



Market analysis Availability of forest products and by-products South-East USA & Texas

Client:

Engie - Electrabel
boulevard Simon Bolívar
B-1000 Brussels

Project No. 130373

September 2017

CONTENTS

1. Introduction.....	3
2. Production volumes.....	3
3. Forest exploitation levels.....	8
4. Price of wood resources.....	10
5. Import and export of wood resources.....	11
6. Conclusion.....	17

FIGURES

Figure 1 : round wood production (harvesting in m ³) in USA between 1961 and 2016	4
Figure 2 : production levels of chips and particles (m ³), pulp for paper (tonnes), sawnwood (m ³) and wood-based panels (m ³) in the USA between 1990 and 2016	5
Figure 3 : evolution of processed timber production in the USA per region.....	6
Figure 4 : Total number of pulp mills and capacity in the Southern U.S., 1953-2009.....	7
Figure 5 : Intensity of timber harvest by county (2015)	8
Figure 6 : Net volume of growing stock in timberland (1975-2015).....	9
Figure 7 : Average net annual growth VS removals (harvests) of growing stock on timberland (2006-2015)	9
Figure 8 : Real stumpage prices in the South by product, 1977 to 2008.	10
Figure 9 : Historical Texas Statewide Product Price-Real 2010 Dollar (1985 to 2015)	11
Figure 10 : imports and exports of round wood in the USA between 1990 and 2016.....	12
Figure 11 : production, imports and exports of pulp and paper in the USA between 1990 and 2016	13
Figure 12 : production, imports and exports of chips and particles in the USA between 1990 and 2016	14
Figure 13 : production, imports and exports of wood-based panels in the USA between 1990 and 2016	15
Figure 14 : production, imports and exports of sawnwood in the USA between 1990 and 2016.....	16

1. Introduction

SGS has been assigned by Electrabel to analyse the market availability of the feedstock used to produce wood pellets in South-East USA & Texas, in order to assess to what extent, the use of those materials for energy purpose might compete with the industrial use of those resources both locally and internationally.

This report will cover the following wood resources used as raw material by pellet producers in South East USA:

- residues of forest exploitation
- round wood from forest thinning
- round wood from forest harvesting
- sawmill residues (sawmill chips, sawdust and shavings)

The industrial activities concerned by those materials are:

- sawmills
- pulp and paper
- wood panels production

The geographic range covered by the analysis includes the most significant forested states in South-East USA: Georgia, Alabama, Florida, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia and the state of Texas. Specific analysis of Texas is given following the general trends in the USA.

2. Production volumes

According to the most recent statistics available from the FAO to data¹ (Figure 1) the production of round wood in the US in 2016 was 399 million m³. It shows a slight increase since 2010 after radical decrease of about 30% experienced between 2005 and 2010. The current production levels are still far below the production levels of 2005 (467 million m³) but since 2011, round wood production seems to be on a stable increasing trend.

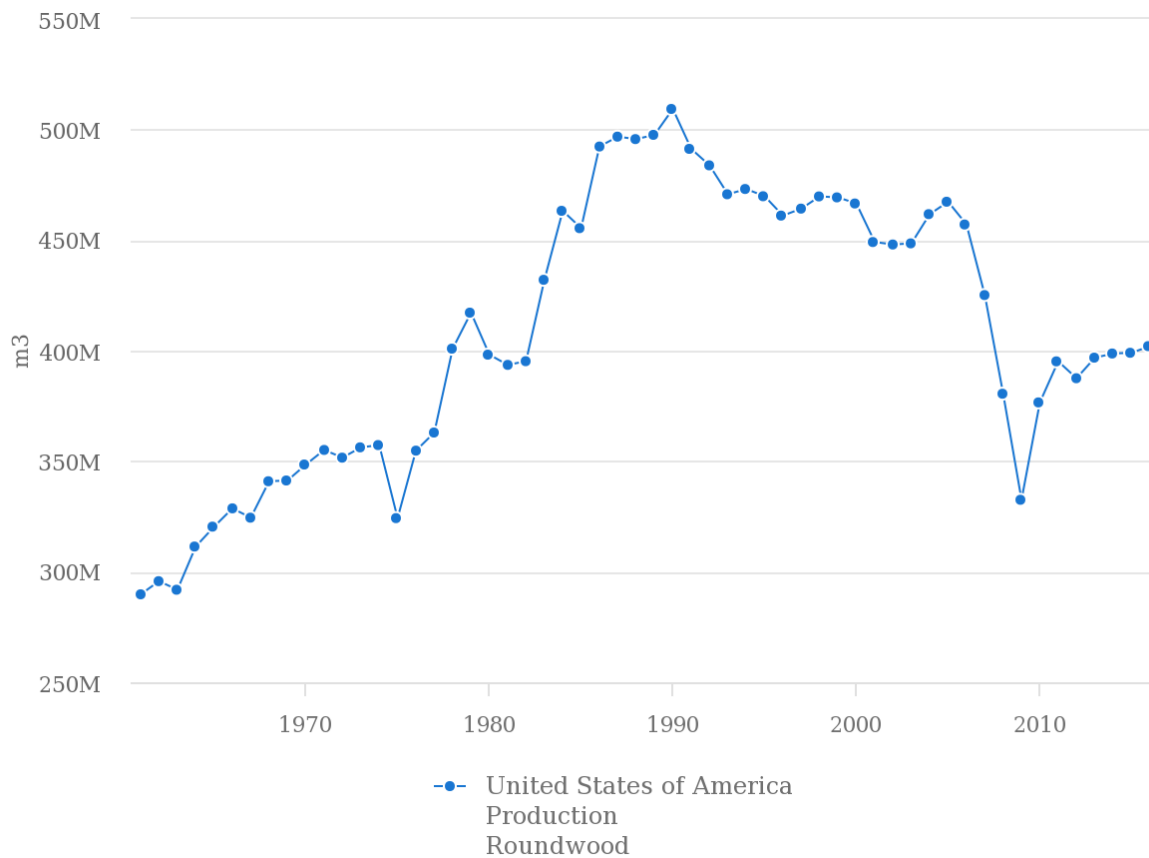
The decrease of the production levels between 2005 and 2010 was triggered by the subprime mortgage crisis, which led to a fall of the demand for timber products as building materials. This situation was subsequently aggravated by the propagation of the financial crisis to other sectors of the economy, resulting in a lower demand for various wood products. As a result, many-wood based industries in the US went bankrupt between 2005 and 2010, leading to a reduced demand for wood raw materials and reduced production levels, associated with a diminution in the volumes of harvested wood. As can be seen on Figure 2, the production of chips and particles, pulp for paper, sawnwood and wood-based

¹ http://faostat3.fao.org/faostat-gateway/go/to/browse/F/*E

panels has also been decreasing in the USA after 2005, following a similar trend as the round wood production.

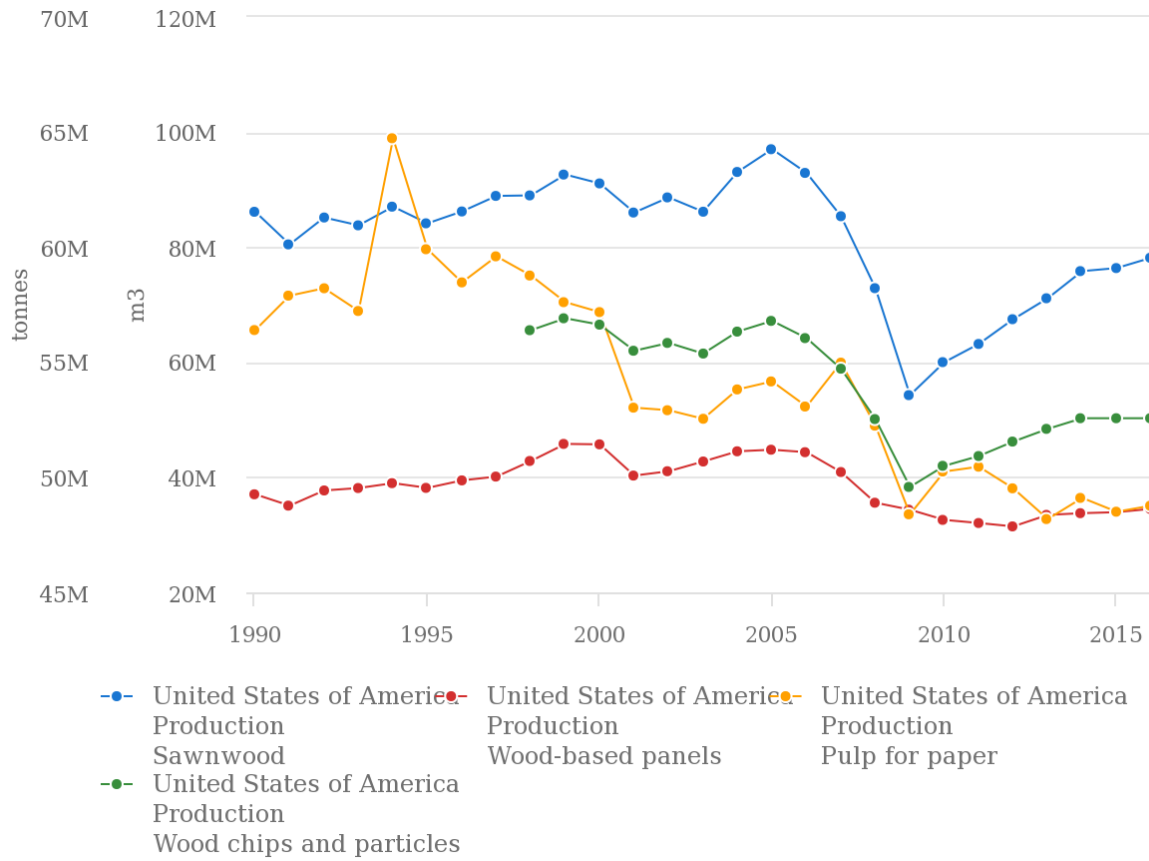
In the recent years, all production volumes (except for pulp for paper) are increasing.

The same trend affected all regions of the USA, as can be seen in the statistics of processed timber production per region on Figure 3 (with distinction between North, South and West regions).



Source: FAOSTAT (Sep 20, 2017)

Figure 1 : round wood production (harvesting in m³) in USA between 1961 and 2016
 (source: FAOstat)



Source: FAOSTAT (Sep 20, 2017)

Figure 2 : production levels of chips and particles (m³), pulp for paper (tonnes), sawnwood (m³) and wood-based panels (m³) in the USA between 1990 and 2016
 (source: FAOstat)

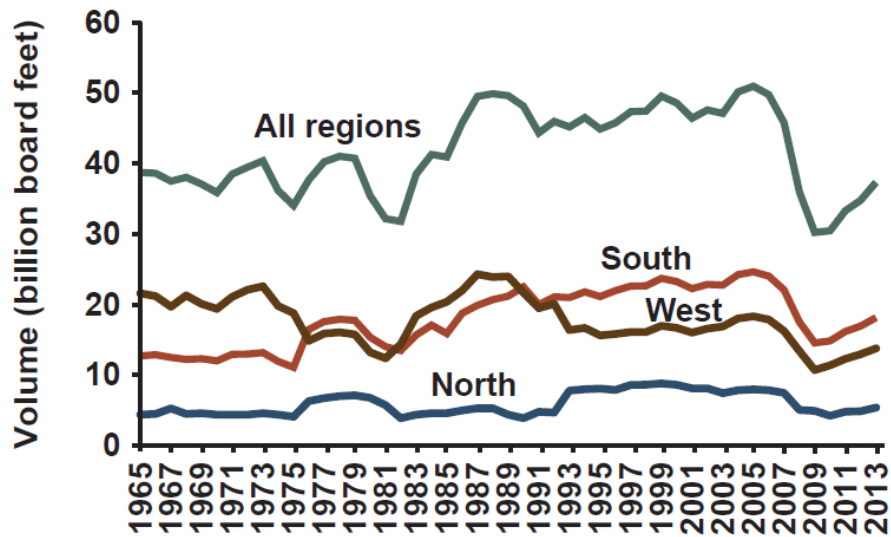


Figure 3 : evolution of processed timber production in the USA per region

(source : J L Howard & R M Westby, "U.S. Timber Production, Trade, Consumption and Price Statistics 1965–2013" (USDA))

When we look more specifically at the production from the forests in the Southern states, we can see that the evolution of the sawn wood production follows a quite similar trend as the trend observed at the country level. As far as pulpwood is concerned, though, the decrease in domestic production and consumption had already started in the late 90ies, because of an important and ongoing reduction of the paper production capacity in the Southern states (Figure 4). According to Wear & Grei (2013)², this reduction of paper production capacity was driven by the competition at the global scale, suggesting cheaper paper and cardboard imports. Indeed the domestic consumption of paper and cardboard products was not declining until 2005 but the imports were clearly increasing from 1990 to 2005 (based on national statistics available in Howard, & Westby, 2013³).

² Wear & Greis, 2013, The Southern Forest Futures Project: technical report

³ Howard, James L.; Westby, Rebecca M. 2013. U.S. timber production, trade, consumption and price statistics 1965–2011. Research Paper FPL-RP-676. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory.

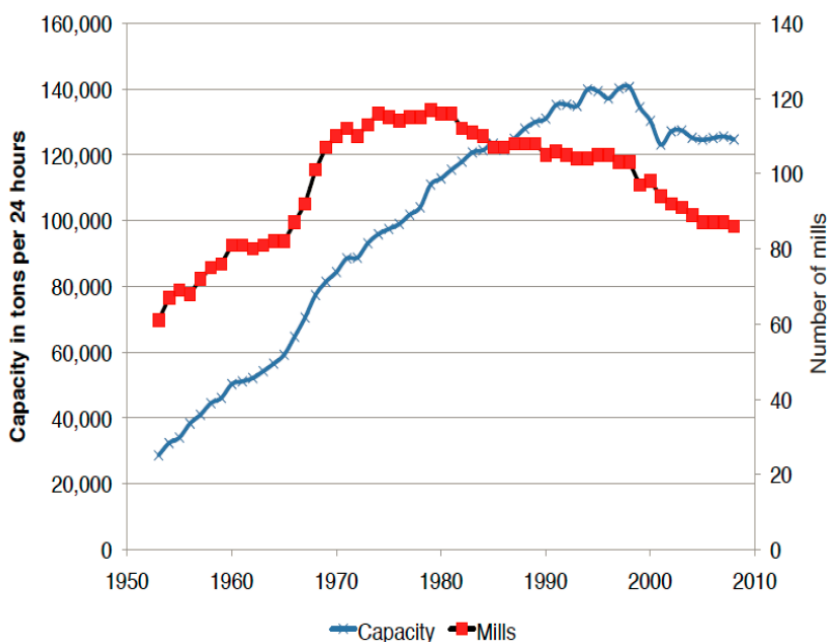


Figure 4 : Total number of pulp mills and capacity in the Southern U.S., 1953-2009
 (source : USDA Forest Service, 2013, Mill Closure Reflects Larger Trends in the U.S. Pulp and Paper Sector)

The production volume between 2006 and 2015 in Texas are presented in

Year	Lumber			Structural Panel	Pulp and paperboard products
	Pine	Hardwood	Total		
	m ³			m ²	tons
2006	3,956,012	566,843	4,522,855	272,729,484	2,781,865
2007	3,659,287	426,436	4,085,722	232,623,631	2,788,308
2008	3,318,037	503,075	3,821,113	204,808,751	2,239,347
2009	2,920,889	404,728	3,325,617	181,977,839	2,050,681
2010	2,804,065	328,922	3,132,987	174,821,428	2,089,521
2011	3,087,548	364,799	3,452,347	177,965,451	2,071,404
2012	3,047,788	280,391	3,328,180	190,366,051	2,081,521
2013	3,268,341	331,371	3,599,713	187,423,070	2,168,403
2014	3,407,944	245,623	3,653,567	218,138,381	2,213,026
2015	3,328,347	252,561	3,580,908	227,098,039	2,106,412

Table 1. Lumber production was on a decreasing trend between 2006 and 2010. It lost more than 30% of its volume. It follows the same trend as national roundwood production volumes. Considering structural panel, it decreased until 2010 and is increasing since that year. Pulp and paper products volume decreased from 2007 to 2009. Since 2009 its production volume is stable over 2 million tons.

Year	Lumber			Structural Panel	Pulp and paperboard products
	Pine	Hardwood	Total		

	m ³			m ²	tons
2006	3,956,012	566,843	4,522,855	272,729,484	2,781,865
2007	3,659,287	426,436	4,085,722	232,623,631	2,788,308
2008	3,318,037	503,075	3,821,113	204,808,751	2,239,347
2009	2,920,889	404,728	3,325,617	181,977,839	2,050,681
2010	2,804,065	328,922	3,132,987	174,821,428	2,089,521
2011	3,087,548	364,799	3,452,347	177,965,451	2,071,404
2012	3,047,788	280,391	3,328,180	190,366,051	2,081,521
2013	3,268,341	331,371	3,599,713	187,423,070	2,168,403
2014	3,407,944	245,623	3,653,567	218,138,381	2,213,026
2015	3,328,347	252,561	3,580,908	227,098,039	2,106,412

Table 1 : Texas industrial products (2006-2015)

(source : adapted from Edgar C. et al., 2017. Harvest Trends 2015. Texas A&M Forest Service)

3. Forest exploitation levels

The level of forest exploitation in the USA compared with the annual growth is analysed for each individual state (see sustainability reports per state), based on USDA's Forest Inventory and Analysis (FIA).

In the Southern states, the analysis leads to the conclusion that the annual growth has been exceeding the harvested volumes in the recent years, reflecting an augmentation of living biomass. Even though some states show a slight augmentation of forest surfaces, the augmentation of living biomass is mostly due to an increased maturity of the trees, resulting in a higher wood volume per unit of surface. The recent decrease in harvested volumes of round wood obviously contributed to the increase of living biomass.

In Texas, the intensity of wood harvest is given in Figure 5. Per acre⁴ of timberland, softwood was more intensely harvested than hardwood. In total the east of timberland is more concerned by harvest than the west.

⁴ 1 acre = 0.404686 ha

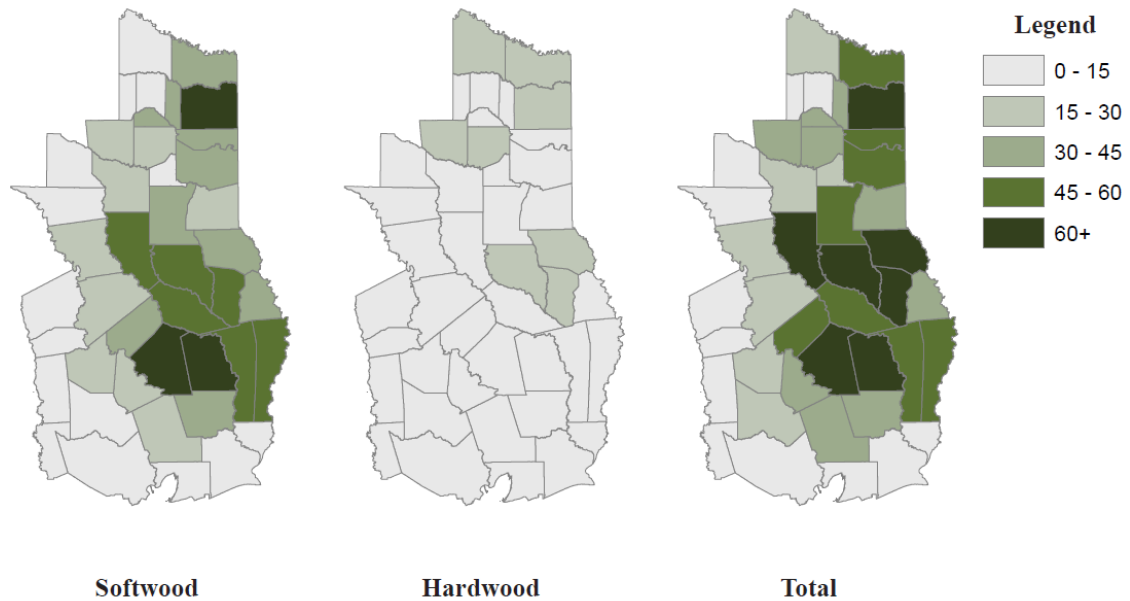


Figure 5 : Intensity of timber harvest by county (2015)
 (source : Edgar C. et al., 2017. Harvest Trends 2015. Texas A&M Forest Service)

Growing stock in east Texas is currently decreasing (Figure 6). It reached its maximum value of 486 million m³ in 2012. The most recent volume of growing stock is 433 million m³ in 2015. This should mean that removals should be greater than growth. However, it is seen in Figure 7 that growth is greater than removals for every year between 2006 and 2015, the net change (= growth - removal) is always positive (except for 2014). According to the figure, growing stock should be increasing. There must be another reason for the decrease. It could be the reclassification of timberland to another land use or the destruction of forests caused by natural disasters.

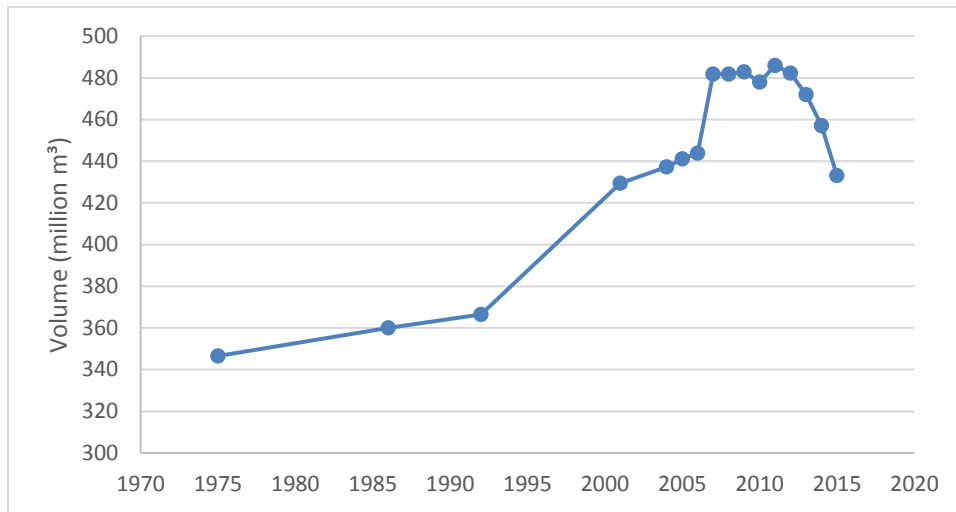


Figure 6 : Net volume of growing stock in timberland (1975-2015)
 (source : adapted from USDA – Forest Service (<http://apps.fs.fed.us/fido/standardrpt.html>))

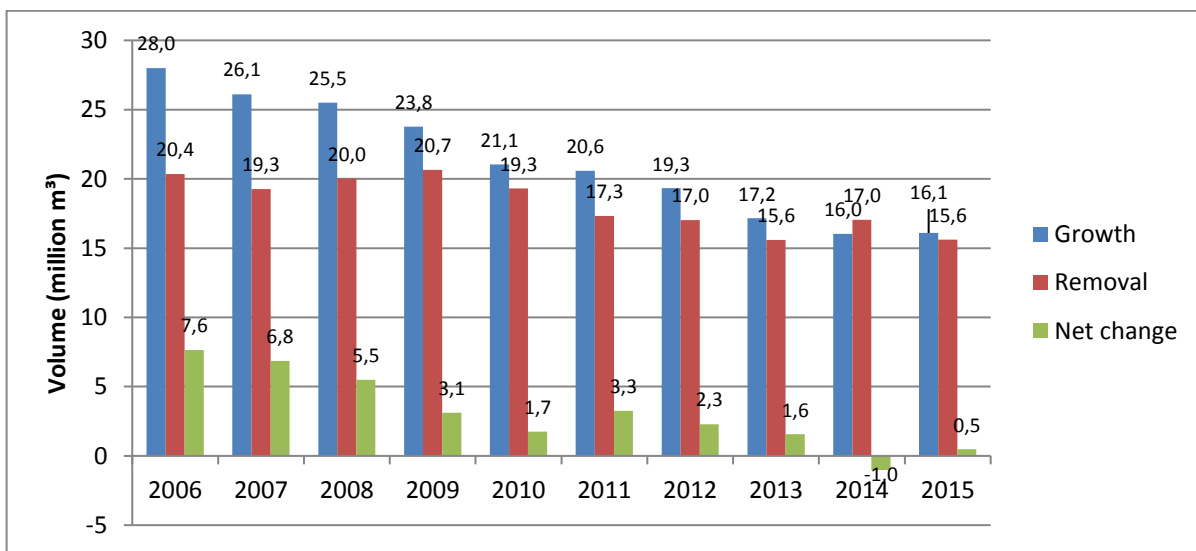


Figure 7 : Average net annual growth VS removals (harvests) of growing stock on timberland (2006-2015)

Net change = net growth - removals
 (source : adapted from USDA – Forest Service (<http://apps.fs.fed.us/fido/standardrpt.html>))

This section is developed in more detail in the report “Forest Sustainability in Texas”.

4. Price of wood resources

As can be seen on Figure 8, the prices of sawnwood and pulp wood in Southern USA have significantly decreased since 2000 and in particular during the period 2005-2010, reflecting the continuous

decrease of the domestic demand for pulp and building materials. Only the price of pulpwood from hardwood remained rather stable during this period.

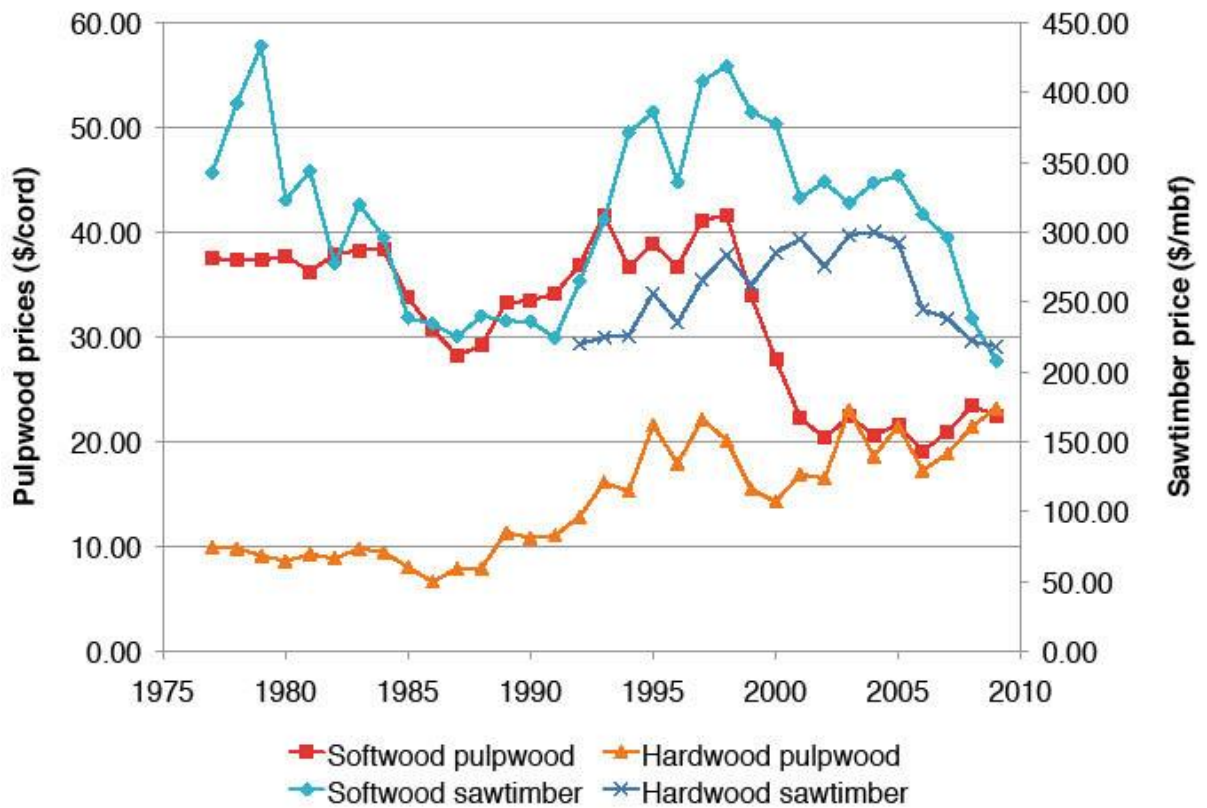


Figure 8 : Real stumpage prices in the South by product, 1977 to 2008.

(Source: Wear & Greis, 2013, The Southern Forest Futures Project: technical report)

In Texas, prices of pine sawlogs has been decreasing since the early 1990s. Since 2008 the trend is quite stable between 20 and 30 \$/ton. Hardwood sawlogs price has been continuously increasing since 1984 (Figure 9). According to Howard & Jones⁵, “because of increased paper recycling and increased processing efficiency, consumption per capita in roundwood equivalent has decreased since about 1986”. It may be a cause for the decreasing price of sawlogs. Pine pulpwood price trend has been oscillating for the whole period. Major drops are found in the late 1990s and in 2008. Hardwood pulpwood price has also been oscillating, however, an increasing trend can be extracted. Between 2000 and 2009, the curve of both pine and hardwood pulpwood prices was similar. Chip-N-Saw price faced a rise between the late 1980s and the late 1990s. From 1998 to 2011, the trend slowly decreased. Since that year, it shows signs of stabilization.

⁵ Howard J. & Jones K., 2015. U.S. Timber Production Trade, Consumption, and Price Statistics, 1965-2013.

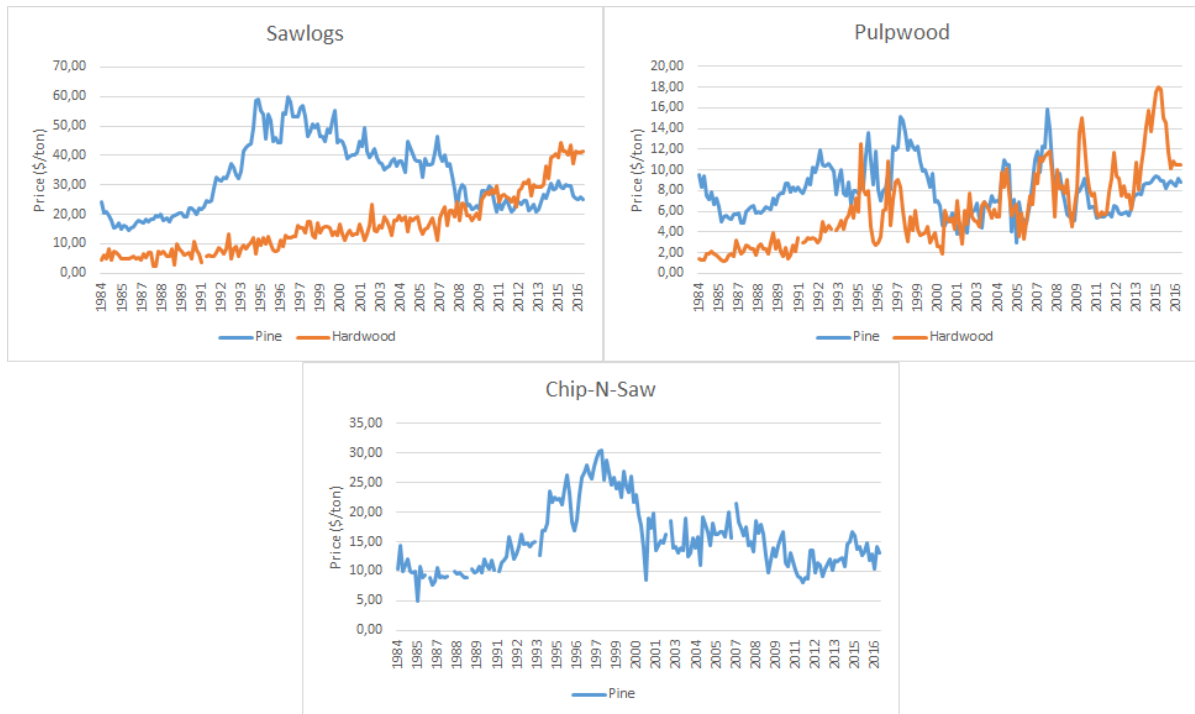
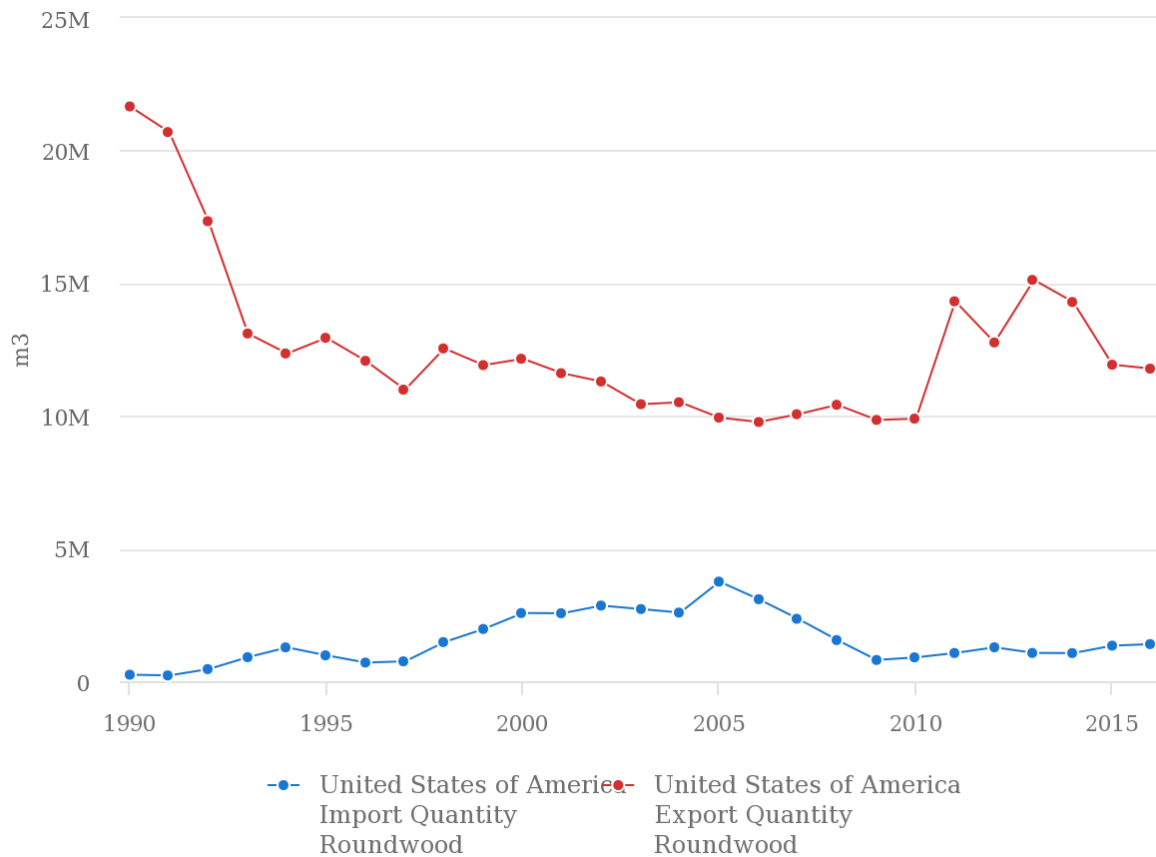


Figure 9 : Historical Texas Statewide Product Price-Real 2010 Dollar (1985 to 2015)
 (Source: adapted from <http://texasforests.tamu.edu/timberpricetrends/>)

5. Import and export of wood resources

In this section, imports and exports are taken into account to assess the availability of the different kind of materials.

While the imports and exports of round wood to/from the USA remains negligible compared to the domestic production, it is noticeable that the imports have clearly decreased and the exports slightly increased since 2005, while domestic demand was falling. Exports saw its volume increase and decrease between 2010 and 2015 (Figure 10).



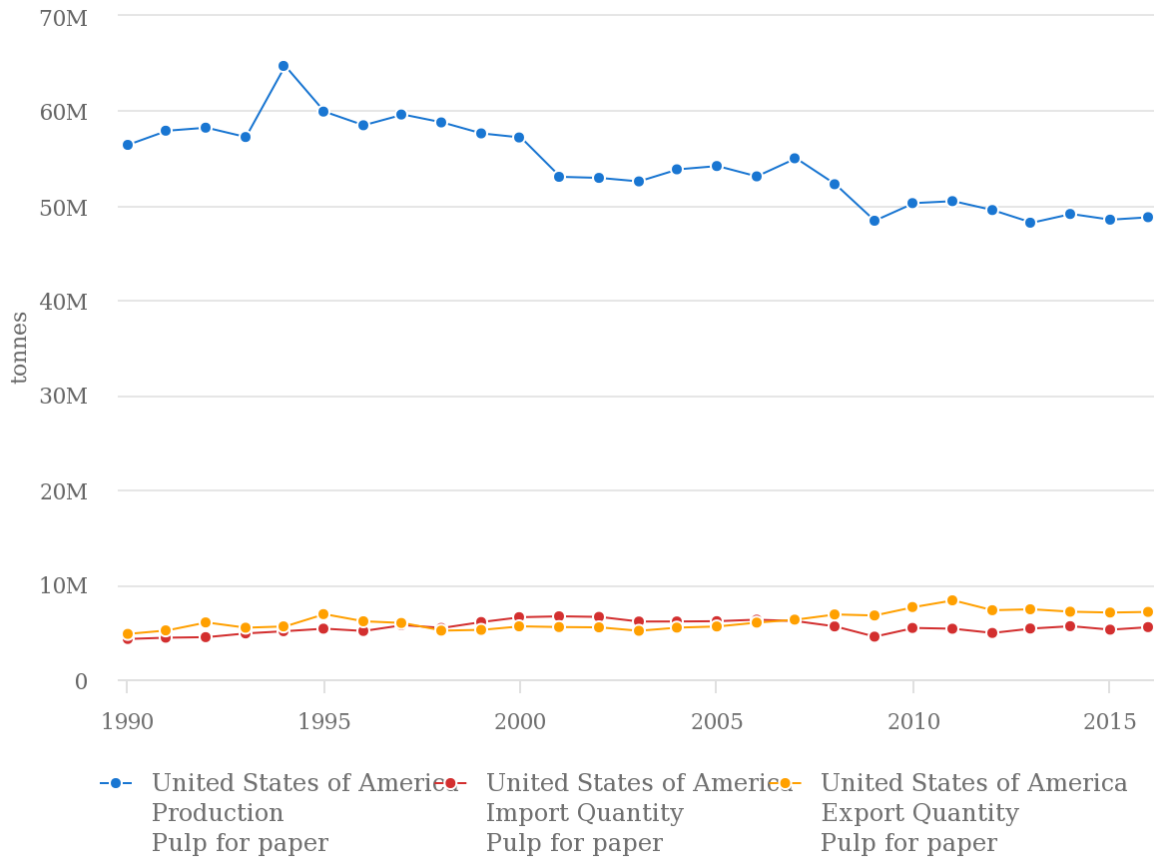
Source: FAOSTAT (Sep 20, 2017)

Figure 10 : imports and exports of round wood in the USA between 1990 and 2016

(source : FAOstat)

The exports of pulp for paper have significantly increased in recent year, while the production was decreasing, suggesting that an excess of material was available on the domestic market when several paper mills were run out of business (Figure 11). The pulp exports which used to be only 5.57 million tons back in 2005, increased to 8.32 million tons in 2011. Since 2011, it decreased reaching a volume of 7.10 million tons in 2016.

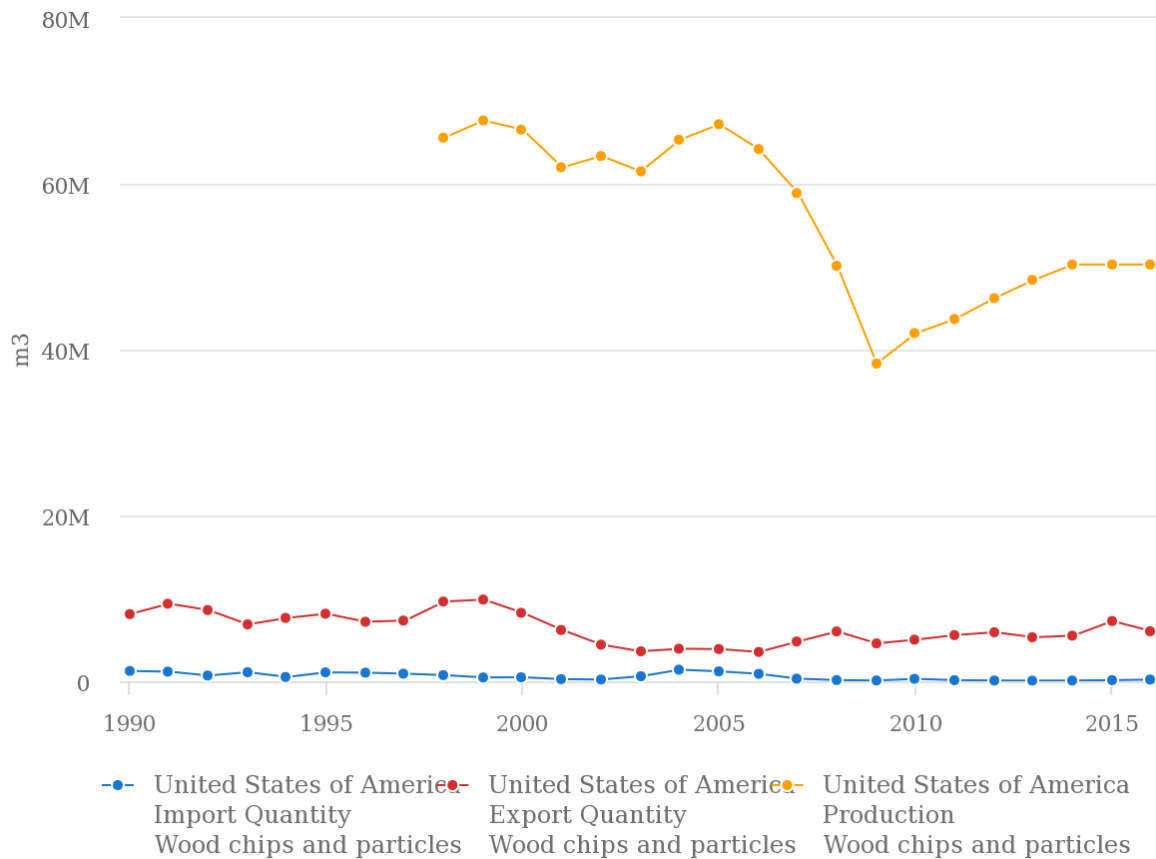
Since 2007 the pulp exports exceed pulp import, while it used to be the opposite situation between 1997 and 2007.



Source: FAOSTAT (Sep 20, 2017)

Figure 11 : Production, imports and exports of pulp and paper in the USA between 1990 and 2016
 (source : FAOstat)

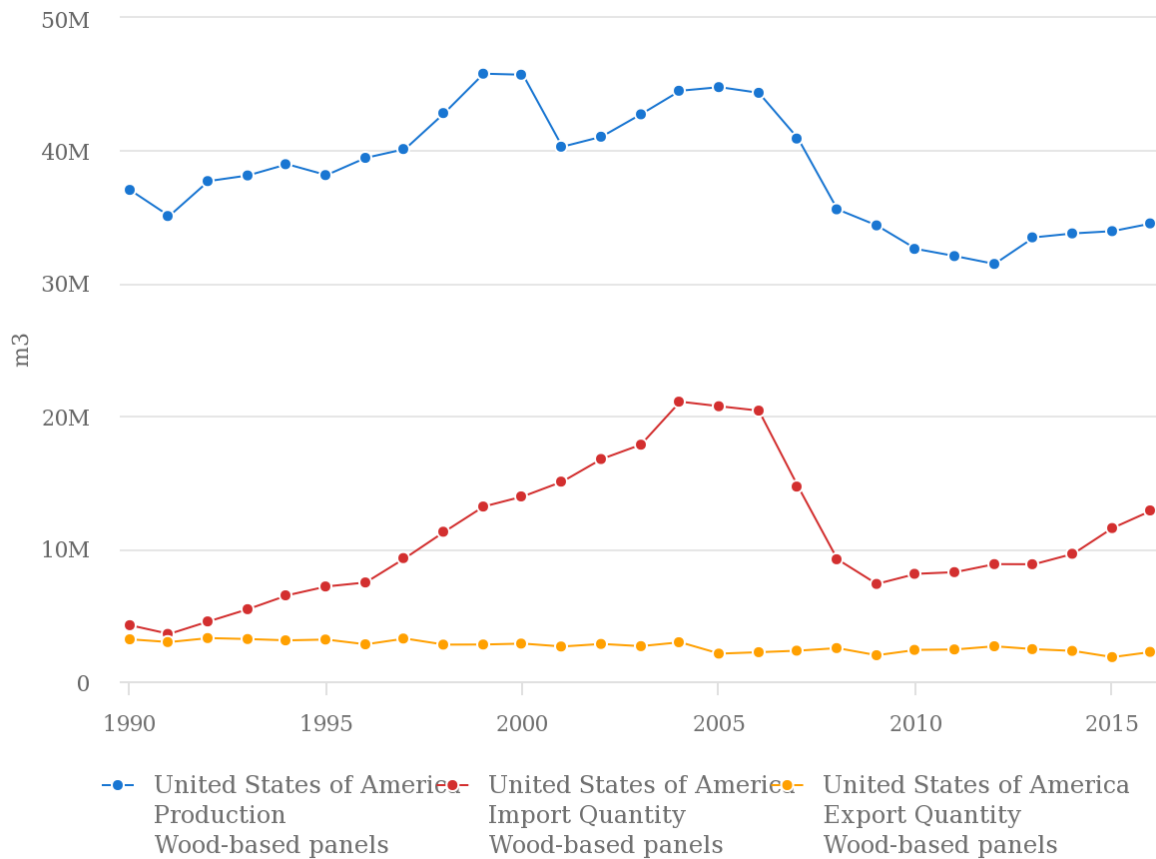
The exported volumes of chips and particles also show an increase in recent years, from 3.8 million m³ in 2005 to 6.0 million m³ in 2016 (Figure 12). During the same period the imports have decreased and were at a negligible level in 2016. The proportion of exported chips and particles, compared to the domestic production, used to be 5.8% in 2005 and have reached 12.0% in 2016.



Source: FAOSTAT (Sep 20, 2017)

Figure 12 : production, imports and exports of chips and particles in the USA between 1990 and 2016
 (source : FAOstat)

The imported volumes of wood-based panels have sharply fallen between 2005 and 2009, following the same decreasing trend as the domestic production (Figure 13). During the same period, the exported volumes have remained negligible. Since 2009, imported volumes increased to a value of 12.9 million m³.



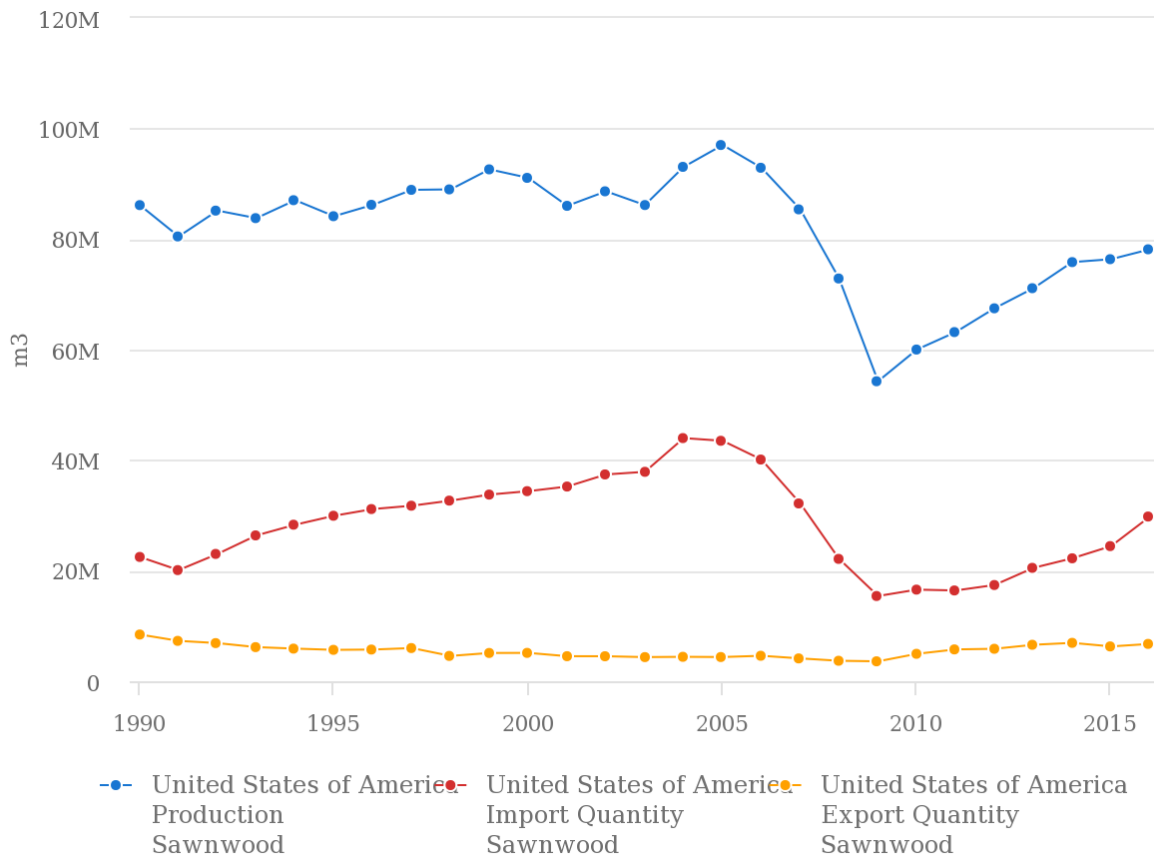
Source: FAOSTAT (Sep 20, 2017)

Figure 13 : production, imports and exports of wood-based panels in the USA between 1990 and 2016

(source : FAOstat)

After a sharp decrease of sawnwood imports between 2005 and 2009 (following the same trend as domestic production), the imported volumes have been increasing (Figure 14). A very large majority of the imports is from Canadian origin. According to Howard & Westby (2013)⁶, the imports of Canadian lumber (processed timber) currently contributes to keep the prices of softwood low, which does not help the sawmill sector to recover from the crisis.

⁶ Howard, James L.; Westby, Rebecca M. 2013. U.S. timber production, trade, consumption and price statistics 1965–2011. Research Paper FPL-RP-676. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory.



Source: FAOSTAT (Sep 20, 2017)

Figure 14 : production, imports and exports of sawnwood in the USA between 1990 and 2016
 (source : FAOstat)

Also according Howard & Westby (2013), a recent increase in the imports of cheap furniture from Asia to USA is responsible for difficulties for domestic producers of furniture and their suppliers of wood boards and wood panels, resulting in a lower demand for those products on the domestic market.

The exports of Texas forest sector in 2015 is described as: *“Texas forest products firms exported \$1.1 billion worth of forest products to foreign countries in 2015, about six percent of the forest sector’s value of direct industry output. Secondary paper and paperboard products was the largest forest products export sub-industry, shipping \$395.7 million worth of products to foreign countries [...]. The value of foreign exports by the secondary solid wood products sub-industry totaled \$292.2 million in 2015. Primary paper and paperboard and primary solid wood products exported \$237.7 million and \$146.9 million, respectively.”*

6. Conclusion

The analysis of offer and demand of wood on the USA market, more particularly in the Southern states, shows that there has been a recent decrease in the production of wood based products, including round wood, sawnwood, paper pulp and wood panels, associated with the closure of wood based industries and a sharp decrease in the domestic demand. This decrease is particularly clear during the period 2005-2010, even though this trend was already noticeable in the Southern states since the late 1990s as far as the paper pulp market is concerned.

Even though the production volume of round wood has started to increase again since 2010, the market remains depressed and the production levels remain much less than they used to be in the period 2000-2005. A sharp decrease of the prices of sawnwood and pulpwood is associated with the reduction of the demand and the closure of wood industry units (except for pulpwood from hardwood, which remains fairly stable).

The imports of woody raw materials (round wood, pulp, chips and residues) have significantly decreased in recent years, while wood based industry were closing. The exports of those products have significantly increased.

A technical report on the production trends and forecasts from forest in Southern USA (Wear & Greis, 2013⁷) reached the following conclusions:

- *Southern forests could sustain higher timber production levels, but demand is the limiting factor and demand growth is uncertain.*
- *Analysis of traditional wood products markets indicates that the supply of biomass could grow by about 43 percent under current levels of productivity without increased scarcity, largely because of declining demands for wood products. With plantation productivity growth at about 50 percent by 2060, forest biomass output could expand by as much as 70 percent without substantial impacts on market scarcity.*

In Texas, after the global economic crisis, productions of saw logs, structural panels and pulp & paperboard products has been increasing. Prices remained quite stable in the recent years. About 6% of the industry output is destined to international export.

⁷ Wear & Greis, 2013, The Southern Forest Futures Project: technical report

Disclaimer

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm . Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.