

Chapter 10

Wood-based Panels - Supply, Trade and Consumption¹

Highlights

- Overall wood-based panels consumption in Europe shows a small increase in 1999 to a new record level.
- Particle board consumption in Europe in 1999 was just above 1998 levels and reached 35.2 million m³, a new record, thanks to the recovery of markets in the second half of the year.
- OSB in Europe is gaining market share very rapidly and consumption was up 43% to just under 1 million m³. This trend is expected to continue as new capacity comes on stream.
- Overall fibreboard consumption in Europe was 2.8% higher in 1999, and reached 10.4 million m³; of this amount, the increase of MDF consumption was stronger, up 10.7% to 7.1 million m³, despite very competitive markets.
- Production of plywood in Europe was up 2.3% from 1998, as output from the main producer Finland was over 1 million m³ for the first time. However, consumption remained near 1998 levels and markets were competitive.
- Overall wood-based panels consumption in North America reached record levels in 1999 to 55.6 million m³, a 5.3% increase.
- In the North American structural panel sector, OSB continued its strong growth and consumption increased 10.6% in 1999. Softwood plywood consumption increased marginally, up 2.9%, due to a fall in United States exports, while North American production remained at 1998 levels.
- Overall wood-based panels consumption in the Russian Federation, was up 13% to 3.0 million m³ in 1999, but overall consumption remains well below 1992 levels.

¹ Coauthored by Mr. Henry Spelter, Research Forester, Forest Products Laboratory, USDA Forest Service. One Gifford Pinchot Drive, Madison, Wisconsin 53705-2398, United States, Telephone +1 608 231 9380, Fax +1 608 231 9592, E-mail: hspelter@facstaff.wisc.edu

10.1 Overview of wood-based panels markets

Preliminary figures of wood-based panels consumption in Europe show a small increase in 1999 to 52.1 million m³ a new record level (table 10.1.1). However, according to the European Panel Federation (EPF), real consumption taking into account particle board stock changes, was higher due to the recovery of markets in the second half of 1999. Particle board is the main panel in Europe with over 67% of total consumption. Consumption of MDF and OSB set record levels. MDF was up 10.7% to 7.14 million m³ and OSB increased by 43% to just under 1 million m³.

In North America trends show a continued strong performance for the wood-based panel sector in 1999 reaching 55.6 million m³. OSB and MDF have continued

their expansion. Dr. Henry Spelter from the USDA, Forest Products Laboratory has contributed to this chapter by analyzing trends for the different panel products in North America using as a frame of reference the concept of life cycle. The analysis shows that while softwood plywood has reached maturity and is at present in a declining phase, particle board is still a mature product OSB and MDF, on the contrary, are new products with rapid market penetration and are substituting other wood products. The secretariat thanks Dr. Spelter for his contribution.

Wood-based panels consumption in the Russian Federation has increased to 3.0 million m³ in 1999. Higher production levels, mostly of particle board contributed to this increase, but overall consumption remains well below 1992 levels.

TABLE 10.1.1

Apparent consumption of wood-based panels (excluding veneer sheets) in Europe, the Russian Federation and North America, 1995-1999

	1995	1996	1997	1998	1999	% of total	
						1995	1999
EUROPE							
Particle board and OSB	30.54	30.11	32.08	34.70	35.16	69.4	67.4
Plywood	6.29	5.83	6.13	6.58	6.61	14.3	12.7
Fibreboard	7.16	7.23	8.25	10.15	10.43	16.3	20.0
Total	43.99	43.17	46.46	51.44	52.19	100.0	100.0
Change on previous year							
- Volume		-0.82	3.29	4.98	0.76		
-%		-1.9	7.6	10.7	1.5		
RUSSIAN FEDERATION							
Particle board	2.05	1.43	2.30	1.71	1.98	71.6	65.2
Plywood	0.20	0.29	0.35	0.40	0.41	6.9	13.6
Fibreboard	0.62	0.43	0.64	0.59	0.64	21.6	21.2
Total	2.87	2.15	3.29	2.69	3.04	100.0	100.0
Change on previous year							
- Volume		-0.72	1.14	-0.60	0.35		
-%		-25.0	53.1	-18.2	12.9		
NORTH AMERICA							
Particle board and OSB	18.66	22.04	24.01	26.50	28.49	42.0	51.2
Plywood	18.92	18.94	18.03	18.13	18.66	42.6	33.6
Fibreboard	6.81	7.09	7.05	8.16	8.46	15.3	15.2
Total	44.39	48.07	49.09	52.79	55.61	100.0	100.0
Change on previous year							
- Volume		3.68	1.03	3.70	2.82		
-%		8.3	2.1	7.5	5.3		

Source: ECE/FAO TIMBER database. 2000.

10.2 Plywood

Dr. Spelter's contribution has been integrated to the description of wood-based panels market developments based on the statistics received by countries. The life cycle concept basically states that everything has a beginning and an end, products passing through several distinct phases. The first phase is characterized by rapid growth, where a product's sales rate exceeds that of its underlying markets. That is, it is gaining market share. This is followed by a phase of maturity, where sales increasingly reflect the twists and turns of end markets as the industry is less able to insulate itself from cycles by achieving market penetration. Finally, there is a phase of decline, where sales lag the pace of downstream markets as other products begin to penetrate the market at its expense.

In North America, western Douglas fir plywood, which traces its origins to the early 1900s but whose modern expression really began in the 1930s with the development of water-resistant adhesives, exhibited the characteristics of a growth industry back in the 1950s (graph 10.2.1). During this period, the ups and downs of housing construction, its main market, were hardly noticeable in its sales chart. By the 1960s, however, when housing slumped, so did its sales, indicating its maturity. Today it is a declining product as other commodities, first southern pine plywood and now oriented strand board, have eaten away at its markets.

Southern plywood's evolution was similar, although its initial progress was much faster, which is attributable to it

being an extension of an existing industry. It too has matured, about a couple of decades later than its western counterpart, and is now exhibiting signs of decline.

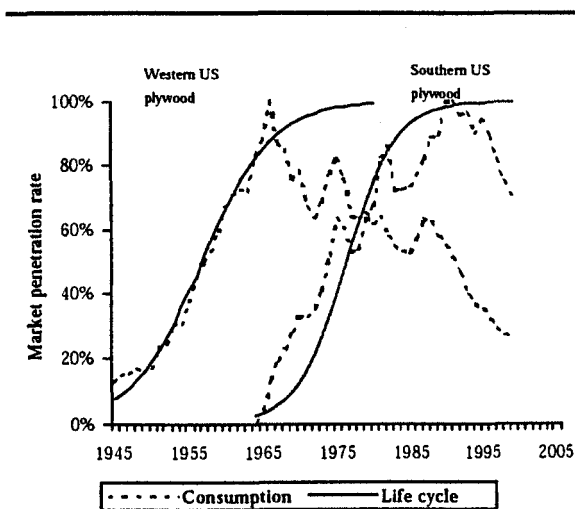
Total structural panel demand (both softwood plywood and OSB) in North America has grown at an average pace of 3% per year over the past three decades (graph 10.2.2). Underlying economic fundamentals of relatively low inflation and robust general growth support that rate of increase over the long term, although current interest rate increases portend a short term cyclical dip. Given plywood's higher costs relative to OSB, it is difficult to imagine the plywood sector claiming its share of that growth increment. Due to the forthcoming rapid increases for OSB (see below), plywood production will probably decline in the coming years. That and looming regulatory mandates to reduce factory air emissions are likely to cause older, less-efficient mills to be abandoned. Already announced closures of two mills in western United States have been attributed to these factors.

Plywood closures are likely to be less severe than the 6 million m³ increase in new OSB capacity due to diversification into products and markets that are less vulnerable to competition from OSB. After peaking at 22.5 million cubic m³ in 1987, plywood production in North America declined but has stabilized in recent years at 17.5 million m³. In the next couple of years, however, around 3 million m³ of production capacity is likely to face permanent closure due to the factors cited above.

In Europe apparent consumption of plywood declined

GRAPH 10.2.1

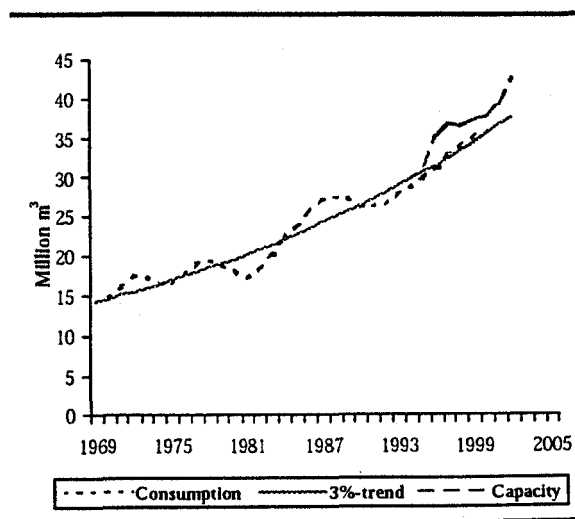
Life cycles of plywood, 1945-2000



Source: Spelter, H., USDA Forest Service, Forest Products Laboratory, 2000.

GRAPH 10.2.2

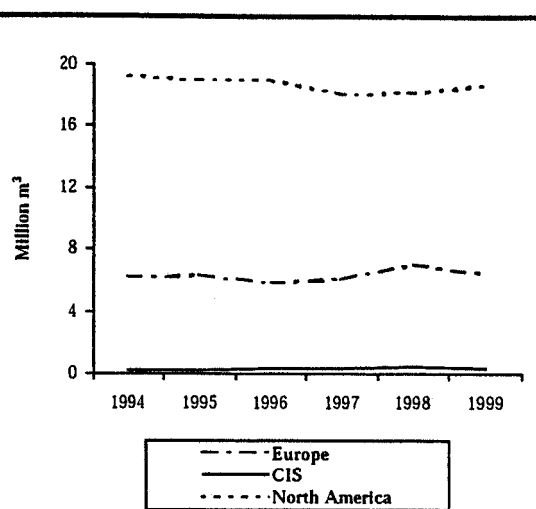
North American structural panel demand and capacity, 1969-2000



Source: Spelter, H., USDA Forest Service, Forest Products Laboratory, 2000.

slightly in 1999 due to higher export volumes outside the region (graph 10.2.3, table 10.2.1). Plywood imports to Europe incurred increased change in market share as North American plywood was substituted by cheaper Brazilian plywood. In mid 2000 the price of tropical plywood, especially from Indonesia, has fallen further. However, production increased as Finland, Europe's main producing country, set a new record level to 1.1 million m³. The regain of activity in end use sectors towards the end of 1999 increased demand for softwood plywood and prices showed modest gains. However, according to Finland's Metsäliitto Group, European markets for birch plywood declined due to over capacity in Finland and fierce competition with exports from the Russian Federation and the Baltic countries (table 10.2.2).

GRAPH 10.2.3
Consumption of plywood, 1994-1999



Source: ECE/FAO TIMBER database, 2000.

TABLE 10.2.1
Plywood balance in Europe, the Russian Federation and North America, 1995-1999
(Million m³)

	1995	1996	1997	1998	1999	Timber Committee estimates for 2000 *
EUROPE						
Production	3.81	3.89	3.88	4.18	4.27	4.35
Imports	4.49	4.14	4.65	5.20	5.26	5.34
Exports	1.96	2.16	2.36	2.77	3.03	3.13
Net trade	-2.53	-1.98	-2.29	-2.43	-2.23	-2.21
Apparent consumption	6.29	5.83	6.13	6.60	6.47	6.56
RUSSIAN FEDERATION						
Production	0.45	0.67	0.88	1.10	1.32	1.47
Imports	0.01	0.01	0.03	0.03	0.01	0.00
Exports	0.26	0.38	0.56	0.74	0.91	1.03
Net trade	0.25	0.38	0.53	0.71	0.91	1.02
Apparent consumption	0.20	0.29	0.35	0.40	0.41	0.45
NORTH AMERICA						
Production	18.97	18.79	17.73	17.48	17.52	17.02
Imports	1.44	1.64	1.85	2.24	2.78	2.70
Exports	1.50	1.49	1.54	1.59	1.63	1.61
Net trade	0.06	-0.15	-0.31	-0.65	-1.15	-1.10
Apparent consumption	18.92	18.94	18.03	18.13	18.66	18.12

* = The Timber Committee's forecast trend from the September 1999 session was applied to the 1999 figure.

Source: ECE/FAO TIMBER database, 2000.

TABLE 10.2.2
Production and trade of Plywood, 1996-1999
(1,000 m³)

	1996	1997	1998	1999	Change 1998 to 1999	
					Volume	%
PRODUCTION						
EUROPE	3.890	3.883	4.175	4,271	96	2.3
Finland	824	908	992	1,076	84	8.5
France	536	539	541	543	2	0.4
Italy	402	414	420	450	30	7.1
Spain	210	210	382	382	0	0.0
Germany	512	448	428	363	-65	-15.2
Poland	190	184	178	172	-6	-3.4
Austria	150	150	150	155	5	3.3
Latvia	103	120	150	155	5	3.3
Other countries	963	911	934	974	40	4.3
RUSSIAN FEDERATION	666	884	1,102	1,320	218	19.8
Canada	1,814	1,830	1,750	1,749	-1	0.0
United States	16.975	15.897	15,732	15,767	35	0.2
NORTH AMERICA	18.789	17,727	17.482	17,516	34	0.2
EXPORTS						
EUROPE	2.165	2.357	2,767	3,031	264	9.5
Finland	617	725	832	939	107	12.9
Belgium-Luxembourg	88	101	355	371	16	4.6
France	180	201	222	243	21	9.4
Other countries	1,279	1,330	1,358	1,478	120	8.8
RUSSIAN FEDERATION	382	559	736	913	177	24.0
Canada	360	557	755	952	197	26.2
United States	1,135	984	833	682	-151	-18.1
NORTH AMERICA	1,495	1,541	1,588	1,634	46	2.9
IMPORTS						
EUROPE	4,140	4,646	5,196	5,260	64	1.2
United Kingdom	965	967	969	971	2	0.2
Netherlands	260	394	528	662	134	25.4
Belgium-Luxembourg	215	313	519	539	20	3.8
Italy	295	312	378	367	-11	-2.9
France	347	353	359	365	6	1.7
Other countries	2,059	2,307	2,443	2,356	-87	-3.6
Canada	239	256	273	291	17	6.3
United States	1,406	1,592	1,964	2,489	525	26.7
NORTHAMERICA	1,645	1,848	2,237	2,780	542	24.2

Source: ECE/FAO TIMBER database, 2000.

10.3 Oriented Strand Board

Among the various sectors of the panel industry, OSB has been the most profitable in recent years. As a consequence, it continues to attract much new investment interest. Looking over the list of projects during the next few years, there are at least 16 announced

new plants or expansions slated for the Americas (table 10.3.1). All told, they represent over 6 million cubic meters of additional capacity, or about a 30% increase. OSB has grown steadily over the past three decades along a path traced out by a standard sigmoid life-cycle curve

(graph 10.3.1). Given this history, one has to ask, where along this curve might it be today?

The current trend of OSB is rooted in steadily growing markets and increasing market shares. But if the latter trend is topping out, as suggested by the flattening part of the Me-cycle curve, then the added capacity may overshoot the market's ability to absorb the new supply. In the past, weakness in end markets was often offset by gains market share. Such is likely to happen again, but

recent data show a fairly advanced state of OSB penetration in its major residential construction markets (table 10.3.2). In terms solely of plywood and OSB, a 1995 end-use survey showed a 61% : 39%, OSB to plywood split. In 1998, this changed to 68% : 32% split, indicating a strong gain. With each such gain in market share the potential for additional gains diminishes. Further, as noted above, plywood production data show product diversification into markets less prone to

TABLE 10.3.1

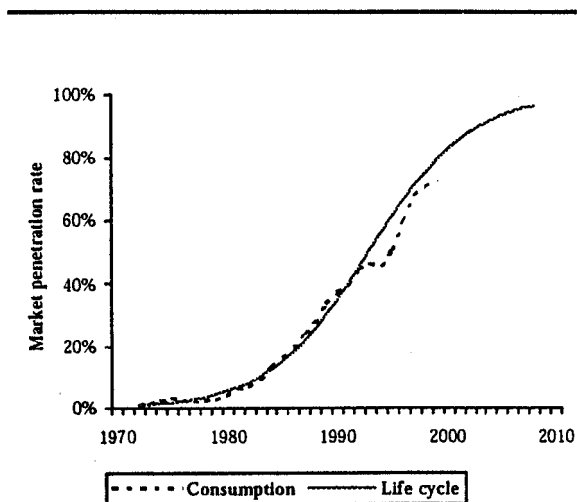
New OSB capacity announcements in North and South America, 2000-2002
(1000 m³)

Company	Location	2000	2001	2002	Cumulative
Norbord	S. Carolina	440			440
Martco (expansion)	Louisiana	55			495
Potlatch (expansion)	Minnesota	165			660
Slocan (expansion)	B. Columbia	60			720
Ainsworth	B. Columbia		360		1,080
Boise Cascade	Chile		440		1,520
Georgia Pacific	Arkansas		360		1,880
Godfrey	New York		440		2,320
Trillium	Venezuela		300		2,620
Weyerhaeuser	Saskatchewan		500		3,120
Ainsworth-Grant	Alberta		530	265	3,915
Ainsworth-Norsk	Saskatchewan			440	4,355
Chateaugay	New York			400	4,755
Louisiana Pacific	B. Columbia			500	5,225
Louisiana Pacific	Quebec			530	5,785
Norbord	Alabama			440	6,225
Total		720	2,930	2,575	6,225

Source: Spelter, H., USDA Forest Service, Forest Products Laboratory, 2000.

GRAPH 10.3.1

Life cycle of OSB, 1970-2010



Source: Spelter, H., USDA Forest Service, Forest Products Laboratory, 2000.

TABLE 10.3.2.

Structural panel residential market shares,
1995 and 1998
(%)

Segment	Product	1995	1998
Floor sheathing	Plywood	33	33
	OSB	28	36
	Slab	36	29
Underlayment	Plywood	13	11
	OSB	9	19
	Other	78	70
Wall sheathing	Plywood	17	13
	OSB	45	49
	Other	38	38
Roof sheathing	Plywood	35	27
	OSB	62	72
	Other	03	01

Source : Wood Products Promotion Council, 2000.

competition from OSB. Less than half of the plywood output in 1998 was sheathing, the grade most directly vulnerable to competition from OSB.

Thus, if all the planned OSB plants are realized, an extended period of weak pricing, consolidation and rationalization, involving both the plywood and the OSB sectors, is likely to follow. If the historical relationship between capacity utilization and margins is applied to the projected capacity utilization based on the plant announcements and the trend in demand, and if costs remain constant at current levels, by 2002 the price level would drop to just above \$150 per m³, as was the case in 1997 (graph 10.3.2). The volatility of structural panels and OSB prices in North America, as a result of consolidation and rationalization in the market observed in 1998 continued in 1999 and through the first half of 2000 (graphs 10.3.3 and 10.3.4).

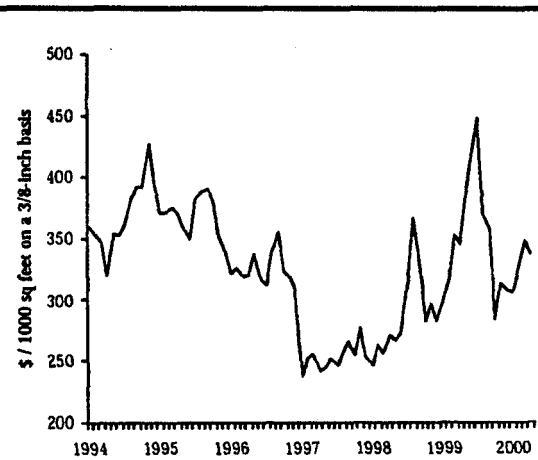
A further notable development in OSB is the rising European interest in it. During 1999, production increased by 43% to 968,000 m³ (tables 10.3.3 and 10.3.5) and several price increases were successfully implemented. There are at least twelve potential new projects on tap (table 10.3.4). If all are realized, over 3 million m³ of capacity will be looking for markets by the end of 2002. But European building methods differ from North America's and wood frame construction is relatively rare. Over a decade ago, the machinery vendor Carl Schenk AG studied the European market potential for OSB and concluded that about 1 million m³ would be the most that would be required. This year European

capacity will increase to over 1.5 million m³ and, although Europe's panel needs are using with some increase in the popularity of frame construction and rebuilding needs, OSB expansion is mainly attributable to new applications like flooring, packaging and decoration (EPF 2000) (graph 10.3.5).

However, it is questionable if a threefold increase in European supply can be accommodated. If this is the case, North American and European exports of OSB may compete in international markets.

GRAPH 10.3.3

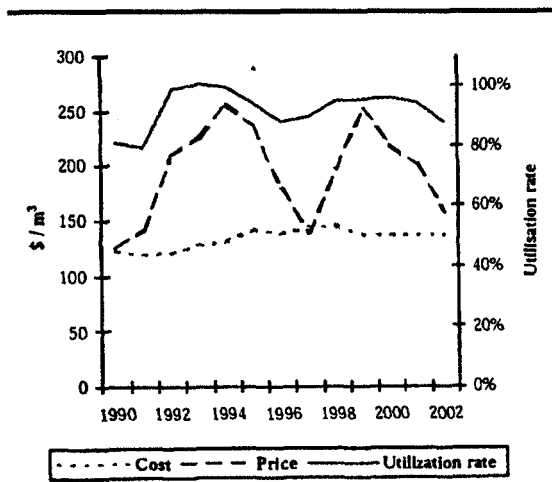
North American structural panel composite prices, 1994 - 2000



Source: Random Lengths Yardstick, 2000.

GRAPH 10.3.2

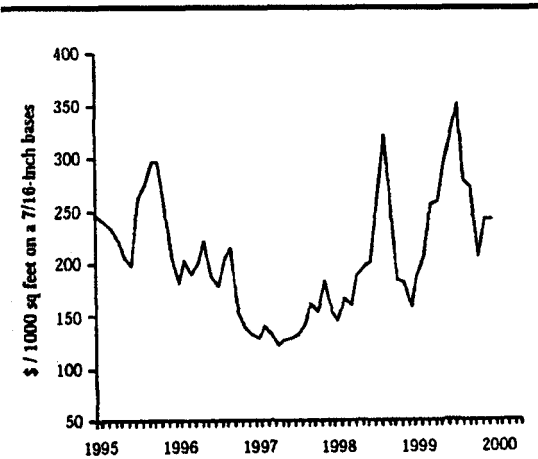
OSB prices and costs versus utilization rate, 1990 - 2002



Source: Spelter, H., USDA Forest Service, Forest Products Laboratory, 2000.

GRAPH 10.3.4

United States OSB prices, 1995 - 2000



Source: Random Lengths Yardstick, 2000.

TABLE 10.3.3

OSB balance in Europe, the Russian Federation and North America, 1995-1999

	1995	1996	1997 (Million m ³)	1998	1999	Timber Committee estimates for 2000 *
EUROPE						
Production	0.37	0.37	0.44	0.66	0.97	1.15
Imports	1.02	0.79	0.99	1.08	1.17	1.19
Exports	0.58	0.53	0.55	0.63	0.73	0.73
Net trade	-0.54	-0.37	-6.57	-0.58	-0.44	-0.46
Apparent consumption	0.44	0.38	0.44	0.37	0.53	1.61
NORTH AMERICA						
Production	11.09	12.80	14.50	16.21	17.92	18.09
Imports	3.47	4.23	4.99	5.81	6.64	5.96
Exports	3.63	4.40	5.20	6.04	6.89	7.23
Net trade	0.16	0.17	0.21	0.23	0.25	1.27
Apparent consumption	10.93	12.62	14.30	15.98	17.67	16.81

* = The Timber Committee's forecast trend from the September 1999 session was applied to the 1999 figure.

Source: ECE/FAO TIMBER database, 2000.

TABLE 10.3.4

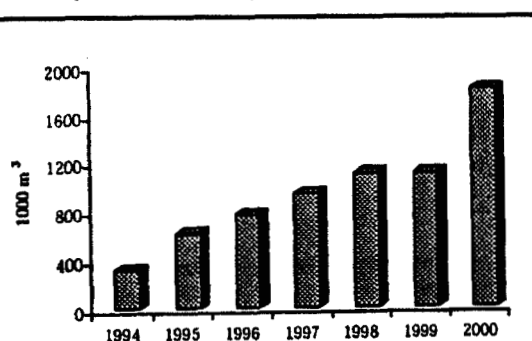
Announced OSB capacity in Europe, 2000-2002

Company	Location	2000	2001	2002	Cumulative (1,000m ³)
Egger	Wismar, Germany	360			360
Agglo	Genk, Belgium	300			660
Isorex (expansion)	France	100			760
Kronofrance	France	360			1,120
Kronotex	Wittstock, Germany		400		1,520
Kunz	Wittenberge, Germany		300		1,820
Pfleiderer	Neumarkt, Germany		300		2,120
Glunz	Nettgau, Germany		300		2,420
Ekoplyta	Poland		200		2,620
Kronospan	Wales, United Kingdom			300	2,920
Hornitex	Beeskow, Germany			400	3,320
Solo	Czech Republic			200	3,520
Total		1,120	1,500	900	3,520

Source: Andritz, Dieffenbacher, 2000.

GRAPH 10.3.5

OSB production capacity in Europe, 1994-2000



Source: European Panel Federation, 2000.

TABLE10.3.5
Production and trade of OSB, 1996-1999
(1,000m³)

	1996	1997	1998	1999	Change 1998 to 1999	
					Volume	%
PRODUCTION						
EUROPE	373	438	663	968	305	46.0
Ireland	0	0	110	300	190	172.7
Poland	0	60	170	280	110	64.7
United Kingdom	223	223	223	223	0	0.0
Belgium-Luxembourg	150	150	150	150	0	0.0
Romania	0	5	10	15	5	50.0
Canada	3,542	4,908	6,274	7,640	1,366	21.8
United States	9,254	9,595	9,936	10,277	341	3.4
NORTH AMERICA	1,2796	14,503	16,210	17,917	1,707	10.5
EXPORTS						
EUROPE	532	545	632	730	98	15.5
Poland	0	50	170	290	120	70.7
Belgium-Luxembourg	113	125	138	150	12	8.9
United Kingdom	118	124	129	135	5	4.2
Slovenia	82	66	51	35	-16	-30.8
Slovakia	115	86	57	28	-29	-50.9
Sweden	0	0	5	16	11	204.0
Other countries	104	94	82	76	-6	-7.6
Canada	4,402	5,177	5,952	6,728	775	13.0
United States	0	19	89	159	70	78.7
NORTH AMERICA	4,402	5,196	6,041	6,887	845	14.0
IMPORTS						
EUROPE	792	994	1,075	1,169	94	8.7
Greece	297	306	316	325	9	3.0
Germany	16	108	200	292	92	46.0
Netherlands	67	82	98	113	15	15.8
Slovakia	0	17	43	69	26	60.1
United Kingdom	195	153	110	67	-43	-39.0
Austria	36	41	46	51	5	10.9
Denmark	0	114	90	49	-41	-45.6
Poland	79	64	50	35	-15	-29.6
Other countries	102	108	123	168	45	36.2
Canada	0	0	59	124	65	111.0
United States	4,230	4,991	5,752	6,513	761	13.2
NORTHAMERICA	4,230	4,991	5,811	6,637	826	14.2

Source: ECE/FAOTIMBER database, 2000.

10.4 Article board

Particle board production began in the United States and Canada in the late 1940s and shows similar development along the life cycle curve (graph 10.4.1). By the mid 1970s, following almost unbroken, sometimes very rapid growth, it had reached maturity. For a while thereafter it lost market share due to concerns over formaldehyde and the Use of MDF. However, measures to

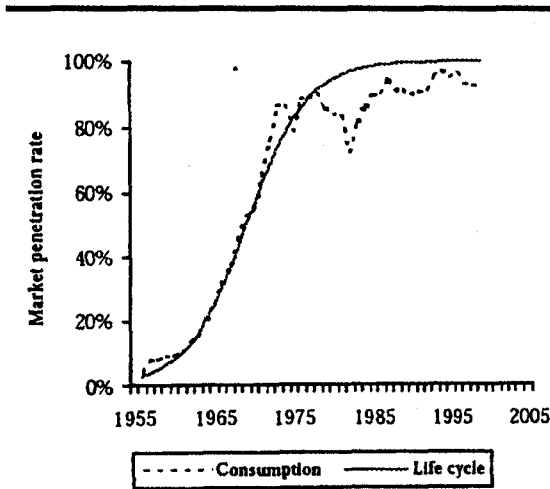
reduce formaldehyde emissions and improve surface and machineability characteristics have enabled it to fend off those challenges and, unlike plywood, maintain its mature status.

The prospects for particle board can be analysed in terms of the life cycle model (table 10.4.1). From 1961 when it attained 10% of its market share potential until 1978 when it reached 90%, its production grew at an

annual rate 16.8. From 1980 to present, its rate of growth shrunk to 2.3% a year, in line with the underlying growth of demand over the past three decades at the hypothetical saturation level of market penetration. Over the next five years, assuming the same historical trend demand growth and a slight recovery of market share, the equilibrium growth in output could be around 3%. This includes particle board made from agricultural fibres such as grass and wheat straw, an area that has seen a recent surge of interest in North America. In numerical terms, this implies an increase of 1.8 million m³, from 1999's 10.6 million m³ to 12.5 million m³ by 2004 (table 10.4.2). Consumption of particle board (excluding OSB) in North America was 2.9% higher in 1999 compared to 1998 and reached 1.8 million m³. The strong demand was the cause for particle board prices to rise steeply in 1999, 43% on average between January and December. As new capacity came on stream, supply eased and prices in early 2000 are lower than a year before, but nevertheless, higher than the depressed 1996 to 1998 level (graph 10.4.2).

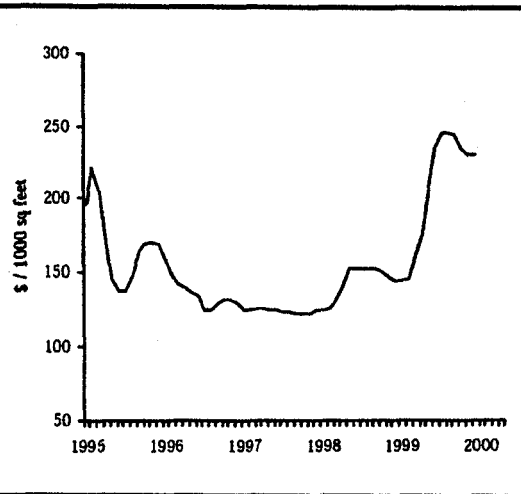
The European particle board sector is bigger than its North American counterpart by about a factor of three. In 1999, its output was reported at 35.2 million m³ (graph 10.4.3, tables 10.4.3 and 10.4.4), slightly higher than the previous year's record total. Weakness of demand in the end-use sectors during the first half of 1999 was offset by a recovery in the second half which also saw a reduction of stocks. Particle board prices were influenced by the recovery of markets and have strengthened somewhat from very depressed levels

GRAPH 10.4.1
Life cycle of particle board, 1955-2000



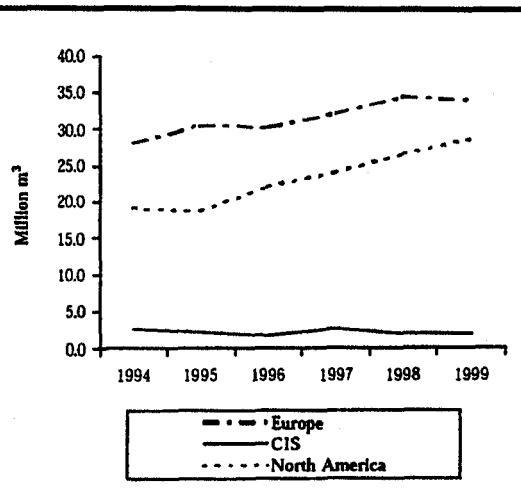
Source: Spelter, H., USDA Forest Service, Forest Products Laboratory, 2000.

GRAPH 10.4.2
United States particle board prices, 1995-2000



Source: Random Lengths Yardstick, 2000.

GRAPH 10.4.3
Consumption of particle board, 1994-1999



Source: ECE/FAO TIMBER database, 2000.

TABLE 10.4.1

United States and Canadian particle board annual rates of growth, 1961-2004

From 10 to 90% of market potential (1961-1978)	From 90% market share to the present (1978-1999)	Demand growth trend (1969-1999)	Projected sales 5-year growth (1999-2004)
16.8%	2.3%	2.3%	3.0%

Source: Spelter, H., USDA Forest Service, Forest Products Laboratory, 2000.

TABLE 10.4.2

Particle board balance (excluding OSB) in Canada and the United States, 1998-1999 (1,000m³)

	1998	1999	%
CANADA			
Production	2,347	2,436	3.8
Imports	219	263	20.6
Exports	1,074	1,054	-1.9
Apparent consumption	1,491	1,645	10.3
UNITED STATES			
Productions	8,128	8,195	0.8
Imports	1,428	1,416	-0.8
Exports	524	432	-17.6
Apparent consumption	9,032	9,179	1.6

Source: ECE/FAO TIMBER database, 2000.

TABLE 10.4.3

Particle board, including OSB, balance in the ECE region, 1995-1999 (Millionm³)

	1995	1996	1997	1998	1999	Timber Committee estimate for 2000 *
EUROPE						
Production	31.23	31.73	33.82	35.93	36.52	37.88
Imports	1.36	7.06	7.88	9.17	9.20	8.69
Exports	8.05	8.68	9.63	10.39	10.57	10.73
Net trade	0.70	1.62	1.76	1.25	1.39	2.03
Apparent consumption	30.54	30.11	32.08	34.71	35.15	35.85
RUSSIAN FEDERATION						
Production	2.21	1.47	1.49	1.57	1.97	2.45
Imports	0.02	0.05	0.98	0.24	0.10	0.09
Exports	0.17	0.10	0.16	0.10	0.09	0.11
Net trade	0.15	0.04	-0.81	-0.14	-0.01	0.01
Apparent consumption	2.05	1.43	2.30	1.71	1.98	2.43
NORTH AMERICA						
Production	19.74	22.74	24.22	26.69	28.55	29.21
Imports	3.12	4.66	6.21	7.46	8.32	7.68
Exports	4.80	5.36	6.43	7.64	8.37	9.15
Net trade	1.08	0.70	0.22	0.18	0.06	1.47
Apparent consumption	18.66	22.04	24.01	26.50	28.49	27.74

* = The Timber Committee's forecast trend from the September 1999 session was applied to the 1999 figure.

Source: ECE/FAO TIMBER database, 2000.

TABLE 10.4.4
Production and trade of particle board, including OSB, 1996-1999
(1,000 m³)

	1996	1997	1998	1999	Change 1998 to 1999	
					Volume	%
PRODUCTION						
EUROPE	31,729	33,825	35,931	36,520	589	1.6
Germany	8,584	9,152	9,300	9,320	19	0.2
France	3,030	3,275	3,483	3,588	105	3.0
Italy	2,205	2,750	2,950	3,070	120	4.1
Spain	1,970	1,970	2,843	2,897	54	1.9
Poland	1,747	2,072	2,474	2,637	163	6.6
Belgium-Luxembourg	3,087	2,565	2,632	2,586	-46	-1.8
United Kingdom	2,164	2,175	2,287	2,439	152	6.6
Austria	1,700	1,771	1,800	1,800	0	0.0
Turkey	1,193	1,728	1,525	1,643	118	7.7
Portugal	695	695	748	719	-29	-3.9
Czech Republic	635	737	790	700	-90	-11.4
Sweden	577	612	650	618	-32	-4.9
Switzerland	530	501	524	525	1	0.2
Ireland	160	200	320	510	190	59.4
Other countries	3,452	3,622	3,605	3,469	-136	-3.8
RUSSIAN FEDERATION	1,472	1,490	1,568	1,969	401	25.6
Canada	6,754	7,961	8,621	10,076	1,455	16.9
United States	15,985	16,263	18,064	18,472	408	2.3
NORTH AMERICA	22,739	24,224	26,685	28,548	1,863	7.0
EXPORTS						
EUROPE	8,679	9,626	10,394	10,568	174	1.7
Belgium-Luxembourg	1,930	2,065	2,175	2,111	-64	-2.9
Germany	1,296	1,544	1,669	1,596	-73	-4.4
Austria	1,134	1,204	1,234	1,184	-50	-4.1
France	1,206	1,252	1,297	1,339	42	3.3
Poland	48	129	315	580	265	84.3
Czech Republic	312	381	405	421	16	4.0
Other countries	2,753	3,051	3,300	3,338	37	1.1
Canada	5,198	6,072	7,026	7,782	756	10.8
United States	158	353	613	591	-22	-3.6
NORTH AMERICA	5,356	6,425	7,639	8,373	734	9.6
IMPORTS						
EUROPE	7,057	7,882	9,166	9,203	37	0.4
Germany	1,559	1,630	1,794	1,522	-272	-15.2
United Kingdom	1,185	1,119	1,153	1,063	-90	-7.8
Netherlands	674	726	720	865	146	20.2
Greece	28	28	680	700	20	3.0
Italy	340	644	642	657	15	2.3
Denmark	303	450	531	640	109	20.5
Other countries	2,968	3,285	3,647	3,755	109	3.0
Canada	301	262	277	387	110	39.7
United States	4,359	5,948	7,180	7,929	749	10.4
NORTH AMERICA	4,660	6,210	7,457	8,316	859	11.5

Source: ECE/FAO TIMBER database, 2000.

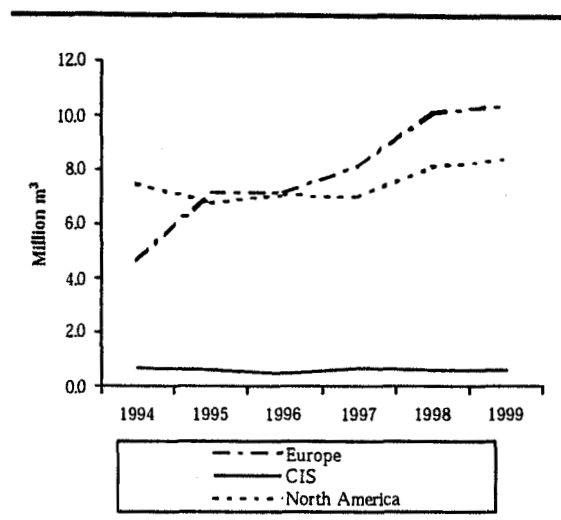
10.5 Fibreboard

Overall fibreboard consumption increased in 1999 compared to 1998 in both North America and Europe (graph 10.5.1 and tables 10.5.1 and 10.5.2). The increase was 3.7% in North America to 8.5 million m³, and in Europe 2.8% to 10.4 million m³. This result is due to MDF which continues to gain market share at a rapid pace, while dry process fibreboards show small year-to-year changes or are regressing. The individual sections below consider more detailed market development for MDF, hardboard and insulating board.

10.6 Medium Density Fibreboard

In the United States production of MDF began in the mid 1960s. It is a refined, premium composite with a more uniform cross section as compared to particle board. Its use is prominent in furniture and cabinetry where edge profiling is needed. Where only a flat core stock with an unexposed edge is required, the less costly particle board is often adequate. So MDF has substituted for some particle

GRAPH 10.5.1
Consumption of fibreboard, 1994-1999



Source: ECE/FAO TIMBER database, 2000.

TABLE 10.5.1
Fibreboard balance in Europe, the Russian Federation and North America, 1995-1999
(Million m³)

	1995	1996	1997	1998	1999	Timber Committee estimate for 2000 *
EUROPE						
Production	7.51	7.52	8.75	10.36	10.85	11.31
Imports	2.81	3.35	4.50	5.29	5.54	5.45
Exports	3.11	3.57	4.69	5.17	5.44	5.61
Net trade	0.42	0.23	0.21	-0.10	0.02	0.16
Apparent consumption	7.16	7.23	8.25	10.15	10.43	11.15
RUSSIAN FEDERATION						
Production	0.75	0.59	0.75	0.62	0.77	0.86
Imports	0.01	0.02	0.06	0.15	0.13	0.14
Exports	0.13	0.17	0.17	0.17	0.26	0.29
Net trade	0.13	0.16	0.11	0.03	0.13	0.15
Apparent consumption	0.62	0.43	0.64	0.59	0.64	0.71
NORTH AMERICA						
Production	7.23	7.31	7.32	8.24	8.43	8.53
Imports	0.68	0.89	1.08	1.24	1.65	1.67
Exports	1.09	1.12	1.34	1.33	1.62	1.75
Net trade	0.41	0.22	0.27	0.09	-0.03	0.08
Apparent consumption	6.81	7.09	7.05	8.16	8.46	8.45

* The Timber Committee's estimated trend from the September 1999 session was applied to the 1999 figure.
Source: ECE/FAO TIMBER database, 2000.

TABLE 10.5.2
Production and trade of fibreboard, 1996-1999
(1,000 m³)

	1996	1997	1998	1999	Change 1998 to 1999	
					Volume	%
PRODUCTION						
EUROPE						
Hardboard	2,276	2,457	2,897	2,680	-217	-7.5
MDF	4,348	5,514	6,619	7,299	680	10.3
Insulating board	892	774	847	883	36	4.2
Total Fibreboard	7,516	8,745	10,364	10,862	499	4.8
of which:						
Germany	900	1,895	1,985	2,506	521	26.2
Italy	1,500	1,300	1,450	1,260	-190	-13.1
Spain	590	590	1,140	1,135	-5	-0.4
Poland	653	733	975	1,060	85	8.7
France	512	540	801	873	71	8.9
Other countries	3,361	3,687	4,012	4,029	17	0.4
Russian Federation	589	749	618	771	153	24.8
Canada	894	1,056	1,245	1,454	209	16.8
United States	6,415	6,262	7,000	6,977	-23	-0.3
NORTH AMERICA	7,309	7,318	8,245	8,431	186	2.3
EXPORTS						
EUROPE	3,574	4,685	5,168	5,438	270	5.2
Germany	522	770	1,017	1,149	132	13.0
France	466	538	527	673	146	27.7
Italy	395	574	483	472	-11	-2.3
Poland	293	332	454	455	1	0.3
Spain	290	289	237	256	19	8.0
Other countries	1,608	2,183	2,450	2,433	-17	-0.7
Russian Federation	173	174	173	255	82	47.4
Canada	497	744	883	1,146	263	29.8
United States	618	600	448	469	21	4.7
NORTH AMERICA	1,115	1,344	1,331	1,615	204	21.4
IMPORTS						
EUROPE	3,351	4,499	5,285	5,536	251	4.7
United Kingdom	599	755	891	772	-119	-13.3
Netherlands	304	457	537	604	67	12.5
Germany	497	561	675	603	-72	-10.7
France	181	275	365	461	96	26.2
Other countries	1,770	2,451	2,817	3,096	279	9.9
Canada	218	211	212	251	38	18.1
United States	675	867	1,032	1,395	363	35.2
NORTH AMERICA	893	1,078	1,244	1,646	401	32.3

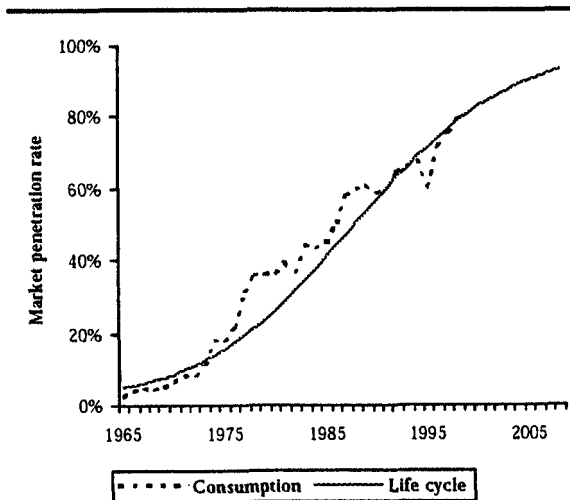
Source: ECE/FAO TIMBER database, 2000.

board as well as for solid wood in the middle price range of the market. It is arguably still a growth industry, so its position on its life cycle curve is a matter of some uncertainty, but in general it appears well advanced and capacity stands at over 4.5 million m³ (graph 10.6.1).

Over the last five years seven new plants were brought into production in North America creating an additional 1.9 million m³ of capacity. The market absorbed this two-thirds increase with some difficulty. Profit margins weakened as prices fell by about a quarter. The year 1999 however, could be characterized as one of consolidation in which markets adjusted to and absorbed the new supply in Canada, where production rose by 25.4% to just under 900,000 m³. Canadian exports to the United States were up 40% to 222,000 m³ and North American consumption reached 3.4 million m³ in 1999, a 7.3% increase (table 10.6.1). Prices stabilized and recovered some, though not all, of the lost ground.

From 1965 when MDF attained 10% of its market share potential to present, its annual rate of growth averaged 10.6% (table 10.6.2). Its estimated market penetration level is now about 80%. The underlying demand growth at its hypothetical full penetration level over the last three decades was just under 3% per year. Extrapolation of the life cycle curve suggests that by 2004 it could advance to 89%. That, in combination with continuation of demand growth at the trend level, would imply a growth rate in production of about 6% per year. If such growth materializes, however, it is likely to occur toward the outer end of the period as recent capacity

GRAPH 10.6.1
Life cycle of MDF, 1960-2005



Source: Spelter, H., USDA Forest Service, Forest Products Laboratory, 2000.

growth and potential cyclical weakness in markets due to rising interest rates will likely postpone new construction plans.

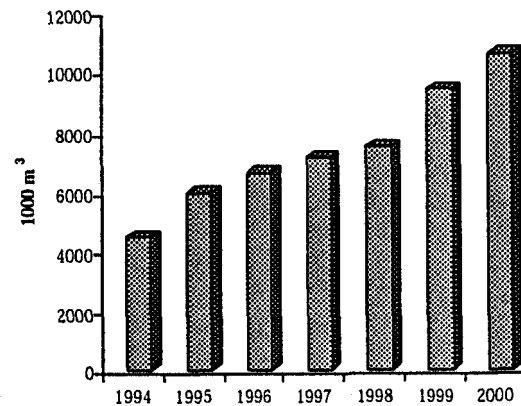
Though having started later, Europe's MDF industry has surpassed North America in production volume (graph 10.6.2). In 1999, production was reported at 7.3 million m³, 10.3% higher than the prior year's volume. With several projects nearing completion, European MDF production is likely to continue on its more rapid growth track in 2000 as well.

Demand in Europe has not followed at the same pace the rapid production growth of MDF and prices have been under pressure. There was a sharp fall of all MDF prices towards the end of 1999. Several price increases have taken place in the first months of 2000, partly due to higher costs of glues and resins.

MDF is still a new product in the Russian Federation, production in 1999 reached 135,000 m³ a 68% increase from the previous year.

GRAPH 10.6.2

MDF production capacity in Europe, 1994-2000



Source: European Panel Federation, 2000.

TABLE 10.6.2

North American MDF annual rates of growth, 1973-2004

From 10% market share to the present	Demand growth trend	Projected sales 5-year growth
(1973-1999)	(1969-1999)	(1999-2004)
10.6%	2.9%	6.0%

Source: Spelter, H., USDA Forest Service, Forest Products Laboratory, 2000.

TABLE 10.6.1
Production and trade of MDF. 1996-1999
(1,000 m³)

	1996	1997	1998	1999	Change 1998 to 1999	
					Volume	%
PRODUCTION						
EUROPE	4.348	5.514	6.619	7.299	680	10.3
of which:						
Germany	710	1,495	1,566	2,032	466	29.8
Spain	490	490	969	962	-7	-0.8
France	363	416	636	698	61	9.6
Italy	700	600	650	650	0	0.0
Poland	196	246	500	612	112	22.4
Belgium-Luxembourg	440	461	483	504	22	4.5
Other countries	1,449	1,806	1,815	1,842	27	1.5
Russian Federation	0	84	80	135	55	68.8
Canada	215	289	712	893	181	25.4
United States	2,057	2,402	2,480	2,501	21	0.8
NORTH AMERICA	2,272	2,691	3,192	3,394	202	6.3
EXPORTS						
EUROPE	1,840	2,540	2,794	2,928	134	4.8
of which:						
Germany	300	434	513	533	20	3.9
France	316	354	328	509	181	55.3
Belgium-Luxembourg	14	205	395	395	0	0.0
Italy	286	435	342	327	-15	-4.4
Other countries	924	1,112	1,216	1,164	-52	-4.3
Russian Federation	0	0	0	0		
Canada	157	338	552	774	222	40.1
United States	114	128	171	189	18	10.5
NORTH AMERICA	271	466	723	963	240	33.1
IMPORTS						
EUROPE	1,555	2,277	2,621	2,764	143	5.5
of which:						
United Kingdom	337	462	572	496	-75	-13.2
Netherlands	172	228	313	351	38	12.1
Spain	172	297	230	326	96	41.6
France	90	169	209	321	113	53.9
Other countries	784	1,121	1,297	1,269	-28	-2.1
Russian Federation	0	64	54	40	-14	-25.9
Canada	112	95	92	113	21	23.2
United States	206	373	612	860	248	40.5
NORTH AMERICA	318	468	704	973	269	38.3

Source: ECE/FAO TIMBER database, 2000.

10.7 Hardboard

European consumption of hardboard fell in 1999 by 9.5% to 2.9 million m³. Production in Italy, the main producer was down 23.8% to 610,000 m³ (table 10.7.1). Hardboard is losing market share to thin MDF, but has been successful in maintaining the door market. During 1999 prices continued to fall, but some recovery has taken place in 2000.

In North America consumption of hardboard showed little change in 1999 from the previous year, it was 2% higher and reached 1.4 million m³. Consumption in the Russian Federation also showed a small increase of 3.2% to 457,000 m³.

TABLE 10.7.1
Production and trade of hardboard, 1996-1999
(1,000 m³)

	1996	1997	1998	1999	Change 1998 to 1999	
					Volume	%
PRODUCTION						
EUROPE	2,276	2,457	2,897	2,680	-217	-7.5
of which:						
Italy	800	700	800	610	-190	-23.8
Germany	140	295	309	336	27	8.7
Poland	285	310	289	249	-40	-13.8
Other countries	1,051	1,152	1,499	1,485	-14	-0.9
Russian Federation	570	601	525	623	98	18.7
Canada	254	342	108	136	28	25.7
United States	1,558	1,328	1,269	1,225	-44	-3.5
NORTH AMERICA	1,812	1,670	1,377	1,361	-16	-1.2
EXPORTS						
EUROPE	1,107	1,335	1,563	1,649	85	5.5
of which:						
Germany	179	283	453	557	104	23.0
Poland	67	96	105	160	55	53.0
Estonia	140	129	170	157	-13	-7.4
Other countries	721	827	836	774	-62	-7.4
Russian Federation	173	174	173	255	82	47.4
Canada	213	276	221	244	22	10.1
United States	419	390	155	158	3	1.9
NORTH AMERICA	632	666	376	402	25	6.8
IMPORTS						
EUROPE	1,218	1,400	1,841	1,841	1	0.0
of which:						
Denmark	100	141	133	232	99	74.4
Germany	208	215	279	221	-58	-20.8
Belgium-Luxembourg	115	73	99	151	52	51.9
Other countries	795	971	1,329	1,238	-92	-6.9
Russian Federation	16	0	91	89	-2	-2.7
Canada	70	74	78	72	-6	-7.5
United States	349	385	263	339	76	28.9
NORTH AMERICA	419	459	341	411	70	20.6

Source: ECE/FAO TIMBER database, 2000.

10.8 Insulating board

Consumption of insulating board in Europe rose by 10.7% to 953.000 m³ (table 10.8.1). In North America consumption in 1999 was around the previous year level and reached 3.7 million m³.

TABLE 10.8.1
Production and trade of insulating board, 1996-1999
(1,000 m³)

	1996	1997	1998	1999	Change 1998 to 1999	
					Volume	%
PRODUCTION						
EUROPE	892	774	847	883	36	4.2
of which:						
Poland	172	177	186	199	13	7.0
Germany	50	105	110	138	28	25.0
Switzerland	110	115	110	120	10	9.1
Other countries	452	274	335	334	-1	-0.4
Russian Federation	19	64	13	13	0	0.0
Canada	425	425	425	425	0	0.0
United States	2.800	2.532	3,251	3,251	0	0.0
NORTH AMERICA	3.225	2.957	3,676	3,676	0	0.0
EXPORTS						
EUROPE	628	811	810	861	51	6.3
of which:						
Poland	111	132	138	155	17	12.6
Switzerland	56	75	116	129	13	10.8
Other countries	268	328	298	285	-13	-4.3
Canada	127	130	110	129	19	17.5
United States	85	82	122	122	0	0.0
NORTH AMERICA	212	212	232	251	19	8.3
IMPORTS						
EUROPE	578	822	824	931	107	13.0
of which:						
Netherlands	55	151	142	179	37	26.1
Germany	132	126	126	136	10	7.9
United Kingdom	92	95	128	135	7	5.4
Italy	130	71	77	128	51	66.2
Other countries	169	379	351	353	2	0.6
Canada	36	42	42	65	23	54.4
United States	120	109	157	196	39	24.8
NORTH AMERICA	156	151	199	261	62	31.1

Source: ECE/FAO TIMBER database, 2000.