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BEST AVAILABLE TECHNIQUES (BAT) IN EUROPEAN ENVIRONMENTAL LEGISLATION

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THE CONTENT OF THE PRESENTATION

- General about the Finnish Forest Industry
- EU's IPPC Directive (Integrated Prevention and Pollution Control)
- What are Best Available Techniques (BAT)
- What is BAT BREF
  - BAT BREF for Pulp and Paper Sector
- CASE: Kraft Pulp Production in Finland

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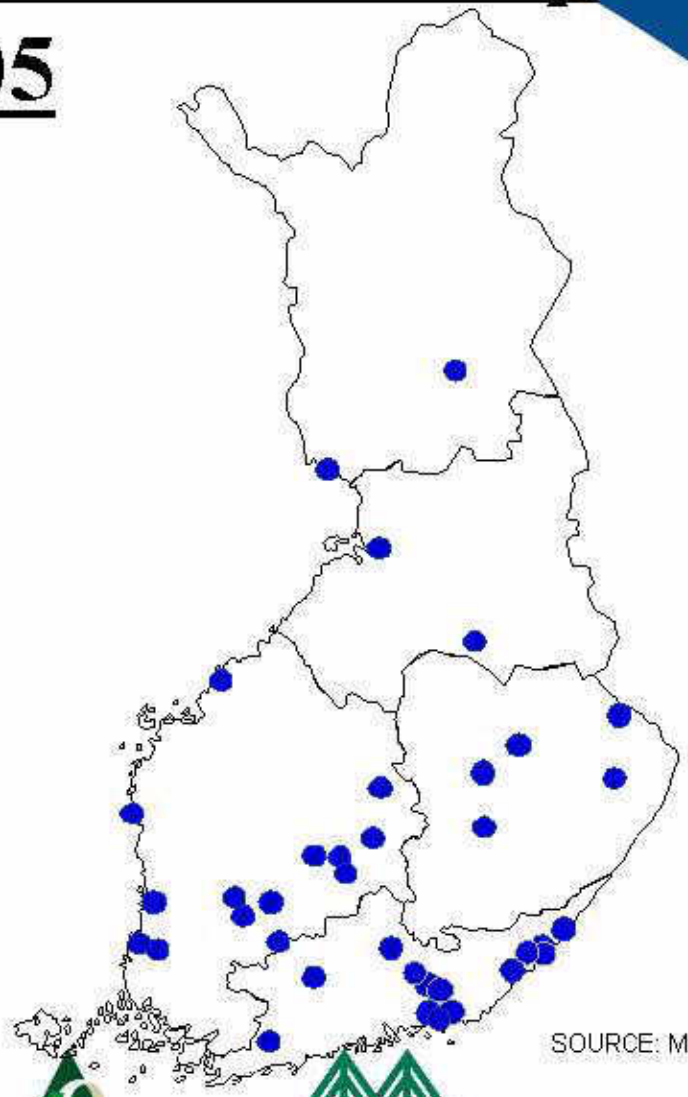
Finnish Paper, Paperboard and Pulp Mills 2005

- In Finland there are:
  - 19 Pulp mills
  - 24 Mechanical and semi-chemical pulp mills
  - 28 Paper mills
  - 14 Paperboard mills



SOURCE: Member companies

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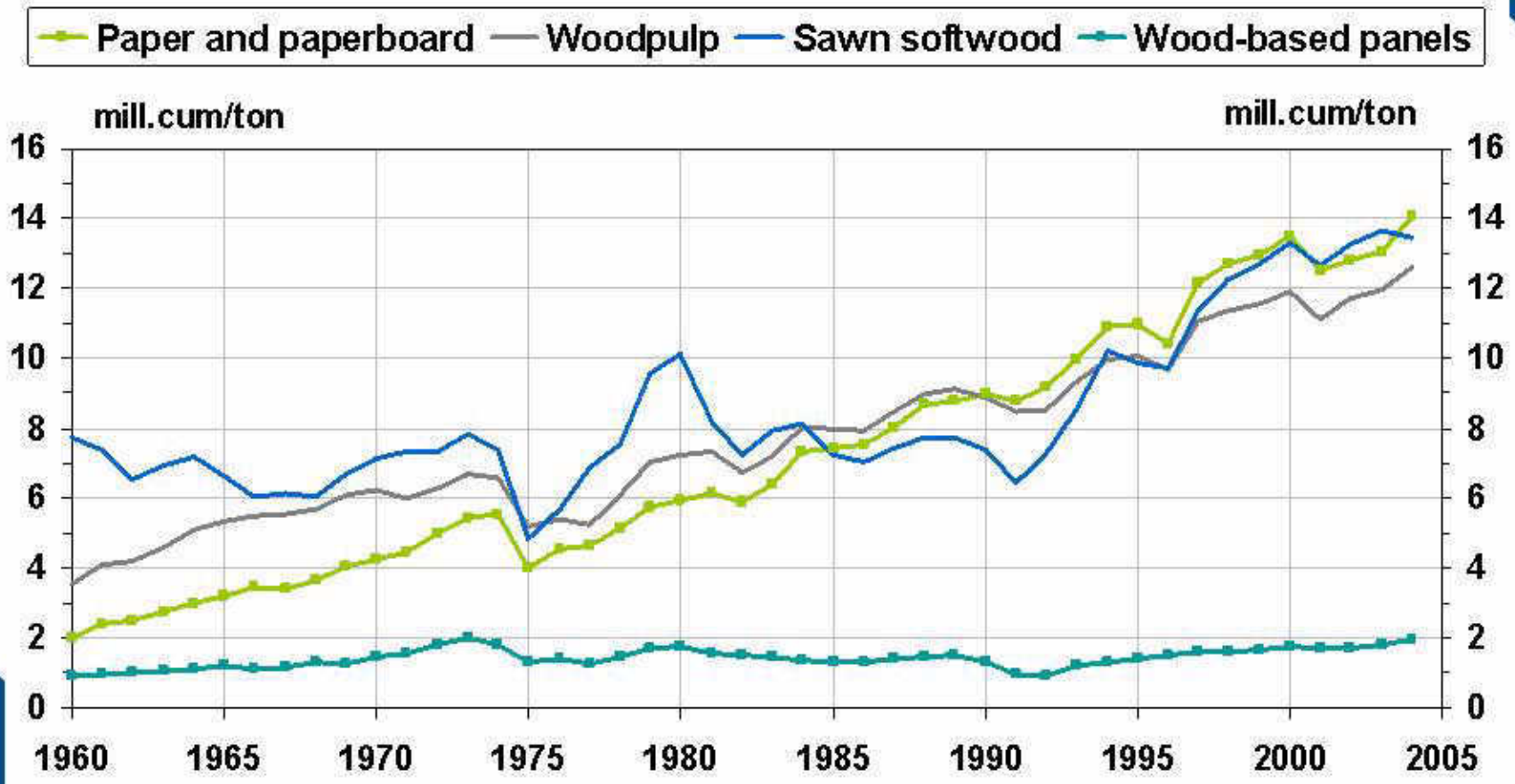
Forest Industry Production in Finland 1960-2004



SOURCE: Finnish Forest Industries Federation

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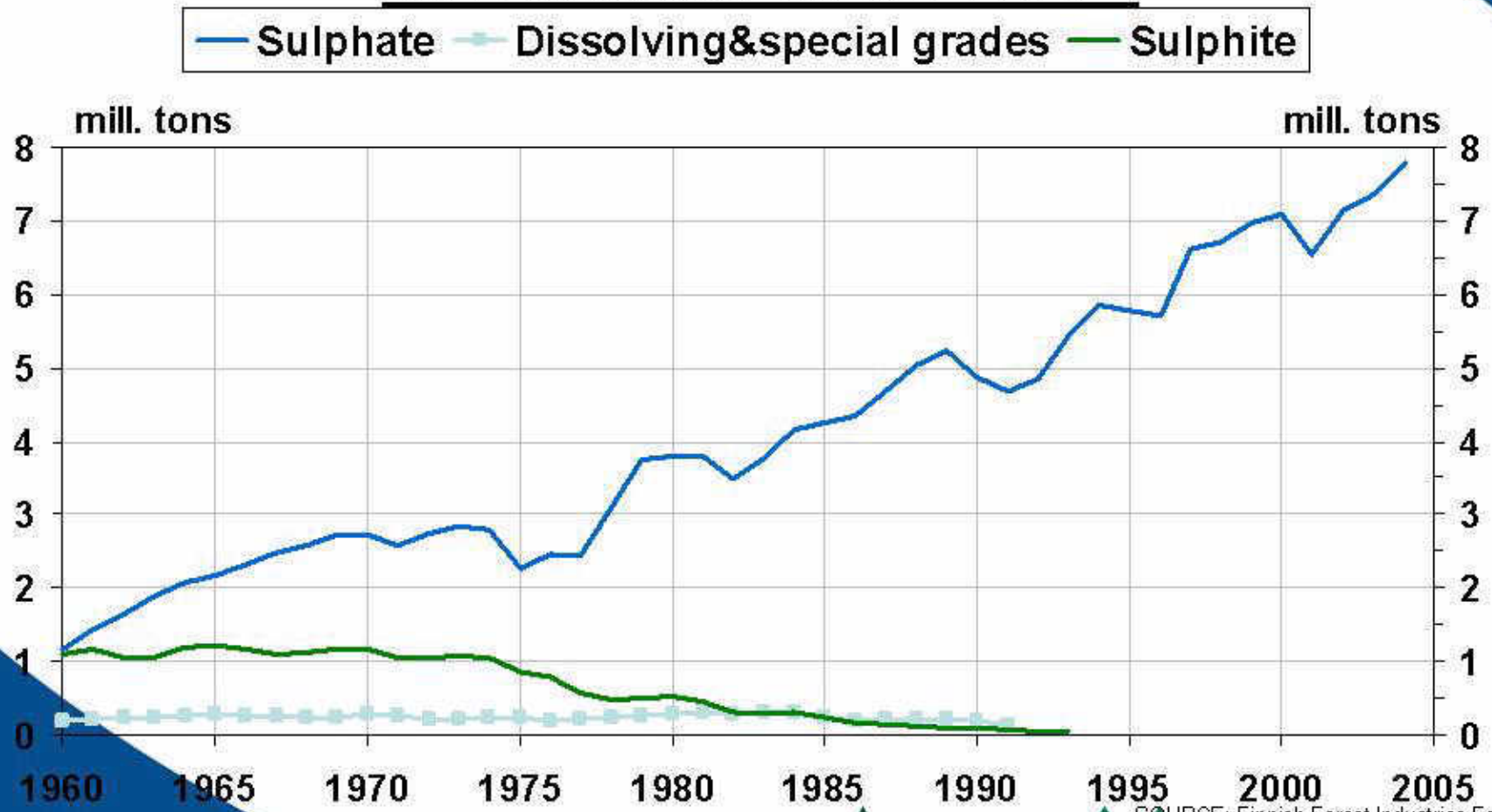
Chemical Pulp Production in Finland 1960-2004



SOURCE: Finnish Forest Industries Federation

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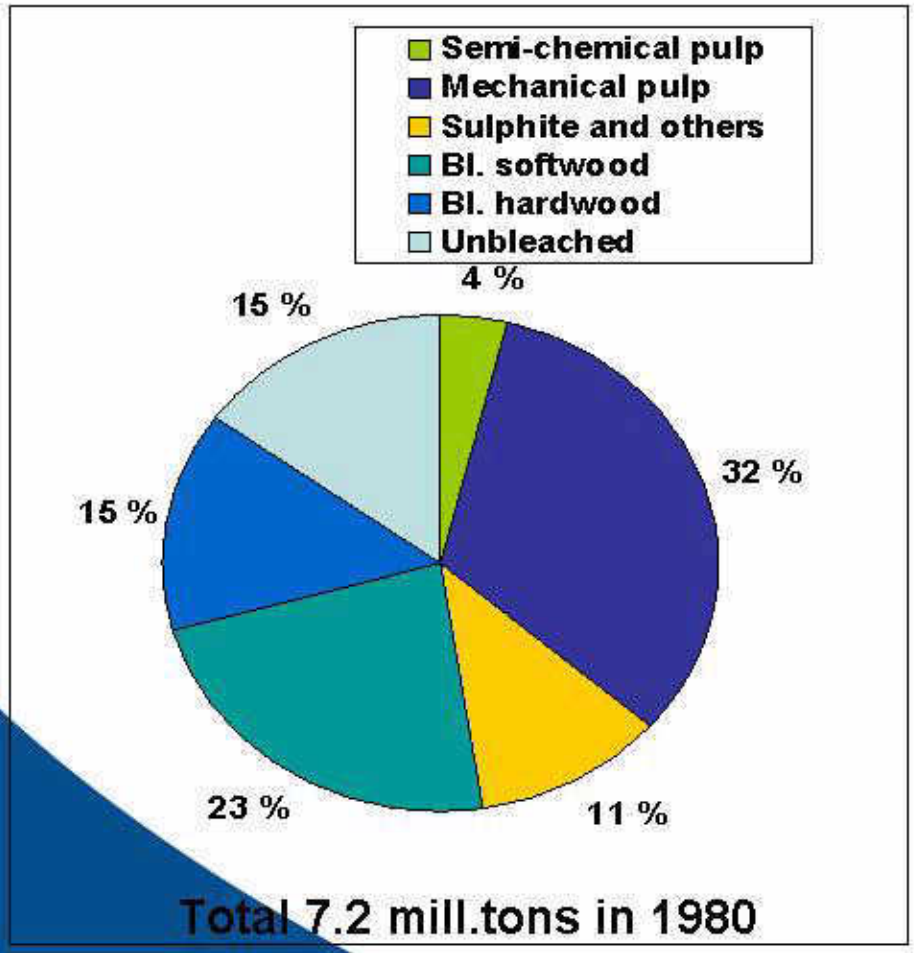
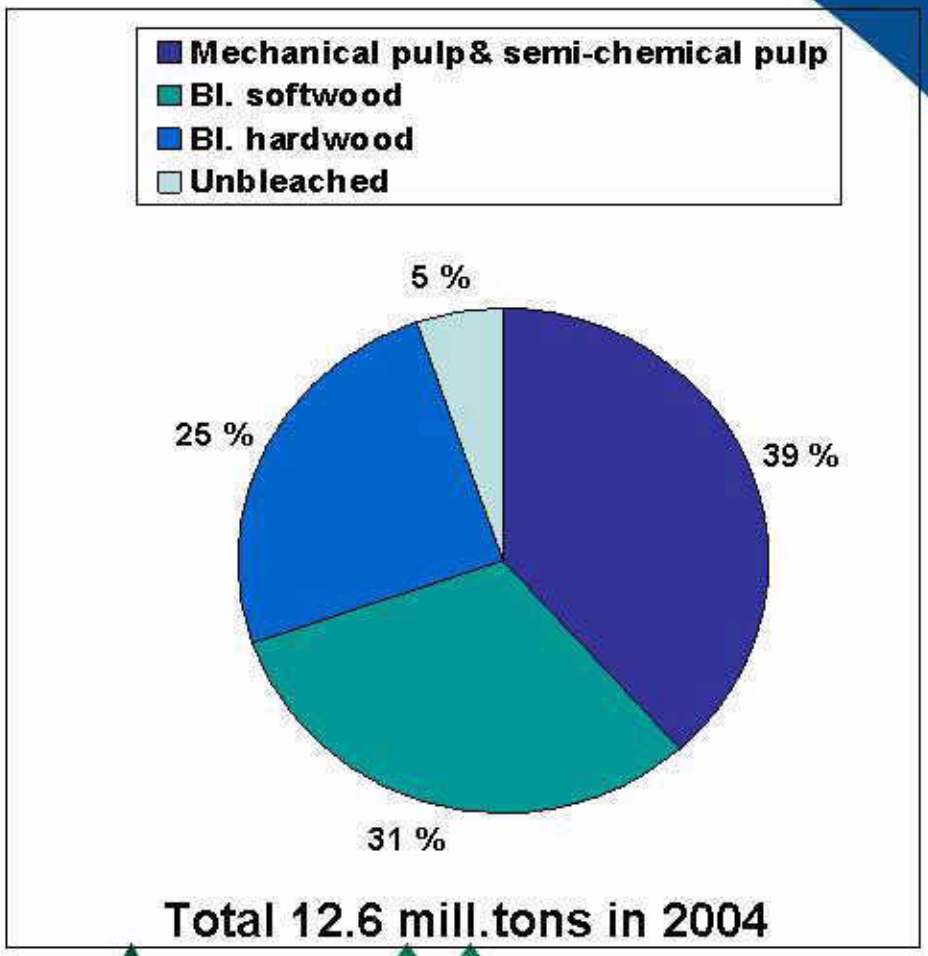
Pulp Production in Finland by Grade in 1980 and 2004





SOURCE: Finnish Forest Industries Federation
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Paper, Paperboard and Pulp Mills owned by Finnish Companies in Europe

Ahlstrom Corporation
La Gère, France
Rottersac, France
Stenay, France
Chantraine, France
Bousbecque, France
Pont-Audemer, France
Saint-Séverin, France
Altenkirchen, Germany
Nümbrecht, Germany
Osnabrück, Germany
Ascoli, Italy
Mathi, Turin, Italy

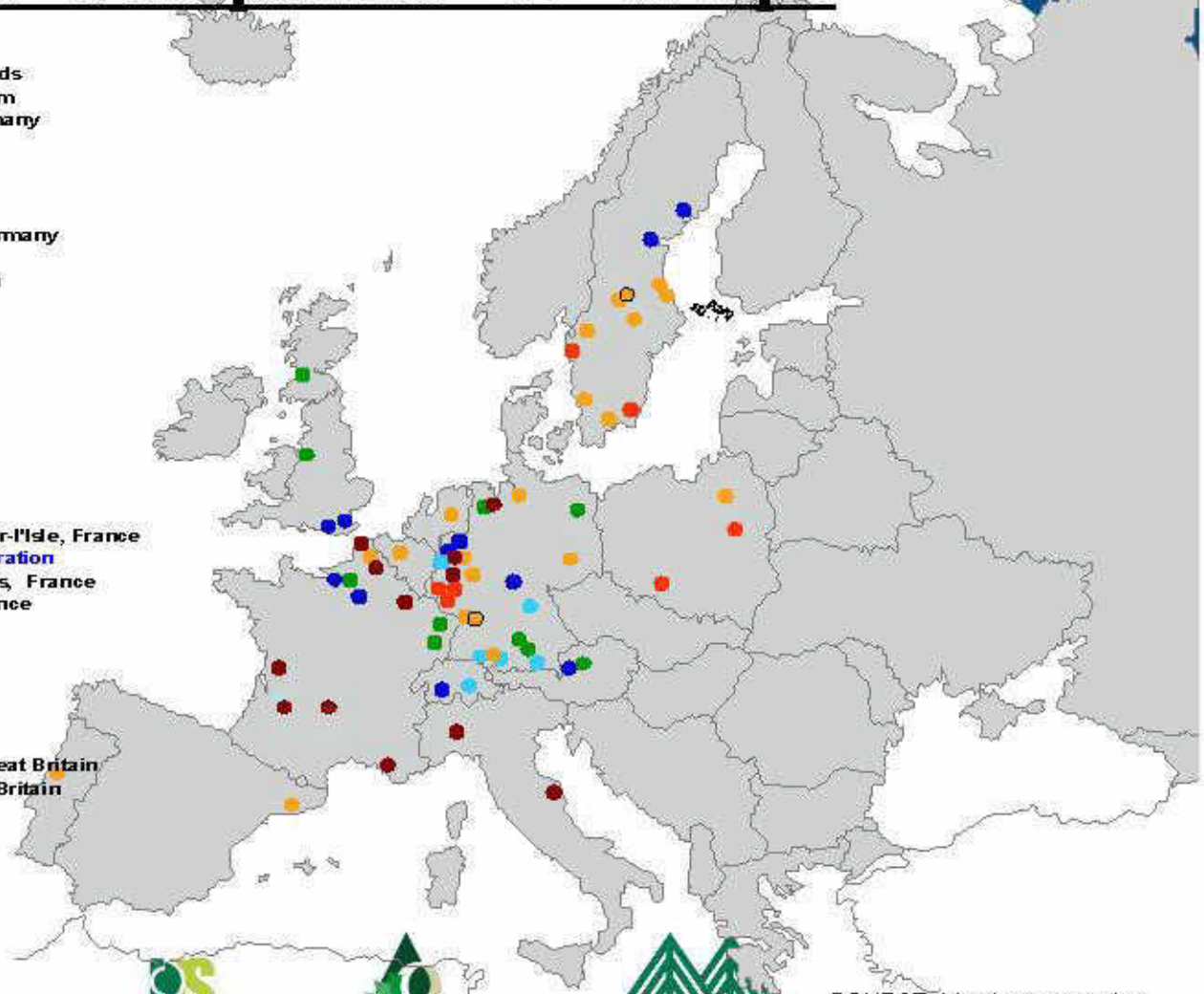
M-real Corporation
Biberist, Switzerland
Sittingbourne, Great Britain
New Thames, Great Britain
Husum, Sweden
Wifsta, Sweden
Zanders Gohrsmühle, Germany
Zanders Reflex, Germany
Stockstadt, Germany
Alizay, France
Pont-St-Maxence, France
Hallein, Austria

Metsä Tissue Corporation
Katrinefors mill, Sweden
Småland mills, Sweden
Kreuzau mill, Germany
Raubach mill, Germany
Stotzheim mill, Germany
Warsaw mill, Poland
Krapkowice mill, Poland

Myllykoski Corporation
Myllykoski Continental: Albbruck,
Dachau and Plattling,
Lang Papier, Rhein Papier, Germany
Utzenstorf Papier, Switzerland

Stora Enso Oyj
Berghuizer, Netherlands
Langerbrugge, Belgium
Sachsen Papier, Germany
Reisholz, Germany
Kabel, Germany
Uetersen, Germany
Baienfurt, Germany
Maxau-Wolfsheck, Germany
Barcelona, Spain
Kvarnsveden, Sweden
Hylte, Sweden
Nymölla, Sweden
Fors, Sweden
Skoghall, Sweden
Grycksbo, Sweden
Norrsundet, Sweden
Skutskär, Sweden
Corbehem, France
Celbi Pulp, Portugal
Ostroleka, Poland
Corenso, St, Seurin-sur-l'Isle, France

UPM-Kymmene Corporation
Papeteries de Docelles, France
Chapelle Darblay, France
Stracel, France
Augsburg, Germany
Nordland, Germany
Schongau, Germany
Schwedt, Germany
Steyrermühl, Austria
Caledonian Paper, Great Britain
Shotton Paper, Great Britain



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SOURCE: Member companies

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Paper, Paperboard and Pulp Mills owned by Finnish Companies outside Europe

Finnish Forest Industries SOURCE: Member companies

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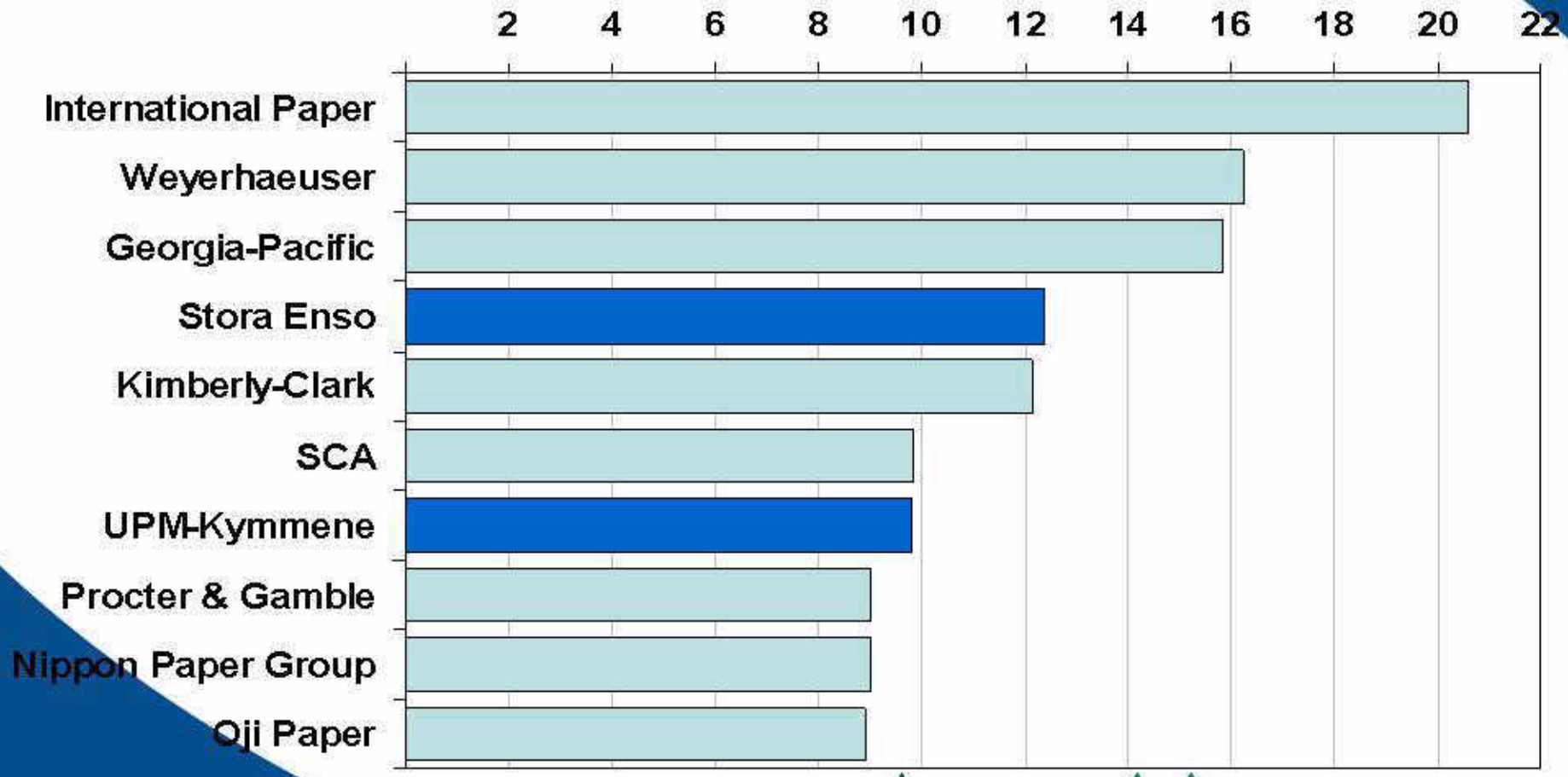
Main Global Forest Industry Companies

Total turnover in 2004, bill. EUR



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SOURCE: Jaakko Pöyry

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European IPPC Directive (Integrated Prevention and Pollution Control)

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EU IPPC (Integrated Pollution Prevention and Control) Directive

- All environmental impacts of the activities must be examined in a fully integrated way
- Discharges and emissions released into the air, water or the soil must all be assessed simultaneously, together with other factors such as resource consumption, waste minimisation, energy-efficiency, noise and vibration, and accident prevention.

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- obliges EU member states to integrate the control of emissions caused by industry
  - all big installations must have new environmental permits by October 2007
  - covers all pulp mills and those paper and board mills, whose production is >20 t/a
- the prevention or the restriction of damages to a minimum caution and precaution - principle
- the application of the best available technology (BAT)
- the best practice from the perspective of the environment (BEP)
- the polluter pays - principle

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- Operators need to prove that their installations function in ways that prevent discharges and emissions wherever this is practically possible, or reduce emissions to acceptable levels by using BAT
  - BAT BREF documents must be taken into account in the permit procedure
- Sites must also ultimately be returned to a satisfactory state after operations cease

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What is Best Available Techniques =BAT?

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In determining what is BAT every word is important

- 'BEST'
  - means most effective in achieving a high general level of protection of the environment as a whole

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- ‘AVAILABLE`
  - techniques mean those developed on a scale which allows implementation in the relevant industrial sector, under economically and technically viable conditions, taking into consideration the costs and advantages, as long as they are reasonably accessible to the operator

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- ‘TECHNIQUES`
  - include both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned

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BAT MEANS

- operators use BAT and best procedures to prevent or reduce environmental impacts
- the most effective and advanced techniques that can be practically adopted to prevent harmful emissions and other environmental impacts, or reduce them to acceptable limits
- must be environmentally, economically and technically feasible
- regulator gives an emission limit value in the environmental permit – operator decides on the technique

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ENVIRONMENTAL IMPACTS

Air pollution, CO_2

Noise

Chemicals

Risks, accidents

Products

Waste

Land use

Visual impact

Wastewater

Transportation

Raw materials, energy efficiency

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WHAT IS A BAT BREF-DOCUMENT?

- The EU member states' competent authorities and industry co-operate on the development of BAT reference documents (BREF)
  - Over 30 BREF documents, horizontal and vertical
  - Revision of BREFs, every three years
- A BAT reference document (BREF) presents the techiques and the emission and consumption levels that are considered to be compatible with BAT in a general sense.

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WHAT IS BAT REFERENCE DOCUMENT (BREF)?

- EU BAT BREF documents
  - describe the techniques which it is agreed can be defined as BAT, as well as the agreed indicative emission levels to be applied when such techniques are used
  - is information of what is possible in operating mills
  - list of appropriate techniques
  - range to emissions (specific emissions e.g. kg/ton of product), not to be considered to be emission limit values. Local situation must be taken into account.
  - list of emerging techniques

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WHAT IS BAT REFERENCE DOCUMENT (BREF)?

What BREFS are:

- Brefs are information
- They might give information about what can be done
- Bref can give information what is possible
- Bref does not say what should be done
- Brefs can be used as a benchmark or an yardstick for permit conditions and will give the overall frame to start negotiations of permits, where local circumstances will be taken into account

What BREFs are not:

- BREFs are not standards or demands
- They do not set or propose emission limit values either at sector, national, regional, local or site specific level
- Shopping lists for different equipment
- They do not provide any legal interpretation of the IPPC Directive
- They cannot be exhaustive nor can they fully take account of all local conditions in determining BAT
- They cannot determine BAT at specific (national, regional, local) levels

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EU BAT BREF FOR PULP AND PAPER SECTOR

- Kraft pulping process
  - Bleached and unbleached
- Sulphite pulping process
- Mechanical pulping and chemi-mechanical pulping
  - Including integrated LWC and SC
- Recycled fibre processing
  - Including integrated RCF paper mills without de-inking and de-inking (newsprint, printing&writing, tissue)
- Papermaking and related processes
  - uncoated fine paper, coated fine paper, tissue

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EU BAT BREF FOR PULP AND PAPER SECTOR

Each chapter contain following information:

- Applied processes and techniques
- Present consumption/emission level
- Techniques to consider in the determination of BAT
- Best available techniques
- Emerging techniques

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CASE: KRAFT PULP PRODUCTION IN FINLAND

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BAT associated emission ranges-wastewater

□	Flow	COD	BOD	TSS	AOX	Total N	Total P
	m3/Adt	kg/Adt	kg/Adt	kg/Adt	kg/Adt	kg/Adt	kg/Adt
Bleached pulp	30 - 50	8-23	0.3-1.5	0.6-1.5	< 0.25	0.1-0.25	0.01-0.03
Unbleached pulp	15 - 25	5-10	0.2-0.7	0.3-1.0	-	0.1-0.2	0.01-0.02

Best available techniques for reducing emissions to water are:

- Dry debarking of wood
- Increased delignification before the bleach plant by extended or modified cooking and additional oxygen stages
- Highly efficient brown stock washing and closed cycle brown stock screening
- Elemental chlorine free (ECF) bleaching with low AOX or Totally chlorine free (TCF) bleaching
- Recycling of some, mainly alkaline process water from the bleach plant
- Effective spill monitoring, containment and recovery system
- Stripping and reuse of the condensates from the evaporation plant
- Sufficient capacity of the black liquor evaporation plant and the recovery boiler to cope with the additional liquor and dry solids load
- Collection and reuse of clean cooling waters
- Provision of sufficiently large buffer tanks for storage of spilled cooking and recovery liquors and dirty condensates to prevent sudden peaks of loading and occasional upsets in the external effluent treatment plant
- In addition to process-integrated measures, primary treatment and biological treatment is considered BAT for kraft pulp mills

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BAT associated emission ranges- emissions to air

□	Dust kg/Adt	SO_2 (as S) kg/Adt	NOx (NO+NO2 as NO2) in kg/Adt	TRS (as S) kg/Adt
Bleached and unbleached kraft pulp	0.2-0.5	0.2-0.4	1.0-1.5	0.1-0.2

Best available techniques for reducing emissions to air are:

- Collection and incineration of concentrated malodorous gases and control the resulting SO2 emissions. The strong gases can be burnt in the recovery boiler, in the lime kiln or a separate, low NOx furnace. The flue gases of the latter have a high concentration of SO2 that is recovered in a scrubber.
- Diluted malodorous gases from various sources are also collected and incinerated and the resulting SO2 controlled.
- TRS emissions of the recovery boiler are mitigated by efficient combustion control and CO measurement
- TRS emissions of the lime kiln are mitigated by controlling the excess oxygen, by using low-S fuel, and by controlling the residual soluble sodium in the lime mud fed to the kiln.
- The SO2 emissions from the recovery boilers are controlled by firing high dry solids concentration black liquor in the recovery boiler and/or by using a flue gas scrubber
- BAT is further the control of NOx emissions from the recovery boiler (i.e. ensuring proper mixing and division of air in the boiler), lime kiln and from auxiliary boilers by controlling the firing conditions, and for new or altered installations also by appropriate design
- SO2 emissions from auxiliary boilers are reduced by using bark, gas, low sulphur oil and coal or controlling S emissions with a scrubber.
- Flue gases from recovery boilers, auxiliary boilers (in which other biofuels and/or fossil fuels are incinerated) and lime kiln are cleaned with efficient electrostatic precipitators to mitigate dust emissions.

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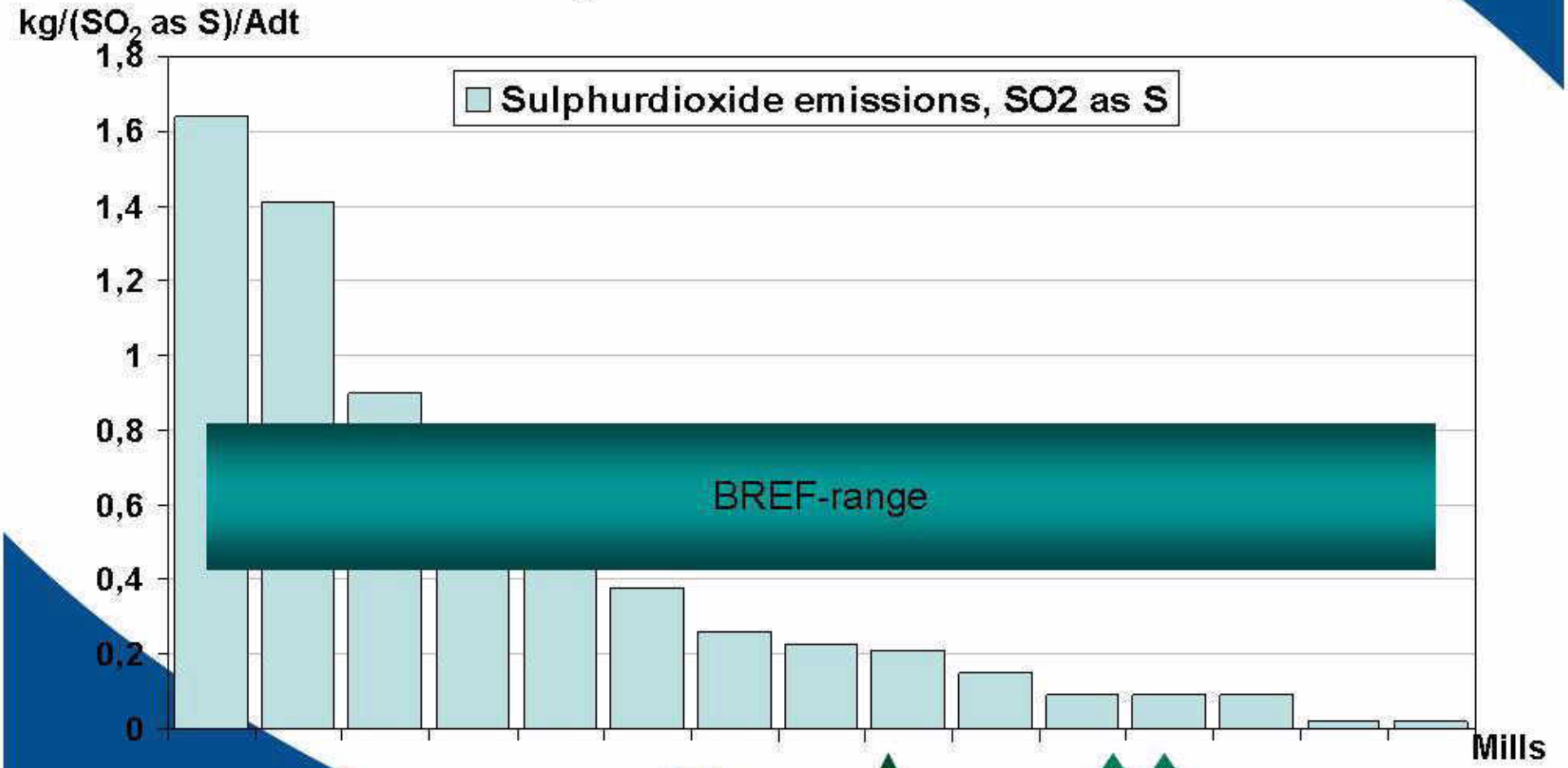
Specific SO_2-emissions (as S), Kraft Pulp Mills in Finland 2004



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Source: Finnish Forest Industries Federation

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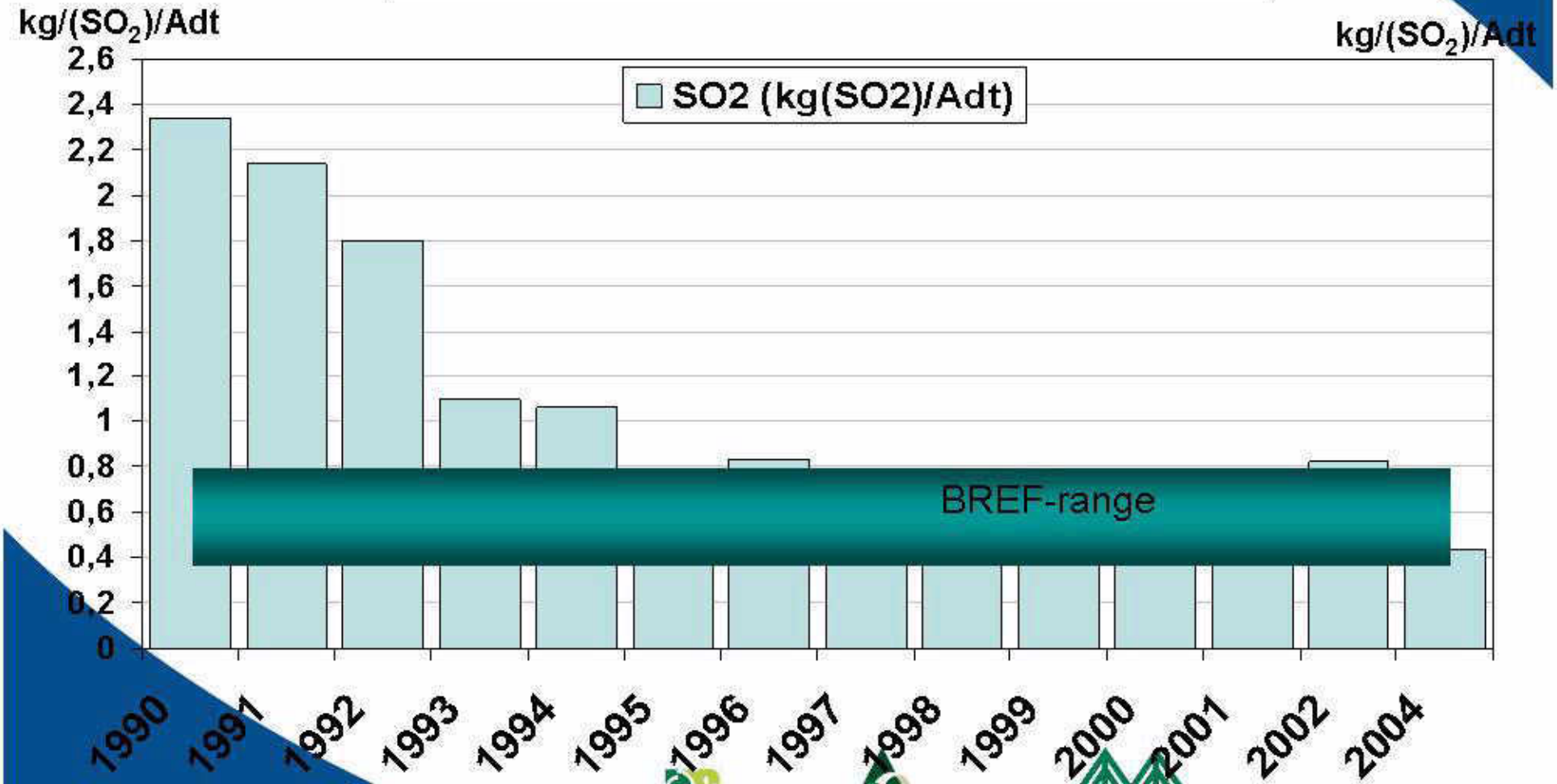
Specific SO2-Emissions, Kraft Pulp Mills in Finland 1990-2004



Source: Finnish Forest Industries Federation

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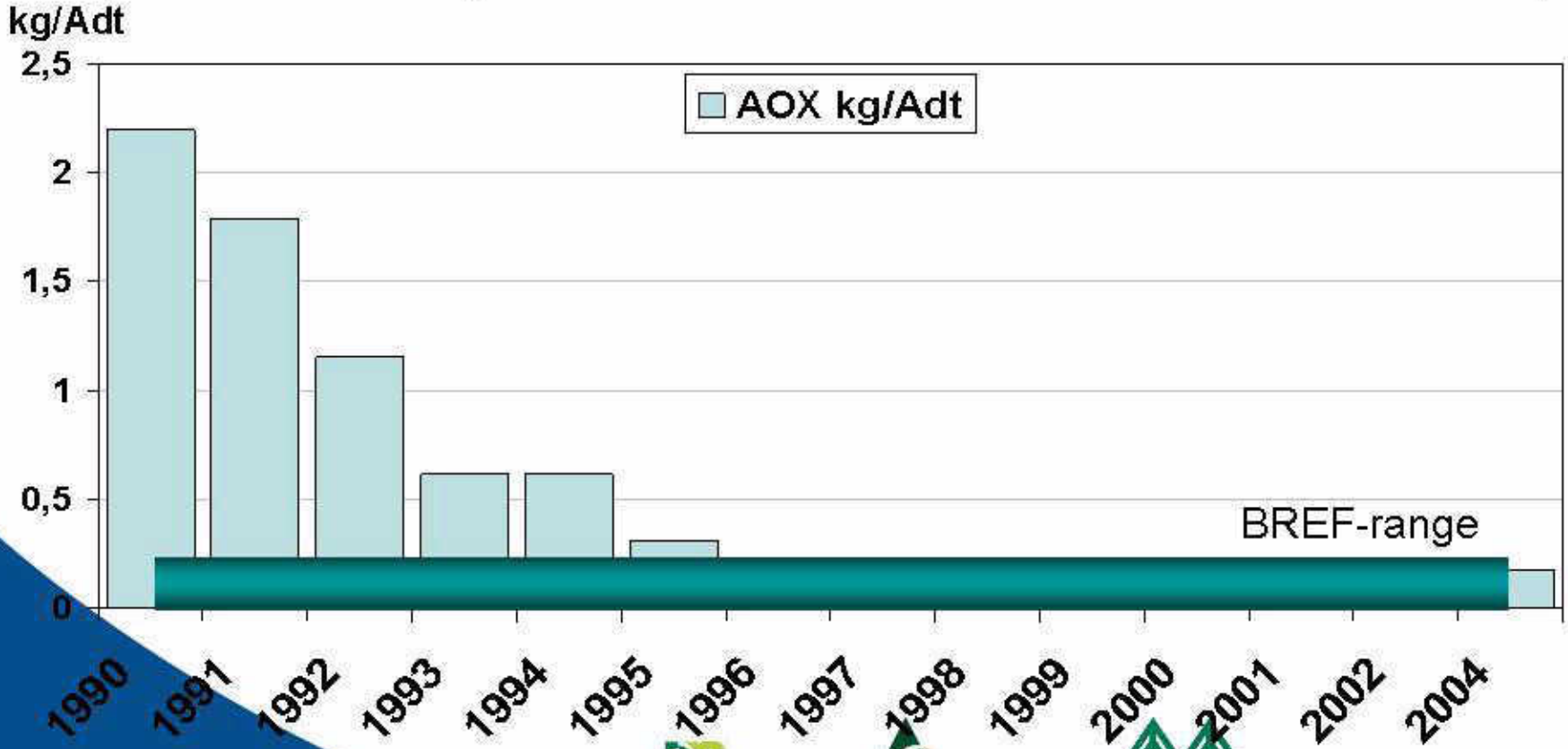
Specific AOX-emission (organic chlorine compounds), Bleached Pulp, Kraft Pulp Mills in Finland 1990-2004,



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Source: Finnish Forest Industries Federation

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Specific AOX-emission (organic chlorine compounds), Bleached Pulp, Kraft Pulp Mills in Finland 2004,

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Source: Finnish Forest Industries Federation

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IMPORTANT IN DETERMINING BAT

- Availability
- Costs
- Alternative techniques
- Age of the mill (clear difference between old and new)
- Comparability of the emissions (need for harmonisation of measurement and reporting methods)
- Technical characteristics, geographical location, local environment of the mill

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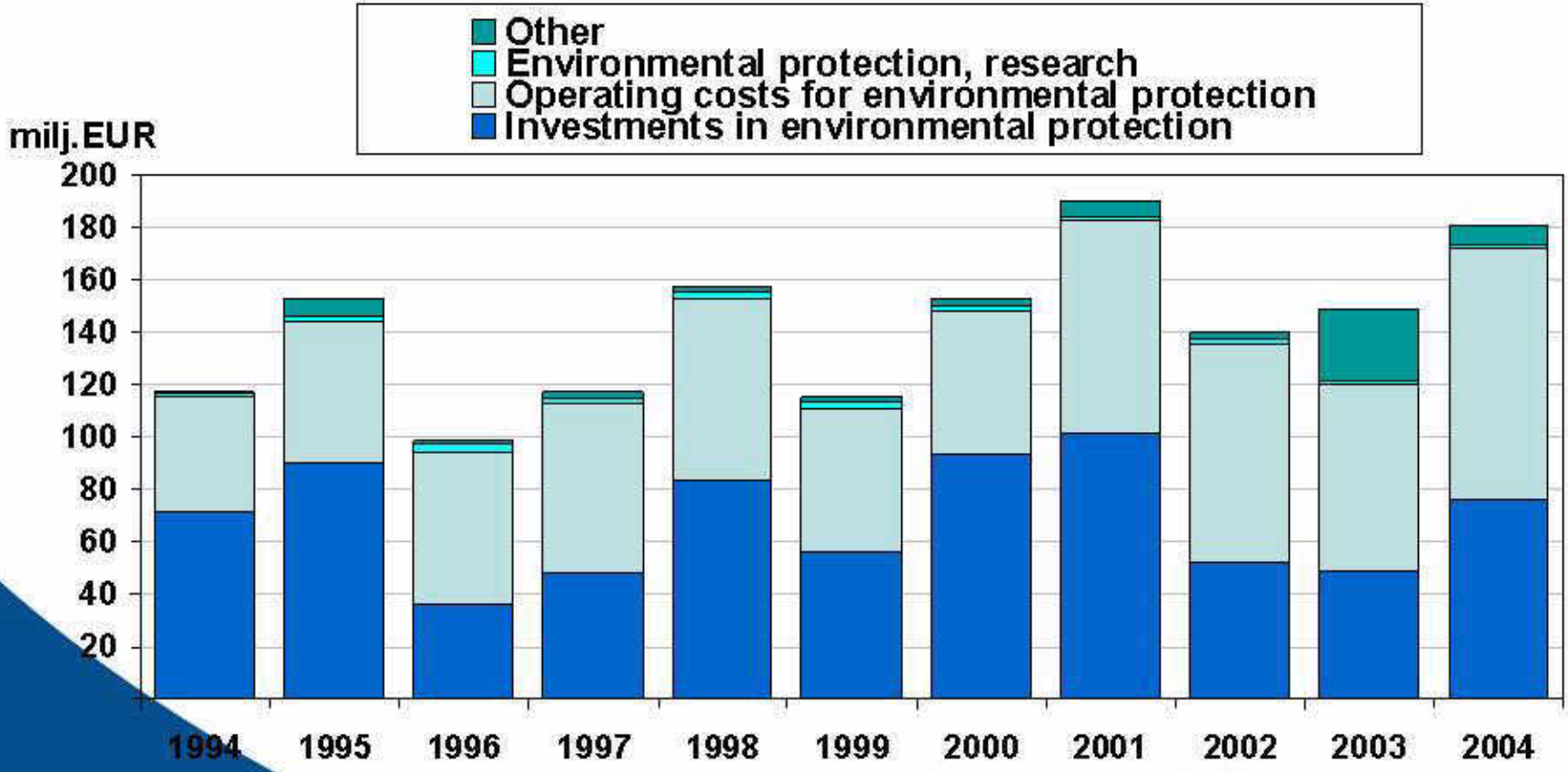
The environmental protection costs for pulp and paper industry in Finland 1994-2004



Source: Finnish Forest Industries Federation

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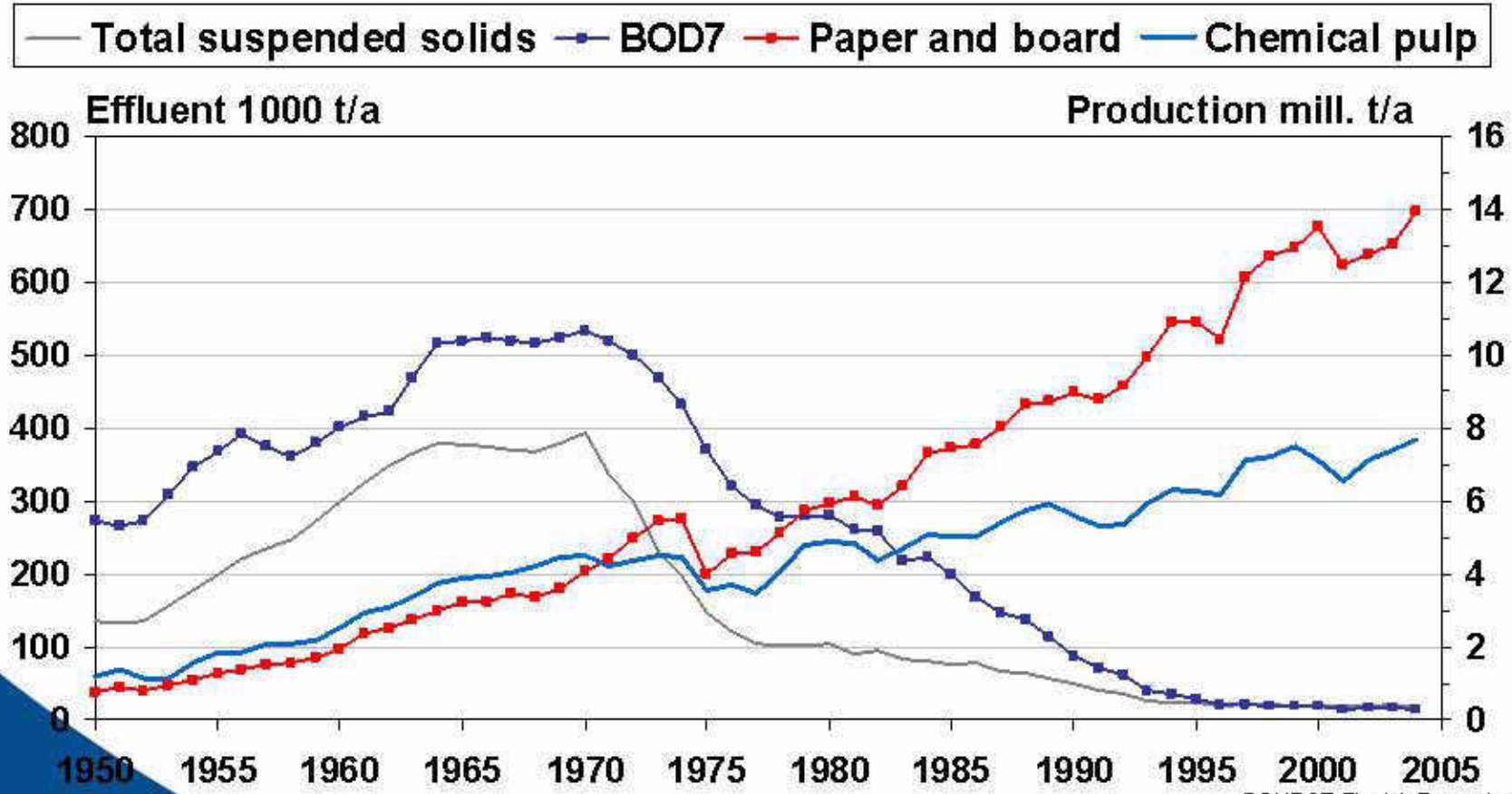
Production of the Pulp and Paper Industry in Finland and Waste Water Load 1950-2004



SOURCE: Finnish Forest Industries Federation and Finnish Environment Institute

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THANK YOU FOR YOUR ATTENTION!

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