

KEY STATISTICS 2022

European pulp & paper industry



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Welcome to the latest issue of Cepi's Key Statistics. This booklet contains the key statistics necessary to give a clear picture of the performance of the European pulp and paper industry in 2022.

The statistics included in this booklet are a compilation of data received from the National Associations which are Cepi members, under the auspices of Cepi's Statistics Network. Some additional sources, such as Eurostat, have been used where necessary and relevant.

Extra statistical information is accessible online to members on Cepi's Library at <https://library.cepi.org/> and to non-members by subscription¹.

The Confederation of European Paper Industries (Cepi) is a Brussels-based non-profit making organisation founded in 1992, which represents the European pulp and paper industry towards the European Institutions. Through its member associations, Cepi also represents approximately 480 pulp, paper and board producing companies across Europe, ranging from small and medium-sized enterprises to multinationals (counting companies with a presence in more than one Cepi country only once). It represents

91% of the European² pulp and paper industry in terms of production. The pulp and paper industry provides 180 000 jobs in Europe directly. It has a turnover of 115 billion euros and adds 25 billion euros to the EU GDP. It is strong in export markets, with an export rate of 21% of its paper and board production.

Circular Economy in the European Pulp and Paper Industry

The European Pulp and Paper industry plays a big role in the circular economy.

This icon has been introduced in the report to highlight the many areas that are circular in our sector. More information on circular economy can be found on Cepi's website.

<https://www.cepi.org/policy-area/sustainability-circularity/>

Members of Cepi in 2022

The National Associations of the 18 following countries are Cepi members: Austria, Belgium, Czech Republic, Finland, France, Germany, Hungary, Italy, The Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and United Kingdom.

Data quality and compliance with EU competition rules



Responsibility for the collection and management of statistical data lies with the Cepi statistics department, which is constantly working to improve the quality of the data reported. In order to further increase the reliability and credibility of the data reported, Cepi has commissioned Deloitte to issue a limited assurance statement on the data quality rating that Cepi carried out on its core indicators in the statistics report. The limited assurance statement is available at <http://www.Cepi.org/statistics>

The compliance of the data produced with the EU competition rules is periodically checked by a law firm.

¹ More statistics reports (annual, quarterly and monthly) are available by subscription:

- Please visit our website <https://www.cepi.org/statistics-order-form/>
- Or contact Ariane Crèvecoeur – Statistics Manager – a.crevecoeur@cepi.org






² Europe minus the Russian Federation



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Pulp and Paper Industry

	1991	2000	2010	2015	2021	2022	% Change 2022/2021	% Change 2022/2010
Industry Structure								
Number of Companies ¹	1 082	979	728	688	675	664	-1.6	-8.8
Number of Mills	1 570	1 309	994	921	884	861	-2.6	-13.4
Pulp	296	233	172	155	150	141	-6.0	-18.0
Paper and Board	1 274	1 076	822	766	734	720	-1.9	-12.4
Number of Paper Machines	2 182	1 858	1 396	1 292	1 225	1 204	-1.7	-13.8
Employment	411 113	279 987	194 894	178 418	180 198	179 951	-0.1	-7.7
Turnover ² (Million Euros)	n.a.	79 388	75 790	80 679	95 000	115 000	21.1	51.7
Investments ² (Million Euros)	n.a.	5 637	2 913	4 181	4 500	5 000	11.1	71.6
Added Value ² (Million Euros)	n.a.	24 494	16 560	18 262	21 000	25 000	19.0	51.0
Total Pulp³ ('000 Tonnes)								
Production Capacity	39 584	43 842	44 189	40 805	43 409	42 351	-2.4	-4.2
Operating Rate	85.4%	91.2%	87.6%	88.9%	85.6%	83.2%	-2.4	-4.3
Production	33 807	39 962	38 695	36 256	37 151	35 247	-5.1	-8.9
Cepi Internal Deliveries	n.a.	39 224	37 045	35 392	34 146	32 699	-4.2	-11.7
Consumption ⁷ (Apparent)	37 815	46 377	43 849	41 108	38 417	37 406	-2.6	-14.7
Market Pulp ('000 Tonnes)								
Production	9 314	11 423	12 706	13 078	15 226	14 696	-3.5	15.7
Exports to Outside Cepi	n.a.	1 332	2 567	3 240	5 748	5 323	-7.4	107.4
Imports from Outside Cepi	n.a.	7 924	7 721	8 091	7 014	7 481	6.7	-3.1
Trade Balance with Outside Cepi	n.a.	-6 592	-5 154	-4 851	-1 266	-2 158	70.5	-58.1
Consumption ⁷ (Apparent)	14 332	18 015	17 860	17 930	16 491	16 855	2.2	-5.6
Exports/Production	n.a.	11.7%	20.2%	24.8%	37.8%	36.2%	-1.5	16.0
Imports/Consumption	n.a.	44.0%	43.2%	45.1%	42.5%	44.4%	1.9	1.2
Paper and Board ('000 Tonnes)								
Production Capacity	73 280	97 658	103 714	99 832	100 567	98 719	-1.8	-4.8
Operating Rate	88.8%	93.0%	91.7%	91.1%	90.0%	86.1%	-3.9	-5.5
Production	65 052	90 823	95 065	90 982	90 531	85 024	-6.1	-10.6
Cepi Internal Deliveries	n.a.	78 796	80 263	77 628	77 613	73 236	-5.6	-8.8
Exports to Outside Cepi	n.a.	13 887	19 164	19 194	20 134	17 563	-12.8	-8.4
Imports from Outside Cepi	n.a.	6 383	5 783	5 367	4 743	5 044	6.3	-12.8
Trade Balance with Outside Cepi	n.a.	7 504	13 381	13 827	15 391	12 519	-18.7	-6.4
Consumption ⁷ (Apparent)	60 102	82 065	81 684	77 155	75 140	72 505	-3.5	-11.2
Exports/Production	n.a.	15.3%	20.2%	21.1%	22.2%	20.7%	-1.6	0.5
Imports/Consumption	n.a.	7.8%	7.1%	7.0%	6.3%	7.0%	0.6	-0.1

	1991	2000	2010	2015	2021	2022	% Change 2022/2021	% Change 2022/2010
Wood ('000 m³)								
Consumption	120 274	148 093	148 901	144 456	152 662	145 719	-4.5	-2.1
Hardwood	30 410	40 048	38 119	40 428	40 668	37 010	-9.0	-2.9
Softwood	89 863	108 046	110 782	104 028	111 994	108 709	-2.9	-1.9
Imports/Consumption	12.8%	17.1%	17.1%	15.3%	14.3%	10.4%	-3.9	-6.7
Domestic/Consumption	87.2%	82.9%	82.9%	84.7%	85.7%	89.6%	3.9	6.7
Paper for Recycling ('000 Tonnes) 								
Collection	25 452	43 658	55 917	55 829	55 408	52 630	-5.0	-5.9
Utilisation	25 360	40 922	48 122	47 751	50 747	47 491	-6.4	-1.3
Exports to Outside Cepi	n.a.	3 751	9 592	10 086	6 884	7 154	3.9	-25.4
Imports from Outside Cepi	n.a.	1 015	1 796	2 008	2 223	2 014	-9.4	12.1
Trade Balance with Outside Cepi	n.a.	2 736	7 795	8 078	4 661	5 139	10.3	-34.1
Utilisation Rate	39.0%	45.1%	50.6%	52.5%	56.1%	55.9%	-0.2	5.2
Exports/Collection	n.a.	8.6%	17.2%	18.1%	12.4%	13.6%	1.2	-3.6
Imports/Utilisation	n.a.	2.5%	3.7%	4.2%	4.4%	4.2%	-0.1	0.5
Recycling Rate in Europe⁴   								
Recycling Rate	40.3%	51.8%	68.5%	71.9%	72.8%	70.5%	-2.4	1.9
Non-Fibrous Materials ('000 Tonnes)								
Consumption	9 504	15 609	16 218	14 475	12 854	11 735	-8.7	-27.6
Energy and Environment⁵								
Fuels Consumption ('000 Tj)	930	1 141	1 282	1 141	1 204	n.a.		
Biomass Use (%) of Total FC 	44.4	49.3	52.9	57.7	60.5	n.a.		
Electricity Consumption (GWh)	86 527	110 424	113 137	98 243	93 239	n.a.		
% of Electricity produced through CHP ⁶	88.0	90.4	95.4	96.2	95.6	n.a.		
CO₂ Emissions (Cepi Countries)								
CO ₂ Direct Emissions (Mega Tonnes)	39.05	41.94	37.83	32.38	28.14	27.03	-3.9	-28.6
Specific CO ₂ Emissions (kt CO ₂ / kt of product)	0.54	0.42	0.35	0.31	0.27	0.27	1.9	-22.8

¹ 480 groups or corporations in 2022, when considering the entities established in one or several countries that are not bound together by legal and/or financial links.

² 2021 and 2022 figures are based on members' data, Eurostat and estimates for some countries.

³ Total Pulp = Market Pulp + Integrated Pulp

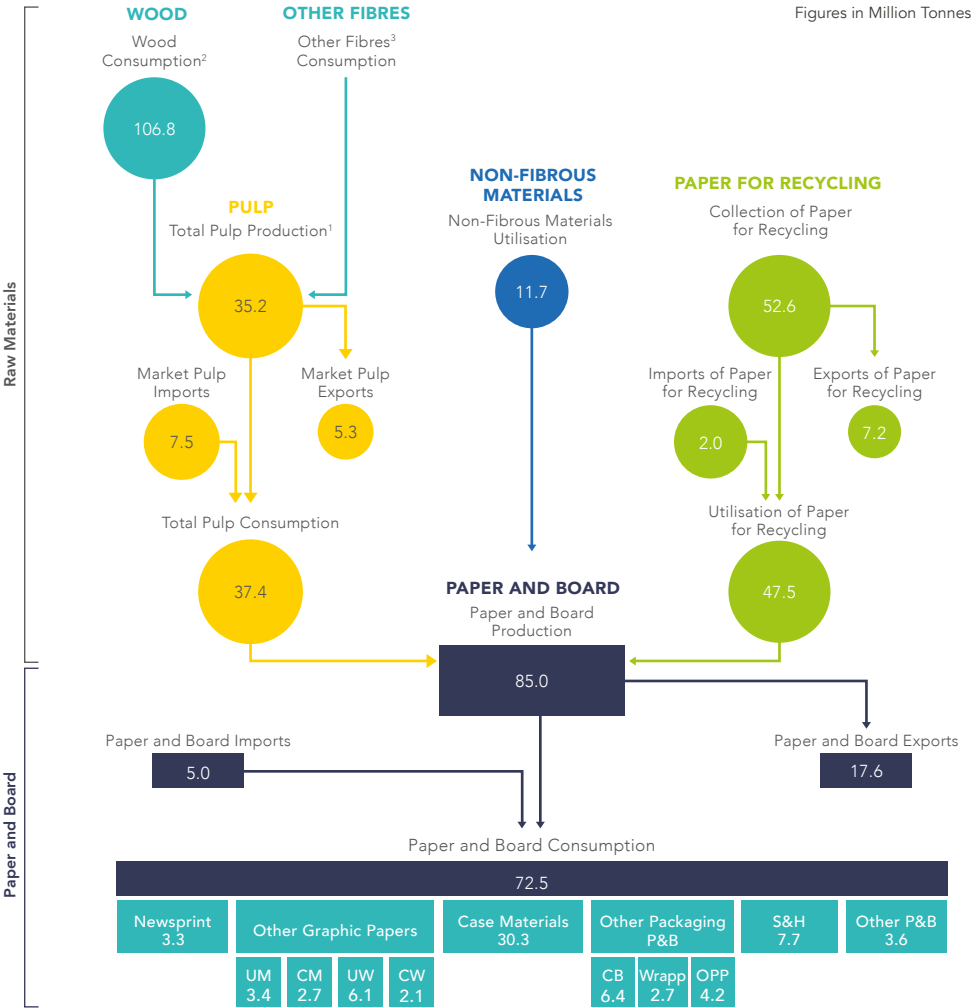
⁴ Europe means EU-27 countries plus Norway, Switzerland and the United Kingdom

⁵ Hungary, Romania and Slovenia are not included in energy and environment data.

⁶ CHP: combined heat and power (compared to total on-site electricity generation)

⁷ Cepi Apparent Consumption = production - exports to outside Cepi + imports from outside Cepi

Pulp and Paper Industry in 2022

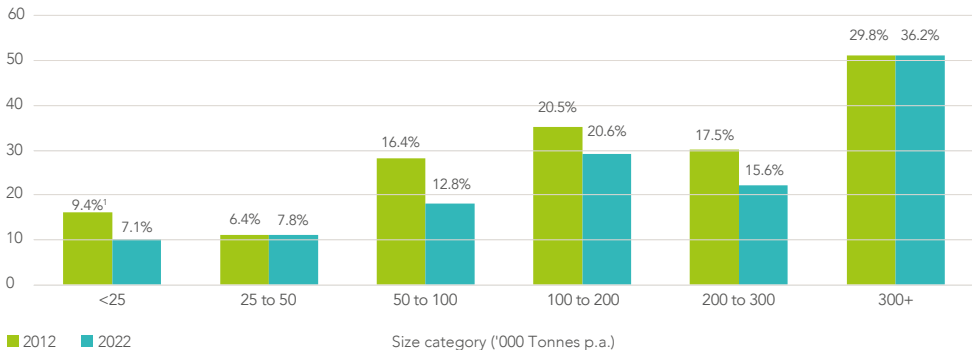


Paper and Board Consumption = Production + Imports from outside Cepi - Exports to outside Cepi
UM = Uncoated Mechanical - CM = Coated Mechanical - UW = Uncoated Woodfree - CW = Coated Woodfree
CB = Carton Board - W = Wrappings - OPP = Other Paper and Board for Packaging - S&H = Sanitary and Household

¹ of which Integrated Pulp 20.6 Million Tonnes
² Wood consumption: see definition on page 30
³ Straw, Bamboo, Bagasse, ...

Number of Pulp Mills by Volume in 2012 and 2022

Number of Pulp Mills

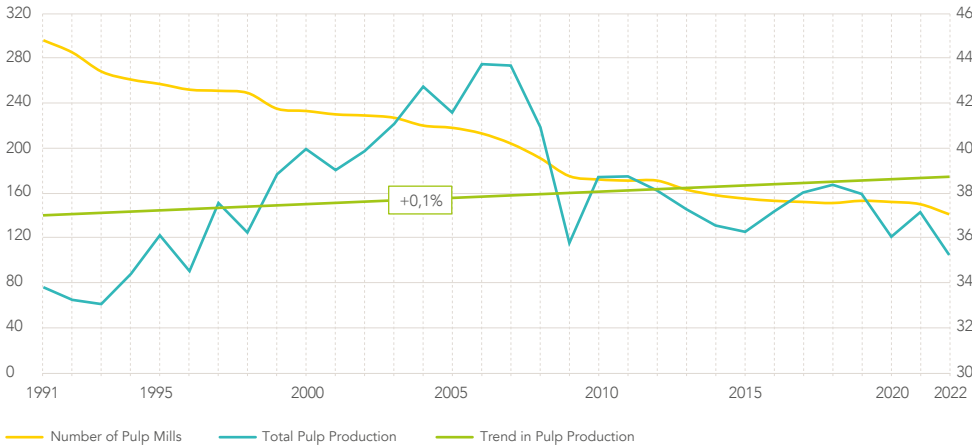


¹ Share of Total Number of Mills

Number of Pulp Mills and Total Pulp Production

Number of Pulp Mills

Total Pulp Production (Million Tonnes)



Total Pulp¹ Production and Consumption

'000 Tonnes

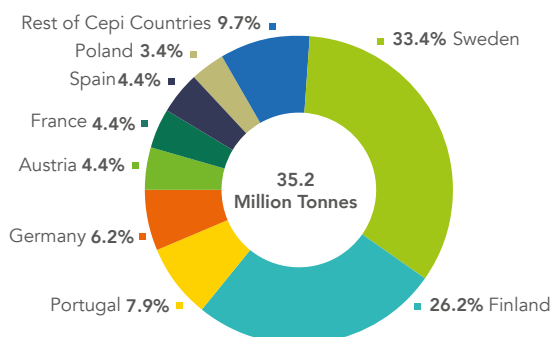
Total Pulp ¹	Production			Consumption		
	2021	2022	% Change 2022/2021	2021	2022	% Change 2022/2021
Mechanical & Semi-Chemical	8 499	7 610	-10.5	8 441	7 678	-9.0
Sulphite Pulp	1 635	1 604	-1.8	1 399	1 414	1.1
Sulphate Pulp	26 927	25 944	-3.7	28 344	28 070	-1.0
Total Chemical Pulp	28 562	27 549	-3.5	29 743	29 484	-0.9
Total Woodpulp	37 061	35 159	-5.1	38 184	37 163	-2.7
Other Pulp²	90	89	-1.5	233	243	4.2
Total Pulp¹	37 151	35 247	-5.1	38 417	37 406	-2.6

... of which Market Pulp Production and Consumption

'000 Tonnes

Market Pulp	Production			Consumption		
	2021	2022	% Change 2022/2021	2021	2022	% Change 2022/2021
Mechanical & Semi-Chemical	1 185	1 127	-4.8	1 126	1 196	6.2
Sulphite Pulp	560	578	3.1	325	387	19.3
Sulphate Pulp	13 423	12 931	-3.7	14 840	15 057	1.5
Total Chemical Pulp	13 983	13 509	-3.4	15 164	15 444	1.8
Total Woodpulp	15 168	14 636	-3.5	16 291	16 640	2.1
Other Pulp²	58	60	4.9	201	215	6.9
Total Market Pulp	15 226	14 696	-3.5	16 491	16 855	2.2

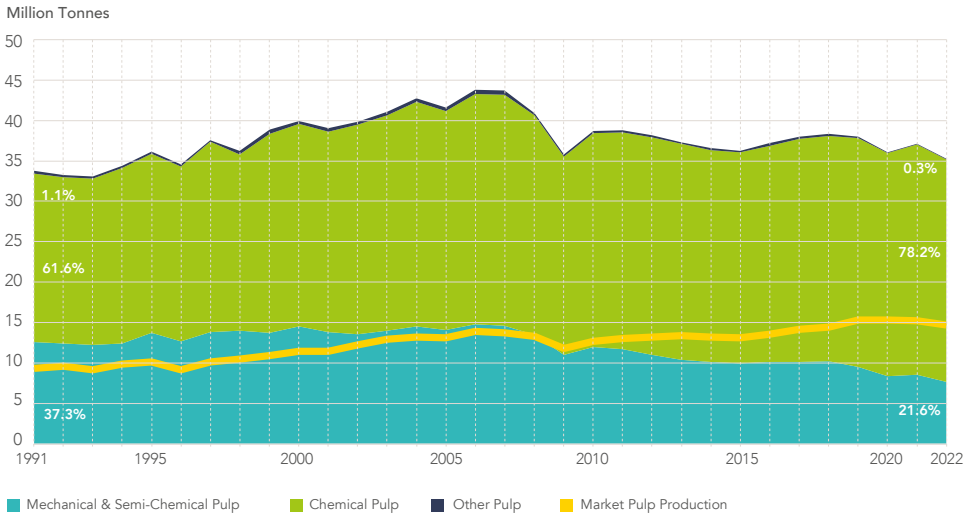
Total Pulp¹ Production by Country in 2022



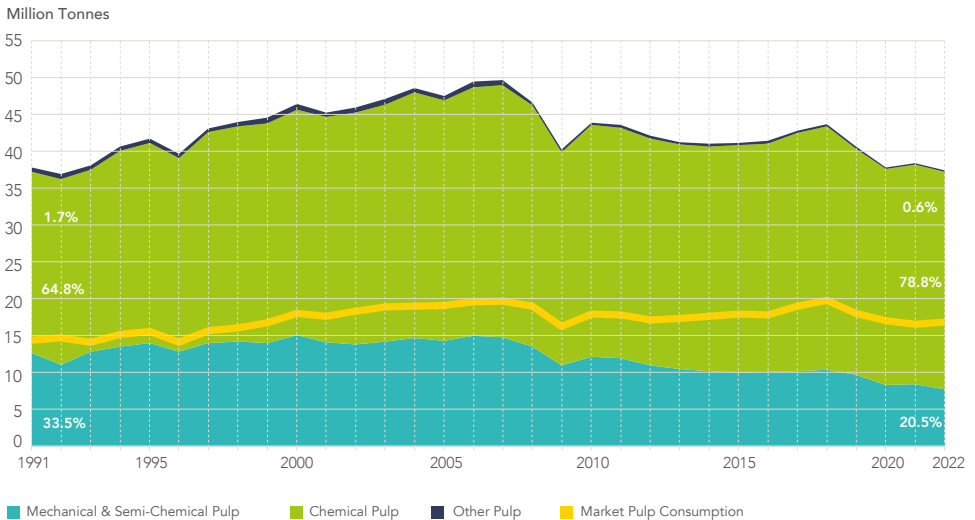
¹ Total Pulp = Market Pulp + Integrated Pulp

² Other Pulp: see definition page 30

Total Pulp¹ Production by Grade and Market Pulp Production

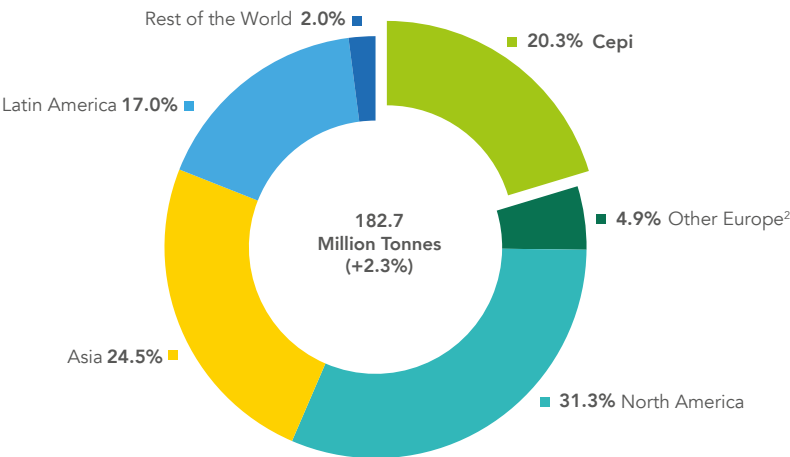


Total Pulp¹ Consumption by Grade and Market Pulp Consumption

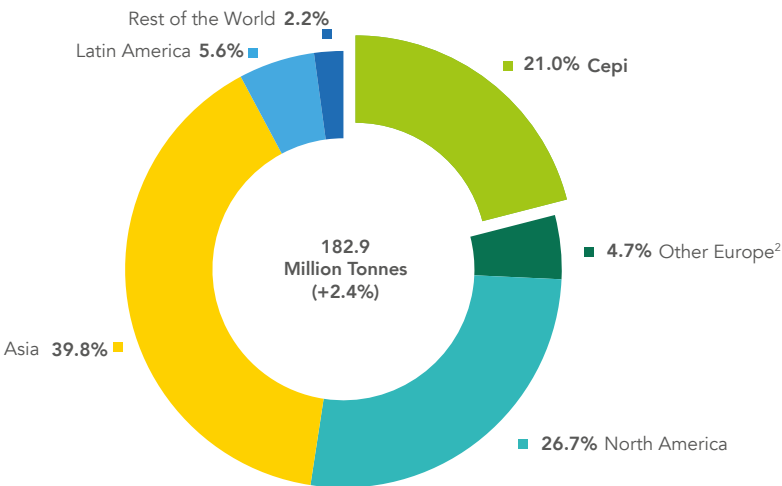


¹ Total Pulp = Market Pulp + Integrated Pulp

World Total Pulp¹ Production by Region in 2021³



World Total Pulp¹ Consumption by Region in 2021³



¹ Total Pulp = Integrated Pulp + Market Pulp

² Other Europe: total Europe excluding Cepi countries

³ Sources: Cepi, Fastmarkets RISI - 2022 figures available end-2023

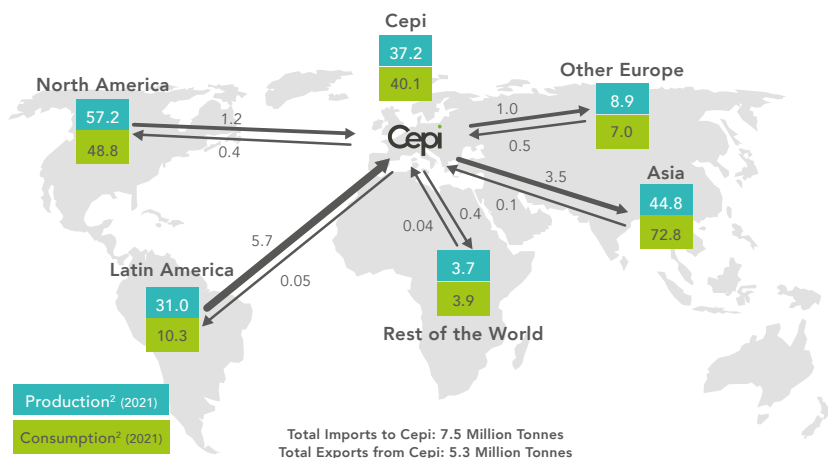
Market Pulp Exports to Other Regions

'000 Tonnes	2000	2010	2015	2021	2022	% Change 2022/2021	% Share of Total
Other Europe ¹	724	719	768	1 014	1 017	0.3	19.1
North America	104	62	59	420	427	1.6	8.0
Latin America	6	49	69	55	48	-13.2	0.9
Asia	412	1 595	2 156	3 902	3 458	-11.4	65.0
Rest of the World	86	142	187	355	373	4.8	7.0
Total	1 332	2 567	3 240	5 748	5 323	-7.4	100.0

Market Pulp Imports from Other Regions

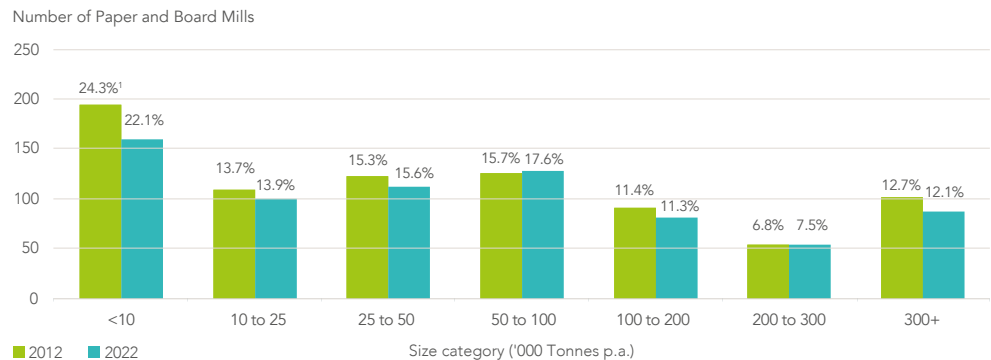
'000 Tonnes	2000	2010	2015	2021	2022	% Change 2022/2021	% Share of Total
Other Europe ¹	657	480	663	598	482	-19.4	6.4
North America	4 623	2 292	1 415	1 122	1 191	6.2	15.9
Latin America	1 916	4 733	5 657	5 207	5 720	9.9	76.5
Asia	272	134	220	36	51	42.1	0.7
Rest of the World	456	81	135	52	37	-28.5	0.5
Total	7 924	7 721	8 091	7 014	7 481	6.7	100.0

Trade Flows of Market Pulp in 2022 (Million Tonnes)

¹ Other Europe: total Europe excluding Cepi countries² Production and consumption of total pulp (market and integrated)

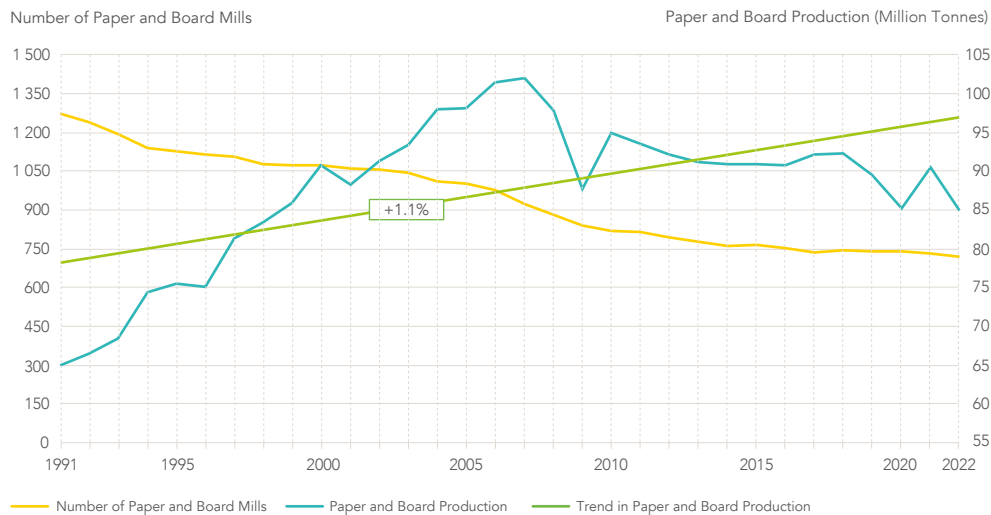
Sources: Cepi, Fastmarkets RISI - 2022 figures available end-2023

Number of Paper and Board Mills by Volume in 2012 and 2022



¹ Share of Total Number of Mills

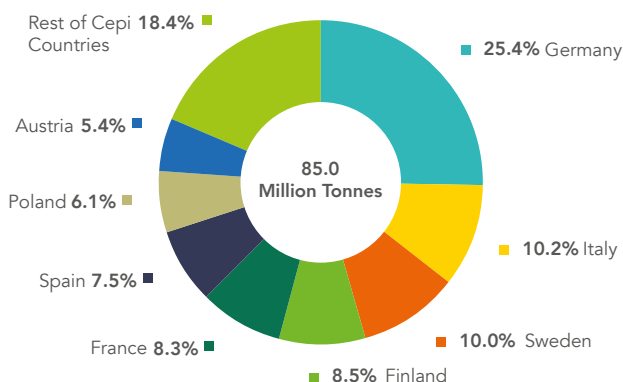
Number of Paper and Board Mills and Paper and Board Production



Paper and Board Production and Consumption

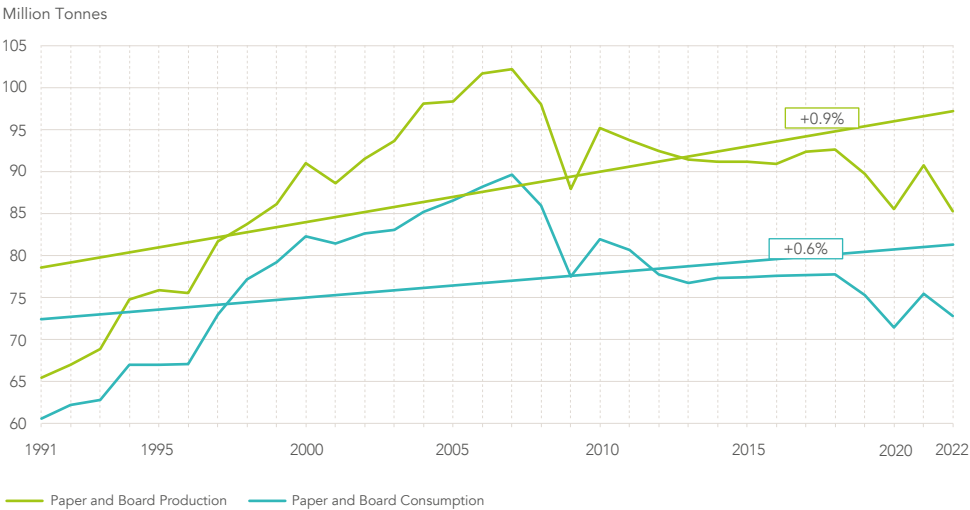
'000 Tonnes	Production			Consumption		
	2021	2022	% Change 2022/2021	2021	2022	% Change 2022/2021
Newsprint	3 875	3 444	-11.1	3 447	3 321	-3.7
Uncoated Mechanical	4 420	3 871	-12.4	3 684	3 405	-7.6
Coated Mechanical	4 436	3 570	-19.5	3 215	2 655	-17.4
Uncoated Woodfree	7 853	7 285	-7.2	6 094	6 078	-0.3
Coated Woodfree	4 409	3 869	-12.2	2 460	2 142	-12.9
Other Graphic Papers	21 118	18 595	-11.9	15 454	14 280	-7.6
Total Graphic Papers	24 993	22 039	-11.8	18 901	17 601	-6.9
Sanitary and Household	7 778	7 981	2.6	7 460	7 719	3.5
Case Materials	34 113	32 548	-4.6	31 630	30 321	-4.1
Carton Board	9 838	9 573	-2.7	6 010	6 402	6.5
Wrappings	4 562	4 341	-4.8	2 853	2 681	-6.0
Other Paper and Board for Packaging	5 045	4 640	-8.0	4 418	4 174	-5.5
Total Packaging Paper and Board	53 559	51 102	-4.6	44 911	43 578	-3.0
Other Paper and Board	4 202	3 902	-7.1	3 868	3 607	-6.8
Total Paper and Board	90 531	85 024	-6.1	75 140	72 505	-3.5
Including Speciality Paper and Board¹	10 836	10 777	-0.5			

Paper and Board Production by Country in 2022

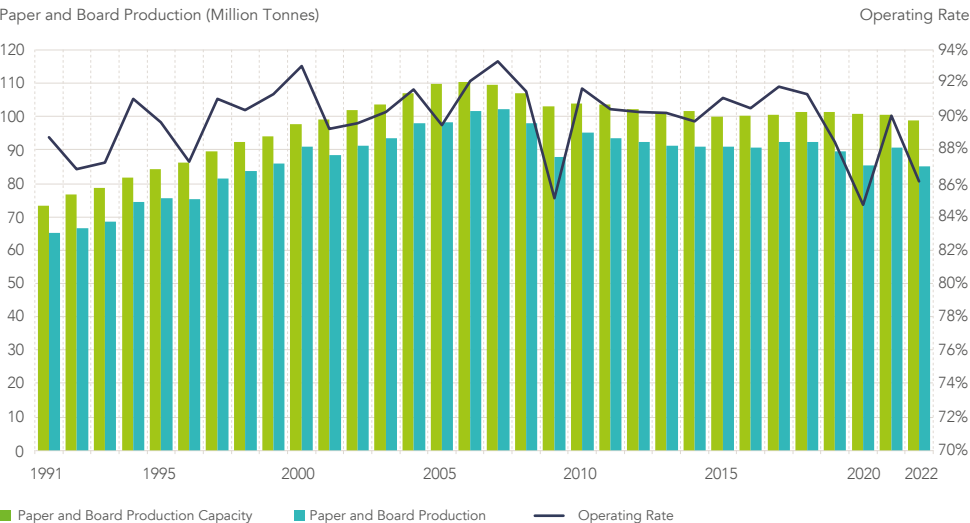


¹Speciality paper and board can be defined as paper or board that require properties (physical, optical, electrical, chemical and/or other special considerations) that are different from the norm for the market sector and application being served. Based on AWA (Alexander Watson Associates) and Cepi estimates.

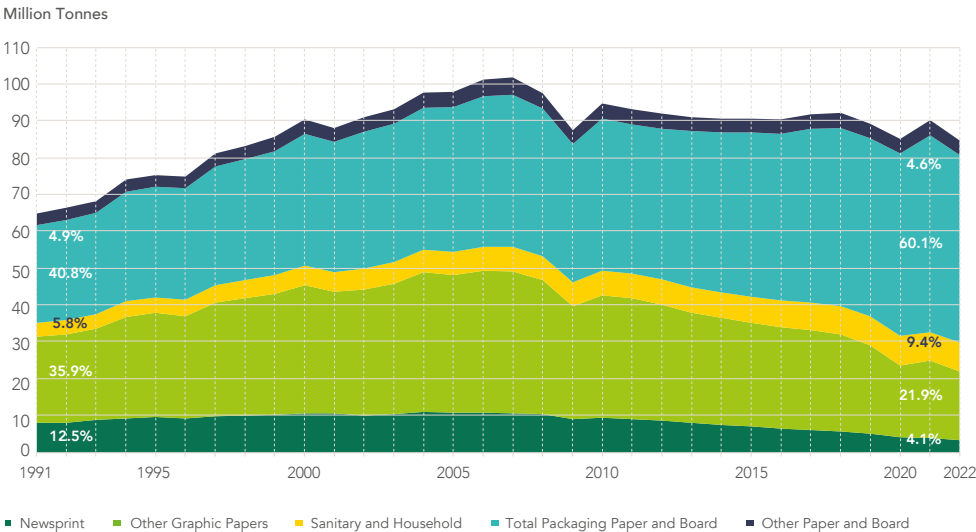
Paper and Board Production and Consumption



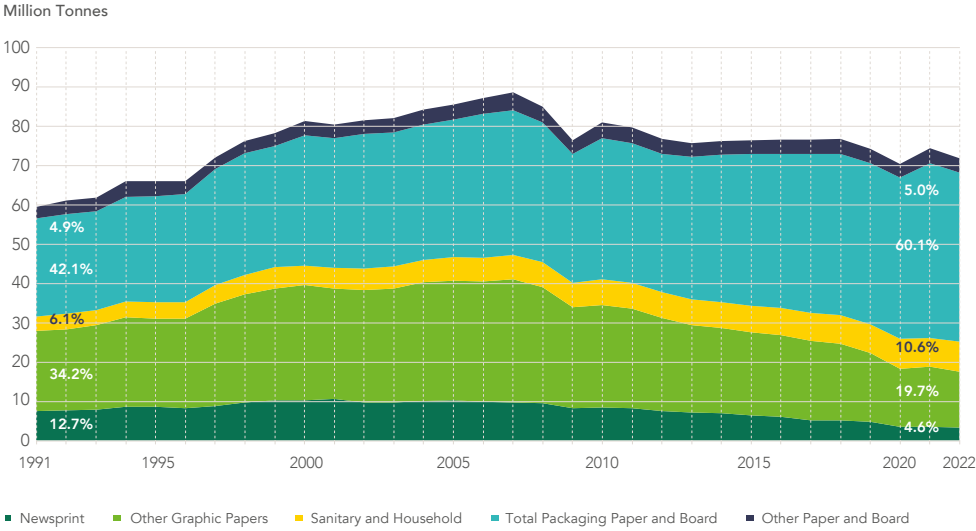
Paper and Board Production and Capacity



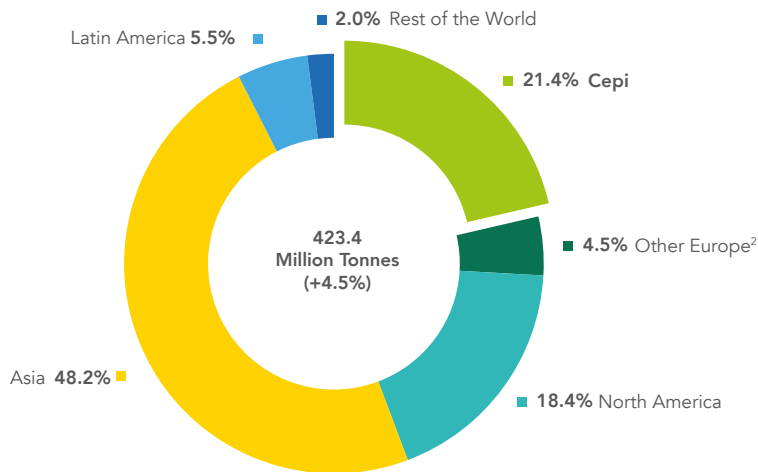
Paper and Board Production by Grade



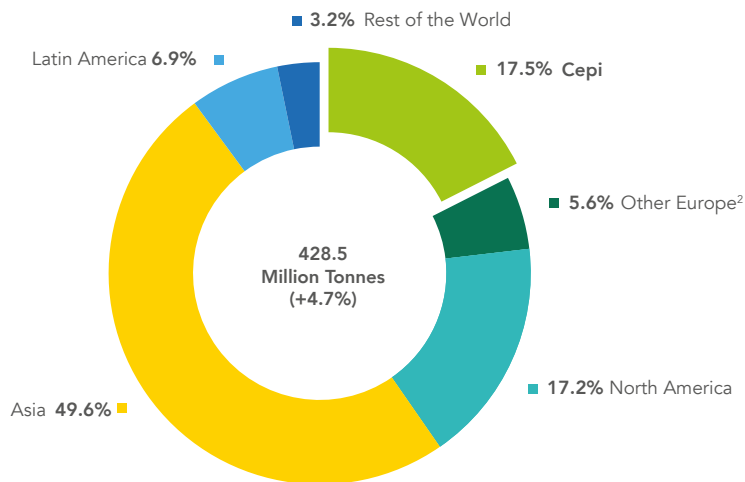
Paper and Board Consumption by Grade



Paper and Board Production by Region in 2021¹



Paper and Board Consumption by Region in 2021¹



¹ Sources: Cepi, Fastmarkets RISI - 2022 figures available end-2023

² Other Europe: total Europe excluding Cepi countries

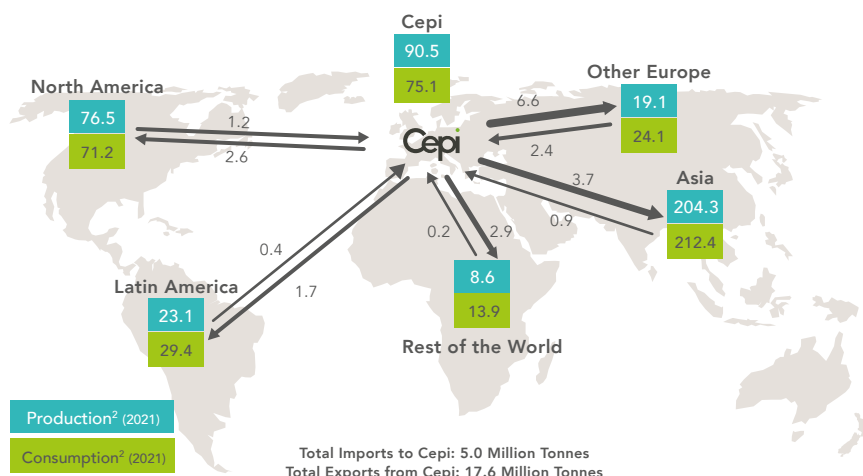
Paper and Board Exports to Other Regions

'000 Tonnes	2000	2010	2015	2021	2022	% Change 2022/2021	% Share of Total
Other Europe ¹	6 090	7 349	7 288	7 690	6 562	-14.7	37.4
North America	2 283	2 055	2 069	2 573	2 607	1.3	14.8
Latin America	874	1 879	1 794	2 011	1 743	-13.3	9.9
Asia	2 933	5 099	4 980	4 865	3 737	-23.2	21.3
Rest of the World	1 707	2 783	3 063	2 995	2 914	-2.7	16.6
Total	13 887	19 164	19 194	20 134	17 563	-12.8	100.0


Paper and Board Imports from Other Regions

'000 Tonnes	2000	2010	2015	2021	2022	% Change 2022/2021	% Share of Total
Other Europe ¹	3 318	2 525	2 544	2 610	2 389	-8.5	47.4
North America	2 191	1 829	1 608	1 176	1 184	0.6	23.5
Latin America	198	498	363	324	378	16.4	7.5
Asia	332	625	581	501	855	70.6	17.0
Rest of the World	344	307	270	131	238	81.8	4.7
Total	6 383	5 783	5 367	4 743	5 044	6.3	100.0

Trade Flows of Paper and Board in 2022 (Million Tonnes)

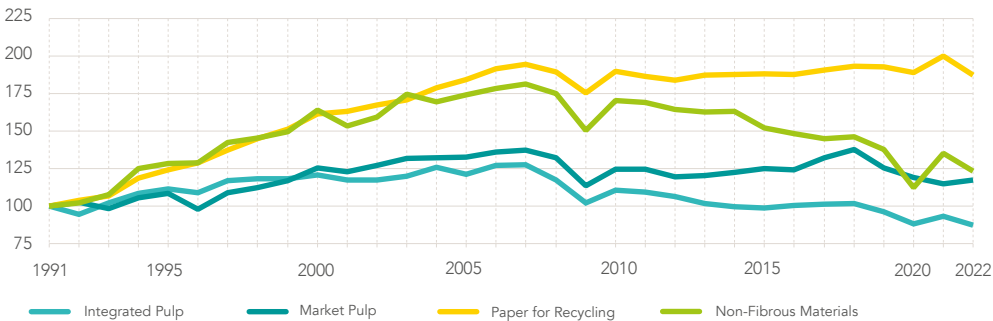
¹ Other Europe: total Europe excluding Cepi countries² Source: Cepi, Fastmarkets RISI - 2022 figures available end-2023

Raw Materials Consumption

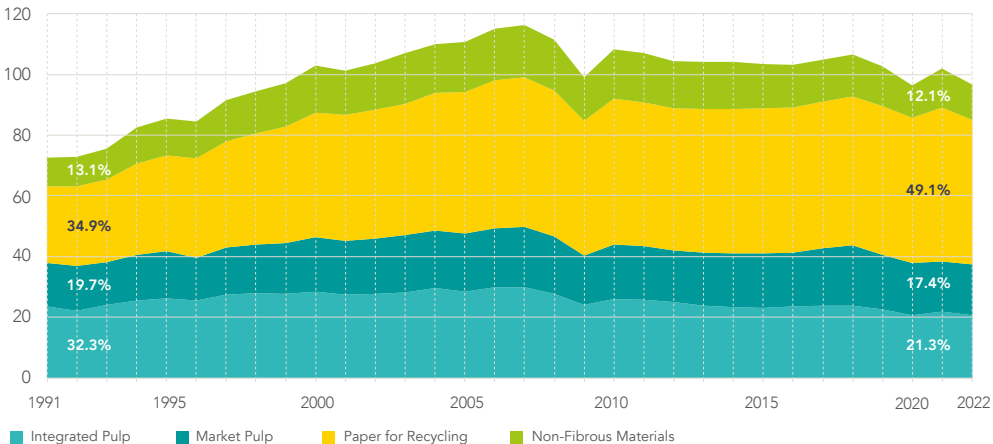
'000 Tonnes	1991	2000	2010	2015	2021	2022	% Change 2022/2021	% Share of Total
Integrated Pulp	23 483	28 362	25 989	23 178	21 926	20 551	-6.3	21.3
Market Pulp	14 332	18 015	17 860	17 930	16 491	16 855	2.2	17.4
Paper for Recycling 	25 360	40 922	48 122	47 751	50 747	47 491	-6.4	49.1
Non-Fibrous Materials	9 504	15 609	16 218	14 475	12 854	11 735	-8.7	12.1
Total Raw Materials	72 679	102 908	108 189	103 333	102 018	96 632	-5.3	100.0

Raw Materials Consumption




Index (1991 = 100)



Million Tonnes



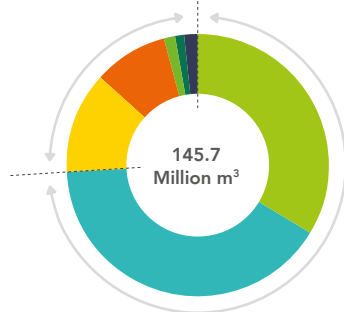
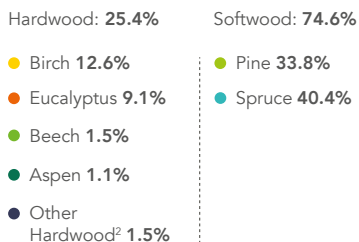
Wood Consumption

'000 m ³	1991	2000	2010	2015	2021	2022	% Change 2022/2021	% Share of Total
Softwood Roundwood	65 240	72 372	76 641	70 532	76 359	76 414	0.1	52.4
Softwood Chips 	24 623	35 673	34 141	33 497	35 635	32 295	-9.4	22.2
Total Softwood	89 863	108 046	110 782	104 028	111 994	108 709	-2.9	74.6
Hardwood Roundwood	28 963	38 542	36 635	38 293	38 367	34 503	-10.1	23.7
Hardwood Chips 	1 447	1 505	1 483	2 134	2 301	2 506	8.9	1.7
Total Hardwood	30 410	40 048	38 119	40 428	40 668	37 010	-9.0	25.4
Total Roundwood	94 204	110 915	113 276	108 825	114 726	110 918	-3.3	76.1
Total Chips 	26 070	37 179	35 625	35 631	37 936	34 801	-8.3	23.9
Total Wood	120 274	148 093	148 901	144 456	152 662	145 719	-4.5	100.0

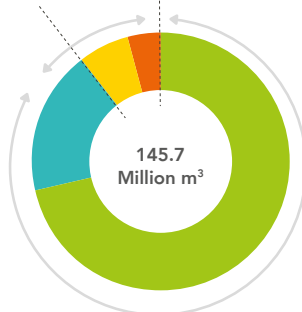
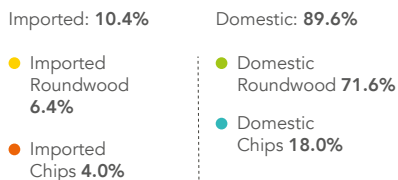


Woodchips used to produce pulp are residues from sawmills and woodworking industry, and are in fact an important contribution to circular economy through industrial symbiosis, although traditionally not reported by Cepi as recycling.

Share in Wood Consumption in 2022

By Species¹

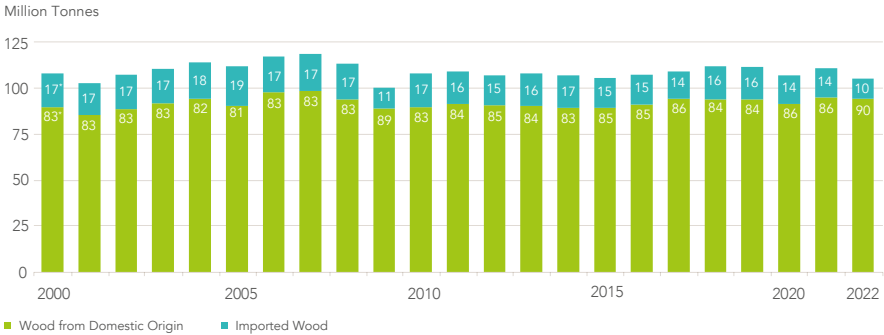
By Origin



¹ Based on a sample representing 90% of total Cepi consumption

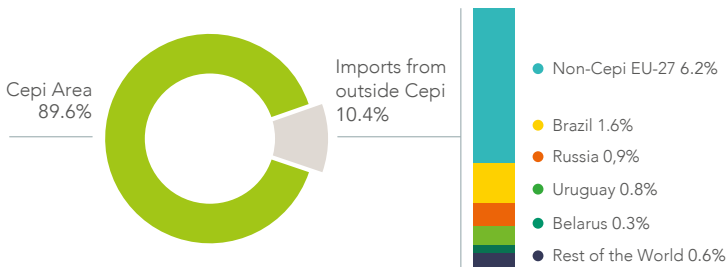
² Other Hardwood = hornbeam, ash, maple, accacia, quercus-cerris, oak, alder, poplar, willow, chesnut

Wood Consumption by Origin

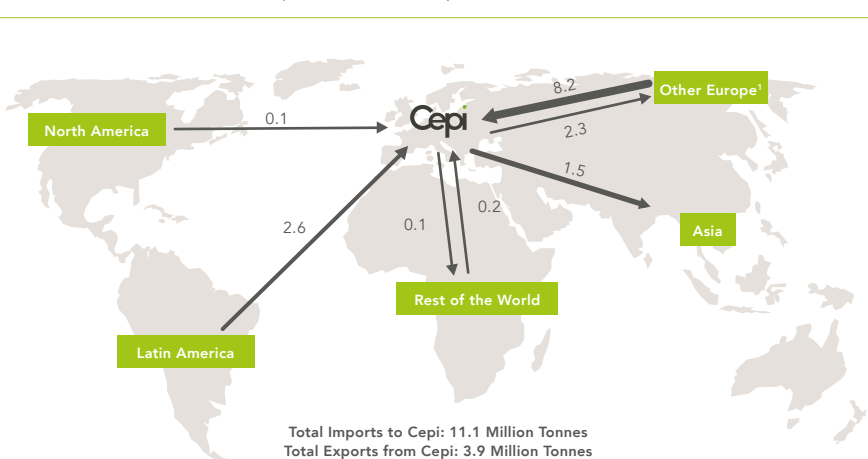


* Percentage of total wood consumption

Wood Consumption Origin in 2022



Trade Flows of Wood in 2022 (Million Tonnes)



Source: Eurostat

¹ Other Europe: total Europe excluding Cepi countries

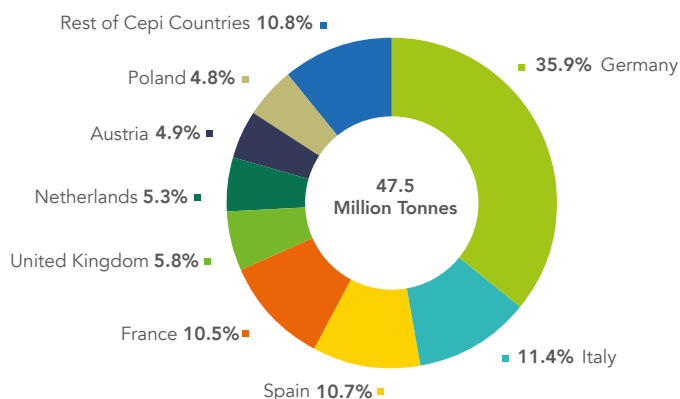
Utilisation of Paper for Recycling by Paper and Board Sector in 2022

'000 Tonnes	Grades of Paper for Recycling							
	A	B	C	D	E	F	G	E/G
Paper and Board Sector	Mixed Grades	Corrugated and Kraft	Newspapers & Magazines	Other Grades	Total Use of Paper for Recycling	Utilisation by Sector ¹ %	Total P&B Production	Utilisation Rate ² %
Newsprint	0	0	3 063	90	3 153	6.6	3 444	91.6
Other Graphic Papers	20	13	2 065	540	2 637	5.6	18 595	14.2
Total Graphic Papers	20	13	5 128	629	5 790	12.2	22 039	26.3
Case Materials	4 610	24 816	163	804	30 394	64.0	32 548	93.4
Carton Board	1 513	850	60	621	3 044	6.4	9 573	31.8
Wrappings & Other Packaging	1 907	1 850	193	376	4 327	9.1	8 981	48.2
Total Packaging Paper and Board	8 030	27 516	417	1 801	37 764	79.5	51 102	73.9
Sanitary and Household	277	150	433	1 604	2 465	5.2	7 981	30.9
Other Paper and Board	204	916	58	294	1 472	3.1	3 902	37.7
Total Paper and board	8 532	28 595	6 035	4 329	47 491	100.0	85 024	55.9
Share of Total	18.0%	60.2%	12.7%	9.1%	100.0%			

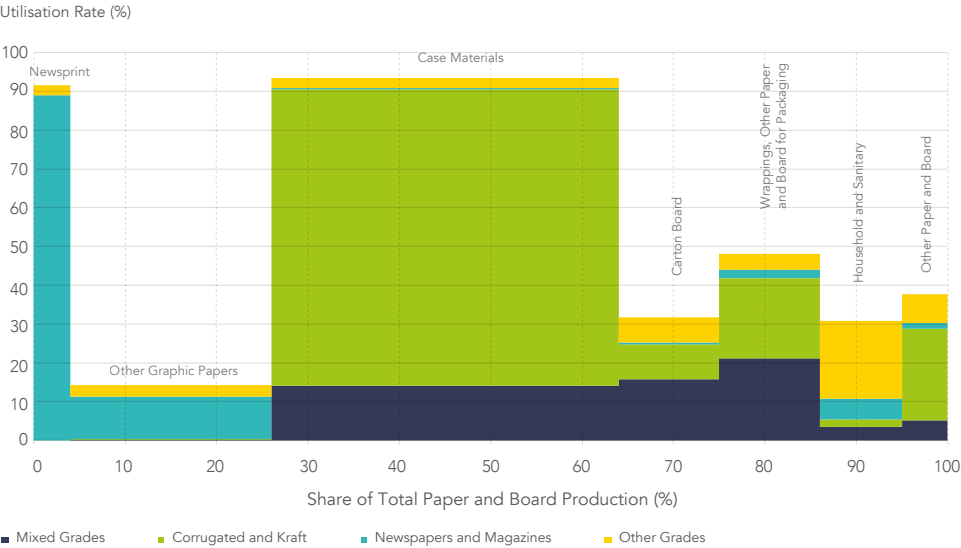
¹ Utilisation by paper and board sector: total use of paper for recycling in a sector as a percentage of the total paper for recycling used by the industry

² Utilisation rate: use of paper for recycling in a sector as a percentage of total paper & board production in that sector

Utilisation of Paper for Recycling by Country in 2022



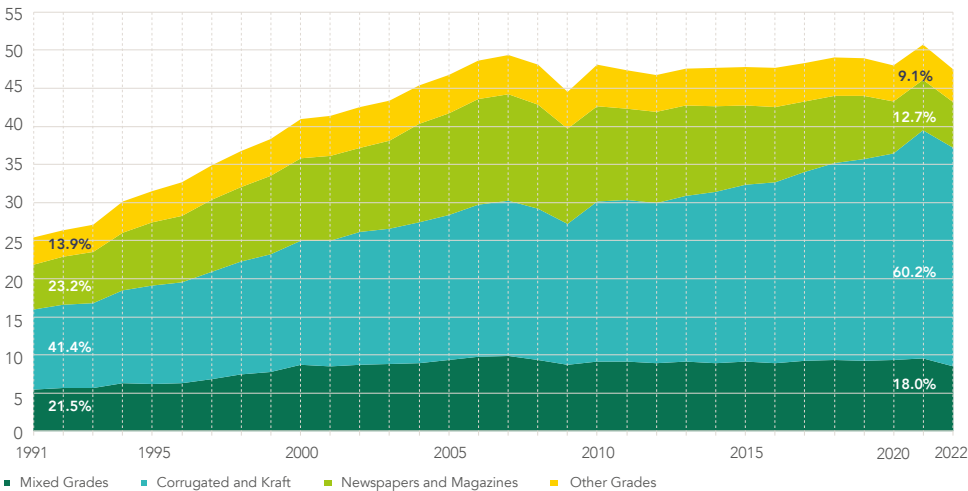
Utilisation of Paper for Recycling by Paper and Board Sector in 2022



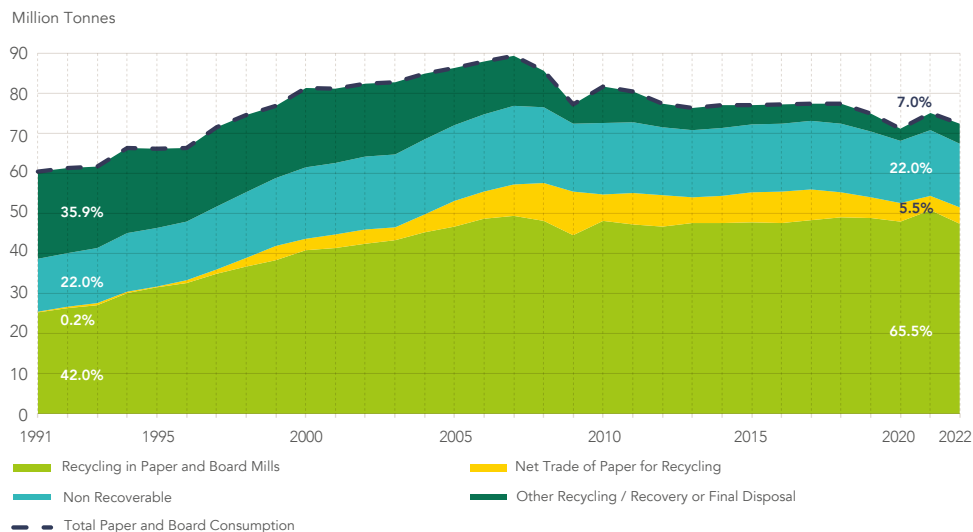
For instance: case materials represent 38% of total paper and board production, have an utilisation rate of 93% and use 64% of total paper for recycling volumes used by the industry.

Important Note: Paper for recycling is composed of fibres but also unusable materials - non-paper components as well as paper and board detrimental to production. The share of unusable materials depends on the actual sorting and collection of used paper. It varies according to grades of paper for recycling and countries. The volume of recycled fibres actually used to produce new paper is therefore lower than the volume of paper for recycling considered. The utilisation rate compares utilisation of paper for recycling to paper & board production.

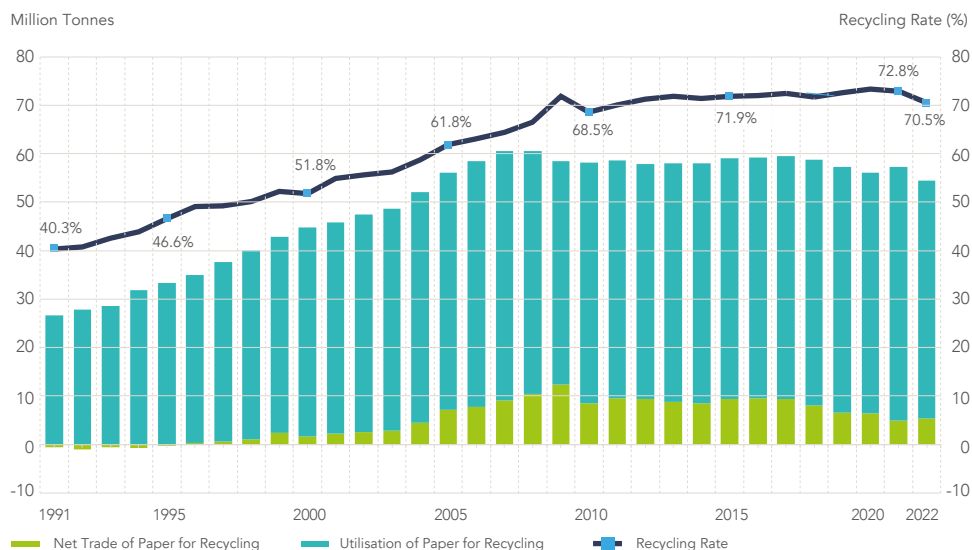
Utilisation of Paper for Recycling by Grade



Paper and Board Consumption and Recycling



Utilisation, Net Trade and Recycling Rate¹ of Paper for Recycling in Europe²



¹ Recycling Rate = "Utilisation of Paper for Recycling + Net Trade of Paper for Recycling", compared to Paper and Board Consumption

² Europe means EU-27 countries plus Norway, Switzerland and the United Kingdom

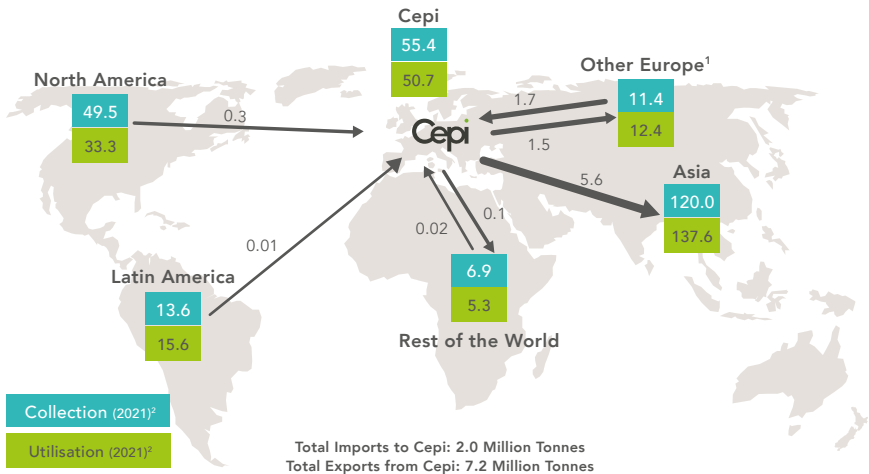
Exports of Paper for Recycling to Other Regions

'000 Tonnes	2000	2010	2015	2021	2022	% Change 2022/2021	% Share of Total
Other Europe ¹	676	373	667	1 521	1 459	-4.0	20.4
North America	47	27	1	0	1	35.3	0.0
Latin America	7	21	9	9	4	-52.1	0.1
Asia	2 894	9 157	9 396	5 296	5 574	5.2	77.9
Rest of the World	127	14	13	58	116	98.6	1.6
Total	3 751	9 592	10 086	6 884	7 154	3.9	100.0

Imports of Paper for Recycling from Other Regions

'000 Tonnes	2000	2010	2015	2021	2022	% Change 2022/2021	% Share of Total
Other Europe ¹	735	1 596	1 787	1 762	1 681	-4.6	83.4
North America	264	184	185	395	297	-24.8	14.8
Latin America	0	3	18	14	6	-56.5	0.3
Asia	9	6	3	13	11	-20.0	0.5
Rest of the World	7	8	15	39	20	-49.8	1.0
Total	1 015	1 796	2 008	2 223	2 014	-9.4	100.0

Trade Flows of Paper for Recycling in 2022 (Million Tonnes)



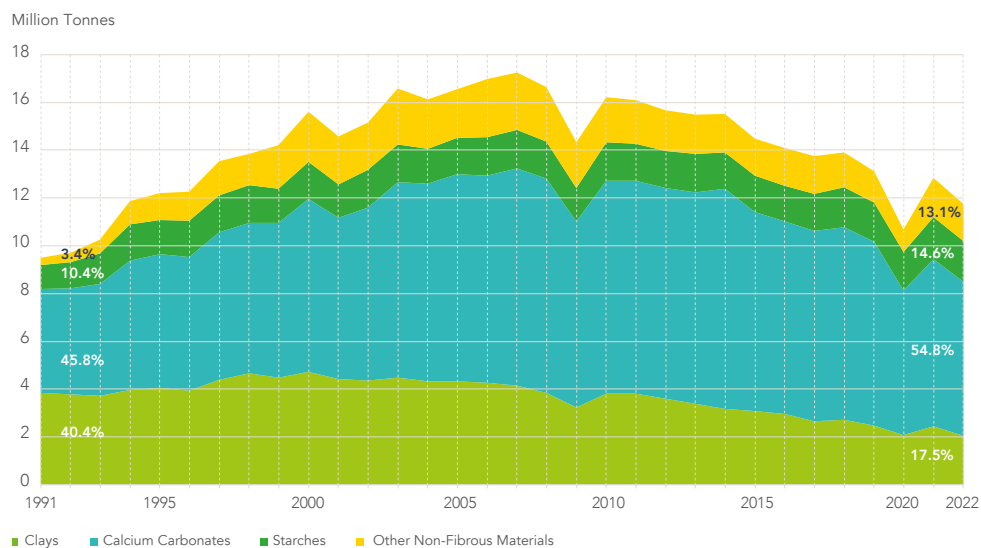
¹ Other Europe: total Europe excluding Cepi countries

² Source: Cepi, Fastmarkets RISI - 2022 figures available end-2023

Non-Fibrous Materials Consumption

'000 Tonnes	1991	2000	2010	2015	2021	2022	% Change 2022/2021	% Share of Total
Clays (coating and filler)	3 842	4 716	3 825	3 080	2 438	2 053	-15.8	17.5
Calcium Carbonates (coating and filler)	4 349	7 247	8 903	8 324	6 998	6 435	-8.0	54.8
Starches (native and modified)	989	1 551	1 593	1 521	1 752	1 711	-2.4	14.6
Other Non-Fibrous Materials	324	2 095	1 897	1 550	1 666	1 536	-7.8	13.1
Non-Fibrous Materials	9 504	15 609	16 218	14 475	12 854	11 735	-8.7	100.0

Non-Fibrous Materials Consumption

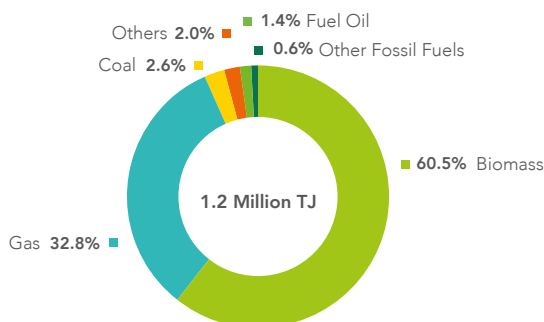


Primary Energy and Electricity Consumption¹

Primary Energy Consumption TJ	1991	2000	2010	2015	2020	2021	% Change 2021/2020	% Share of Total ³
Gas	259 593	404 946	489 565	395 064	373 840	394 687	5.6	29.1
Fuel Oil	129 461	90 914	37 856	19 368	17 292	16 910	-2.2	1.2
Coal	113 867	59 304	53 280	45 925	31 930	31 834	-0.3	2.3
Other Fossil Fuels	10 134	19 052	14 529	10 624	8 925	7 603	-14.8	0.6
Biomass 	413 248	562 865	677 569	657 986	694 243	728 471	4.9	53.7
Other	3 560	4 151	8 948	12 374	23 116	24 458	5.8	1.8
Total Fuels Consumption	929 863	1 141 232	1 281 746	1 141 341	1 149 346	1 203 963	4.8	88.8
Net Bought Electricity	205 852	246 864	202 945	167 381	148 251	152 442	2.8	11.2
Total Primary Energy Consumption	1 135 715	1 388 096	1 484 691	1 308 722	1 297 596	1 356 405	4.5	100.0
Fraction of Biomass in Total Fuels Consumption	44.4%	49.3%	52.9%	57.7%	60.4%	60.5%	0.1	

Electricity Consumption GWh	1991	2000	2010	2015	2020	2021	% Change 2021/2020	% Share of Total
Total Electricity Produced at Site	29 416	41 930	56 780	51 748	49 900	50 894	2.0	54.6
Purchased Electricity	59 045	72 255	67 567	57 838	52 485	53 139	1.2	57.0
Sold Electricity	-1 864	-3 681	-11 193	-11 343	-11 305	-10 794	-4.5	11.6
Total Electricity Consumption	86 527	110 424	113 137	98 243	91 081	93 239	2.4	100.0
% of Electricity produced through CHP²	88.0%	90.4%	95.4%	96.2%	95.7%	95.6%	-0.1	

 In 2021, 61% of fuels used in the pulp and paper industry came from biomass; large amount of that is process residues.

Fuels Consumption in 2021¹

¹ Excluding Hungary, Romania & Slovenia - excluding Poland before 2003

2022 data will be available end-2023

² CHP: combined heat and power (compared to total on-site electricity generation)

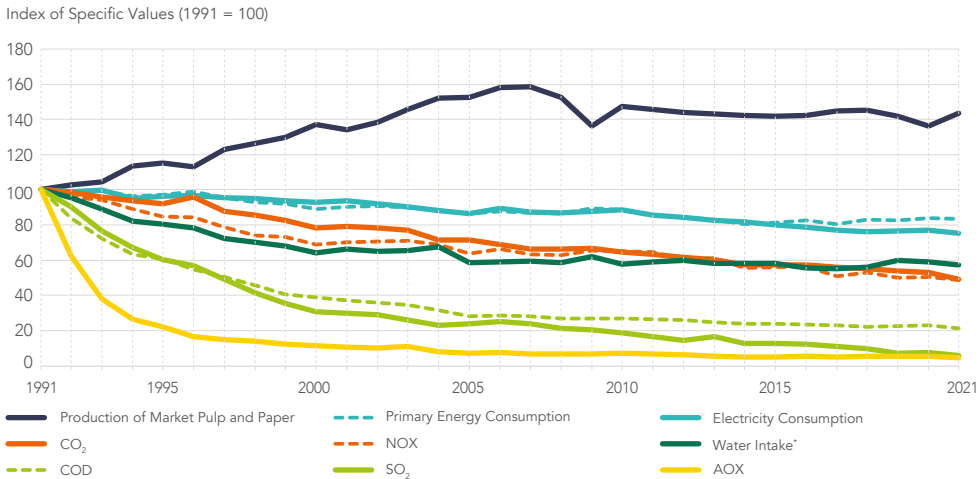
³ Share of total primary energy consumption (including net bought electricity)

Key Figures on Energy and Environment¹

	1991	2000	2010	2015	2020	2021	% Change 2021/2020	% Change 2021/1991
Energy Consumption								
Production of Market Pulp and Paper and Board ('000 Tonnes)	71 971	98 691	106 084	102 047	98 098	103 176	5.2	43.4
Specific Primary Energy Consumption (Tj/kt)	15.78	14.07	14.00	12.82	13.23	13.15	-0.6	-16.7
Specific Electricity Consumption (MWh/kt)	1.20	1.12	1.07	0.96	0.93	0.90	-2.7	-24.8
Direct CO₂ Emissions²								
Absolute (Mega Tonnes)	39.05	41.94	37.83	32.39	28.93	28.14	-2.7	-27.9
Specific (kt CO ₂ / kt of product)	0.54	0.42	0.35	0.31	0.29	0.27	-7.4	-51.0
Indirect CO₂ Emissions³								
Absolute (Mega Tonnes)	13.88	14.33	11.59	10.30	8.27	9.64	16.6	-30.5
Specific (kt CO ₂ / kt of product)	0.19	0.15	0.11	0.10	0.08	0.09	10.9	-51.6
Water Specific Emissions								
COD (kg / T of product)	23.36	9.08	6.32	5.61	5.34	4.92	-7.8	-78.9
AOX (kg / T of product)	0.433	0.049	0.030	0.022	0.023	0.021	-9.3	-95.3
Air Specific Emissions								
SO ₂ (kg S / T of product)	1.32	0.40	0.24	0.16	0.10	0.07	-26.3	-94.4
NOx (kg NOx / T of product)	1.31	0.90	0.85	0.73	0.66	0.64	-3.3	-51.2

¹ Excluding Hungary , Romania & Slovenia - excluding Poland before 2003² 2022 data will be available end-2023³ Including all Cepi countries from 2005Direct CO₂ Emissions: the fossil emissions produced by the pulp and paper mills and connected energy plants³ Indirect CO₂ Emissions: CO₂ emissions from net bought electricity, calculated as "net bought electricity" multiplied by the "electricity emissions factor" applied in each country

Evolution of Environmental Impacts

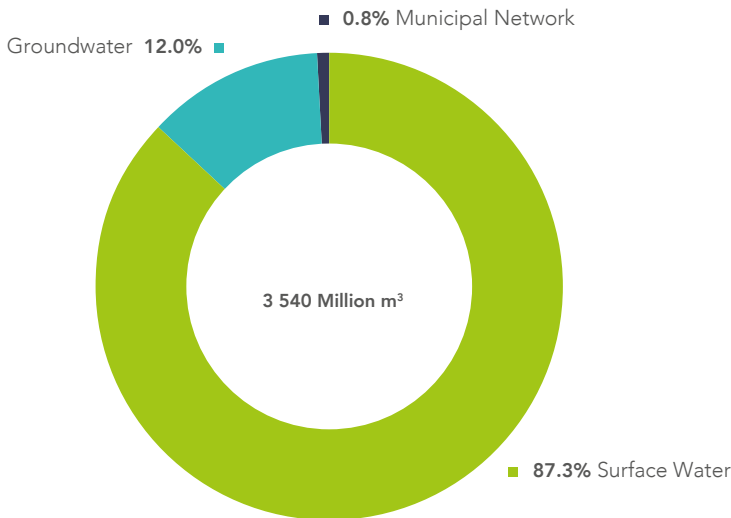


Water Emissions: COD (Chemical Oxygen Demand) - AOX

Air Emissions: CO₂ - NOX (Azote Oxydes) - SO₂

*Water Intake: Due to the change in data collection system in one country, 2019 data on water can't be compared to 2018 data

Sources of Water Intake in 2021¹

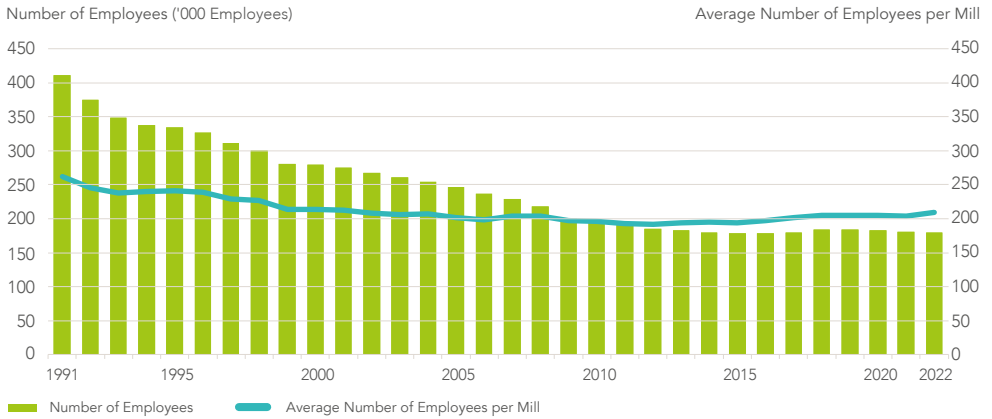


¹ Excluding Hungary, Romania & Slovenia - excluding Poland before 2003

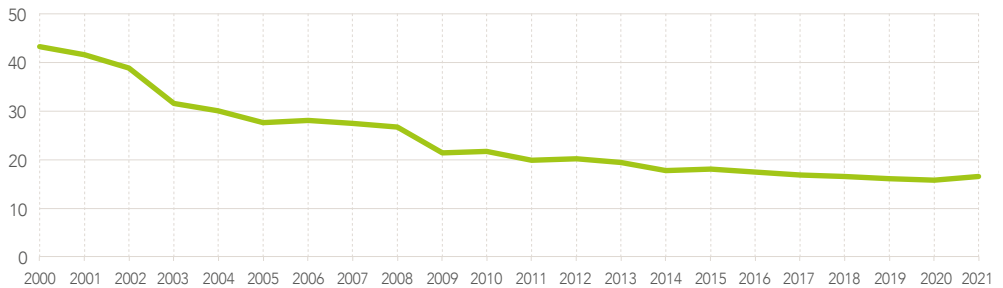


In 2021, around 90% of water abstracted to produce paper and board has been returned to its source after treatment.

Employment Evolution



Accident Rate¹



¹ Accident rate: Number of accidents (fatal and non-fatal) x 1000/number of employees (absence of more than 3 days)
 Include Austria, Finland, France, Germany, Italy, Netherlands, Norway, Portugal, Spain, Sweden, United Kingdom
 Data for 2022 will be available end-2023

Pulp

Pulp Consumption: production + Imports from outside Cepi - Exports to outside Cepi

Integrated Pulp Production: integrated pulp is produced for use as raw material in the production of paper at the same mill, or for shipment by a producing mill to other mills, which it owns, controls or with which it is affiliated within the same country and therefore not sold on the open market

Pulp Grades:

Mechanical - Stone groundwood: pulp produced by grinding wood into relatively short fibres.

Cepi Harmonised Code is 923 000 000

Semi-chemical: pulp produced in a two-stage process which involves partial digestion with chemicals, followed by mechanical treatment in a disc refiner. Cepi Harmonised Code is 921 000 000

Chemical - Sulphite: pulp produced by cooking wood chips in a pressure vessel in the presence of bisulphite liquor.

Cepi Harmonised Code is 922 200 000

Chemical - Sulphate (or kraft): pulp produced by cooking wood chips in pressure vessels in the presence of a sodium hydroxide (soda) liquor. Cepi Harmonised Code is 922 100 000

Other Pulp: produced from fibres other than wood, such as sugar cane bagasse, wheat straw, kenaf, cotton rags and hemp

Paper and Board

Paper and Board Consumption: production + Imports from outside Cepi - Exports to outside Cepi

Paper and Board Grades:

Newsprint: paper mainly used for printing newspapers. Cepi Harmonised Code is 100 000 000

Uncoated mechanical: paper suitable for printing or other graphic purposes where less than 90% of the fibre furnish consists of chemical pulp fibres. Cepi Harmonised Code is 211 000 000

Uncoated woodfree: paper suitable for printing or other graphic purposes, where at least 90% of the fibre furnish consists of chemical pulp fibres. Cepi Harmonised Code is 231 000 000

Coated papers: all paper suitable for printing or other graphic purposes and coated on one or both sides with minerals such as china clay (kaolin), calcium carbonate, etc

Cepi Harmonised Code for Coated Mechanical is 212 000 000 and for Coated Woodfree is 232 000 000

Sanitary and Household: this covers a wide range of tissue and other hygienic papers for use in households or commercial and industrial premises. Cepi Harmonised Code is 700 000 000

Case materials: papers and boards mainly used in the manufacture of corrugated board.

Included are kraftliner, testliner, semi-chemical fluting, and waste-based fluting (Wellenstoff).

Also known as containerboard, corrugated case materials, cardboard, linerboard or corrugating medium.

Cepi Harmonised Code is 300 000 000

Carton board: made from virgin and/or recovered fibres, mainly used in cartons for consumer products.

Also known as solid board, folding box board, boxboard or carrier board. Cepi Harmonised Code is 400 000 000

Wrappings: papers whose main use is wrapping or packaging made from any combination of virgin or recovered fibres, bleached or unbleached. Included are sack kraft, other wrapping krafts, sulphite and grease-proof papers.

Cepi Harmonised Code is 500 000 000

Other paper and board for packaging: this category embraces all paper and board mainly for packaging purposes other than those listed above. Cepi Harmonised Code is 600 000 000

Other paper and board: includes cigarette papers and filter papers, as well as gypsum liners and special papers for waxing, insulating, roofing, asphaltting, and other specific applications or treatments. Cepi Harmonised Code is 800 000 000

Paper for Recycling

Collection: utilisation - Imports from outside Cepi + Exports to outside Cepi

Utilisation rate: percentage of paper for recycling utilisation compared to the total paper & board production

Recycling rate: "utilisation of paper for recycling + net trade of paper for recycling", compared to paper & board consumption

Utilisation by sector: total utilisation of paper for recycling in a sector as percentage of the overall utilisation of paper for recycling.

Wood

The wood used for pulp and paper manufacturing is mainly constituted of the following assortments: pulpwood (roundwood other than sawlogs, from silvicultural measures such as thinning or final felling), chips and residues from sawmills. The utilisation of sawlogs is very limited and sawdust volumes consumed are negligible. The relative shares of softwood and hardwood used depend on the country considered and the pulp and paper grades produced. The main softwood species used are pine and spruce. The main hardwood species used are birch, eucalyptus, beech and aspen. Oak is hardly used.

The wood consumption figures reported by the pulp and paper companies and included in the Cepi statistics are the volumes of wood at the mill gates and come from domestic supply or imports.

More information can be found in the Cepi booklet "Pulp and paper industry - definitions and concepts" available on Cepi's website.

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