lower log prices on offer during the downturn (AHEC, 2013).



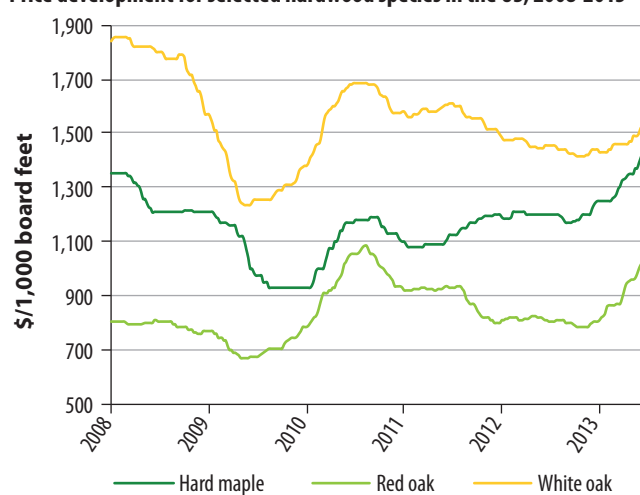
### 6.4.3 Prices

Prices for kiln-dried US sawn hardwood, after a period of stability in the second and third quarters of 2012, were trending upwards between November 2012 and July 2013. The rise in prices is due to restricted availability at a time of improving demand. However, by July 2013, production was coming in line with demand and prices may stabilize in the second half of 2013 (Hardwood Review, 2013).

The trend of increasing prices is also reflected in the Price Series UNECE/FAO TIMBER database (UNECE/FAO 2013) (graph 6.4.2).

**GRAPH 6.4.2**

**Price development for selected hardwood species in the US, 2008-2013**



**Note:** Nominal prices, not adjusted for inflation.

**Source:** UNECE/FAO TIMBER database, 2013.

### 6.4.4 Trade

#### 6.4.4.1 Imports

Most US imports of sawn hardwood from outside North America are tropical hardwoods for decking and flooring. In 2012, improving construction activity in the US boosted imports from Brazil, Cameroon, and Malaysia, the major suppliers. However US imports from Ecuador, mainly balsa, fell by 40% to 41,000 m<sup>3</sup> in 2012.

The large cross-border trade in sawn hardwood between the US and Canada has been rising in recent years. US imports of sawn hardwood from Canada were 248,000 m<sup>3</sup> in 2012, up 8% compared with 2011 and 17% more than in 2009. Canadian imports from the US in 2012 were 604,000 m<sup>3</sup>, 7% more than 2011 and nearly 30% up on the volume in 2009 at the height of the financial crisis. Canada consistently imports only around 30,000 m<sup>3</sup> of sawn hardwood from outside North America each year, mainly from Brazil and Cameroon (Global Trade Atlas, 2013).



**Source:** AHEC, 2013.

#### 6.4.4.2 Exports

Exports of US sawn hardwood to countries outside the subregion were 2.5 million m<sup>3</sup> in 2012, 12% more than in 2011 and the highest level ever recorded. Exports to China/Hong Kong SAR were 1.3 million m<sup>3</sup>, half of the total in 2012 and 15% up on 2011. Exports to other Asian countries, mainly Indonesia, Japan, Malaysia, Thailand and Viet Nam, increased 27% to 617,000 m<sup>3</sup>, which was another record.

These gains were sufficient to offset a 13% decline in exports to European countries, dropping to 351,000 m<sup>3</sup> in 2012. The downturn in Europe was mainly due to a 27% decline in exports to Italy, the largest European market for American hardwood. Exports to northern European countries were stable during 2012 (AHEC, 2013).



**Source:** AHEC, 2013.

Canadian exports of sawn hardwood to countries outside the subregion were 134,000 m<sup>3</sup> in 2012, 7% down on 2011. In 2012, Canadian exports fell to China/Hong Kong SAR and Germany, the two largest markets (Global Trade Atlas, 2013). In contrast to US exporters, Canadian mills lack access to several species now popular in international markets, such as tulipwood and walnut, and are more dependent on less fashionable species like maple and birch. In 2012 and 2013, Canadian mills have been concentrating more on domestic and US markets.

## 6.5 EXTRAREGIONAL INFLUENCE ON THE UNECE REGION

Outside the UNECE region, the Asia-Pacific region continued to dominate the sawn hardwood trade, which is increasingly diverted from the EU to China (see table 6.5.1). World imports of tropical sawn hardwood continued to rebound from a record low in 2009 to reach 10.1 million m<sup>3</sup> in 2011, although growth slowed in 2012. Most of the growth had occurred in China, Thailand and the US, while demand in the EU was affected by the deteriorating economic situation in the eurozone. Strong domestic demand in the ASEAN-5 economies (Indonesia, Malaysia, the Philippines, Thailand and Viet Nam) has continued to divert the ASEAN sawn hardwood trade to within the region.

China's growth in sawn hardwood imports has been significant - imports of temperate and tropical hardwoods grew 88% and 81% respectively between 2009 and 2012. The reasons for this growth include rising demand for sawn hardwood in China's furniture and flooring industries and increases in log export restrictions from supplying countries (Gabon, Russian Federation) creating a substantial supply gap. The diversion of global sawn hardwood supply from Europe to China, increases in log export restrictions from supplying countries (Gabon, Russian Federation) and emerging markets have kept supplies low relative to demand and prices relatively high.



Source: T. Scarr, 2013.

TABLE 6.5.1

Tropical sawn hardwood balance in Asia-Pacific, Latin America/Caribbean and Africa, 2010-2012

	(Million m <sup>3</sup> )			
	2010	2011	2012	Change (%) 2011-2012
<b>Asia-Pacific</b>				
Production	20.34	20.34	19.98	-1.8
Imports	7.02	7.70	7.76	0.8
Exports	7.73	6.11	5.91	-3.3
Apparent consumption	18.95	21.91	20.83	-4.9
<b>Latin America/Caribbean</b>				
Production	18.74	18.86	18.97	0.6
Imports	0.24	0.27	0.16	-40.7
Exports	1.28	1.64	1.08	-34.2
Apparent consumption	17.7	17.49	18.05	3.2
<b>Africa</b>				
Production	5.21	5.52	5.49	-0.5
Imports	0.03	0.03	0.01	-66.7
Exports	2.13	2.19	1.74	-20.6
Apparent consumption	3.11	3.34	3.75	12.3

Source: ITTO, 2013.

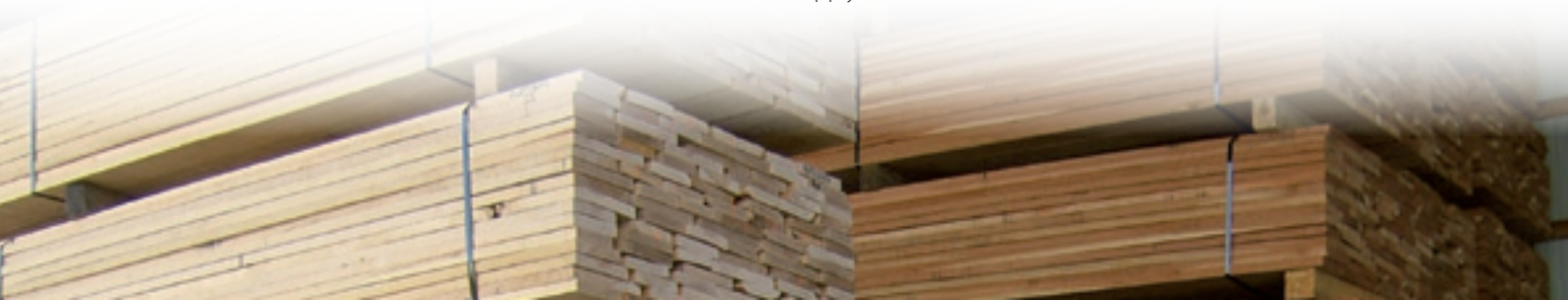
## 6.6 POLICY AND REGULATORY INFLUENCES ON THE SECTOR

The following are some of the key policy issues impacting the sawn hardwood sector:

Plant health issues: there is mounting public concern about the potentially devastating effects on forests of pests, notably the emerald ash borer (*Agrilus planipennis*) in North America and *Hymenoscyphus pseudoalbidus*, the fungus causing ash dieback in Europe. Plant health authorities are tightening inspection regimes and requirements for phytosanitary certificates. These regimes need to be rigorous, but also efficient and targeted to avoid unnecessary barriers to trade.

Demand for biomass is rising due to renewable energy targets in Europe and North America. Full life-cycle carbon accounting is necessary to ensure appropriate allocation of wood fibre and land resources to encourage cascaded use.

Enforcement of legislation to minimize the risk of illegal wood entering the major consuming markets of the US, EU, Australia and Japan is placing new demands on hardwood enterprises to demonstrate evidence of legal sourcing. This is challenging in an industry with highly fragmented resource ownership and supply chains.





Progress to develop green building systems based on full life-cycle assessment (LCA) of environmental impacts of different materials, now well advanced in Europe, is creating new opportunities for sawn hardwood products. However, green building systems that rely on lists of “desirable attributes” (e.g. favouring “certified wood” over “uncertified wood” or “recycled products” and “short-rotation renewables” over “long rotation renewables”) create barriers to the use of sawn hardwood, particularly in North America and Asia.

## 6.7 INNOVATION IN THE SECTOR

Advances in wood modification technologies, such as heat treatment, are improving the durability of temperate hardwoods and creating opportunities for their use in a wider range of exterior applications. Opportunities are also growing for structural uses of hardwood in building and product design. The development of glulam and cross-laminated timber (CLT)

are already providing competition for concrete and steel. For example, AHEC claim that due to superior structural properties, CLT panels made from American tulipwood could potentially be much thinner than softwood panels of similar strength and stiffness. This leads to a saving in materials and to the possibility of more slender solutions (AHEC, 2013).

The sawn hardwood sector is actively engaged in gathering carbon footprint and other life cycle analysis (LCA) data and contributing to the development of tools to make this information accessible to designers and other key decision-makers. For example, AHEC is developing an environmental profiling “tool” that combines legality information required for laws like the EUTR and Lacey Act, sustainability data from the US Forest Service, and environmental life cycle impact data prepared by PE International in conformance with ISO LCA standards. The system makes possible the production, at the push of a button, of a two-page profile specific to every container of US hardwood exported (AHEC, 2013).

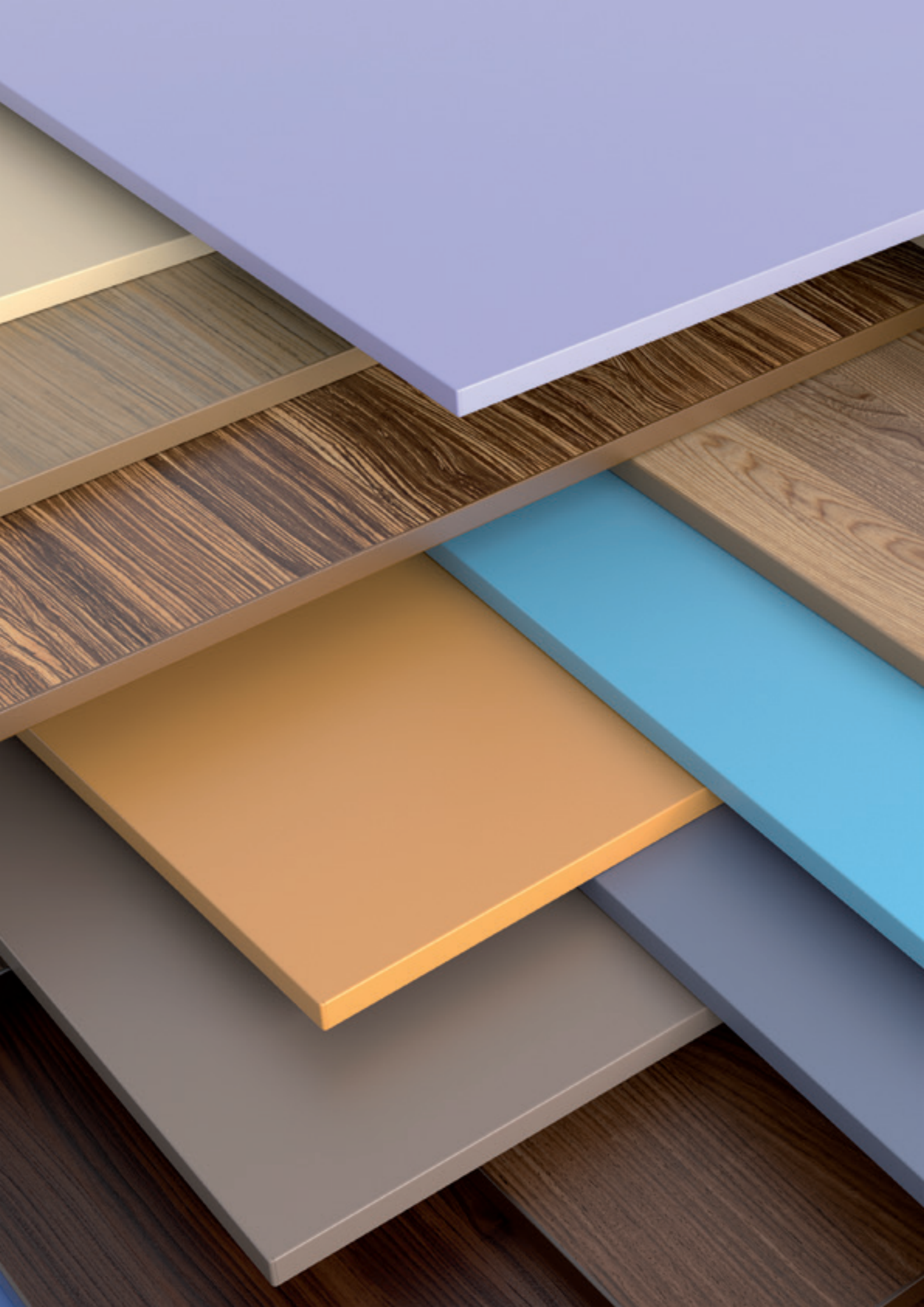
## 6.8 REFERENCES

Note: The *Review* has a statistical annex, which is available at: [www.unece.org/fpamr2013](http://www.unece.org/fpamr2013)

- AHEC. 2013. American Hardwood Export Council 2013. Personal communication with David Venables and Michael Snow of the American Hardwood Export Council. May 2013.
- EOS. 2013. Press release on the Annual General Assembly of the European Organisation of the Sawmill Industry. Vienna, 4 June 2013.
- Eurostat. 2013. Available at: <http://epp.eurostat.ec.europa.eu>
- EUWID. 2013a. Slight boost in demand for beech lumber on German domestic and export market in April. Vol. 87 No. 18, 2 May 2013, p. 7. Available at: [www.euwid-wood-products.com/](http://www.euwid-wood-products.com/)
- EUWID. 2013b. Marked reductions registered by France’s hardwood sawmills in domestic sales. Vol. 87 No. 8, 20 February 2013, p. 10. Available at: [www.euwid-wood-products.com/](http://www.euwid-wood-products.com/)
- EUWID. 2013c. Reduction of around 2.1 million m<sup>3</sup> registered in technical cutting capacity in Central Europe. Vol. 87 No. 24, 12 June 2013, p. 1. Available at: [www.euwid-wood-products.com/](http://www.euwid-wood-products.com/)
- EUWID. 2013d. Ukrainian oak exports to the EU decline by 7%. Vol. 87 No. 24, 12 June 2013, p. 5. Available at: [www.euwid-wood-products.com/](http://www.euwid-wood-products.com/)
- FEP. 2013. The European Parquet Industries in 2012. Press release issued 7 July 2013. Available at: [www.parquet.net/files/FEP\\_PRESS\\_RELEASE\\_-\\_June\\_2013-EN.pdf](http://www.parquet.net/files/FEP_PRESS_RELEASE_-_June_2013-EN.pdf).
- FII. 2013. Forest Industries Intelligence Limited analysis of Eurostat Comext data.
- Global Trade Atlas. 2013. Available to subscribers via: [www.gtis.com/gta/](http://www.gtis.com/gta/)
- Hardwood Market Report. 2013. Are We There Yet? Presentation by David Caldwell. Hardwood Market Report. PO Box 2633, Memphis, TN38088.
- Hardwood Review. 2013. Market Brief. Available at: [www.hardwoodreview.com/Main.aspx?ReturnUrl=%2f](http://www.hardwoodreview.com/Main.aspx?ReturnUrl=%2f)
- Il Legno. 2013. Various issues. IDM Milan. Available at: [www.editriceidm.it/riviste\\_view.php?id=20&cod=il](http://www.editriceidm.it/riviste_view.php?id=20&cod=il)
- ITTO. 2013. Annual Review and Assessment of the World Timber Situation 2012. Available at: [www.itto.int/annual\\_review/](http://www.itto.int/annual_review/)
- Simeone. 2013. Russia’s Forest Sector and International Trade in Forest Products: Export Taxes on Roundwood, Priority Investment Projects, and WTO Accession. John Simeone. School of Russia and Asian Studies. Available at: [www.sras.org/russia\\_forest\\_sector\\_wto](http://www.sras.org/russia_forest_sector_wto)
- UNECE/FAO TIMBER database. 2013. Available at: [www.unece.org/forests/fpm/onlineadata](http://www.unece.org/forests/fpm/onlineadata)







# 7 WOOD-BASED PANEL MARKETS

Lead author: *Ivan Eastin*



Contributing authors:

*Isabelle Brose,  
Frances Maplesden and  
Igor Novoselov*



## HIGHLIGHTS

- The European wood-based panels industry stagnated during 2012, reflecting subdued building activity and demand for durable goods such as wooden furniture.
- Demand and consumption fell in 2012 as a result of the economic turmoil in Europe, particularly in southern Europe.
- Turkey is the biggest market for medium density fibreboard (MDF) in Europe and increases in demand from this market had counterbalanced decreases in demand in some other countries when measured in volume.
- The US imposed preliminary countervailing duties and anti-dumping duties on Chinese hardwood plywood imports.
- In the wake of increased US housing starts, demand for wood-based panels increased significantly in North America for the first time since 2006.
- North American composite panel-related industries—and panel producers generally—are becoming healthier, although the western US continues to lag.
- Capacity utilization rates for wood-based panel mills improved in 2012, and are expected to continue rising.
- Particle board shipments in the US in 2012 were the lowest since 1983, but are recovering quickly and this year may match or exceed the pace of increased demand for MDF.
- MDF shipments saw a double digit recovery in 2012, with significant, continued improvement projected for 2013.
- Composite panel manufacturers, especially in the south-eastern US, have expressed substantial concern about the potential impact on raw material supply caused by the growth of wood pellet production and export.
- Wood-based panel production in the Russian Federation continued to increase, although at a slower rate than in 2011.
- The first oriented strand board (OSB) production line opened in the Russian Federation in 2012.



## 7.1 INTRODUCTION

North America saw improvements in the economy and housing starts in 2012, which has provided a substantial boost to the panels sector. In Europe, the debt crisis continued to be a drag on the economy, with the panels sector following this downward trend. The decline would have been much worse had it not been for the dramatic growth in panel consumption seen in Turkey. Slowing economic growth within Russia caused the production of wood-based panels to grow at a slower rate relative to the high rate of growth observed there and in the Commonwealth of Independent States (CIS) subregion in 2011. Notably, Russia opened its first two OSB mills in 2012.

The 2012 Timber Committee forecast for wood-based panel consumption expects moderate growth in 2013 compared with 2012 in the CIS subregion and in North America, with very slight growth in Europe. For perspective, the 2013 consumption forecast compared against 2008 consumption is still down 9.1% in Europe; up 13.4% in the CIS; and down 6.8% in North America. North American consumption had already fallen substantially in 2008, and if the 2013 forecast is compared with the 2007 figure, consumption this year will be 25% less than what was consumed seven years ago.

## 7.2 EUROPE

### 7.2.1 Consumption

Consumption of wood-based panels fell in 2012, particularly in southern Europe, as the economic turmoil in Europe continued. Production and imports hardly changed (table 7.2.1). Following two years of slight improvement, demand for particle board fell by 3.5% in 2012, to 33.5 million m<sup>3</sup>. The biggest falls occurred in the United Kingdom, followed by Portugal, Italy, Spain and Romania. The largest markets for particle board were in Germany, followed by Poland, Turkey, Italy and France (EPF, 2013).

In 2012, medium density fibreboard (MDF) consumption grew by 4.8% to 12.7 million m<sup>3</sup>. Increased demand from Turkey offset decreased demand from 11 other countries. Turkey has become the biggest market for MDF, consuming almost 4 million m<sup>3</sup> in 2012. It now accounts for more than 30% of the total apparent consumption in the subregion. Consumption of MDF remained level in Poland, the country with the second biggest apparent consumption, followed by the United Kingdom, France and Italy (EPF, 2013).

Construction remained subdued in Europe in 2012, and isn't forecast to increase in 2013. Demand for oriented strand board (OSB) contracted by 3.5%.

TABLE 7.2.1

Wood-based panel balance in Europe, 2011-2013

	(1,000 m <sup>3</sup> )			Change (%) 2011-2012
	2011	2012	2013f	
Production	67 331	67 005	67 756	-0.5
Imports	31 233	31 057	30 984	-0.6
Exports	31 120	31 153	31 388	0.1
Net trade	-113	96	405	
Apparent consumption	67 444	66 910	67 351	-0.8

Notes: f=Timber Committee forecast, October 2012.

Source: UNECE/FAO TIMBER database, 2013.

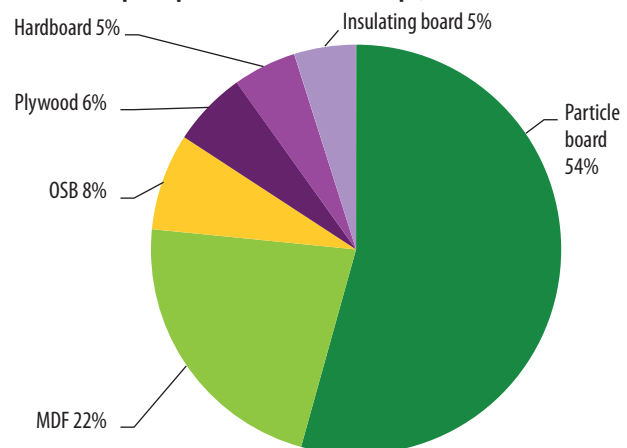
### 7.2.2 Production, capacity utilization and change

In term of production, particle board is the most important wood-based panel, accounting for over half of the total volumes produced in 2012 (graph 7.2.1). Medium density fibreboard (MDF) accounts for close to ¼ of the volumes produced and the remaining quarter is split between oriented strand board (OSB), plywood, hardboard and insulation board.

Particle board production fell by 3.1% in 2012, to 35.5 million m<sup>3</sup>, reflecting the poor European economic situation and the stagnant demand for durable goods such as furniture. In Latvia, Turkey and Sweden, however, production increased significantly, although not enough to compensate for reduced production elsewhere.

GRAPH 7.2.1

Wood-based panel production shares in Europe, 2012



Source: UNECE/FAO TIMBER database, 2013.

Germany remained the largest particle board producer in Europe, accounting for roughly one sixth of European production, followed by Poland. Turkey ranked third in production for the first time. Turkish production increased by 22% from 2008 to 2013 and grew in 2012 alone by 8.2%. France and Italy were the



fourth and fifth largest producers, despite Italy having seen a 13% fall in production 2012 (European Panel Federation, 2013).

In 2012, European Panel Federation (EPF) producers cut capacity by 578,000 m<sup>3</sup> to 39.9 million m<sup>3</sup>. The United Kingdom, followed by Italy and Spain recorded the largest falls in capacity. In contrast, particle board production capacity increased significantly in Romania.

MDF production in Europe is reported to have reached 14.6 million m<sup>3</sup> in 2012, surpassing for the first time the level of 2008. Production grew by 582,000 m<sup>3</sup> or 4.2% since 2011. Turkey—by far the biggest producer in the subregion—accounted for most of the increase and now accounts for 27% of European production, an increase of 12% over 2011.

Poland remained the second largest MDF producer, and also increased production. Of the remaining top five producers, France, Germany and Spain reported stagnating or falling production. While Germany has finished cutting back its capacity, Italy, Spain and Sweden all experienced further cutbacks, including permanent closures.

In 2012, European production of OSB increased by 3.6% to reach almost 5 million m<sup>3</sup>. The top five countries, Germany, Romania, Czech Republic, Poland and Latvia all increased production. Production in Romania increased the most (by 120,000 m<sup>3</sup>) and accounted for two thirds of the increased capacity in Europe. EPF reports further capacity expansions are forecast for Italy and Poland in 2013, while an important investment is planned for Bulgaria in 2014.

## 7.2.3 Trade

### 7.2.3.1 Imports

Imports of particle board accounted for 28% of apparent consumption in 2012 and amounted to 9.5 million m<sup>3</sup>. Germany remained Europe's largest importer, followed by Poland, Italy, France and Sweden.

Particle board imports from outside the EU27 came mainly from neighbouring countries: Switzerland, followed by Norway, Turkey, Croatia, China and the Russian Federation. MDF imports from outside the EU27 came mainly from Switzerland, Norway and Turkey but also from Chile, China and Malaysia. EU27 imports of OSB came mainly from Canada, China and Switzerland.

### 7.2.3.2 Exports

Particle board exports in 2012 were almost unchanged at 11.6 million m<sup>3</sup> but represented a larger share of production, at 32.6%. Austria, Germany, France, Romania and Spain were the largest exporters in 2012. Exports to countries outside the EU27 rose by 15% in 2012 representing 4% of all particle board produced. The main buyers were in the Far East and Middle East but exports to Africa, especially North Africa, increased significantly.

MDF exports fell by 4.2% in 2012, with 7% of sales to countries outside Europe. Sales of MDF outside the EU27 rose by 3%, most being to the Middle East, showing the increasing importance of emerging economies.

Most European OSB in 2012 was traded within Europe, following sharp falls in exports to the Far and Middle East, which had seen significant increases in 2011. However, exports to Africa, especially North Africa, rose significantly though the total volume remained small.

## 7.3 COMMONWEALTH OF INDEPENDENT STATES, WITH A FOCUS ON THE RUSSIAN FEDERATION

The wood-based panels sector in the subregion is expanding rapidly, mainly driven by positive developments in the Russian Federation, but also by increased exports. The Russian Federation accounts for 82.7% of the production, 75.8% of the apparent consumption and 72.6% of the exports in the CIS.

### 7.3.1 Consumption

Consumption of wood-based panels rose by 2.5% in 2012, reaching 15.8 million m<sup>3</sup> (table 7.3.1). Consumption of all wood-based panels increased in the CIS.

**TABLE 7.3.1**  
Wood-based panel balance in the CIS, 2011-2013

	(1,000 m <sup>3</sup> )			
	2011	2012	2013f	Change (%) 2011-2012
Production	14 793	15 438	16 018	4.4
Imports	3 840	4 501	4 491	17.2
Exports	3 201	4 126	4 157	28.9
Net trade	-640	-375	-334	
Apparent consumption	15 432	15 814	16 352	2.5

**Notes:** f=Timber Committee forecast, October 2012.

**Source:** UNECE/FAO TIMBER database, 2013.

### 7.3.2 Production and capacity utilization change

In 2012, there was a positive trend in wood-based panels production in all panel sectors, despite the slowdown that occurred in 2010 and 2011. A positive factor was the implementation of national housing construction projects.

Production was up by 4.4%, reaching 15.4 million m<sup>3</sup>, with strong increases being posted within all three major panel sectors in the Russian Federation (table 7.3.2).

In early 2013, Argus SFK opened a plywood plant (located in the Sverdlovsk region) and will gradually expand the volume of plywood production at the plant. In April 2013, the Kronospan group acquired the Russian wood-based panels and furniture manufacturer Elektrogorskmebel (located in the Moscow region). Elektrogorskmebel's production range includes raw particle boards, coated panels and kitchen furniture. DOK Kalevala (located in Karelia) delayed the opening of its large-scale OSB plant until mid-2013. Sveza holding strengthened its position within the Russian plywood market.

The key event in the plywood industry in 2012 was the acquisition of the Fankom plywood mill in the Sverdlovsk region by Sveza holding. The company now owns six plywood mills and produces one third of all Russian plywood.

Capacity utilization in 2011 was 80% for fibreboard, 78% for particle board and 83% for plywood.

**TABLE 7.3.2**

**Wood-based panel production in the Russian Federation, 2009-2012**

	(1,000 m <sup>3</sup> )				Change (%) 2011-2012
	2009	2010	2011	2012	
Plywood	2 107	2 689	3 040	3 146	3.5
Particle board*	4 562	5 429	6 634	6 751	1.8
MDF	1 003	1 078	1 197	1 316	9.9

**Note:** \*Excludes OSB.

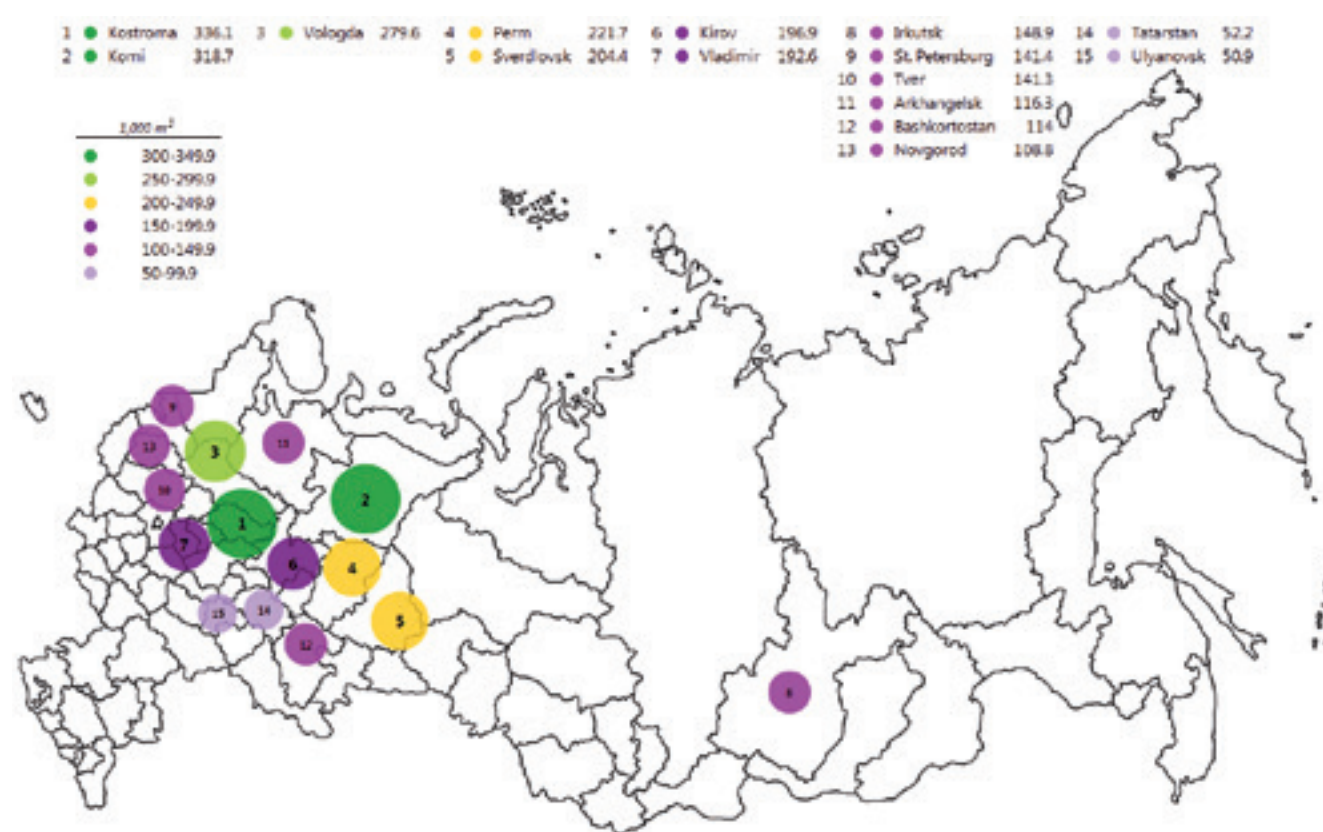
**Source:** UNECE/FAO TIMBER database, 2013.

### 7.3.2.1 Plywood

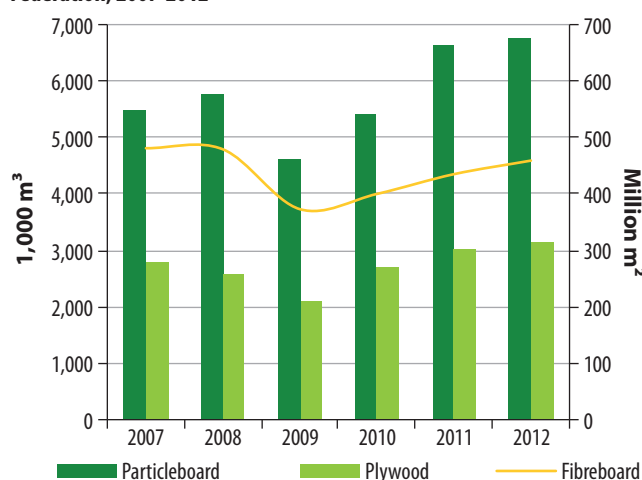
The Russian plywood industry is spread over many regions but the principal regions are Kostroma, the Komi Republic and Vologda (figure 7.3.1). Plywood production increased in 2012, continuing the strong recovery that followed the decline in 2008. (graph 7.3.1).

**FIGURE 7.3.1**

**Top 15 plywood production regions in the Russian Federation, 2012**



**Source:** Rosstat, 2013.

**GRAPH 7.3.1****Particle board, plywood and fibreboard production in the Russian Federation, 2007-2012**

**Note:** Particle board and plywood in 1,000 m³, fibreboard in million m².

**Source:** Rosstat, 2013.

**7.3.2.2 Particle board**

Production increased in 2012 to reach a new high (graph 7.3.1). The Moscow region remained the leading particle board producer at 1.1 million m³, little changed from 2011 (95% of all particle board panels were produced by the company Kronospan). Production in the Vologda region increased in 2012 by 17.9% to reach 748,600 m³, and in the Kostroma region increased by 5.4% to reach 662,800 m³.

In February 2013, IKEA purchased a particle board mill in Novgorod region (rated capacity 500,000 m³) to produce light wood panels. Part of its production will supply the Swedwood furniture mill in Yesipovo (Moscow region).

**7.3.2.3 Oriented Strand Board**

On 24 July 2012, the Novovyatskiy ski mill announced that it had opened the first Russian OSB line in the Kirov region, with an annual rated capacity of 100,000 m³ of OSB and 130,000 m³ of particle board. However, the OSB line operated in test mode throughout the second half of the year and has yet to enter commercial production. A Vladimir region OSB plant entered start-up in mid-2012 and is currently in production. This mill operated at 30% of its rated capacity at the end of 2012 and is scheduled to operate at full capacity during 2013.

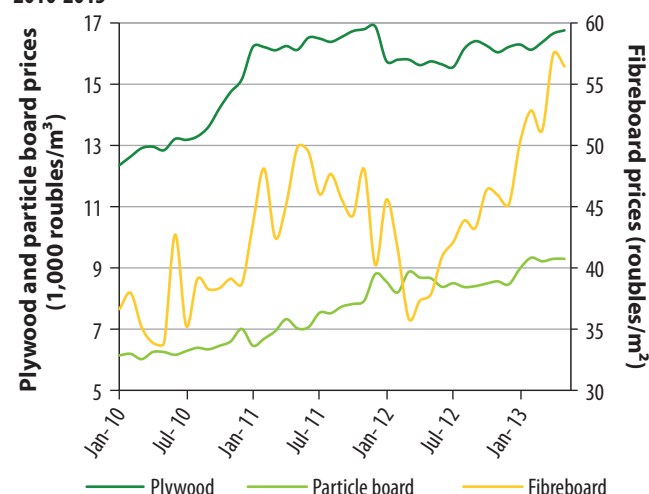
**7.3.2.4 Fibreboard**

Fibreboard production in the Russian Federation continued to rise in 2012, though it has yet to return to pre-recession levels (graph 7.3.1).

The increase was partly due to Sukhonskiy PPM (Sokol, Vologda region), which launched its third hard fibreboard line with a rated annual production volume of 9 million m², bringing the total capacity of the mill to 27.3 million m². The new line will produce 1.22 metre-wide panels (60% of all production). The mill will have a 21% share of the market in the European part of the Russian Federation. It's estimated that over the period from 2013 to 2019, 4.1 billion roubles (\$128 million) will be invested to upgrade the Sukhonskiy mill.

**7.3.3 Prices****7.3.3.1 Plywood**

According to Rosstat, Russian plywood prices in December 2012 were roughly 3.9% lower than December 2011 and for the year 2012 prices were on average 2.2% less than in 2011 (graph 7.3.2). Plywood prices dropped substantially in January of 2012 but increased slowly during 2012, closing at over 16,000 roubles per m³ (\$500) and as of May 2013 were closing in on 17,000 roubles (\$548).

**GRAPH 7.3.2****Monthly prices for wood-based panels in the Russian Federation, 2010-2013**

**Source:** Rosstat, 2013.

**7.3.3.2 Particle board**

Also according to Rosstat data, particle board prices have been strengthening and as of May 2013 had topped rouble 9,300 (\$300) per m³ (graph 7.3.2).

**7.3.3.3 Fibreboard**

The Rosstat data show that fibreboard prices are volatile, but trended upward in 2012. As of May 2013, prices were at rouble 56.4 (\$1.82) per m², a 49% increase over May 2011 (graph 7.3.2).





Source: APA, 2013.

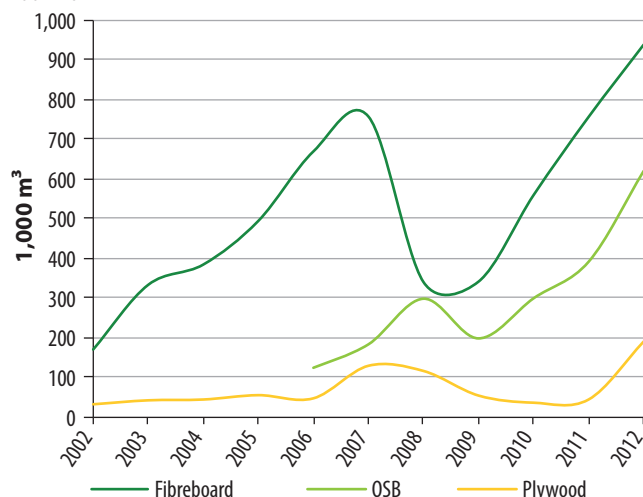
## 7.3.4 Trade

### 7.3.4.1 Plywood imports

In 2012, the Russian Federation imported 189,000 m<sup>3</sup> of plywood, valued at, \$49.2 million. This figure was more than four times the volume imported in 2011 (graph 7.3.3). The largest supplier, China, boosted its deliveries by 35.8% to reach 93,600 m<sup>3</sup>, giving China a 77% market share of plywood imports in the Russian Federation. Germany provided 7% of plywood imports, while Italy supplied an additional 5% in 2012.

GRAPH 7.3.3

Fibreboard, OSB and plywood imports into the Russian Federation, 2002-2012



Note: 2002-2005 data for OSB imports not available.

Sources: UNECE/FAO TIMBER database, 2013; Rosstat, 2013; Russian Customs data, 2013.

### 7.3.4.2 Particle board imports

In 2012, the Russian Federation imported 275,000 m<sup>3</sup> of particle board (\$114 million). Imports from China were 46,592 m<sup>3</sup> (representing 17% of total imports), which was 4.4% higher than 2011. Deliveries from Poland decreased by 10.3%, to 109,860 m<sup>3</sup> (40% of total imports), although the import value grew by 18.7% to reach \$35.9 million. Imports of particle board from Germany totalled 31,645 m<sup>3</sup> (11.5% of the total), up by 46.9% relative to 2011. The value of imports from Germany rose 40.8%, reaching \$20.3 million.

### 7.3.4.3 OSB imports

OSB imports rose sharply in 2012 to 618,700 m<sup>3</sup>, partly a result of increased construction of timber frame housing (graph 7.3.3). In terms of market share, Latvia supplied 147,200 m<sup>3</sup>, valued at \$44.6 million, Canada provided 140,200 m<sup>3</sup> (an increase of 18%) and Romania was the third largest supplier.

### 7.3.4.4 Fibreboard imports

Imports of fibreboard increased in 2012 by 24.1% to stand at 937,000 m<sup>3</sup>, valued at \$392 million (graph 7.3.3). China was the major supplier (representing 42% of total imports) with 393,000 m<sup>3</sup> (+16.3%), valued at \$110 million. Germany was the second largest supplier with 173,000 m<sup>3</sup>, valued at \$119 million. Poland was the third largest supplier.

### 7.3.4.5 Plywood exports

Russian plywood exports in 2012 amounted to 1.57 million m<sup>3</sup>, 14.2% higher than in 2011, with the export value reaching \$857 million (+2.3%). Half of its plywood production volume was exported. The United States remained the largest importer of Russian plywood (with a market share of 14%), importing 221,800 m<sup>3</sup> in 2012 (\$115 million). The Egyptian market strengthened in 2012, rivalling the US market in size with exports increasing by 25.2% to reach 218,000 m<sup>3</sup>. The value of plywood exports to Egypt rose by 19.9%, reaching \$105.8 million. Germany imported 10% of Russian plywood exports, while Turkey imported 8% and Azerbaijan 7%.

### 7.3.4.6 Particle board exports

In 2012, Russian particle board exports increased by 172.3% to 761,000 m<sup>3</sup>, largely due to the inclusion of exports to Kazakhstan and Belarus in the trade statistics. While exports to almost all markets decreased in 2012, exports to Azerbaijan increased by 6.6%.

The largest importer of Russian particle board was Uzbekistan, with a 56% share of the market. Kyrgyzstan was second with a 12% share while Azerbaijan was third with 10%. Despite remaining the largest market, Uzbekistan curtailed imports by 20.9% down to 181,700 m<sup>3</sup> (export value was down by 13.1% to \$44 million). Deliveries to Kyrgyzstan fell by 4.8% to reach 39,700 m<sup>3</sup> (although the export value increased by 2.4% to

reach \$12 million). Azerbaijan imported 32,800 m<sup>3</sup> of Russian particle board, an increase of 6.6% over 2011, while the export value increased by 10.6% to reach \$8 million.

#### 7.3.4.7 Fibreboard exports

The CIS countries remained a major market for Russian fibreboard exports, despite being 85% less in 2012 than in 2011. Almost half of exports went to Uzbekistan, with 12% to Tajikistan and 11% to Kyrgyzstan. Total exports were 329,000 m<sup>3</sup> valued at \$138 million.

## 7.4 NORTH AMERICA

### 7.4.1 Consumption

In 2012, the modest recovery in housing starts in both the US (+26.3%) and Canada (+10.8%) helped to push up consumption of wood-based panels (table 7.4.1). North American demand for structural panels was up by 11.6% for OSB and 3.8%, for softwood plywood.

TABLE 7.4.1

Wood-based panel balance in North America, 2011-2013

	(1,000 m <sup>3</sup> )			Change (%) 2011-2012
	2011	2012	2013f	
Production	41 990	42 846	43 716	2.0
Imports	10 838	10 798	11 168	-0.4
Exports	7 179	7 244	7 825	0.9
Net trade	-3 659	-3 554	-3 343	
Apparent consumption	45 649	46 399	47 059	1.6

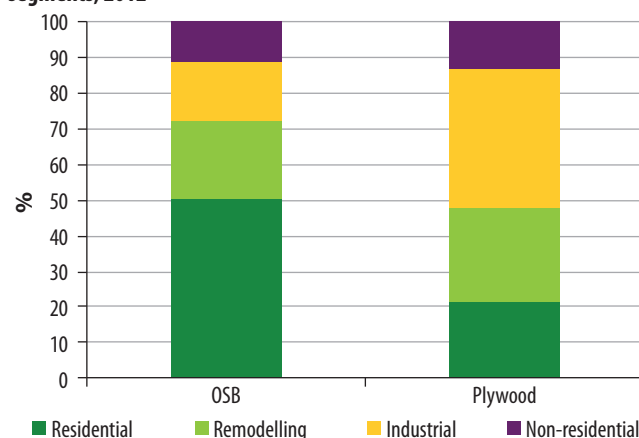
Notes: f=Timber Committee forecast, October 2012.

Source: UNECE/FAO TIMBER database, 2013.

The recovery in demand for structural panels occurred across almost every segment of the four major end-use markets: residential construction, remodelling, industrial and non-residential (graph 7.4.1).

GRAPH 7.4.1

Demand for OSB and plywood in major North American market segments, 2012



Source: APA, 2013.

Growth in demand for both plywood and OSB was strongest in the residential sector showing the strong linkage between new housing starts and the consumption of structural panels in North America (graph 7.4.2). Demand in other market segments was weak, with the exception of demand for OSB in the non-residential sector. This pattern in demand is expected to continue into 2013 (APA 2013a, 2013b).

GRAPH 7.4.2

Apparent consumption of structural panels in North America compared with US housing starts, 2008-2012



Sources: UNECE/FAO TIMBER database, 2013; US Census, 2013.

The overall demand for non-structural panels continued the flat trend observed from 2009 through 2011. Particle board and hardboard demand declined by 4.4% and 6.9%, respectively, while demand for MDF was up by 10.3%. With North American housing starts projected to increase by 18.3% in 2013, demand for non-structural wood-based panels is expected to continue its slow recovery, with demand increases projected for particle board, MDF and hardboard.

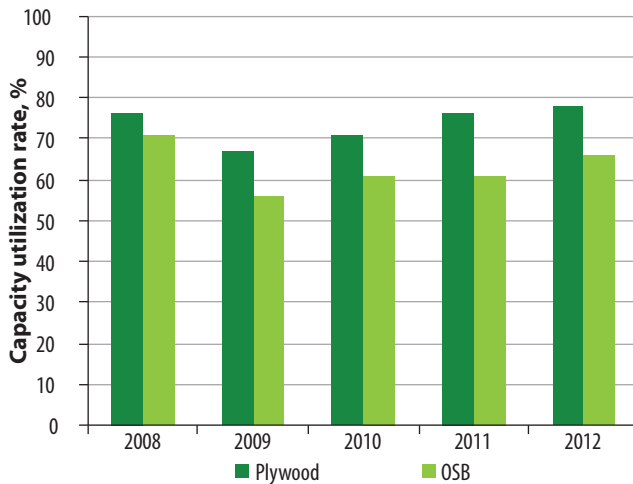
## 7.4.2 Production and capacity utilization change

In response to the housing market recovery, production capacity within the North American structural panel sector increased slightly, by 2.2%, over 2011 to reach 44.9 million m<sup>3</sup> in 2012. There were no major mill openings or closures in the OSB and plywood sectors in 2012 (APA, 2013a).

Most plywood production capacity (84.7%) and around two thirds of OSB production capacity (63.5%) is in the US. The capacity utilization rate within the structural panel industry remained low at just 69.5% in 2012 (graph 7.4.3). For plywood, the rate was 78% and 66% for OSB (graph 7.4.3). The capacity utilization rate in 2012 for plywood in the US was 84% and in Canada, 76%. For OSB, the rates were 68% and 62% respectively.

GRAPH 7.4.3

Plywood and OSB capacity utilization rates in North America, 2008-2012



Source: APA, 2013.

The situation was similar within the non-structural panel sector in 2012 (CPA, 2013a). Production capacity for particle board was 11.8% lower (at 9.15 million m<sup>3</sup>) and for MDF it was 3% lower (at 4.79 million m<sup>3</sup>). In contrast, production capacity increased slightly in the hardboard sector and was up by 0.6% (to 1.15 million m<sup>3</sup>). Most capacity is located in the US: 72.2% for particle board, 75.3% for MDF, and the vast majority of hardboard. Capacity utilization rates increased across all industry sectors but remain below the levels before the housing crisis.

The capacity utilization rate within the particle board sector increased to 58.7% from 54.1% between 2011 and 2012, to 76.4% from 67.1% within the MDF sector, and to 69.6% from 65.9% within the hardboard sector (CPA, 2013b).

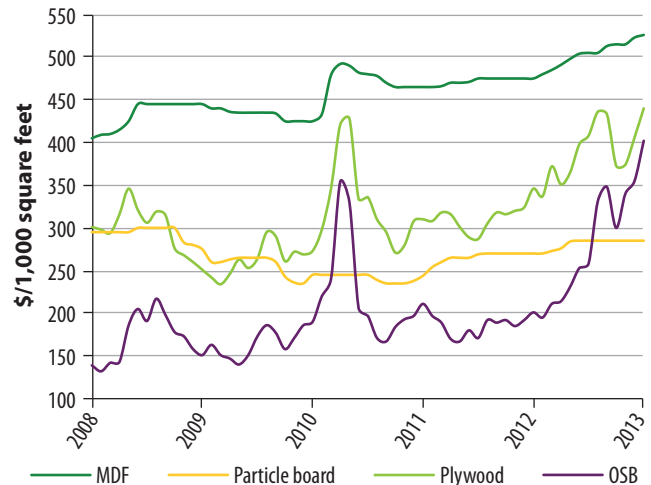
## 7.4.3 Prices

Increased demand for structural wood-based panels helped to drive up prices in 2012 (graph 7.4.4). Prices for western plywood were up by 17.3% in 2012, reaching \$406 per thousand square

feet (\$4.37 per m<sup>2</sup>) (Random Lengths, 2013). OSB prices surged in 2012, jumping by 76.6% to reach a five-year high of \$355 per thousand square feet (\$3.82 per m<sup>2</sup>). Non-structural panels showed a similar trend in 2012. The price of particle board jumped by 55.6% to reach \$285 per thousand square feet (\$3.07 per m<sup>2</sup>), while MDF prices increased by a more moderate 10.1% to \$523 per thousand square feet (\$5.63 per m<sup>2</sup>).

GRAPH 7.4.4

North American wood-based panel prices, 2008-2013



Source: Random Lengths, 2013.

## 7.4.4 Trade

### 7.4.4.1 Imports

North American imports of wood-based panels increased by almost 21% (on a value basis) in 2012, from \$3.6 billion to \$4.3 billion, with the US accounting for 79.1% of wood-based panel imports (table 7.4.2). Almost half of the panel imports by value were for plywood (45.4%) with fibreboard (29.2%) and particle board (25.4%) each accounting for approximately one quarter of panel imports. On a product basis, the values of North American panel imports were up by 17.8% for plywood, by 12% for fibreboard and by 40.1% for particle board. The US accounted most of the panel imports in 2012 by value, with an import share of 81% for plywood, 64.7% for fibreboard and 92.1% for particle board.

The trade data show that North America was a net importer of wood-based panels, posting a trade deficit of almost \$2.2 billion in 2012.

However, whereas the US ran a trade deficit of \$2.76 billion, Canada posted a \$573 million trade surplus. Most of the trade deficit in wood-based panels can be attributed to plywood, which accounted for almost three quarters of the deficit. The remainder was for fibreboard, while North America posted a trade surplus for particle board.



TABLE 7.4.2

## North American wood-based panel imports, 2009-2012

	(Million \$)				
	2009	2010	2011	2012	Change (%) 2011-2012
<b>United States</b>					
Plywood	1 269	1 390	1 357	1 594	17.5
Fibreboard	806	705	719	820	14.1
Particle board*	580	798	711	1 017	43.1
Subtotal	2 655	2 893	2 787	3 431	23.1
<b>Canada</b>					
Plywood	198	294	313	373	19.1
Fibreboard	403	451	413	447	8.3
Particle board*	64	77	77	87	12.6
Subtotal	665	822	803	907	13.0
<b>North America</b>					
Plywood	1 466	1 684	1 671	1 968	17.8
Fibreboard	1 209	1 156	1 131	1 267	12.0
Particle board*	644	875	788	1 104	40.1
Total	3 319	3 715	3 590	4 338	20.9

**Note:** \*Excluding OSB.

**Source:** UNECE/FAO TIMBER database, 2013.

## 7.4.4.2 Exports

North American exports of wood-based panels increased by 17.3% (on a value basis) in 2012, from \$1.83 billion to \$2.15 billion, with Canada accounting for 68.8% of wood-based panel exports (table 7.4.3). Over half of panel exports were particle board (58.4%) with fibreboard (24.3%) and plywood (17.3%) each accounting for approximately one-quarter of panel exports. On a product basis, the values of North American panel exports were down by 0.2% for plywood, but were up by 5.9% for fibreboard and by 29.8% for particle board. The US accounted for the majority of plywood and fibreboard exports in 2012 with export shares of 56% and 55.7% of the value, respectively. However, Canada dominated particle board exports, with an 86.4% share of the value.



**Source:** Metsä Group, 2013.

TABLE 7.4.3

## North American wood-based panel exports, 2009-2012

	(Million \$)				
	2009	2010	2011	2012	Change (%) 2011-2012
<b>United States</b>					
Plywood	207	191	203	208	2.3
Fibreboard	396	263	268	292	9.0
Particle board*	118	154	163	170	4.5
Subtotal	721	607	634	670	5.7
<b>Canada</b>					
Plywood	194	180	169	164	-3.2
Fibreboard	276	234	227	232	2.3
Particle board*	627	873	804	1 085	34.9
Subtotal	1 097	1 287	1 200	1 481	23.4
<b>North America</b>					
Plywood	401	371	373	372	-0.2
Fibreboard	671	498	494	524	5.9
Particle board*	746	1 026	967	1 255	29.8
Total	1 818	1 895	1 834	2 151	17.3

**Note:** \*Excluding OSB.

**Source:** UNECE/FAO TIMBER database, 2013.

## 7.5 EXTRAREGIONAL INFLUENCE ON THE UNECE REGION

The decline in tropical plywood production and trade continues to affect European and North American hardwood plywood markets, with the dynamics of the trade in Asia-Pacific influencing the availability and prices of tropical plywood in the UNECE region. Production curtailment and plant closures continued in 2012 in all major tropical producer countries (China, Indonesia and Malaysia) in response to:

- Depressed demand in the major consuming countries.
- Continued substitution by softwood plywood and other panel products.
- The restricted supply of tropical peeler logs.

The trend towards production in cost-competitive China and away from Malaysia and Indonesia continued in 2012, with China becoming the dominant global producer of plywood (both softwood and hardwood), accounting for 56% of the global plywood production and 33% of the global production of tropical plywood.

Although only a small proportion of China's tropical plywood production is exported directly, about 30% is estimated to be exported indirectly as furniture and other secondary-processed wood products.

Although global trade in tropical plywood has declined over the last decade, since 2008 it has fluctuated, with imports dropping in 2011 to 5.9 million m<sup>3</sup> and expected to rise in 2012 to 6.4 million m<sup>3</sup>.

Trade continues to be dominated by a few major players in the Asia-Pacific region. Japan, the major importer, accounted for nearly half of world imports in 2011 while the bulk of all tropical plywood imports were sourced from China, Indonesia and Malaysia.

In 2012, Japan's tropical plywood imports increased to 2.7 million m<sup>3</sup>, benefiting from steadily rising housing starts and significant production curtailment and plant closures in Japan's tropical plywood industry that year. Japan's domestic tropical plywood industry has had difficulties in procuring tropical logs from Southeast Asia, which have been increasingly diverted to other markets such as China and India. In 2013, tropical plywood imports were expected to be affected by a weakening yen and increasing manufacturing costs in Indonesia and Malaysia, which has put upward pressure on tropical plywood prices.

The trend towards substitution by softwood and temperate hardwood plywood and other panels for tropical plywood has continued. Indonesia's tropical plywood exports plunged by 22% to a record low in 2011 and remained at the level of 1.7 million m<sup>3</sup> in 2012 as production was increasingly diverted to the domestic market. Indonesia's domestic economy has grown strongly in recent years and domestic demand for plywood has increased in the construction industry as well as within the furniture industry.

## 7.6 POLICY AND REGULATORY INFLUENCES ON THE SECTOR

In 2012, the European Commission and the European Parliament approved the report on the accounting rules and national plans for emissions resulting from land use and land use change from agricultural and forest activities (LULUCF). The new rules open the way to include in these accounts the pool of wood products (sawnwood, panels, paper) in use in each Member State, and acknowledge that wood products continue to sequester the CO<sub>2</sub> absorbed during the growth of the tree through to the end of their useful life.

The new LULUCF rules may prompt governments to increase their support for the forest products sector in the future. For example, by encouraging implementation of the new rules which promote the substitution of wood products for more energy-intensive materials in new construction and remodeling.

When the Russian Federation joined the World Trade Organization (WTO) in August 2012, a big concern of the Russian panel industry was that they might lose some of their needed raw materials to exports, given the reduced constraints

to exporting raw materials agreed upon within the WTO negotiations. As of May 2013, however, there have been no indications of any significant supply problems for the panels industry in the Russian Federation.

The US Department of Commerce found that Chinese hardwood plywood manufacturers had received unfair and illegal subsidies from the Chinese Government. As a result of this finding, imports of Chinese hardwood plywood from all but three Chinese producers will be subject to a cash deposit requirement for estimated countervailing duties of either 22.6% or 27.2%. In a separate ruling, the Department subsequently found that all but two Chinese hardwood plywood manufacturers were guilty of dumping plywood products into the US at prices that were below fair market value. In response, the Department imposed preliminary anti-dumping duties of 22.1% on 101 Chinese companies and 64% on all other manufacturers and exporters (with the exception of the two companies that were not found to be dumping plywood into the US market).



## 7.7 REFERENCES

Note: The *Review* has a statistical annex, which is available at: [www.unece.org/fpamr2013](http://www.unece.org/fpamr2013)

APA. 2013a. American Plywood Association, the Engineered Wood Association. Structural Panel & Engineered Wood Yearbook. APA Economics Report E179. April. 79 pp.

APA. 2013b. American Plywood Association, the Engineered Wood Association. Engineered Wood Statistics. First Quarter, 2013. 9 pp.

Composite Panel Association, 2013a. 2013 North American Capacity Report. 19 pp.

Composite Panel Association, 2013b. CPA Industry Snapshot, December 2012. 5 pp.

European Panel Federation. 2013. Annual Report 2012/2013. Available at: [www.europanel.org](http://www.europanel.org)

Federal Customs Service of the Russian Federation. 2012. Available at: [www.customs.ru](http://www.customs.ru)

Random Lengths, 2013. Random Lengths Yearbook 2012.

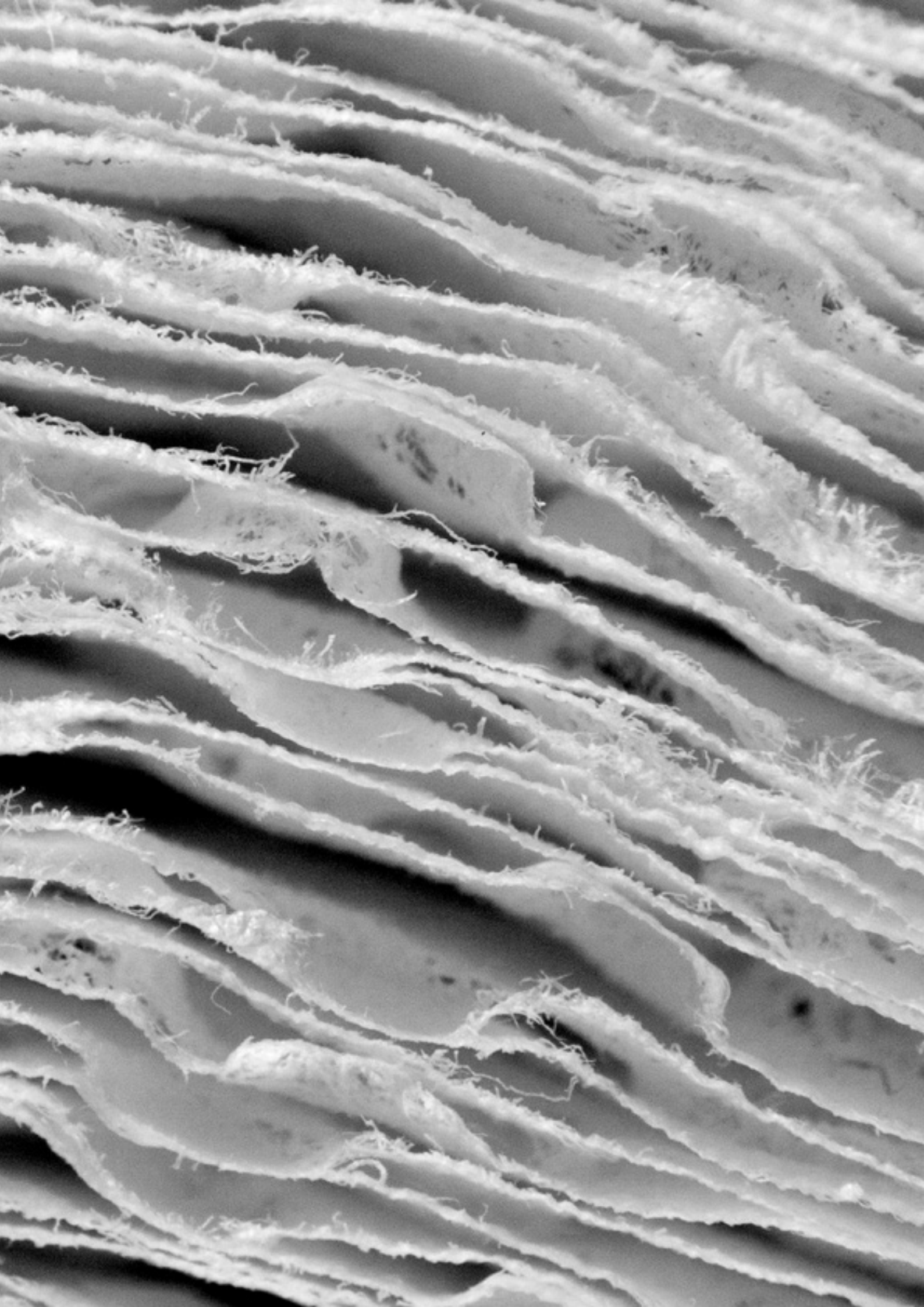
Rosstat. 2012. Federal Service of the State Statistics. Available at: [www.gks.ru/](http://www.gks.ru/)

Russian Forest Industry in 2012. Available at: <http://whatwood.ru>

UNECE/FAO TIMBER database. 2013. Available at: [www.unece.org/forests/fpm/online\\_data](http://www.unece.org/forests/fpm/online_data)







# 8 PAPER, PAPERBOARD AND WOODPULP MARKETS

Lead author: *Michel Valois*



Contributing authors:

*Eduard Akim,  
Bernard Lombard and  
Tomas Parik (no picture)*



## HIGHLIGHTS

- Graphic paper output across North America and Europe fell as a result of plant closures, while woodpulp production was flat. Paperboard output was also flat in the UNECE region despite improved economic situation in North America and more online shopping.
- A wave of consolidations and takeovers in 2011 and 2012 in the paperboard sector continued to allow for significant rationalization in North America. The same phenomenon began to show in the graphic paper sector in 2013 in the US.
- In Europe and North America, the sector has been pushing forward with green technology, such as wood-based biorefineries and biofuels, hoping to boost income by diversifying revenue streams into areas such as energy generation from biomass and black liquor.
- In Asia, expansion in the tissue sector—mainly in China and Indonesia—overshadowed the need for capacity reductions and better product prices.
- In China, a government decree announced the closure of 4.6 million tonnes of pulp and paper capacity in 2013, following capacity reductions of almost 10 million tonnes in 2012 and 8.3 million in 2011.
- A slowdown in the massive capital spending that stemmed from liberal credit markets in China in 2012 and early 2013 has recently slowed the demand there for European and North American pulp and recovered paper.
- The Russian Federation is gearing itself towards improving efficiency, increasing capacity and reducing imports by producing products domestically.
- A wave of conversions from paper-grade pulp to dissolving grades continued in 2012 and into 2013, as a result, prices have fallen from the record high levels that were seen in 2011.
- In South America, chemical market pulp capacity expansions continued, but slower projected demand growth has led to project delays and the closure of high-cost capacity.
- As Brazil expands its pulp production infrastructure, it has taken the lion's share of market opportunities, leaving players in North America and Europe with a smaller proportion of the global pulp trade.



## 8.1 INTRODUCTION

2012 was another challenging year for the global pulp, paper and paperboard industry. Despite significant capacity closures covering several pulp, paper and paperboard grades in Europe, Japan and North America, production capacity is still too high when measured against falling or static demand (across most grades). In all major regions, only paperboard production and apparent consumption remained strong.

In the hope of remaining viable, companies have continued to merge, to dispose of unprofitable and unwanted mills, to adopt a range of cost-saving measures or to focus on niche markets. It seems inevitable that excess capacity in key commodity graphic grades will result in further reductions in capacity and industry consolidation.

With much of Europe gripped by an economic recession in the mid-2012 to mid-2013 period and China's gross domestic product growth slowing to 7% in 2012 (from 9%-10% in 2007-2011), global demands for pulp, paper and paperboard remained largely static. China provided the only bright spot in 2012, as capital investment in paper machines continued. Towards the end of 2012 and into 2013, large capacity increases were announced in the tissue category by major Asian pulp and paper companies. In all, 5.6 million tonnes of tissue capacity expansions are expected over the 2012-2015 period, a 15.9% increase (Valois Vision Marketing, 2013a).

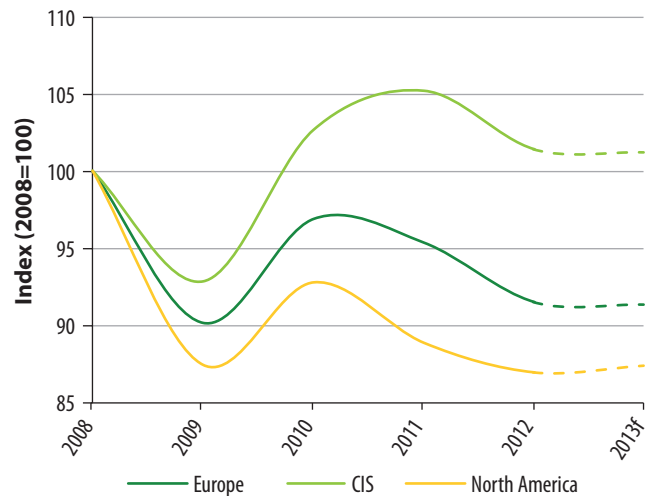
The popularity of the Internet and smart phones to transfer data and communicate continued the incentive to reposition advertising dollars from print media to electronic platforms, and thus demand for printing and writing grades continued to decline across western Europe, the Commonwealth of Independent States, North America and Japan. Stagnant or declining demand for paper in developed markets has forced all companies to take a fresh look at their operations (graph 8.1.1).

No major expansion of pulp lines or paper machines is taking place in North America, western Europe or Japan. The only major investment in new capacity in 2012 was the conversion of a few old chemical market pulp lines (paper grade) to produce higher quality dissolving and fluff pulps.

The commodity dissolving pulp market in 2013 is oversupplied and prices depressed to the point where some producers are losing money. There's a growing demand for fluff pulp, used in baby diapers, adult incontinence and feminine hygiene products to meet rising demand in developed markets such as South America, Middle East, North Africa and Asia as disposable incomes rise.

GRAPH 8.1.1

Apparent consumption of paper and paperboard in the UNECE region, 2008-2013



Note: f=Timber Committee forecast, October 2012.

Source: UNECE/FAO TIMBER database, 2013.

In the paper sector, the current trend in mature markets is to convert newsprint machines to paperboard and packaging grades, or to simply permanently idle a machine or entire mill.

Prices for pulp and paper in general fell in mid-2012. Companies reacted quickly to try to reverse this by targeted capacity rationalization. Market pulp prices fell mid-year. Those for printing and writing paper remained low following failed attempts by companies to raise them. Major consolidation in the North American paperboard industry allowed a slight increase in prices. By mid-2013, market pulp producers managed to increase list prices, but heavy discounting meant that real prices barely changed. Printing and writing paper prices were still falling in the first half of 2013, forcing several producers to further curtail high-cost capacity.

In China, as massive capital has been invested in recent years, which has led to chronic overcapacity across all graphic paper and paperboard grades. A government decree announced the closure of 4.6 million tonnes of pulp and paper capacity in 2013, following capacity reductions of almost 10 million tonnes in 2012 and 8.3 million in 2011. These closures will continue to favour companies having newer equipment that has been running well below full capacity.

With so much of the installed capacity in the developed world being old or inefficient, further rationalization is likely to occur across virtually all sectors of the vast pulp, paper and paperboard industry. In contrast, massive capital investment continues to find its way into emerging markets in South America, the Middle East, North Africa and Asia.





Source: UPM, 2013.

A long-awaited full recovery in output has failed to materialize. In Europe and North America, the sector has been pushing forward with green technology, such as wood-based biorefineries and biofuels, hoping to boost income by diversifying revenue streams into areas such as energy generation from biomass and black liquor.

## 8.2 EUROPE

### 8.2.1 Paper and paperboard production in CEPI<sup>9</sup> countries decreased by 1.6%

The recovery in 2010, which saw production climb by 8%, hasn't continued. Production in 2012 fell by 1.6% over 2011 (2.0% for all of Europe, including non-CEPI countries) (table 8.2.1). Europe's production remains above 99 million tonnes, but is 10% below pre-crisis production levels (graph 8.2.1). This is more favourable, however, than the falls in production experienced by the majority of other heavy industry sectors in Europe. There isn't a consistent picture across Europe: Austria, Poland and, to a lesser extent Sweden have seen production grow, while France, Finland and Italy have seen production fall by 5% - 6%. Germany, which accounts for close to a quarter of all European production, has recorded a drop of only 0.4%.

TABLE 8.2.1

Paper and paperboard balance in Europe, 2011-2013

	(1,000 tonnes)			Change (%) 2011-2012
	2011	2012	2013f	
Production	101 143	99 125	98 449	-2.0
Imports	56 937	53 083	53 252	-6.8
Exports	65 209	63 089	62 745	-3.3
Net trade	8 273	10 006	9 493	21.0
Apparent consumption	92 871	89 119	88 956	-4.0

Notes: f=Timber Committee forecast, October 2012.

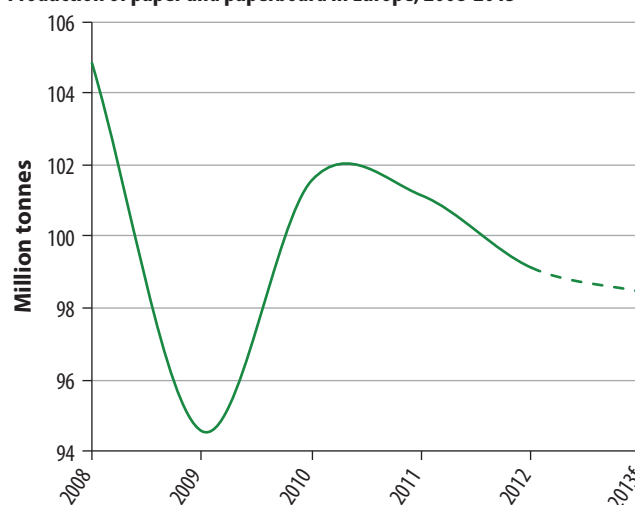
Source: UNECE/FAO TIMBER database, 2013.

<sup>9</sup> Confederation of European Paper Industries.

There has been a net loss in capacity of about 1 million tonnes in 2012, in spite of the installation of new, more efficient equipment.

GRAPH 8.2.1

Production of paper and paperboard in Europe, 2008-2013



Note: f=Timber Committee forecast, October 2012.

Source: UNECE/FAO TIMBER database, 2013.

### 8.2.2 Production of packaging and tissue grades increases but decline in graphics

Packaging and tissue grades recorded growth in production compared with 2011, while graphic grades declined for the eighth consecutive year, by 4.6% (CEPI, 2013). The decline in graphic grades reflects the impact of electronic communication, lower readership levels and reduced advertising spending. Newsprint declined by 7.3% to the lowest annual output in 20 years.

Production of both, uncoated woodfree grades and uncoated mechanical grades has decreased over 3% compared with 2011. Output of coated woodfree grades decreased by 1.3% and of coated mechanical grades by 6.7%. The result is that production of uncoated graphic grades has decreased by 3.4% and coated grades by 4.1%. Mechanical graphic grades, excluding newsprint, registered a decrease in output of 5.4% and production of woodfree grades fell by 2.4%.

The production of packaging grades was static in 2012 compared with 2011, at 45.4 million tonnes, but for the first time, these have overtaken graphic grades in terms of share of total paper and paperboard production, with packaging grades accounting for 44.5% and graphic grades for 43.4% of the total production.

Sanitary and household papers have seen output rise by 1%, continuing to grow, apart from the hiatus during 2008 and 2009. Overall production of all other grades of paper and paperboard—mainly for industrial and special purposes—fell by 0.8%.

TABLE 8.2.2

## Paper and paperboard in Europe, 2008-2012

	(Million tonnes)							
	Production				Apparent consumption			
	2008	2011	2012	Change (%) 2011-2012	2008	2011	2012	Change (%) 2011-2012
<b>Paper and paperboard</b>	104.8	101.1	99.1	-2.0	97.4	92.9	89.1	-4.0
<b>Graphic papers</b>	49.0	44.0	42.1	-4.3	43.5	37.9	34.9	-7.9
Newsprint	10.7	9.2	8.7	-5.7	11.7	9.6	8.2	-14.7
Uncoated mechanical	9.0	7.7	7.5	-2.3	6.9	6.2	6.2	-0.1
Uncoated woodfree	9.5	9.6	9.3	-2.8	9.2	9.1	8.4	-7.8
Coated papers	19.9	17.5	16.6	-5.2	15.7	13.0	12.1	-6.6
<b>Sanitary and household papers</b>	7.1	7.3	7.3	-0.5	6.9	7.5	7.4	-1.1
<b>Packaging materials</b>	44.1	45.4	45.4	0.0	42.3	43.1	42.4	-1.5
Case materials	25.6	26.8	26.7	-0.1	26.7	27.5	26.9	-2.3
Carton	9.5	9.7	9.7	0.8	7.6	7.6	7.8	1.9
Wrapping papers	4.9	5.0	5.1	2.5	4.1	4.3	4.2	-1.9
Other papers, mainly packaging	4.1	4.0	3.8	-3.8	3.8	3.7	3.6	-2.7
<b>Other paper and paperboard</b>	4.6	4.4	4.3	-2.4	4.7	4.3	4.3	-0.4

Source: UNECE/FAO TIMBER database, 2013.

### 8.2.3 Paper consumption

Paper and paperboard apparent consumption fell by 4.0% in Europe in 2012 and is now 14% below that seen before the crisis (CEPI, 2013). Total paper and paperboard production for the year fell by 2% over 2011.

In 2012, production of graphic grades decreased by 4.3% and production of packaging grades remained unchanged. Exports rose by 6.2%, mainly to other European countries (35% of all exports). Exports to Asia accounted for 28%, and about 10% was exported to North America.

Imports of paper and paperboard into the region decreased by 10.5% in 2011. Imports from other European countries accounted for 41% of all imports, North America had a share of 34% and the remaining 23% was split among the rest of the world.

Paper and paperboard prices have been on a downward trend in Europe since the second half of 2011. Nonetheless, this trend is nuanced according to the paper grade considered. After the relative stability of prices in 2011, graphic paper prices showed a slow and continuous erosion throughout 2012. For packaging grades, there was a very marked decline seen in 2011 and a slight recovery in early 2012, followed by a continuous drop until the end of the year.

### 8.2.4 Total pulp production declines but market pulp output increases

Pulp production, at approximately 39.5 million tonnes, fell by 0.1% over 2011 (table 8.2.3) (CEPI, 2013). Mechanical pulp fell by 3.0%, following mill closures in Norway and Sweden, while chemical pulp increased by 0.6%. Market pulp was influenced by major investment and paper-machine rationalization, especially in Finland and Portugal, and production increased by about 4.4% in 2012. Integrated pulp output fell 3%, as a result of closures of paper units in integrated mill sites.

TABLE 8.2.3

## Woodpulp balance in Europe, 2011-2013

	(1,000 tonnes)			
	2011	2012	2013f	Change (%) 2011-2012
Production	39 411	39 454	39 508	0.1
Imports	19 312	20 041	20 147	3.8
Exports	13 309	14 918	15 210	12.1
Net trade	-6 003	-5 123	-4 937	
Apparent consumption	45 414	44 577	44 445	-1.8

Notes: f=Timber Committee forecast, October 2012.

Source: UNECE/FAO TIMBER database, 2013.

Pulp prices that had begun to decline in mid-2010 continued to fall and by the end of 2011 had dropped by 25% to 30%. Prices (euros) in the first half of 2012 increased by close to 20%, partly as a result of the weakness of the euro against the US dollar. Thereafter prices in the second half of the year stabilized, as the euro regained strength against the dollar.

### 8.2.5 Wood market developments: impact of the Russian tariff-reduced wood quota and the EU Timber Regulation

Prices for pulpwood fell in 2012 (averaging close to -15%), continuing the trend that began in 2011. (CEPI, 2013); The Russian Federation's accession to the WTO in August 2012 was accompanied by the setting up of a 9.5 million m<sup>3</sup> tariff-reduced export quota for Russian pine and spruce to the European Union, offering preferential customs duties, compared with the prohibitive levels applied since 2006. It is too early to assess what impact this development will have on the European pulp and paper industry, particularly in Finland.

### 8.2.6 Use of paper for recycling by CEPI members fell by 1%

There was little change (-1%) in paper recycling in 2012 (CEPI, 2013); most of the mill closures mostly targeted production of virgin-fibre-based graphic paper. Prices of paper for recycling recorded upward movements that were rather marked in the first months of 2012, in the order of 20% to 50%. These increases were followed by drops of the same magnitude in the middle of the year. The increases occurring during the last quarter appeared more moderate and left paper for recycling prices rather far away from the levels reached in mid-2011.

China's role in evolving world prices remains decisive. China imported 12% more recycled paper in 2012, with Europe supplying close to 30% of the total volume of imports.

## 8.3 COMMONWEALTH OF INDEPENDENT STATES, WITH A FOCUS ON THE RUSSIAN FEDERATION

### 8.3.1 CIS paper and paperboard production continues to strengthen while apparent consumption drops

Paper and paperboard production grew marginally in 2012, while apparent consumption fell (table 8.3.1).

TABLE 8.3.1

Paper and paperboard balance in the CIS, 2011-2013

	(1,000 tonnes)			
	2011	2012	2013f	Change (%) 2011-2012
Production	9 452	9 541	9 617	0.9
Imports	2 820	2 537	2 537	-10.0
Exports	2 678	2 830	2 925	5.7
Net trade	-142	293	388	
Apparent consumption	9 594	9 248	9 229	-3.6

Notes: f=Timber Committee forecast, October 2012.

Source: UNECE/FAO TIMBER database, 2013.

### 8.3.1.1 Production setbacks in Russian paper industry

Russian paper production experienced a 5% decline in 2012 from 2011, whereas in 2012 both chemical pulp and paperboard output grew by 2.2% and 0.5% respectively (table 8.3.2).

The first four months of 2013 showed a decrease of 8% for paper, while there was a 2.3% increase for paperboard production. A decrease in newsprint paper production occurred due to structural changes in newsprint consumption at the global level.

TABLE 8.3.2

Production of chemical woodpulp, graphic paper and paperboard in the Russian Federation, 2011-2012

	(1,000 tonnes)		
	2011	2012	Change (%) 2011-2012
Chemical woodpulp*	5 873	6 004	2.2
Graphic paper	2 363	2 245	-5.0
Paperboard	4 512	4 535	0.5

Note: \*Chemical woodpulp includes semi-chemical woodpulp and dissolving grades.

Source: UNECE/FAO TIMBER database, 2013.

### 8.3.2 CIS woodpulp production rises modestly, while apparent consumption drops

Woodpulp production and apparent consumption rose in 2012 (table 8.3.3). In Russia (the largest producer and consumer in the CIS), the first four months of 2013 have shown a 10% decrease in pulp production following modest growth in chemical woodpulp production in 2012 (+2.2%) (table 8.3.2).



TABLE 8.3.3

**Woodpulp balance in the CIS, 2011-2013**

	(1,000 tonnes)			
	2011	2012	2013f	Change (%) 2011-2012
Production	7 967	8 312	8 463	4.3
Imports	208	227	227	9.4
Exports	2 035	2 258	2 258	11.0
Net trade	1 828	2 031	2 031	
Apparent consumption	6 139	6 281	6 432	2.3

Notes: f=Timber Committee forecast, October 2012.

Source: UNECE/FAO TIMBER database, 2013.

### 8.3.3 Production and capacity change

Output of pulp, paper and paperboard in the Russian Federation has more than doubled since 1996 but is still significantly lower than the levels of pre-transition periods of 1988-1989 (Rosstat, 2012). Restructuring of the Russian pulp and paper industry continues in 2013, with some progress being made towards higher value products with better processing of wood raw material. An example of restructuring is the investment project by Ilim Group, which has many important components, such as: a new manufacturing facility in Bratsk (operational on 19 June 2013) and expansion of white paper and coated capacity in Koryazhma (operational on 3 March 2013).



Source: UPM, 2012.

### 8.3.4 Russian trade

#### 8.3.4.1 Imports

The annual trade deficit in paper and paperboard was \$1.78 billion in 2012. This was because imports tend to be the higher value products such as high quality materials for container and packaging, coated paper, and tissue, whereas exports are mainly commodity products, such as newsprint and kraft-linerboard.

#### 8.3.4.2 Exports

Exports of pulp and paper increased from 1990, reaching a peak in 2005. Russian exports, as a percentage of production, have remained largely unchanged since 1996, accounting for roughly 80% of market pulp output, and 30%-35% for paper and paperboard. Major export destinations were China (market pulp, kraft-linerboard), Ireland (market pulp, kraft-linerboard), India (newsprint), and Turkey (newsprint). Pulp exports exceeded 2 million tonnes, 60% of which was imported by China.

## 8.4 NORTH AMERICA

The North American pulp, paper and paperboard industry continued to see production line closures in 2012 and during the first half of 2013, due to poor financial results following prolonged periods of overcapacity linked with falling demand.

Paper and paperboard production declined marginally in 2012 over 2011, while pulp output was flat. Although graphic paper production suffered from production line closures, paperboard output was stronger, partly due to continued growth in online shopping and an ongoing economic recovery. Chemical pulp production was essentially flat, with the industry continuing to shift output from paper grade pulp to dissolving and fluff pulps.

Domestic demand for graphic paper continued to suffer, due to lower advertising budgets for print advertising, and growing use of electronic media for data and information, much of which is Internet-based. Pulp mill conversions, mainly to higher-value-added dissolving grades, continued to be a major industry focus.

Paper machine restarts in the graphic sector were enabled with both public and private funds, but with limited success, forcing the temporary or permanent closure of other facilities. The graphic paper industry remained oversupplied and prices depressed.

The paperboard sector saw rigorous growth following major rationalization in the industry, including mergers and acquisitions that led to overall capacity reductions. The reshaped segment attracted new capacity from converted mechanical and woodfree paper machines that were uncompetitive.

The chemical pulp sector was subject to a series of line closures (kraft and high-yield) as companies suffered ongoing losses, and major capital investments to maintain their operations were unjustified.

Cost-reduction initiatives across the pulp, paper and paperboard industry continued throughout 2012 and into 2013, as companies were unable to raise prices. Prices were negatively affected by excess capacity in all sectors and stagnant or decreasing demand due to the recession in Europe and an economic slowdown in China.

### 8.4.1 Production and apparent consumption in 2012

In 2012, consumption continued to fall, albeit at a slower pace than from 2010 to 2011. Graphic papers suffered especially, as the growth of electronic media continued at the expense of paper. The paperboard/packaging sector saw a major consolidation among major producers, with capacity reductions leading the way.

North American paper and paperboard production and exports fell, with a 2.2% fall in apparent consumption (table 8.4.1).

Mill closures resulted in a loss of more than a million tonnes of capacity. Coming on top of the more than 2 million tonnes lost in 2011, this represents an overall 10% reduction in capacity (Valois Vision Marketing, 2013b).

The fall in graphic paper production was even steeper (table 8.4.2). Over the period 2008-2012, graphic paper production declined by 25.8%, whereas packaging material output edged lower by a mere 0.5%. The growth in online shopping has benefited the paperboard sector.

Between January 2000 and July 2013, worldwide newsprint capacity fell by 15 million tonnes, 7.4 million of the drop in North America. In 2013 North American newsprint capacity was 7.6 million tonnes, having fallen by almost half from the 15 million tonnes that existed in 2000 (UNECE/FAO TIMBER database, 2013; Valois Vision Marketing, 2013c).

**TABLE 8.4.1**  
Paper and paperboard balance in North America, 2011-2013

	(1,000 tonnes)			
	2011	2012	2013f	Change (%) 2011-2012
Production	88 488	86 288	86 689	-2.5
Imports	11 747	11 858	11 822	0.9
Exports	20 514	20 145	20 120	-1.8
Net trade	8 767	8 287	8 297	
Apparent consumption	79 721	78 001	78 391	-2.2

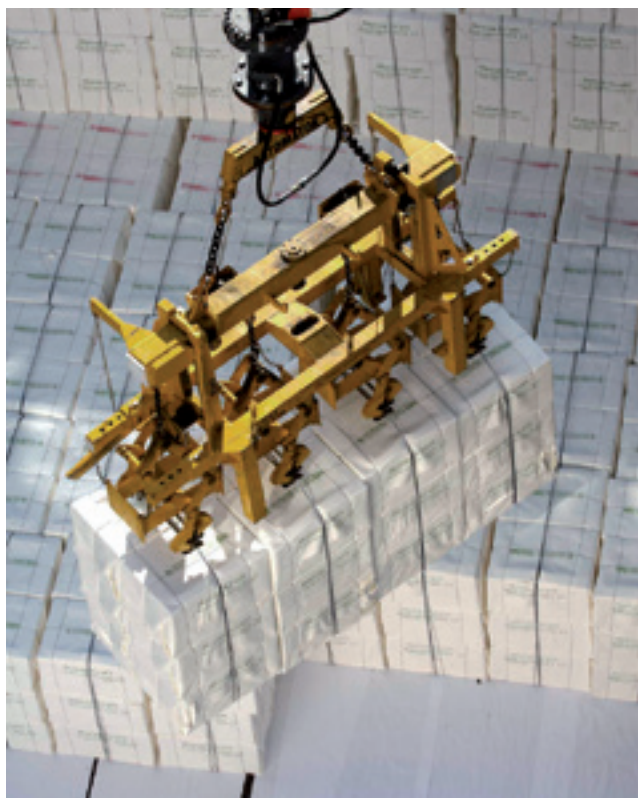
Notes: f=Timber Committee forecast, October 2012.

Source: UNECE/FAO TIMBER database, 2013.

**TABLE 8.4.2**  
Paper and paperboard in North America, 2008-2012

	(Million tonnes)							
	Production				Apparent consumption			
	2008	2011	2012	Change (%) 2011-2012	2008	2011	2012	Change (%) 2011-2012
<b>Paper and paperboard</b>	96.0	88.5	86.3	-2.5	89.7	79.7	78.0	-2.2
<b>Graphic papers</b>	35.3	28.1	26.2	-6.7	33.8	26.1	24.6	-5.8
Newsprint	10.2	7.3	6.7	-8.1	7.2	4.7	4.7	-0.3
Uncoated mechanical	5.9	4.4	3.7	-17.6	5.9	4.5	3.7	-18.5
Uncoated woodfree	10.8	9.1	8.8	-3.0	10.8	9.0	8.7	-3.8
Coated papers	8.4	7.2	7.0	-3.1	9.8	7.8	7.5	-4.1
<b>Sanitary and household papers</b>	7.3	7.3	7.3	-0.9	7.4	7.4	7.3	-1.5
<b>Packaging materials</b>	48.9	49.0	48.8	-0.5	44.1	42.2	42.3	0.3
Case materials	32.0	32.9	32.8	-0.2	28.4	28.3	28.7	1.4
Carton	8.0	7.3	7.0	-3.4	6.9	5.8	5.4	-6.7
Wrapping papers	1.7	3.1	3.2	1.2	1.6	2.4	2.6	5.6
Other papers, mainly packaging	7.2	5.7	5.7	0.0	7.2	5.7	5.7	-0.1
<b>Other paper and paperboard</b>	4.5	4.0	4.0	0.0	4.5	4.0	3.8	-5.5

Source: UNECE/FAO TIMBER database, 2013.



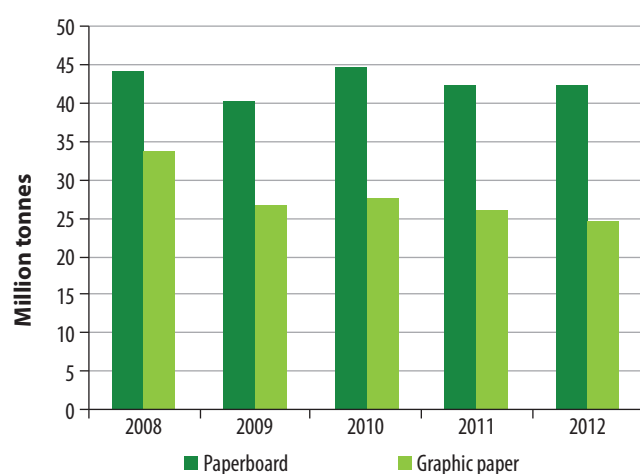
Source: Metsä Group, 2013.

Apparent consumption for graphic papers was down by 5.8% in 2012 over 2011 to 24.6 million tonnes (graph 8.4.1), with imports down by 6.1% to 7.7 million tonnes.

In contrast, paperboard's apparent consumption was up 0.3% to 42.3 million tonnes, with imports up 15.3%, while exports were down 18.7%. Stronger demand stems from a surge in online shopping.

GRAPH 8.4.1

Graphic paper and paperboard apparent consumption in North America, 2008-2012



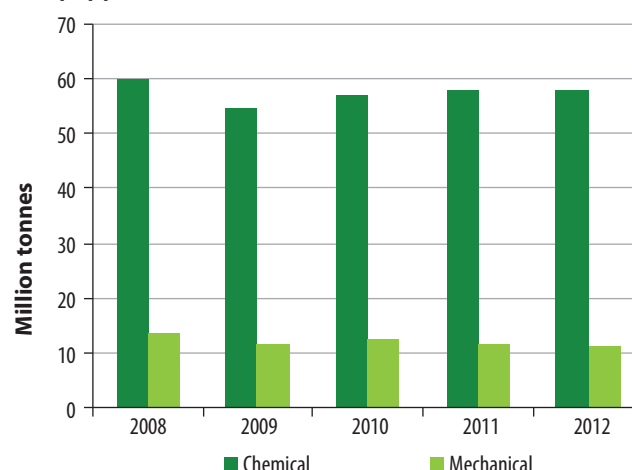
Source: UNECE/FAO TIMBER database, 2013.

In the paperboard sector, containerboard capacity fell by 500,000 tonnes in 2012 and in the first half of 2013.

Production of chemical woodpulp was virtually flat in 2012 against 2011 (graph 8.4.2), rising only 0.2%, as mills worked to lower unit costs in a very low-margin environment; excess supply was the main driver behind weak prices for all market pulps in 2012 over 2011, followed by weaker demand for pulp imports in Europe.

GRAPH 8.4.2

Woodpulp production in North America, 2008-2012



Note: Chemical woodpulp includes semi-chemical woodpulp and dissolving grades.

Source: UNECE/FAO TIMBER database, 2013.

Imports were lowered by 7.4% to 5.3 million tonnes, the result of capacity rationalization and conversions overseas. Exports were down by 3.4%, as new domestic tissue operations demanded more North American market pulp. Apparent consumption in 2012 increased 0.7% over that of 2011.

The lacklustre market recovery for chemical market pulp in the second half of 2012 that continued into 2013 was almost entirely driven by Asian demand. Doubts as to its sustainability grew in mid-2013, due to a slower Chinese economy, and sluggish global printing and writing paper markets.

In essence, low paper prices, the result of an imbalance between supply and demand, continue to make any full recovery for the pulp market in 2013 highly doubtful.

Production of mechanical woodpulp, 11.3 million tonnes in 2012, was 1.7% lower than in 2011, the result of capacity rationalization (graph 8.4.2). Consumption was 1.2% lower.

## 8.4.2 Pulp mill conversions to dissolving pulp continues

During a period when dissolving pulp prices were very high in global markets due to poor cotton crops in the US and China, and exceptionally strong demand from Asia, capacity additions



were made that have exceeded the most optimistic demand scenarios. As a result, prices have fallen from record levels in 2011 and are continuously under pressure as incremental capacity announcements continued in 2012 and into 2013.

In 2012, dissolving pulp capacity was 7 million tonnes against a demand of 5.4 million, resulting in an operating rate of 76.5%. By 2016, projected capacity and demand at 9 million tonnes and 7 million tonnes respectively is expected to lead to the industry continuing to run at less than 80% of capacity. (Valois Vision Marketing, 2013d).

## 8.5 EXTRAREGIONAL INFLUENCE ON THE UNECE REGION

### 8.5.1 South America

#### 8.5.1.1 Pulp, paper and paperboard production in Brazil

Since the late 1980s, Brazilian companies, along with foreign entities from Japan and elsewhere, have invested heavily in domestic facilities to produce bleached eucalyptus kraft pulp, printing and writing paper grades, tissue and other paper-related products. To furnish fibre to the pulp and paper mills, plantations have long been established that are globally recognized as some of the best in the world in terms of genetic engineering.



Source: Donald Owen, 2013.

As Brazil aggressively expands its pulp production infrastructure, it has taken the lion's share of market opportunities in emerging economies, leaving players in North America and Europe with a smaller proportion of the global pulp trade.

In 2012, Brazilian production of pulp, paper and paperboard reached 24.1 million tonnes, virtually unchanged from the 2011 figure. With no meaningful expansions taking place in 2012, pulp production was essentially on par with 2011 at 13.9 million tonnes (-0.2%). Paper production was 0.2% higher in 2012 over 2011 at 10.2 million tonnes.

The largest increases in paper and paperboard production came in the areas of tissue and boxboard. Tissue production rose by 7.6% in 2012 over 2011 to top 1 million tonnes. Boxboard production reached 760,000 tonnes in 2012, up by 3.7% over 733,000 tonnes in 2011.

#### 8.5.1.2 Brazil's balance of trade

While pulp production in Brazil serves domestic customers, being used internally to produce paper and paperboard, most of the pulp is exported in the form of market pulp. In 2012, Brazil exported 8.51 million tonnes of pulp according to the country's pulp and paper association Bracelpa, thus representing 61.3% of production (table 8.5.2). This represented a slight (0.4%) increase over 2011's 8.48 million tonnes (60.9% of production).

TABLE 8.5.1  
Woodpulp balance in Brazil, 2011-2012

	(1,000 tonnes)		
	2011	2012	Change (%) 2011-2012
Production	13 922	13 896	-0.2
Domestic sales	1 561	1 640	5.1
Exports	8 478	8 513	0.4
Imports	392	411	4.8
Apparent consumption	5 836	5 794	-0.7

Source: Bracelpa, 2013.

Exports of printing and writing paper are a much smaller portion of Brazil's trade, as most of the production is used internally. In 2012, only 952,000 of the 2.6 million tonnes (36%) of production were exported (table 8.5.2).

TABLE 8.5.2  
Printing and writing paper balance in Brazil, 2011-2012

	(1,000 tonnes)		
	2011	2012	Change (%) 2011-2012
Production	2 681	2 635	-1.7
Domestic sales	1 631	1 688	3.5
Exports	1 034	952	-7.9
Imports	699	661	-5.4
Apparent consumption	2 346	2 344	-0.1

Source: Bracelpa, 2013.

#### 8.5.1.3 Chile

Chile has long followed Brazil in its quest to expand its pulp, paper and paperboard industry, but the journey has always been slower and less centrally orchestrated. Nonetheless, its industry is thriving, with expansions in recent years of pulp, paper, tissue and paperboard mills that have made Chile into a truly global player.

Chilean pulp, paper and paperboard exports in dollar terms were significantly impacted by lower prices, due to the global slowdown. In 2012, export sales were lower by 12.8%, according to Chilean Customs Service (Come) (table 8.5.3), mainly as a result of lower kraft pulp prices.

**TABLE 8.5.3****Pulp, paper and paperboard exports in Chile, by value, 2011-2012**

	(1,000 \$)		
	2011	2012	Change (%) 2011-2012
Bleached radiata kraft	1 400	1 150	-17.9
Bleached eucalyptus kraft	1 239	1 154	-6.8
Unbleached radiata kraft	256	230	-10.4
Newsprint	141	108	-23.6
Folding boxboard	344	347	1.1
Sack kraft	15	21	33.7
Other	230	151	-34.1
<b>Total</b>	<b>3 625</b>	<b>3 161</b>	<b>-12.8</b>

**Source:** Chilean Customs Service (Come), 2013.

Chilean export volumes of pulp, paper and paperboard in 2012, were 4.5% higher than in 2011 according to Chilean Customs Service (Infor) (table 8.5.4).

**TABLE 8.5.4****Pulp, paper and paperboard exports in Chile by volume, 2011-2012**

	(1,000 tonnes)		
	2011	2012	Change (%) 2011-2012
Bleached radiata kraft	1 799	1 900	5.6
Bleached eucalyptus kraft	1 864	2 023	8.5
Unbleached radiata kraft	361	402	11.3
Newsprint	211	160	-24.0
Folding boxboard	319	325	1.9
Sack kraft	16	24	54.7
Other	161	111	-31.4
<b>Total</b>	<b>3 625</b>	<b>3 161</b>	<b>-12.8</b>

**Source:** Chilean Customs Service (Infor), 2013.

## 8.5.2 Asia

### 8.5.2.1 China: pulp production and consumption continue to grow but at slower pace

Overshadowing significant investments in the industry is the fact that China's growth in paper and paperboard production fell to 3.2% in 2012, down from 7.1% in 2011. The consumption growth rate fell to only 3.0% in 2012, down from 6.3% in 2011 (table 8.5.5).

**TABLE 8.5.5****Pulp, paper and paperboard production and apparent consumption in China, 2012**

	(Million tonnes)			
	Production		Apparent consumption	
	2012	Change (%) 2011-2012	2012	Change (%) 2011-2012
Pulp	78.7	1.9	93.5	3.4
Paper and paperboard	102.5	3.2	100.5	3.0

**Source:** China Paper Association, 2013.



**Source:** UPM, 2013.

### 8.5.2.2 Chinese pulp imports grow 14.0% in 2012 to reach record levels.

In 2012, kraft pulp imports continued to grow, reaching 13.3 million tonnes, an increase of 14.0% over 2011 and up by 50.3% over 2010 (table 8.5.6) according to the Chinese Customs Bureau.

Total pulp imports reached 16.5 million tonnes in 2012, up by 14.0% from 2011 and up by 44.8% over 2010. The primary beneficiaries of the strong growth in Chinese pulp imports continue to be North American, European and Russian exporters, but increasingly, over the last two decades, South American players also have aggressively expanded their exports to China.

**TABLE 8.5.6****Pulp imports in China, 2010-2012**

	(1,000 tonnes)			
	2010	2011	2012	Change (%) 2011-2012
Kraft	8 879	11 707	13 347	14.0
Mechanical	1 426	1 401	1 417	1.1
Dissolving	964	1 146	1 579	37.8
Other	97	185	119	-35.7
<b>Total</b>	<b>11 365</b>	<b>14 439</b>	<b>16 463</b>	<b>14.0</b>

**Source:** China Customs Bureau, 2013.



With a growing papermaking asset base in China, the need for fibre also increases, and one of the largest sources of raw material is recovered paper. In 2012, recovered paper imports grew by 10.2% over 2011 to reach 30.1 million tonnes (table 8.5.7).

According to the US Department of Commerce (Bureau of Census), 47% of Chinese recovered paper imports were sourced from the US in 2012, down from 52.5% in 2011.

**TABLE 8.5.7**  
**Recovered paper imports in China, 2011-2012**

	(Million tonnes)		
	2011	2012	Change (%) 2011-2012
Recovered paper imports	27.3	30.1	10.2
Recovered paper exports from US to China	14.3	14.1	-1.3
Chinese recovered paper sourced from the US	52.5%	47.0%	
US recovered paper exports	21.1	20.1	-4.3
US recovered paper exports to China	68.0%	70.1%	

**Source:** China Customs Bureau, 2013; US Department of Commerce, (Bureau of Census), 2013.



**Source:** UPM, 2013.



**Source:** Metsä Group, 2013.

## 8.6 REFERENCES

Note: The *Review* has a statistical annex, which is available at: [www.unece.org/fpamr2013](http://www.unece.org/fpamr2013)

Bracelpa. 2011, 2012. Brazilian Pulp and Paper Association. Available at: [www.bracelpa.org.br/bra2/?q=en](http://www.bracelpa.org.br/bra2/?q=en)

Chilean Customs Service (Come, Infor). 2011, 2012. Available at: [www.aduana.cl](http://www.aduana.cl)

China Paper Association. 2012. Annual statistical release. Available at: [www.ietd.iipnetwork.org/content/china-paper-association](http://www.ietd.iipnetwork.org/content/china-paper-association)

Chinese Customs Bureau. 2011-2012. Pulp imports. Available at: [www.chinacustomsstat.com](http://www.chinacustomsstat.com)

Confederation of European Paper Industries (CEPI). 2013. CEPI Preliminary Statistics 2012. Available at: [www.cepi.org](http://www.cepi.org)

Rosstat. 2012. Available at: [www.gks.ru/wps/wcm/connect/rosstat/rosstatsite.eng](http://www.gks.ru/wps/wcm/connect/rosstat/rosstatsite.eng)

UNECE/FAO TIMBER database. 2013. Available at: [www.unece.org/forests/fpm/onlineadata](http://www.unece.org/forests/fpm/onlineadata)

US Department of Commerce (Bureau of Census). 2013. Available at: [www.census.gov](http://www.census.gov)

Valois Vision Marketing. 2013a. China Study. Available at: [www.valoisvision.com](http://www.valoisvision.com)

Valois Vision Marketing. 2013b. Pulp Mill Closures & Conversion Study 2013. Available at: [www.valoisvision.com](http://www.valoisvision.com)

Valois Vision Marketing. 2013c. Newsprint Capacity data. Available at: [www.valoisvision.com](http://www.valoisvision.com)

Valois Vision Marketing, 2013d, Dissolving Analysis. Available at: [www.valoisvision.com](http://www.valoisvision.com)





# 9 WOOD ENERGY MARKETS

Lead author: **Francisco X. Aguilar**

Contributing authors:



*Branko Glavonjić,  
Rens Hartkamp,  
Warren Mabee and  
Kenneth E. Skog*



## HIGHLIGHTS

- Wood is the main source of renewable energy in the UNECE region, accounting for 38.4% of all renewables.
- Wood energy production and trade volumes are increasing worldwide with a generally positive outlook, driven primarily by renewable energy targets.
- While wood energy consumption in the forest-based industry remains steady or below recent averages, residential and power-and-heat sector demand is expected to increase.
- Fluctuations in wood energy use related to weather and the availability of cheap natural gas (primarily in North America) will influence wood energy consumption in the short term.
- Wood pellet-market segments are integrating; small and medium-sized enterprises and the wood products industry in Europe are developing innovative technologies to produce heat and steam.
- In just three years, imports of industrial wood pellets into the EU27 countries rose from less than 2 million tonnes a year to 4.5 million tonnes in 2012. The US was the largest exporter of industrial wood pellets, followed by Canada and the Russian Federation. Trade of wood pellets between EU27 countries was even greater, reaching an estimated 4.7 million tonnes.
- Russian wood pellet production is estimated to have increased by 50% in 2012 and may have exceeded 1.5 million tonnes, over 90% of which was exported.
- Expected growth in consumption of wood pellets within the UNECE region (especially Belgium, Netherlands, UK) and Asia (e.g. Japan and Republic of Korea) is likely to increase global demand significantly.
- There are signs of current overcapacity in wood pellet manufacturing in North America and South-East Europe. Although excess capacity might be matched by future demand, economic feasibility might be challenged, for instance, by greater competition for raw materials, higher transport cost and new transaction costs, including requirements for proof of sustainability.
- Wood-based cellulosic biofuel production hasn't reached commercial scale (20,000 gallons – 75,708 litres - in 2012) and is well below current targets for cellulosic transport fuels (500,000 gallons – 1.9 million litres) set out in the US Energy Independence and Security Act.
- The European Commission and energy-sector stakeholders have started to develop new renewable energy targets for 2030 and beyond.



## 9.1 INTRODUCTION

The most recent data from the UNECE/FAO Joint Wood Energy Enquiry (JWEE 2011) show that in 2011 wood energy was the principal source of renewable energy, accounting for 38.4% of all renewables in 28 UNECE member countries (UNECE/FAO, 2013). The largest consumer of wood energy is the forest-based industry (46.8%), followed by the residential (32.6%), and the power-and-heat (18.3%) sectors, though official statistics have tended to underestimate residential use.

The two main sources of wood for energy come from indirect (58.3%) and direct (32.6%) sources. About 40% of all mobilized woody biomass is used for energy in the UNECE region. Average wood energy consumption in the UNECE region was 0.74 m<sup>3</sup>/capita in 2011 (UNECE/FAO, 2013).

## 9.2 CONSUMPTION AND PRODUCTION OF WOOD ENERGY IN THE UNECE REGION

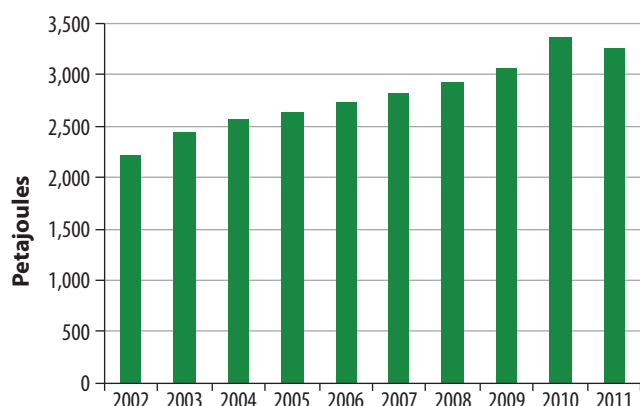
### 9.2.1 Europe

Data from Eurostat (2013) show that the EU27 region produced 3,270 Petajoules (PJ) (327 million m<sup>3</sup>) of energy from wood and wood waste in 2011, a 3.1% decrease from 2010. However, this still represents a 45.6% rise in absolute wood energy consumption since 2002 (graph 9.2.1).

The top-five wood energy producers in the EU27 are Germany (15.0%), France (11.4%), Sweden (10.5%), Finland (9.7%) and Poland (8.1%). The latest data from the JWEE show that the residential sector leads wood energy use in the European subregion (41%), followed by industry (29%), and the power-and-heat sector (28%). Use of wood energy in the power-and-heat sector continues to grow.

**GRAPH 9.2.1**

**EU27 primary energy production from wood and wood waste sources, 2002-2011**



Source: Eurostat, 2013.

Production of wood energy feedstock reached record levels in all South-East European<sup>10</sup> countries in 2012, driven by strong domestic and export demand, almost certainly the result of the prolonged and severe winter of 2011. Wood chips, briquettes and pellets were mainly directed to export markets, while firewood dominated domestic household consumption for heating purposes.

According to preliminary estimates, total firewood production in South-East European countries was 15.1 million m<sup>3</sup> in 2012. Households are the largest category of firewood consumers. For instance, in Serbia, households accounted for 90.1% of firewood consumption and 96.0% in Montenegro (TCP/FAO Project Serbia; Monstat Montenegro, 2013). Companies producing particle board, hardboard and wood pellets compete with households for roundwood supplies.

Wood chip production in 2012 reached 754,000 tonnes, of which 66% were produced in Croatia and Serbia. Over 90% of these wood chips were used directly in power-and/or-heat generation or wood pellet manufacture. Croatia is the leading South-East European country in wood chip production, with 84% exported. Slovenia is the biggest consumer, with about 90,000 tonnes of wood chips used in thermal power and district heating plants, mainly in the capital, Ljubljana. Serbia takes second place, followed by Bulgaria and Bosnia and Herzegovina.

Wood pellet manufacturers are the largest consumers of wood chips in Bulgaria and Bosnia and Herzegovina. Estimated total wood pellet consumption in South-East Europe was 243,000 tonnes in 2012. Bulgaria was the leading consumer, accounting for 33% of total consumption, followed by Slovenia, Serbia and Croatia (graph 9.2.2) (Timber Trade Centre, 2012).

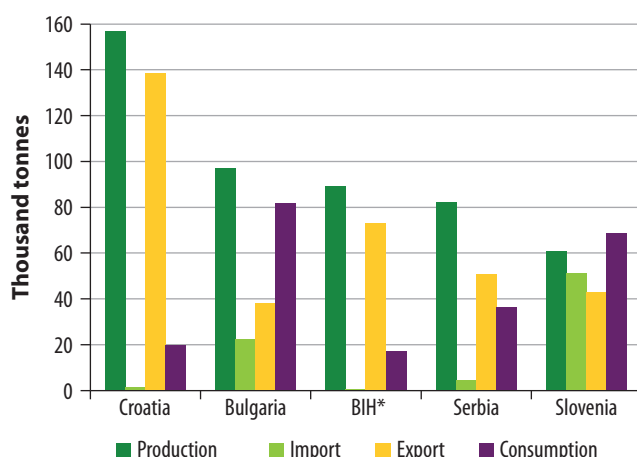
Wood pellet production in South-East Europe has increased steadily for the last five years. In 2012, 78 wood pellet plants with an estimated capacity of over 900,000 tonnes were operational (graph 9.2.2). Wood pellet plants are concentrated in Croatia, Bulgaria, Bosnia and Herzegovina and Serbia. Croatia has the biggest installed wood pellet production capacity. Construction of new wood pellet plants continued in the first three months of 2013, despite the fact that in 2012 wood pellet plants were, on average, operating at about 56% of their capacities. It is possible, that these underutilized capacities could lead to less competitive plants going out of business in the medium term.

<sup>10</sup> Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, Montenegro, Romania, Serbia, Slovenia, The former Yugoslav Republic of Macedonia.



**GRAPH 9.2.2**

**Wood pellet production, export, import and consumption in top five South-East European countries, 2012**



**Note:** \*Bosnia and Herzegovina.

**Source:** Glavonjić, 2012.

With the exception of Montenegro, the former Yugoslav Republic of Macedonia and Slovenia, it's the lack of raw materials that's limiting capacity utilization. Strong competition with the particle board sector has created significant price pressures. For example, the average price of 1 m<sup>3</sup> of sawdust (bulk) in Serbia in December 2012 was roughly €7.50 (Ex works) but in 2008 it was less than €2 (Timber Trade Centre of the Faculty of Forestry, 2013).

## 9.2.2 Commonwealth of Independent States

According to some Russian wood pellet market analysts (Infobio, 2013; National Forest Development and Investment Agency, 2013), the country's domestic consumption of different kinds of wood energy for heat production is growing, including the use of sawmill co-products, firewood, wood briquettes and pellets. Russian wood pellet production is reported to have increased by about 50% and may have reached 1.5 million tonnes in 2012. An estimated 96% of production was exported, mainly (91%) by sea in bulk for industrial consumers primarily in Sweden and Denmark (Infobio, 2013; National Forest Development and Investments Agency, 2013).

Wood pellet production in the Northwestern Federal District (the northern part of European Russia) region showed fast growth. According to the Russian Export Agency, 700,000 tonnes of wood pellets were exported through the port of Vyborg in 2012; mainly by the company VLK (formerly Vyborgskaya Lesopromyshlennaya Korporatsiya).

In Russian Federation's Far East (near Vanino, Khabarovskiy Krai), wood pellet production capacity has increased to 250,000 tonnes of wood pellets per year with an estimated 80,000 tonnes produced in 2012. All volume was exported to the

Republic of Korea (Infobio, 2013; National Forest Development and Investments Agency, 2013). Several small companies located far from Baltic or Arkhangelsk ports have stopped production because of the high transport costs. Despite this, in 2012, the North-West regions's share of wood pellet production increased by 5% to 87% of national production due to logistical advantaged of accessing markets in the Baltic Sea region.

Wood pellet manufacturers in the Russian Federation also find partners in private owners of small- and medium-sized heating systems and local governments. Several medium-sized combined heat-and-power (CHP) plants are now also being built with foreign investment using different types of wood energy products. Co-combustion (with coal) for power production is not used in the Russian Federation.

Wood briquette production has risen by 20% to approximately 300,000 tonnes a year, of which approximately 40% was sold domestically in 2012. In general production capacity is small (<2 tonnes/hour). Wood briquettes are sold for about 60% of the price of wood pellets and are popular in the country's residential market.

In Belarus, the Government is steadily increasing the use of domestic energy sources for heat production (mainly wood energy), which reached an estimated 25% of total energy sources for heating in 2012 (Koistra, 2013). The use of wood energy in district heating is 39.4% of total energy used and on track to reach 54.5% in 2015. In 2012, government-owned forest management units produced about 1 million m<sup>3</sup> of wood chips, the objective being to increase production to 1.5 million m<sup>3</sup> by 2016 (Koistra, 2013).

The country still has untapped potential to increase wood energy production, and lies closer to European markets than the Russian Federation. Firewood, fuel chips, wood briquettes and pellets are produced by public and private companies. In contrast to the Russian Federation, Belarus has no large wood pellet manufacturing facilities but an increasing number of small-sized ones (1-4 tonnes/hour).

## 9.2.3 North America

Canada consumed approximately 226.5 PJ (23 million m<sup>3</sup>) of solid wood co-products for energy and generated approximately 242.9 PJ (24 million m<sup>3</sup>) from pulping liquors in 2011 (Statistics Canada, 2013). About 8% of all Canadian manufacturing is powered by co-products, as well as wood pellets and other wood-based fuels (Statistics Canada, 2012). Wood supplies a fraction of residential heating in Canada (about 4.5% of homes), compared with natural gas (>50%), electricity (34%) and heating oil (9%). This is due to the higher cost of heating with wood (Can\$ 19/GJ) compared with natural gas (Can\$ 10/GJ), although wood compares favourably with electricity (Can\$ 34/GJ) and heating oil (Can\$ 41/GJ) (Wood Pellet Association of Canada, 2013).



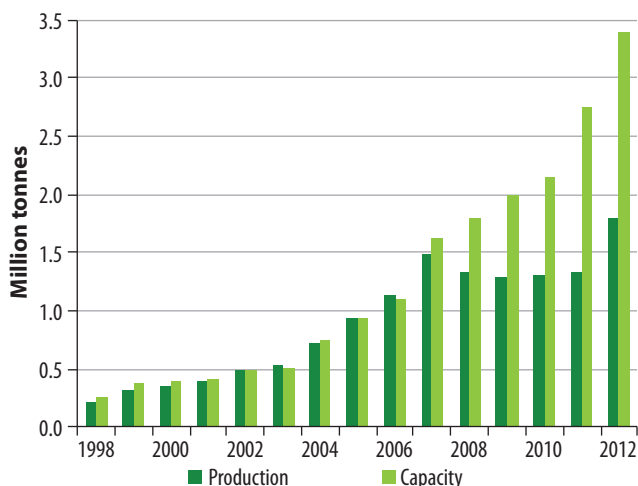
Natural gas prices remain low because of the expansion of shale gas production in the US, coupled with Canada's already sizeable production of natural gas. Canadian production of shale gas has not yet reached commercial status, although various projects are under development (Canadian Association of Petroleum Producers, 2013). The Wood Pellet Association of Canada estimates that a 3% replacement of heating oil and electricity by Canadian households would translate into a 2.3 million tonne per year domestic market for wood pellets.

Graph 9.2.3 shows that wood pellet production capacity in Canada continues to grow, but actual production still lags behind capacity (Wood Pellet Association of Canada, 2013).

Canada had 49 wood pellet plants with estimated capacity of 3.4 million tonnes per year by May 2013 (Biomass Magazine, 2013a). A number of other facilities are in the planning phase potentially adding capacity by as much as 2 million tonnes per year (Wood Pellet Association of Canada, 2013).

### GRAPH 9.2.3

Wood pellet production and capacity in Canada, 1998-2012



Sources: Biomass Magazine, 2013a; Wood Pellet Association of Canada, 2013.

In the US, wood energy consumption was 2,094 PJ (209 million m<sup>3</sup>) in 2012. Consumption has been within 7% of this level since 2001. Over this period, annual residential and electric power use have each increased 50-60 PJ/year (5-6 million m<sup>3</sup>) but annual industrial use has decreased by about 140 PJ (14 million m<sup>3</sup>). The highest level of industrial use was in 1997 at 1,826 PJ (183 million m<sup>3</sup>). Total wood consumption in 2012 was 26% below the 1985 high of 2,835 PJ (284 million m<sup>3</sup>).



Source: UNECE/FAO, 2013.

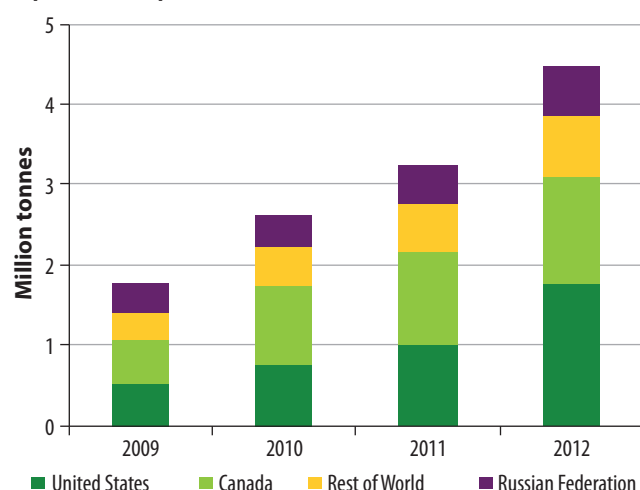
Wood energy continues to decline as a share of renewable energy consumption, contracting from 37% to 22% between 2000 and 2012 as result of the fact that many other forms of renewable energy have grown at a much faster pace (US DOE, 2013b). One of the most dynamic markets for wood energy in the US remains wood pellet manufacturing. Production is about evenly split between residential (domestic) and industrial wood pellets (largely for export) but most recent developments suggest that the production of industrial wood pellets for export will dominate manufacturing.

According to the Biomass Magazine (2013c), wood pellet production capacity in the US amounts to 8.2 million tonnes. The same source reports planned capacities of close to 15 million tonnes. Actual wood pellet production is estimated at 1.7 and 4.0 million tonnes in Canada and the US, respectively (Murray, 2013).

## 9.3 TRADE

### 9.3.1 Trade within the UNECE region

Wood pellets dominate trade of wood energy feedstock with the EU27. The US was the main exporter of wood pellets to the EU27 in 2012, followed by Canada and the Russian Federation (graph 9.3.1). In 2012, total imports into the EU27 from Canada, the Russian Federation, US and the rest of the world reached 4.5 million tonnes. However, trade within the EU27 is still the largest market in the world, accounting for about 4.7 million tonnes of wood pellets (REN21, 2012).

**GRAPH 9.3.1****Imports of wood pellets to EU27, 2009-2012**

Sources: Eurostat, 2013.

The Netherlands imports more than €100 million worth of wood pellets a year from outside the EU27, based on cost insurance and freight delivered to the Amsterdam, Rotterdam and Antwerp region (CIF ARA), making it one of the largest importers. The Government intends to encourage a trebling of biomass imports by 2020 to approximately 2.7 million tonnes of wood pellets per year. However, it's now exploring less expensive options (co-firing has been subsidized for a decade) to reach 2020 renewable energy targets, making trade volumes for the near future unpredictable (Argus, 2013).

Until recently, the residential heating market in the Netherlands was of negligible importance, but in 2012 the number of companies selling 15 kg bags of wood pellets for domestic use more than doubled to around 200. Even though final consumers pay a 21% value-added tax on wood pellet purchases, wood pellets are likely to stay competitive, in particular against natural gas. In the coming years, many small and medium-sized energy power companies might switch to heat from biomass. According to the Dutch and Belgian Renewable Energy Action Plans, Benelux wood pellet consumption will more than double by 2020 to exceed 5.5 million tonnes with an estimated value of about \$1 billion (Flach, 2013).

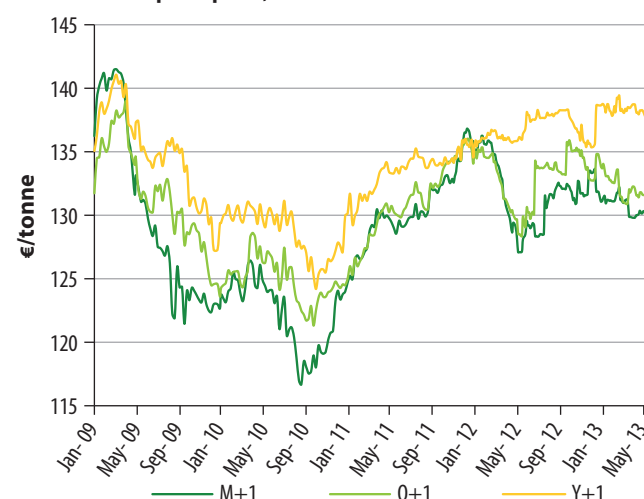
Italy, following its national Renewable Energy Action Plan, is expected to increase use of solid biomass in the heating sector from 1.6 million tonnes in 2010 to 5 million tonnes in 2020. Italy's wood pellet imports increased by 19% in 2012 to just over 1 million tonnes, coming primarily from other EU countries (859,310 tonnes), but there have also been increases in imports from Canada and Bosnia and Herzegovina in particular (Fordaq, 2013).

Total export of wood fuels from South-East Europe in 2012 reached \$296.2 million, of which wood pellets accounted for

23.1%, wood briquettes and other wood residues 18.2% and wood chips 12.7%. Imports of wood fuels (except firewood) reached \$42.4 million.

Principal markets for exports from South-East European countries in 2012 were Italy (61.1%) and Greece (17.8%). Italy has been their major export market, but exports to Greece of pellets and other wood fuels are increasing due to higher oil, electricity and gas prices. Producers and exporters from Bulgaria and Serbia were the most significant suppliers of wood pellets to the Greek market. Bosnia and Herzegovina and Croatia export over 80% of their production, while Serbia exports about 60% of its production (graph 9.3.2).

Prices for industrial wood pellets traded at the ICE Exend in Rotterdam (formerly APEX-Exend) showed stable levels in 2012 and early 2013 compared with past years, with contracts for material to be delivered over the next month (M+1) fluctuating around €130/tonne CIF ARA (graph 9.3.2).

**GRAPH 9.3.2****Industrial wood pellet prices, 2009-2013**

Notes: Prices given in €/tonne based on delivery CIF ARA Rotterdam. M+1=next month price, Q+1=next quarter price, Y+1=next year price.

Source: ICE Exend, 2013.

In the Russian Federation, 2012 saw growth in exports of high quality wood briquettes and pellets by road from the western border regions to central and southern Europe, despite long transport distances and logistical bottlenecks. Also, wood pellets, in addition to chips, are now supplied from Russian Karelia to Finland by road. In contrast to overseas trade (where industrial wood pellets are sold to international traders FOB or FCA), the responsibility for cross-border deliveries to Finland sits with Russian sellers.

The sector has seen major consolidation in recent years, with the number of exporting companies falling from 206 in 2011 to 68 in 2012 (National Forest Development and Investment Agency, 2013). In the North-West Region of the Russian Federation,



export prices by sea transport ranged from €85 - €120/tonne FOB, depending on season and destination. In the country's Far East region, the price was around \$100/tonne FOB.

In Belarus, wood energy exports increased by an estimated 6% (Belarusian Telegraf Agency, 2013). Exports of wood pellets, primarily manufactured by private enterprises, reached 100,000 tonnes in 2012. Many Belarusian companies cooperate closely with partners in Latvia and Lithuania since the Baltic States have several ports with the same gauge-width (1524mm) railways.

### 9.3.2 World market developments influencing production/trade in the region

Prospects for growth in markets in Asia will likely influence production and trade in the UNECE region. In the Republic of Korea, a Renewable Portfolio Standard that aims for 6.1% of energy generation from renewables in 2020 and 11.5% by 2030 (with strict penalties for lack of compliance) may create new markets for industrial wood pellets. Although current wood pellet consumption is negligible in the Republic of Korea, future wood pellet demand may reach 1.6 million tonnes by 2014/15 and possibly 4.5 million tonnes by 2020 (Hawkins Wright, 2012).

Japan is the largest importer of wood pellets in Asia, most of them used in co-firing at power plants. An increase in demand for wood energy in Japan will be triggered by its need to replace nuclear energy.

China has an established wood pellet market but the majority are manufactured domestically with little reliance on imports. However, ambitious renewable energy targets may open new markets there for wood pellet exporters (Roos and Brackley, 2012).

## 9.4 PUBLIC POLICY, SUSTAINABILITY AND TECHNOLOGICAL DEVELOPMENTS

### 9.4.1 Public policy and regulatory developments in the UNECE region

EU Regulation 995/2010 or "Timber Regulation" came into force on 3 March 2013. The regulation prohibits placing illegally harvested timber and timber products, including wood for energy use, on the EU market. Operators, those placing timber products on the EU market for the first time are required to exercise "due diligence", and downstream traders are required to keep information about suppliers and customers, so as to make timber products easily traceable. The legislation covers both wood and wood-based products produced in the EU and those imported to the EU market (EUR-Lex, 2010).

The European Commission (2013a) issued a Green Paper, "A 2030 framework for climate and energy policies", which outlines targets beyond 2020. It stresses that by 2030 greenhouse gas emissions should be reduced by 40% in the EU and by 2050 between 80%-95% in order to be consistent with the internationally agreed target to limit atmospheric warming to below 2°C.

The Green Paper's proposed Energy Roadmap 2050 suggests a share of around 30% in 2030 for renewable energy. It aims to provide certainty and reduce regulatory risk in order to spur investment and create more demand for efficient low-carbon technologies while promoting research, development and innovation.

In response to the Green Paper, the UK Secretary of State for Energy and Climate Change has proposed a more ambitious target to reduce emissions, based on 1990 levels, by 50% by 2030 (UK DECC, 2013).

The price for carbon traded under the EU Emissions Trading System recently experienced a new low, falling from €20 (\$26) a tonne in 2011 to €5 a tonne in early 2013. A price on carbon emissions from power facilities has been used as a tool to reduce the use of fossil fuels under a cap-and-trade system for the EU27, as well as in Norway and Liechtenstein.

Low prices are partly linked to a surplus of emissions allowances (European Commission, 2013b). Nevertheless, greenhouse gas emissions from installations participating in the EU Emissions Trading System have decreased 2% during the first half of 2013.

In one of the most recent developments, the UK Department of Energy and Climate Change has adopted a Carbon Price Floor that was due to take effect from 1 April 2013 (UK DECC, 2013). This is designed to provide an incentive to invest in low-carbon power generation by providing greater support and certainty to the carbon price in the UK's electricity generation sector (UK HM Revenue and Customs, 2013).

In late 2012, the UK Government also relaxed its original plan to cap subsidies once a dedicated biomass plant capacity exceeded 400 megawatts/year of energy generation. According to Vukmanovic, the Government expects this move to mobilize at least \$975 million in biomass projects by giving investors certainty in demand and public support by setting clear subsidy levels for the 2013-2017 period (Vukmanovic, 2012).

In North America, Canada plans to end its subsidy for biofuels in 2017 (Reuters Canada, 2013). This will affect both food-based and wood-based biofuel production, and, as yet, no follow-up programme has been announced that might support emerging technologies for wood-based biofuels.

Canada has also ended its Pulp and Paper Green Transformation Program, which provided Can\$ 1 billion in funding to 24 companies to upgrade facilities, including recovery boilers for more efficient wood to energy generation (NRCan, 2012). No



new wood to energy programmes have been announced at the federal level by the time this review was prepared.

In the US, 16 of the 29 States with renewable portfolio standards are considering legislation that would reduce the need for renewable energy after a drop in natural-gas prices (Martin, 2013). Low natural-gas prices may also affect how much wood energy is consumed by households.

#### 9.4.2 Ensuring wood energy sustainability and feedstock quality

Some energy stakeholders, including some buyers and traders of industrial wood pellets, are calling for clear and harmonized government regulations on sustainability for the feedstocks for bioenergy, as well as its generation and use. Although the Renewable Energy Directive defines sustainability criteria for liquid biofuels, there is no standard for solid or gaseous biofuels among the EU27 members. The European Commission is expected to come forward with a proposal on harmonized sustainability criteria for biomass for power generation and heating and cooling in 2013.

A wide range of sustainability initiatives have been developed which may create confusion among market participants and may cause higher cost to the producer and traders. A global, harmonized approach may facilitate securing sustainable biomass – and biofuels production and trade, so as to avoid indirect effects (e.g. land-use changes). In this context, Pelkmans et al. (2013) proposed the following recommendations:

- Agreement on a common and cross-sector understanding and approach regarding sustainability principles and criteria, as well as certification approaches that keep costs of implementation in perspective.
- Government intervention to ensure legal and international coherence in the form of a multilateral environmental agreement (i.e. translation of standards and certification into public policy instruments).

A milestone in the development of the wood pellet market in the Russian Federation was the issuing of the first DINplus wood pellet quality standard certificate (Ivin, 2013; Glukhovskiy, 2013). In the entire CIS region, only one other company (in the Ukraine) has the certificate. The ENplus certificate, which has become popular in the EU27 for pellets used in residential heating, has yet to be issued in the CIS region.

By the end of 2012, ENplus certified pellets were produced in Austria, Belgium, Canada, Croatia, the Czech Republic, Denmark, France, Germany, Italy, Lithuania, Poland, Portugal, Romania, Slovenia, Slovakia, Spain, Switzerland, the Netherlands, the UK and the US (European Pellet Council, 2013).

In the US, especially in the southern States, where the majority of industrial pellet mills are located, widespread certification systems to assess greenhouse-gas emissions and establish Chain-of-Custody are not common. Mills purchase wood from dozens of different brokers, loggers and landowners (directly and indirectly), which means that adopting Chain-of-Custody certification would require significant financial resources and would take time until it could be fully adopted (Biomass Magazine, 2013b).

All wood pellet contracts traded on the ICE Endex exchange are certified with either the Green Gold Label certification scheme, the Laborelec-SGS Solid Biomass Sustainability Scheme or the Drax Biomass Sustainability Implementation Process to ensure sustainability (ICE Endex, 2013).



Source: Metsä Group, 2013.

#### 9.4.3 Technological innovation in the wood energy sector

Torrefaction (mild thermal treatment of biomass or raw material containing biomass under low-oxygen conditions) might offer the greatest potential for the commercialization of wood energy. The resulting bio-coal can be used directly in traditional coal-fired power plants. Compared to the direct use of biomass as a fuel, bio-coal has enhanced energy, logistic handling and grinding qualities (Dutch Torrefaction Association, 2013).



It's relatively early to work on the standardization of the torrefaction process and bio-coal products and discussions have started within the International Organization for Standardization (ISO). Important aspects for standardizing torrefied biomass include grindability, water-repellent properties, transport-related properties and safety properties.

The Wood Pellet Association of Canada has identified torrefaction as an emerging opportunity for pellet producers (Wood Pellet Association of Canada, 2011). A number of Canadian technology providers are focusing on torrefaction (e.g. Airex Energy, Allied Blower, Torrefied Wood Pellet Equipment Ltd). At least two torrefied wood pellet plants have been announced in Canada: Torrefuels and Diacarbon (which is planning to scale up a pilot pelleting and briquetting system) (Canadian Biomass, 2011; Diacarbon, 2013).

In the US, New Biomass Energy LLC has made its third shipment of torrefied wood pellets to Europe. The estimated shipment of more than 4,000 tonnes will be used in coal-fired power plants. The company has been producing torrefied wood pellets using commercial-scale reactors since early 2012 and is reportedly expanding its production capacity from 150,000 tonnes/year to 250,000 tonnes/year (New Biomass Energy, 2013).

US wood-based cellulosic biofuel production has not reached commercial scale (20,000 gallons (75,708 litres) in 2012) and is well below the current targets for cellulosic transport fuels of 500,000 gallons (1.9 million litres) set forth in the US Energy Independence and Security Act of 2007 (EISA, 2013). Some large energy companies have actually reduced their investments in related research and development. Lack of competitiveness due to low returns on investments compared to fossil fuels has been a major cause for cellulosic fuels not reaching commercial scale (Elgin and Waldman, 2013).

As an exception to this trend, a former paper mill now owned by KiOR has been re-engineered to produce gasoline and diesel from pine chips in Mississippi, US. KiOR (2013) claims its gasoline is also the first renewable cellulosic gasoline registered by the US Environmental Protection Agency for domestic sale and compared with ethanol or biodiesel has no compatibility issues.

## 9.5 CONCLUSIONS AND OUTLOOK

Wood energy markets continued to grow in 2012. Although wood energy consumption from the industrial sector declined slightly, residential and power-sector demands expanded. The EU27 and CIS are poised to see large growth in wood energy consumption, partly driven by renewable energy targets and improvements in investment climates, respectively.

An increasing trend in foreign investment in wood pellet manufacturing in the Russian Federation, as well as in CHP plants reflect confidence in energy markets.

Growth of wood energy production in Canada will continue to be linked to exports of wood pellets. Projections for the US show growth in wood energy use through 2030 but at a rate slower than previous forecasts (US DOE, 2013a).

Wood pellets dominate international wood fuel trade. The EU27 is and will continue to be the largest market in the world for pelletized wood energy. New growth may come from countries including Belgium, the Netherlands and the UK. New and excess capacity in Canada, the Commonwealth of Independent States, South-East Europe and the US should be able to match the growing demand.

New markets in Asia will also drive higher consumption of wood energy and could eventually create price pressures in the global wood energy market. There are signs of current excess capacity in wood pellet manufacturing in North America and South-East Europe, although investments in new plants continue to grow at an exponential rate.

Unutilized manufacturing capacity may be matched with future growth in global wood pellet demand, but manufacturers are likely to face greater competition for raw materials, higher transport charges and higher costs complying with more complex export requirements (particularly to the EU) if sustainability criteria are adopted that may result in additional transaction costs. These may suggest caution in future investments in new wood pellet manufacturing facilities.

A key issue for further development of wood pellet trading appears to be likely requirements for certification of forests and wood used for pellets. Attainable criteria and standards would e.g. facilitate certification. This development will likely take place in the European region. A common EU27 standard might avoid some transaction costs and ease implementation.

Clear regulations about financial support for renewable energy projects and renewable energy mandates will be a driving force for new investment in wood energy. Public policy debate over new targets beyond 2020 will also impact current developments and spur or limit investments primarily in power generation projects. Production of commercial-scale wood-based cellulosic transport biofuels continues to miss public targets. Technological progress has not resulted in the cost improvements necessary for competing with fossil fuels.





## 9.6 REFERENCES

- Argus Biomass Markets. 2013. Issue 13-14, p.8.
- Belarusian Telegraph Agency. 2013. Available at: [www.belta.by/ru/all\\_news/economics/Lesxozy-Belarusi-uvelichili-eksport-pererabotannoj-drevesiny-i-snizili-dolju-kruglyx-lesomaterialov\\_i\\_621418.html](http://www.belta.by/ru/all_news/economics/Lesxozy-Belarusi-uvelichili-eksport-pererabotannoj-drevesiny-i-snizili-dolju-kruglyx-lesomaterialov_i_621418.html)
- Biomass Magazine. 2013a. Canada Pellet plants. Ottawa, Canada. Available at: <http://biomassmagazine.com/plants/listplants/pellet/Canada>
- Biomass Magazine. 2013b. Certification Uncertainty. Ottawa Canada. Available at: <http://biomassmagazine.com/articles/8942/certification-uncertainty>
- Biomass Magazine. 2013c. US Pellet plants. Ottawa, Canada. Available at: <http://biomassmagazine.com/plants/listplants/pellet/US/page:1/sort:state/direction:asc>
- Canadian Association of Petroleum Producers. 2013. Shale Gas. Edmonton, Canada. Available at: [www.capp.ca/canadaIndustry/naturalGas/ShaleGas/Pages/default.aspx](http://www.capp.ca/canadaIndustry/naturalGas/ShaleGas/Pages/default.aspx)
- Canadian Biomass. 2011. Biomass torrefaction technologies. Ottawa, Canada. Available at: [www.canadianbiomassmagazine.ca/component/option,com\\_topcropeditor/task,showissue/issueid,87/magazineid,5/Itemid,131](http://www.canadianbiomassmagazine.ca/component/option,com_topcropeditor/task,showissue/issueid,87/magazineid,5/Itemid,131)
- Diacarbon. 2013. Press release. Available at: [www.diacarbon.com/blog/gaining-momentum-in-the-commercial-phase](http://www.diacarbon.com/blog/gaining-momentum-in-the-commercial-phase)
- Dutch Torrefaction Association. 2013. On Torrefaction of biomass. Available at: <http://torrefactie.nl/en/alle-torrefactie-producten>
- Elgin, B. and Waldman, P. Chevron defies California on carbon emissions. Bloomberg. Available at: [www.bloomberg.com/news/2013-04-18/chevron-defies-california-on-carbon-emissions.html](http://www.bloomberg.com/news/2013-04-18/chevron-defies-california-on-carbon-emissions.html)
- EIA, 2013. Energy Information Administration. Cellulosic biofuels begin to flow but in lower volumes than foreseen by statutory targets. Available at: [www.eia.gov/todayinenergy/detail.cfm?id=10131](http://www.eia.gov/todayinenergy/detail.cfm?id=10131)
- EUR-Lex. 2010. Regulation (EU) No. 995/2010 of the European Parliament and of the Council. Available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:295:0023:0034:EN:PDF>
- European Commission. 2013a. Green paper: A 2030 framework for climate and energy policies. COM(2013) 169 final. 16p. Available at: [http://ec.europa.eu/energy/consultations/doc/com\\_2013\\_0169\\_green\\_paper\\_2030\\_en.pdf](http://ec.europa.eu/energy/consultations/doc/com_2013_0169_green_paper_2030_en.pdf)
- European Commission. 2013b. Climate Action Newsroom: EU ETS: continuing decline in emissions but growing surplus of allowances in 2012. Available at: [http://ec.europa.eu/clima/news/articles/news\\_2013051601\\_en.htm](http://ec.europa.eu/clima/news/articles/news_2013051601_en.htm)
- European Pellet Council. 2013. ENplus certified pellet producers and traders. Available at: [www.enplus-pellets.eu](http://www.enplus-pellets.eu)
- Eurostat. 2013. Supply, transformation, consumption - renewables and wastes (total, solar heat, biomass, geothermal, wastes) - annual data.
- Flach, R. 2013. The Market for Wood Pellets in the Benelux. Global Agricultural Information Network GAIN Report NL3001.
- Fordaq. 2013. Italy's wood pellets imports rise in 2012. Available at: [http://madera.fordaq.com/fordaq/news/WoodpelletsItalyEUsolidbiomass\\_31876.html?Printable=yes](http://madera.fordaq.com/fordaq/news/WoodpelletsItalyEUsolidbiomass_31876.html?Printable=yes)
- Glavonjić, B. 2012. Consumption of wood fuels in households in Serbia – present state and possible contribution to the climate change mitigation, Thermal Science, vol. 15, No. 3, pp.571-585, Belgrade, Serbia.
- Glukhovskiy, V.M. 2013. Technical Director, LesInTech. (personal communication).
- Hawkins Wright. 2012. The current and future demand for industrial wood pellets. USIPA: 2nd Annual Exporting Pellets Conference. New Orleans 29 October 2012.



- ICE Endex. 2013. ICE Endex Wood Pellets. Available at: [www.iceendex.com/market-results/futures-markets/iceendex-wood-pellets](http://www.iceendex.com/market-results/futures-markets/iceendex-wood-pellets)
- Infobio. 2013. The Bioenergy International. Available at: [www.infobio.ru](http://www.infobio.ru)
- Ivin, E.L. 2013. General Director, LesInTech. (Personal communication).
- KiOR. 2013. Press release: KiOR ships first cellulosic diesel. Available at: <http://investor.kior.com/releasedetail.cfm?ReleaseID=749004>
- Koistra, A. 2013. Use of biomass for heat and energy in the Republic of Belarus. Forest Products and Technologies for the Future Seminar. Russian Federal Forestry Agency and the ECE-FAO Forestry and Timber Section. St. Petersburg, Russian Federation 22-24 May 2013. Available at: [www.unece.org/fileadmin/DAM/timber/meetings/20130522/presentations](http://www.unece.org/fileadmin/DAM/timber/meetings/20130522/presentations)
- Martin, C. 2013. US States Turn Against Renewable Energy as Gas Plunges. Bloomberg. Available at: [www.bloomberg.com/news/2013-04-23/u-s-states-turn-against-renewable-energy-as-gas-plunges.html](http://www.bloomberg.com/news/2013-04-23/u-s-states-turn-against-renewable-energy-as-gas-plunges.html)
- Murray, G. 2013. Market and Policy Trends in Europe and North America: A Trans Atlantic Comparison. European Pellet Conference. 27 February 2013. Wels, Austria.
- Monstat Montenegro. 2013. Wood Fuel Consumption In 2011 In Montenegro. New energy balances for wood fuels. Available at: [www.monstat.org/eng/novosti.php?id=840](http://www.monstat.org/eng/novosti.php?id=840)
- National Forest Development and Investments Agency. 2013. Market Research. Available at: [www.nlari.ru](http://www.nlari.ru)
- New Biomass Energy. 2013. Third Bulk Shipment to Europe Announced. Available at: <http://newbiomass.com/2013/01/third-bulk-shipment-to-europe-announced>
- NRCan. 2012. Pulp and Paper Green Transformation Program: Mission accomplished. Ottawa, Canada. Available at: <http://cfs.nrcan.gc.ca/pages/231>
- Pelkmans, L., Goovaerts, L., Smith, C.T., Joudrey, J., Stupak, I., Englund, O., Junginger, M., Sheng Goh, C., Chum, H., Cowie, A. 2013. Task 4: Recommendations for improvement of sustainability certified markets. IEA Bioenergy. Strategic Inter-Task Study: Monitoring Sustainability Certification of Bioenergy. 15 pp.
- REN21. 2012. Renewables 2012. Global Status Report, Pp. 172.
- Reuters Canada. 2013. Canada to end biofuel subsidy in 2017: Report. Ottawa, Canada. Available at: <http://ca.reuters.com/article/domesticNews/idCABRE91M0AP20130223>
- Roos, J. and Brackley, A. 2012. The Asian Wood Pellet Markets. Gen Tech Rep. PNW-GTR-861. Portland, Oregon. US Department of Agriculture, Forest Service, Pacific Northwest Research Station, p. 25.
- Statistics Canada. 2012. Energy fuel consumption of manufacturing industries in gigajoules, by North American Industry Classification System. Ottawa, Canada. Available at: [www5.statcan.gc.ca/cansim/a05?lang=eng&id=1280006](http://www5.statcan.gc.ca/cansim/a05?lang=eng&id=1280006)
- Statistics Canada. 2013. Report on Energy Supply and Demand in Canada - 2011 Preliminary. Ottawa, Canada.. Available at: [www.statcan.gc.ca/pub/57-003-x/57-003-x2010000-eng.htm](http://www.statcan.gc.ca/pub/57-003-x/57-003-x2010000-eng.htm)
- TCP/FAO. 2011. Project: "Wood energy for sustainable rural development" TCP/YUG/3201
- Timber Trade Centre of the Faculty of Forestry. 2013. Wood Energy Market Data in South Eastern European Region. University of Belgrade, Serbia (internal document).
- UK DECC. 2013. UK Department of Energy and Climate Change. UK urges Europe on 50% ambition on emissions reductions. Press release. 28 May 2013. Available at: [www.gov.uk/government/news/uk-urges-europe-on-50-ambition-on-emissions-reductions](http://www.gov.uk/government/news/uk-urges-europe-on-50-ambition-on-emissions-reductions)
- UK HM Revenue and Customs. Carbon price floor. 2013. Available at: [www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/179259/carbon\\_price\\_floor.pdf.pdf](http://www.gov.uk/government/uploads/system/uploads/attachment_data/file/179259/carbon_price_floor.pdf.pdf)



- UNECE/FAO. 2013. Joint Wood Energy Enquiry (JWEE) 2011. United Nations, Geneva. Retrieved on 15 May 2012. Available at: [www.unece.org/jwee](http://www.unece.org/jwee)
- US DOE. 2013a. US Department of Energy. Energy Information Administration. 2013a. Annual energy outlook. 2013. Report DOE/EIA-0383(2013). Available at: [www.eia.gov/forecasts/aeo/data.cfm?filter=renewable#renewable](http://www.eia.gov/forecasts/aeo/data.cfm?filter=renewable#renewable)
- US DOE. 2013b. Energy Information Administration. Monthly energy review, April 2013. Available at: <http://205.254.135.7/totalenergy/data/monthly/#summary>
- Vukmanovic, O. 2012. Britain sets five-year plan to spur solar, biomass energy. Reuters 18 December 2012. Available at: [www.reuters.com/article/2012/12/18/us-renewable-subsidies-britain-idUSBRE8BH0R620121218](http://www.reuters.com/article/2012/12/18/us-renewable-subsidies-britain-idUSBRE8BH0R620121218)
- Wood Pellet Association of Canada. 2011. Torrefied Wood – A new emerging energy carrier. Vancouver, Canada. Available at: [www.pellet.org/linked/2011-03-09%20ccpc%20presentation%20\(2\).pdf](http://www.pellet.org/linked/2011-03-09%20ccpc%20presentation%20(2).pdf)
- Wood Pellet Association of Canada. 2013. Pellet awakening in Canada? Ottawa, Canada. Available at: [www.pellet.org/home/60-pellet-awakening-in-Canada](http://www.pellet.org/home/60-pellet-awakening-in-Canada).







# 10 VALUE-ADDED WOOD PRODUCTS MARKETS

Lead author: *Tapani Pahkasalo*



Contributing authors:

*Peter Aurenhammer,  
Christopher Gaston*



## HIGHLIGHTS

- Value-added, engineered wood products have the potential to provide an effective alternative to building systems that are less green.
- The recovery in value-added wood products markets is uneven, as US imports are growing but Europe remains largely stagnant.
- Furniture production has grown on average 18% per year in emerging market economies, while growth within the UNECE region has been only 1% per year.
- Global furniture trade reached the pre-crisis level of 2008 during 2012 after four years of decline and a slow recovery.
- Furniture manufacturing has not returned to the UNECE region in any significant scale, in spite of talk to the contrary; instead production is increasingly off-shored to countries ranging from China to Viet Nam, Indonesia, etc.
- The Lacey Act case against Gibson Guitars has reached an agreement, giving other companies crucial information about the required control measures, and proving that demand-side forestry regulation in consumer countries can be effective.
- The EU Timber Regulation has been in force since March 2013 and timber traders are starting to implement their due diligence systems; but as of late June 2013, there was little if any EUTR-compliant timber to enter the market.
- Remodelling activity in the US housing markets is at a high level due to work on rental houses and with ageing homeowners retrofitting their houses for changing needs.
- Profiled wood imports to the US increased 28%, although still at low levels, and European markets remained stagnant during 2012.
- Laminated veneer lumber has traditionally used coniferous wood for raw material; however, a new plant in Germany has been constructed to use beech, which provides a ray of hope for forest managers who have lamented the falling marketability of beech.





## 10.1 INTRODUCTION

Value-added wood products (VAWP) are wood products that have been further processed into furniture, builders' joinery and carpentry products (BJC), profiled wood and engineered wood products (EWP). Sometimes they are also called secondary processed forest products. They include I-beams (also called I-joists) with their I-shaped cross section, finger jointed sawnwood, glulam, made of sawnwood glued into beams, and laminated veneer lumber (LVL), which is formed from gluing together sheets of veneer and then re-sawing the laminate to desired dimensions. Cross-laminated timber, which is also an engineered wood product, is covered in chapter 3.

Many of the EWPs have strong credentials for contributing towards a greener economy through wood construction systems that can compete with other non-wood systems that are more carbon intensive. The design values and aesthetics of wood have become visible in areas such as Olympic venues and large multi-storey buildings, profiling wood as material suitable for large-scale modern buildings.

## 10.2 FURNITURE

In 2012, global furniture production reached a value of \$450 billion. China is the largest furniture manufacturing country, followed by the US, Italy and Germany. In 2012, furniture trade amounted to \$122 billion, equalling the pre-crisis level of 2008. The largest furniture importers are the US, Germany, France, the UK and Japan. The Centre for Industrial Studies (CSIL) forecast is for \$130 billion worth in furniture trade in 2013 (CSIL, World Furniture Outlook 2013). Production and trade exceeded the previous forecasts slightly, although the development is uneven among the countries of the UNECE region.



Source: APA, 2013.

CSIL expects the furniture trade to continue growing faster than furniture consumption, as global manufacturers and retailers implement their sourcing strategies and consumption increases in emerging markets. Furniture production has grown dramatically since 2003, on average 18% per year in emerging-market countries.

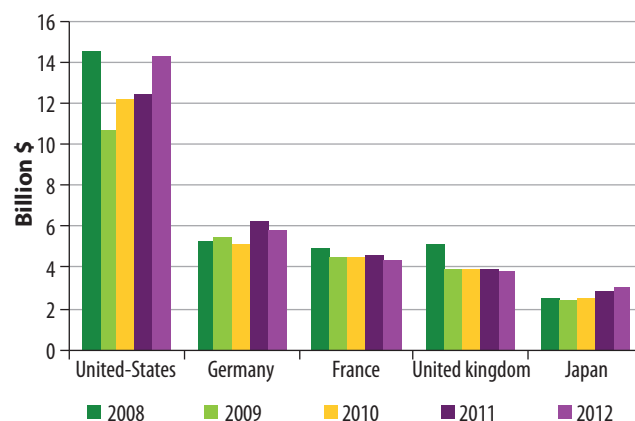
In 2012, household spending for furniture in the US was \$84.2 billion. The estimate for 2013 is \$87.8 billion and spending is expected to cross the \$100 billion value by 2017 (Dana French, 2013). This implies that solid growth in furniture consumption in the US will continue, whereas poor economic growth holds consumption back in Europe.

Furniture imports to the US were \$14.4 billion in 2012, which is still well below the pre-crisis levels of 2007 and 2008. Furniture trade is very sensitive to economic growth and housing construction. Early results for 2013 show that trade has continued to recover in the US. Economic turmoil in Europe continued through 2012, with furniture imports down slightly in Germany and France, and the UK market continuing to be stagnant (graph 10.2.1).

In the US, the share of furniture imported from Asia continues to grow despite the increased talk of a return to domestic furniture manufacturing. This is apparent also in Europe although Germany and France, clearly consume a high share of European-made furniture (table 10.2.1).

GRAPH 10.2.1

Furniture imports for the top five importing countries, 2008-2012



Sources: Eurostat, 2013; Ministry of Trade and Customs of Japan, 2013; US International Trade Commission, 2013.



**TABLE 10.2.1****Furniture imports for the top five importing countries, 2011-2012**

Origin by (%)	(Market shares in percentage and values in billion dollars)									
	United States		Germany		France		United Kingdom		Japan	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Asia	71.6	74.6	16.7	18.0	21.0	23.1	50.2	53.3	88.8	89.1
North America	11.6	9.9	0.2	0.2	0.4	0.4	0.9	1.0	1.0	0.9
Europe	10.3	9.3	82.5	81.4	77.1	75.3	46.9	43.6	10.2	9.9
Latin America	6.2	6.0	0.4	0.3	1.0	0.7	1.7	1.8	0.0	0.0
Others	0.4	0.2	0.2	0.2	0.5	0.5	0.2	0.3	0.0	0.0
Total value of imports	12.4	14.4	6.3	5.9	4.7	4.4	3.9	3.9	2.8	3.1
Of which furniture parts	1.9	1.9	1.5	1.3	0.8	0.8	0.7	0.7	0.5	0.6

Sources: Eurostat, 2013; Ministry of Trade and Customs of Japan, 2013; US International Trade Commission, 2013.

### 10.2.1 Italian furniture industry

In 2012, Italy kept its position as the world's third largest manufacturer of furniture after China and the US (CSIL, 2012). Despite a 10.5% decline in the value of production in 2012 (table 10.2.2), it remains the most important furniture producer in Europe.

Wooden furniture accounts for 37% of the value of the total furniture output. The wooden furniture sector represents 9% of the total employment and 17% of the enterprises in Italy's its manufacturing-sector (FederlegnoArredo, 2013a).

Apparent consumption of furniture in Italy plummeted by 19.4% between 2011 and 2012 (27.2% between 2010 and 2012). The value of apparent consumption also went well below the level of 2009.

**TABLE 10.2.2****Furniture balance in Italy, 2009-2012**

	(Million €)				
	2009	2010	2011	2012	Change (%) 2011-2012
Production	20 528	21 297	20 269	18 140	-10.5
Exports	9 814	10 002	10 433	10 510	0.7
Imports	2 056	3 105	3 167	1 580	-50.1
Apparent consumption	12 770	14 400	13 002	10 479	-19.4
Share of exports (%)	47.8	47	51.5	57.9	12.4

Note: Includes sectors of furniture, bathroom accessories, office furniture and lightning appliances.

Source: FederlegnoArredo, 2013c.

Italian furniture producers offset some of the reduced domestic consumption by increasing exports. France, Germany and the UK remain the three biggest importers. Exports of furniture in 2012 to the US grew by 15.9%, to the United Arab Emirates by 12.1% and to the Russian Federation by 9% (the Russian market looks particularly promising so far in 2013) (FederlegnoArredo, 2013c).

In 2013, further declines in the domestic market are expected (-10.6%). However the Government has approved a measure (May 2013) to allow tax deductions on investments for renovation and furniture replacement. This could potentially increase domestic consumption of furniture by up to 20%, and safeguard 8,000 jobs and 1,800 small businesses in the industry. (FederlegnoArredo, 2013b).

### 10.2.2 Trade-policy issues

In 2003 the American Furniture Manufacturers Committee for Legal Trade filed an antidumping petition against China for wooden bedroom furniture from some major producers there. The resulting antidumping duties were imposed at the beginning of 2005. The US Department of Commerce finalized the administrative review of the wooden bedroom furniture antidumping case in August 2012, which was started in 2010. Chinese furniture manufacturers have had to pay up to 216% duty for bedroom furniture imported from China into the US.

Many Chinese companies have chosen to stop wooden bedroom furniture exports to the US. Observers see that the interests of the US furniture industry have not been served well, as the furniture companies have relocated the production to Viet Nam, Indonesia and other countries that are not subject to similar duties (Furniture Today, 2012).

The Lacey Act was amended in 2008 to control illegal wood product imports to the US and the first test trial was against guitar manufacturer Gibson Guitars (Clarke & Grant, 2012).

The EU Timber Regulation (EUTR) came into force in March 2013. It requires companies that place wood and wood products on the EU markets to exercise due diligence in the acquisition of products and prohibits placing illegally harvested timber on the market. The due diligence requires that there be access to information, risk assessment and risk mitigation. Both the EUTR and Lacey Act have potential implications for the furniture industry (see chapter 2 for more on the Lacey Act and the EUTR).

## 10.3 ENGINEERED WOOD PRODUCTS

In addition to the EWPs covered in this chapter (I-beams, finger-jointed structural sawnwood, glulam and laminated veneer lumber), there are other structural composite lumber products. These include Parallel Strand Lumber (PSL), Laminated Strand Lumber (LSL) and Oriented Strand Lumber (OSL). Each of these products is made from strands of wood of varying lengths and widths to achieve different strength and stiffness properties.

PSL and LSL have been manufactured for several years, mainly by one company in North America, and production volumes have been relatively low compared with other engineered wood products. Cross-laminated timber is covered in chapter 3 of this publication.

All of the EWPs covered in this chapter are heavily dependent on new residential construction but also on non-residential building construction (especially in Europe). A third market is repair and remodelling of homes.



Source: UPM, 2013.

### 10.3.1 Europe

Although EWP production and demand in Europe has at best flattened in 2012, these products continue to enhance the use of wood and support its potential as a “green” building material, notably in industrial and public buildings, and in multi-family dwelling applications.

#### 10.3.1.1 Glulam

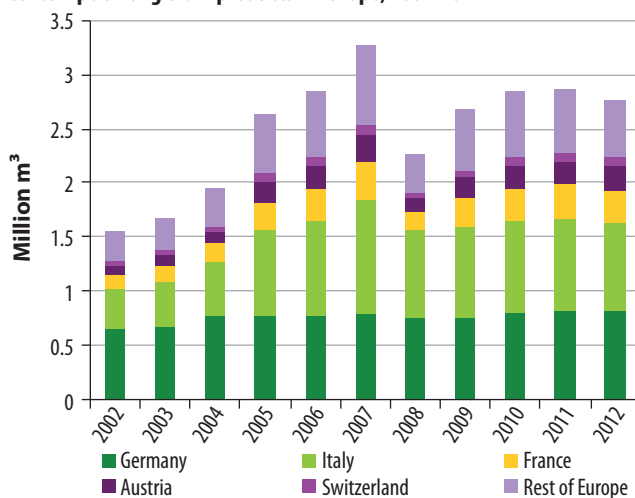
Glulam (Glued laminated timber) continues to be the EWP with the largest share in Europe. Some glulam is exported to Japan, but largely it continues to be a subregional market. Germany and Austria have traditionally been the key markets for glulam, and Italy showed rapid growth in consumption of glulam prior to 2007 (graph 10.3.1). However, Italy’s glulam consumption has been affected by the country’s economic downturn and decline in construction activity. For 2012 Italy’s glulam consumption is estimated at 800,000 m<sup>3</sup> (down 6% from 2011).

High statistical uncertainties occur when comparing the 2011 and 2012 export and import statistics of Austria, Germany and Italy. For example, Austrian export statistics show glulam exports to Italy have grown by 17.2% while Italian import statistics show a reduction of 15% (Holzkurier, 2013a, 2013c).



Source: Pölkky Oy, 2013.

**GRAPH 10.3.1**  
Consumption of glulam products in Europe, 2002-2012



Sources: EUWID, 2011, 2012; Holzkurier, 2011, 2012a; Studiengemeinschaft Holzleimbau, 2012; Pöry, 2012, 2013.

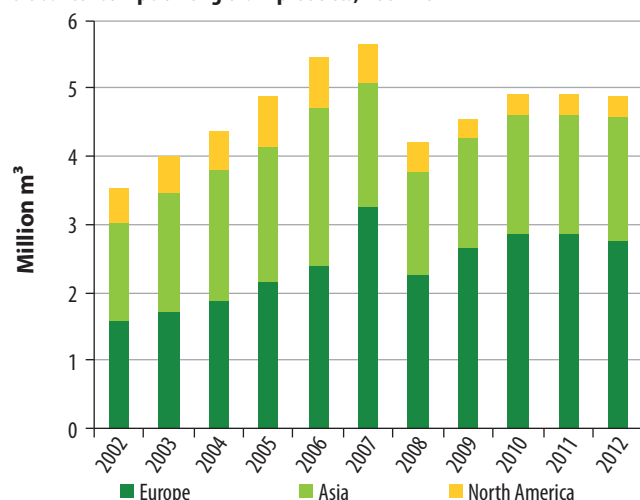
Consumption of glulam in Eastern Europe remains low, despite growth potential. Glulam production in both Austria and Germany grew steadily over the period 2000-2010. Overall production capacity in Europe is growing (Holzkurier, 2013b). As a result, producers have focused strongly on increasing exports to France, Italy and Japan as the main potential markets (graphs 10.3.1 and 10.3.2).

In 2012, export of glulam to Japan declined for Austria by 7.9% and for Finland by 5% (Holzkurier, 2013c; Suomen Liimapuuyhdistys, 2013).

Finland is among Europe's largest glulam producers. In 2012, production dropped by 9% from 2011, to 302,000 m<sup>3</sup>. Sales in Finland were 41,500 m<sup>3</sup> and exports to the rest of Europe were at 46,500 m<sup>3</sup>. Exports to non-European countries (Japan) were down almost 5% to 214,000 m<sup>3</sup>. Exports to European countries declined by 14% (Suomen Liimapuuyhdistys, 2013).

**GRAPH 10.3.2**

**Global consumption of glulam products, 2002-2012**



**Sources:** EUWID, 2011, 2012; Holzkurier, 2011, 2012a; Studiengemeinschaft Holzleimbau, 2012; Pöyry, 2012, 2013.

### 10.3.1.2 Laminated veneer lumber

Several products compete with glulam, such as laminated veneer lumber (LVL), which has gained importance thus far only in northern Europe. However, in 2013 Pollmeier in Germany is expected to start LVL production from beech, starting with 150,000 m<sup>3</sup> of production capacity.

Beech LVL has technical advantages compared with spruce glulam (improved bending strength of up to 53%). The price should be below 700 €/m<sup>3</sup> (Holzkurier, 2013d). This could be an interesting option for additional value-added from beech, given the relatively low marketability of beech sawnwood and roundwood.

### 10.3.1.3 Finger-jointed structural timber

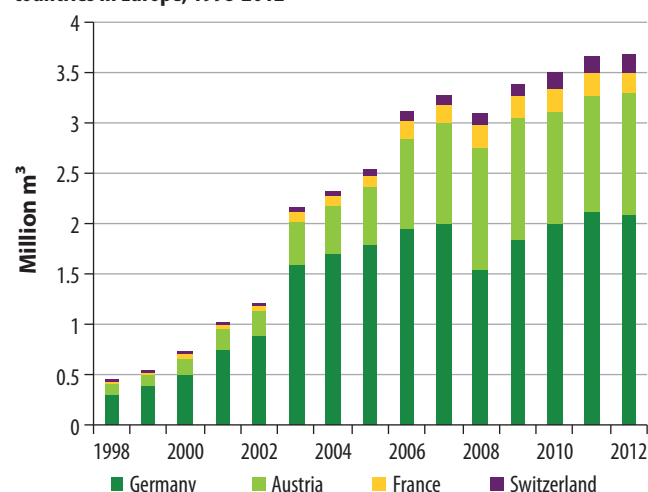
Finger-jointed structural timber also enjoys a significant market share in central Europe. Production is mainly located in Austria and Germany and the highest demand is in the German domestic market (graph 10.3.3).

In 2012, production in Austria and Germany increased by 3.8% (+94,000 m<sup>3</sup>) over 2011, to a total of 2.6 million m<sup>3</sup>. This shows a positive trend but not as high as expected in early 2012.

Shrinking demand and competition (i.e. in southern Germany) have led to reduced growth rates. Additional finger-jointed production capacity is expected, but some capacity projects are on hold. For 2013, a growth rate of 3.5% in production is expected (Holzkurier, 2013a). Finger-jointed sawnwood continues to take some of the market share of traditional construction timber.

**GRAPH 10.3.3**

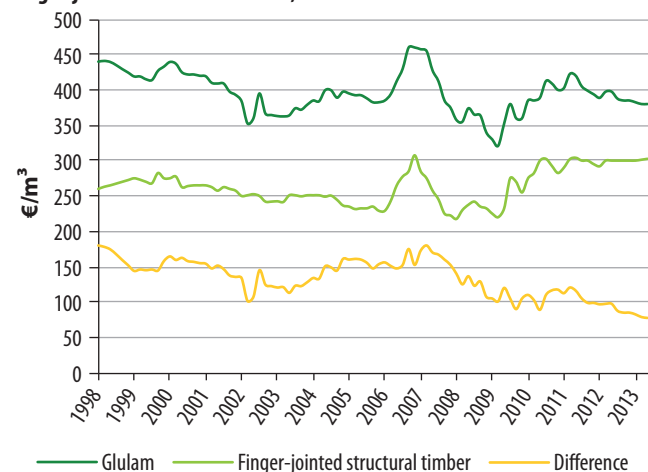
**Consumption of finger-jointed structural timber products in four countries in Europe, 1998-2012**



**Sources:** EUWID, 2011, 2012; Holzkurier, 2012b; Pöyry, 2012, 2013.

**GRAPH 10.3.4**

**Nominal price in Germany and price difference between glulam and finger-jointed structural timber, 1998-2012**



**Note:** Price difference not adjusted for inflation.

**Source:** EUWID, 2012, 2013.

A comparison between the prices of glulam and finger-jointed structural timber in Germany shows that the price differential between the two products has narrowed from as much as 180 €/m<sup>3</sup> to less than 70 €/m<sup>3</sup>, between 1998 and 2012 (graph 10.3.4) (EUWID, 2013). These two products are not generally



competing against one another for most end uses, although they both utilize sawnwood as a raw material. It is interesting to note that prices for finger jointed structural sawnwood have generally gained ground on glulam since 1998.

### 10.3.2 North America

Engineered wood products in North America have shown a modest recovery since the bottoming out of building construction activity in 2009-2010. The information presented in this section on the use of EWP's is available from reports on new residential construction and repair and remodelling in North America published by the Wood Products Council. These reports are noted in the References (section 10.5).

#### 10.3.2.1 Glulam

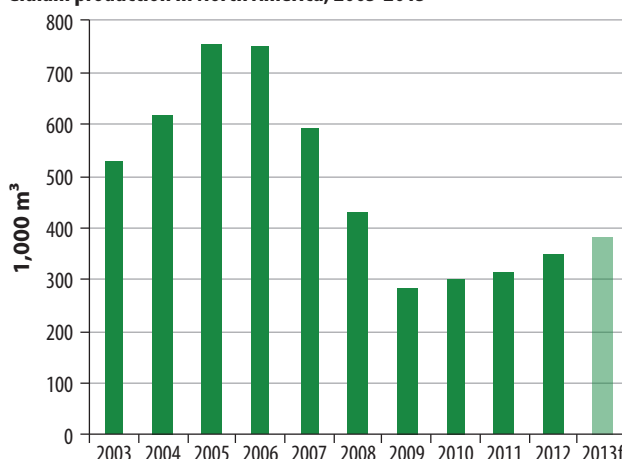
Overall production of North American glulam collapsed from 750,000 m<sup>3</sup> in 2006 to 285,000 m<sup>3</sup> in 2009. Production has shown significant gains since the collapse and is forecast to be roughly 380,000 m<sup>3</sup> in 2013 (graph 10.3.5, table 10.3.1). Glulam end use in 2012 was split between new residential and remodelling (51%), and non-residential other (49%) (APA, 2013).



Source: APA, 2013.

GRAPH 10.3.5

Glulam production in North America, 2003-2013



Notes: Conversion: 650 board feet per m<sup>3</sup>. f=forecast.

Sources: APA, 2013.

TABLE 10.3.1

Glulam consumption, production and trade in North America, 2011-2013

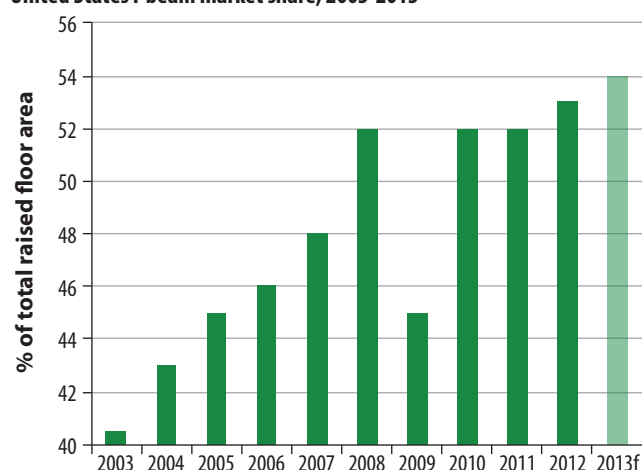
	(1,000 m <sup>3</sup> )			
	2010	2011	2012	Change (%) 2011-2012
<b>United States</b>				
Consumption				
Residential	106.2	141.5	175.4	33.2
Non-residential	138.5	149.2	150.8	7.7
Industrial/other	18.5	20.0	21.5	8.1
Total	263.1	310.8	347.7	18.1
Exports	1.5	1.5	1.5	0.0
Imports	-4.6	-6.2	-7.7	34.8
Inventory change	23.1	7.7	7.7	-66.7
Production	283.1	313.8	349.2	10.8
<b>Canada</b>				
Consumption	23.1	26.2	23.1	13.4
Exports	6.2	7.7	9.2	24.2
Production	29.2	33.8	32.3	15.8
Total production	312.3	347.7	381.5	11.3

Notes: Conversion: 650 board feet per m<sup>3</sup>. f=forecast. Canadian imports assumed to be minimal.

Source: APA, 2013.

#### 10.3.2.2 Wooden I-beams

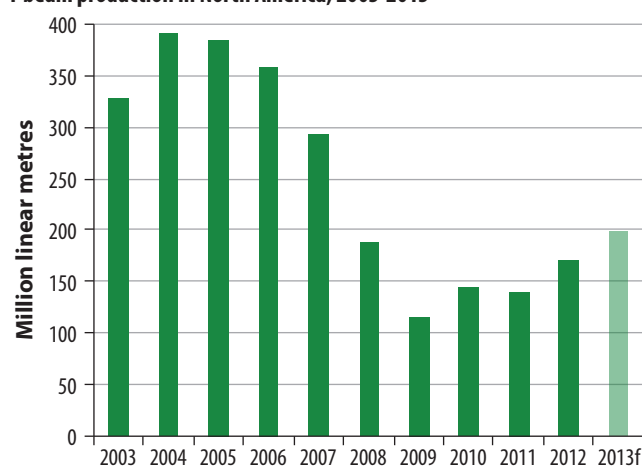
New home construction accounts for 80% of wooden I-beam sales, mostly for single-family dwellings. Builder surveys indicate that the I-beam share of raised wood floor area (does not include concrete floor area) has remained at roughly 52% for four out of the past five years (graph 10.3.6). The market share was only 16% in 1992.

**GRAPH 10.3.6****United States I-beam market share, 2003-2013**

**Notes:** Wooden I-beam market share of total raised floor area, single family homes. f=forecast.

**Sources:** APA, 2013; NAHB, 2013.

The practical and peak production of I-beams was reached in 2004 (with 391 million linear metres). When the US housing bubble burst, I-beam demand and production declined. Roughly 115 million linear metres were produced in 2009, with significant increases since then. The forecast for 2013 is 198.5 million linear metres, a 71% increase from 2009 (graph 10.3.7, table 10.3.2). I-beam end use in 2012 was 95% residential and remodelling, and 5% non-residential other (APA, 2013).

**GRAPH 10.3.7****I-beam production in North America, 2003-2013**

**Notes:** Conversion: 3.28 linear feet per metre. f=forecast.

**Sources:** APA, 2013.

**TABLE 10.3.2****Wooden I-beam consumption and production in North America, 2011-2013**

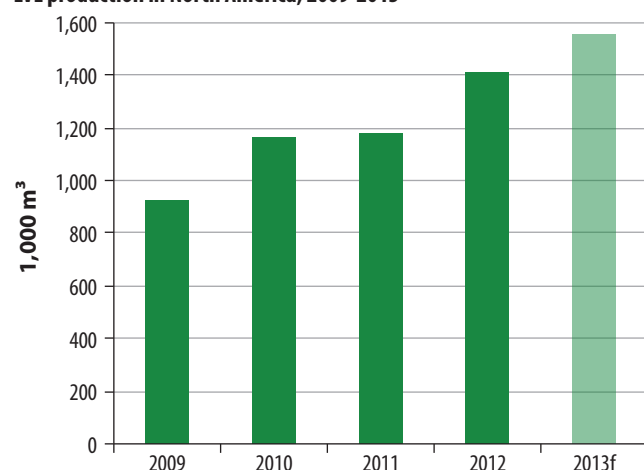
	(Million linear metres)			
	2011	2012	2013f	Change (%) 2011-2012
<b>United States</b>				
Consumption				
New residential	85.4	103.7	132.9	21.4
Repair and remodelling	3.4	4.0	4.3	17.6
Non-residential/other	6.4	6.4	6.7	0.0
Total	95.1	114.0	143.9	19.9
Production	89.3	109.5	129.9	22.6
<b>Canada</b>				
Consumption	28.4	34.8	31.7	22.5
All exports	16.8	19.8	16.8	17.9
Inventory change	-0.9	0.6	6.1	166.7
Production	50.0	60.1	68.6	20.2
Total production	139.3	169.5	198.5	21.7

**Notes:** Conversion: 3.28 linear feet per metre. f=forecast.

**Source:** APA, 2013.

### 10.3.2.3 Laminated veneer lumber

Most laminated veneer lumber (LVL) is eventually used in new home construction. In 2012, 73% was used for beam and header applications, and the balance for I-joist flanges. A small amount is classified as industrial rim boards (included in the beam and header category). Rim boards are used on the perimeter of an I-beam floor system to provide a fastening point for I-beams and to assist in distribution of loads from walls.

**GRAPH 10.3.8****LVL production in North America, 2009-2013**

**Notes:** Conversion: 35.3137 cubic feet per m³. f=forecast.

**Sources:** APA, 2013.

Production peaked along with the US housing market in 2005 at 2.6 million m<sup>3</sup>. Since then, it has declined along with I-beam production and the housing market. An estimated 1.6 million m<sup>3</sup> is forecast to be produced in 2013, up 68% from 2009 (graph 10.3.8, table 10.3.3).

LVL is a well-accepted product for beams and headers and growth should return with an improved housing market. Like other EWP's, LVL allows the use of longer spans and fewer pieces to carry the same loads than do other conventional wood products. This is a specific market advantage for long-span LVL and glulam products in public and industrial/commercial buildings.

**TABLE 10.3.3****LVL consumption and production in North America, 2011-2013**

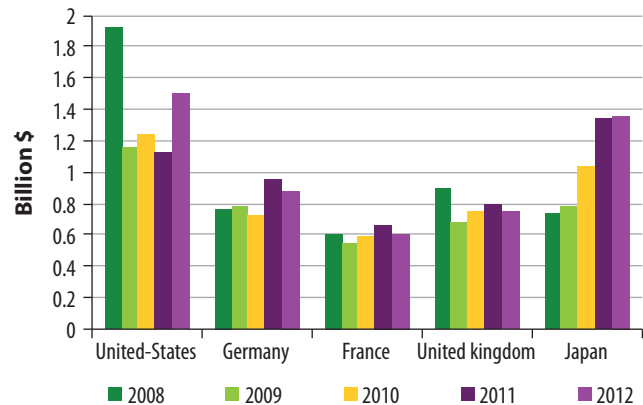
	(1,000 m <sup>3</sup> )			
	2010	2011	2012	Change (%) 2011-2012
<b>Demand</b>				
I-beam flanges	301.3	379.5	455.9	25.2
Beams, headers, others	876.7	1 033.6	1 098.7	17.9
Total demand	1 178.0	1 413.0	1 554.6	19.9
<b>Production</b>				
United States	1 078.9	1 305.4	1 430.0	21.0
Canada	99.1	107.6	124.6	8.6
Total production	1 178.0	1 413.0	1 554.6	19.9

**Notes:** Conversion: 35.3137 cubic feet per m<sup>3</sup>; f=forecast.

**Source:** APA, 2013.

## 10.4 BUILDERS' JOINERY, CARPENTRY AND PROFILED WOOD

Builders' joinery and carpentry (BJC) markets recovered rapidly (33% growth compared to previous year) in the US, but European markets declined during 2012. Asian exporters seem to be the sole beneficiaries of the growing demand in the US as the demand concentrates on the more economic products. The European markets are mainly supplied by European producers (graph 10.4.1 and table 10.4.1).

**GRAPH 10.4.1****Builders' joinery and carpentry imports for the top five importing countries, 2008-2012**

**Notes:** Conversion: 35.3137 cubic feet per m<sup>3</sup>. f=forecast.

**Sources:** APA, 2013.

**Sources:** Eurostat, 2013; Ministry of Trade and Customs of Japan; US International Trade Commission, 2013.

The Leading Indicator of Remodeling Activity (LIRA) in the US remained flat almost through 2010-2012 but is now showing promising signs. During the last two quarters of 2012, LIRA was developing well and the forecast for 2013 is for a healthy 20% improvement (LIRA, 2013). Many investors have bought foreclosed properties and are now carrying out the repairs to rent them out while the US economy is slowly recovering. This is expected to boost the remodelling market in the US, which is a significant market for BJC (US Housing Stock, 2013).

Another interesting group are older homeowners, who are retrofitting houses to meet their future needs. A decade ago, homeowners of over 55 years of age accounted for less than one third of all home improvement spending. By 2011, this share had already grown to over 45% (Kermit F. Baker, Director of the Remodeling Futures Program).



**TABLE 10.4.1****Builders' joinery and carpentry imports for the top five importing countries, 2011-2012**

	(Market shares in percentage and values in billion dollars)									
	United States		Germany		France		United Kingdom		Japan	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Total value of imports	1.1	1.5	1.0	0.9	0.7	0.6	0.8	0.7	1.3	1.4
<b>Origin by (%)</b>										
Asia	19.4	33.9	10.2	12.1	15.2	13.2	31.5	35.7	63.2	69.0
North America	58.0	47.4	0.2	0.2	0.6	0.8	2.7	2.2	2.7	2.6
Europe	6.0	4.6	88.7	86.9	79.9	83.0	60.5	57.5	29.9	24.5
Latin America	16.4	13.9	0.1	0.0	3.5	2.1	2.8	3.1	0.0	0.0
Others	0.1	0.2	0.7	0.7	0.7	0.9	2.5	1.5	4.1	3.9

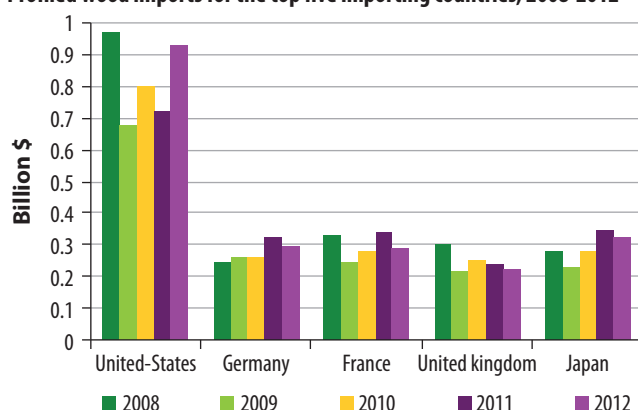
**Sources:** Eurostat, 2013; Ministry of Trade and Customs of Japan, 2013; US International Trade Commission, 2013.

Profiled wood markets (table 10.4.2, graph 10.4.2) did not see any drastic movements in 2012, although US imports increased about 28% over 2011. From 2006 to 2009, the US import market for profiled wood declined by more than 60% and the market

is still less than what it was in 2002. Other UNECE-region main markets declined during 2012. Consumption follows housing construction. No improvement can be expected before general economic activity picks up.

**TABLE 10.4.2****Profiled wood imports for the top five importing countries, 2011-2012**

	(Market shares in percentage and values in billion dollars)									
	United States		Germany		France		United Kingdom		Japan	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012
Total value of imports	0.7	0.9	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.3
<b>Origin by (%)</b>										
Asia	25.1	22.6	26.9	25.1	12.6	15.5	53.1	60.7	83.0	82.8
North America	1.2	9.9	1.4	1.2	0.6	0.3	4.3	3.0	7.0	7.5
Europe	3.1	2.6	61.6	64.5	57.4	58.9	39.7	34.3	5.7	4.6
Latin America	70.3	62.8	7.8	6.3	27.3	24.1	2.3	1.7	3.6	4.4
Others	0.4	2.1	2.4	2.9	2.1	1.3	0.6	0.3	0.6	0.7

**Sources:** Eurostat, 2013; Ministry of Trade and Customs of Japan, 2013; US International Trade Commission, 2013.**GRAPH 10.4.2****Profiled wood imports for the top five importing countries, 2008-2012****Sources:** Eurostat, 2013; Ministry of Trade and Customs of Japan; US International Trade Commission, 2013.

## 10.5 REFERENCES

- APA - The Engineered Wood Association. 2013. Structural Panel and Engineered Wood Yearbook. APA Economics Report E175. Available at: [www.apawood.org](http://www.apawood.org)
- Clarke & Grant, World Resources Institute, 2012. Available at: [www.insights.wri.org/news/2012/08/gibson-guitar-logging-bust-demonstrates-lacey-acts-effectiveness](http://www.insights.wri.org/news/2012/08/gibson-guitar-logging-bust-demonstrates-lacey-acts-effectiveness)
- CSIL. 2013. World Furniture Outlook 2013. Available at: [www.csilmilano.com](http://www.csilmilano.com)
- Dana French. 2013. Furniture Today. Available at: [www.furnituretoday.com](http://www.furnituretoday.com)
- Eurostat. 2013. External Trade. Available at: <http://epp.eurostat.ec.europa.eu>
- EUWID. 2011. Wood Products and Panels. Available at: [www.euwid-wood-products.com](http://www.euwid-wood-products.com)
- EUWID. 2012. Wood Products and Panels. Available at: [www.euwid-wood-products.com](http://www.euwid-wood-products.com)
- EUWID. 2013. Wood Products and Panels. Available at: [www.euwid-wood-products.com](http://www.euwid-wood-products.com)
- FederlegnoArredo. 2013a. Brochure Istituzionale 2013. Available at: [www.federlegno.it](http://www.federlegno.it)
- FederlegnoArredo. 2013b. Comunicati Stampa 2013. Available at: [www.federlegno.it](http://www.federlegno.it)
- FederlegnoArredo. 2013c. Consuntivi Annuali 2012. Available at: [www.federlegno.it](http://www.federlegno.it)
- Furniture Today. August 2012. Available at: [www.furnituretoday.com](http://www.furnituretoday.com)
- Holzkurier. 2011. Nr. 38. 2011er Prämisse. Available at: [www.timber-online.net](http://www.timber-online.net)
- Holzkurier. 2012a. Nr. 19. Wieder 30% mehr. Available at: [www.timber-online.net](http://www.timber-online.net)
- Holzkurier. 2012b. Nr. 17. Produktion um 6% gestiegen. Available at: [www.timber-online.net](http://www.timber-online.net)
- Holzkurier. 2013a. Nr. 12. KVH wächst langsam weiter. Available at: [www.timber-online.net](http://www.timber-online.net)
- Holzkurier. 2013b. Nr. 7. Produktionserhebung. Available at: [www.timber-online.net](http://www.timber-online.net)
- Holzkurier. 2013c. Nr. 11. Um 9 % weniger produziert. Available at: [www.timber-online.net](http://www.timber-online.net)
- Holzkurier. 2013d. Nr. 1/2. Im Herbst kommt Buchen-FSH. Available at: [www.timber-online.net](http://www.timber-online.net)
- LIRA. 2013. Leading Indicator for Remodeling Activity. Available at: [www.jchs.harvard.edu/leading-indicator-remodeling-activity-lira](http://www.jchs.harvard.edu/leading-indicator-remodeling-activity-lira)
- NAHB. 2013. National Association of Home Builders. Available at: [www.nahb.org](http://www.nahb.org)
- Pöyry. 2012. Management Consulting Databases. Available at: [www.poyry.com](http://www.poyry.com)
- Pöyry. 2013. Management Consulting Databases. Available at: [www.poyry.com](http://www.poyry.com)
- Studiengemeinschaft Holzleimbau. 2012. Classified address lists. Available at: [www.brettschichtholz.de](http://www.brettschichtholz.de)
- Suomen Liimapuuyhdistys. 2013. Available at: [www.suomenliimapuuyhdistys.fi](http://www.suomenliimapuuyhdistys.fi)
- Ministry of Finance and Customs Japan. 2013. Japan Imports of Commodity by Country. Trade Statistics of Japan. Available at: [www.customs.go.jp/toukei/info/tsdl\\_e.htm](http://www.customs.go.jp/toukei/info/tsdl_e.htm)
- US International Trade Commission, 2013. Available at: [www.usitc.gov](http://www.usitc.gov)
- US Housing Stock. 2013. Ready for Renewal. Improving America's Housing, 2013. Joint Center for Housing Studies of Harvard University. Available at: [www.jchs.harvard.edu/sites/jchs.harvard.edu/files/harvard\\_jchs\\_remodeling\\_report\\_2013.pdf](http://www.jchs.harvard.edu/sites/jchs.harvard.edu/files/harvard_jchs_remodeling_report_2013.pdf)
- Wood Products Council. 2009a. Wood Used in New Residential Construction US and Canada. February. Available at: [www.apawood.org](http://www.apawood.org)
- Wood Products Council. 2009b. Wood Used In Residential Repair and Remodeling US and Canada. February. Available at: [www.apawood.org](http://www.apawood.org)









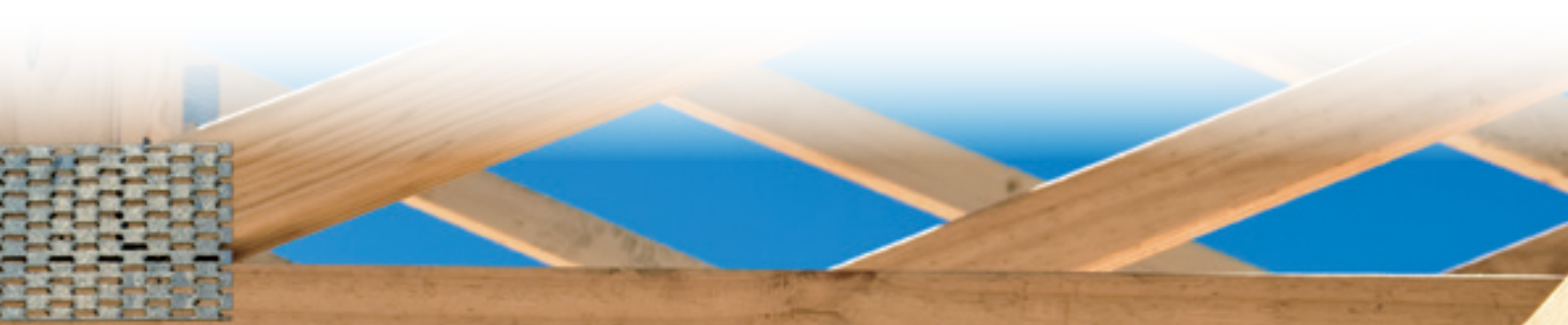
# 11 HOUSING AND CONSTRUCTION MARKETS

Lead author: *Delton Alderman*



## HIGHLIGHTS

- The UNECE region's economic recovery has been sluggish; national income in more than half of the region's countries has yet to return to 2008 levels and unemployment remains high.
- Numerous risks remain that could endanger even moderate growth in 2014 and beyond as the eurozone crisis appears to be deepening.
- Further deterioration in the eurozone or an economic downturn in a major country might have significant implications not only for the European Union but also for the global economy.
- The European housing construction market is still stagnant due to the ongoing sovereign debt crisis, a recession in several countries and the lingering effects of the collapse of the Spanish and Irish housing markets. Growth estimates are negative for new housing and remodelling in 2013 - with improvement in new housing not expected until 2014 at the earliest.
- Uncertainties about the sovereign debt crisis and a lack of confidence in several European countries, in addition to increasing unemployment, low consumer sentiment, tightened loan requirements and adverse income prospects, have contributed to the unstable performance of the European housing markets. This may hinder a robust housing recovery in Europe.
- The United States housing market is improving; yet, to place things in perspective, housing starts remain at historically low levels.
- United States home prices are increasing year on year; the Standard & Poor's 10- and 20-City Composites have increased 10.3% and 10.9%, respectively.
- North American building material demand and prices have increased substantially from their 2010 levels. Canadian and United States forest-product exports are stable, particularly due to Chinese imports. North American forest-product firms also are benefitting from the improving United States housing market.
- Canada's economic fundamentals slowed in late 2012 and this trend is expected to continue into 2013. Forecasts suggest modest housing demand, with a resulting decline in housing starts in 2013.





## 11.1 BRIEF OVERVIEW OF THE ECONOMIC SITUATION IN THE UNECE REGION IN 2012-2013

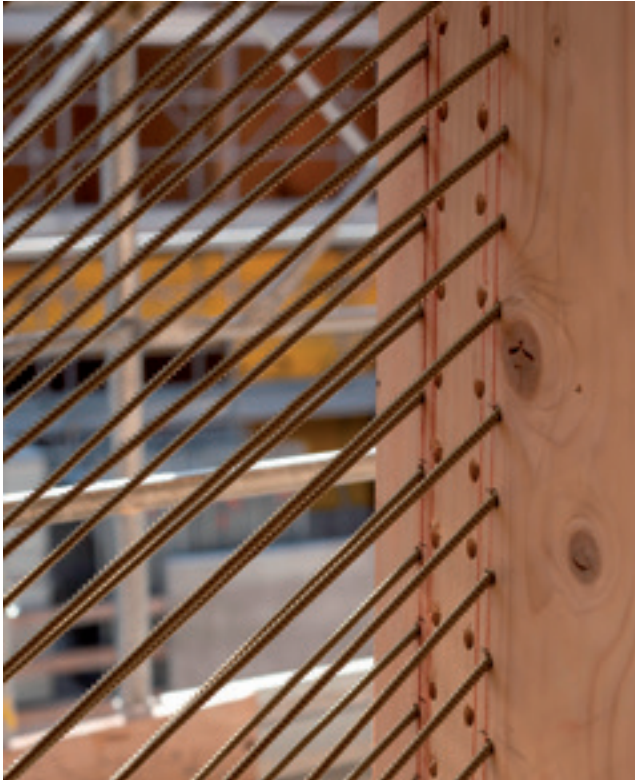
Prospects are uneven for the UNECE Region. According to the World Bank (2013), the global economy is transitioning into what may be a smoother and less volatile period. In the developed and high-income countries such as in Europe, growth is being restrained by weak consumer and business confidence, along with continued banking-sector and fiscal restructuring. In the United States, the economy is improving incrementally. However, a private-sector recovery may be negatively affected by fiscal tightening from State and Federal Governments.

The World Bank estimates the world's 2012 gross domestic product (GDP) growth at 2.3% and forecasts a 2.2% increase for 2013. The projections are 3.0% for 2014 and 3.3% for 2015.

In the US, GDP growth for 2012 was 2.2%; with an estimate of 2.0% for 2013 and projections of 2.8% for 2014 and 3.0% for 2015.

The eurozone is struggling and future projections are weak: -0.5% for 2012; an estimate of -0.6% for 2013; and 0.9% for 2014 and 1.5% for 2015.

The prospects for the Russian Federation's economy are brighter, with an estimated GDP growth of 3.4% in 2012 and 2.3% for 2013. Projections for 2014 are 3.5% and 3.9% for 2015.



Source: proHolz Austria, 2013.

## 11.2 EUROPEAN CONSTRUCTION MARKET

### 11.2.1 Review and outlook

Overall, the European<sup>11</sup> housing market is at best stagnant and is "strongly influenced by macroeconomic events" (Euroconstruct, 2012; 2013). It's affected by prior overbuilding, chronic unemployment in several countries; low consumer sentiment, and the sluggish economy in member countries.

For instance, Spain's overbuilding led to a housing crash, which has become a drag on the economy and on other countries' construction sectors. Prospects for the subregion's housing markets have been revised downwards from previous forecasts. This is in part a result of the downgrading in the region's current and future GDP. New housing starts are not projected to reach the symbolic 1.5 million units until well after 2015.

In addition, within this modest projection, over 70% of the construction is expected to occur in five countries: Germany, France, Italy, the United Kingdom, and Spain. Countries projected to have a positive construction outlook in 2013 are Norway, Germany, United Kingdom, Austria, Switzerland and Belgium. However, only Germany and the United Kingdom are estimated to have robust construction markets through to 2015. In 2013 significant construction decreases are estimated for Spain, Portugal, Ireland and the Czech Republic (Euroconstruct, 2013). Allen (2013) reports that construction conditions don't seem to be improving, as construction decreased by 7.9% and by 7.2% in the EU27 from March 2012 to March 2013.

Remodelling garnered the largest share of construction activity in 2012, nearly 61% of the total. In Eastern Europe, about 66% of building activity is new construction, versus nearly 33% in Western European countries (Euroconstruct, 2013). The percentage of remodeling is projected to increase steadily in future years, due to government support as compared to new construction, where larger financial capital requirements and longer timeframes for new construction are typically required.

### 11.2.2 European construction trends

#### 11.2.2.1 New housing

Housing permits and starts are minimal in the Euroconstruct region and are substantially below the numbers recorded in the early 2000s (graphs 11.2.1 and 11.2.2). Again, economic

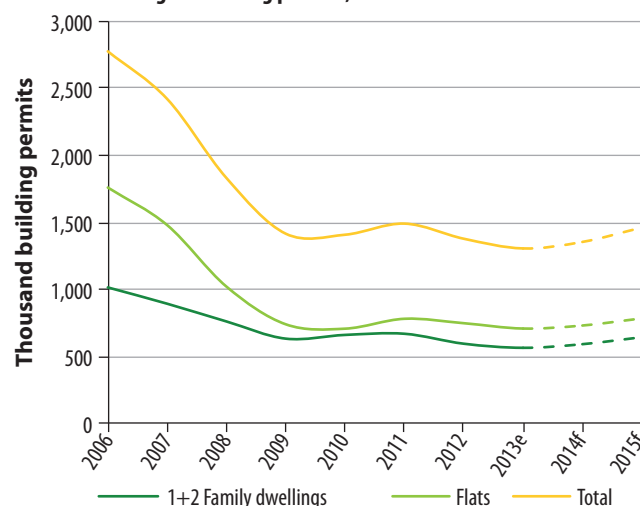
<sup>11</sup> Housing and construction data for Europe refer to Euroconstruct data and its geographical coverage. The Euroconstruct report comprises the following 19-countries: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom. Euroconstruct bases its analysis of eastern European construction on 4 of these: Czech Republic, Hungary, Poland and Slovakia.



conditions are the principal hindrances to a robust housing recovery. A record 2.77 million homes were permitted in 2006, and in 2012, 1.38 million units were authorized - a 50.3% decrease.

**GRAPH 11.2.1**

**Euroconstruct-region building permits, 2006-2015**



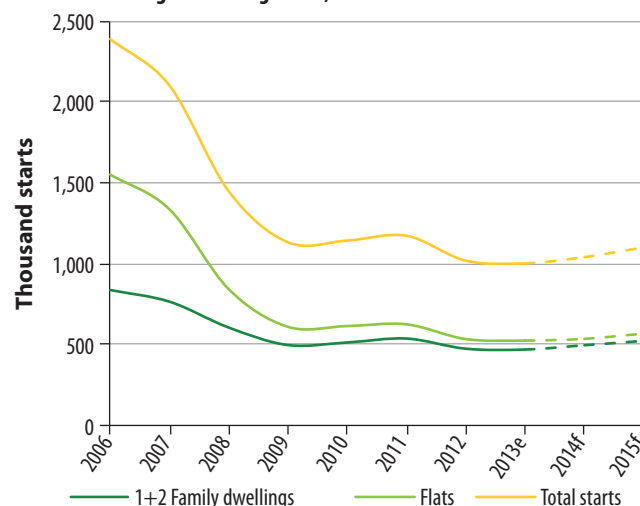
**Note:** 2013 is an estimate, 2014 and 2015 are Euroconstruct forecasts.

**Sources:** Euroconstruct, 2013.

The projections are for 565,000 single- and multi-family and 709,200 apartments to be built in 2013. Forecasts for 1+2 family dwellings and flats are not expected to approach 2006 levels in the foreseeable future. The notable exception to these forecasts is Germany, which is the recipient of private capital inflows that are being directed to the real estate construction and housing markets (Euroconstruct, 2012; 2013).

**GRAPH 11.2.2**

**Euroconstruct-region housing starts, 2006-2015**



**Note:** 2013 is an estimate, 2014 and 2015 are Euroconstruct forecasts.

**Sources:** Euroconstruct, 2013.

In 2013, the value of construction is estimated to be less than in 2012, a 3.2% decrease, with gains of 2.2% projected for 2014 and 4.0% for 2015. Projections for housing renovation are expected to improve, but only in small increments: for 2014 (0.4%) and 2015 (1.3%) as contrasted with 2012. Historically, renovation and home remodelling has been steady, as home renovation and remodelling have been supported by government programmes (Euroconstruct, 2013).

#### 11.2.2.2 Non-residential buildings and civil engineering

Europe is in a period of financial consolidation that may last for some time. Budget reductions, combined with cuts in business, government and personal spending, and deleveraging are having a substantial negative effect on construction demand. Non-residential construction represents the second largest construction subsector; the housing sector is the largest. In 2012, non-residential construction was nearly 33% of all construction activities, and as a comparison, housing and civil engineering were 45% and 22%, respectively. Germany, the United Kingdom, France, Italy and Spain were the five largest non-residential markets in 2012 (Euroconstruct, 2013).

New non-residential construction activities for all building sectors declined by 3.3% in 2012 - and are projected to decrease another 2.6% by 2015. The 2012 amount is 20% less than 2008, adjusted for inflation. The decrease is evidenced by contrasting new residential, non-residential building, civil engineering, and residential remodelling (graph 11.2.3). Given the present economic environment, the educational, warehouse, agricultural, commercial, health, office and miscellaneous non-residential building sectors are forecast to decrease until 2015. Only the industrial construction subsector is projected to increase - by 1.9% in 2015 (Euroconstruct, 2013).

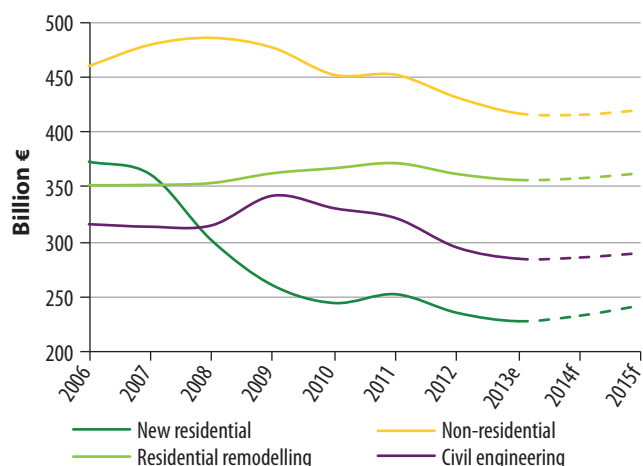


**Source:** proHolz Austria, 2013.

Residential remodelling is projected to be the driver for all construction sectors in the near term, increasing to €362.3 billion (\$484.6 billion) by 2015, from €361.5 billion (\$470.4 billion) in 2012. Non-residential construction values are predicted to decrease 2.8%, from €431.4 billion (\$561.4 billion) in 2012 to billion €419.7 billion (\$546.2) in 2015 (Euroconstruct, 2013).

GRAPH 11.2.3

## European construction spending, 2006-2015



**Note:** 2013 is an estimate, 2014 and 2015 are Euroconstruct forecasts.

**Sources:** Euroconstruct, 2013.

Civil engineering activities have, on the whole, decreased since 2009. Civil engineering spending varies greatly from one country to another. This sector is predicted to continue to decrease by 1.5% from €294.7 billion (\$383.5 billion) in 2012, to €289.6 billion (\$376.8 billion) by 2015. Civil engineering is particularly vulnerable to budget allocations, and projections are for slow, if any, growth (Euroconstruct, 2013).

### 11.2.2.3 Construction-sector shares and growth: Western versus Eastern Europe

In Western Europe, total residential construction is predicted to increase from €577.8 billion (\$751.9 billion) in 2012 to €585.3 billion (\$761.7 billion) by 2015. Residential construction's projected share is expected to consolidate through 2013 and then increase in 2014 and 2015 in the western countries. The four Eastern European countries covered by Euroconstruct are projected to decrease from €19.0 to €18.9 billion (\$24.7 billion to 24.6 billion) (Euroconstruct, 2013).

A significant change in the distribution of construction across sectors occurred in Western Europe, as compared with the period from 2006 to 2011, with less money being directed to the civil engineering sector. This is most likely due to two factors, decreased budgets and builder restraint. Eastern Europe's spending emphasis is directed towards new civil engineering and new non-residential construction (74.9%) (graph 11.2.4) (Euroconstruct, 2013).

GRAPH 11.2.4

## Euroconstruct region sector shares for new construction, 2012



**Sources:** Euroconstruct, 2013.

### 11.2.2.4 European construction materials

The current, stagnant and depressed, housing market in Europe is undoubtedly having negative consequences for the forest products sector. There are significant differences in the quantity of wood used in the construction of European dwellings, with an average of only 8-10% built with timber frame construction, but ranging up to 45% in the northern European area and 70% in Scotland. This is in contrast to North America, where 90% of homes are built with timber frames (CEI-Bois, 2010). Estimates for wood contained in the average dwelling in Europe are quite low at less than one m<sup>3</sup> per housing unit (UNECE/FAO, 2012).



**Source:** proHolz Austria, 2013.

Italy, like other countries in Europe, has seen an increase in the use of wood for the construction of housing. While still modest, it has grown from 1,223 new residential buildings in Italy in 2006 to 5,005 new buildings in 2010 and is forecast to increase to almost 8,000 in 2015. Since the destructive earthquakes in Abruzzo in 2009, the share of cross-laminated timber, which is very resilient to failure in earthquakes, was as high as 41% in new construction (Gardino, 2011).



Source: proHolz Austria, 2013.

Despite the relatively low volume of wood used in individual European homes, the total volume of wood consumed is still very important, when all residential consumption is taken together. In addition, wood construction is gaining in popularity in Europe, with promotion from government agencies, industry associations and green building advocates. Cross-laminated timber along with other engineered wood products has also opened up new opportunities for wood that were until recently not available.

### 11.3 COMMONWEALTH OF INDEPENDENT STATES CONSTRUCTION MARKET, WITH A FOCUS ON THE RUSSIAN FEDERATION

#### 11.3.1 Housing construction in the Russian Federation

Housing completions in the Russian Federation have reached record levels. In 2012, 826,800 new dwellings were built, totalling 65.2 million m<sup>2</sup> (for more information see section 5.3.3 of chapter 5) of residential space (Iambla, 2013). This exceeded 2011, when 786,000 units were built (Russian Federation Federal State Statistics Service, 2013). As compared with 2008 levels, the 2012 housing data indicated a 5.2% increase in the quantity of new homes built and a 1.8% increase in floor area (Iambla, 2013).

The average housing area per resident is estimated to have increased from 22 m<sup>2</sup> at the end of 2008 to about 23.4 m<sup>2</sup> at the end of 2012. In comparison with the early 1990s, per capita housing space has increased by almost 7 m<sup>2</sup>. At 23.4 m<sup>2</sup>, the Russian Federation's per capita housing area is still much smaller than that of most European countries, where the average is more than 30 m<sup>2</sup> (Iambla, 2013).

In the first quarter of 2013, the Russian Federation commissioned 126,100 apartments with a total area of 10.4 million m<sup>2</sup> and individual developers built 39,700 residential buildings with a total area of 5.3 million m<sup>2</sup>. In comparison, in the first quarter of 2012, 9.8 million m<sup>2</sup> of housing were commissioned (Russian Federation Federal State Statistics Service, 2013).

The use of wood in home construction is increasing in Russian Federation. In 2002, just 2.2% of homes were classified as having wood structures. This figure grew steadily to 7.1% of homes in 2012 (see chapter 5 for more information).

### 11.4 NORTH AMERICAN CONSTRUCTION MARKET

#### 11.4.1 United States housing market improving

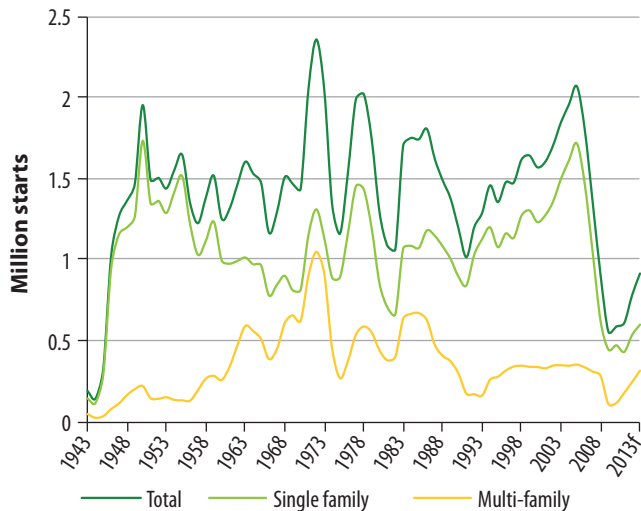
The US housing market is in the stage of early recovery. For instance, in May 2013 housing permits were at a seasonally annualized adjusted rate (SAAR) of 974,000; 20.8% more than in 2011 (US Census, 2013a).

However, to place things in perspective, single-family housing starts (graph 11.4.1) currently are less than the 1946 level and less than in the crash year of 2008. According to Standard & Poor's/Case-Shiller home price indices (2013), US home prices increased year on year. The 10- and 20-City Composites increased 10.3% and 10.9%, respectively, and prices are now at mid-2003 levels (Standard & Poor's, 2013). Most estimates, including the Federal Housing Finance Agency (2013), project that a moderate to robust housing recovery is still several years away.

New US house sales also indicate improvement. In April 2013, new house sales increased to a SAAR of 454,000, a level not witnessed since 2008. This volume of new house sales is similar to 1966, 1969, and 1981-1982. The median new house sale price was \$271,600, 8.3% more than in April 2012 (US Census, 2013b).

Also in April 2013, existing home sales were 4.97 million (SAAR) and the median existing house sales price was \$192,800, which was 9.7% higher than in April 2012 (National Association of Realtors, 2013).



**GRAPH 11.4.1****US housing units and starts (SAAR), 1943-2013**

**Note:** f=forecast (May 2013 data). SAAR=Seasonally Annualized Adjusted Rate.

**Sources:** US Census, 2013a.

In the US, other factors affecting new house construction and forest-product use include existing houses that are underwater, delinquent or shadow inventory houses. As of May 2013, Lender Processing Services (2013) reported that about 3.3 million home loans were at least 90 days delinquent and RealtyTrac® (2013) reported 1.36 million properties were in the pipeline for foreclosure.

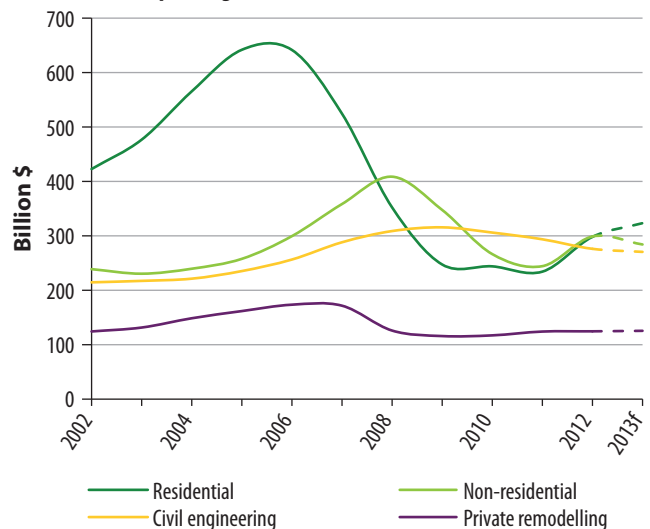


**Source:** APA, 2013.

Underwater homeowners owe more on their mortgage than the home's current appraised value (negative equity) and it is currently estimated that between 9 million (Lender Processing Services, 2013) and 11 million owners are underwater (RealtyTrac®, 2013). The "shadow" inventory continues to affect consumer psychology and potentially prices and sales as these homes have been foreclosed on by the lender but have not been listed for sale on the market. The shadow inventory estimate for June 2013 was 7.4 million units (Joint Center for Housing Studies, 2013a).

## 11.4.2 United States construction outlook

Housing construction spending is incrementally improving (graph 11.4.2), as total private residential construction spending increased 23.1% year on year from May 2012 to May 2013, to \$318.5 billion (SAAR). Single-family construction spending increased 26.7% year-over-year, to \$166.3 million (SAAR). This is important, as single-family homes consume more wood products than other housing subsectors, such as multi-family or manufactured homes. Housing improvements or remodelling spending increased 3.3% year-over-year to \$124.2 billion (SAAR) in May 2013 (US Census, 2013b). The Leading Indicator of Remodeling Activity (US Census, 2013b) projects that \$148 billion will be spent on remodelling in 2013, an increase of 0.2% from 2012.

**GRAPH 11.4.2****US construction spending, 2002-2013**

**Note:** 2013f (May 2013 data).

**Source:** US Census, 2013c.

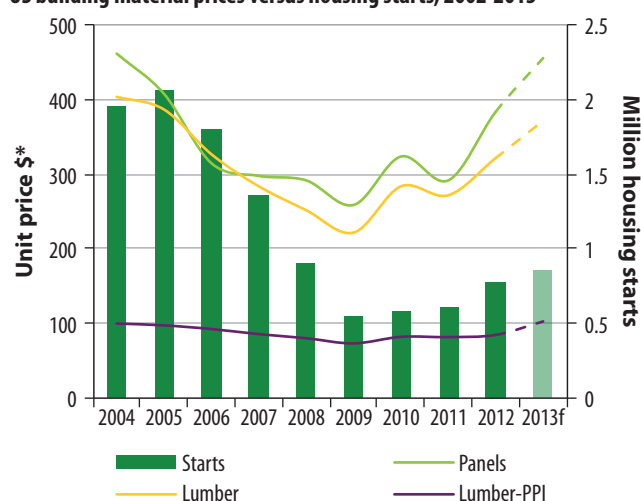
Even with an improving market, a robust housing recovery might be hindered by, for instance, increasing delinquencies, foreclosures, underwater homes, shadow inventory, elevated levels of unemployment and under-employment, sizeable and increasing student debt levels, and a fragile economy.

## 11.4.3 North American construction materials

Traditionally, the prices of North American sawn softwood and structural panels are greatly influenced by US housing starts. North American homes have been the primary market for sawn softwood and structural panels – in the past, some estimates indicated that 65% of wood building materials were directed to this market sector. Building-material prices improved greatly in 2012 and 2013 (graph 11.4.3). Much of this price gain can be attributed to the Chinese export market, improved US new housing starts, and the repair and remodelling sector.

GRAPH 11.4.3

US building material prices versus housing starts, 2002-2013



**Note:** f=forecast (May 2013 data). Structural panel composite price unit=1,000 square feet, framing lumber composite price unit=1,000 board feet, lumber composite price unit=1,000 board feet, lumber Producer Price Index (1982=100).

**Source:** US Census, 2013a, Random Lengths, 2013; US Bureau of Labor Statistics, 2013.

Currently, US repair and remodelling and industrial markets each consume more lumber than new housing, about 21.4 million m<sup>3</sup> and 20.3 mil m<sup>3</sup>, respectively (board feet converted to m<sup>3</sup> using a nominal board feet to actual m<sup>2</sup> ratio of 590). New home construction consumed 17.2 mil m<sup>3</sup> in 2012. (RISI, 2013). The consumption of sawn softwood for construction and remodelling consumes most of the sawn softwood produced in the region and other products such as structural panels and some EWP are also very strongly tied to the housing sector.



**Source:** APA, 2013.

## 11.4.4 Canadian housing-construction market

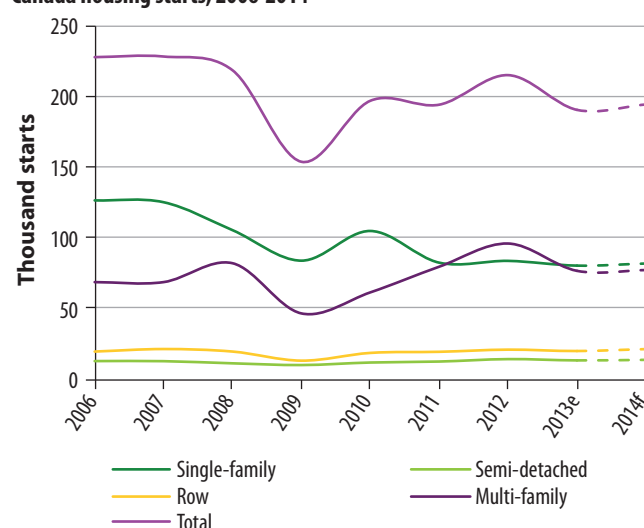
The Canadian housing market is healthy and 189,930 starts were projected for 2013 (Canada Mortgage and Housing Corporation (CMHC, 2013). In the past year, several analysts have opined that Canada is in a housing bubble; however, if there is a bubble, it has not yet burst. As a result of economic uncertainty, forecasts are for between 171,200 and 217,000 units in 2014.

Of the 2013 projection, 80,000 single-family and 110,000 multi-family starts are forecast. The 2014 outlook for single-family starts is relatively stable at 82,000. Multi-family starts are expected to range between 100,000 and 125,000 in 2014 (Graph 11.4.4.) (CMHC, 2013).

The 2013 forecast for GDP was revised downwards, reflecting an uncertain economic outlook. The economy is expected to expand in 2014, which would lend support to the housing market. Employment is forecast to increase by 1.3% in 2013 and 1.6% in 2014 and, although modest, this also would aid the housing market (CMHC, 2013).

GRAPH 11.4.4

Canada housing starts, 2006-2014



**Notes:** 2013 is an estimate. 2014 is a CHMC forecast.

**Source:** CHMC (Canada Housing and Mortgage Corporation), 2013.

## 11.5 REFERENCES

- Allen, T. 2013. March 2013 compared with February 2013. Available at: [http://epp.eurostat.ec.europa.eu/cache/ity\\_public/4-17052013-ap/en/4-17052013-ap-en.pdf](http://epp.eurostat.ec.europa.eu/cache/ity_public/4-17052013-ap/en/4-17052013-ap-en.pdf). Eurostat Press Office. Accessed June 12.
- Canada Mortgage and Housing Corporation. 2013. Housing market outlook – Canada's housing market is stabilizing. Available at: [www.cmhc-schl.gc.ca/odpub/esub/64591/64591\\_2011\\_Q02.pdf](http://www.cmhc-schl.gc.ca/odpub/esub/64591/64591_2011_Q02.pdf). Ottawa, CA. Accessed May 31.
- CEI-Bois. 2010. Tackle Climate Change: Use Wood. Available at: [www.cei-bois.org/files/b03500-p01-84-ENG.pdf](http://www.cei-bois.org/files/b03500-p01-84-ENG.pdf)
- Euroconstruct. 2012. 74th Euroconstruct Summary Report, European Construction Forecasts through 2015. The 74th Euroconstruct Conference. Munich, Germany. December 2012. 250 pp.
- Euroconstruct. 2013. 75th Euroconstruct Summary Report. The 75th Euroconstruct Conference. Copenhagen, Denmark. June 2013. 180 pp.
- Federal Housing Finance Agency. 2013. US house prices rose 1.9 percent in first quarter 2013. Available at: [www.fhfa.gov/webfiles/25172/2013Q1HPI.pdf](http://www.fhfa.gov/webfiles/25172/2013Q1HPI.pdf). Accessed June 24.
- Gardino, P. 2011. Il mercato italiano delle case in legno nel 2010. Promo Legno, Milano.
- Iambla, V. 2013. Construction sector in Russia H1 2013. PMR Research. Kraków, Poland. June 11. 5 pp.
- Joint Center for Housing Studies. 2013. State of the Nation's Housing 2013. Available at: [www.jchs.harvard.edu/research/state\\_nations\\_housing](http://www.jchs.harvard.edu/research/state_nations_housing). Accessed June 14. 44 pp.
- Leading Indicator of Remodeling Activity (LIRA). 2013. Momentum Building for Home Improvement Activity. 18 April 2013. Available at: [www.jchs.harvard.edu/momentum-building-home-improvement-activity](http://www.jchs.harvard.edu/momentum-building-home-improvement-activity). Accessed April 22.
- LenderProcessingServices. 2013. May 2013 Mortgage Performance Observations. Available at: [www.lpsvcs.com/LPSCorporateInformation/CommunicationCenter/DataReports/MortgageMonitor/201304MortgageMonitor/MortgageMonitorApril2013.pdf](http://www.lpsvcs.com/LPSCorporateInformation/CommunicationCenter/DataReports/MortgageMonitor/201304MortgageMonitor/MortgageMonitorApril2013.pdf). Accessed June 14.
- National Association of Realtors. 2013. April existing home sales ease. Available at: [www.realtor.org/press\\_room/news\\_releases/2011/05/sales\\_ease](http://www.realtor.org/press_room/news_releases/2011/05/sales_ease). Accessed May 20.
- Random Lengths. 2013. Random lengths framing lumber and structural panel composite prices. Available at: [www.randomlengths.com/In-Depth/Monthly-Composite-Prices](http://www.randomlengths.com/In-Depth/Monthly-Composite-Prices). Random Lengths Publications, Inc. Eugene, Oregon. Accessed June 10.
- RealtyTrac. 2013. Market Summary. Available at: [www.realtytrac.com/statsandtrends](http://www.realtytrac.com/statsandtrends). Accessed June 12.
- RISI. 2013. January 13 Lumber Commentary. Available at: [www.risiinfo.com/Marketing/Commentaries/lumber\\_com.pdf](http://www.risiinfo.com/Marketing/Commentaries/lumber_com.pdf). Accessed June 14.
- Russian Federation Federal State Statistics Service. 2013. Housing Construction. Available at: [www.gks.ru/wps/wcm/connect/rosstat\\_main/rosstat/ru/materials/news/a2740e0044b81cf2beadff0abf71f704](http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/materials/news/a2740e0044b81cf2beadff0abf71f704). Accessed June 11.
- Standard & Poor's. 2013. Home prices see strong gains in the first quarter of 2013. [www.housingviews.com/wp-content/uploads/2013/05/CSHomePrice\\_Release\\_March-Qtr1-Results.pdf](http://www.housingviews.com/wp-content/uploads/2013/05/CSHomePrice_Release_March-Qtr1-Results.pdf). Accessed May 28.
- Standard & Poor's/Case Shiller home price indices. 2013. Available at: <http://us.spindices.com/index-family/real-estate/sp-case-shiller>
- UNECE/FAO. 2012. Sawn softwood markets 2011-2012. pp 49. Forest Products Annual Market Review 2011-2012.
- US Bureau of Labor Statistics. 2013. Producer price index-commodities. Available at: <http://data.bls.gov/PDO/servlet/SurveyOutputServlet>. Accessed May 6.
- US Census-DOC. 2013a. New residential construction in May 2013. Available at: [www.census.gov/const/www/newresconstindex.html](http://www.census.gov/const/www/newresconstindex.html). Accessed June 18.
- US Census-DOC. 2013b. New residential sales in May 2013. Available at: [www.census.gov/construction/c30/pdf/privsa.pdf](http://www.census.gov/construction/c30/pdf/privsa.pdf). Accessed June 25.
- US Census-DOC. 2013c. Value of construction put in place – May 2013. Available at: [www.census.gov/construction/nrs/pdf/newressales.pdf](http://www.census.gov/construction/nrs/pdf/newressales.pdf). Accessed July 1.
- The World Bank. 2013. Global economic prospects – June 2013: less volatile, but slower growth. A. Burns and T.J. van Rensburg (authors). Available at: <http://go.worldbank.org/46Q9NMFY80>. Accessed June 13.













# ANNEXES

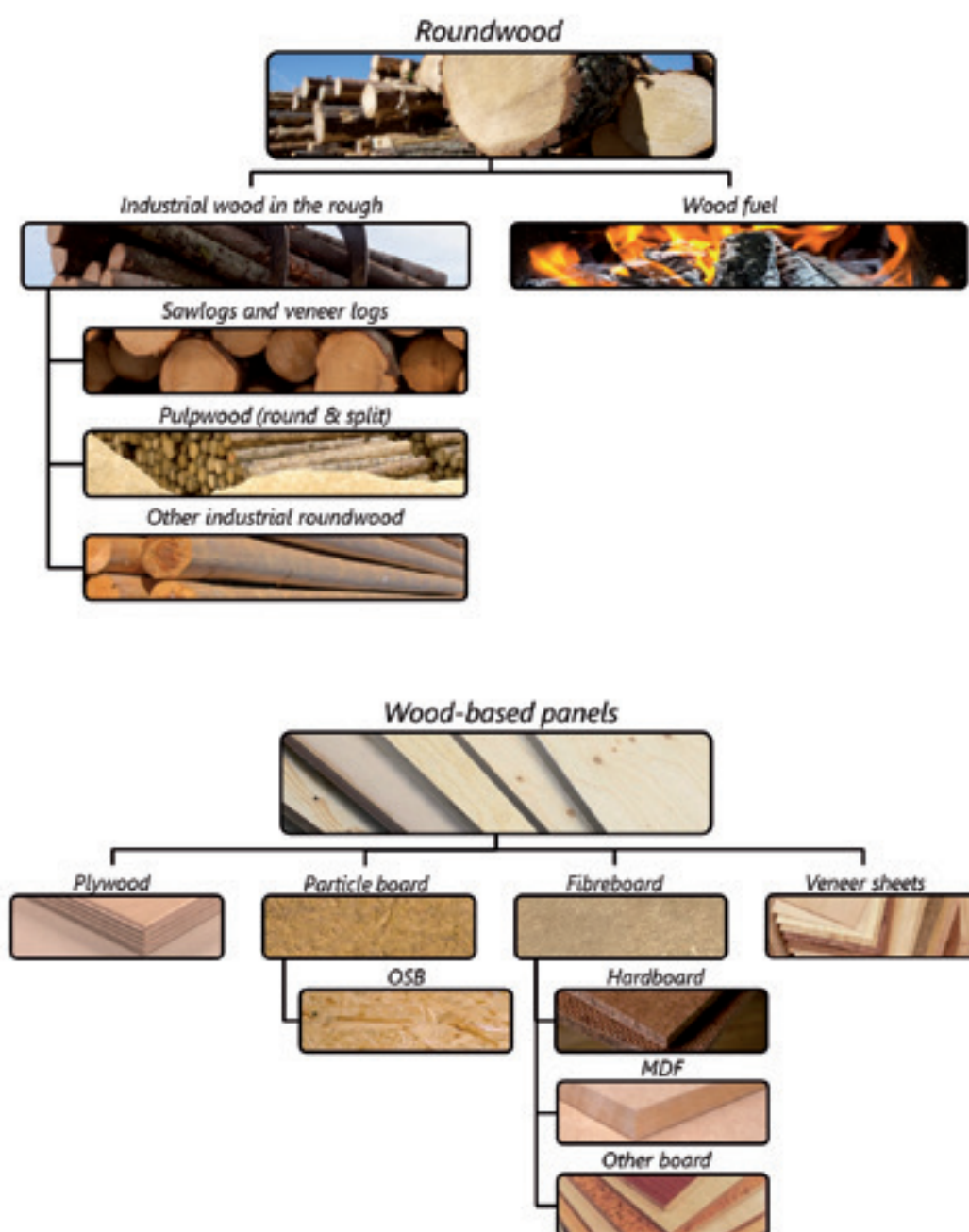
<b>Components of wood products groups .....</b>	<b>114</b>
Roundwood flowchart.....	114
Wood-based panels flowchart.....	114
Wood pulp flowchart.....	115
Paper and paperboard flowchart .....	115
<b>Countries in the UNECE region and its subregions .....</b>	<b>116</b>
<b>List of authors .....</b>	<b>117</b>
<b>Some facts about the Committee on Forests and the Forest Industry .....</b>	<b>118</b>
<b>UNECE/FAO publications .....</b>	<b>119</b>

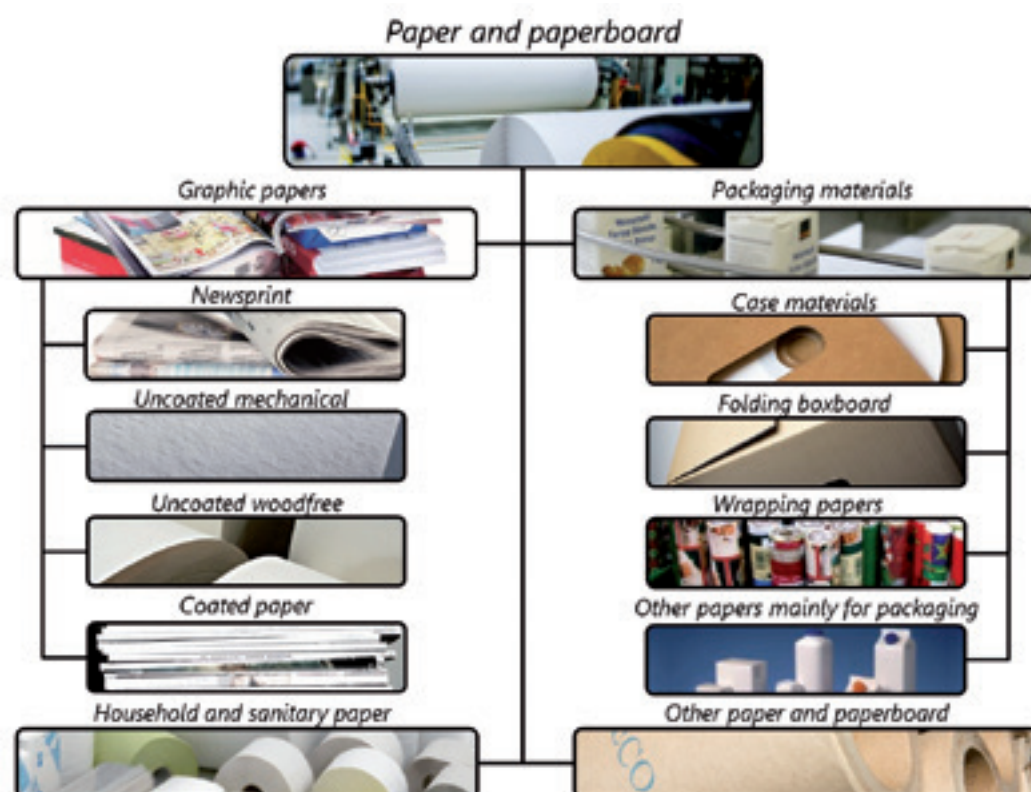
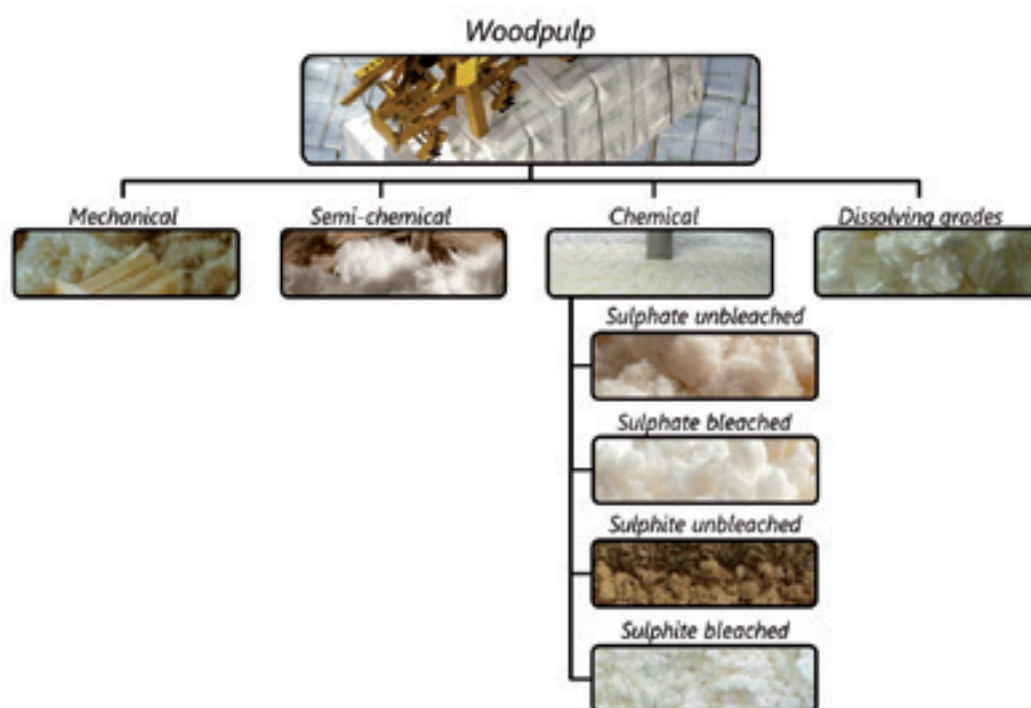


## COMPONENTS OF WOOD PRODUCTS GROUPS

(Based on Joint Forest Sector Questionnaire nomenclature)

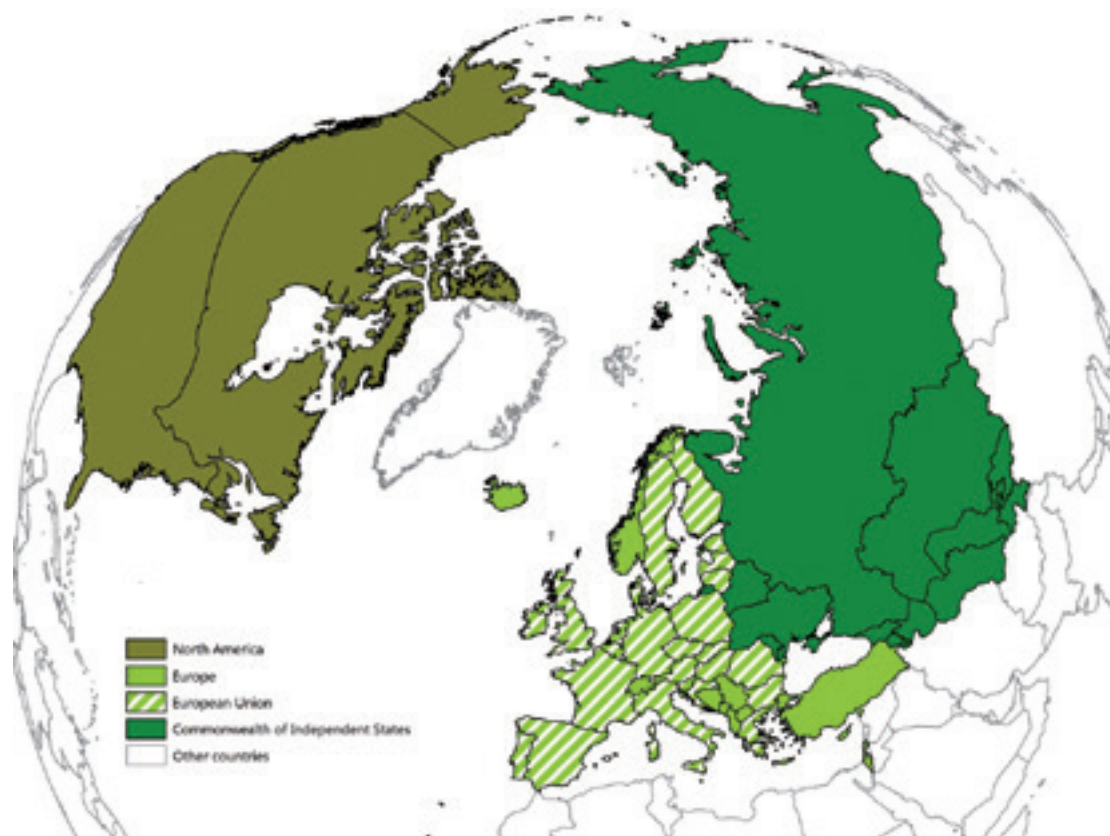
The important breakdowns of the major groups of primary forest products are set out in the diagrams below. Many sub-items are further divided into softwood or hardwood. These are all the roundwood products, sawnwood, veneer sheets and plywood. Items that don't fit into listed aggregates aren't shown – wood charcoal, chips and particles, wood residues, sawnwood, other pulp and recovered paper. The sources for pictures used in these diagrams are databanks of the 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	

European Union		Europe	
Austria	Italy	Other countries	
Belgium	Latvia	Albania	
Bulgaria	Lithuania	Andorra	
Croatia (1.7.2013-)	Luxembourg	Bosnia and Herzegovina	
Cyprus	Malta	Iceland	
Czech Republic	Netherlands	Israel	
Denmark	Poland	Liechtenstein	
Estonia	Portugal	Monaco	
Finland	Romania	Montenegro	
France	Slovakia	Norway	
Germany	Slovenia	San Marino	
Greece	Spain	Serbia	
Hungary	Sweden	Switzerland	
Ireland	United Kingdom	The former Yugoslav Republic of Macedonia	
		Turkey	



## LIST OF AUTHORS

<i>First Name</i>	<i>Family Name</i>	<i>Chapter</i>	<i>Affiliation</i>	<i>Email address</i>
Francisco X.	Aguilar	9	University of Missouri, Columbia, Missouri, US	<a href="mailto:aguilarf@missouri.edu">aguilarf@missouri.edu</a>
Eduard	Akim	8	State Technological University of Plant Polymers, St. Petersburg, Russian Federation	<a href="mailto:akim-ed@mail.ru">akim-ed@mail.ru</a>
Delton	Alderman	11	USDA Forest Service, Princeton, West Virginia, US	<a href="mailto:dalderman@fs.fed.us">dalderman@fs.fed.us</a>
Peter	Aurenhammer	3, 10	Pöyry Management Consulting Austria GmbH	<a href="mailto:peter.aurenhammer@prosilva.at">peter.aurenhammer@prosilva.at</a>
Olin	Bartlomé	3	Lignum, Holzwirtschaft Schweiz, Zurich	<a href="mailto:olin.bartlome@lignum.ch">olin.bartlome@lignum.ch</a>
Isabelle	Brose	7	European Confederation of Woodworking Industries, Brussels, Belgium	<a href="mailto:isabelle.brose@cei-bois.org">isabelle.brose@cei-bois.org</a>
Douglas	Clark	3	Clark Forestry Consulting, UK	<a href="mailto:douglaspc@clark.co.uk">douglaspc@clark.co.uk</a>
Ivan	Eastin	7	University of Washington, Seattle, Washington, US	<a href="mailto:eastin@uw.edu">eastin@uw.edu</a>
Asta	Eder	3	Asta Eder Composites Consulting	<a href="mailto:asta.eder@wpc-consulting.eu">asta.eder@wpc-consulting.eu</a>
Håkan	Ekström	4	Wood Resources International LLC, Seattle, Washington, US	<a href="mailto:hekstrom@wri-ltd.com">hekstrom@wri-ltd.com</a>
Kathryn	Fernholz	2	Dovetail Partners, Minneapolis, Minnesota, US	<a href="mailto:katie@dovetailinc.org">katie@dovetailinc.org</a>
Christopher	Gaston	3, 10	FPIInnovations, Vancouver, Canada	<a href="mailto:Chris.Gaston@fpinnovations.ca">Chris.Gaston@fpinnovations.ca</a>
Branko	Glavonjić	9	Faculty of Forestry, Belgrade State University, Belgrade, Serbia	<a href="mailto:branko.glavonjic@sfb.bg.ac.rs">branko.glavonjic@sfb.bg.ac.rs</a>
Rens	Hartkamp	9	Freelance consultant, The Hague, Netherlands	<a href="mailto:r.hartkamp@wvrgroup.com">r.hartkamp@wvrgroup.com</a>
Antti	Koskinen	5	Pöyry Management Consulting Oy, Vantaa, Finland	<a href="mailto:Antti.Koskinen@poyry.fi">Antti.Koskinen@poyry.fi</a>
Florian	Kraxner	2	International Institute for Applied Systems Analysis, Laxenburg, Austria	<a href="mailto:kraxner@iiasa.ac.at">kraxner@iiasa.ac.at</a>
Bernard	Lombard	8	Confederation of European Paper Industries (CEPI), Brussels, Belgium	<a href="mailto:b.lombard@cepi.org">b.lombard@cepi.org</a>
Warren	Mabee	9	Queens University, Kingston, Ontario, Canada	<a href="mailto:warren.mabee@queensu.ca">warren.mabee@queensu.ca</a>
Frances	Maplesden	5, 6, 7	Maplesden Consulting, Rotorua, New Zealand	<a href="mailto:Fran_map@clear.net.nz">Fran_map@clear.net.nz</a>
Peter	Moonen	3	Canadian Wood Council	<a href="mailto:pmoonen@wood-works.ca">pmoonen@wood-works.ca</a>
Igor	Novoselov	2, 5, 7	Whatwood, Moscow, Russian federation	<a href="mailto:igor.novoselov@whatwood.ru">igor.novoselov@whatwood.ru</a>
Rupert	Oliver	6	Forest Industries Intelligence Ltd, Settle, UK	<a href="mailto:rjwoliver@btopenworld.com">rjwoliver@btopenworld.com</a>
Tapani	Pahkasalo	10	INDUFOR, Helsinki, Finland	<a href="mailto:tapani.pahkasalo@indufor.fi">tapani.pahkasalo@indufor.fi</a>
Tomas	Parik	8	Confederation of European Paper Industries (CEPI), Ivancice, Czech Republic	<a href="mailto:tomas.parik@frantschach.com">tomas.parik@frantschach.com</a>
Helmuth	Resch	3	University of Natural Resources, Vienna, Austria	<a href="mailto:helmuth.resch@boku.ac.at">helmuth.resch@boku.ac.at</a>
Robert	Shelburne	1	United Nations Economic Commission for Europe, Geneva, Switzerland	<a href="mailto:robert.shelburne@unece.org">robert.shelburne@unece.org</a>
Kenneth E.	Skog	9	USDA Forest Service, Forest Products Laboratory, Wisconsin, US	<a href="mailto:kskog@fs.fed.us">kskog@fs.fed.us</a>
Russ	Taylor	5	International Wood Markets Group Inc., Vancouver, BC, Canada	<a href="mailto:retaylor@woodmarkets.com">retaylor@woodmarkets.com</a>
Jukka	Tissari	2	Food and Agriculture Organization of the United Nations (FAO), Rome, Italy	<a href="mailto:jukka.tissari@fao.org">jukka.tissari@fao.org</a>
Michel	Valois	8	Valois Vision Marketing, British Columbia Canada	<a href="mailto:michel@valoisvision.com">michel@valoisvision.com</a>

## SOME FACTS ABOUT THE COMMITTEE ON FORESTS AND THE FOREST INDUSTRY

The Committee on Forests and the Forest Industry is a subsidiary body of the United Nations Economic Commission for Europe. It constitutes a forum for UNECE member countries to consult with each other and work together on issues related to forestry, the forest industry and forest products. All countries in Europe, the Commonwealth of Independent States, the United States, Canada and Israel are members of the UNECE and participate in its work.

Working towards achieving sustainable development, the Committee provides member countries with the information and services they need for policy- and decision-making regarding their forest and forest industry sectors, including the trade and use of forest products and, when appropriate, formulates recommendations addressed to governments and interested organizations. To this end, it makes the following commitments:

1. With the active participation of member countries, to undertake short-, medium- and long-term analyses of developments in, and having an impact on, the forest sector, including those offering possibilities for the facilitation of international trade and for enhancing the protection of the environment.
2. In support of these analyses, to 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 organizing seminars, workshops and ad hoc meetings and setting up ad hoc groups for the exchange of economic, environmental and technical information between governments and other institutions of member countries for developing and implementing policies leading to the sustainable development of the forest sector and to the protection of the environment in their countries.
4. Carry out tasks identified as being of priority, including the facilitation of subregional cooperation and activities in support of the economies in transition of central and eastern Europe.
5. To keep under review its structure and priorities and cooperate with other international and intergovernmental organizations active in the sector, and in particular with the Food and Agriculture Organization of the United Nations and its European Forestry Commission, and with the International Labour Organization, to ensure complementarity and avoid duplication, thereby optimizing the use of resources.

You can get more information about the Committee's work by writing to:

[info.ECE-FAOforests@unece.org](mailto:info.ECE-FAOforests@unece.org)

UNECE/FAO Forestry and Timber Section  
Trade and Sustainable Land Management Division  
United Nations Economic Commission for Europe  
Palais des Nations  
CH-1211 Geneva 10, Switzerland

Fax: +41 22 917 0041  
[www.unece.org/forests](http://www.unece.org/forests)



# UNECE/FAO PUBLICATIONS

## Forest Products Annual Market Review 2012-2013

ECE/TIM/SP/33

**Note:** Other market-related publications and information are available for download at: [www.unece.org/forests](http://www.unece.org/forests)

## Geneva Timber and Forest Study Papers

The Lviv Forum on Forests in a Green Economy	ECE/TIM/SP/32
Forests and Economic Development: A Driver for the Green Economy in the ECE Region	ECE/TIM/SP/31
Forest Products Annual Market Review 2011-2012	ECE/TIM/SP/30
The North American Forest Sector Outlook Study 2006-2030	ECE/TIM/SP/29
European Forest Sector Outlook Study 2010-2030	ECE/TIM/SP/28
Forest Products Annual Market Review 2010-2011	ECE/TIM/SP/27
Private Forest Ownership in Europe	ECE/TIM/SP/26
Forest Products Annual Market Review 2009-2010	ECE/TIM/SP/25
Forest Products Annual Market Review 2008-2009	ECE/TIM/SP/24
Forest Products Annual Market Review 2007-2008	ECE/TIM/SP/23
Forest Products Annual Market Review 2006-2007	ECE/TIM/SP/22
Forest Products Annual Market Review, 2005-2006	ECE/TIM/SP/21
European Forest Sector Outlook Study: 1960 – 2000 – 2020, Main Report	ECE/TIM/SP/20
Forest policies and institutions of Europe, 1998-2000	ECE/TIM/SP/19
Forest and Forest Products Country Profile: Russian Federation	ECE/TIM/SP/18
(Country profiles also exist on Albania, Armenia, Belarus, Bulgaria, former Czech and Slovak Federal Republic, Estonia, Georgia, Hungary, Lithuania, Poland, Romania, Republic of Moldova, Slovenia and Ukraine)	
Forest resources of Europe, CIS, North America, Australia, Japan and New Zealand	ECE/TIM/SP/17

**The above series of sales publications and subscriptions are available from the United Nations publications office:**

Sales and Marketing Section, Room DC2-853  
United Nations  
2 United Nations Plaza  
New York, N.Y. 10017  
United States, of America

Fax: + 1 212 963 3489

E-mail: [publications@un.org](mailto:publications@un.org)

Web site: <https://unp.un.org>



## Geneva Timber and Forest Discussion Papers

Swedish Forest Sector Outlook Study	ECE/TIM/DP/58
The Importance of China's Forest Products Markets to the UNECE Region	ECE/TIM/DP/57
Good Practice Guidance on Sustainable Mobilisation of Wood: Proceedings from the Grenoble Workshop	*ECE/TIM/DP/56
Harvested Wood Products in the Context of Climate Change Policies: Workshop Proceedings - 2008	*ECE/TIM/DP/55
The Forest Sector in the Green Economy	ECE/TIM/DP/54
National Wood Resources Balances: Workshop Proceedings	*ECE/TIM/DP/53
Potential Wood Supply in Europe	*ECE/TIM/DP/52
Wood Availability and Demand in Europe	*ECE/TIM/DP/51
Forest Products Conversion Factors for the UNECE Region	ECE/TIM/DP/49
Mobilizing Wood Resources: Can Europe's Forests Satisfy the Increasing Demand for Raw Material and Energy Under Sustainable Forest Management? Workshop Proceedings. January 2007	*ECE/TIM/DP/48
European Forest Sector Outlook Study: Trends 2000-2005 Compared to the EFSOS Scenarios	ECE/TIM/DP/47
Forest and Forest Products Country Profile: Tajikistan	*ECE/TIM/DP/46
Forest and Forest Products Country Profile: Uzbekistan	ECE/TIM/DP/45
Forest Certification – Do Governments Have a Role?	ECE/TIM/DP/44
International Forest Sector Institutions and Policy Instruments for Europe: A Source Book	ECE/TIM/DP/43
Forests, Wood and Energy: Policy Interactions	ECE/TIM/DP/42
Outlook for the Development of European Forest Resources	ECE/TIM/DP/41
Forest and Forest Products Country Profile: Serbia and Montenegro	ECE/TIM/DP/40
Forest Certification Update for the UNECE Region, 2003	ECE/TIM/DP/39
Forest and Forest Products Country Profile: Republic of Bulgaria	ECE/TIM/DP/38
Forest Legislation in Europe: How 23 Countries Approach the Obligation to Reforest, Public Access and Use of Non-Wood Forest Products	ECE/TIM/DP/37
Value-Added Wood Products Markets, 2001-2003	ECE/TIM/DP/36
Trends in the Tropical Timber Trade, 2002-2003	ECE/TIM/DP/35
Biological Diversity, Tree Species Composition and Environmental Protection in the Regional FRA-2000	ECE/TIM/DP/33
Forestry and Forest Products Country Profile: Ukraine	ECE/TIM/DP/32
The Development of European Forest Resources, 1950 To 2000: a Better Information Base	ECE/TIM/DP/31
Modelling and Projections of Forest Products Demand, Supply and Trade in Europe	ECE/TIM/DP/30
Employment Trends and Prospects in the European Forest Sector	ECE/TIM/DP/29
Forestry Cooperation with Countries in Transition	ECE/TIM/DP/28
Russian Federation Forest Sector Outlook Study	ECE/TIM/DP/27
Forest and Forest Products Country Profile: Georgia	ECE/TIM/DP/26
Forest Certification Update for the UNECE Region, summer 2002	ECE/TIM/DP/25
Forecasts of Economic Growth in OECD and Central and Eastern European Countries for the Period 2000-2040	ECE/TIM/DP/24
Forest Certification update for the UNECE Region, summer 2001	ECE/TIM/DP/23
Structural, Compositional and Functional Aspects of Forest Biodiversity in Europe	ECE/TIM/DP/22

Markets for Secondary Processed Wood Products, 1990-2000	ECE/TIM/DP/21
Forest Certification Update for the UNECE Region, summer 2000	ECE/TIM/DP/20
Trade and Environment Issues in the Forest and Forest Products Sector	ECE/TIM/DP/19
Multiple Use Forestry	ECE/TIM/DP/18
Forest Certification Update for the UNECE Region, summer 1999	ECE/TIM/DP/17
A summary of "The competitive climate for wood products and paper packaging: the factors causing substitution with emphasis on environmental promotions"	ECE/TIM/DP/16
Recycling, Energy and Market Interactions	ECE/TIM/DP/15
The Status of Forest Certification in the UNECE Region	ECE/TIM/DP/14
The Role of Women on Forest Properties in Haute-Savoie (France): Initial research	ECE/TIM/DP/13
Interim Report on the Implementation of Resolution H3 of the Helsinki Ministerial Conference on the Protection of Forests in Europe (results of the second enquiry)	ECE/TIM/DP/12
Manual on Acute Forest Damage	ECE/TIM/DP/7

\* Web downloads only.

***The above publications are available free of charge from:***

UNECE/FAO Forestry and Timber Section  
United Nations Economic Commission for Europe  
Palais des Nations  
CH-1211 Geneva 10, Switzerland

Fax: +41 22 917 0041

E-mail: [info.ECE-FAOforests@unece.org](mailto:info.ECE-FAOforests@unece.org)

Downloads are available from: [www.unece.org/forests](http://www.unece.org/forests)







## **UNECE/FAO GENEVA TIMBER AND FOREST STUDY PAPERS**

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 Industries 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 as well as experts from other sectors. These publications often form the basis for discussions of the Committee on Forests and the Forest Industries and the European Forestry Commission and their subsidiary bodies.

Study Papers are usually based on statistics, forecasts and information submitted by country correspondents in the UNECE region (Europe, North America and Commonwealth of Independent States). The basic information is often submitted via agreed questionnaires, and then complemented by expert analysis from outside and within the secretariat. Study papers are issued on the responsibility of the secretariat, although the studies most often are the work of many contributors outside the UNECE/FAO.

Study Papers are translated whenever possible into the three official languages of the UNECE: English, French and Russian. They are UN sales documents and are distributed accordingly via UN bookstores and their affiliates. They are automatically distributed to heads of delegation of the Committee and the Commission, as well as nominated repository libraries, information centres and official distribution lists. They are also available via the Sales and Marketing Sections in Geneva and New York via [unpubli@unog.ch](mailto:unpubli@unog.ch) and [publications@un.org](mailto:publications@un.org) respectively. Study papers are also available on the Timber Committee and European Forestry Commission website at: [www.unece.org/forests](http://www.unece.org/forests)

UNECE/FAO Forestry and Timber Section  
Trade and Timber Division  
United Nations Economic Commission for Europe/  
Food and Agriculture Organization of the United Nations  
Palais des Nations  
CH-1211 Geneva 10, Switzerland  
Fax +41 22 917 0041  
[www.unece.org/forests](http://www.unece.org/forests)  
[info.ECE-FAOforests@unece.org](mailto:info.ECE-FAOforests@unece.org)

# Forest Products Annual Market Review 2012-2013

The Forest Products Annual Market Review 2012-2013 offers a comprehensive analysis of markets across the UNECE region, including North America, Europe, the Russian Federation and the Central Asian republics, as well as market influences from outside the UNECE region. It covers the range of products from the forest to the final end-user: from roundwood and primary processed products to value-added and innovative wood products.

Statistic-based chapters of the Review analyse markets of wood raw materials, sawn softwood, sawn hardwood, wood-based panels, paper, paperboard and woodpulp. Other chapters analyse policies, innovative wood products, markets of 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 the international markets, and policies concerning forest and forest products are broadly discussed, as well as the main drivers and trends. It also analyses the general economic situation and the general uncertainty on forest products markets in the difficult economic environment.

The Review, with all the statistical information and analysis on forest products markets, is a key background document for the Market Discussions held at the annual UNECE Committee on Forests and the Forest Industries, and also provides valuable and objective information for policymakers, researchers and investors.

Further information about forest products markets, as well as information about the UNECE Committee on Forests and the Forest Industries and the FAO European Forestry Commission, is available on the website: [www.unece.org/forests](http://www.unece.org/forests).

The Review has a statistical annex, which is available at: [www.unece.org/fpamr2013](http://www.unece.org/fpamr2013).

Information Service  
United Nations Economic Commission for Europe

Palais des Nations  
CH - 1211 Geneva 10, Switzerland  
Telephone: +41(0)22 917 44 44  
Fax: +41(0)22 917 05 05  
E-mail: [info.ece@unece.org](mailto:info.ece@unece.org)  
Website: <http://www.unece.org>

13-25284  
ISBN 978-92-1-117070-2



9 789211 170702