Sustainable Biomass Program

Supply Base Report GLOWOOD - INDÚSTRIA, SA

Third Surveillance Audit

www.sbp-cert.org

Completed in accordance with the Supply Base Report Template Version 1.3

For further information on the SBP Framework and to view the full set of documentation see www.sbp-cert.org

Document history

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Contents

1 Overview

Producer name: GLOWOOD - INDÚSTRIA, SA.

Producer location: Parque Empresarial, Lote 1, Expansão 1. Cercal do Alentejo - 7555-999 Santiago do Cacém, PORTUGAL

Geographic position: 37°47'36.1"N 8°41'08.3"W

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Close of last CB audit: 06/Mar/2018, Cercal do Alentejo.

Name of CB: NEPCon Spain I C

Translation from English: Yes

SBP Standard(s) used: Standard 1 version 1.0, Standard 2 version 1.0, Standard 4 version 1.0, Standard 5 version 1.0

Weblink to Standard(s) used: https://sbp-cert.org/documents/standards-documents

SBP Endorsed Regional Risk Assessment: Not Applicable

Weblink to SBE on Company website: http://www.glowood.pt/

Indicate how the current evaluation fits within the cycle of Supply Base Evaluations				
Main (Initial) Evaluation	**First Surveillance**	**Second Surveillance**	**Third Surveillance**	**Fourth Surveillance**
☐	☐	☐	X	☐

2 Description of the Supply Base

2.1 General description

Glowood – Indústria, SA was founded in May 2011 with the support of IAPMEI through the POalentejo program. Dedicated to the production and marketing of pellets, with strong commitment to the foreign market, since more than 90% of the production is for export.

The company buys roundwood, chips and sawdust, mainly pine (Maritime Pine/Pinus pinaster and Umbrella Pine/Pinus pinea), as raw material for its manufacturing process. For the drying process, in addition to pine biomass (small logs, bark, waste and leftover), it can also use small roundwood and leftovers of Eucalyptus (Eucalyptus spp.) and rarely poplar (Populus spp), acacia (Acacia spp) and alder (Alnus glutinosa), and eventually other species.

All wood comes from forested áreas of Portugal, mainly from the districts of Setúbal, Beja, Évora, Lisbon, Portalegre, Santarém, Castelo Branco, Faro, Leiria and Coimbra. In 2018 It was also made a small experience using chips of Criptomeria (*Cryptomeria japonica*) from São Miguel Island, Azores.

The primary feedstock (roundwood, harvesting waste and other forest waste mainly branches from pruning of umbrella pine) is supplied by approximately 32 companies, mostly small and medium, which are made aware of and controlled in order to obtain the necessary information about the origin of the management unit, with a compromise stated to that effect.

Suppliers who purchase standing timber and carry out their operations, usually make a selection of material, bigger logs for higher end value processes (sawmills) and small logs and leftovers to other processes, including pellets manufacturing and energy production.

This practice is encouraged by the company, with a supply policy to promote the effective use and sustainability of forest resources. The acceptance of larger roundwood is limited (diameter ≤ 40 cm) and there is a formal agreement with a sawmill, located next to the plant, which receives the larger logs delivered by the suppliers, providing in exchange, sawdust and other waste (lumber rejects, chips, small logs etc.).

The secondary feedstock (woodchips and sawdust) comes from suppliers who deliver the material produced (chips) or sawdust resulting from the sawmilling process, essentially from three sawmills, whose wood supply is also from adjacent forest areas in Portugal. It was made a small experience using chips of Criptomeria (*Cryptomeria japonica*) from São Miguel Island, Azores.

Therefore, the company's supply area remains essentially the continental Portuguese territory.

Thus the company's supply area is restricted to the Portuguese mainland.

In 2018, Glowood produced a total of 34.105,36 t of pellets, with a level of consumption of raw material in the order of 72.413,95.

Portugal has a population of about 9.8 million inhabitants and 8.7 million hectares.

According to preliminary data from the latest National Forest Inventory, 2013 (IFN6 - Areas of land use and forest species in mainland Portugal in 1995, 2005 and 2010), the forest land use is the dominant use of the mainland. The Portuguese forest occupies 3.2 million hectares, which corresponds to 35.4% of the country, one of the largest proportions of forested areas of Europe.

Land-Uses in Portugal – 2010

Source: ICNF National Forest Inventory, Preliminary Results, 2013

- 35% Forestry
- 32% Bushland and Natural Pastures
- 24% Agriculture
- 5% Urban
- 2% Inland Waters
- 2% Unproductive

Forest Stands in Mainland Portugal – 2010
Source: ICNF National Forest Inventory, Preliminary Results, 2013

- 26% Eucalyptus/ Eucalyptus spp.
- 23% Corkoak / Quercus suber
- 23% Maritime Pine / Pinus pinaster
- 11% Holmoak / Quercus rotundifolia
- 6% Stone Pine / Pinus pinea
- 2% Oak / Quercus spp.
- 1% Sweet Chestnut Tree / Castanea sativa
- 6% Other Hardwoods
- 2% Other softwoods

The dominant forest species is Eucalyptus, representing the largest area of the country (812,000 ha; 26%), second is Cork Oak (737,000 ha; 23%), followed by the Maritime Pine (714,000 ha; 23%). The area occupied by softwood species corresponds to 31% of the Portuguese forest, the remainder (69%) is occupied by broadleaf species.

Over the period 1995-2010 the forest areas exhibited a decrease of 4.6%, corresponding to a net loss rate of 0.3% / year (10 mil ha / year). The net decrease of forest areas (-150,611 ha) is mainly due to conversion to the land use class "brush and pastures." In addition to this conversion, significant amount of forested land was converted to urban use between 1995 and 2010 (28 000 ha).

Note that although there is a decrease in forest area, the fact that this is not accentuated demonstrates the significant resilience of the forest to large disturbances to which it was subjected to during the review period. On the one hand, the very serious forest fires of the last two decades (more than 2.5 million hectares burned between 1990 and 2012), and on the other, the occurrence of diseases such as the pine wood nematode which has severely affected the maritime pine nationally, forcing excessive harvests due to enforcing of phytosanitary regulations. No other country in Europe has been subject to this level of disturbance.

The decrease of forest area is mainly due to reduction in temporarily treeless areas (burned areas, harvested areas and regenerated areas), with emphasis on increasing the areas reforested, which is explained in part by the action of nature itself (natural regeneration) demonstrating the natural adaptation of the soil to the forest, but also by the action of forest owners who have continued to invest in reforestation.

According to preliminary data from IFN6, the main change of forest species between 1995 and 2010, were maritime pine presenting a decrease of about 263 000 ha (26.9% less). Most of this area became "brush and pastures" (165,000 ha), 70,000 ha to eucalyptus, 13 000 ha in urban areas and 13,700 ha in forest areas with other tree species.

On the other hand, there is an increase of eucalyptus area of about 95,000 hectares. It is also to highlight the increase of umbrella pine (46% in total area and 54% in terms of replanted area).

The change in area of other species has been less significant, especially during the period 2005 to 2010.

The harvest of Umbrella Pine stands takes a leading role in the forestry economy in some regions, particularly in the south (Alentejo), mainly due to the unique characteristics of its main production (pine nuts for the food industry) which has allowed the rapid development of the umbrella pine envelope, which today occupies an important place in the regional and national economy. In the Alentejo region, about 67% of the national production of pine cone and 15% of world production of pinecone occurs.

According to data from the National Strategy for Forests, forest properties in Portugal are mostly private, with 2.8 million hectares, or 84.2% of the total area owned by family-oriented smallholdings and 6.5 % are owned by industrial companies. Public areas correspond to 15.8% of the total, of which only 2% (the lowest percentage in Europe) are the private domain of the State.

The size of the forest estate has a very defined geographical distribution, with a large number of properties located in the north and center of less than 1 hectare in size. It is estimated that there are over 400 000 forest owners in the country.

According to the prospective study for the Forest Sector published by the AIFF (Association for the Competitiveness of Industry Forestry Sector) in 2013, the size of the stands is a key factor in the context of the Portuguese forest, with significant impact on the profitability and sustainability of the activity. In the North and center of the country approximately 54% of this forest area spread over stands of less than 10 ha. The small size of the properties has particular relevance to the two main species whose distribution and harvest are in the central and northern regions:

- In Maritime Pine, 63% of the stands are in areas less than 10 ha and 25% in areas less than 2 ha;
- In Eucalyptus, 50% of forest stands are in properties of less than 10 ha.

Also according to the same study, the Portuguese business structure in the forest industry has some of the most representative European companies in the sector. In the point of view of transactions to the international market for forest and forest-based products, the most important are: paper and cardboard, pulp, cork, wood and resin products and furniture.

The wood sector, particularly softwood for industrial purposes and softwood for sawlogs are essentially based on maritime pine. The pulp, paper and board sector are based mainly on eucalyptus.

According to the Characterization of the Forestry Sector Report 2014 prepared by the AIFF, the trade balance related to the industries of forestry sector had a positive balance of 2,474 million euros in 2013, representing 9.1% of total national exports of goods and 3 4% of the total national imports of goods. The forestry sector represents 2.2% of the total company employees in Portugal and 1.7% of the total employed population.

A breakdown of forestry goods production allows us to observe different trends. The production of maritime pine (softwood for industrial purposes) shows a decrease of 3.6% in value compared to 2011 and for the year 2002 a decrease of 4.5%. In 2012, the production value of wood for sawing was lower than the previous year (-2.3%), due to the price decrease (-2.6%), as the volume has increased (+0 4%) for the third consecutive year;

The production of Eucalyptus (hardwood to mill) maintained the growth trend (interrupted only in 2009), of an increase of 9.2% over the previous year and an increase of 63.4%. This high growth in eucalyptus wood production for industrial use makes this the main forestry goods (representing 36.8%), about 17% higher than the production of softwood for industrial purposes.

Also, according to the AIFF in 2012, the Gross Value Added (GVA) in the forestry increased by 3.9% in volume and 2.4% in value relative to 2011. With regard to the Forestry Production an increase of 4.3% in volume and 3.6% in value in relation to 2011 was recorded. In the same year, the GVA of the forestry sector industries accounted for 1.2% of national GVA, maintaining a significant importance in total manufacturing (11%).

The analysis of GVA by sector reveals a particular negative impact on the timber industry in recent years, with the GVA presenting a reduction of about 40% between 2007 and 2012 (-429 million euros), much lower than reported values for the pulp industry, paper, paperboard and articles thereof (-4%). In the whole period considered (2004-2012) only the sectors pulp, paper, paperboard and articles thereof presents a growth of GVA.

According to Pedro Sebastião Perestrelo de Souza e Holstein Campilho in his thesis Assessment of National Potential for Forest Biomass Utilization for Energy Purposes published in 2010, the trend of loss of socioeconomic sustainability of the Portuguese forestry sector in recent years, when supplemented with a conjecture to encourage the production of renewable energy, translates into a set of developments which enhance the demand for biomass from logging residues for energy use. The demand for biomass tends to be met in the short term, in scenarios substantially sustainable. However, in the medium and long term projection, even without considering significant increases in demand for this resource, results in difficulties to meet existing market demands with conditions for sustainability as those experienced in the short term.

The pine forest is distributed throughout the country with Maritime Pine occupying 23% of the forest area of the mainland, mostly located in small areas and Umbrella Pine occupying 6% of the total forest area of continental Portugal, with its main distribution in the south of the country.

Maritime Pine (*Pinus pinaster*) forests are usually managed in stands of trees, generally of seed or seedling origin, that normally develop a high closed canopy, and can be managed using natural regeneration or by sowing or planting.

In cases of natural regeneration and planting, the initial phase is intended to gradually reduce the density of plants to 1200-1600 trees / ha. Initially in groups and then selectively with mechanical or manual harrowing or slashing. After 10 years the trees can be pruned (1-2) and thinned (2-3) utilizing the residual material, leaving a final cut (30-40 years) of about 500-600 trees / ha, while proceeding to also control unwanted vegetation mechanically or manually harrowing or slashing. In the case of natural regeneration, during the final cut about 25 large trees / ha are left as seed trees.

In the case of a plantation, the ground is prepared with disking, ripping and harrowing along the contours in areas with slopes up to 30%, on steeper slopes the site preparation and planting is manual. The planting density depends on the site condition, usually 1200 to 1600 seedlings / ha.

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In Umbrella Pine (*Pinus pinea*) silviculture, the intertree distance at planting depends on the future purpose of the stand: production of wood or cones (pine nuts).

For the production of wood intertree distances of 4x3 m. are used to promote natural pruning. The distance between rows should allow the passage of agricultural machines mainly used for brushing. In stands oriented to cone production (with or without using grafting technique), the trees should grow in favorable light and ventilation, in order to develop large canopies that favor the production of pine cones. The most commonly used intrertree distance is (5x5), but also (6x5), (6x6) and (8x6) are used.

In areas well-adapted for Umbrella Pine, natural regeneration can be used. The natural regeneration results in a high number of plants per hectare. Thus a selection of the best developed plants must be done promptly.

Stand tending is done through pruning and thinning's that produce considerable amount of woody material. The first pruning should occur after 5-6 years after planting. The 2nd pruning should occur between 10 and 12 years, taking into account the development of the stand. This pruning often coincides with the 1st thinning. The 3rd pruning is between 20 and 25 years, coinciding with the 2nd thinning. The final cut is usually done after 40 years.

Eucalyptus silviculture (mainly *E. globolus*) is based on planting and the clear-cutting the forest, usually between 10 and 15 years, utilizing all of the wood with or without the bark (simple coppice). Priority is given to conducting coppice for 1, 2 up to 3 rotations, selecting shoots after each cut. If last cut is not deemed productive then the area is re-planted.

In mixed stands with Maritime Pine, the system is based on thinning the forest in order to leave a percentage of remaining trees for future use when the stumps of the harvested Eucalyptus trees produce shoots (composed coppice)

Planting of eucalyptus starts with the site preparation, which normally consists of destroying and incorporating existing woody material, followed by tillage (disking, ripping, and harrowing).

Fertilization depends on the site and the owner conditions. The planting is carried out to a density typically between 1100 and 1300 seedlings per hectare. Between the second and sixth year a second fertilization and competing vegetation control is recommended.

The selection of shoots is made during the second and third year, maintaining a number of stems per hectare corresponding to the initial density of planting.

In most cases, the harvest occurs between 10 and 15 years. The basic logging operating system consists of utilizing a tractor processer and a tractor loader, and usually manual felling with a chainsaw.

The Poplar is currently cultivated on a small scale. Given the nature of the soil (deep and wet), site preparation is done in late summer or early autumn. The intertree distance commonly used is 4x4 meters. The 1 year old plants from cuttings are planted as deep as possible (0.5 meters) in order to develop a good root system.

Usually there is a heavy competition from weeds that requires manual weeding two times, complemented with shallow harrowing during the first four years. During the first 3 to 4 years it is very important to carry out pruning, to prevent forking and add value to the wood, whose final use are veneer.

The Poplar can be managed in coppice, with clear cuts made from 14 years, or usually older, depending on the purpose and final use opportunities.

Acacia is an invasive species in Portugal, appearing in pure or mixed formations, and it is not permitted to plant and cultivate. However, using it is allowed.

The material tested from Azores (chipps of Cryptomeria certified FSC 100%) came from public forest areas in São Miguel Island, certified by the FSC, managed by the forestry regional authority (DDRF-Direção Regional dos Recursos Florestais).

The forest in the Azorean archipelago cover an area of about 70,000 hectares, which is about 30% of the Azorean territory, divided mainly into two major groups: the protection forest and the production forest.

The protection forest occupies about 35% of the forest area, including, Laurifólias Forests, forests of *Ilex aquifolium*, Zimbrais and Ericais.

The production forest, occupies the remaining 65% of the forest area and includes Acacia (*Acacia melanoxylon*), Maritime Pine (*Pinus pinaster*), Cryptomeria (*Cryptomeria japonica*) and Eucalyptus (*Eucalyptus globulus*) (Ordinance No. 114/2006).

The Cryptomeria represents the specie with the largest area of pure stands in the archipelago and São Miguel Island has about 70% of the stands of Cryptomeria.

Among the species in the production forest, Eucalyptus and Cryptomeria are those that have the main economic interest, being the Cryptomeria the most exploited in the area, occupying about of 12.500 hectares, which corresponds to 60% of the area of production forest.

Regarding Cryptomeria silviculture, is mainly produced in nurseries from seeds. Normally is planted with densities between 2500-4000 trees/ha. The forest operations includes essentially the site preparation, planting, cleaning maintenance, replanting, pruning, thinning and clear-cutting after 30 years.

The production of Cryptomeria wood has great economic importance in the Azores, mainly as a building material. This specie produces a soft wood, easy to work, lightweight and durable, so it is often used in construction, carpentry and furniture. The Azorean industry of wood of Cryptomeria generates a large amount of forest residues (wood offcuts, bark, branches and leaves).

The Forest Management Plan (FMP) is a planning instrument within the legal framework provided by the Forest Policy Framework Law (Law No. 33/96 of August 17) and later by Decree-Law No. 16 / 2009 of January 14, which approves the legal framework of management plans, management and interventions of forest areas (repealing Decree-Law No. 205/99 of June 9, which governed the elaboration process, approval, implementation and modification of FMPs to be applied to forest areas).

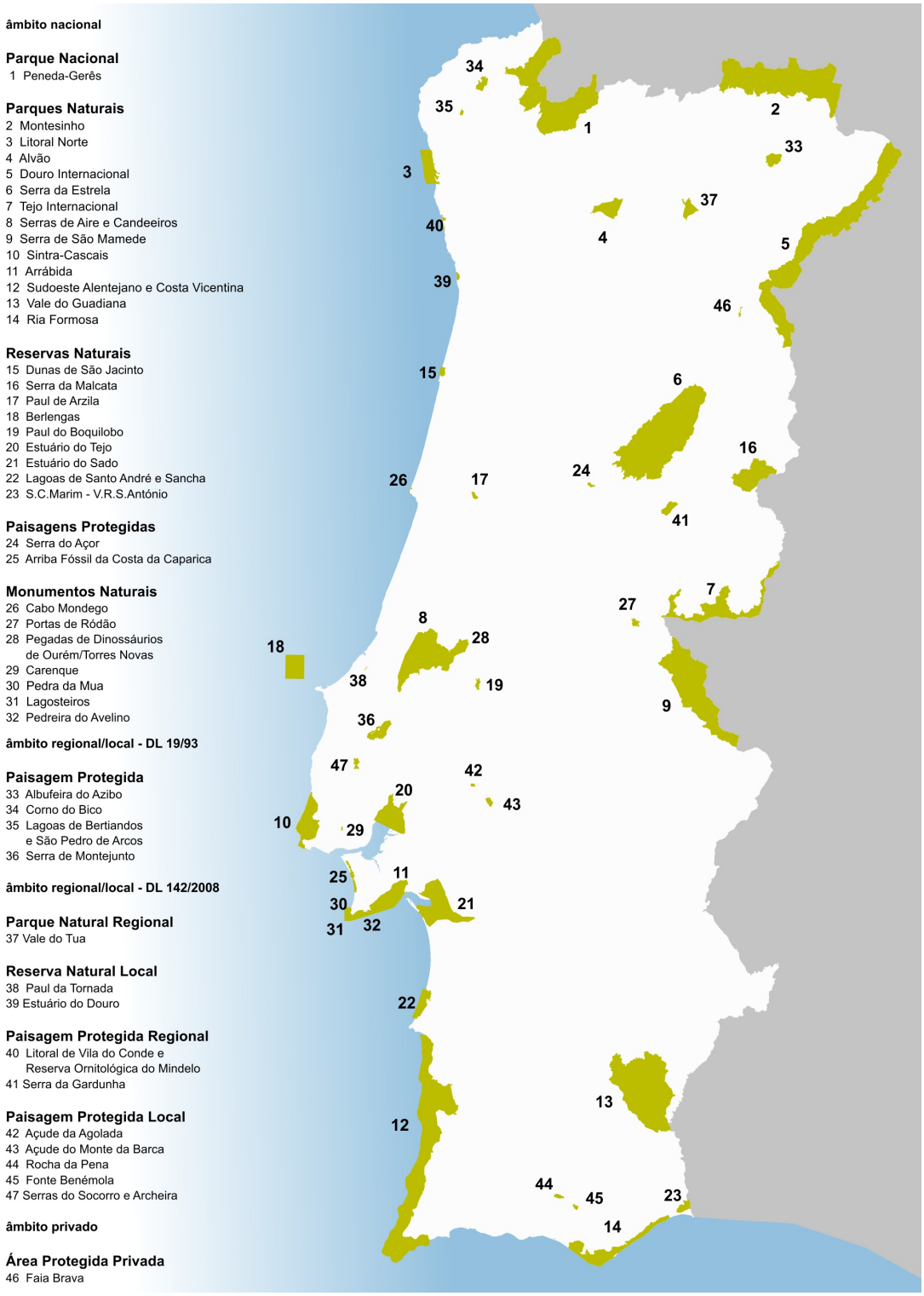
The dynamics of the FMP development processes and the PEIFs (Specific Plans for Forest Intervention) in a more general way to private and public forest areas is still young, having started with the approval of the Regional Forest Management Plans (PROF) in 2006-2007, reinforced with the conditions of having the FMPs approved as eligibility criteria for access to support for forest investment programs under the PRODER, together with the development of forest certification processes.

In April 2013 (last available information ICNF), there were 2,266 approved FMPs (1,522,195 hectares), representing 44% of the forest area in Portugal.

In Portugal it is not necessary to have specific authorization for harvesting except for cork oak, holm oak and logging in protected or classified areas. When harvesting softwoods (Pine and others) it is necessary to produce a harvest manifest, pruning and transport of coniferous wood (Decree-Law 123/2015 of 3 July), which concerns the application of the extraordinary measures of plant protection essential to the control of the pine wood nematode (PWN).

CITES – (Convention on International Trade in Endangered Species of Wild Fauna and Flora) not includes timber species on the lists for Portugal and Spain.

Map of the infrastructure of National Protected Areas:



Product Group	Certification	Nº Suppliers	Input Group	Format	Species	Quantity (t)	%
Controlled Feedstock	FSC CW (*)	32	Primary feedstock from forests (products or residues)	Roundwood	Maritime pine, Umbrella pine, Acácia, Poplar	20296,56	32,19
			Primary feedstock from forests (products or residues)	Roundwood	Eucayptus	2964,6	4,70
			Primary feedstock from forests (products or residues)	Wood chips	Maritime pine, Umbrella pine	5445,62	8,64
			Wood industry residues (secondary feedstock)	Wood chips Sawdust Wood offcuts	Maritime pine	17370,44	27,55
SBP-compliant Primary Feedstock	FSC SBP	2	FSC 100%	Roundwood, Chips	Eucayptus, Maritime pine, Umbrella pine	3470,24	5,51
		9	SBP			13373,14	21,21
SBP-compliant Secondary Feedstock	FSC	1	FSC 100%	Wood chips Wood offcuts	Criptomeria	125,9	0,20

(*) Non-certified material controlled under the company's Chain of Custody Management System, which is certified according to the FSC-STD-40-005 Standard for Company Evaluation of FSC Controlled Wood.

2.2 Actions taken to promote certification amongst feedstock supplier

The company has contacted each of its suppliers and affirmed the importance of providing certified material (FSC or PEFC), pointing out the increasing demands of markets and consumers regarding the legal and sustainable source of forest products, including biomass for energy production.

The implementation of the **Supplier Qualification and Control Program** is also considered an important action in the sense of promoting forest certification, since the qualification of the suppliers represents the fulfillment of several requirements applicable to the certification, also having as support Good Practice Guides, applicable to both suppliers and forest producers and managers, which have been drafted and have been distributed.

Qualified suppliers have their legal status proven, practice and propagate Good Forest Practices, collect and send prior information about the area of origin of the material to be supplied and are subject to **Glowood's** follow-up and control actions.

The person responsible for the **Supplier Qualification and Control Program**has also informed the producers and forest owners that added value is gained by managing their areas as certified, either individually or through group initiatives recognized by the company.

In addition, the company's employees have participated in events related to management and forest certification, trying to gather information and give their contribution to the development of the subject, especially in Portugal.

2.3 Final harvest sampling programme

In 2018, it is estimated that 13,75% of wood material consumed may have originated in final fellings, being 0,82% from stands with an expected rotation length of more than 40 years, according evaluation made on reception of the material. It refers essentially to the Pine roundwood, especially of Umbrella Pine (*Pinus pinea*) managed with main objective of producing cones (pine nuts).

2.4 Flow diagram of feedstock inputs showing feedstock type [optional]

N.A

2.5 Quantification of the Supply Base

Supply Base

a. Total Supply Base area: 3,27 million ha
b. Tenure by type: Private: 2,84 million ha Public: 472.200 ha
c. Forest by type: Temperate: 3,27 million ha
d. Forest by management type: Plantations: 1.8 million ha; Natural/ Semi natural: 1.42 million ha
e. Certified forest by scheme (ha): FSC: 423.580 ha PEFC: 268.813 ha

Feedstock

f. Total volume of feedstock: 0 – 200.000 t (64.549,5 t)
g. Volume of primary feedstock: 0 – 200.000 t (47.053,16 t)
h. Percentage of primary feedstock:
   - Certifiedto an SBP-approved Forest Management Scheme: 5,57 % (3.596,14 t)
   - Not certified to an SBP-approved Forest Management Scheme: 94,43 %

i. List all species in primary feedstock, including scientific name:
   - Maritime pine (*Pinus pinaster*)
   - Umbrella pine (*Pinus pinea*)
   - Eucayptus (*Eucalyptus spp*)
   - Poplar (*Populus spp*)
   - Acacia (*Acacia spp*)
   - Cypress (*Cupressus spp*)

- Criptomeria or Sugi (*Cryptomeria japonica*)

j. No feedstock from primary forest.
k. Primary feedstock from primary forest certified to an SBP-approved Forest Management Scheme - 5,38 %
   Primary feedstock from primary forest not certified to an SBP-approved Forest Management Scheme - 94,62 %
l. Volume of secondary feedstock: 17 496,34 t (27,11%)
m. No tertiary feedstock

For the following year, we intend to maintain the supply profile from 2018, maintaining or increasing the consumption of primary feedstock and slightly reducing the consumption of secondary feedstock, essentially woodchips, sawdust and slabwood from maritime pine.

With the company's continued efforts to encourage the supply of certified source material (FSC or PEFC), it is expected that the volumes registered for these material categories will increase. In 2018 has been received more than double the amount purchased in 2017, representing about 4 times more in percentage terms.

With the certification according to the Standard 1: Feedstock SBP Compliance Standard, we intend to maintain and expand the income of "SBP compliant" feedstock.

3 Requirement for a Supply Base Evaluation

SBE completed	SBE not completed
X	☐

Most of feedstock is not FSC nor PEFC certified, which results in a need for a Supply Base Evaluation to enable the supply of SBP compliant pellets.

4 Supply Base Evaluation

4.1 Scope

Primary feedstock originating from forests located in Portugal, mainly the districts of Setúbal, Beja, Évora, Lisbon, Portalegre, Santarém, Castelo Branco, Faro, Leiria and Coimbra, provided by qualified suppliers under Glowood´s **Supplier Qualification and Control Program**. In 2018 it was also made a small experience using chips of Criptomeria (*Cryptomeria japonica*) from São Miguel Island, Azores.

4.2 Justification

The Supply Base Evaluation is justified by the company's intention to increase pellet production with the "SBP compliant" biomass claim, considering the insufficient supply of FSC and PEFC certified primary feedstock in national market.

4.3 Results of Risk Assessment

While the Regional Risk Assessment (RRA), which is being carried out by the Working Group created under Technical Committee 145 of the Portuguese Quality Institute (IPQ), and coordinated by ANPEB (National Association of Biomass Energy Pellets), is not yet completed and endorsed by SBP, the first Regional Risk Assessment made in 2016 on request by ANPEB was considered for this SBE, in accordance with the requirements of the SBP, for primary feedstock originating from the mainland of Portugal, having identified 13 indicators with specified risk:

- 2.1.1 - Forests and other areas with high conservation value in the Supply Base are identified and mapped.
- 2.1.2 - Potential threats to forests and other areas with high conservation values (HCV) from forest management activities are identified and managed. (HCV 1, HVC 3, HCV4 e HCV5)
- 2.1.3 - Feedstock is not sourced from forests converted to production plantation forest or non-forest lands after January 2008.
- 2.2.1 - Feedstock is sourced from forests where there is appropriate assessment of impacts, and planning, implementation and monitoring to minimise them.
- 2.2.2 - Feedstock is sourced from forests where management maintains or improves soil quality (CPET S5b).
- 2.2.3 - Key ecosystems and habitats are conserved or set aside in their natural state (CPET S8b).
- 2.2.4 - Biodiversity is protected (CPET S5b).

- 2.2.6 - Negative impacts on ground water, surface water and water downstream from forest management are minimized. (CPET S5b).
- 2.4.1 - The health, vitality and other services provided by forest ecosystems are maintained or improved (CPET S7a).
- 2.4.2 - Natural processes, such as fires, pests and diseases are managed appropriately(CPET S7b).
- 2.5.1 - Legal, customary and traditional tenure and use rights of indigenous people and local communities related to the forest are identified, documented and respected (CPET S9)
- 2.8.1 - Appropriate safeguards are put in place to protect the health and safety of forest workers(CPET S12)
- 2.9.1 - Biomass is not sourced from areas that had high carbon stocks in January 2008 and no longer have those high carbon stocks.

4.4 Results of Supplier Verification Programme

NA.

4.5 Conclusion

The main conclusion of the Glowood Supply Based Assessment indicates that the company, through its **Supplier Qualification and Control Program**, is able to **ensure** the supply of primary feedstock with indicators as low risk, thus suitable for production of pellets with SBP compliant claim.

To date, the Program has produced the following results:

- Training of 20 suppliers
- 14 qualified suppliers
- 18 Monitoring Audits (Primary Feedstock) in 2018
- 42 supplies with Information of Origin of the Forest Material, totalling 22.539,14 tons of primary feedstock in 2018

The main indicators for which it was not possible to assess the risk as low were:

- 2.1.3 - 6 supplies from final felling on areas that will be converted into non forest use.
- 2.2.2 e 2.9.1 – 4 supplies from felling followed by stump remove.
- 2.1.2, 2.2.3, 2.2.4 e 2.4.1 – 1 supply from a protected area (Natural Park) without legal documentation

5 Supply Base Evaluation Process

The Glowood Supply Base Evaluation was carried out by a team defined and coordinated by the Integrated System Manager (GSI), with expertise and experience in topics related to the specified risks and the defined mitigation measures, including ISO 9001 and 14001 certifications, ENplus, FSC, PEFC and SBP.

As mentioned above, was considered the first National Risk Assessment made upon request of ANPEB, in accordance with the requirements of the SBP.

For the 13 indicators with specified risk, mitigating measures and respective means of verification were defined.

The **Supplier Qualification and Control Program** involves now 14 primary feedstock suppliers, which enables 20,72% of primary feedstock for pellets SBP compliant biomass production in 2018.

Were also trained and invited to participate in the program 6 more suppliers, with the perspective that they will take part formally. The Good Practice Guidelines, applicable to suppliers and property owners and managers, as well as forms for collecting and sending information., are still being used.

Qualified suppliers have their legal status proven, practice and propagate Good Forest Practices, collect and send prior information about the area of origin of the material to be supplied and are subject to **Glowood's** follow-up and control actions.

For each supply area, the qualified supplier must collect the necessary information, in conjunction with the forest owner and/or responsible for the area, by filling in a form designed for this purpose, which is sent to **Glowood**.

Based on the information received, the Glowood personal evaluate the framework and identify any aspects to be verified and confirmed to ensure compliance with mitigating measures and the respective risk assessment.

Glowood personal should ensure that the area is perfectly identified and that, depending on the situation, be consulted the various sources that are referenced in the risk assessment, which have information to conclude about risk indicators and to establish possible mitigating measures.

The analysis of information and consultations can lead to the following situations:

- **Disqualification of material**: in the case of confirmed specific risk for at least 1 indicator. (Example: indication that the area is not replanted after harvest – Indicator 2.1.3)
- **Need for conduct specific field audit**: in the case of doubtful situations or requesting more information or confirmation. (Example: difficult to accurately locate the area; Indication of the presence of important natural areas, invasive species, pests or diseases, signs of erosion, information from stakeholders, etc.)
- **Low risk classification**: in the case of no indication that raises questions, including the consultation sources.

The **Supplier Qualification and Control Program** includes a monitoring plan, based in field audits to a sample of suppliers, taking into account their activity in the previous year, to confirm the origin of the material, the effectiveness of mitigating measures and, in the end, the risks evaluation.

Once chosen the suppliers to monitor, origin areas of the material provided as "SBP-compliant" are identified, taking into account the supply frequency, quantity, characteristics of the sites and the type of material provided.

Monitoring audits are made by expertise personal with experience in the issues related to specified risks and mitigating measures defined, being recorded the details and evidence, the conclusion about the risk and possible corrective actions, taking account of the criteria and guidelines established on SBP standards and other applicable requirements.

6 Stakeholder Consultation

The Supply Base Evaluation, including the Risk Assessment and the Supplier Qualification and Control Program, was subject to a public consultation, launched on October 2, 2017, in order to gather contributions to consolidate or improve the Evaluation.

The consultation was done by e-mail, and more than 60 interested parties were contacted, including Authorities, Municipalities, Town Councils, Representative Entities, Teaching Institutions, Producer Associations, Companies, Service Providers, Clients, Specialists, Fire Department and Unions.

6.1 Response to stakeholder comments

So far only one response has been received, and the respective stakeholder declared to have no competence in risk assessment and qualification and control of suppliers, and therefore could not comment.

7 Overview of Initial Assessment of Risk

The National Risk Assessment made upon request of ANPEB, in accordance with the requirements of the SBP, for primary feedstock originating in the mainland of Portugal, identified 13 indicators with specified risk:

Table 1. Overview of results from the risk assessment of all Indicators (prior to SVP)

Indicator	Initial Risk Rating		
	Specified	Low	Unspecified
1.1.1		X	
1.1.2		X	
1.1.3		X	
1.2.1		X	
1.3.1		X	
1.4.1		X	
1.5.1		X	
1.6.1		X	
2.1.1	X		
2.1.2	X		
2.1.3	X		
2.2.1	X		
2.2.2	X		
2.2.3	X		
2.2.4	X		
2.2.5		X	
2.2.6	X		
2.2.7		X	
2.2.8		X	
2.2.9		X	

Indicator	Initial Risk Rating		
	Specified	Low	Unspecified
2.3.1		X	
2.3.2		X	
2.3.3		X	
2.4.1	X		
2.4.2	X		
2.4.3		X	
2.5.1	X		
2.5.2		X	
2.6.1		X	
2.7.1		X	
2.7.2		X	
2.7.3		X	
2.7.4		X	
2.7.5		X	
2.8.1	X		
2.9.1	X		
2.9.2		X	
2.10.1		X	

8 Supplier Verification Programme

8.1 Description of the Supplier Verification Programme

NA.

8.2 Site visits

NA.

8.3 Conclusions from the Supplier Verification Programme

NA.

9 Mitigation Measures

9.1 Mitigation measures

Supplier Qualification and Control Program includes the following mitigation measures and respective means of verification, for each of the indicators considered with specified risk.

2.1.1 - Forests and other areas with high conservation value in the Supply Base are identified and mapped.

- Suppliers Qualification and Control Program (PSI 16 -Programa de Qualificação e Controlo Fornecedores), including consultation of cartography and others information sources, and verification that forests and other areas with high conservation values (HCV), specifically HCV 1.2, HCV 1.3, HCV 1.4 and HCV 3, are identified and mapped.
- Disqualify material coming from areas where high conservation values are not identified and mapped.

Means of Verification:

- Checklist completed by the supplier/forest owner
- Location and consultation of information and cartography

2.1.2 - Potential threats to forests and other areas with high conservation values (HCV) from forest management activities are identified and managed. (HCV 1, HVC 3, HCV4 e HCV5)

- Consultation of information sources regarding HCVs.
- Procedures for conduct specific field audits to identify and address real and potential threats to forests and other areas with high conservation values, specifically HCV 1, HCV 2, HCV 3 and HCV 4, which were previously identified and mapped.
- Disqualify material coming from areas where forest management and operations represent evident threats to HCV 1, HCV 2, HCV 3 and HCV 4.
- Promotion of Good Forest Practices
- Monitoring plan

Means of Verification:

- Checklist completed by the supplier/forest owner
- Location, consultation of information sources and identification of constraints established for areas
- PGF (Forest Management Plan) or project approved, when applicable
- Forest authority (ICNF) document, when applicable
- Field Audit

2.1.3 - Feedstock is not sourced from forests converted to production plantation forest or non-forest lands after January 2008.

- Consultation of historical information sources and information from stakeholders
- Analysis of owner's information regarding the past and future area's covering and use.
- Procedures to conduct monitoring field audits to verify if feedstock is or is not sourced from forests converted to production plantation forest or non-forest lands after January 2008.
- Disqualify material coming from areas where natural forest were converted into Eucalyptus or other plantation from 2008, or to be converted with Eucalyptus or other plantation, or transformed into pasture, agriculture or other non-forest use;
- Promotion of Good Forest Practices
- Monitoring plan

Means of Verification:

- Checklist completed by the supplier/forest owner
- Location and consultation of the owner and stakeholders
- Field Audit

2.2.1 - Feedstock is sourced from forests where there is appropriate assessment of impacts, and planning, implementation and monitoring to minimise them.

- Consultation of information sources and legislation regarding impact assessment.
- Analysis of information from the area regarding social and environmental aspects
- Procedures for conduct field audits to verify social and environmental aspects and the appropriate assessment, planning and implementation of measures for minimise real or potential impacts, especially in case of clear cuttings made over a specific size area, defined regionally by each Regional Forest Plan (PROF), as the maximum clearcutting area or the size of even aged monoespecific forest stand.
- Disqualify material coming from areas where no appropriate assessment of impacts, and planning, implementation and monitoring to minimise them, is confirmed;
- Promotion of Good Forest Practices
- Monitoring plan

Means of Verification:

- Checklist completed by the supplier/forest owner
- Consultation of Regional Forest Plans (PROF)
- Field Audit

2.2.2 - Feedstock is sourced from forests where management maintains or improves soil quality (CPET S5b).

- Consultation of information sources and legislation related with soil aspects
- Analysis of information from the area regarding soil erosion.
- Procedures for conduct field audits to verify if forest management maintains or improves soil quality, especially in forest lands located on desertification susceptible area according to Forest Services (ICNF) cartography and with size above minimum size required for Forest Management Plan in respective PROF.

- Disqualify material coming from areas where is confirmed that forest management do not maintains or improves soil quality.
- Promotion of Good Forest Practices
- Monitoring plan

Means of Verification:

- Checklist completed by the supplier/forest owner
- Consultation of Forest authority (ICNF) cartography and Regional Forest Plans (PROF)
- Field Audit

2.2.3 - Key ecosystems and habitats are conserved or set aside in their natural state (CPET S8b).

- Consultation of information sources regarding biodiversity
- Analysis of information from the area regarding biodiversity.
- Procedures for conduct specific field audits to identify and address real and potential threats to conservation of key ecosystems and habitats.
- Disqualify material coming from areas where forest management and operations represent evident threats to conservation of key ecosystems and habitats.
- Promotion of Good Forest Practices
- Monitoring plan

Means of Verification:

- Checklist completed by the supplier/forest owner
- Location, consultation of information sources and identification of conditions established for concerned areas, ecosystems and habitats.
- PGF (Forest Management Plan) or project approved, when applicable
- Forest authority (ICNF) document, when applicable
- Field Audit

2.2.4 - Biodiversity is protected (CPET S5b).

- Consultation of information sources regarding biodiversity.
- Analysis of information from the area regarding biodiversity.
- Procedures for conduct specific field audits to identify and address real and potential threats to protection of biodiversity.
- Disqualify material coming from areas where is confirmed that forest management and operations do not ensure that biodiversity is protected.
- Promotion of Good Forest Practices
- Monitoring plan

Means of Verification:

- Checklist completed by the supplier/forest owner
- Location and consultation of information sources.

- PGF (Forest Management Plan) or project approved, when applicable
- Forest authority (ICNF) document, when applicable
- Field Audit

2.2.6 - Negative impacts on ground water, surface water and water downstream from forest management are minimized. (CPET S5b).

- Consultation of information sources and legislation related with water.
- Analysis of information from the area regarding soil erosion.
- Procedures for conduct field audits to verify if forest management maintains or improves soil quality, especially in case of clear cuttings at dimensions above to the maximum area indicated for each region by PROF (Regional Forestry Management Plan), in areas which are not managed by ICNF.
- Disqualify material coming from areas where is confirmed that forest management do not minimise negative impacts on ground water, surface water and water downstream.
- Promotion of Good Forest Practices
- Monitoring plan

Means of Verification:

- Checklist completed by the supplier/forest owner
- Location and consultation of information sources and Regional Forest Plans (PROF)
- PGF (Forest Management Plan) or project approved, when applicable
- Field Audit

2.4.1 - The health, vitality and other services provided by forest ecosystems are maintained or improved (CPET S7a).

- Consultation of information sources regarding biotic and abiotic risks for the ecosystems services.
- Analysis of information from the area regarding biotic and abiotic risks.
- Procedures to access information from the area regarding biotic and abiotic risks, and procedures for conduct monitoring field audits to verify ecosystems services, social and environmental aspects and the appropriate assessment, planning and implementation of measures for minimise real or potential risks and impacts.
- Disqualify material coming from areas where health, vitality and other services provided by forest ecosystems are not maintained or improved;
- Promotion of Good Forest Practices
- Monitoring plan

Means of Verification:

- Checklist completed by the supplier/forest owner
- Location and consultation of information sources.
- PGF (Forest Management Plan) or project approved, when applicable
- Field Audit

2.4.2 - Natural processes, such as fires, pests and diseases are managed appropriately(CPET S7b).

- Consultation of information sources and legislation regarding natural processes (fires, pests, invasive species, and diseases).
- Analysis of information from the area regarding invasive species, diseases, resources for fire prevention and protection
- Procedures for conduct field audits to verify these aspects if necessary.
- Disqualify material coming from areas where natural processes, such as fires, pests and diseases, are not managed appropriately.
- Promotion of Good Forest Practices
- Monitoring plan

Means of Verification:

- Checklist completed by the supplier/forest owner
- Location and consultation of information sources.
- PGF (Forest Management Plan) or project approved, when applicable
- Field Audit

2.5.1 - Legal, customary and traditional tenure and use rights of indigenous people and local communities related to the forest are identified, documented and respected (CPET S9)

- Analysis of information from the area regarding use and abuse of fences and inadequate signs and closed gates
- Procedures for conduct field audits to verify these aspects if necessary.
- Disqualify material coming from areas where is confirmed the use and abuse of fences and inadequate signs and closed gates in a way that customary rights are not respected (except in case of licensed catle parks or big game hunting areas).
- Promotion of Good Forest Practices
- Monitoring plan

Means of Verification:

- Checklist completed by the supplier/forest owner
- Legal license, when applicable
- Field Audit

2.8.1 - Appropriate safeguards are put in place to protect the health and safety of forest workers(CPET S12)

- Suppliers training and qualification.
- Confirmation of legal status of qualified suppliers in relation with health and safety requirements.
- Procedures for conduct monitoring field audits to verify all the aspects related with health and safety of forest workers.
- Disqualify material coming from areas where there are insufficient or inappropriate safeguards to protect the health and safety of forest workers.
- Promotion of Good Forest Practices

- Monitoring plan

Means of Verification:

- Documentation of the operator (supplier, owner or other): health insurance, medical certificates, Social security non-debt statement, training records, records of Personal Protection Equipment distribution, etc.
- Field Audit

2.9.1 - Biomass is not sourced from areas that had high carbon stocks in January 2008 and no longer have those high carbon stocks.

- Consultation of information sources regarding high carbon stocks areas (wetlands, peatlands and old mature forests stands).
- Analysis of information from the area regarding the riparian vegetation and old mature forests stands.
- Procedures for conduct monitoring field audits to verify if biomass is sourced from areas that had high carbon stocks in January 2008 and no longer have those high carbon stocks.
- Disqualify material coming from areas that had high carbon stocks in January 2008 and no longer have those high carbon stocks.
- Promotion of Good Forest Practices
- Monitoring plan

Means of Verification:

- Checklist completed by the supplier/forest owner
- Legal harvest license, when applicable
- Field Audit

9.2 Monitoring and outcomes

2018 results:

- 42 supplies with Information of Origin of Forest Material, totaling 22.171,2 tons of primary feedstock
- 18 Field Audits
- 22.539,14 tons of primary feedstock supplied with origin information from qualified suppliers
- 9.166 tons of primary feedstock with at least one indicator with specific risk
- 13.373,14 tons of primary feedstock with all indicators with low risk.

The indicators for which it was not possible to assess the risk as low were:

- 2.1.2 - Potential threats to forests and other areas with high conservation values (HCV) from forest management activities are identified and managed. (HCV 1, HVC 3, HCV4 e HCV5)

- 2.1.3 - Feedstock is not sourced from forests converted to production plantation forest or non-forest lands after January 2008.

- 2.2.1 - Feedstock is sourced from forests where there is appropriate assessment of impacts, and planning, implementation and monitoring to minimise them.
- 2.2.2 - Feedstock is sourced from forests where management maintains or improves soil quality (CPET S5b).
- 2.2.3 - Key ecosystems and habitats are conserved or set aside in their natural state (CPET S8b).
- 2.2.4 - Biodiversity is protected (CPET S5b).
- 2.4.1 - The health, vitality and other services provided by forest ecosystems are maintained or improved
- 2.9.1 - Biomass is not sourced from areas that had high carbon stocks in January 2008 and no longer have those high carbon stocks.

For the other indicators, it was possible to evaluate the risk as low, determined by:

- Information previously collected from the areas,
- Verification of areas during and/or after operations,
- The organizational level of the suppliers,
- The good condition of the machinery and equipment, and
- Training of workers and observation of good forestry practices during the execution of operations.

10 Detailed Findings for Indicators

Detailed findings for each Indicator are given in the document “SBP National Risk Assessment for Portugal” elaborated in compliance with SBP framework.

11 Review of Report

11.1 Peer Review

This report was sent to an independent reviewer. The review period was 10 days. The comments received were duly considered in the final edition of the report.

The reviewer is a Registered Professional Forester with university degrees in forestry from both Sweden and Canada. Since 1982, he has worked for various forest based companies and organisations in Sweden, Canada, Switzerland and Portugal where he currently resides.

At this time, he works in Portugal, Sweden, Norway, Denmark, USA and Canada as a natural resource consultant in management, representation and certification as well as an auditor for SBP, FSC, PEFC, ISO 9001, ISO 14001, ISO 19011, OHSAS 18001 and GAP analyses.

This version of the SBR has been revised in order to update the values of consumption and production, with no changes in the characteristics of the supply base to justify a new peer review.

11.2 Public or additional reviews

The Supply Base Evaluation, including the Risk Assessment and the Supplier Qualification and Control Program, was subject to a public consultation, launched on October 2, 2017, in order to gather contributions to consolidate or improve the Evaluation.

The consultation was done by e-mail, and more than 60 interested parties were contacted, including Authorities, Municipalities, Town Councils, Representative Entities, Teaching Institutions, Producer Associations, Companies, Service Providers, Clients, Specialists, Fire Department and Unions.

12 Approval of Report

Approval of Supply Base Report by senior management			
Report Prepared by:	Natércia Carvalho Giovanni de Alencastro	Gestor do Sistema Integrado Consultor	07/02/2019
	Name	Title	Date
The undersigned persons confirm that I/we are members of the organisation's senior management and do hereby affirm that the contents of this evaluation report were duly acknowledged by senior management as being accurate prior to approval and finalisation of the report.			
Report approved by:	João Baetas	Diretor Geral	08/02/2019
	Name	Title	Date

13 Updates

13.1 Significant changes in the Supply Base

The main changes in the Supply Base for 2018 are related with the following:

- Lower consumption (about 30%) due to the long interruption of production for construction and maintenance in the factory.
- Decrease on the percentage of forest residues consumption.
- Percentage increase in roundwood consumption.
- Percentage increase in the consumption of secondary feedstock, essentially chips, sawdust and wood offcuts of maritime pine.
- Maintenance of the Supply Base Evaluation, which enabled the increase in the consumption of "SBP compliant" feedstock, from situations in which all the SBP indicators were evaluated as low risk.
- Increased input of FSC certified material (about double the amount of 2017 in absolute terms).

13.2 Effectiveness of previous mitigation measures

NA.

13.3 New risk ratings and mitigation measures

NA.

13.4 Actual figures for feedstock over the previous 12 months

The supply of last year (January to December 2018) is characterized as:

Material	Species	Quantity (t)	2017 (t)
Roundwood	Maritime pine	15.388,36	16.153
	Umbrella pine	9.931,48	16.081
	Eucalyptus	7.198,40	4.068
	Other	1.705,5	2.067
Biomass (Forest residues)	Maritime and Umbrella Pine	11.326,42	40.119
Wood Industry Residues (Chips, Sawdust, Slabwood)	Maritime and Umbrella Pine	17.370,44	28.219
Wood Industry Residues (Chips and Slabwood	Criptomeria/Sugi	125,90	
		63.046,5	108.075

13.5 Projected figures for feedstock over the next 12 months

The forecast supply for 2019 is characterized as:

Material	Species	Quantity (t)	%	
			SBP controlled	SBP compliant
Roundwood	Maritime and Umbrella Pine	27.300	15	45
	Otherspecies	8.900	5	5
Biomass (Forest residues)	Maritime and Umbrella Pine	11.500	5	10
Wood Industry Residues (Chips, Sawdust, Slabwood)	Maritime and Umbrella Pine	17.500	15	-
		65.200	**100**	