

Industrial Tree Plantations and Green Bonds

Investor Briefing

May 2019

Authors:

Wolfgang Kuhlmann, Merel van der Mark, Sergio Baffoni

This discussion document is based on a study written by Wolfgang Kuhlmann for Südwind - Institut für Ökonomie und Ökumene in July 2018. Given its relevance for the finance community, it has been translated and adapted by EPN.



Environmental Paper Network

Introduction

A green bond is a bond earmarked for climate and environmental projects. These bonds are typically asset-linked and backed by the issuer's balance sheet, and are also referred to as climate bonds.¹

Issuers self-label bonds as green. At a minimum, the issuers themselves provide details on the green eligibility criteria for the use of proceeds, which are, for example, disclosed in a green bond framework. For more transparency, issuers can commission an external review on the green credentials of the use of proceeds.^{2,3}

To increase credibility, some voluntary standards have been developed in recent years, which issuers can apply to their green bonds. However, the generally weak criteria of these standards and the poor disclosure requirements raise the question of whether these self-labelled bonds can credibly claim that they will have a positive impact on the environmental and/or the climate. It also raises the question of whether they can fulfil their promise of catalysing positive change by providing new and additional funds to stimulate additional green projects.

A short history of the Green Bonds market

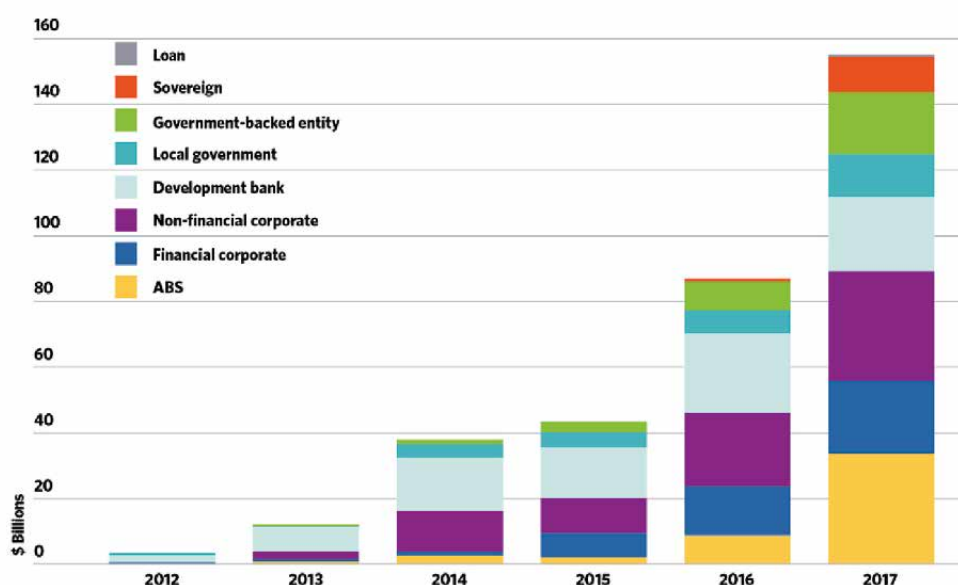
The first green bonds were launched by the European Investment Bank (EIB) in 2007, when it issued a EUR 600 million

'climate awareness bond'. The World Bank followed in 2008 with a USD 414 million bond. In the following years, the green bond market remained dominated by development banks, but as of 2013, volume started to pick up and other financiers joined the market. While in 2012 the green bond market accounted for less than USD 5 billion, by 2017 it was worth almost USD 160 billion.⁴

China has become a world leader in

the issuance of green bonds, accounting for almost 40% of all green bonds in 2016.⁵

Labelled green bond market today



Source: CBI 2018 ⁶

1 Investopedia – Green Bonds page. Available at: <https://www.investopedia.com/terms/g/green-bond.asp>, accessed on 29-1-2019

2 Bradesco 2018: Papel e Celulose, Departamento de Pesquisas e Estudos Econômicos, https://www.economiaemdia.com.br/EconomiaEmDia/pdf/infset_papel_e_celulose.pdf

3 Climate Bonds Initiative – Second opinion page. Available at: <https://www.climatebonds.net/market/second-opinion>, accessed on 29-1-2019

4 2 Degrees Investing Initiative, 2018. Shooting for the moon in a hot air balloon? <https://2degrees-investing.org/wp-content/uploads/2018/10/Green-bonds-updated-paper-Oct-2018.pdf>, accessed on 28-1-2019

5 Reuter, 22-3-2017. China eyes "consistent" green bond standards to lure more investment. Available at: <https://www.reuters.com/article/china-economy-greenbonds/china-eyes-consistent-green-bond-standards-to-lure-more-investment-idUSL3N1GZ30T>, accessed on 29-1-2019.

6 Climate Bonds Initiative, 2018: Green Bond Highlights 2017. Available at: <https://www.climatebonds.net/files/reports/cbi-green-bonds-highlights-2017.pdf>, accessed on 28-1-2019

Green Bond Standards

This growth in green bonds has been largely attributed to the development of green bond frameworks, which are meant to give investors more clarity on what makes a bond “green”.

A first framework was pioneered by the EIB and the World Bank, with a third-party review by Cicero. This was followed by the release of the “Climate Bond Standard” by the Climate Bonds Initiative (CBI) in 2011, and in 2014 the International Capital Market Association published the **Green Bond Principles**.

As part of its plan to develop a green financial system, various Chinese regulators have also been rolling out national green bond guidelines over the past few years.⁷ In 2018, China’s Green Finance committee partnered with the EIB to harmonise its green bond standards.⁸ Also in 2018, the EU announced its plans to develop a EU green bond label by 2019.⁹ At an international level, the International Organisation for Standardisation (ISO) is formulating Green Bonds Criteria, which are expected to be published in 2020.¹⁰

Green bonds for the forestry sector

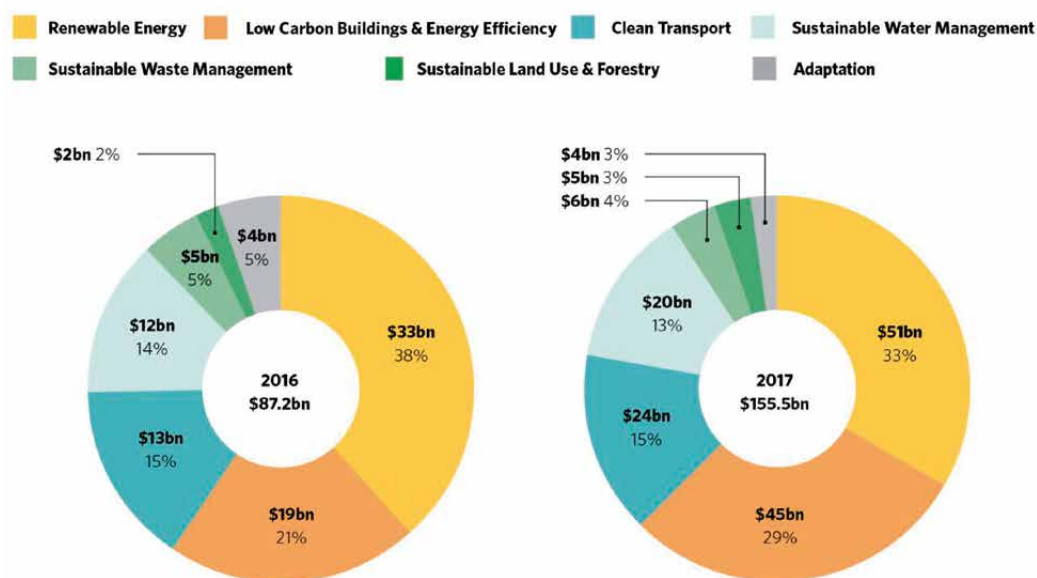
While trees are the only proven and safe way of removing carbon from the atmosphere, and thus to fight climate change, the green bond market for the forestry sector is still quite small.

In 2016 it represented just 2% of the total market, and in 2017 there was only a slight increase to 3%.¹¹

Among these are green bonds launched by the Brazilian pulp and paper companies Suzano (USD 500 million in 2016, increased by USD 200 million in 2017), Fibria (USD 700 million in

2017) and Klabin (USD 500 million in 2017) as well as the Chilean pulp and paper company CMPC (USD 500 million in 2017).¹²

Use of proceeds of labelled green bonds



Source: CBI 2018¹³

7 CBI, 21-6-2017. Myth buster: why China’s green bond market is more orderly than you might think. An Overview from Climate Bonds Initiative. Available at: <https://www.climatebonds.net/2017/06/myth-buster-why-china%E2%80%99s-green-bond-market-more-orderly-you-might-think-overview-climate>, accessed on 29-1-2019.

8 CBI, 21-6-2017. Myth buster: why China’s green bond market is more orderly than you might think. An Overview from Climate Bonds Initiative. Available at: <https://www.climatebonds.net/2017/06/myth-buster-why-china%E2%80%99s-green-bond-market-more-orderly-you-might-think-overview-climate>, accessed on 29-1-2019.

9 European Commission, 2018. Commission action plan on financing sustainable growth https://ec.europa.eu/info/publications/180308-action-plan-sustainable-growth_en

10 2 Degrees Investing Initiative, 2018. Shooting for the moon in a hot

air balloon? Available at: <https://2degrees-investing.org/wp-content/uploads/2018/10/Green-bonds-updated-paper-Oct-2018.pdf>, accessed on 28-1-2019 ; <https://www.iso.org/standard/75559.html>

11 2 Degrees Investing Initiative, 2018. Shooting for the moon in a hot air balloon? Available at: <https://2degrees-investing.org/wp-content/uploads/2018/10/Green-bonds-updated-paper-Oct-2018.pdf>, accessed on 28-1-2019

12 ICMA. Green Bond database. Available at: <https://www.icmagroup.org/green-social-and-sustainability-bonds/green-social-and-sustainability-bonds-database/#searchResultHold>, accessed on 29-1-2019.

13 Climate Bonds Initiative, 2018: Green Bond Highlights 2017. Available at: <https://www.climatebonds.net/files/reports/cbi-green-bonds-highlights-2017.pdf>, accessed on 28-1-2019

Challenges in Certifying Forestry / Plantation operations

One limiting factor in the issuance of green bonds for the forestry sector might be the lack of sector specific standards. Several of the bonds that were issued by companies from the pulp and paper sector received a second party opinion by Sustainalytics which confirmed their alignment with the International Capital Market Association's (ICMA) Green Bond Principles.¹⁴ However, these Principles are general and do not take into account the peculiarities of investing in plantations or forests.

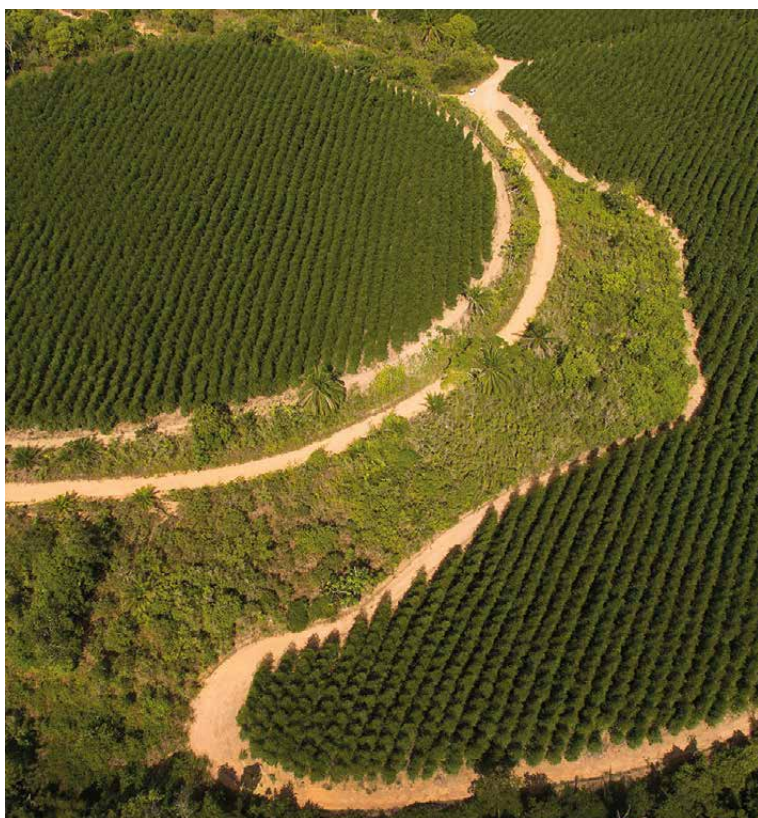
In late 2018, the Climate Bonds Initiative (CBI) published Green Bond Criteria specific for the Forestry Sector, but these still lack key criteria, such as the requirement to provide full emission calculations. The EU is also working on forestry sector specific criteria, as a part of its new regulation on sustainable finance establishing a 'taxonomy', but these have not yet been finalised.

There are several challenges with elaborating such criteria, as they should be robust enough to guarantee that the projects that are certified do indeed have an environmental/climate additionality, compared to a Business As Usual scenario.

Trees are crucial for the removal of carbon from the atmosphere, and therefore their proper management is a strong mitigation tool. Thus, any forestry activity eligible for green bond funding should be able to demonstrate that the amount of carbon stored in a forest will not only be maintained, but will be improved over time. This can only be achieved if the annual harvest is less than the annual increment.

In theory some carbon can also be stored if the timber is made into long-lasting wood products. However, this is hard to prove and to track, and it's not something plantation companies can be held accountable for. On the other hand, if the timber is used for products with a short life cycle, such as for biomass pellets or for pulp, there will be no mitigation effect.

This case study tries to assess whether plantation forestry for pulp and paper production, which has already been the object of green bonds issued for emitted green bonds in Brazil, can meet these criteria.



This photo from the backside of Suzano's Green Bond Report 2017 shows "mosaic planting with ecological corridors".

¹⁴ Sustainalytics 2017. CMPC external review. Available at: <https://www.icmagroup.org/Emails/icma-vcards/CMPC-External%20review%20Report.pdf>, accessed on 29-1-2019

Sustainalytics 2017. Fibria Green Bond. Available at: https://www.icmagroup.org/Emails/icma-vcards/Fibria_External%20Review%20Report.pdf, accessed on 29-1-2019

Sustainalytics 2017. Klabin Green Bond. Available at: https://www.icmagroup.org/Emails/icma-vcards/Klabin_External%20Review%20Report.pdf, accessed on 29-1-2019

Sustainalytics 2017, Suzano Papel e Celulose AS Green Bond. Available at: https://www.icmagroup.org/Emails/icma-vcards/Suzano_External%20Review%20Report.pdf, accessed on 29-1-2019

Case study: Brazil

Between 2016 and 2017, three large pulp and paper companies issued green bonds in Brazil which were largely used to finance the maintenance of their

plantations. This case study looks at the details of these green bonds, the use of proceeds, and analyses the (lack of) additionality.

Eucalyptus plantations and pulp production in Brazil

Since the beginning of the 1990s, when the planting of eucalyptus started to expand significantly in Brazil, the country has become the second largest producer of pulp after the US and the eighth largest producer of paper. In the last 20 years, pulp production has more than tripled, reaching 19.5 million tonnes in 2017 (of which two-thirds is exported). During the same period, production of paper increased from 6.2 to 10.5 million tonnes per year (of which about 20% is exported).¹⁵

In 2016, industrial wood production in Brazil covered an area of 10 million hectares. Of these, 75% are eucalyptus plantations, located mostly in the states of Minas Gerais (24%), São Paulo (17%) and Mato Grosso do Sul (15%). Another 21% are pine plantations, which are mainly found in the cooler southern states of the country.¹⁶ While pine plantations are declining, the area of eucalyptus plantations has grown by 2.4% per year over the past five years. During this period, the largest increase (400,000 hectares (ha)) happened in the state of Mato Grosso do Sul.¹⁷

Eucalyptus seedlings are produced in industrial nurseries and are planted on previously cleared land. The trees can be harvested seven years after planting, and new stems will grow from the stubs (coppicing). After two more harvests, the roots have to be removed and new trees are planted. Thanks to the tropical climate, there is no pronounced seasonality and the timber can be harvested at any time, supplying the pulp mills throughout the year. Since the harvest is done by machines (harvesters), only a few workers are needed.

With biotechnology and genetic engineering, the timber yield was increased in recent years. When cloning seedlings, companies work closely with universities and Embrapa, the state-owned agricultural research agency. With an annual growth of



Industrial plantations in Brazil, Source: Pöyry 2017¹⁸

39 m³ per hectare per year in eucalyptus, Brazil tops the world (in Portugal, the rate is only 12 m³ per hectare per year). This way, a 140,000 ha area of eucalyptus plantations can supply wood to a pulp mill with an annual capacity of 1.5 million tonnes. In Scandinavia, an area almost five times as large (720,000 hectares) is needed for a plant with the same capacity.¹⁹

15 Bradesco 2018: Papel e Celulose, Departamento de Pesquisas e Estudos Econômicos, https://www.economiaemdia.com.br/EconomiaEmDia/pdf/infset_papel_e_celulose.pdf, accessed on 29-1-2019

16 Sistema Nacional de Informações Florestais: Boletim SNIF 2017, http://www.florestal.gov.br/snif/images/Publicacoes/boletim_snif_2017.pdf, accessed on 29-1-2019

17 Brazilian Tree Industry: Report 2017, http://iba.org/images/shared/Biblioteca/IBA_RelatorioAnual2017.pdf, accessed on 29-1-2019

18 Pöyry 2017: A Indústria de Celulose e Papel no Brasil, http://www.poyry.com.br/sites/www.poyry.com.br/files/media/related_material/16out27a-abtcp.pdf, accessed on 29-1-2019

19 Bradesco 2018: Papel e Celulose, Departamento de Pesquisas e Estudos Econômicos, https://www.economiaemdia.com.br/EconomiaEmDia/pdf/infset_papel_e_celulose.pdf

Negative impacts of eucalyptus plantations

The scientific community agrees that conversion of natural forests to industrial timber plantations leads to dramatic losses in biodiversity.²⁰ Like in agriculture, plantation management involves soil preparation, fertilisation, herbicide use, clearing of undergrowth, elimination of diseased trees, thinning, elimination of animals which can damage the trees, and periodic logging. Most local plant species are removed, and the few species which do manage to survive are periodically eliminated. Epiphytes

Water

One of the most serious ecological impact of eucalyptus plantations is the large amount of water needed by these trees. In South Africa, eucalyptus trees consume 30 to 64 litres a day on fertile soils and 15 to 34 litres a day on less productive soils. This leads to an evaporation of 1,100 to 1,200 mm per ha per year.

Eucalyptus roots can reach a depth of up to eight meters at the age of three years, and 28 meters at the age of nine. This allows the plants to suck water from deep layers of soil, especially in drier months. Numerous studies have shown that plantations consume significantly more water than the original vegetation. This leads to reduced run-off and a lowering of the water table. Streams dry up and wells may not be deep enough anymore.²³

and climbing plants which support other fauna also tend to disappear. Only a relatively small group of species normally manages to adapt to newly-created environments, and some of them are eliminated because they damage plantation productivity. All these factors cause profound changes in the flora and fauna of local ecosystems.²¹

The establishment of plantations has also caused numerous social and land conflicts, often involving indigenous peoples, quilombola (afro-descendant) and other traditional communities that rarely have legal recognition or titles to their traditional land. A study commissioned by the Brazilian Indian Authority, FUNAI, identified an area of 120,000 hectares in the state of Espírito Santo as the traditional land of the Pataxó indigenous people. But despite protests, the Pataxó were awarded only 52,000 ha in 2008. Most of the land was granted to companies, among them Aracruz Celulose (which became Fibria and is now part of Suzano), which had already planted 30,000 ha with eucalyptus.²²

Others communities were not evicted from their land, but lost the basis of their livelihood. The large amount of water needed by the eucalyptus trees caused a drop of the water level in many areas, drying up streams and wells, and making the surrounding land unsuitable for gardening and agriculture. Often, the remaining water is heavily contaminated with pesticides, which are applied indiscriminately by spraying from aircraft over the plantations.

20 See as example: Du Bus de Warnaffe G, Deconchat M., 2008, Impact of four silvicultural systems on birds in the Belgian Ardenne: implications for plantation management. *Biodivers Conserv*. Available at: <https://link.springer.com/article/10.1007%2Fs10531-008-9364-x>, accessed on 29-1-2019 or A. J. Armstrong , H. J. van Hensbergen , D. F. Scott & S. J. Milton 2010, Are Pine Plantations "Inhospitable Seas" around Remnant Native Habitat within South-western Cape Forestry Areas?, *South African Forestry Journal*, Available at: <https://www.tandfonline.com/doi/abs/10.1080/00382167.1996.9629703>, accessed on 29-1-2019 L.L. Bremer, K.A. Farley, or Does plantation forestry restore biodiversity or create green deserts? A synthesis of the effects of land-use transitions on plant species richness *Biodivers. Conserv.*, 19. Available at: <https://www.scopus.com/record/display.uri?eid=2-s2.0-78649759134&origin=inward&txGid=1b3cb1742db8cba0e-fea8ee79ff6e2ef>, accessed on 29-1-2019

21 Ricardo Carrere, *Pulping the South*, 1996. Available at: https://wrm.org.uy/wp-content/uploads/2013/04/Pulping_the_South.pdf, accessed on 29-1-2019

22 CEPEDES 2008: Violações Socioambientais Promovidas pela Veracel Celulose, Propriedade de Stora Enso e Aracruz Celulose. Available at: http://wrm.org.uy/oldsite/paises/Brasil/CEPEDES_2008.pdf, accessed on 29-1-2019

23 J. Albaugh et al. 2013: Eucalyptus and Water Use in South Africa, *International Journal of Forestry Research*. Available at: <https://www.hindawi.com/journals/ijfr/2013/852540/#B13>, accessed on 29-1-2019



Expansion in Mato Grosso do Sul

Due to growing opposition to the expansion of eucalyptus plantations, and the rise of the price of land, the expansion of industrial tree plantations has been stalling in the traditionally forestry states of Minas Gerais, São Paulo and Bahia since 2010. Things are very different in other regions: In Mato Grosso do Sul, 500,000 ha have been turned into eucalyptus plantations in the last six years alone.²⁴

The development is concentrated around the small town of Três Lagoas, on the Rio Paraná. Here the land is flat and fertile – and there are hardly any social movements or groups still holding traditional rights such as indigenous or quilombola communities.²⁵ Most of the land is owned by large-scale farmers, often controlling more than 1,000 hectares and willing to sell or lease their land to pulp companies.

In 2009, Fibria opened its first pulp mill with a capacity of 1.3 million tonnes per year in Três Lagoas. Only 50 km upstream, a 1.7 million tonnes plant was developed by Eldorado three years later. Shortly thereafter, both companies announced that they wanted to expand their production. The second Fibria plant (1.75 million tonnes) started operation in 2017. A new Eldorado plant (2.3 million tonnes) is planned to be completed by 2020.²⁶ In the near future, over 7 million tonnes of pulp could

be produced every year in this micro-region, and eucalyptus plantations are expected to cover more than one million ha.²⁷

Companies do not have to worry about the environmental impact. A law requiring an environmental impact assessment (EIA) for agro-industrial projects larger than 100 ha does not apply to them, as the state government ruled that an EIA is not necessary if degraded land is improved by planting. This way, heavily impacting industrial plantations are presented as projects to protect the global climate and to prevent erosion.²⁸

In both cases, the licenses for the pulp mills were approved by the state environmental authority, thus de-legitimising the competent authority (the national environmental authority Ibama). As the mills impact the Paraná river, they affect more than one Brazilian state.²⁹

All plants in the Três Lagoas region use elementary chlorine free (ECF) bleaching technology. Instead of chlorine gas they use chlorine compounds, which significantly reduces the formation of dioxins. However, given the large amount of pulp produced in the area, there is still a substantial danger that dioxins will accumulate in the food chain and can also harm humans through the consumption of fish.



24 Brazilian Tree Industry: Report 2017. Available at: http://iba.org/images/shared/Biblioteca/IBA_RelatorioAnual2017.pdf, accessed on 29-1-2019

25 Indigenous peoples have already been evicted from their land and then dispersed by cattle ranching – often holding fake property titles (grilagem). See reports by Comissão Pastoral de la Terra 2017, Conflitos no Campo Brasil 2013. Available at: <https://www.cptnacional.org.br/component/jdownloads/send/41-conflitos-no-campo-brasil-publicacao/14110-conflitos-no-campo-brasil-2017-web?Itemid=0>, accessed on 29-1-2019 and Greenpeace 2001. State of Conflict, Available at: <https://www.greenpeace.org/usa/wp-content/uploads/legacy/Global/usa/report/2007/8/state-of-conflict.pdf>, accessed on 29-1-2019

26 Euwid, 03-03-2017. Eldorado postpones start-up of Três Lagoas BEK pulp line. Available at: <https://www.euwid-paper.com/news/singlenews/Artikel/eldorado-postpones-start-up-of-tres-lagoas-bek-pulp-line-to-2020.html>, accessed on 29-1-2019

27 EJOLT Report No. 3, 2012: An overview of industrial tree plantations in the global South. Available at: http://www.ejolt.org/wordpress/wp-content/uploads/2012/06/120607_EJOLT-3-plantations-lower.pdf, accessed on 29-1-2019

28 See footnote 22

29 Environmental Paper Network Discussion Document 3, 2017: Expansion of the Brazilian Pulp Industry. Available at: <http://environmentalpaper.org/wp-content/uploads/2017/09/170314-Pulp-Mill-Expansion-in-Brazil-discussion-document.pdf>, accessed on 29-1-2019

Fibria (Suzano)

Fibria Celulose S.A. became the world's largest producer of eucalyptus pulp when it merged with Suzano in January 2019. The company was originally formed in 2009 by a merger of the companies Votorantim Celulose e Papel and Aracruz Celulose.

Before the 2019 merger, Fibria employed more than 18,300 workers in five countries, and its annual pulp production capacity was 7.25 million tonnes. In Brazil, it had plants located in Aracruz (Espírito Santo), Jacaré (São Paulo), Três Lagoas (Mato Grosso do Sul) and Eunápolis (Bahia), the latter in partnership with Veracel, a joint venture with the Swedish paper company Stora Enso.

Near to Aracruz, in a partnership with Cenibra, the company operated the only Brazilian port specialised in pulp loading (Portocel). Its annual load capacity is 7.5 million tonnes.

The forestry activities of the company covered 1,092 million hectares: 656,000 of which were eucalyptus plantations, while 374,000 hectares were intended for environmental protection and 61,000 hectares were kept for other purposes.

The annual turnover in 2017 was 3.5 billion US dollars.³⁰

In January 2017, Fibria launched its first green bond of USD 700 million. According to the Second Party Opinion (SPO) by Sustainalytics,³¹ the funds would be invested in five areas. In April 2018, Fibria reported that USD 371 million had been spent between 2015 and 2017.³²

Fibria Green Bond	Expenditures 2015 – 2017 (in USD millions)	
<i>Sustainable Forest Management</i>	349.7	94,2 %
<i>Restoration of Native Forests and Conservation of Biodiversity</i>	5.1	1,4 %
<i>Waste Management</i>	16.0	4,3 %
<i>Sustainable Water Management - Water Usage Efficiency</i>	0.3	0,05 %
<i>Renewable Energy</i>	0.2	0,05 %

A breakdown of the expenditures on Forest Management, shows that between 2015 and 2017, the following amounts were disbursed in these subcategories:³³

Fibria Green Bond: Sustainable forest management	Expenditures 2015 – 2017 (in USD millions)	
<i>Forest Maintenance</i>	50.8	14 %
<i>Forest Protection and Management</i>	114.3	32 %
<i>Purchase of Certified Wood</i>	184.6	52 %

30 Fibria – About page. Available at: <http://www.fibria.com.br/en/corporate/about-fibria/>, accessed on 29-1-2019

31 Sustainalytics 2016: Fibria Green Bond - Framework overview and second party opinion. Available at: http://www.sustainalytics.com/sites/default/files/green_bond_framework_and_opinion_fibria.pdf, accessed on 29-1-2019

32 Fibria's Green Bond Report 2017 - Use of proceeds attestation. Available at: http://r2017.fibria.com.br/wp-content/uploads/2018/05/Fibria-2017-Report_GreenBond-2.pdf, accessed on 29-1-2019

33 See footnote 30

Purchasing wood instead of protecting forests

Fibria's green bond has a clear focus on plantation management, it spent half of its funds in this area. In the SPO, "Sustainable Forest Management" is described as follows:

Capital expenditures necessary to sustainably manage eucalyptus forest plantations that are certified by the Forest Stewardship Council (FSC®) or Cerflor (PEFC). This includes:

(i) *New planting and replanting activities such as:*

- *Production and acquisition of eucalyptus seedlings*
- *Preparation of soil for the plantation of seedlings, including subsoiling and harrowing activity*
- *Planting of seedlings*
- *Protection and maintenance of planted seedlings up to harvest*

In the SPO the development of new plantations plays a major role, but by the end of 2017, half of the money had been spent on purchasing wood. However, the eligibility criteria for this green bond do not include such activities.³⁴

If Fibria used the proceeds of the Green Bond to acquire certified wood, rather than non-certified wood, it can argue there is an improvement to its Business As Usual procedures. But the proceeds of the Green Bonds should only be used to cover the costs of that additionality, so that would be the difference between the price of certified wood and the price of non-certified wood. It should not cover the full price of the certified wood. However, it is not clear from publicly available documents whether this is the case.

Questionable climate protection

In Fibria's report the implications and the differences between the terms Forest Maintenance and Forest Management are not clear. For the years 2016 and 2017 it reports only one project, estimated at less than USD 80,000.

Which activities were financed with this amount remains unclear. Regarding the project São José II Farm, the 2017 report states: "The financing at this location will primarily fund protection and maintenance activities of the certified forests."³⁵ The question remains, against whom the plantation must be protected.

The estimates of the environmental benefits of the projects are also questionable. They are given in tonnes of carbon dioxide (CO₂) being stored each year. In the case of the São José II farm, 65,175 tonnes of CO₂ are supposed to be stored each year on an area of 537 hectares, or 121.4 tonnes of CO₂ per ha and year. This seems unrealistic. Even when assuming an annual increment of 40 m³ per year, it would only be 36.7 tonnes of CO₂ per ha per year.³⁶

Apart from possible miscalculations, the fundamental question is whether CO₂ will be stored at all and if so, for how long. On average, the eucalyptus plantations are harvested (clear-cut) after 7 years,

and the wood is turned into pulp. About half of the wood is lignin, which is usually burned to produce energy, thus releasing carbon immediately. The other half will be made into office or tissue paper, which will rarely last more than a year. In the best case, a small part of it is recycled again. The larger part ends up in landfills or waste incinerators.

Within 2-3 years after harvest, almost all the "stored" CO₂ is re-released into the atmosphere. And this does not yet take into account the CO₂ emissions related to soil erosion, a common issue in eucalyptus plantations.

In addition, it would be necessary to assess what type of vegetation was present on the land converted into plantations. Officially, this is usually "degraded land", which may consist of pastures, scrubland or forest remains. During clearing and preparation for planting seedlings, significant amounts of CO₂ may have been released from the original vegetation and soil.

³⁴ See footnote 29

³⁵ See footnote 30

³⁶ With a weight of around 500 kg per m³ the annual increment of 40 m³ would be 20 tonnes of wood per ha per year. Since half of it is carbon; 10 tonnes multiplied by 3.67 gives 36.7 tonnes of CO₂ per ha and year.

Restoration of native forests

Restoration does not have a high priority, as shown from the above figures about investment. Fibria claims that it keeps one ha of natural forest for every two ha of plantation,³⁷ but it doesn't mention that this was the minimum requirement

according to Brazilian law. With the amendment of the Brazilian Forest Act in 2012, the area that has to be preserved as a forest on private land has been reduced from 35% to 20% (in the Amazon region it has been reduced from 80% to 50%).³⁸

Genetically modified eucalyptus

As a long-term goal, Fibria wants to reduce the area of land needed to produce a certain amount of pulp by a third. To achieve this, the yield per ha needs to be increased by 50%.

As this goal can hardly be reached with classical breeding, they are promoting research into genetically modified eucalyptus varieties. Fibria's "Policy on genetically modified eucalyptus"³⁹ states:

"For these objectives, Fibria understands that the GM Eucalyptus may be an important factor in leveraging our competitiveness, expanding the limits and accelerating the gains expected by the classic methodology. Additionally, Fibria believes that the society as a whole, will benefit from the genetic engineering of forest species.

Currently, Fibria does not plant GM Eucalyptus on a commercial scale, but in relation to the

aforementioned, the Company has a dedicated line of research for the development of GM Eucalyptus. The research, carried out by the Company regarding this matter, occurs under contention (laboratory and greenhouse) and open (field trials) regimes. All the Company's decisions on GM Eucalyptus research comply with the current legislation and the scientific knowledge and take into consideration stakeholder demands and concerns."

Although currently, genetically modified seeds are not yet used nationwide, Fibria keeps all options open. The SPO praises the "transparent and conservative approach in introducing genetically modified seedlings". It also states: "Additionally, Fibria has committed that no bond proceeds will be allocated to GM eucalyptus related activities".⁴⁰ That should not be enough for an investor with strict criteria for genetic modification.

Job losses

With the expansion of production capacity in Três Lagoas by 2 million tonnes of pulp in 2017, a fully automated nursery was also put into operation, producing 43 million seedlings per year. Compared to the nurseries in the states of São Paulo and Bahia,

each producing 30 million seedlings, the new plant also requires significantly less manpower. However, the Sustainability Report 2017 emphasises that jobs at the old locations will be maintained.⁴¹

37 Fibria Report 2017: A Forest of Opportunities. Available at: <http://r2017.fibria.com.br/wp-content/uploads/2018/04/Fibria-2017-Report-1.pdf>, accessed on 29-1-2019

38 These include, in particular, a strip at least 15 meters wide around waterways and more than 10 meters wide around peaks of mountains and steep slopes. See: Castelo Thiago Bandeira 2015: Brazilian forestry legislation and government policies to combat deforestation, *Ambient. soc.* vol.18 no.4. Available at: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1414-753X2015000400013&lng=pt&tlng=pt, accessed on 29-1-2019

39 Policy on Fibria's genetically modified eucalyptus (GM Eucalyptus). Available at: https://ir.fibria.com.br/enu/6713/Policy_GM%20Eucalypt_Website_final.pdf, accessed on 29-1-2019

40 See footnote 29

41 See footnote 35

Conclusions

The ecological added value of the green bonds issued by Brazil's leading domestic pulp and paper producer is very limited. The dubious calculation of CO₂ savings and intensive research into genetically modified trees indicate that the company is not engaged in any kind of environmental reorientation of its business activities. Instead, green bonds are used to finance those parts of Fibria's normal business operations that are deemed less environmentally destructive because they are FSC-certified.

An analysis of green bonds issued by other Brazilian pulp and paper producers (Suzano, Klabin) shows very similar results.⁴² They do not initiate a change towards a sustainable economy, but at best only make existing practices less harmful to the environment. The Paris Climate Agreement however, calls for a comprehensive redirection of financial flows. This could be achieved by measures leading to a meaningful reduction of paper consumption or a consistent paper recycling system.

Green bonds are an excellent opportunity to put together the growing demand for ethical investment and the huge environmental challenges the world is facing. They can attract resources otherwise unavailable for making changes on the ground, and they can finance the implementation of projects that contribute to a better environment and climate. But this can only work if the green bonds can provide additionalities, both financially and ecologically.

Financial additionality is achieved when green bonds can mobilise more funds for green projects than standard bonds would. Whether this actually happens, especially for forest and plantation projects, remains to be seen. Questions about the lack of financial additionality are also raised in a report from the 2 degrees investing initiative, which concludes that "we currently lack evidence to conclude that as currently designed Use-of-Proceeds green bonds contribute – or can without further enhancement contribute – to scaling up the investments in green projects."⁴³

Ecological additionality is achieved when the projects that are financed through green bonds have an additional positive impact on the environment and/or the climate, compared to a baseline

Business As Usual scenario. In the case of Fibria (Suzano), this does not hold true. The proceeds were used predominantly for the management of existing plantations, without any additionality regarding increased carbon stocks or improved forest management.

The EU's High Level Expert Group on sustainable finance already highlighted that one of the main challenges of the green bond market in general is "doubts on the additionality of certain green projects and their impact, as well as concerns that green bonds have in some cases merely been used to re-label existing investments", and it stressed the "insufficient disclosure and data on how green bonds lead to the scaling up of investments in green projects and activities". These concerns are also repeated in a report by the 2 degrees investing initiative, which suggests that the assessment of all bond issuers against climate targets might be more effective than issuing green bonds.

If green bond investors cannot be confident that funds will support practices that go beyond Business As Usual, investments will dry up. The lack of a robust system that can promote excellence and exclude disputable projects puts the whole concept of green bonds at risk. Projects with disputable assumptions, weak accounting and a lack of transparency represent a high reputational risk for the whole system, which could end green bonds' role as a tool for ethical investment.

Standardization bodies, like the International Capital Market Association (ICMA), the Climate Bonds Initiative (CBI) and the European Commission must therefore ensure their green bonds standards are robust enough to guarantee additionality is achieved and human rights are taken into account.

42 Südwind, 2018. Große Erwartungen – Glaubwürdigkeit und Zusätzlichkeit von Green Bonds.
<https://suedwind-institut.de/files/Suedwind/Publikationen/2018/2018-39%20Gro%C3%9fe%20Erwartungen%20%e2%80%93%20Glaubwuerdigkeit%20und%20Zusaetzlichkeit%20von%20Green%20Bonds.pdf>

43 2 Degrees Investing Initiative, 2018. Shooting for the moon in a hot air balloon? Available at: <https://2degrees-investing.org/wp-content/uploads/2018/10/Green-bonds-updated-paper-Oct-2018.pdf>, accessed on 28-1-2019

