

Forest Products Conversion Factors

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Joint Working Party on Forest Economics and Statistics,
Geneva, 24-25 March 2010



Background

- The Project was initiated at the 2008 Working Party Meeting
- It took the correspondents much longer than anticipated to obtain the factors
- Factors from 16 countries and one trade association
- Differs from past efforts: explanatory text, more products and sub-products
- Completed in January 2010



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Roundwood

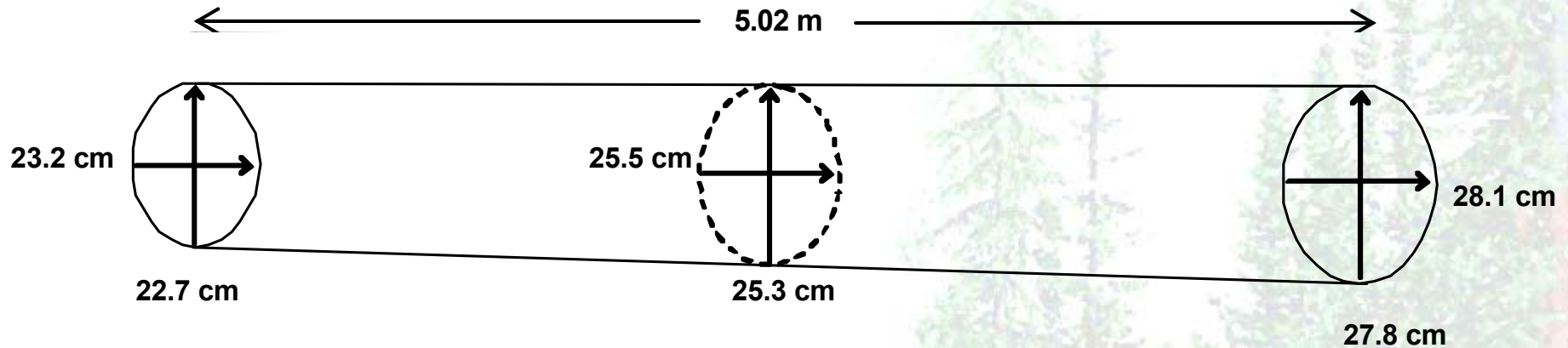
- Differences probably in the range of $\pm 6\%$
- Some outside of this range, but it appears that steps to harmonize are taken by countries where difference is large
- Biggest issue is truncating (rounding down) diameters, lengths, and trim allowance (unmeasured length)



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Example of log volume calculation using actual dimensions and two of the most common formulas:

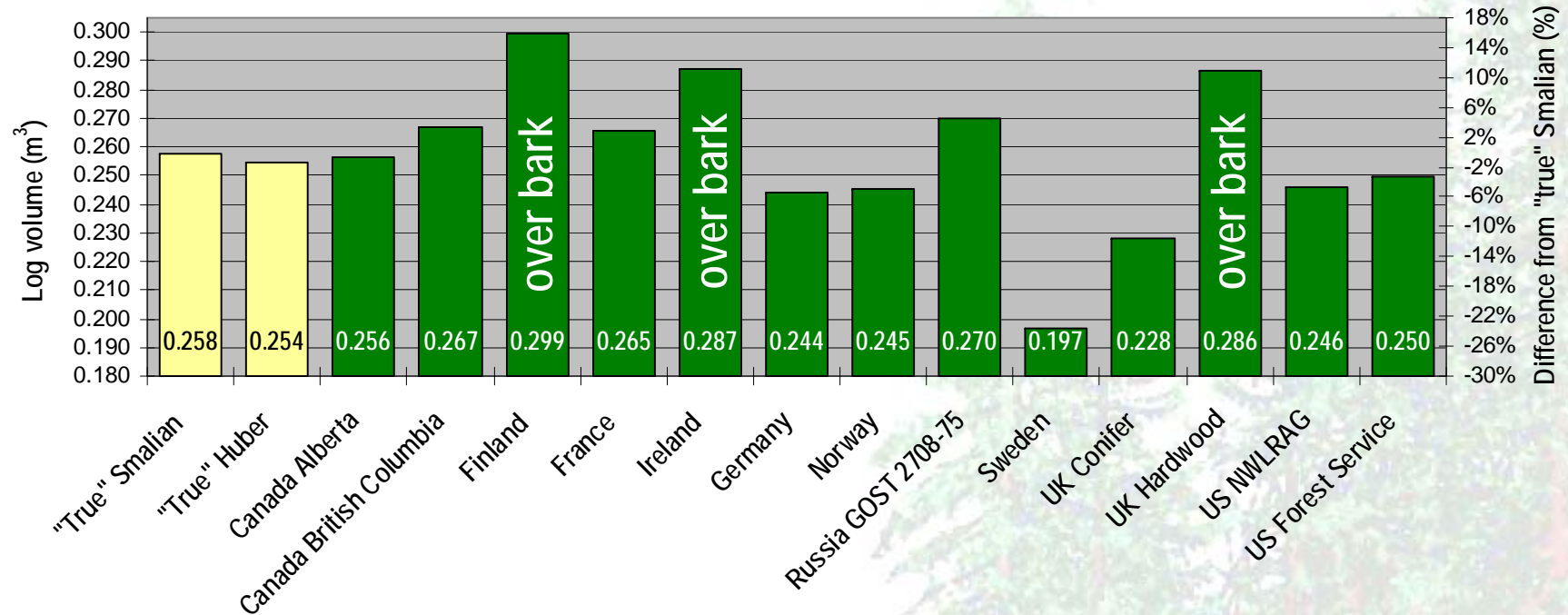


Smalian formula: $\left(\left(\frac{23.2+22.7}{2}\right)^2 + \left(\frac{28.1+27.8}{2}\right)^2\right) \times 5.02 \times 0.00003927 = 0.258 \text{ m}^3$

Huber formula: $\left(\frac{25.5+25.3}{2}\right)^2 \times 5.02 \times 0.00007854 = 0.254 \text{ m}^3$



Roundwood volume: using log from previous slide and country/regional standards



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Sawnwood

- Two significant issues are affecting sawnwood volume:
 - State of manufacture (where the volume is assessed for reporting purposes)
 - Nominal sizing, which is related to “state of manufacture”.
 - Intended to represent volume in a previous state, e.g. prior to drying, trimming and planing



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Sawnwood: states of manufacture example

Log 100%

Boule = 80%
(11% sawdust, 9% slab)

Dry-surfaced = 46% (4% shrinkage,
6% trim, 8% shavings)

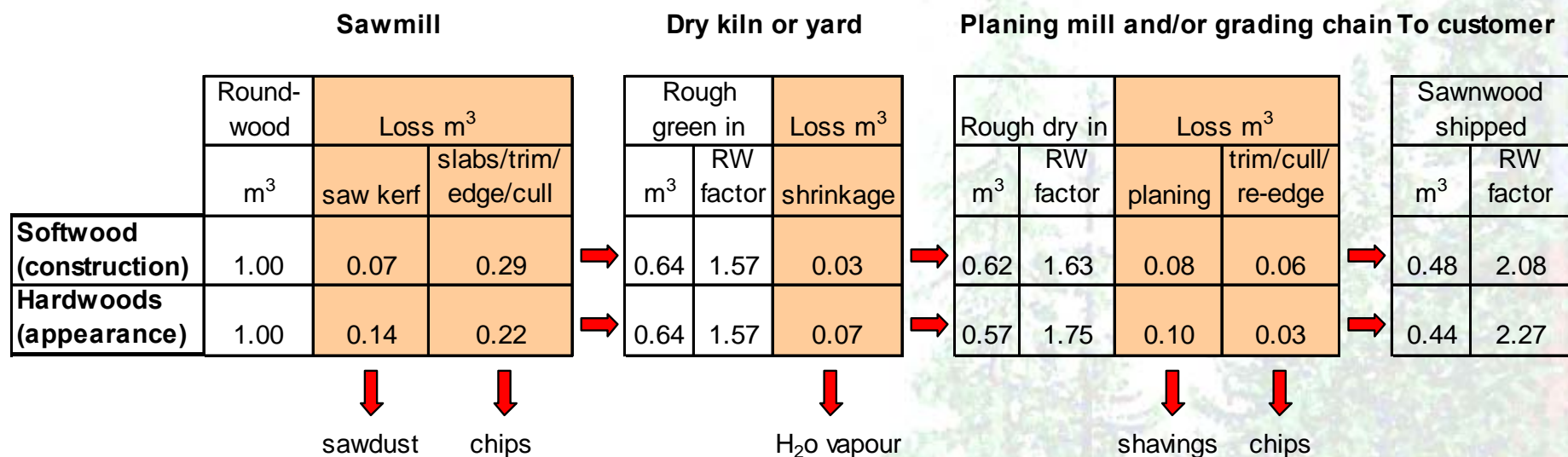
Rough-green = 64%
(2% sawdust, 14% edging)

Flitch



Sawnwood state of manufacture

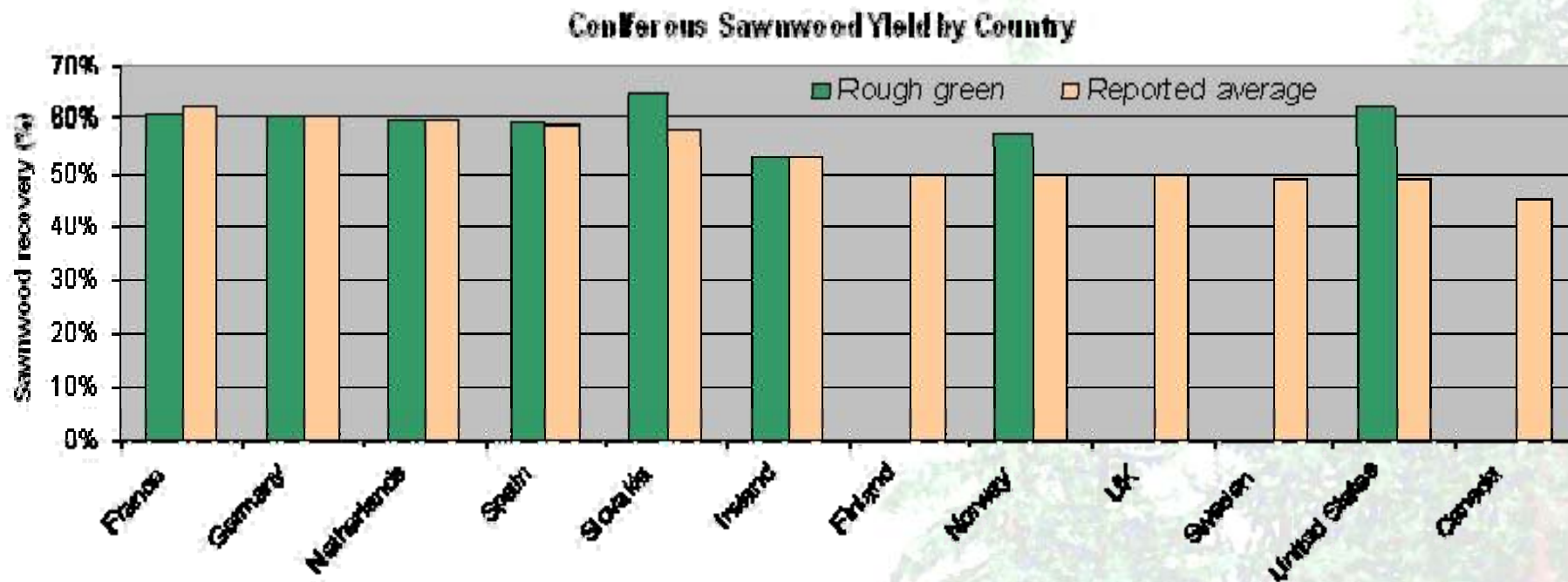
Process overview



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Sawnwood recovery by country (rough green vs. reported)



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Nominal sizing

Product	Walseley Code	Nominal Size (mm)	Finished Size (mm)		
Reduced PSE	G06965	12 x 33	8 x 33		66%
Reduced PSE	G06967	12 x 39	8 x 44		59%
Reduced PSE	G06006	12 x 39	12 x 33		80%
Reduced PSE	G06013	12 x 39	12 x 44		88%
Reduced PSE	G06031	12 x 100	12 x 94		74%
Reduced PSE	G06050	12 x 150	12 x 144		72%
Reduced PSE	G06074	14.5 x 33	14.5 x 33		88%
Reduced PSE	G06082	14.5 x 50	14.5 x 44		67%
Reduced PSE	G06101	14.5 x 75	14.5 x 69		70%
Reduced PSE	G06116	14.5 x 109	14.5 x 94		72%
Reduced PSE	G06157	14.5 x 144	14.5 x 144		73%
Whitewash PSE	G06188	18.5 x 50	18.5 x 44		74%
Whitewash PSE	G06191	18.5 x 75	18.5 x 69		77%
Whitewash PSE	G06194	18.5 x 109	18.5 x 94		78%
Whitewash PSE	G06200	18.5 x 125	18.5 x 119		80%
Whitewash PSE	G06203	18.5 x 150	18.5 x 144		81%
Whitewash PSE	G06206	10.5 x 109	10.5 x 109		0%
Whitewash PSE	G06207	18.5 x 200	18.5 x 194		92%
Whitewash PSE	G06209	18.5 x 225	18.5 x 219		92%

www.buildcenter.co.uk



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Data Harmonization

- Summary:
 - Basis of production volume for roundwood and sawnwood vary by country
 - It matters when country or subregional comparisons made and making a material balance
 - May matter in carbon balances
 - Won't matter for marking change within a country, unless practices are changing, e.g., increasing amounts of dried planed sawnwood
 - Affects conversion factors
 - We adjust volumes for nominal sizing in North America (-28%), but apparently make no adjustments for any European countries



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Comparison with conversion factors from the FAO Statistical Yearbook

- Key differences...
 - Wood raw materials m³ per metric ton

Product	Factor	FAO Statistical	DP-49, 2010	difference
		Yearbook/JFSQ	Median	
Coniferous sawlog	m ³ /mt	1.43	1.07	-25.2%
Non-coniferous sawlog	m ³ /mt	1.25	0.91	-27.2%
Tropical	m ³ /mt	1.37	1.12	-18.2%
Coniferous pulp log	m ³ /mt	1.54	1.12	-27.3%
Non-coniferous pulp log	m ³ /mt	1.33	0.91	-31.6%
Coniferous wood chips	m ³ /mt		1.19	
Non-coniferous wood chips	m ³ /mt		1.01	
All wood chips	m ³ /mt	1.6	1.13	-29.4%

Source: UNECE/FAO, 2010



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- Sawnwood, plywood, veneer pulp & paper

Product	Factor	FAO Statistical Yearbook/JFSQ	DP-49, 2010 Median	difference
Coniferous sawnwood, rough-dry	m ³ rw/m ³ p		1.99	
Non-coniferous sawnwood, rough-dry	m ³ rw/m ³ p		2.01	
All sawnwood*	m ³ rw/m ³ p	1.6	1.89	18.1%
Veneer sheets	m ³ rw/m ³ p	1.9	2	5.3%
Plywood	m ³ rw/m ³ p	2.3	2.13	-7.4%
Wood pulp	m ³ /mt	3.37	3.86	14.5%
Paper and paperboard	m ³ /mt	3.37	3.6	6.8%

Source: UNECE/FAO, 2010

Note: *ITTO factor is 1.82



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MBF (1,000 board feet) of sawlogs to m³

- One mbf = 4.53 m³ (source, FAO, 1950 or earlier)
 - May have been reasonable under old growth harvests in the past
- Varies by log size and the board foot rule used
- The “real” m³/mbf is likely closer to 5.7, in the aggregate, but varies substantially by region





7 inch (18 cm) top diameter



11 inch (28 cm) top diameter 14 inch (36 cm) top diameter



22 inch (56 cm) top diameter



34 inch (86 cm) top diameter



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Why does any of this matter?

- People use our conversion factors!

4.211 One of the most significant errors made by the USDOC was the conversion factor it used to compare the stumpage rates in different jurisdictions. Comparing US and Canadian stumpage rates involves different measures of log volumes. Log volumes in several of the US comparison areas used by the USDOC are measured in thousand board feet (MBF) whereas stumpage in Canada is measured in cubic metres (m³) using a metric scale designed to measure the total volume of solid wood in logs..

World Trade Organization. 2002. United States – Preliminary Determinations with Respect to Certain Softwood Lumber from Canada: Report of the Panel (WT/DS236/R)

The conversion factor generally used to convert logs measured in board feet to cubic meters has traditionally been set at 4.53. Because of diminishing old growth, large-diameter trees, the average conversion factor has risen, as illustrated in this analysis of Washington state sawmill data over the period 1970–1998. Conversion factors for coastal and interior Washington were estimated at 6.76 and 5.93, respectively, up from 4.0 to 4.5 in the 1970s. Average saw-log diameters over the same period were estimated to have declined from 56 to 29 cm for coastal Washington and from 41 to 25 cm for interior Washington.

Spelter, Henry. 2002. Conversion of board foot scaled logs to cubic meters in Washington State, 1970–1998. Gen. Tech. Rep. FPL-GTR-131. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory.

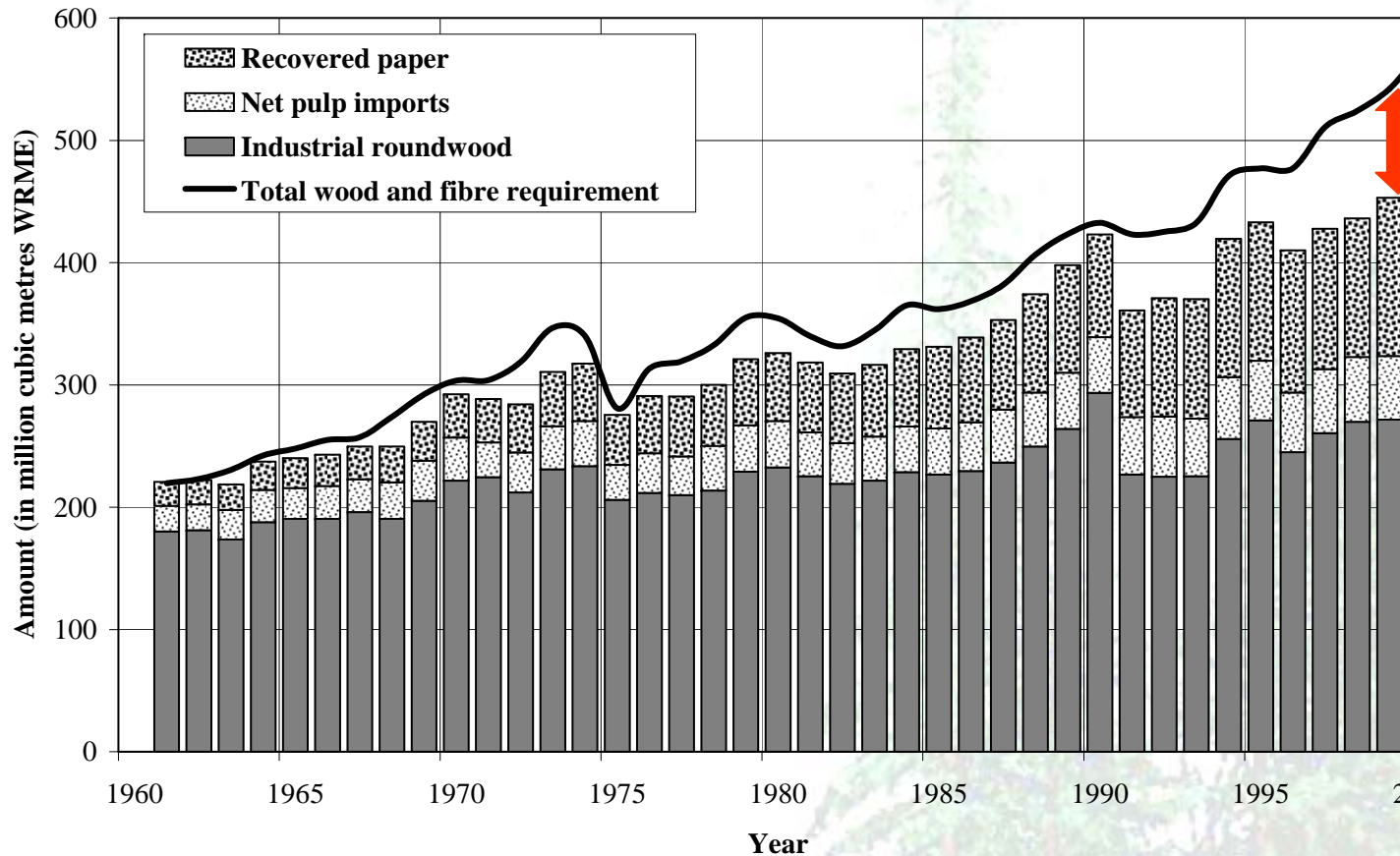


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EFSOS 2005 Imbalance

Trends in wood raw material consumption in Western Europe from 1961 to 2000



Source: derived from FAOSTAT production and trade statistics (<http://faostat.external.fao.org>).



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Thank you for your attention

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