

GARNICA PLYWOOD

Plywood for a better world



Engineered Wood Products Based on Poplar Wood
Nanjing Forestry University - China, October 30th 2008

Group Garnica Plywood: facilities



The Garnica Plywood Group has more than 245,000 m² of manufacturing facilities and a production capacity of 142 000 m³ in 2008

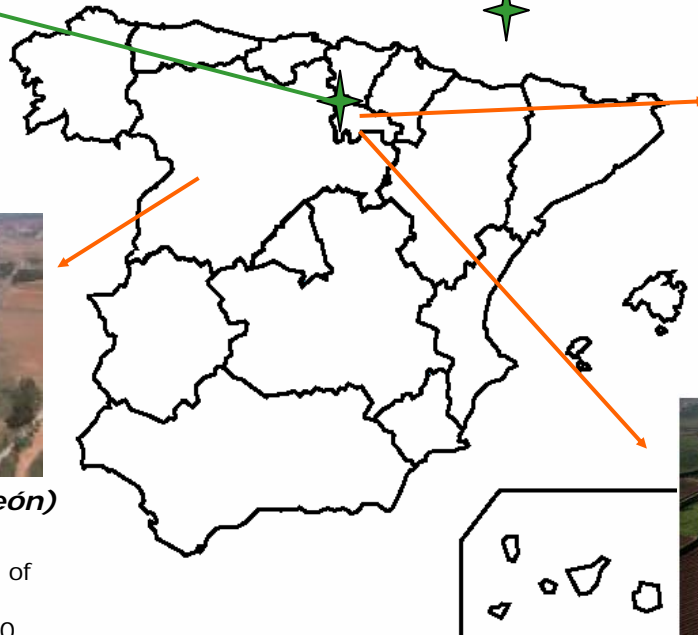


New Plant under construction in Marmande (FRANCE)



Baños del Río Tobía (La Rioja)

New Plant under construction in Baños de Río Tobía (La Rioja)



- 10 000 m² built in an area of 45 000 m²

- Production in 2008: 45 000 m³ plywood panels and 30% of the veneer produced by the Group

- 107 permanent employees

Fuenmayor (La Rioja)

- 13 000 m² built in an area of 60.000 m²

- Production in 2008: 66 000 m³ plywood panels

- 79 permanent staff



Valencia de D. Juan (León)

- 28 000 m² built in an area of 140 000 m²

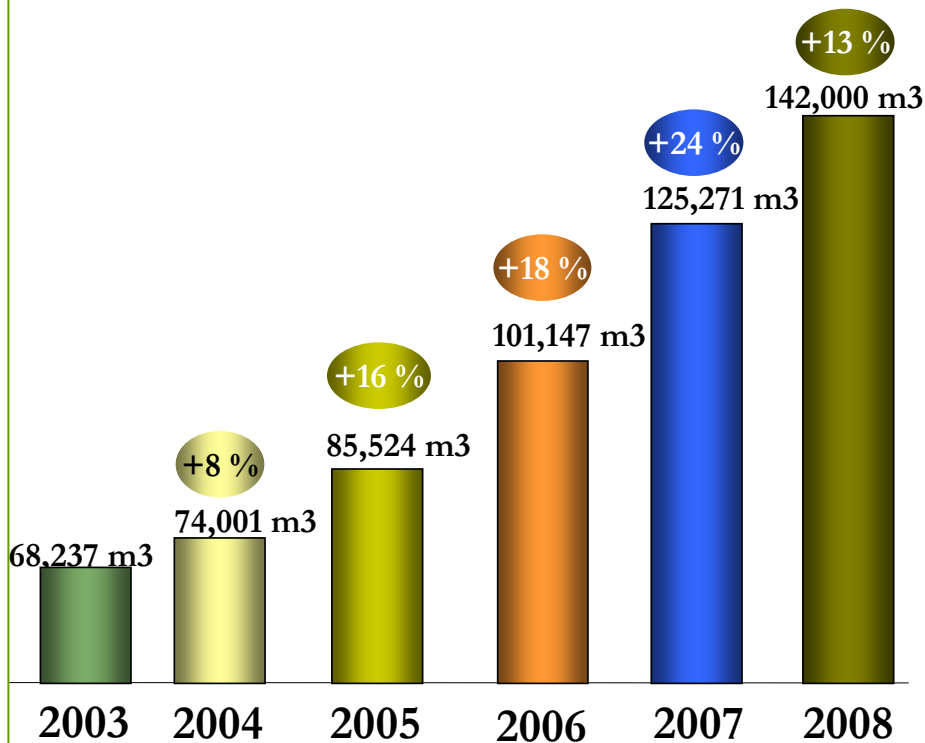
- Production in 2008: 40 000 m³ plywood panels and 70% of the veneer produced by the Group

- 120 permanent employees

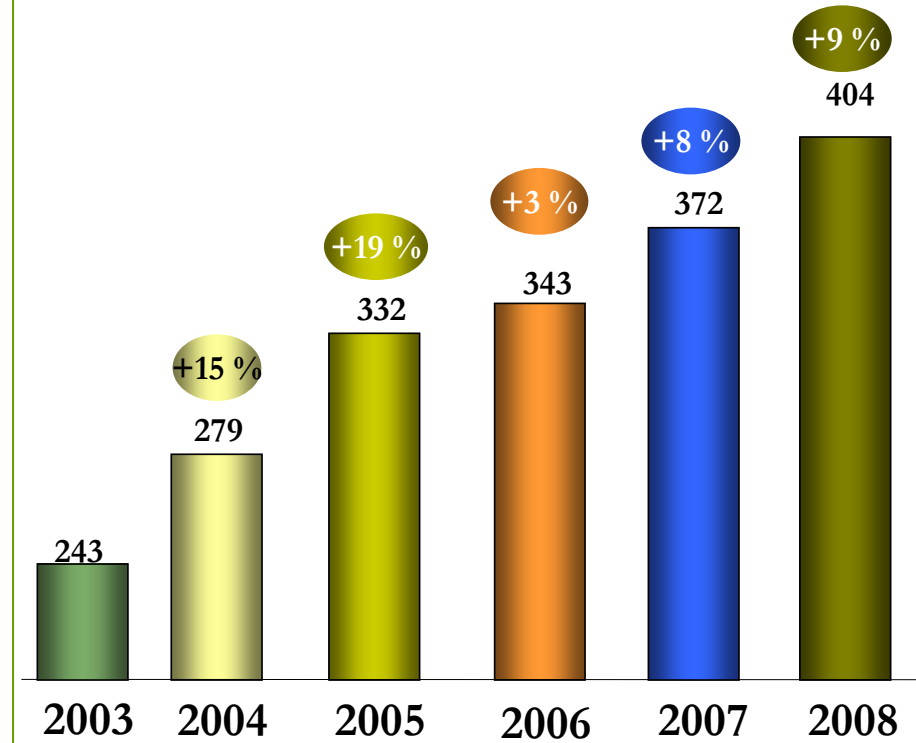
Grupo Garnica Plywood: continuous growth



Continuous production growth



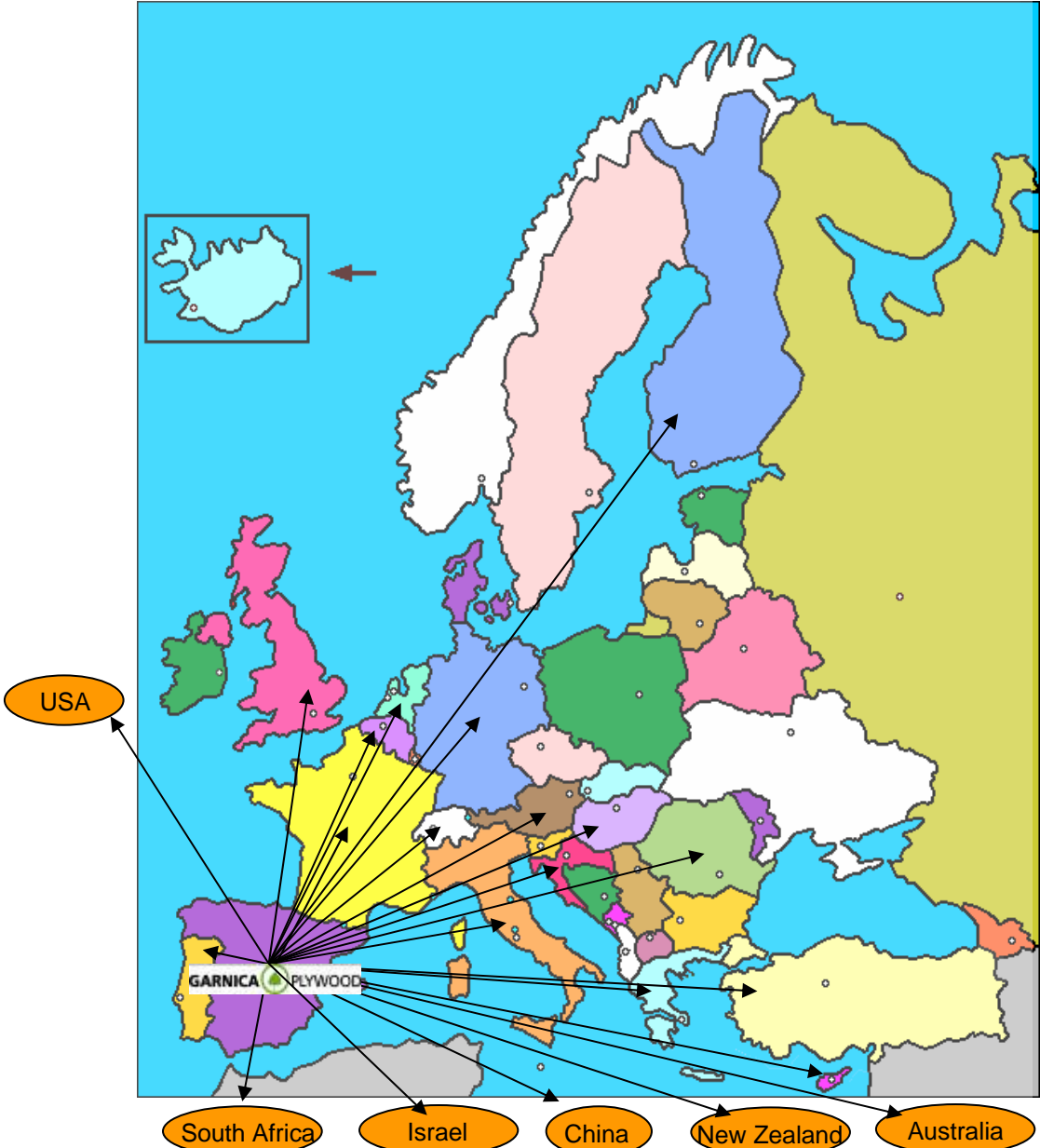
Continuous staff growth



Our market:



- Australia
- Austria
- Belgium
- China
- Chypre
- Croatia
- Finland
- France
- Germany
- Greece
- Holland
- Hungary
- Israel
- Italy
- Lichtenstein
- New Zealand
- Portugal
- Romania
- South Africa
- Switzerland
- Turkey
- UK
- USA



Integracion in GARNICA production from plantation to plywood

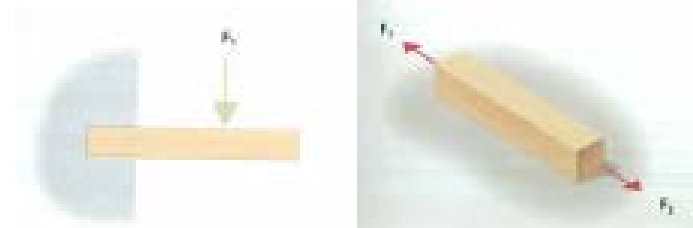


- ✓ 30.000 (about 100 ha/year) poplar planted every year, coming from our own nurseries
- ✓ 5 different Clones: *Beaupre*, *Raspalje*, *Unal*, *I-214*, *MC*
- ✓ Searching for the sustainability



- ✓ 49 clones tested in 20 experimental plots
- ✓ Testing for : Wood quality, Disease tolerance, Fast growth, Soil adaptation...
- ✓ Collaboration with Research Institutions and Research Centres from Spain, Italy, Belgium and France.

- ✓ Meetings
- ✓ Advice to Farmers
- ✓ Leaflets, ...
- ✓ Promotional poplar plantations at Schools



Resources and market balances in poplar plywood manufacturing



- Why produce poplar ?



- Why use hybrid poplars ?

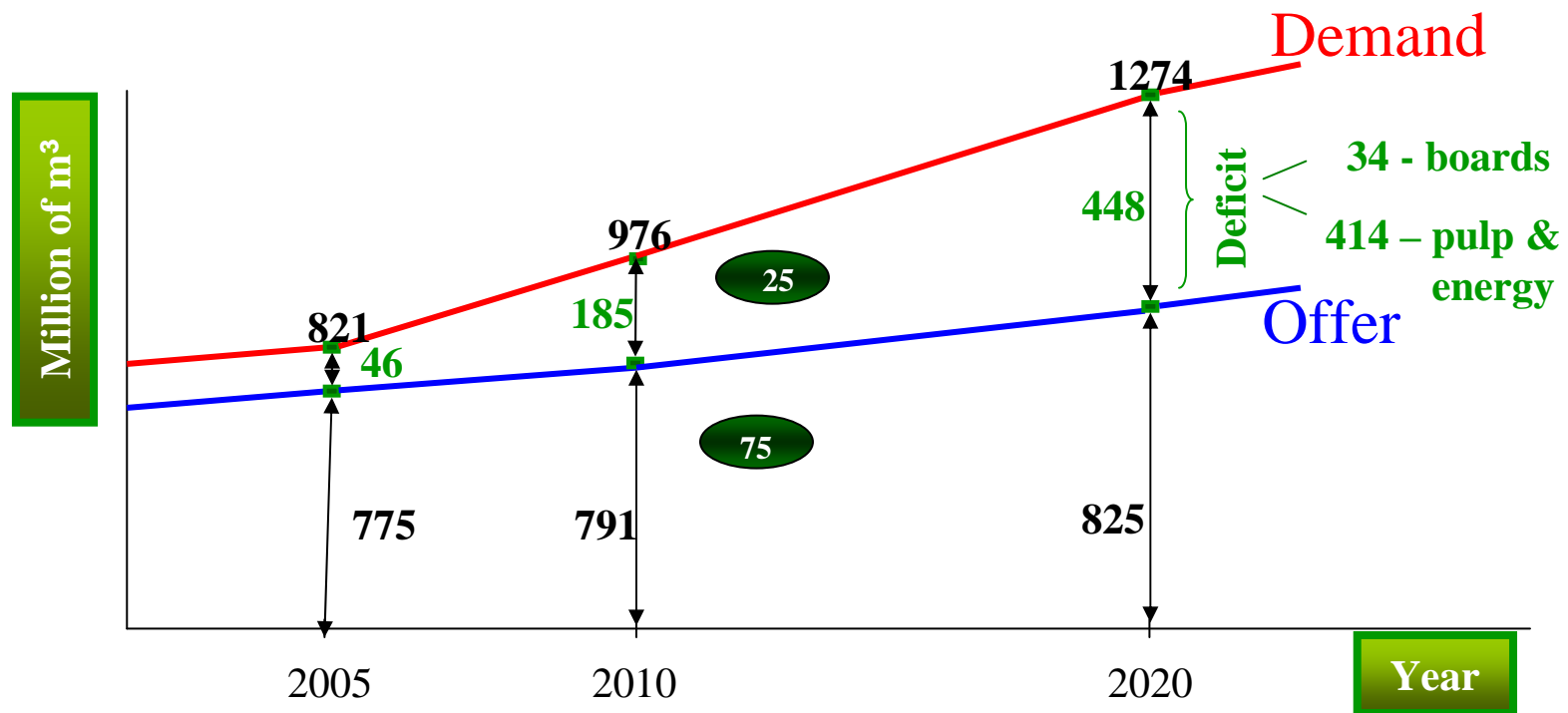
- Why produce plywood ?



Why produce poplar ?



Economical reasons



Study published by AITIM n° 252 on the balance of offer and demand of wood with forecast to 2010 y 2020 in the 29 European countries analysed.

Why use hybrid poplars ?



It is the planted tree which has succeeded to equal the properties of tropical wood in the most demonstrative way.

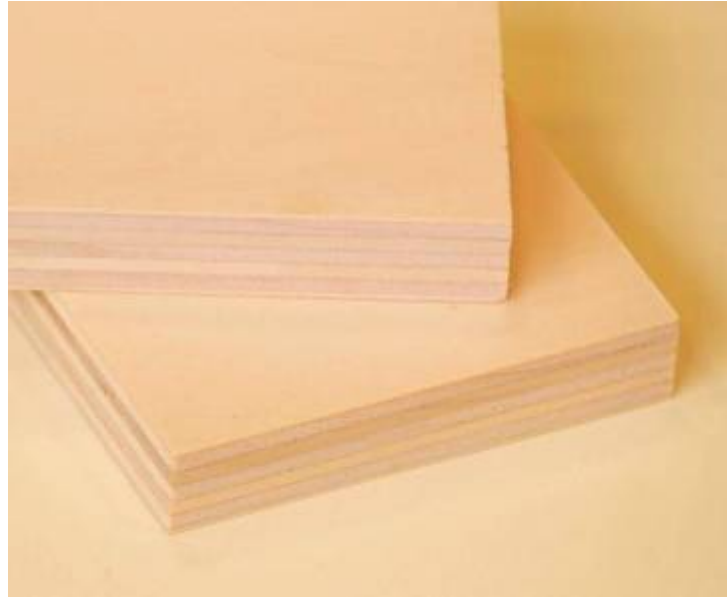
Only poplar is comparable to okoumé, calabó or fromager in terms of physical and mechanical properties.

Qualities

- Low wood specific volume (density) and high level of mechanical resistance in comparison with many other species;
 - [table of characteristics](#)
- Fine texture and anisotropic regular grain
 - homogeneity of veneer
- White sapwood
 - all class of high quality finish
- Fast growth;
 - possible intensive field production
- Domesticated tree, with easy establishment



Why produce plywood ?



Technical reasons

- Gluing efficiency
- Short fibre length compensated by ply (veneer) crossing
- Core association of veneer with visual and morphological deficiencies (veneer grading)

Industrial reasons

- High efficiency of raw material use (50%)
- Large diversity of final product (flexibility)
 - final thickness of board
 - used ply number (veneers)
 - thickness of each ply
 - species of each ply
- Operational machinery contribution
- Small and large possible production
- Homogeneous quality



Why produce plywood ?



	Density (Kg/m ³)	Swelling Rate*	MOE N/mm ²	MOR N/mm ²	Surface Quality
Poplar Plywood	<u>410-440</u>	<u>2%</u>	3800	38	<u>++</u>
Softwood Plywood	460-600	3%	5500	45	+
Okume Plywood	500-550	<u>2%</u>	4500	45	+
Particleboard	500-700	12-16%	1800	14	+
MDF	500-800	12-18%	2000	20	<u>++</u>
HDF	800-1000	16-22%	3500	35	<u>++</u>
OSB (Pine)	600-700	5-25%	4000	32	-
Blockboard (Softwood)	500-620	6%	8000	65	+

* 24h in water at 20°C



Flexibility and durability of final products



Market requirements:

- **Delivery time :**
 - a) Specific products: 30 days
 - b) Standard products: immediately
- **Quality standards :**

Depends on the market, requiring for :

 - Top finishing quality ;
 - High mechanical resistance for technical products ;
 - Top quality/price ratio

Garnica Plywood's answer:

- **Flexibility :**

Board production system with overlapped veneers, allowing all combinations of sizes, gluing and species.
- **Durability : Quality and Sustainability**

by certifying the products with the Technical and the Environmental standards

CERTIFICATIONS

ISO 9000: Quality

ISO 14000: Environmental

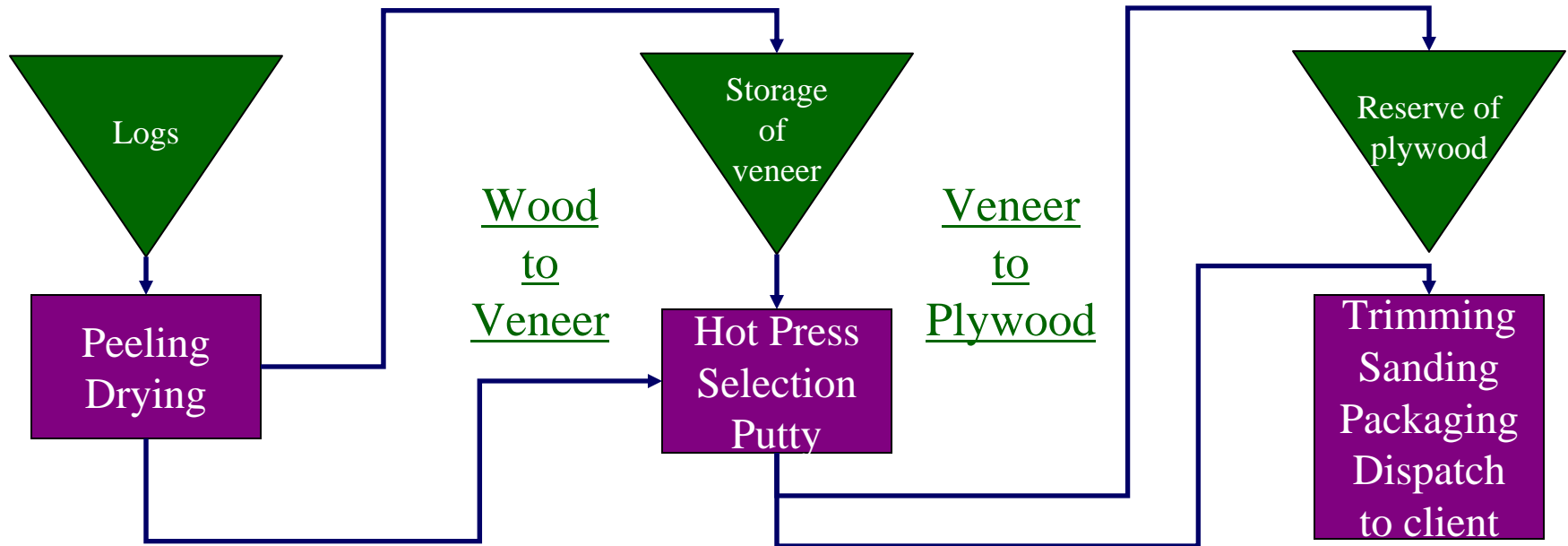
PEFC: Sustainable management and plantation

AITIM (Spain), CTBX (France): Product quality

E1 (Germany): Formaldehyde emission

Others...

Engineering process to optimise homogeneity of final products

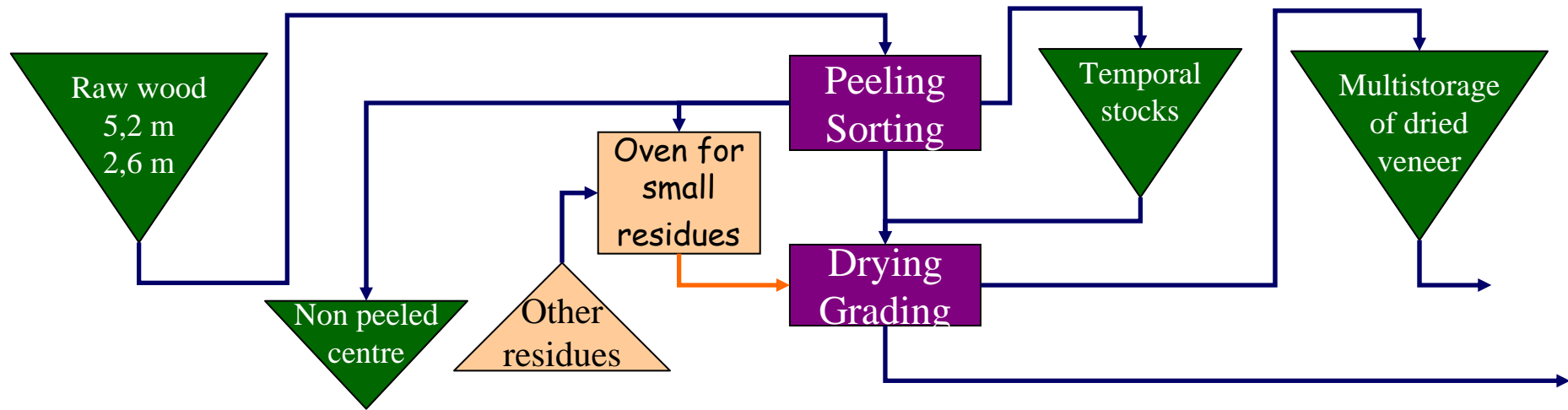


Orders are produced by specialised production lines adapted or designed for specific customised products;

Three level storage model give high flexibility to process;

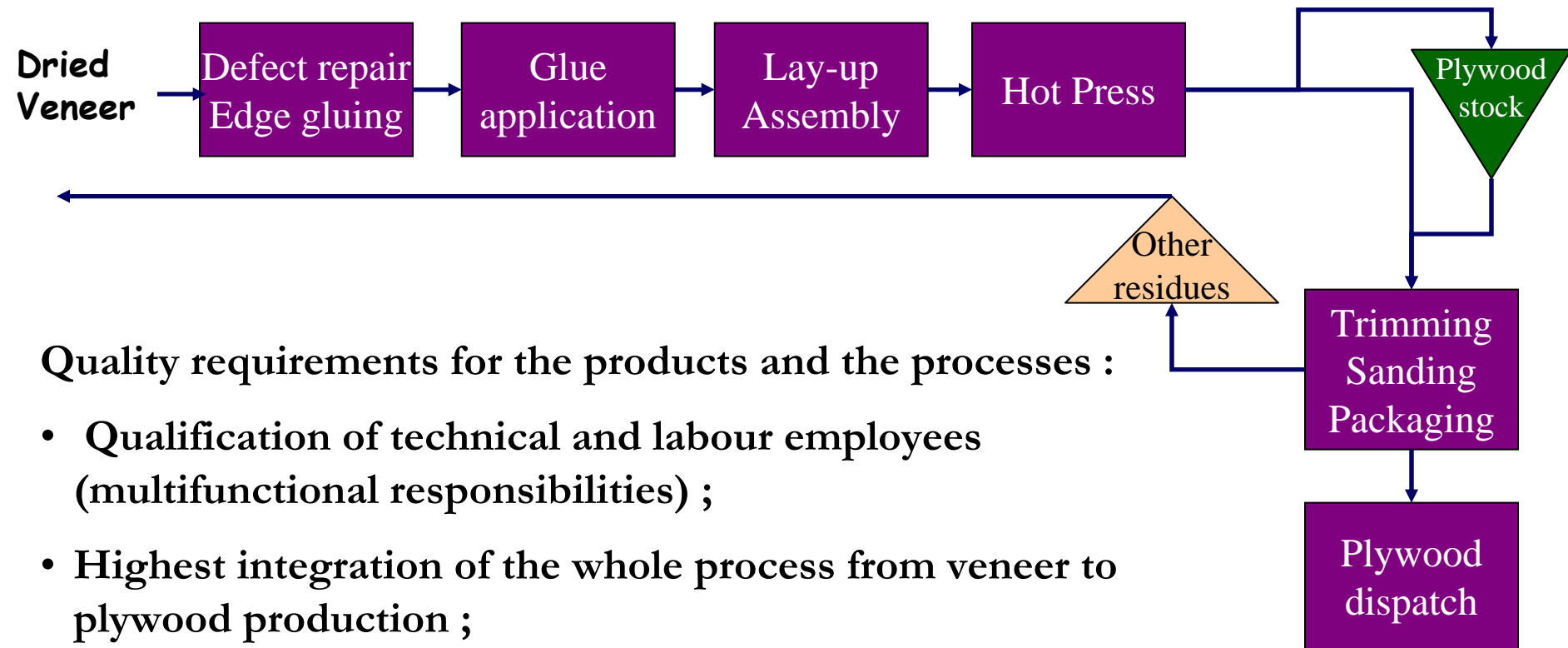
It is a management based on Multifactory planning.

Engineering process to optimise homogeneity of final products : Wood to Veneer



- ✓ Three factories with three peeling units :
 - “Cremona” (Italian) 5,2 m logs :
 - “Raute” (Finnish) 2,6 m logs;
- ✓ Seven veneer dryers. Sorting process is partly automate with moisture probe and associated with drying oven.
- ✓ Five hot presses with metallic plates, distributed in 3 plants.
- ✓ Three trimming and sanding processes

Engineering process to optimise homogeneity of final products : Veneer to Plywood



Quality requirements for the products and the processes :

- Qualification of technical and labour employees (multifunctional responsibilities) ;
- Highest integration of the whole process from veneer to plywood production ;
- Machinery upgrading with incorporation of new technologies (moisture sensor, optic sensor for grading, ...) ;
- Analysis of process and evaluation of products characteristics.



Examples of 2007 improvements:

- New infrastructure investments (% production improvement):
 - ✓ Trunk charging system: + 12 % of logs
 - ✓ Peeler: + 10 % of raw veneer
 - ✓ Dryer: + 5-25 % of dried veneer
 - ✓ Automatic piling system: + 10 % of dried veneer
 - ✓ Double line of plywood formation: + 40 % of boards

- Products :
 - ✓ Urea and phenolic resins: + 5-25 % of hot press boards

Grading logs and veneer as key issues



“Upstream factor”

Grading necessity must be reduced by obtaining quality logs and veneers

Logs :

- ✓ Selection of poplar stands based on (1) the clone planted, and, (2) the quality of cultural operations ;
- ✓ logging organisation and stands high homogeneity ;
- ✓ round wood stocking according to logs quality
- ✓ logs selection before peeling to homogenise mechanical and physical properties
- ✓ transformation process adapted to produce the required qualities and sizes
- ✓ technical optimisation of machinery to fit to the variation of the raw material and its uses

Veneer :

- ✓ peeling optimisation to differentiate qualities and thicknesses of the veneers
- ✓ sorting of veneers according to their colour and visual defaults
- ✓ homogenise moisture content



Sustainability and global energy balance of Garnica's poplar plywood manufacturing



ECONOMICAL PERSPECTIVE

Peeling logs have a use efficiency $\left\{ \begin{array}{l} = 10 \times > \text{to particule board uses} \\ = 5 \times > \text{to the sawing uses} \end{array} \right.$

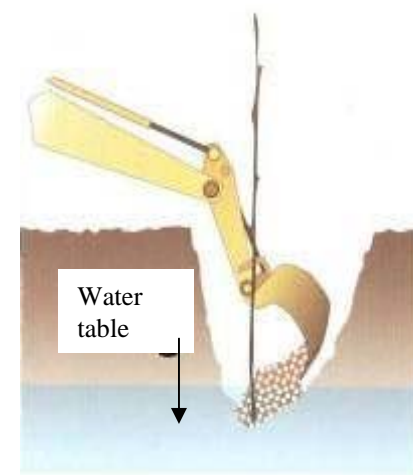
TECHNICAL PERSPECTIVE

- ✓ Our integrated model is able to give the highest transformation yield, with the minimum of logs (50% use efficiency from the raw material)
- ✓ The last technological improvements used to adapt the machinery to transform the raw material shows the great new opportunities of the future.



ENVIRONMENTAL PERSPECTIVE

- ✓ Sustainable management of plantations – PEFC
(*Programme for the Endorsement of Forest Certification* schemes)
- ✓ Poplar absorbs CO₂ = 10 tm/ha/Year (very effective for rural areas)
- ✓ Poplar stands can be installed without competition for water uses of other productions
- ✓ Poplar stands decontaminates water by absorbing minerals derived from agricultural treatments, settled in the river banks.
- ✓ Plywood production requires low energy consumption, compared to other boards such as particle boards, MDF, OSB, etc. (371,5 Kwh/m³ are needed to produce plywood of which 254 Kwh come from “green”energy based on the process residues combustion).



POPLAR : the wood of 21st Century



Poplar and poplar plywood, because of their great physical and mechanical properties and their suitability for industrial and decorative uses, are the great alternative in the 21st Century, in order to reduce the need of tropical woods.

Poplar and poplar plywood are our best allied against the climate change.

It is our task to get human beings to understand this reality, and to get their help to search for innovations.

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www.garnicaplywood.com