

The Impacts of Climate Change on Pulp and Paper Manufacturing Industry in Australia

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Abstract: Climate change has been a growing concern in the past several decades, strongly affecting the global ecosystem from numerous perspectives. Thinking from a human being's point of view, the impact of climate change is not simply about the weather or temperature, it involves almost all areas of our life through living and producing activities. Forest, as the primary natural resource of raw material for the pulp and paper manufacturing industry (PPM) is fairly sensitive to climate. This directly results in a high dependency on climate change in the industry. Besides that, the nature of its high demand in energy and water resources also enhances the climate-related impacts of the industry from various operating aspects. This research paper mainly focuses on the potential influence arising from climate change in relating to the PPM industry in Australia. Both risks and recommendations are included in the consideration.

Keywords: Climate Change; Pulp and Paper Manufacturing Industry; Sustainability

1. Introduction

Climate refers to “the mean temperature, precipitation, winds, humidity, frequency of extreme weather event over a length period of time, which is at least thirty years” (Pan, 2019, p.1). Climate change, therefore, could be defined as the deviating from the past mean climate for a long-term due to natural variability and anthropogenic activities such as emission-based global warming. In the wake of climate change, climate-related risk refers to risks include those from potential acute or chronic natural disasters, change in climate patterns and the related technology, market, legal and changes in government policies risks.

Intergovernmental Panel on Climate Change (IPCC) has listed a lot of evidence of climate change on how human activities affect the climate, and the most convincing evidence is the change in surface air temperature over land from 1850 to 2018 (IPCC, 2019). According to the statistical data, there is only around 0.9°C increase of the surface air temperature in 110 years, from 1850 to 1960; whilst from 1960 to 2018, accompanied with acceleration of industrialization and the increase of the number of factories, the surface air temperature approximately increased 1.4°C. Therefore, we could infer that climate change is critically affected by human activities.

The PPM industry mainly manufactures newsprint, tissue, and packaging, from a variety of inputs including woods and recycled paper. Besides, in the Australian PPM industry, the majority of these companies are in the eastern states of Australia, which are Queensland, New South Wales, and Victoria. Besides, there are three leading companies, Norske Skog Industries Australia Limited with 13.1% market share, Paper Australia Pty Ltd with 19% market share, and Pratt Holdings Proprietary Limited with 27.6% market share.

2. Transition Risks

2.1 Policy and Legal Risk

The PPM industry is highly energy-consuming and polluting.-Carbon emissions emitted from this sector are worthy of attention as well.

The first policy is about carbon emission. Australia has two main targets to reduce its greenhouse gas emissions under international agreements, the Kyoto Protocol, 5% below 2000 levels by 2020 and the Paris Agreement, 26-28% below 2005 levels by 2030. Climate Council (2018) stated that even if the current reduction of carbon emission is on the right track to meet the 2020 Kyoto Protocol target, it is not adequate to meet the 2030 Paris Climate Agreement target. Therefore, Australia is likely to publish further legislation or use other approaches. When these new regulations or tools are promulgated, the PPM industry, as one of the industries with high carbon emissions, will likely be the first to be regulated.

The second policy is about climate-related risk disclosures. AASB (2019) has published the climate-related and other emerging risks disclosures: assessing financial statement materiality using AASB/IASB Practice Statement 2. Although all the companies in the Australian PPM industry are limited or private companies, they may later become listed companies on ASX or public companies with the requirement to make mandatory disclosure.

In summary, there is a high policy risk for the Australian PPM industry. To meet these targets, companies need to update their equipment and improve their productivities. For companies, the choice could be purchasing of new equipment which is costly or invest more in research and development. In addition, for all the new equipment, there will be time and cost for staff training in equipment operation. Overall, investment in fixed assets or R&D costs could be massive, but it may not be rewarded in a short time. Small companies might go bankrupt as a result.

2.2 Market risk

The major raw material of the PPM industry is wood. Commercial planting trees are mainly distributed along the eastern coast of Australia and southwest Australia that coincide with the distribution of major PPM enterprises. In addition, the tree as a raw material has a long growth cycle and is mainly affected by temperatures and rainfalls.

For the growth of the tree, appropriate temperature and abundant rainfall are essential. Comparing the mean temperature and rainfall between 20th century and today, there is a 1.1 °C increase of the mean temperature, and a remarkable decrease in rainfall, especially in the eastern and southwest Australia. The main commercial plantation areas, indicating a negative correlation. Besides, rising temperatures and a net decrease in average rainfall in the southern and eastern Australia could make droughts and heatwaves occur more frequently. Hence increasing the probability of tree wilting and forest fires.

According to the industry performance, even with the development of technology and the change of people's environmental awareness that reduced the demand for newsprint and printing, the demands for tissue and packaging continued to increase. Therefore, the demand for raw material – wood, is likely to remain unchanged.

Overall, the increasing price of raw material could push the industry's costs to a higher level. If the selling price remains unchanged, as costs grow, these companies' revenue would fall. If the selling price increases, compared with imported low-cost paper products, the industry will lose its competitive advantage, resulting in a reduction in market shares.

2.3 Reputation Risk

Reputation is an essential intangible asset. Considering the PPM industry as one of the major polluters, it has attracted continuous public attention regarding climate change. Hence, reputation risk should be also included as one of the transition risks, viewing from both customer evaluation and relevant legal penalty perspectives.

Nowadays, customer evaluation of purchasing has taken sustainable theories into consideration, rather than focusing solely on quality-dependent factors, such as quality and price. Therefore, the likelihood of negative impacts on reputation for

the PPM industry seems to be high. Moreover, partially products of the PPM industry is regarded as a traditional business, and it can be substituted by digital business (Remane, et.al., 2017), which seems to be more consistent with sustainability.

Under this circumstance, the demand for the PPM industry might decrease significantly, and its bargaining power in the market tends to be lower. However, in the meantime, the cost of production for the industry remains in a relatively higher level, and has a trend of increasing consecutively, due to the climate change concern. Thus, a forward decrease of the profitability for the PPM industry might arise.

3. Recommendation

3.1 Recycling Resources

One of the essential recommendations in the production process is to maximize the use of recyclable materials, which upholds to replace virgin paper by recycled paper in higher efficiency and lower waste way, which could have positive impacts from both economic and sustainable perspectives.

According to the research from Environmental Paper Network, one tone of wood-based virgin paper requires 4.4 tones of fresh trees as input material, while one tone of recycled paper only needs 1.4 tones of recovered paper (Kinsella, 2018). As for the tissue products, recycled products' impact on climate change is only at around 30% of virgin tissue products (Ford, 2018). The significant difference between them could directly result in a huge cost reduction, and sensitivity deduction towards the material price change. The efficiency of using raw material can be increased to a large extent, and there would not be too much demand for input - trees. Moreover, if it is possible to keep on improving the recycled material efficiency by newly developed technology, the positive impact on both climate change and the PPM industry could be enlarged to a higher level.

3.2 Clean Energy and Production

Using renewable energy sources and higher efficient machines could be another train of thought. In achieving a lower carbon emission, using wind power generation or hydroelectric generation, and improving energy efficiency through water usage can be effective to some extent. In completing this recommendation, it requires the companies among the PPM industry to make energy efficiency investments. Both drivers and barriers should be considered.

Firstly, the cost of energy is massive for the industry. With the growing concern of climate change, sustainability has becoming a common awareness among the public. One of the results is a more volatile energy market, with an overall increasing trend of price. This would encourage the PPM industry, which is energy-intensive, to adjust the structure of their energy resource, making renewable and clean energy more practical. Secondly, this kind of behavior represents companies' positive and responsible attitude towards the climate change issue, which is consistent with what has always been advocated by the regulators and the whole society, this might efficiently prevent energy efficiency investments from being declined.

However, in reality, there still exist some barriers for investing in clean energy, causing less incentive to make such investment. The primary reason should be the short-term oriented focus. Investment in clean energy might lower the return of investment in the beginning period. Furthermore, purchasing a high-efficiency machine would be recognized as an expense, while not too much extra profits might be generated for the first year. If the financial metrics are the main indicators of the performance measuring system, there would be less incentive for the companies' manager to make those investments.

4. Conclusion

To sum up, based on the previous discussion, climate change has resulted in a series of risks that would negatively affect the PPM industry from both transitional and physical perspectives. It indicates that to some extent, climate change has truly pushed the whole industry up to a riskier level. Despite the specific meaning for each risk, they can be generally concluded as the risk of increasing in cost as a whole.

Referring to the positive aspect, climate change also brings multiple opportunities during the course of implementing related recommendations. The main structure consists of improvements from inputs (direct material), operating, and reporting processes. According to the analysis and discussion of the feasibility for each recommendation, mitigating the climate-related risks from the input perspective seems to be the one with the highest availability, since there is a little change to the industry's operational structure, but only affect the material resource at the first place. And it can significantly cut off the high expense on virgin wood material, leading to higher profitability.

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