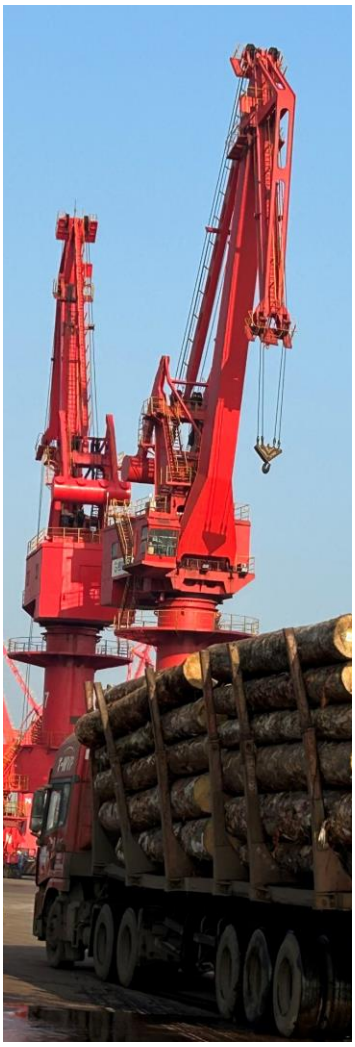
China Forest, Log & Lumber Outlook

SUPPLY, DEMAND & PRICES TO 2030/2035



FEBRUARY 2024

Contents

EXECUTIVE SUMMARY **2**

1 INTRODUCTION **10**

1.1 Overview of China's Forest Industry 11
1.1.1 Chinese Wood Supply Gap 12
1.1.2 Forest Resource 13
1.1.3 Natural Forests 23
1.1.4 Natural Forest Harvesting 24
1.1.5 Plantation Forests 28
1.1.6 Forestry and Carbon Markets 30
1.1.7 Climate Change and Forestry 31
1.2 Government Programmes and Policies Related to the Forest Industry 31
1.2.1 Forest Programmes 32
1.2.2 Forest Policies 33
1.2.3 Deforestation Abroad 34
1.3 Green Building Construction 35
1.4 China's "One Belt-One Road" Initiative 36
1.4.1 BRI and Forest Products Trade 40
1.5 China Land and Ocean Ports 42

2 CHINA MACROECONOMIC ENVIRONMENT **46**

2.1 Key Issues in China's Economy 47
2.2 China Macroeconomic Outlook 51
2.2.1 Consumer Price Index 51
2.2.2 Foreign Exchange 52
2.2.3 Prime Loan Rate 53
2.2.4 Net Domestic Credit Growth 53
2.2.5 Gross Domestic Product 54

3 SOFTWOOD LUMBER END-USE SEGMENTS **57**

4 DEMAND DRIVERS **60**

4.1 China Demographics 60
4.2 Chinese Consumer 65
4.3 China Housing Market 67
4.4 Other China Housing Demand Forecasts for 2024 78
4.5 China Housing Demand Trends to 2023 79
4.6 China Housing Demand Forecast to 2035 81

5 CHINA LUMBER PRODUCTION – LOG SOURCES **83**

5.1 Domestic Logs 83
5.2 Imported Logs 84
5.2.1 Russia 85
5.2.2 New Zealand 87
5.2.3 Europe 89
5.2.4 Uruguay 89
5.2.5 United States of America 90
5.2.6 Canada 92
5.3 Imported Lumber 92
5.3.1 Russia 93
5.3.2 Canada 96
5.3.3 United States of America 97

5.3.4 Europe 99
5.3.5 Southern Hemisphere Pine Countries 100

6 CHINA SOFTWOOD DEMAND/SUPPLY OUTLOOK 2035 102

7 SOFTWOOD LOG & LUMBER PRICE OUTLOOK: 2035 108

7.1 SOFTWOOD IMPORTED LOG PRICE OUTLOOK 108
7.2 SOFTWOOD IMPORTED LUMBER PRICE OUTLOOK 112

8 STRATEGIC FOCUS OF THE INDUSTRY 119

8.1 COMMERCIAL FOREST PRODUCTION 119
8.1.1 Fast-Growing and High-Yield Timber Plantation Development Programme 120
8.1.2 National Timber Reserve Forests Development Plan 121
8.2 COMMERCIAL FOREST FOCUS CHANGE 122
8.2.1 Issues in Developing Commercial Eucalyptus Plantations 126
8.3 OTHER AFFORESTATION, RESTORATION AND CONSERVATION 127

9 HARDWOOD DEMAND, END-USE SEGMENTS AND DEMAND DRIVERS 129

9.1 ROUNDWOOD HARDWOOD PRODUCTION 129
9.1.1 Hardwood Roundwood Imports 130
9.1.2 Hardwood Roundwood Exports 134
9.2 WOOD-BASED PANEL OVERVIEW 134
9.3 VENEER AND PLYWOOD 134
9.3.1 Hardwood Plywood Industry in China 135
9.3.2 Imports and Exports 135
9.3.3 Demand Drivers 136
9.4 OTHER PANELS (PB, MDF AND OSB) 136
9.4.1 Demand Drivers 138
9.5 TIMBER 138
9.5.1 Hardwood Timber Industry in China 138
9.5.2 Imports and Exports 140
9.5.3 Demand Drivers 142
9.6 FLOORING AND FURNITURE 142
9.7 BIOENERGY 143
9.7.1 Demand Drivers 144
9.8 HARDWOOD PULP 144
9.8.1 Hardwood Woodchip 144

10 HARDWOOD PULP INDUSTRY 146

10.1 INTRODUCTION 146
10.2 INSTALLED CAPACITY AND PRODUCTION – 2012 VS 2022 146
10.3 DEMAND DRIVERS 148
10.4 TOP PRODUCERS OF HARDWOOD PULP 149
10.5 PULP CAPACITY AND PRODUCTION OUTLOOK 149
10.6 OUTLOOK FOR HARDWOOD DEMAND FOR PULP 152

11 DOMESTIC HARDWOOD PLANTATIONS REVIEW 153

11.1 TREE BREEDING AND SILVICULTURE 153
11.1.1 Genetic Resources and Tree Breeding 153
11.1.2 Advanced Tree Propagation 153
11.1.3 Improved Silviculture 154
11.1.4 Rotation Length 154
11.1.5 Coppicing 154
11.2 GROWTH RATES 154
11.3 PLANTATION COSTS 155

11.3.1 Establishment and Maintenance Costs 155
11.3.2 Harvest and Transport Costs 157
11.3.3 Road Construction/Maintenance Costs 158
11.3.4 Overhead Costs 158
11.3.5 Other Minor Costs 158
11.3.6 Cost of Land 159
11.4 LOG PRICES 159

12 COST COMPETITIVENESS OF CHINA DOMESTIC SUPPLY 161

12.1 RETURNS FOR GROWING VENEER/SAW LOGS WITH PULPLOG AS BYPRODUCT 161
12.2 RETURNS FOR GROWING PULPLOG ONLY 162
12.3 GROWER RETURN SENSITIVITY ANALYSIS 163
12.4 CHINESE IMPORTED HARDWOOD WOODCHIP PRICES 164
12.5 ANALYSIS OF MAXIMUM WOOD PAYING CAPABILITY 164
12.6 A FEASIBLE FUTURE SUPPLY SCENARIO 166

13 HARDWOOD WOODCHIP DEMAND AND SUPPLY OUTLOOK 167

13.1 HARDWOOD WOODCHIP DEMAND/SUPPLY MODELLING 167
13.1.1 Mean Annual Increment 167
13.1.2 Areas and Future Area Changes 167
13.1.3 Future Pulplog Demand 169
13.1.4 Import Woodchip Availability 169
13.2 DEMAND AND SUPPLY SCENARIO RESULTS 170
13.3 HARDWOOD SCENARIO SUMMARY 171
13.4 OTHER CONSIDERATIONS 172

APPENDIX 1: REGIONAL MARKET & SUPPLIER TRENDS – COMMENTS FROM FIELDWORK 174

APPENDIX 2: CONTRIBUTORS 182

Table of Figures

Figure 1-1: China's provinces and city tier ranking 10
Figure 1-2: China wood consumption sectors 11
Figure 1-3: China's wood supply gap (million m^3 RWE), 2011-2020, all species 13
Figure 1-4: Distribution of forest resources in China 14
Figure 1-5: Main species distribution in natural and plantation forests 16
Figure 1-6: Development of annual industrial roundwood log production volume in Mainland China 18
Figure 1-7: Historical log production in Mainland China 1990-2022 by log type 18
Figure 1-8: Comparison between China's total historical log production from different data sources 19
Figure 1-9: Comparison between China's total historical log production from different data sources (total sawlogs and sawn wood) 20
Figure 1-10: NFGA 2021-2021 harvest data compared to allocated harvest quotas 23
Figure 1-11: Distribution of natural forest resources in China 24
Figure 1-12: The coverage of NFPP of China 25
Figure 1-13: Historical forest area change in the last 30 years 27
Figure 1-14: Distribution of plantation forest resources in China 28
Figure 1-15: Loans from China reaching their (originally scheduled) final repayment dates (2000 – 2050) 38
Figure 1-16: Percentage of variable interest rate lending to countries in and not in financial distress 39

Figure 1-17: Composition of China's loan portfolio by financial instrument 39
Figure 1-18: Northern Sea Route alternative 42
Figure 1-19: Industrial park locations 44
Figure 1-20: China supply chain 45
Figure 1-21: The main configurations in the China part of the roundwood value chain 45
Figure 2-1: China GDP growth versus selected countries 46
Figure 2-2: China GDP by sector in 2021 47
Figure 2-3: GDP per capita and average GDP growth rates for selected countries (2015-2019) 49
Figure 2-4: Tokyo versus Beijing residential property prices 50
Figure 2-5: Index of China's shrinking working-age population 50
Figure 2-6: China Consumer Prices Index (CPI) 52
Figure 2-7: Forex, actual and outlook 52
Figure 2-8: Prime loan rate 53
Figure 2-9: Net domestic credit growth 54
Figure 2-10: China's historic GDP and GDP growth forecasts 55
Figure 3-1: End use – China imported softwood logs 57
Figure 3-2: End use – China imported softwood lumber 58
Figure 3-3: End use – China softwood lumber consumption 58
Figure 4-1: China population outlook to 2050 60
Figure 4-2: UN forecast of China's population to 2100 61
Figure 4-3: UN population changes for selected countries and regions 62
Figure 4-4: Fertility rate in China 63
Figure 4-5: China's working age and 65+ population projections 64
Figure 4-6: Births in China – low-fertility projection 64
Figure 4-7: China consumer confidence index 65
Figure 4-8: Youth unemployment (top chart) and total unemployment including youth unemployment (bottom chart, blue line) 66
Figure 4-9: Monthly construction indicators 68
Figure 4-10: Construction starts 68
Figure 4-11: China's construction activity pipeline 69
Figure 4-12: Monthly property sales volume 69
Figure 4-13: Number of cities (out of 70) where residential price indexes are rising 70
Figure 4-14: Home sales in China, percentage year-on-year change 71
Figure 4-15: New and secondhand residential property prices 72
Figure 4-16: Housing inventories 72
Figure 4-17: Pledged supplementary lending 73
Figure 4-18: Affordable-housing by programme type 75
Figure 4-19: Total household loans, by component 76
Figure 4-20: China's existing houses and house presales 76
Figure 4-21: Mortgage rates 77
Figure 4-22: Residential housing starts and sales trend – China 80
Figure 4-23: Total housing starts and sales trend – China 80
Figure 4-24: Floor space completed by building type – China 81
Figure 4-25: China total housing starts and sales – base case forecast 82
Figure 5-1: China commercial softwood timber and log and lumber imports - RWE 83
Figure 5-2: Chinese customer preferences towards logs 84
Figure 5-3: China softwood log imports 85
Figure 5-4: Russia softwood and hardwood timber harvest by region 86
Figure 5-5: China softwood log imports – Russia and total 86
Figure 5-6: New Zealand timber harvest – Scenario 3 88
Figure 5-7: New Zealand log exports 88
Figure 5-8: Central Europe damaged timber log harvest and exports 89
Figure 5-9: Uruguay sawlog supply, demand, and log exports 90

Figure 5-10: US softwood log exports 91
Figure 5-11: US softwood log exports to China 91
Figure 5-12: British Columbia log exports 92
Figure 5-13: China softwood lumber imports 93
Figure 5-14: Russia sawn softwood production, exports, and consumption 94
Figure 5-15: Russia sawn softwood exports 95
Figure 5-16: Monthly sawn wood exports to China, by Russian region 95
Figure 5-17: British Columbia softwood lumber exports 96
Figure 5-18: British Columbia softwood lumber exports to China 97
Figure 5-19: US softwood lumber exports to China 98
Figure 5-20: US softwood and hardwood lumber exports to China 98
Figure 5-21: China softwood lumber imports – Canada and US 99
Figure 5-22: China softwood lumber imports – Europe 99
Figure 5-23: China softwood lumber imports – top-five European exporters 100
Figure 5-24: China softwood lumber imports – Southern Hemisphere pine countries 101
Figure 6-1: China softwood lumber consumption by end use 103
Figure 6-2: China domestic softwood saw log supply 104
Figure 6-3: China softwood log imports 105
Figure 6-4: China softwood lumber supply and demand 105
Figure 6-5: China softwood lumber imports 106
Figure 7-1: Radiata pine A grade real price forecast 108
Figure 7-2: Radiata pine A grade nominal price forecast 109
Figure 7-3: Price History of Key Softwood Log Import Species to China (USD/m^3 nominal) 110
Figure 7-4: Real forecast prices for softwood logs by species 110
Figure 7-5: Nominal price forecasts for softwood logs by species 111
Figure 7-6: China softwood lumber price forecasts – Nominal CIF USD/m^3 114
Figure 7-7: China softwood lumber price forecasts (real) – USD/m^3 CIF 116
Figure 8-1: China's industrial roundwood consumption and self-reliance % (1990-2022) 119
Figure 8-2: Trend of eucalypt plantation development in China 123
Figure 9-1: Schematic outline of China's domestic hardwood supply chain 129
Figure 9-2: Hardwood industrial roundwood production in China 130
Figure 9-3: China hardwood log imports 131
Figure 9-4: China hardwood log imports split by tropical and non-tropical 131
Figure 9-5: China non-tropical hardwood log imports split by country 132
Figure 9-6: China non-tropical hardwood imports split by species 133
Figure 9-7: Apparent consumption – plywood – hardwood 135
Figure 9-8: Apparent consumption – sawn wood – all species 138
Figure 9-9: Apparent consumption – timber – hardwood 139
Figure 9-10: Hardwood timber production – hardwood and tropical hardwood 140
Figure 9-11: China hardwood timber imports 141
Figure 9-12: China hardwood chip imports 145
Figure 10-1: Five main hardwood pulp producing provinces in China 147
Figure 10-2: Hardwood pulp production and capacity by main province, 2012 and 2022 148
Figure 10-3: Top producers of hardwood pulp in 2023 149
Figure 10-4: Location of hardwood pulp mills – existing and those under construction 150
Figure 10-5: Top hardwood pulp producers capacity changes 2023-2025 151
Figure 10-6: Hardwood pulp capacity and production forecast 2022-2035 152
Figure 12-1: Price of imported hardwood woodchip 164
Figure 12-2: Maximum mill wood paying capacity 165
Figure 13-1: Eucalyptus plantation area development and forecast to 2035 168
Figure 13-2: Poplar plantation area development and forecast to 2035 169
Figure 13-3: Results of scenario analysis 170

Table of Tables

Table 1-1: Historical national forest inventory survey data 14
Table 1-2: Forest type 15
Table 1-3: Forest group and type 15
Table 1-4: Forest group and function type 15
Table 1-5: Forest group and land ownership 17
Table 1-6: Forest group and forest ownership 17
Table 1-7: Province level harvest volumes 20
Table 1-8: The Approved AHQ of the country and the four provinces visited by Margules Groome 2016-2020 (million m^3) 22
Table 1-9: The Approved AFQ of the country and four provinces visited by Margules Groome 2021-2025 (million m^3) 22
Table 1-10: Target and achievement of China's NFPP 26
Table 1-11: AHQs for Non-mature harvesting of Natural Forest 2021-2025 (million m^3) 28
Table 1-12: Main plantation forest species 29
Table 1-13: Plantation forest age-class 29
Table 1-14: China's stipulated minimum harvest age for harvest by region and main species 29
Table 2-1: Comparison of Japan's economy (1990) versus China (2023) 48
Table 2-2: China economic challenges and opportunities 51
Table 4-1: Year-on-year change in major property indicators and forecast 2024 79
Table 7-1: Radiata pine A grade real price forecasts in December 2023 USD/m^3 109
Table 7-2: Real price forecasts by species 111
Table 7-3: Nominal price forecasts by species 112
Table 7-4: China softwood lumber price forecasts (nominal) – USD/m^3 CIF 114
Table 7-5: China softwood lumber price comparison (nominal): 2024-2035 vs 2018-2023 115
Table 7-6: China softwood lumber price forecasts (real) – USD/m^3 CIF 116
Table 8-1: Key eucalypt plantation R&D initiatives in China 121
Table 8-2: The timber reserve forest development tasks during the 14th Five-Year Plan period (2021-2025) for some south China provinces 122
Table 8-3: Eucalyptus plantation area and standing volume 2014-2018 125
Table 8-4: Major eucalyptus taxa planted in China 125
Table 8-5: Proportion of plantation area by forest ownership in the four provinces visited by Margules Groome 126
Table 8-6: Summary of strategic non-commercial forestry initiatives 127
Table 9-1: Plywood industry in China (2020-2023f) – all species – million m^3 135
Table 9-2: Particleboard industry in China (2020-2023f) – all species – million m^3 137
Table 9-3: MDF industry in China (2020-2023f) – all species – million m^3 137
Table 9-4: OSB industry in China (2020-2023f) – all species – million m^3 137
Table 9-5: China timber imports volume in the first quarter of 2023 140
Table 9-6: China timber imports value in the first quarter of 2023 140
Table 10-1: Estimated hardwood pulp production scenarios and hardwood consumptions 152
Table 11-1: Growth rates (MAI) for the four provinces visited 154
Table 11-2: Guangdong province forest establishment and maintenance costs 155
Table 11-3: Guangxi province forest establishment and maintenance costs 155
Table 11-4: Fujian province forest establishment and maintenance costs 156
Table 11-5: Yunnan province forest establishment and maintenance costs 156
Table 11-6: Summary total establishment and maintenance costs by province 157
Table 11-7: Forest harvesting costs by province 157
Table 11-8: Forest transportation costs by province 158
Table 11-9: Forest road construction/maintenance costs by province 158
Table 11-10: Other costs 159
Table 11-11: Typical forest land rental by provinces 159
Table 11-12: Guangdong province log prices 159
Table 11-13: Guangxi province log prices 160

Table 11-14: Fujian province log prices 160
Table 11-15: Yunnan province log prices 160
Table 11-16: Summary of plywood log and pulplog prices 160
Table 12-1: Indicative grower returns – veneer/saw log with pulpwood as byproduct 161
Table 12-2: Indicative grower returns – coppiced veneer/saw log with pulpwood as byproduct 162
Table 12-3: Indicative grower returns – planted pulplog only 162
Table 12-4: Indicative grower returns – coppiced pulplog only 163
Table 12-5: MAI sensitivity analysis 163
Table 12-6: Weighted average import hardwood woodchip price - 2023 164
Table 12-7: Analysis of grower returns assuming selling veneer/saw logs at maximin log paying capacity prices 165
Table 13-1: MAI assumptions used in scenarios (m^3/ha/a sob) 167
Table 13-2: Summary for scenarios 171