Market analysis
Availability of forest products and by-products
Alberta - Canada

Client:

Engie - Electrabel
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1. Introduction

SGS has been assigned by Electrabel to analyse the market availability of the feedstock used to produce wood pellets in Canada, 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 Alberta:

- Residues of forest exploitation
- Round wood from forest thinning & harvesting
- Wood processing residues

The industrial activities concerned by those materials are:

- sawmills
- pulp and paper
- wood panels production

The geographic range covered by the analysis includes the Province of Alberta.

2. Production volumes

According to the most recent statistics available from the FAO to data[1] (Figure 1) the production of round wood in Canada in 2017 was 155 million m³. It shows a progressive increase since 2010 after radical decrease of about 45% experienced between 2004 and 2010, as a result of the economic downturn (especially in the housing sector of the US which is a major driver for the exports of Canadian lumber). The current production levels are still far below the production levels of 2004 (208 million m³), even though the forest economy seems to recover slowly.

An identical trend can be observed in Alberta (Figure 2), where the total volumes of round wood dropped between 2005 and 2009 despite an augmentation in some places of the Allowable Annual Cut (AAC) as part of the effort to tackle the mountain pine beetle outbreak. The drop in round wood production between 2005 and 2009 was much less severe in Alberta (-27%) than in Canada as a whole (-45%).The decrease of round wood production in Alberta after 2005 is much more noticeable on private land (-78%) than on public land (-19%)

After 2010, Alberta seems to recover completely from the crisis, unlike the rest of Canada.. The levels of roundwood production in Alberta for year 2016 (25.5 million m³) are hardly lower than the highest levels recorded before the crisis (27.5 million m³ in 2005).

Alberta represented nearly 15% of Canada's round wood production in 2016.[2]

[1] www.fao.org/faostat

[2] https://www150.statcan.gc.ca/n1/daily-quotidien/131112/dq131112a-eng.htm?fpv=4005

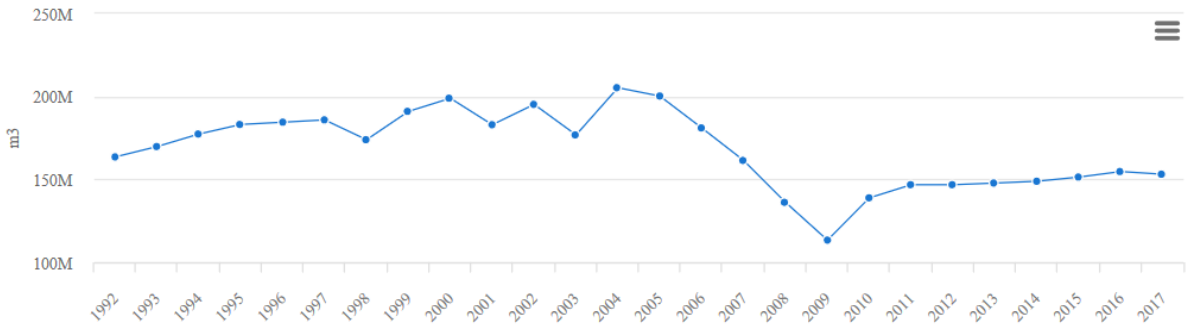

Figure 1 : production of round wood in Canada (1992-2017)
(source : FAOstat)

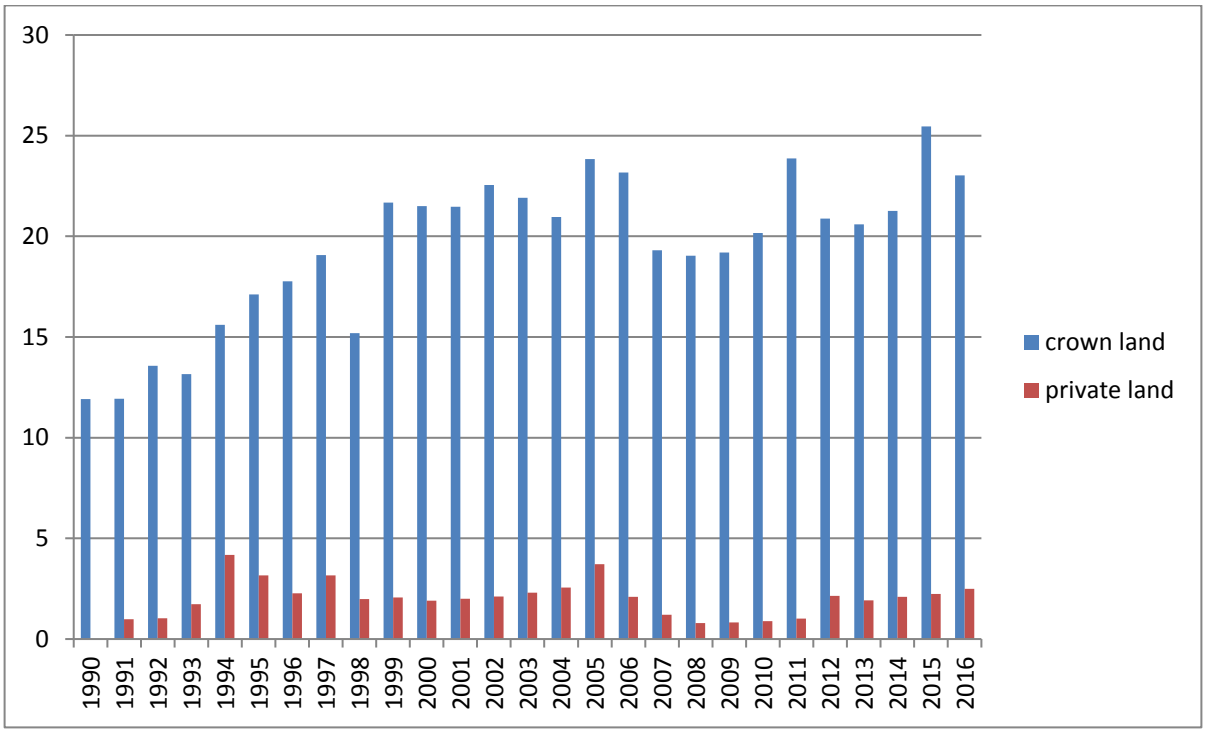

Figure 2 : production of round wood in Alberta (1990-2016) in million m³
(source : national forestry database http://nfdp.ccfm.org)

The economic evolution after 2005 led 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 3, the production of pulp for paper, sawnwood and wood-based panels has also been decreasing in Canada after 2005, following a similar trend as the round wood production.

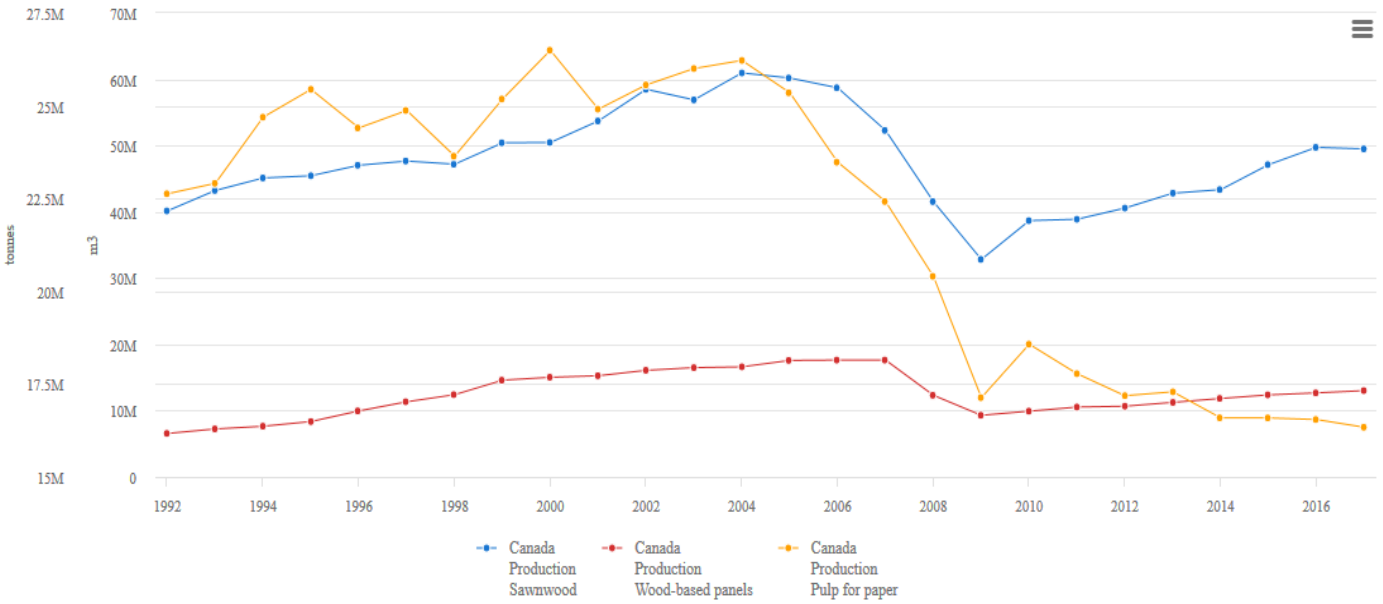

Figure 3 : production levels of pulp for paper (tonnes), sawnwood (m³) and wood-based panels (m³) in the Canada between 1992 and 2016
(source : FAOstat)

Unlike Canada as a whole, the lumber production in Alberta did not decrease between 2005 and 2009, it even showed a slight increase (+4.0%) (Figure 4)while the rest of the Canadian provinces experienceda sharp decrease as a result of the economic crisis.[3] This may be explained by the fact that about 37% of lumber produced in Alberta was sold outside Canada and that while production and exports of lumber by the province fell, the domestic consumption figures actually grew.[4]

[3] https://www150.statcan.gc.ca/n1/daily-quotidien/131112/dq131112a-eng.htm?fpv=4005

[4] FP Innovations, 2011, Wood market statistics Alberta https://fpinnovations.ca/products-and-services/market-and-economics/Documents/2011-wood-market-statistics-in-alberta.pdf

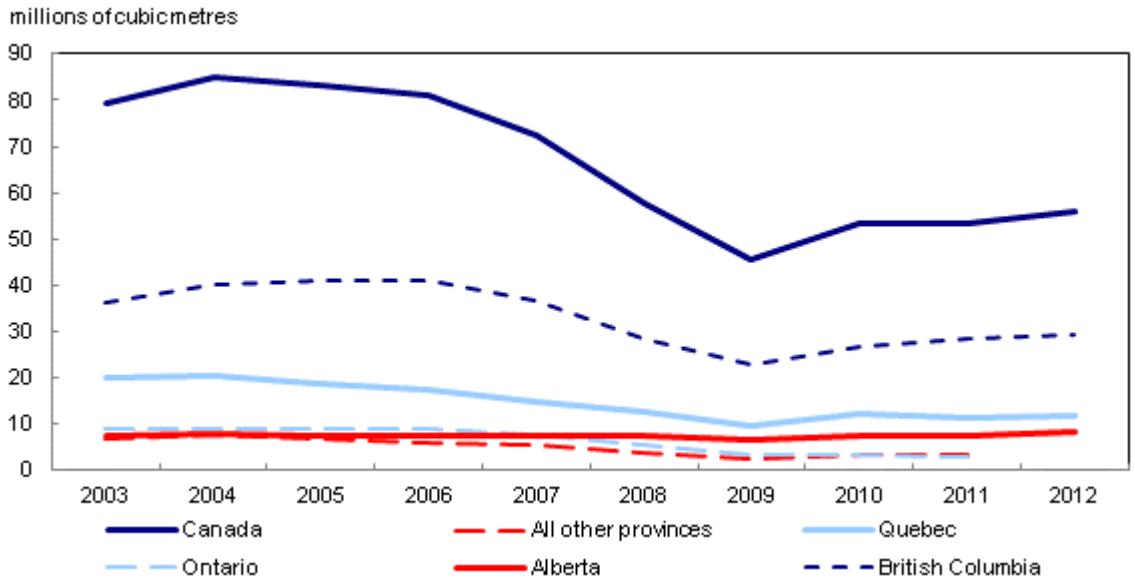

Figure 4 : production levels of sawnwood (in million m³) per province in Canada
(source : statistics Canada[5])

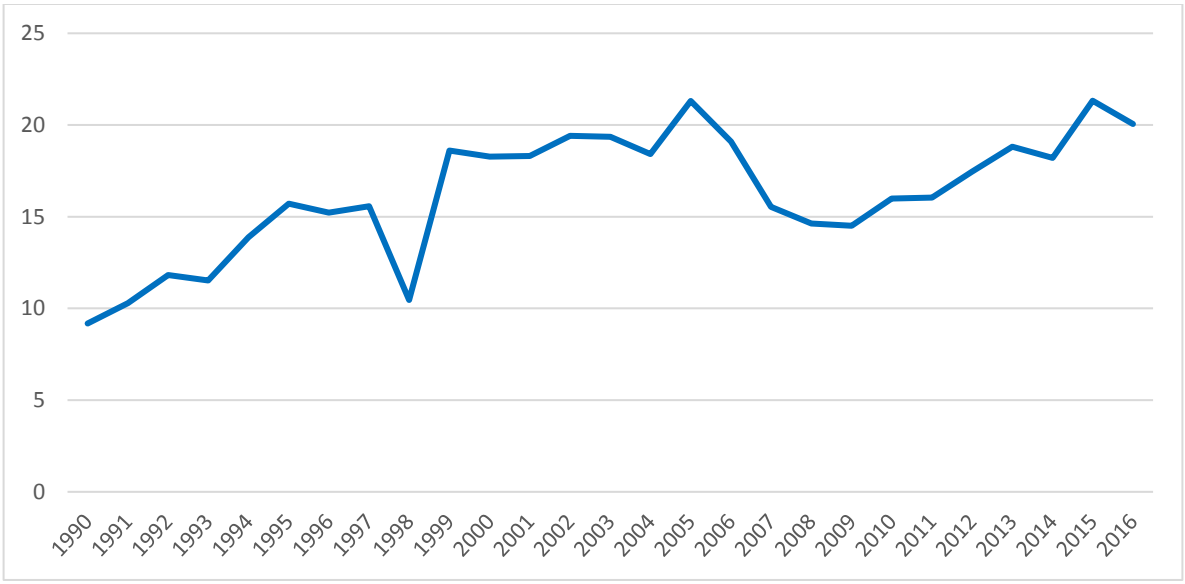

Figure 5 : Production of logs and bolts in Alberta (1990-2016) in million m³
(source : national forestry database http://nfdp.ccfm.org)

As can be seen on Figure 5 the production of “logs and bolts” (used to produce sawnwood and veneer in the first place, and generating residues for other uses) has significantly decreased in Alberta between 2005 and 2009, before showing signs of recovery after 2010. This is the same pattern as observed for sawnwood production in Canada as a whole, even though the trend was again much less severe in

[5] http://www.statcan.gc.ca/daily-quotidien/131112/dq131112a-eng.htm?fpv=4005

Alberta than in the rest of the country (Figure 3). Unlike in Canada as a whole the production levels of sawnwood in Alberta were back to the pre-crisis levels by 2014.

Most of the wood harvested in Alberta consist in “logs and bolts” with 20 million m³ produced in 2016 (Figure 5). Other types of wood account for much smaller volumes, with 5.4 million m³ pulpwood (Figure 6), 0.008 million m³ for other industrial uses (Figure 7) and 0.04 million m³ for firewood (Figure 8).

On Figure 6, we can see that the trend for pulpwood production in Alberta, even though fluctuating, does not show any long-term decreasing trend, contrasting strongly with the persistent decrease of pulp for paper in Canada as a whole (Figure 3), even though it is worth noting that pulp-grade wood does not necessarily ends up as pulp for paper : it can also be used in for energy and wood panels application.

On Figure 7, we can see that other types of industrial wood (such as wood posts) features an irregular pattern with a decreasing trend, but remains marginal.

On Figure 8, we can see the spectacular rebound of firewood from 2013 onwards but this production remains marginal.

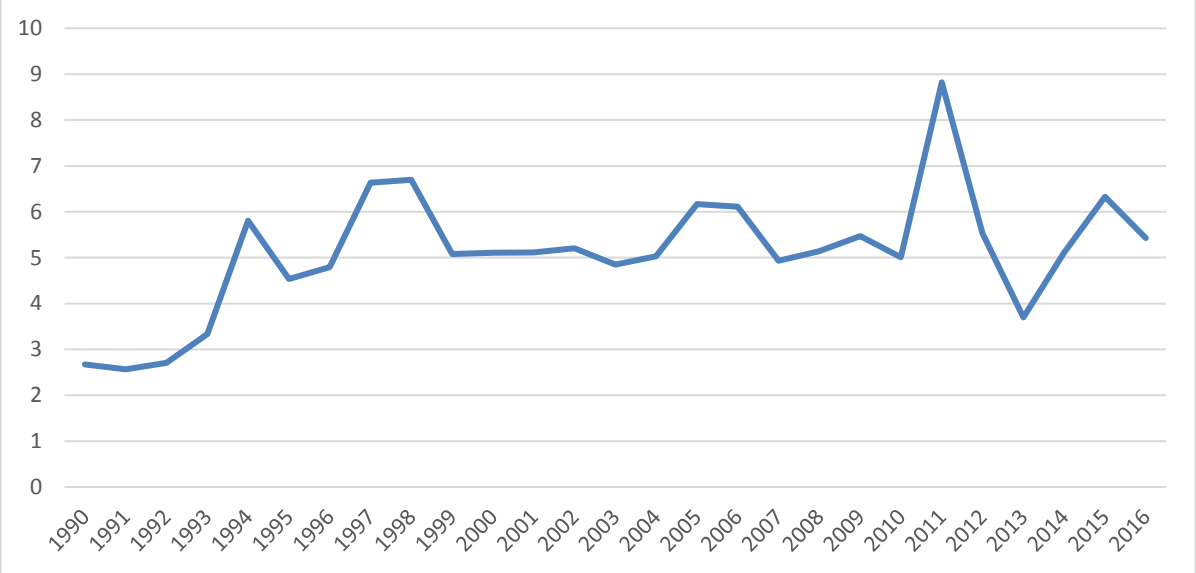

Figure 6 : Production of pulpwood in Alberta (1990-2016) in million m³
(source : national forestry database http://nfdp.ccfm.org)

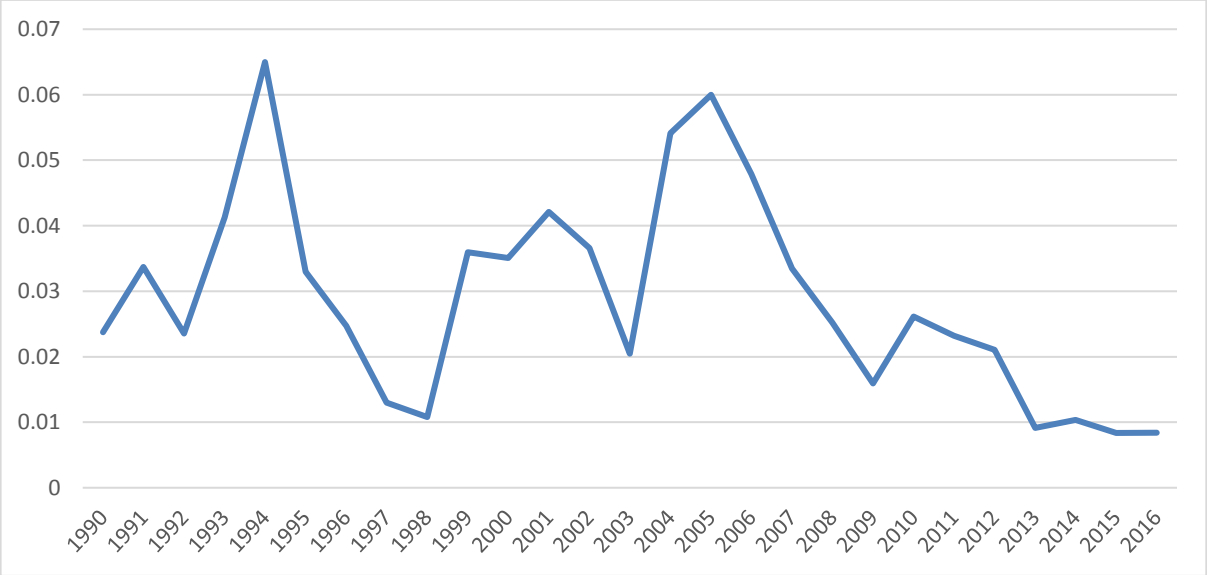

Figure 7 : Production of other industrial wood in Alberta (1990-2016 in million m³
(source : national forestry database http://nfdp.ccfm.org)

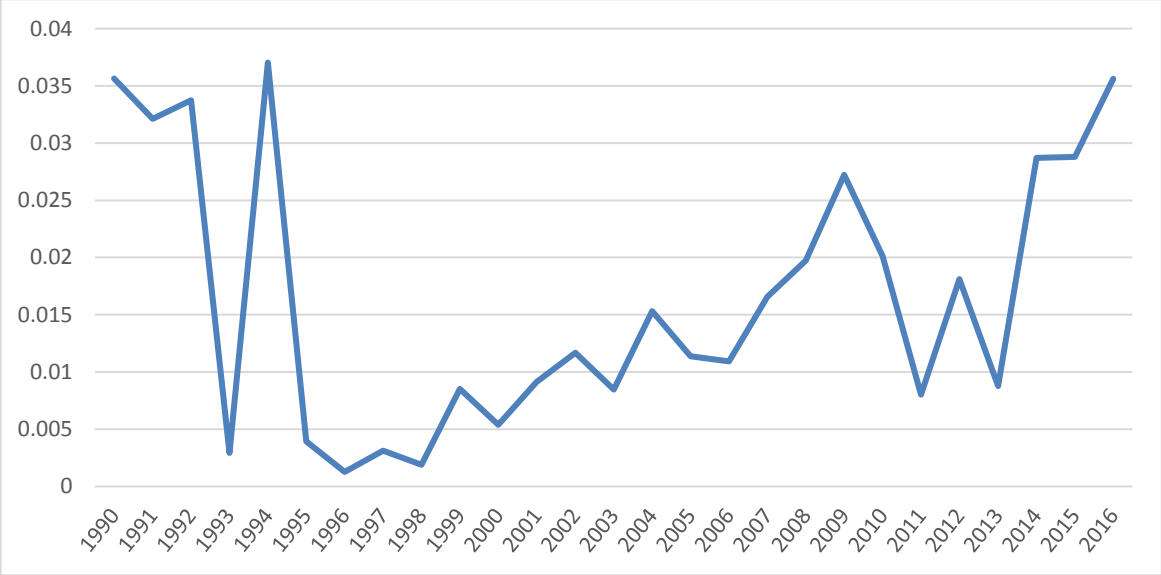

Figure 8 : Production of domestic and industrial firewood in Alberta (1990-2016) in million m³
(source : national forestry database http://nfdp.ccfm.org)

3. Forest exploitation levels

The volumes of harvested wood from Alberta's forests are described in more details in SGS's report on forest sustainability.

A central concept in forest management and in forest economics is the Wood Supply, which reflects the potential sustainable harvest. According to the National Forestry Database[6], *it refers to an allowable volume of timber that can be harvested over a specified period of time.* On Crown Land, the Wood Supply is also referred to as Annual Allowable Cuts, which is the maximum amount of wood that the authorized operator of the respective forest management unit is allowed to harvest. Each province estimates their potential harvest levels or ACCs on lands under their jurisdiction.

On Crown land in Canada, we can see that the actual cut always remains below the level of wood supply and that the gap between both was especially large in the period 2005-2010 because of the reduced commercial harvesting during this period (Figure 9).

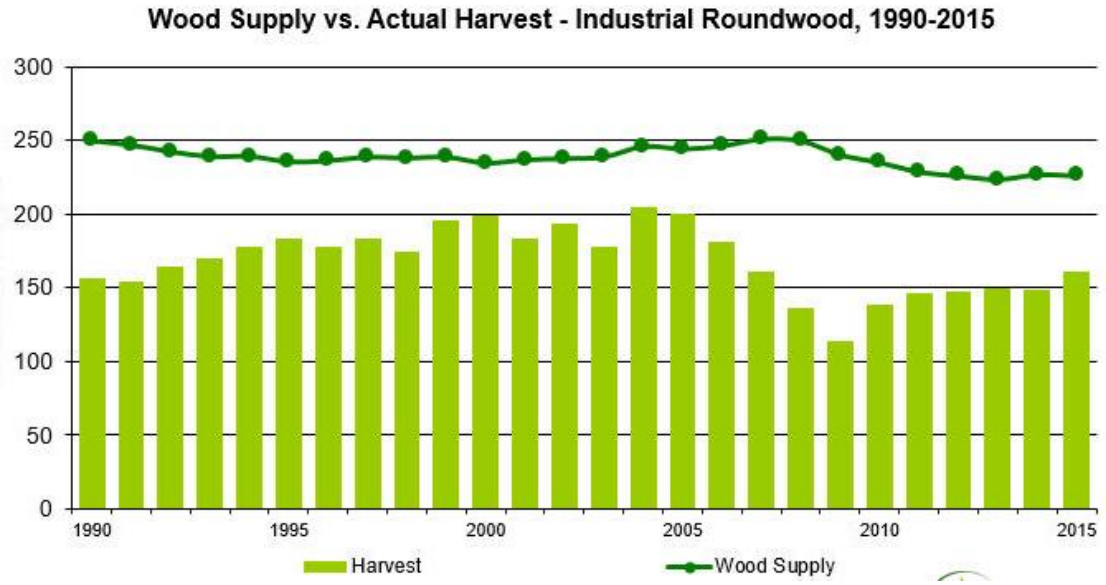

Figure 9 : Comparison of estimated sustainable wood supply and actual wood harvest in Canada (1990-2015) in million m³
(source : national forestry database http://nfdp.ccfm.org)

In Alberta, the AAC, as a five-year rolling average, used to be of about 24 million cubic metres per year in the period 2001 to 2005. Then, after 2005, the mountain pine beetle outbreak led the authorities to raise the levels of Allowable Annual Cuts (AAC) as part of effort to salvage timber and control pest propagation. It is probably because of those additional cuts planned as response to the beetle outbreak that the actual levels of harvesting remained rather stable on Crown Land after 2005 (Figure 10). Otherwise, we would have expected to see the actual harvest to fall like elsewhere in Canada.

[6] http://nfdp.ccfm.org/supply/background_e.php

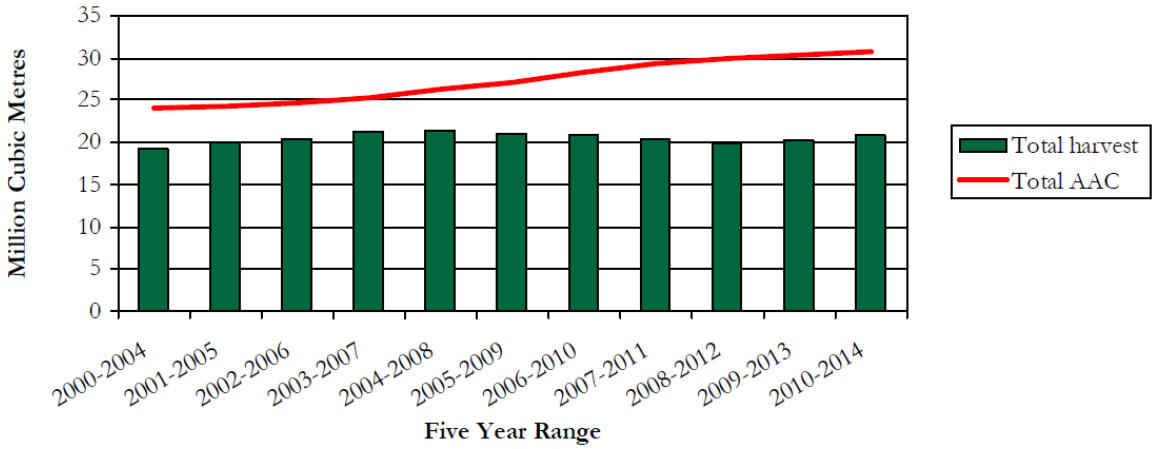

Figure 10 : Allowable annual cuts and actual levels of harvesting as a five-year rolling average (2000-2014) on Crown Land in alberta
(source: Sustainable Forest Management – 2015 Facts & Statistics –Annual Allowable Cut, 2017, Ministry of Agriculture and Forestry)

4. Price of wood resources

Because of massive exports of Canadian wood to the USA, it is common practice in Canada to refer to USA's Random Lengths softwood lumber composite price when analysing the trends in lumber prices (Figure 11).

Lumber prices in North America have fallen between 2005 and 2009 in relationship with the Mortgage Subprime Crisis By 2013 the lumber prices had already reached a level which is close to the average of the last 30 years (if prices are corrected to reflect inflation). The latest trend shows a very sharp increase in the lumber prices to customer, which seems to result from the USA's new imposed tariffs on lumber importations from Canada[7].

Figure 12 present price indices for the price of sawnwood in Canada. Without the influence of the USA's import tariffs, the lumber prices on the domestic Canadian market appear to have remained much more stable recently, with a slow increase comparable to inflation rates.

[7] https://www.bloomberg.com/opinion/articles/2018-05-10/trump-gives-the-gift-of-high-lumber-prices

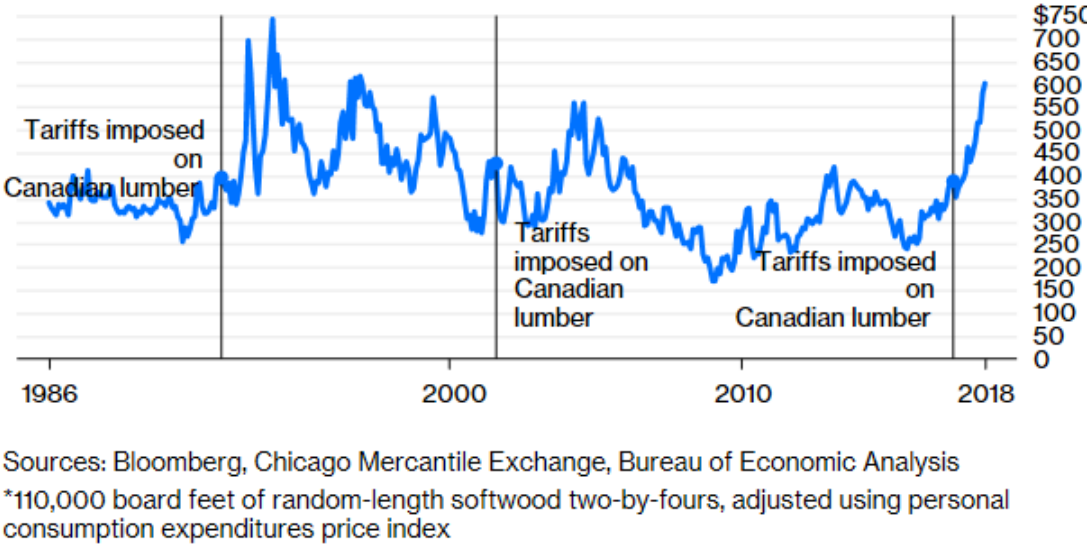

Figure 11 : Random Lengths softwood lumber composite price (1986-2018), in USD/MBF (source: Bloomberg 2018 https://www.bloomberg.com/opinion/articles/2018-05-10/trump-gives-the-gift-of-high-lumber-prices)

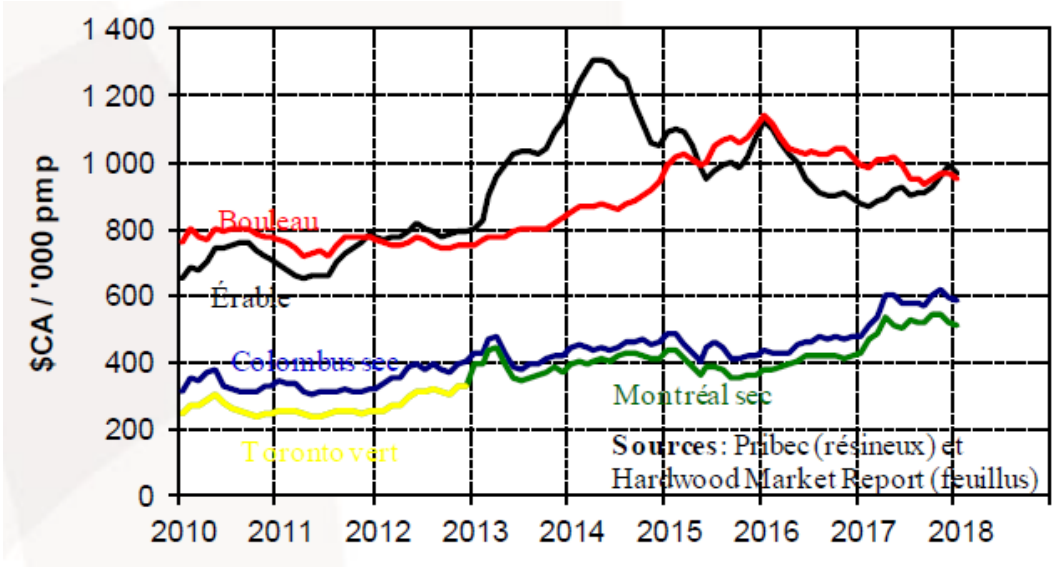

Figure 12 : Sawnwood prices in Canada (2010-2018)
Red=birch, black = maple, green = Montreal index for softwood, blue = Columbus index for softwood, yellow = Torronto index for softwood.- Prices in Canadian dollars, not adjusted to compensate inflation ; (source : Forêts, Faune et Parcs Québec[8])

[8] https://mffp.gouv.qc.ca/wp-content/uploads/prix.pdf

After year 2000, the prices of wood pulp and wood chips remained rather stable in Canada, as reflected on Figure 13, while the price of newsprint paper shows more fluctuation, without long term increase or decrease.

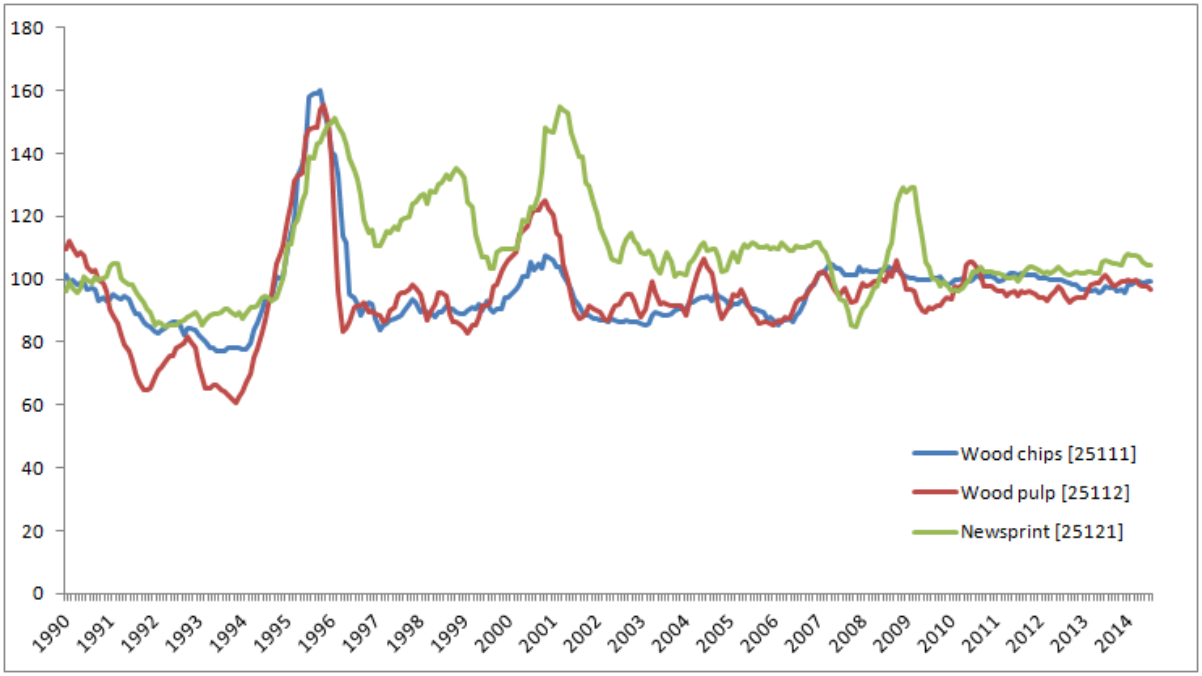

Figure 13 : Price index for wood chips, wood pulp and newsprint in Canada (1990-2014)
reference : 100 = price index for 2010
(source : Statistics Canada, CANSIM, Industrial product price index, by North American Product Classification System - NAPCS)

5. Import and export of wood resources

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

While the imports and exports of roundwood to/from Canada remain negligible compared to the domestic production, it is noticeable that both the imports and exports have decreased between 2005 and 2009, when the economic crisis struck the US construction market and have been going down ever since (Figure 14).

Even though Canada is a very large exporter of wood, very little volumes are exported as roundwood. This is because the sawmill industry is very well developed and competitive, as it can process large amounts of roundwood, available at cheap price on the domestic market (because stumpage prices on

Crown land are low). Hence most of the wood exports from Canada are as lumber. As per 2016, the roundwood exports represent only 5% of Canada's roundwood production and Canada was even a net importer of round wood until 2010.

Because of the increase of the round wood trade to Asia, the total exports of round wood are currently largely higher than they used to be before the 2004-2009 crisis. In total, Canada is now a net exporter of round wood. The situation of Alberta as far as roundwood international trade is concerned is completely different from the rest of the country. The export levels have never been large and have become insignificant after the 2005 crisis. The roundwood export from Alberta has not been increasing again afterwards, unlike in Canada as a whole and in British Columbia in particular (Figure 15). Actually, Alberta hardly export any roundwood at all.

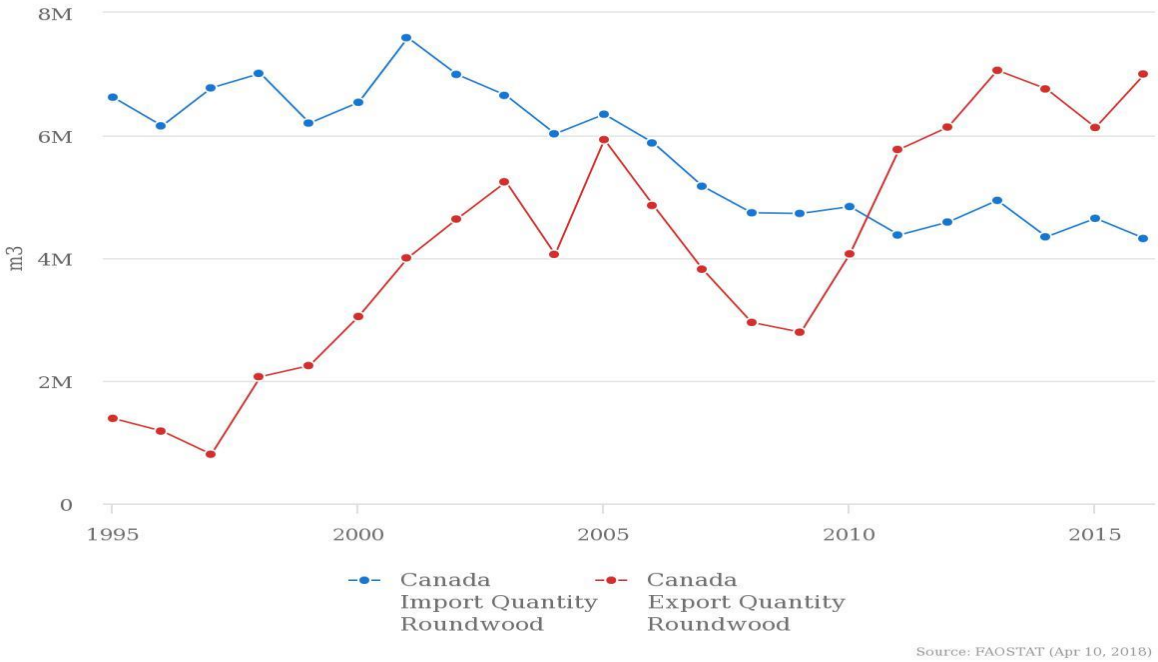

Figure 14 : Roundwood imports and exports in Canada (1995-2016)
(source : FAOstat)

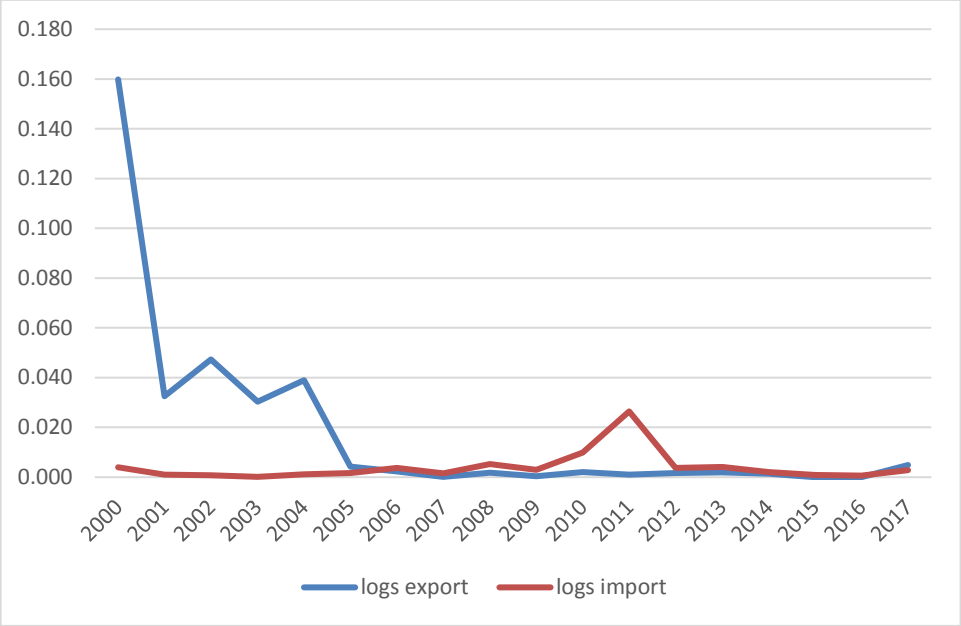

Figure 15 : Roundwood imports and exports in Alberta (2008-2016) in million m³
Source : Natural Resources Canada https://cfs.nrcan.gc.ca/statsprofile/trade/ca

The exports of sawnwood (Figure 16) from Canada as a whole show rather stable levels before the 2005 crisis, then they have collapsed to reach in 2009 about 50% of their pre-crisis level. The export have fairly recovered in the 20010-2016 to reach levels close to to the pre-crisis situation again. Sawnwood imports to Canada are not significant.

The trend for international sawnwood trade (Figure 17) is quite the same in Alberta, where the exports have suffered of the crisis and recovered afterwards to nearly reach the pre-crisis levels.

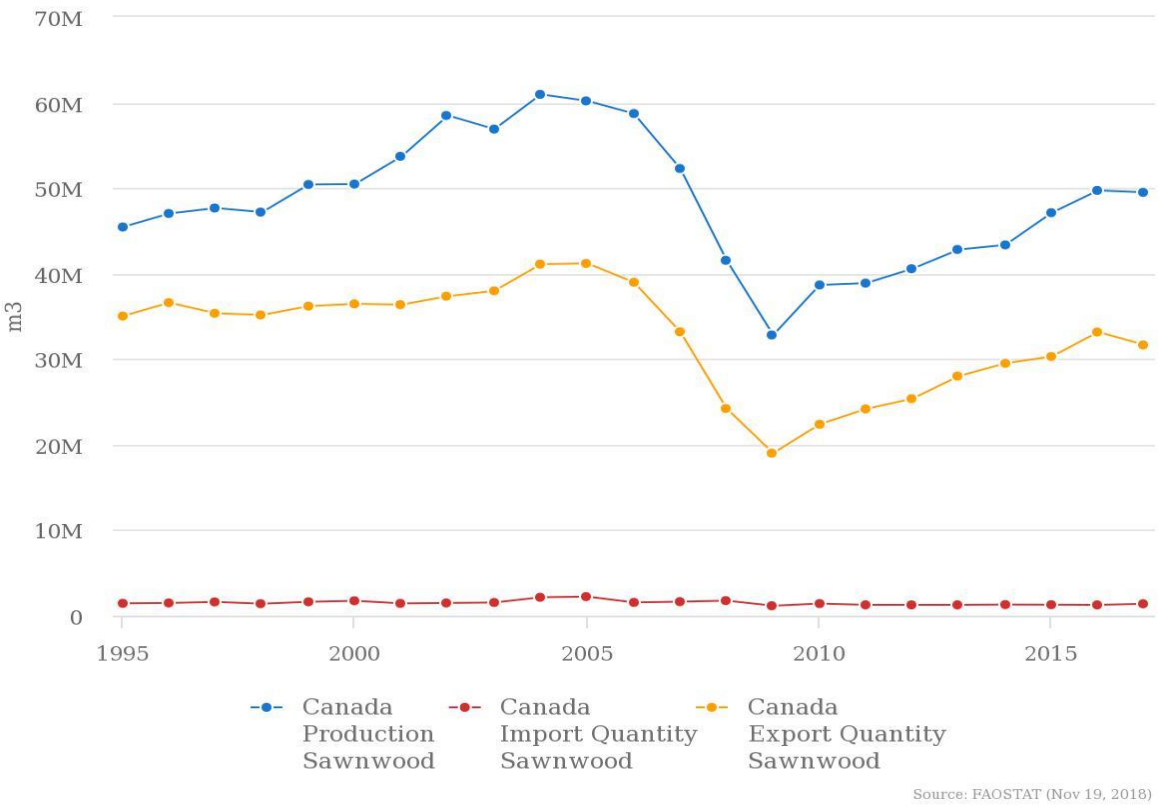

Figure 16 : Sawnwood imports and exports in Canada (1995-2017)
(source : FAOstat)

Figure 17 : Sawnwod imports and exports in Alberta (2000-2017) in million m³
Source : Natural Resources Canada https://cfs.nrcan.gc.ca/statsprofile/trade/ca

The exports of pulp for paper from Canada have remained rather stable, with only a small decrease between 2005 and 2009, while the production of pulp for paper was falling sharply (Figure 18). This suggests that the decrease in the production of pulp for paper was mostly at the expense of the domestic paper production (which collapsed between 2005 and 2009) and not at the expense of pulp exports. The domestic production capacity of both pulp and paper has indeed sharply decreased in Canada between 2005 and 2009. Currently, the export of pulp for paper account for slightly more than 50% of the domestic production and the imports remain negligible.
On Figure 19; we can see that the exports of paper from Canada have been constantly shrinking since 2005.

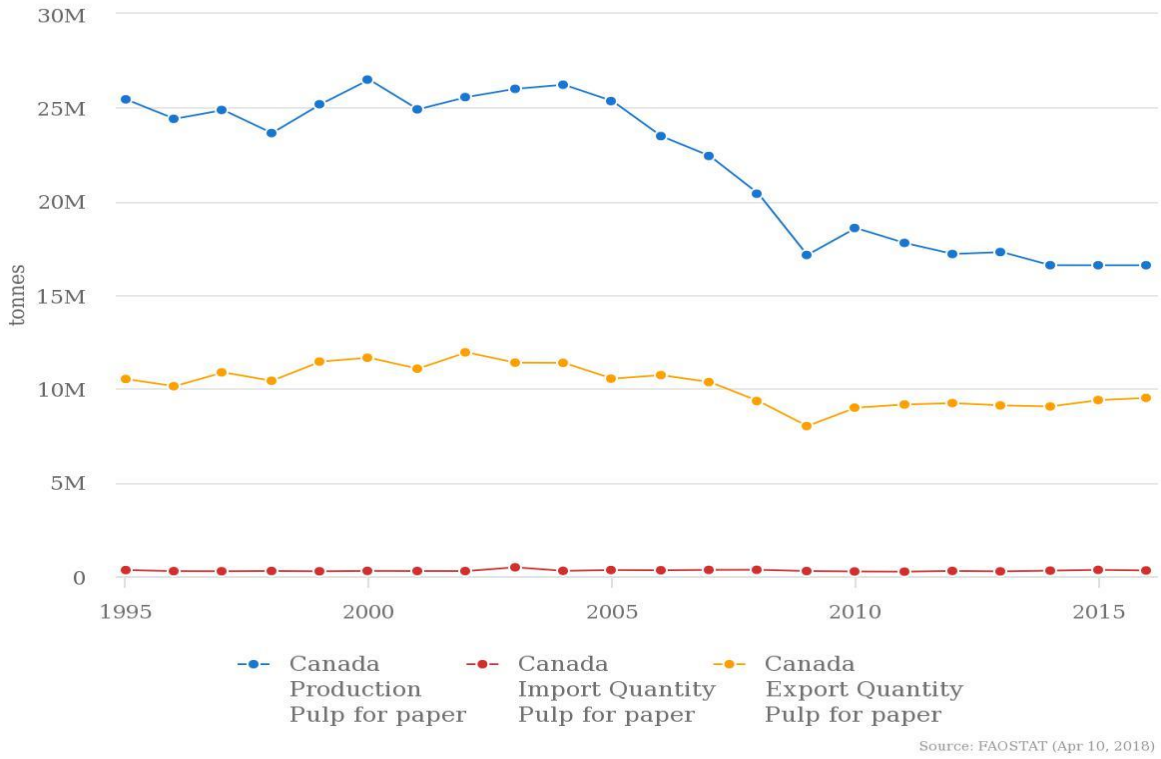

Figure 18 : Production, imports and exports of pulp for paper in Canada (1995-2016)
(source : FAOstat)

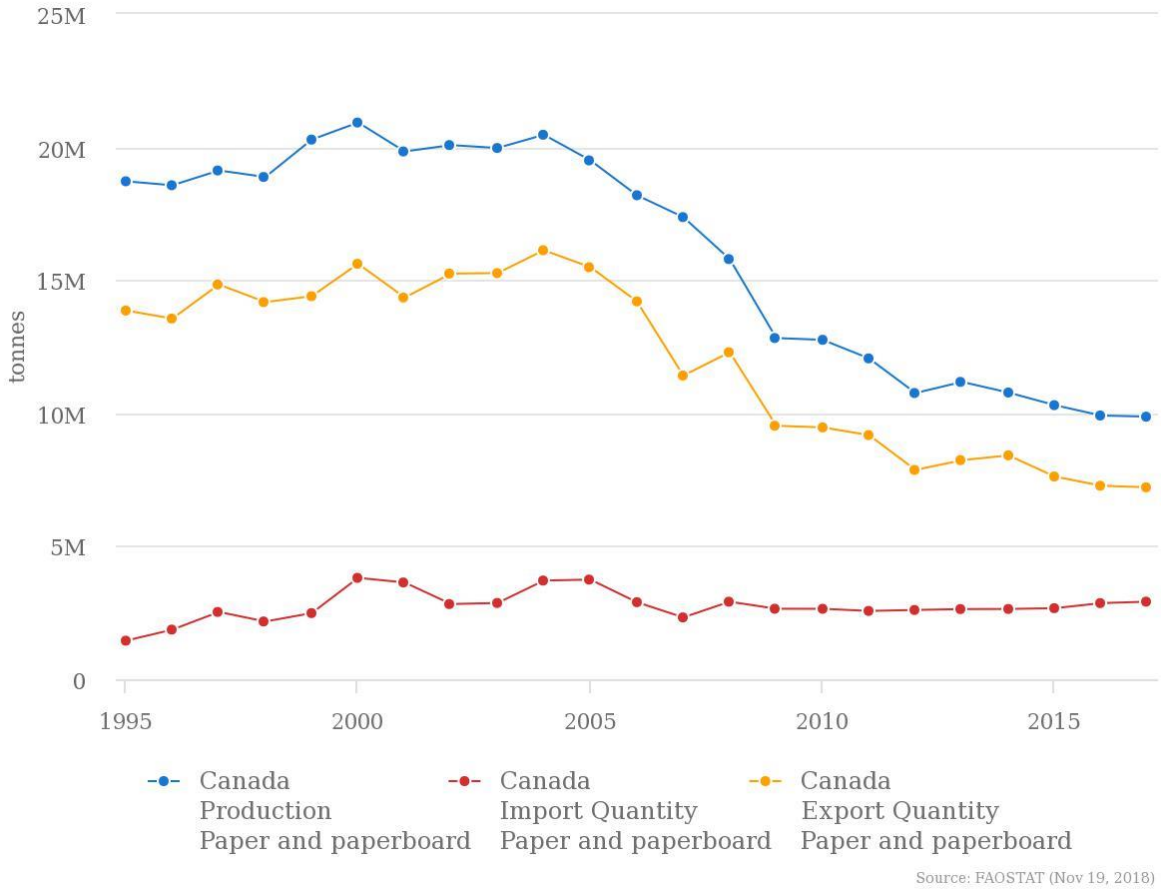

Figure 19 : Production, imports and exports of paper in Canada (1995-2016)
(source : FAOstat)

On Figure 20 we can see the same trend for the pulp trade to/from Alberta. The pulp imports are virtually inexistent, while the exports remain stable and even show a slight increase over the last years. With only 1 paper mill and 6 pulp mills, Alberta accounts for 8% of the pulp and paper exports of Canada[9].

Because the pulp and paper exports actually consist more of pulp than of paper in value (Figure 21) the export revenue was kept rather constant over time because the pulp exports have been stable in Canada and Alberta, unlike the paper exports which continue to decrease in Canada as a whole (Figure 19).

[9] FPInnovation, Wood Market Statistics, Alberta, edition 2011

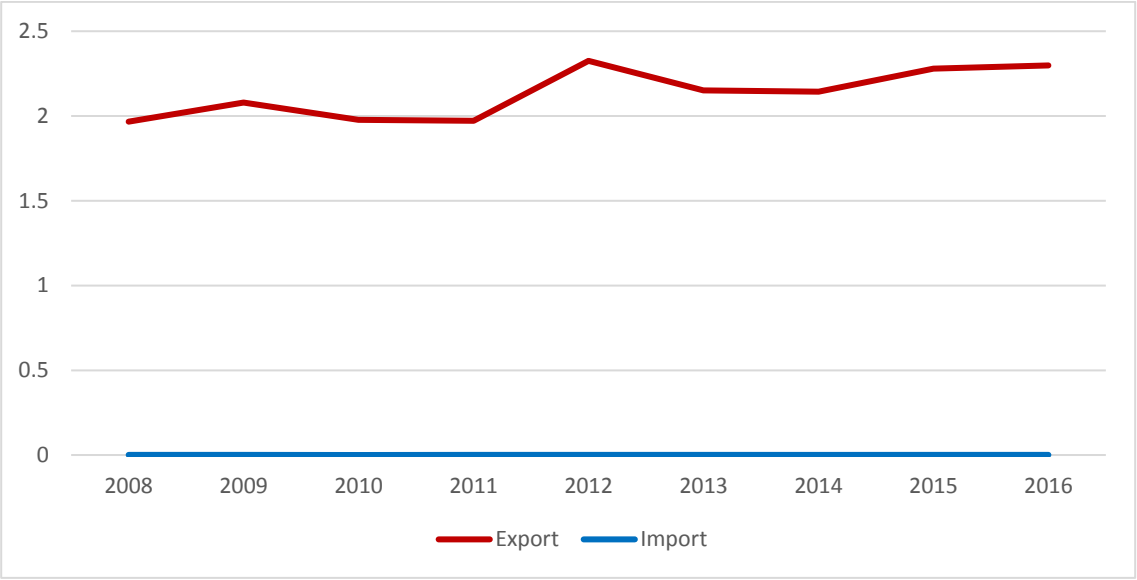

Figure 20 : Wood pulp imports and exports in Alberta (2008-2016) in millions dry tons
Source : Natural Resources Canada https://cfs.nrcan.gc.ca/statsprofile/trade/ca

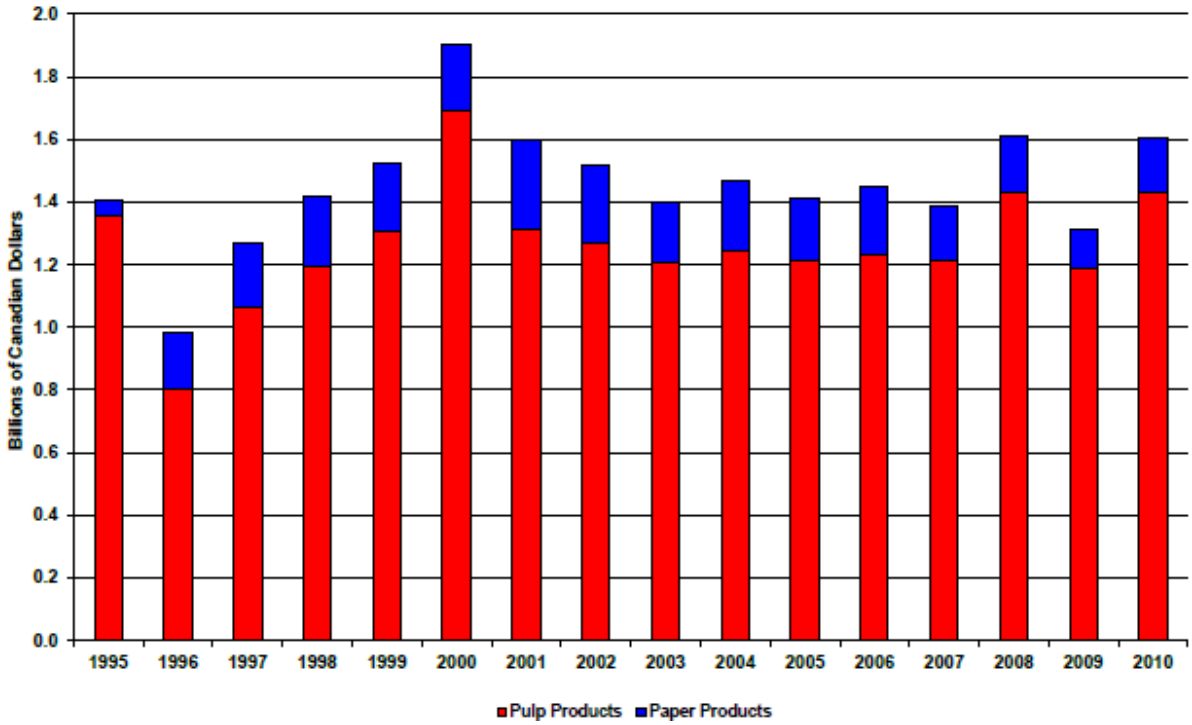

Figure 21 : Pulp and paper exports from Alberta (1995-2010)
Source : FPInnovation, Wood Market Statistics, Alberta, edition 2011

The produced and exported volumes of wood-based panels have sharply fallen after 2005, in relation with the dropping demand on US markets, which is the major market for the panels used in construction (Figure 23 and Figure 22). The exports have hardly increased again after 2009. During the same period, the exported volumes have remained negligible.

In Alberta, we can observe an excellent recovery of the exports of panels between 2012 and 2016 (Figure 23). The imports of wood-based panels into Alberta are dominated by particleboard and plywood, while the exports from Alberta are dominated oriented strand boards. Like in Canada as a whole, exports have been increasing after 2010. Imports are rather irregular.

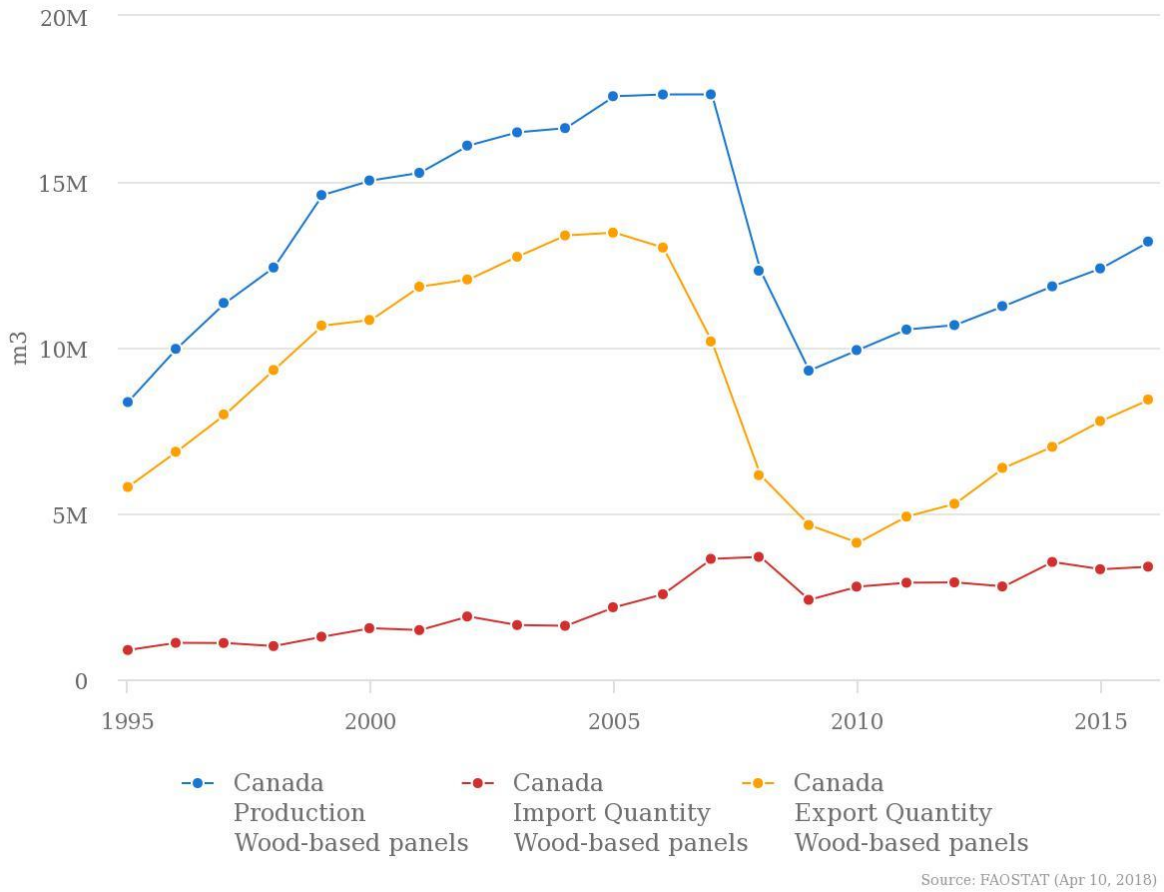

Figure 22 : Production, imports and exports of wood-based panels in Canada (1992-2013) (source : FAOstat)

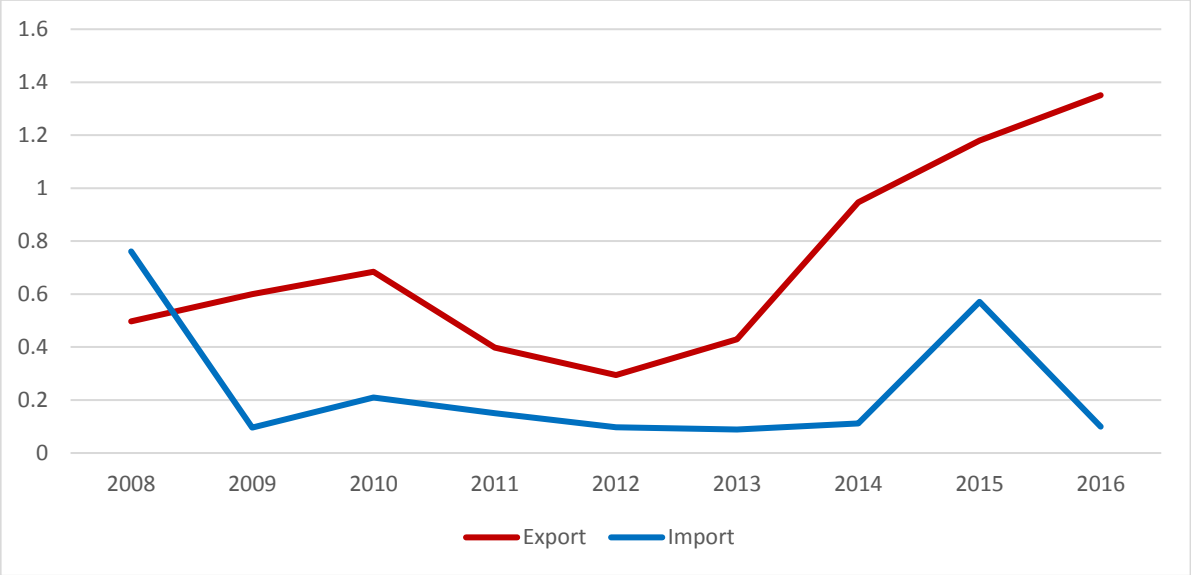

Figure 23 : Wood-based panels imports and exports in Alberta (2008-2016) in millions m³
Source : Natural Resources Canada https://cfs.nrcan.gc.ca/statsprofile/trade/ca

We can see on Figure 24 that the main export destination for wood products from Alberta are United states and Asia. The exports to United States have been decreasing between 2004 and 2009. They have partially recovered afterwards but remain depressed. Even though the exports to the Asian markets have been growing, they can't make up for the losses in the exports to the US market, which remains the largest destination of exports.

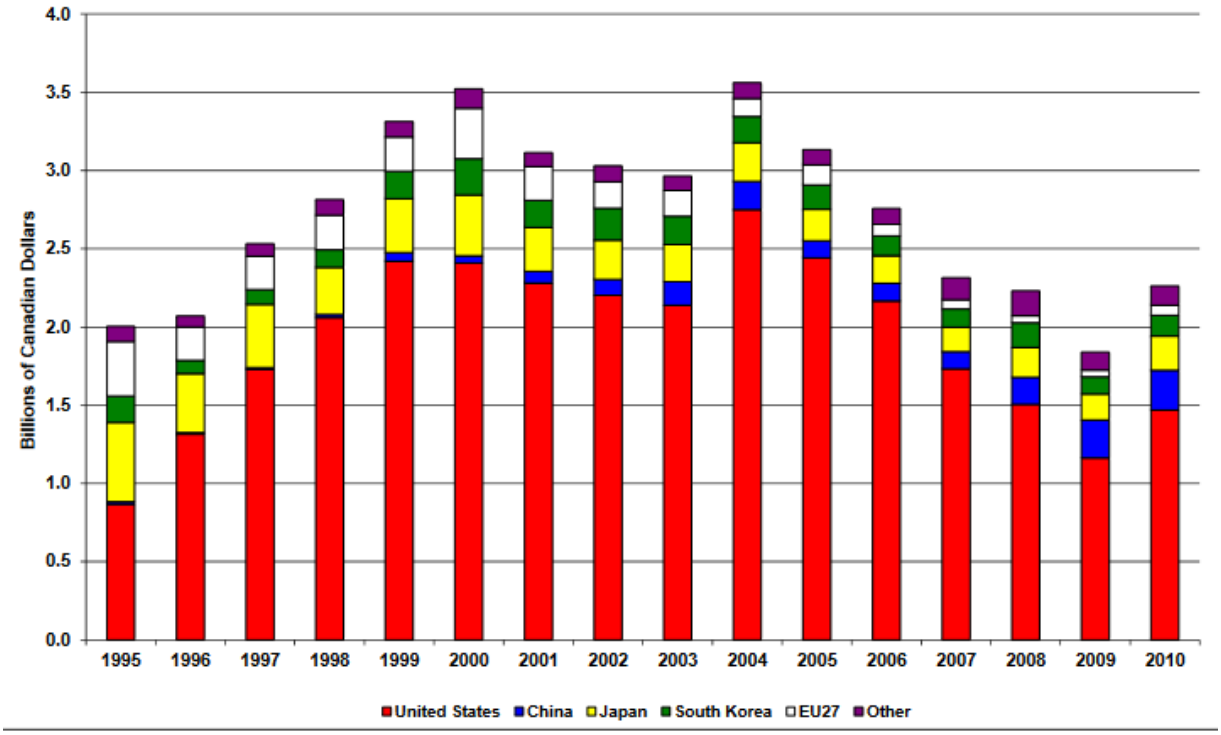

Figure 24 : Wood products exports from Canada per destination
Source : FPInnovation, Wood Market Statistics, Alberta, edition 2011

6. Wood pellets

The recent evolutions of the wood pellet production in Canada as a whole is presented on Figure 25. We can see that the pellet production has nearly doubled in only four years. More than 80% of the pellets are currently exported.

Even though production statistics are not available by province, Figure 26 indicates the repartition of the production capacity per province. We can see that Alberta account for about 5.8% of the national production capacity in 2018. From this proportion and from the most recent reported total pellet output from Canada (as presented on Figure 25), we can estimate that the yearly production pellet production from Alberta to be around 150,000 tonnes pellets for Alberta.
Through a rough estimation with the suitable conversion factors, we can come to the conclusion that the production of wood pellets in Eastern Canada represent about 1% the annual roundwood harvesting.

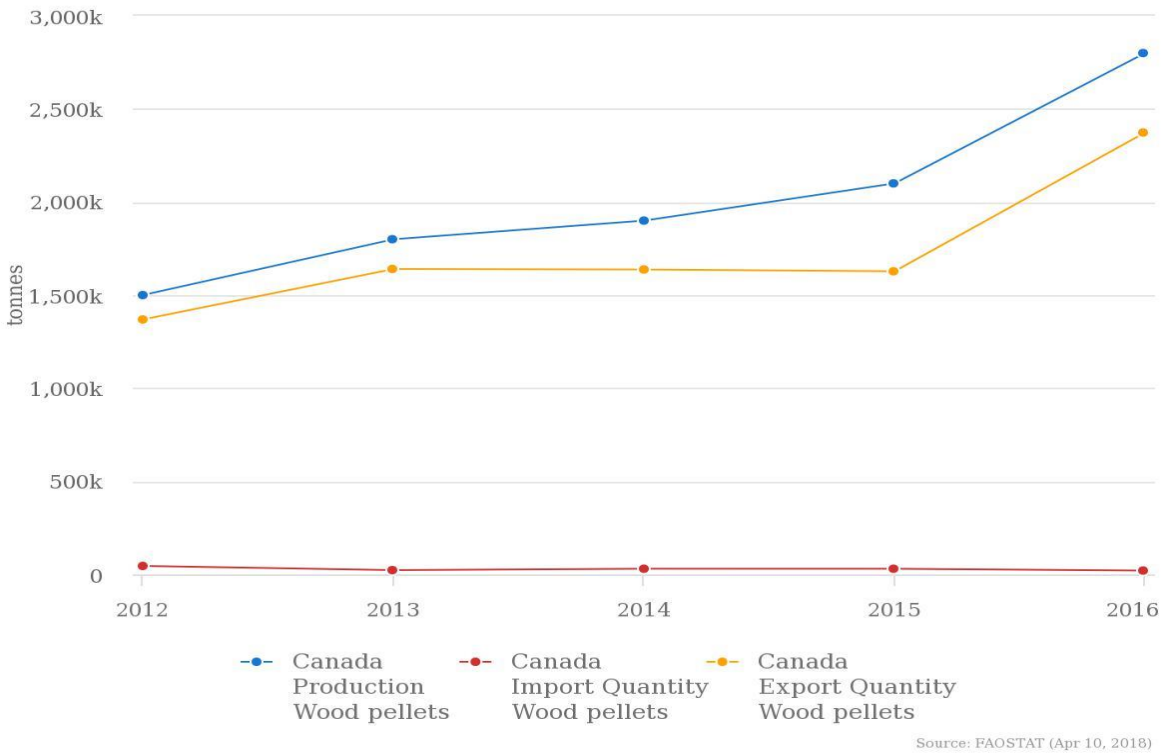

Figure 25 : Production, imports and exports of wood pellets in Canada (2012-2016)
(source : FAOstat)

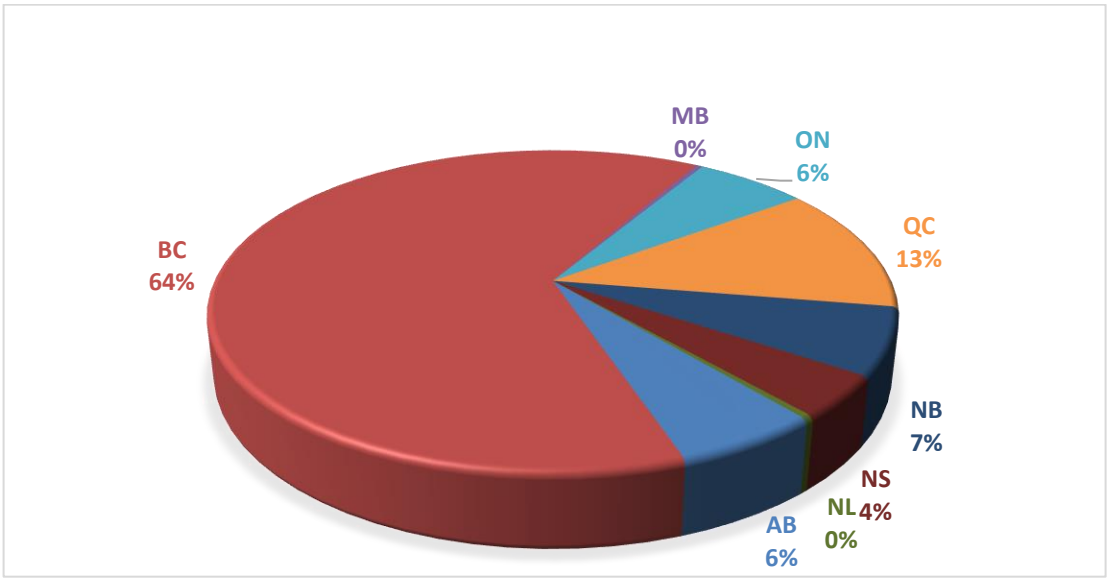

Figure 26 : Wood pellet production capacity per province in 2018
(source : Canadian Biomass Magazine
https://www.canadianbiomassmagazine.ca/images/cbm_pelletmap2018.pdf)

7. Conclusion

Canada and especially Alberta have a forest industry essentially oriented to the export markets. The exported products are mostly lumber, wood panels, as well as pulp and paper. The USA are the major destination for lumber.

Only 5% of the production is exported as roundwood. Despite a rapid increase of roundwood exports from British Columbia to the Asian markets, a similar trend is not experienced in Alberta where the roundwood exports remain nearly non-existent, which means that nearly all wood harvested is processed in the region.

The analysis of the wood market in Alberta, shows that a major decrease of roundwood production (by about 27%) was triggered by the subprime mortgage crisis in USA between 2005 and 2009, which caused the demand for wood based panel and lumber to collapse. This drop in production was much less severe than in the rest of Canada (where a 45% drop in roundwood production was experienced). Unlike in Canada as a whole, the recent roundwood production levels have recovered to the same levels as before the 2005.

Starting with the 2005 crisis and continuing until now, the paper production and the paper export from Canada has been continuously decreasing with permanent closure of some facilities and diminution of the production capacity. However, the pulp trade does not show the same trend : even though the total pulp production in Canada has been decreasing because of reduced demand from domestic paper mills, pulp exports have remained rather constant all throughout the crisis both in Canada as a whole and especially in Alberta where there are six pulp mills and only one paper mill. Even though fluctuating, the level of pulp production in Alberta does not show any long-term decreasing trend, which strongly contrast with the rest of Canada.

Large amounts of round wood are available for harvesting, but in recent years the harvested volumes from regulated forest land were much smaller than the Allowable Annual Cut (AAC), because of market conditions and also because of the pine beetle outbreak which has expanded from British Columbia to Alberta, with the need to sanitary cuts and salvage cuts. The market is however slowly recovering, as lumber prices and harvested volumes have been increasing since 2010.

The partial recovery of sawmill activity after 2009 means that larger amounts of sawmill residues are available again for pulp, panels and bioenergy. The stable character of the pulp production and export indicates sufficient supply despite the reduced levels of forest harvesting.

Additionally, increasing amounts of material from beetle damaged trees which is not suitable for lumber and paper applications and still suitable for energy will be available in the next decades as more necessary sanitary cuttings will be needed.

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