



Trends in World Bleached Chemical Pulp Production: 1990-2000

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Summary

Elemental Chlorine-Free (ECF) pulp, bleached with chlorine dioxide, continues to dominate the world bleached chemical pulp market. In 2000, the first year of the new millennium, ECF production will be 53.1 million tonnes, totaling more than two-thirds of the world market share.

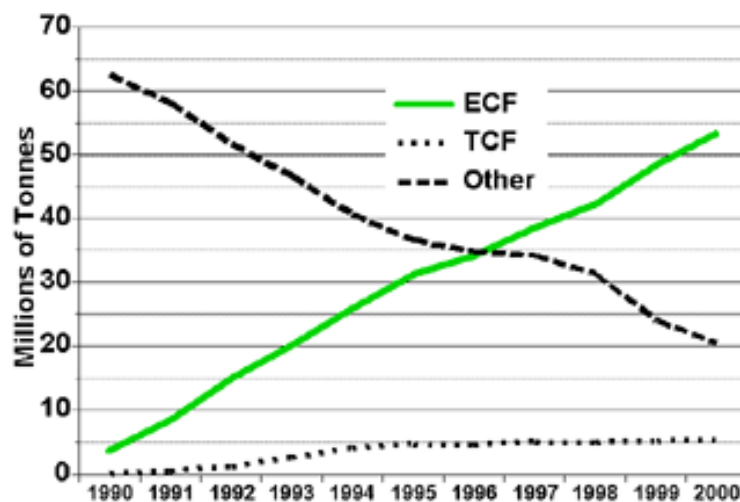
The transition to ECF is nearing completion. Market data show an ever-widening gap between ECF and TCF (Totally Chlorine-Free) production. ECF continues to grow at an annual rate of 10% per year, with an additional 5 million tonnes entering the market in 2000. TCF remained steady at 6-7% of world bleached chemical pulp production, with small net increase of 0.1 million tonnes of production in 2000.

Government organizations increasingly recognize and document ECF's proven pollution prevention record and acknowledge ECF as a component of Best Available Technology (BAT). Producers and users alike continue to desire ECF's superior product quality. With such strong government support and ECF's overall environmental integrity, its growth will continue.

World Bleached Chemical Pulp (BCP) Production Profile

In 2000, ECF commands the highest worldwide market share at greater than 67%, totaling more than 53.1 million tonnes. This marks a 10% production increase from 1999. ECF market share continues to grow in all pulp producing regions. For example, ECF now accounts for more than 50% of bleached chemical pulp production in South America and is growing more than 30% per year. Increased pulp production in the region will ensure continued growth of ECF [1].

World BCP Production: 1990 - 2000



"Significantly, in Germany, at the sulphite mill recently converted to bleached kraft, ECF accounts for 75% of the mill's production [2]."

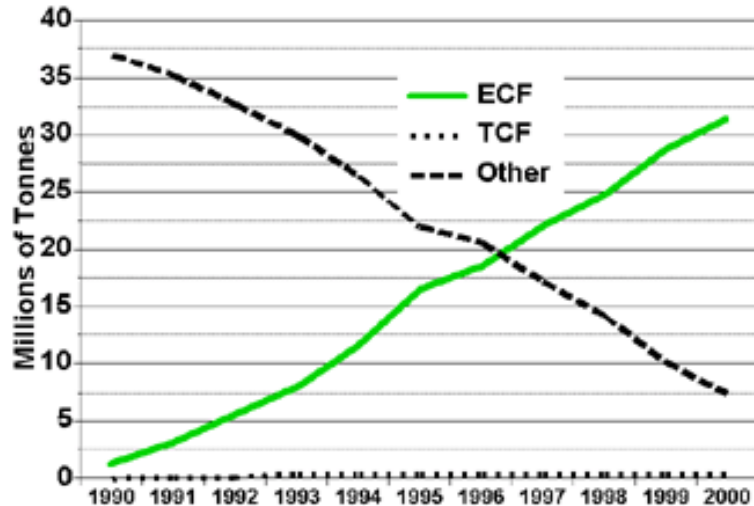
North America

In North America, ECF production will increase in 2000 by 10% to represent over 80% of bleached chemical pulp production. In contrast, there is no growth in TCF production.

Separately, in 2000, Canadian BCP production of ECF will remain at 10.7 million tonnes, holding more than 90% of the market. In the United States, ECF continues to grow rapidly, with another 2.6 million tonnes entering the market in 2000. ECF production will grow by 15% to more than 20 million tonnes, 75% of U.S. bleached chemical pulp production.

The marketplace and the recently promulgated United States Environmental Protection Agency (EPA) Cluster Rule for the pulp and paper industry are driving the rapid conversion to ECF. The Cluster Rule is based in part on ECF as the Best Available Technology (BAT) for bleached paper grade kraft and soda mills [3]. Accelerated growth is expected in the United States in 2001, as many mills will come into compliance with the Cluster Rule.

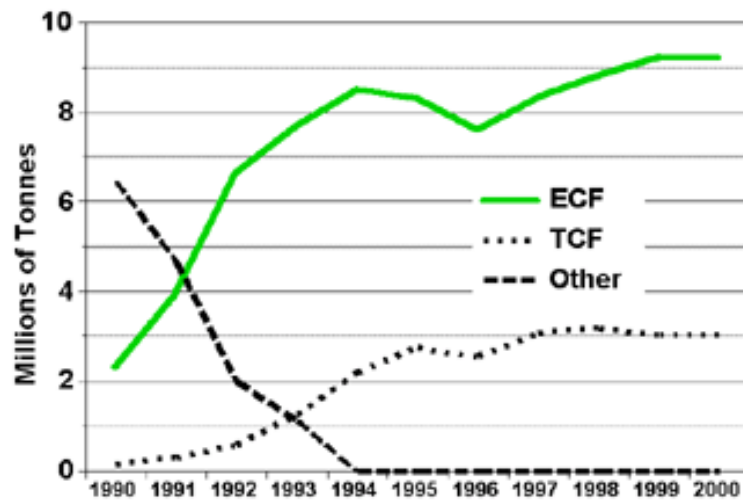
North American BCP Production: 1990 - 2000



Scandinavia

In Scandinavia, ECF demand remains strong, accounting for ~75% of bleached chemical pulp production --- triple that of TCF. In 2001, ECF production will continue to grow, with two new ECF fibreines starting up with net capacity increases of 820,000 tonnes per year [4]. TCF production will also grow by about 260,000 tonnes per year, as Sodra Cell AB completes expansions at its Monsteräs and Värö mills [5].

Scandinavian BCP Production: 1990 - 2000



Japan

Japan produces approximately 8 million tonnes of bleached chemical pulp. As reported last year, all major bleached pulp producers in Japan have announced their intentions to eliminate chlorine and in most cases, convert to ECF [6]. As a result, ECF production is beginning to grow rapidly, doubling to 1 million tonnes in 2000.

Looking Ahead

Significantly, ECF was recently recognized as a component of "Best Available Techniques" (BAT) by the European Community in its Integrated Pollution Prevention and Control (IPPC) reference document [7].

But perhaps even more important is the recognition given to ECF by the International Joint Commission (IJC). The IJC is a body that monitors and reports biennially on the progress the Governments of the United States and Canada make towards restoring and maintaining the waters of the Great Lakes Basin Ecosystem under the Great Lakes Water Quality Agreement. The Agreement commits both nations to the policy that:

"The discharge of toxic substances in toxic amounts be prohibited and the discharge of any or all persistent toxic substances be virtually eliminated."

In its 10th Biennial report, the IJC report recognized the pulp and paper industry and ECF technology for a significant accomplishment under the Agreement. The IJC stated [8]:

"A notable accomplishment occurred when the pulp and paper industry changed its process for pulp bleaching by substituting chlorine dioxide for elemental chlorine. This substitution virtually eliminated the production of dioxins from pulp and paper mills."

Acknowledgment of its environmental performance by organizations such as the IJC, recognition as a component of BAT by the European Commission, its cost-competitiveness, and high quality desired by producers users alike, ensure continued growth for ECF in the 21st Century.

Sources

The Alliance for Environmental Technology, "Trends in World Bleached Chemical Pulp Production: 1990-1999," October 1999.

2000 AET International Survey

References

1. Press Release, "Aracruz to Expand Production Capacity to 2 Million Tons." Aracruz Celulose S.A., July 6, 2000.
2. Meadows, D.G., "Germany's Rosenthal Mill Prospering after Conversion to Kraft Pulping." Tappi Journal, Vol. 84. No. 1. January 2001
3. Federal Register, Vol. 63, No. 72. April 15, 1998.
4. Press Release, Stora Enso Oy, May 1999. (www.storaenso.com)
5. Press Release, Sodra Cell AB, September 11, 2000. (www.paperloop.com)
6. The Alliance for Environmental Technology, "Trends in World Bleached Chemical Pulp Production: 1990-1999," October 1999.
7. European Commission " Integrated Pollution Prevention and Control (IPPC): Draft Reference Document on Best Available Techniques in the Pulp and Paper Industry." August 1999.
8. International Joint Commission (IJC). "10th Biennial Report on Great Lakes Water Quality." July, 2000.

Appendix (All Data in Millions of Tonnes*)

World

	ECF	TCF	Other
1990	3.5	0.1	62.7
1991	8.2	0.4	58.2
1992	14.9	1.2	51.8
1993	20.0	2.6	46.8
1994	25.7	4.1	40.8
1995	31.2	4.7	36.8
1996	34.0	4.5	35.0
1997	38.4	5.0	34.4
1998	42.2	4.8	31.4
1999	48.5	5.1	24.1
2000	53.1	5.2	20.6

Scandinavia

	ECF	TCF	Other
1990	2.3	0.1	6.5
1991	4.0	0.3	4.7
1992	6.6	0.6	2.0
1993	7.7	1.3	1.1
1994	8.5	2.2	0.0
1995	8.3	2.8	0.0
1996	7.6	2.6	0.0
1997	8.3	3.1	0.0
1998	8.8	3.2	0.0
1999	9.2	3.0	0.0
2000**	9.2	3.0	0.0

** Estimate based on 1999 production volumes

United States

	ECF	TCF	Other
1990	0.5	0.0	26.8
1991	1.6	0.0	25.6
1992	2.8	0.0	24.4
1993	4.0	0.2	23.0
1994	6.0	0.2	21.0
1995	9.1	0.3	17.9
1996	10.4	0.2	16.6
1997	13.3	0.2	13.8
1998	15.5	0.2	11.4
1999	18.1	0.2	8.9
2000	20.7	0.2	6.3

Canada

	ECF	TCF	Other
1990	0.7	0.0	10.3
1991	1.3	0.0	9.7
1992	2.6	0.0	8.4

1993	3.9	0.1	7.0
1994	5.5	0.1	5.5
1995	7.3	0.0	4.2
1996	8.1	0.0	4.0
1997	8.7	0.0	3.4
1998	9.1	0.0	2.8
1999	10.5	0.0	1.3
2000	10.7	0.0	1.1

Rest of World (Includes Western Europe, Chile, Brazil, South East Asia, Africa, Australia, New Zealand, and Japan)

	ECF	TCF	Other
1990	0.1	0.0	19.1
1991	1.3	0.1	18.2
1992	2.9	0.6	17.0
1993	4.4	1.1	15.7
1994	5.8	1.6	14.3
1995	6.5	1.6	14.7
1996	7.9	1.8	14.4
1997	8.2	1.8	17.2
1998	9.7	1.7	17.2
1999	11.0	1.7	14.0
2000	12.5	2.0	13.2

*All data has been rounded to the nearest tenth

The Alliance for Environmental Technology (AET) is an international association of chemical manufacturers and forest products companies dedicated to improving the environmental performance of the pulp and paper industry. AET was created to establish a clearinghouse of educational and technical resources relating to chlorine dioxide and its use in chemical pulp bleaching.

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