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TIMBER FINANCE
SHAPING THE CARBON SINK BUILT ENVIRONMENT

Sector Report: Timberland REITs

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1. Introduction to Timber REITs

Real Estate Investment Trusts (REITs) are investment vehicles that, subject to certain conditions, do not pay income tax on income that is distributed to shareholders as a dividend. Hence, they are considered tax transparent, as they avoid double taxation at the company and the investor level. REITs can be exchange-listed or private, and are typically used in the context of traditional real estate assets such as office, residential, retail, etc. Timber REITs are a sub-category of REITs and are defined as REITs in which more than 50% of the value of the assets is related to the production of timber. While REITs generally own buildings and collect rents, Timber REITs own timberland, sell timber to wood products companies, and regrow the trees over a multi-year period.

Three Timber REITs currently exist and are exchange-listed: Weyerhaeuser, Potlatch Deltic and Rayonier. The first company converting into a timber REIT was Plum Creek in 1999 – it was later acquired by Weyerhaeuser, which became a REIT in 2010, 110 years after its founding. In 2004 Rayonier, founded in 1926, and Potlatch, founded in 1903, became REITs as well. Although the set of investment opportunities in this asset class is very limited, Timber REITs nevertheless are important for investors as they provide liquid access to an illiquid asset class (timberland).

2. Environmental Aspects

Through their timberland assets and active forest management, Timber REITs have a direct environmental impact on the CO2-sequestration (absorption) capabilities of forests and their long-term carbon storage potential. By actively managing the risk of fires, insects and diseases, they can help preserve the health and long-term carbon storage capabilities of forests. By planting new seedlings, they reforest the harvested areas and re-activate the carbon sequestration cycle that lasts for decades. The timber they sell can be used further in the value chain to produce carbon-storing wood products and these products in turn provide an important **substitution effect**[1]: building a house with timber, instead of concrete and steel, avoids significant emissions associated with CO2-intenstive production processes of steel and cement. Timber is also used in short-lived products which are quickly thrown away and burned (e.g., biomass for energy generation) - in these cases, the carbon that had been sequestrated over decades gets released back into the atmosphere. Therefore, it is important to minimise the burning of biomass (which tends to be considered, for good and bad reasons[2], carbon-neutral) along the value chain and give preferential treatment to durable applications for this biomass.

To put things into perspective, the volume of harvested timber corresponds to a single-digit percentage of the total forests, since it takes decades for seedlings to grow to the size of the previously harvested trees. Weyerhaeuser reports a harvesting rate of ca. 2%; Potlatch Deltic 3.9%; and Rayonier ca. 3.5% of total acreage, closer to 2% if we take reported carbon stock harvested vs. stored. The timberland areas controlled by Timber REITs range from ca. 2m acres for Potlatch to ca. 10m owned by Weyerhaeuser, which also manages an additional 14m acres in Canada that it does not own, as in Figure 1. The chart also shows the companies' estimates of the **carbon stored** in their forests, including above-ground biomass, soil carbon, and excluding dead wood.

[1] Studies such as Nunery & Keeton (2009) show that some sequestration and storage capacity is lost when actively managing the forest, which makes product substitution effects particularly important in terms of net balance.
[2] While biomass is often considered *carbon neutral*, since its emissions will eventually be sequestrated again by newly planted trees, it generates significant emissions when burned. See the critical letter sent by a large group of scientists to leading world politicians https://www.woodwellclimate.org/letter-regarding-use-of-forests-for-bioenergy/

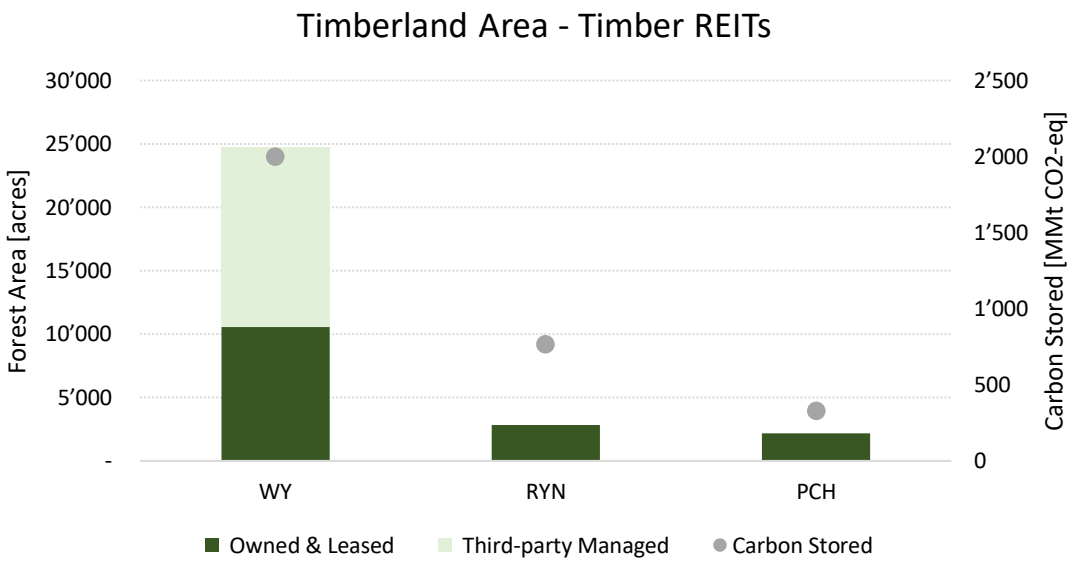

Figure 1: Owned, leased and managed forest areas for the three Timberland REITs, and carbon stored in the forests as reported by the companies. Source: companies' reports.

If we consider **carbon sequestration**, instead of the storage in the forests, the numbers reported by companies cannot always be easily compared, due to different methodologies, assumptions and system boundaries. Figure 2 below shows the breakdown of different carbon footprint drivers[3].

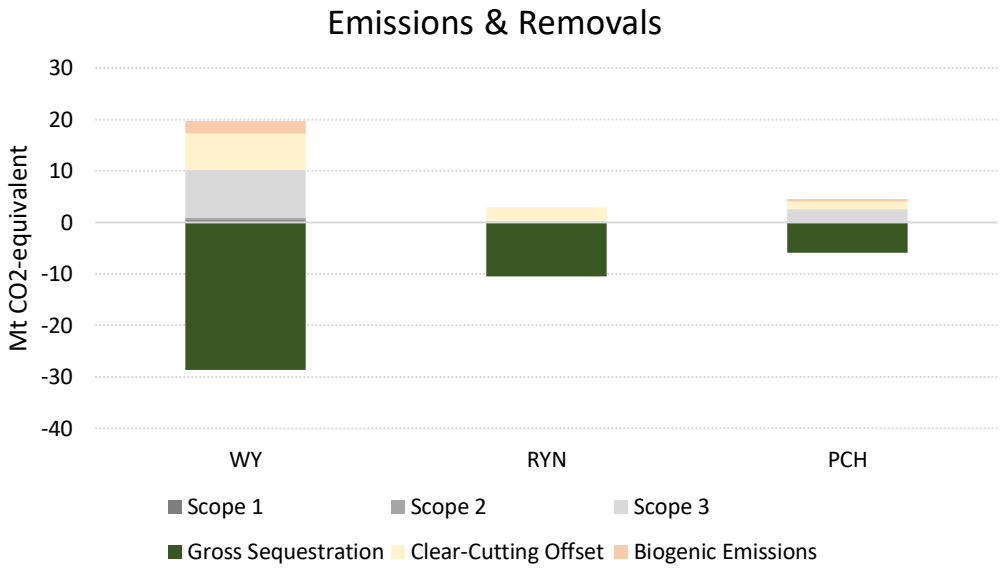

Figure 2: reported Scope 1, 2 and 3 emissions, as well as biogenic emissions; modelled CO2 (gross) sequestration based on forest areas owned and leased; modelled clear-cutting offset. Sources: companies' reports (Scope 1-3 and biogenic, forest area), Timber Finance (sequestration and clear-cutting emissions).

[3] It should be noted that forest removal and emission numbers are our indicative estimates, rather than exact quantities, and are aimed at providing an approximate indication of steady-state operations. There may be significant variability in actual and reported sequestration by companies in individual years, e.g. due to wildfires, updates to the inventories, etc.

Rayonier pops up because of its almost negligible emissions compared to the carbon sequestration of its timberlands – it can be explained by the different business model according to which the company does not process timber into, for example, sawn wood or pulp.

The criticism against the harvesting practice called *clear-cutting* has to be addressed as we need to provide, where possible and despite the high complexity of the subject, a comprehensive picture of the companies' carbon footprint. As a background, carbon is stored not only above-ground in trees (woody biomass), but also below-ground, in the soil[4]. Studies such as Peichl et al. (2022), Hamburg et al. (2019) and Vestin et al. (2020) show that after clear-cut harvesting, carbon and other greenhouse gases are released back into the atmosphere over the years and that carbon is eventually re-sequestrated by newly planted trees after several years. The intensity of these emissions appears to be very significant in the harvested area[5]. If applied to ca. 2-3% of the managed forest area (the harvested portion) it becomes much smaller, on an aggregate basis, but is still significant. Rayonier has harvesting cycles[6] of 22-28 years in the U.S. South and New Zealand, where trees grow faster, and 40-50 years in the Pacific Northwest. Relative to the breakeven horizon by Hamburg et al. (2019) – 15 years for a Northern US forest - ca. one third of Rayonier's harvesting cycle would be needed to go back to "carbon breakeven". As a rule of thumb, one could then discount gross sequestration by ca. 20-30% in order to obtain an approximate estimate of the net sequestration after accounting for harvesting effects[7]. While these numbers are just indicative estimates, they can give us an indication of the overall climate impact[8]. It should be noted that there is no established consensus at an industry level for, and even less with regards to the reporting of, emissions associated with harvesting. Academically, according to Peichl et al. (2022), at least as far as boreal forests are concerned, the driver of clear-cut emissions appears to be the lack of sequestration, rather than an increase in respiration; Vestin et al. (2020) note that different studies reported different dynamics.

Timberland REITs' activities are concentrated in the earlier part of the timber value chain, which otherwise goes further with companies that process lumber into engineered wood products, generating emissions (fossil as well as biogenic) from their sawmills; companies that process fiber logs into pulp and paper, generating emissions from their pulp and paper mills; and companies who then distribute these products, generating emissions with their logistics. Substitution effects, mentioned earlier, are not included in this analysis and are included in the subsequent timber value chain. Scope 3 emissions reported by Timberland REITs are related to the further processing of wood products by other companies, consequently aggregations of emissions across the entire timber value chain must accommodate this and ensure emissions are not double-counted.

As a bottom line, investors who are interested in holding liquid real assets which are directly linked to the forest's carbon sequestration capacity, Timberland REITs are the primary category to consider.

3. Evolution of the Business

As part of their evolution, Timber REITs divested over the last two decades from paper and packaging activities, as can be seen in Figure 3, to focus on timberland and wood products. Weyerhaeuser divested its containerboard packaging business in 2008 to International Paper; its liquid packaging board business to Nippon Paper Industries; and its pulp business to International Paper, in 2016. Potlatch spun off its pulp business in 2008 into a separated listed entity – Clearwater Paper - and merged in 2018 with Deltic Timber, increasing its presence in wood products. Rayonier spun off its cellulose business in 2014 into a separate listed company – Rayonier Advanced Materials.

[4] Above-ground percentage as estimated by the companies: 50% Weyerhaeuser, 54% Rayonier, 35% PotlatchDeltic
[5] According to Vestin (2020), up to 17.5 t CO2-eq/ha/year over a three-year average
[6] https://www.reit.com/news/reit-magazine/november-december-2017/rayoniers-sustainable-forestry-helps-build-nassau-county
[7] Assuming quadratic sequestration rate growth for the first 20 years, constant sequestration rate afterwards, and a 50-years cycle, the offset would be -19%
[8] Peichl et al. (2022) estimate an 18-year breakeven horizon for Swedish boreal forests, consistent with the study by Hamburg et al. Southern forests may however have different dynamics and more academic research is required to improve quality and reliability of the estimates.

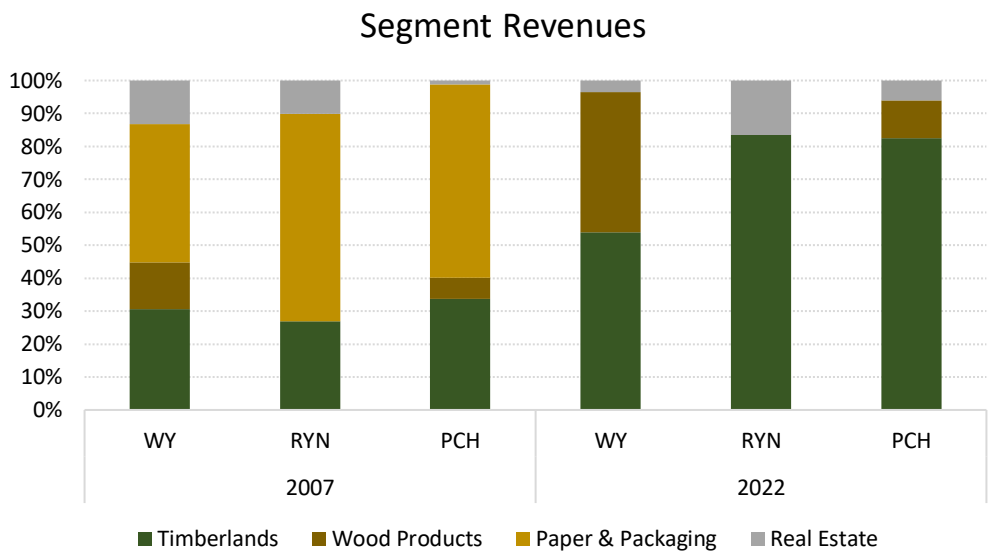

Figure 3: US Timber REITs' segment breakdown in 2007 and 2022. Source: companies' reports, Timber Finance.

After ceasing paper and packaging activities, timber REITs today focus on forest and wood products. Rayonier is focused on timberland, auctioning standing timber and selling logs, while retaining a significant real estate segment focused on the sale of land. Potlatch also predominantly focuses on the most fundamental part of the timber value chain, while also manufacturing plywood. Weyerhaeuser is the timber REIT with the largest share of revenues from wood products further along the value chain.

4. Stock Performance and Business Characteristics

From the end of 2007, corresponding to the peak of the last market cycle, before the global financial crisis ignited by the US Subprime crisis, the three REITs delivered on average a net total return of 5.9% per year. The smaller Rayonier and Potlatch Deltic significantly outperformed Weyerhaeuser over the period.

In a larger context, taking both the timber value chain as well as the traditional construction sector into consideration, Timber REITs delivered very strong risk-adjusted returns. Their lower total return over the cycle (6.5% median), while not being as high as that of other wood product manufacturers (8.5%), was much less volatile than the rest of the industry (25% vs. 49%).

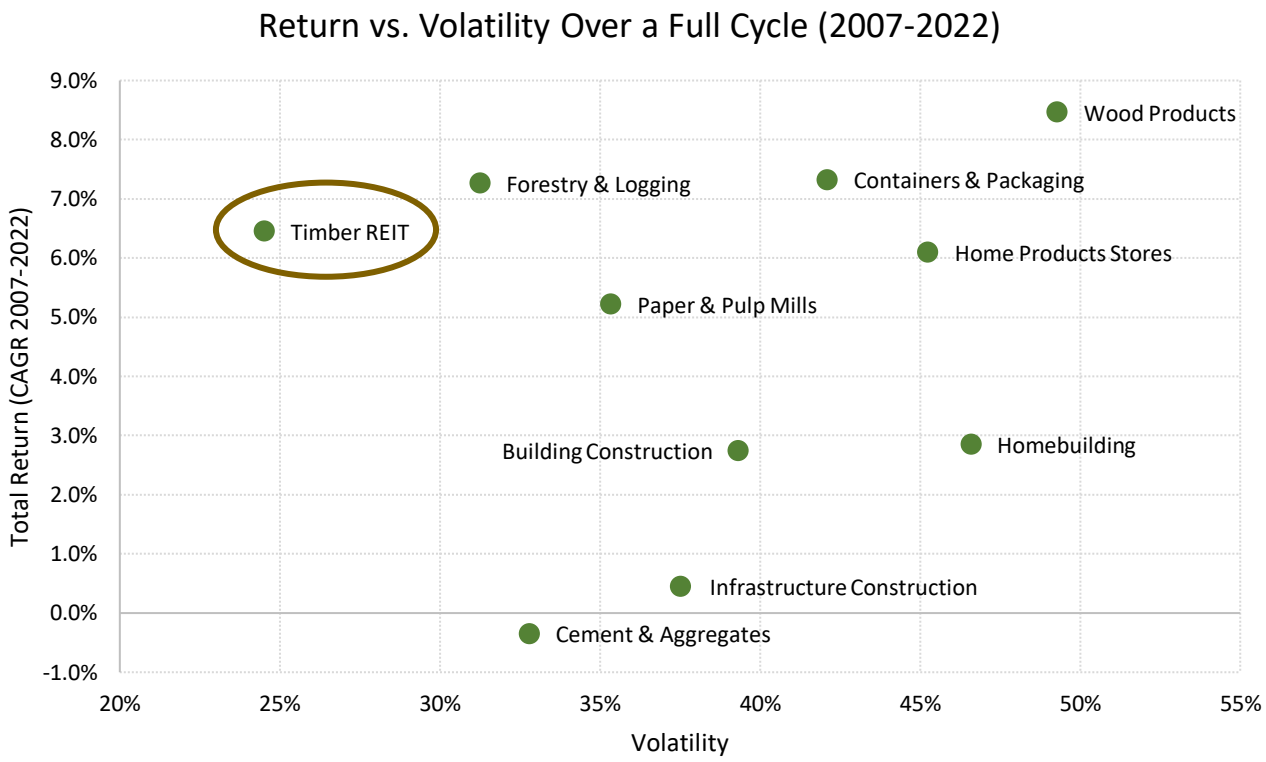

Figure 4: Return and volatility for timber and non-timber sub-sectors over the full cycle period 2007-2022. Source: Bloomberg, Timber Finance.

The basic business model (excluding vertical integration into wood products) of Timber REITs is relatively simple: they manage timberland and sell timber to companies who will then use that timber to manufacture more value-added products. When demand for wood products decreases, Timber REITs will generally sell less and at lower price. When demand for wood products increases, they will sell more at higher prices. A cyclical business. What makes Timber REITs special, is their ability to adjust harvest rates when prices are unfavourable and preserve and grow their asset base. This allows companies to ramp up sales volumes when market conditions normalize. There is an important optionality value in Timber REITs that is valuable to long-term investors. During the 2008-2009 recession, Timber REITs did exactly that – they reduced harvesting to preserve their timber inventory and let it grow, in view of better market conditions to sell.

Today, compared to the 2008-2009 downturn, Timber REITs have higher exposures to timberland and less towards wood products, so the long-term orientation and optionality dynamics of timberland investments have become an even more dominant characteristic defining their risk/return profile.

5. Regional Exposures

In the US, key areas for industrial timberlands are the North-West, South-East and North-East (see Figure 5). Different areas have different types of trees – hardwood grows mostly in the North and South, softwood is dominant on the Pacific coast. Also, different areas are exposed to different risks in relation to fire as well as insects and diseases. The interaction of these effects is complex, as fires of low intensity can also have positive effects (FAS, 2021). The map below explains us why Timber REITs own timberlands in certain regions and not others.

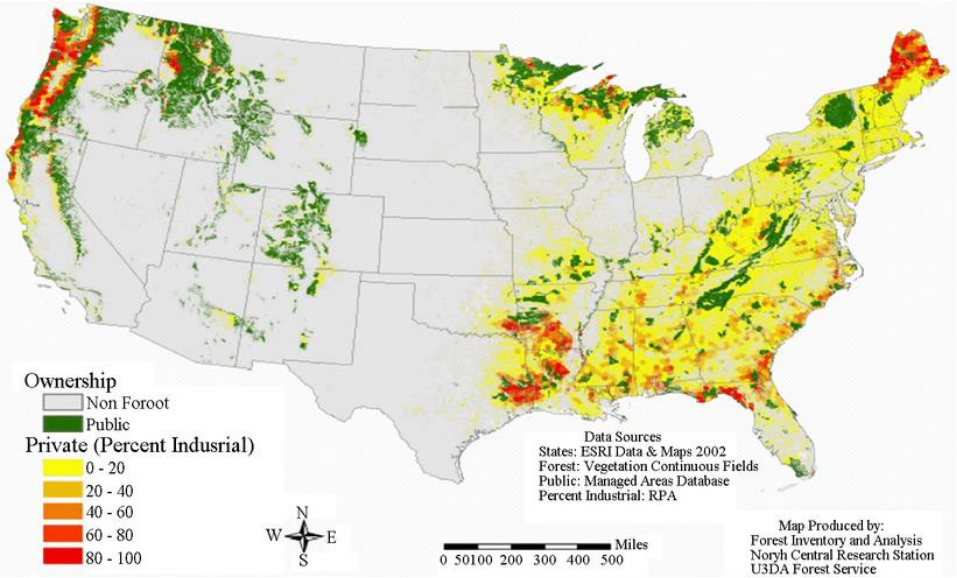

Figure 5: Timberland distribution in the US. Source: T. Straka (2013).

Unsurprisingly, the three timber REITs own forests exactly in those regions, but it is interesting to note how close the REITs are to each other in terms of regional exposure, as summarised in Figure 6. Over 60% of their timberlands exposure is located in the US Southeast, while the rest is in the Northern regions or, in the case of Rayonier, split between North-western US and New Zealand. It is interesting to see Potlatch Deltic's evolution over the last 15 years, moving from a North-western focus to a South-eastern focus, helped by the acquisitions of Deltic Timber with timberlands in Arkansas and Louisiana, and CatchMark Timber with timberlands in Georgia, Alabama and South Carolina.

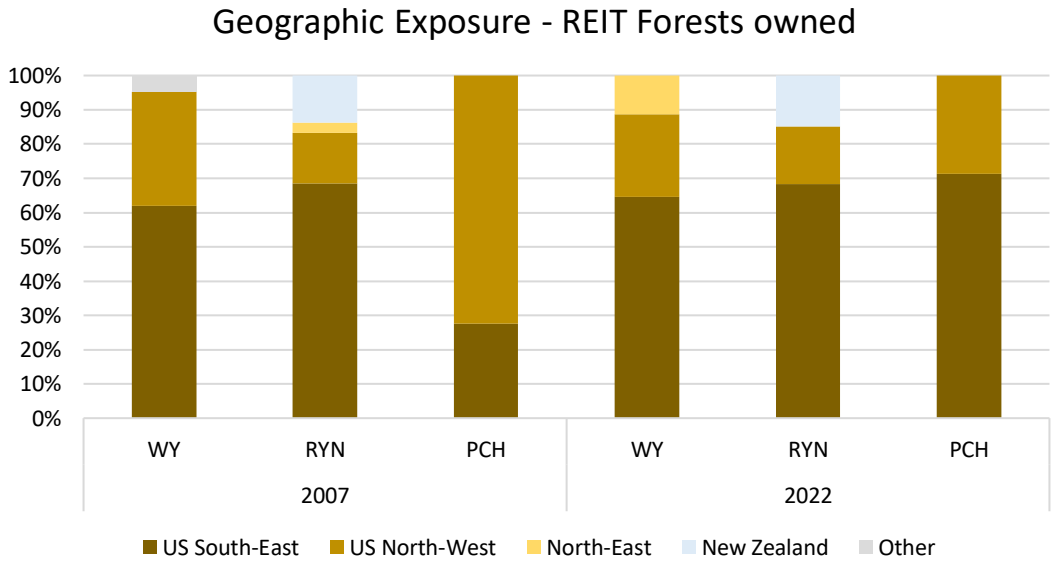

Figure 6: Timberland distribution in 2007 and 2022 for the three Timberland REITs. Source: companies' reports, Timber Finance.

6. Conclusions

Timber REITs are a liquid option to invest in productive timberlands. They actively generate a significant environmental impact through their harvesting and sustainable[9] forest management practices, influencing sequestration and carbon storage in forests and harvested wood products. From a business point of view, their evolution over the last decades led them towards the initial stages of the timber value chain, spinning off paper and packaging businesses, and focusing on a cyclical activity that entails a significant optionality value arising from the decision of how much to harvest depending on prevailing market conditions and monetary incentives.

7. Literature

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8. Disclosures and Conflicts of Interest

Some or all the companies mentioned in this report may be included in the Timber Finance Forest-Based Construction Basket tracker and are part of the Timber Finance Carbon Capture & Storage Index.

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9 Weyerhauser and PotlatchDeltic report 100% of their timberlands being SFI certified, Rayonier 96%

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