
IMPACT OF CERTIFIED EMISSION REDUCTION (CER'S) ON THE PROFITABILITY OF TAMILNADU NEWSPRINT AND PAPER LIMITED (TNPL) - A MIXED APPROACH CASE STUDY

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Abstract

Purpose – TNPL is an active player in Indian CDM market. Kyoto Protocol gave birth to CDM, which can be used by entities to earn certified emission reduction (CER's) certificates and earn some incentives for reducing Green House Gas (GHG) emission. The purpose of this paper is to evaluate the impact of certified emission reduction (CER's) on operating profits of TNPL and to give some recommendation for reporting standards for CER's.

Design/methodology/approach – Mixed research methodology has been applied for the current study. Multiple regression technique has been applied to analyse the impact of CER's on financial performance of Indian companies. The data for dependent, independent variables and control variables has been obtained from Ace Equity database for the period of 12 years. The output of the regression is supported by content analysis of annual report for the period of 11 years.

Findings - The CER's income does not have a significant relationship with operating profit, but has descent percentage of correlation with operating profit. Output of content analysis reports shows there is a decline in the information regarding CDM over the year. It has been suggested to TNPL that CER's income has a descent percentage of correlation with operating profit, hence they should continue to report important information regarding CDM in their annual reports.

Originality Value – Current research is first of its kind to analyse the impact of CER's on operating profits of TNPL. It is beneficial source for companies doing carbon trading and reporting in their annual reports.

Introduction

Kyoto protocol gave birth to Clean Development Mechanism (CDM), which is an international offset program. It allows developed countries to earn Certified Emission Reduction (CER's) certificates through offsets and sequestration projects in developing countries. Each CER's represents a reduction of one metric ton of carbon dioxide in the atmosphere. Developed countries can use CER's to offset their Greenhouse Gas emission (GHG) in more cost effective way (Michael Gillenwater, 2011). Entities with excess CER's

can trade them in exchange at prevailing market price and this trading of CER's is called carbon credits trading. The amount of global emission can be controlled through buying and selling of carbon through carbon credit trading method (Gupta, 2011). In this way organisation who are responsible for GHG emission are made to pay for their act and those who reduce GHG emission can be incentivised for their act. Thus, carbon trading motivates the business entities to reduce GHG emission by using clean technologies and other environmental friendly method of operations.

India signed and ratified the protocol in August 2002 and has emerged as a world leader in reduction of GHG emission by adopting CDM (Vivek Birla, 2012). India is the second largest market for CDM after China. As on 2012, total 7366 CDM projects were registered in the work, out of that 1444 projects were from India(Newswire, 2008). Many Indian entities like Delhi Metro, Gujrat Flourochemicals, Jindal Group etc... had undertaken CDM projects and are being benefitted selling CER's. One such entity is Tamilnadu Newsprint Private Limited. The aim of this study is to analyse the impact of CER's on the operating profitability of TNPL and also to analyse the information disclosure practice followed by TNPL in their annual report regarding CDM.

Tamilnadu Newsprint Limited (TNPL) and CDM Project

TNP is has undertaken four CDM projects with UNFCCC, first under waste management, second and fourth under renewable energy sector and third in energy efficiency improvement and three projects are under validation stage (Limited, 2018). The first project is "Methane extraction and fuel conservation project" which involves installation of a closed anaerobic system that will produce and collect consistently high quality methane- rich biogas from bagasse wash water generated from bagasse yard and bagasse washing area in pulp mill. The project involves in utilisation of the collected biogas as a fuel in a lime kiln, which was earlier using furnace oil. Project extracts and captures biogas, nearly 15,000 m³ per day, in a closed digester and it helps in reducing methane emission. It is a first CDM project in the world in pulp and paper industry and waste management sector in the country. This project was registered with UNFCCC on 14th February 2005 and UNFCCC issued 1, 61,956 Certified Emission Reduction (CERs). Another CDM project of TNPL has generated 4 x 0.75 MW WEGs and 3 X 1.25 MG WEGs in the Devarkulam wind farm. This project generate green energy from wind source and sell electricity to state electricity utility. The project was registered on 24th May 2007 and reduced 97,408 tonnes CO₂ emission and generated equal amount of carbon credits for the period April 2004 till October 2011. Another project by TNPL of CDM has generated electricity using 5 x 1.25 MW WEGs in Alagiapandiapuram village of Tirunelvely district and 6 x 1.25 MW WEGs in Deverkulum villages of Tirunelveli District. Tjis project generates electricity using windmill energy and exported to state electricity utility. This project was registered on 4th April 2012 and reduced 28,478 t CO₂ equivalent per annum GHG emissions. There is another CDM project of TNPL registered with UNFCCC, where they have installed high pressure Black Liquor Solid (BLS) fired power plant operating on the Steam – Rankine cycle for replacement of the existing low pressure system. This project has reduced 1, 32, 632 MT of CO₂ equivalent GHG emissions and same number of CERs per annum for a period of 10 years from 3rd May 2011 to 2nd May 2021(Limited, 2018).

Literature Review

Current study aims to analyse the impact of CER's on the operating profitability of TNPL and also to analyse the information disclosure practice followed by TNPL in their annual report regarding CDM. Hence, the literature review has been divided into two parts, i.e. Impact of CDM of financial performance and content analysis of CDM disclosure.

Impact of CDM on Financial Performance

3M undertook a project where they analysed the relationship between carbon emission project and dividend per share. Using least square regression method it was found out that there is a significant relationship between carbon emission reduction project and dividend per share of 3M Company. Hence, it was suggested that some companies may experience enhanced dividend per share if they engage in carbon reduction project (Collins C. Ngwakwe, 2013). Another study using a sample of Australian Securities Exchange (ASX) 200 indexed companies from 2006 to 2010, impact of carbon reduction project on long lived asset value and operating cash flow was analysed. Using Heckman's Two Stage approach, it was found out that assets value and operating cash flow will be adversely affected if reduction plan is implemented. It was also found out that long lived asset will decrease if listed companies are emission liable. In fact, it was further found out that long lived assets is negatively associated with listed company's carbon emission level (Li Yongqing, 2013). Another research using sample companies indexed in Australian Stock Exchange 200 from 2006 to 2010 was done to analyse impact of carbon emission reduction plan on cost of capital. It was found out that cost of debt and equity will increase if companies are emission liable. Cost of debt is also positively correlated with companies' emission intensity (Yongqing Li, 2014). Another research analysed importance of clean development mechanism project on wind energy investment in Turkey. It was found out that enterprise value is positively correlated with CERs price (Murat Tunc, 2012). Using three Chinese state oil companies it was found out that companies to mitigate GHG emission are positively correlated to total assets and sales income, but negatively related to net income, return on total assets and return of shareholder value. It was also suggested that environmental performance will have long term impact on financial performance (Xiaoyu Liu, 2011). Using Economic Times top 20 Indian firms' impact of industry sector on voluntary environmental disclosure and association between firms carbon related risk exposure and cost equity was analysed panel regression. It was found out that firms which are operating in highly environmental sensitive industry sector are more likely to disclose carbon information publicly compared to those which are operating in the less environmental sensitive industry sector (Praveen Kumar, 2017). Using Japanese companies Corporate Social Responsibility report, relationship between environmental costs, corporate responsibility rating and financial performance was analysed. It was found out that companies' financial performance is positively related to average CSR rating and environmental conservation costs (Bea Chiang, 2015).

Content Analysis of CDM Disclosure

Annual report of top 100 African companies were analysed and a sentence count of environmental disclosure was done using Hackston and Milne methodology. It was found out that companies disclose significantly more environmental information than other companies, in total and each category (C J de Villiers, 2001). It was also found out that Carbon Disclosure Project (CDP) has successfully urged the firms to disclose extensive information

about climate change and response rate has been very impressive but not in regards of cognitive and value dimensions (Ans Kolk, 2008). It was also identified that there is a greater need for standardisation of carbon accounting and GHG auditing will require cross-functional skills with operational and process knowledge, accounting capabilities and understanding how operational data correlates with estimates of GHG emission (Olson, 2010). It was also found out that Australian emission trading scheme (ETS) is a complex market solution to reduce GHG emission. Measurement and reporting of GHG emission under Australian ETS is a challenge for accountancy professional to provide a workable conceptual framework (Patty McNicholas, 2011). Australia also implemented National Greenhouse and Energy Reporting (NGER) Act and it was found out that accounting researcher plays a significant role in highlighting the potential of accounting practices of carbon emission (Lodhia, 2011). CDP report of 85 Chinese companies were analysed and it was found out that valuable information is fully disclosed, there is an inconsistency in the annual report, social responsibility report and sustainability report and hence it was suggested that carbon reduction strategies and realise importance of carbon disclosure (Chen Zhang, 2011). It was suggested that rigorous governance framework and management system should evolve for GHG reporting keeping in consideration carbon pricing mechanism and companies financial performance and increased risk associated with inaccurate reporting (Martinov-Bennie, 2012). To analyse the carbon emission reporting in investment banking, financial institutions in USA, Europe and Australia were interviewed and it was found out that diverse methods were used by the firm to calculate, measure and report carbon emission (Matthew Haigh, 2012). Another study using Australian companies aimed to analyse the extent of voluntary carbon disclosure during 2006 to 2008. It was found out that carbon disclosure score has significantly increased. Larger firm with higher visibility tend to make more comprehensive carbon disclosure (Bo Bae Choi, 2013). Using the annual report and corporate social responsibility report for the year 2010 of top 100 A-listed companies in Shanghai Stock Exchange, a content analysis was done to analyse the extent of GHG reporting. It was found out that larger companies with higher level of GHG emission tend to have higher level of GHG disclosure. Profitability and overseas listing were not significantly related to GHG reporting. States own companies report less GHG information than private companies (Choi Ieng Chu, 2013).

Hence studies has been undertaken to analyse the impact of carbon reduction on financial performance, carbon reporting on financial performance and factors impact GHG reporting, but no study has been particularly undertaken to analyse the impact of carbon trading on the financial performance of TNPL and extent of CDM information disclosure by TNPL. Hence this study aims to

- Analyse impact of income from carbon trading on operating profit of TNPL
- Extent of CDM disclosure in the annual report of the company for different stages of CDM (Themes of CDM)
- To suggest steps to improve CDM reporting for Indian entities

Data Collection and Methodology

For analysing the impact of carbon income on operating income, data has been collected from annual report. Dependent variable (Operating Profit) and independent variable (income from CER's) has been retrieved from annual report of the company for the year 2005-06 till 2016-17. Other control variables like income tax, inventory and investment has been retrieved from ace equity database(Burja, 2011) for the year 2005-06 till 2016-17. To test the impact of CER's income on operating profits, multiple regression analysis has been applied (Burja,

2011)using SPSS software at 5% significance level. Hence, the proposed hypothesis is as follows:-

Ho: Income from CER's does not significantly impact operating profits of TNPL

Ha: Income from CER's significantly impacts the operating profits of TNPL

Table 1 below depicts the Descriptive Statistics of all the chosen variables and table 2 depicts the co-linearity statistics.

Table 1 – Descriptive Statistics

Descriptive Statistics			
	Mean	Std. Deviation	N
OpProfit	371.13000	175.316499	12
CERs	6.15083	5.386796	12
Income Tax	37.78417	16.326355	12
Inventory	273.64333	136.127877	12
Investment	3.32333	5.260395	12

Table 2 – Multi co-linearity Diagnostic

Co-linearity Statistics	
Tolerance	VIF
.557	1.796
.540	1.853
.402	2.490
.736	1.359

Seeing the value of Variance Inflation Factors (VIF), it can be analysed that no correlation exists between independent variables (To, 2018). Below table 3 depicts the model summary along with Durbin Watson value.

Table 3 - Model Summary

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	.932 ^a	.869	.795	2.521

Looking at table 3, Durbin Watson value is 2.5, which means there is autocorrelation problem with the data(To, Durbin Watson Test & Test Statistic, 2018) and adjusted R square value is .795, which means operating profit is 79.5% explained by independent variables (Income from CER's, Inventory, Investment and income tax). Below table 4 depicts the coefficient table.

Table 4 – Coefficient Table

Model	Sig.
(Constant)	.761
CERs	.948
1 IncomeTax	.744
Inventory	.004
Investment	.868

As per the co-efficient table CER's significant value is more than 0.05, hence we fail to reject the null hypothesis and hence income from CER's does not significantly impacts operating profits of TNPL over the selected year. Below table 5 depicts the correlation of all the variables.

Table 5 - Correlation Table

		Correlations				
		OpPro fit	CERs	IncomeTax	Inventory	Investmen t
Pearson Correlation	OpProfit	1.000	.470	.619	.930	-.332
	CERs	.470	1.000	.130	.536	-.468
	IncomeTax	.619	.130	1.000	.622	-.270
	Inventory	.930	.536	.622	1.000	-.383
	Investment	-.332	-.468	-.270	-.383	1.000

By seeing table 5, it can be very well seen that there is a positive correlation of 47% between CERs and operating profits. Hence, positive correlation between CER's and operating profit is significant. There are 4 CDM projects undertaken by TNPL and even if income from CER's does not significantly impacts operating profit, there is a significant amount of positive correlation between operating profits and CER's.

Annual reports are the key source of documents for investors and any company should provide significant amount of information to investors regarding their different activities undertaken to investors. Hence, it needs to be analysed the extent of information provided by the companies regarding the CDM over a period of time. To do this, content analysis of TNPL annual report was done for the year 2006-07 till 2016-17 for five different themes. The sub themes was chosen on the basis of stages of CDM, i.e. "Registration of projects", "Progress of CDM", "Accounting of CDM", "Future of CDM" and "Equipment's used for CDM". Under each sub theme, different themes were there selected depending upon the theme title. For each theme, the percentage disclosure was calculated and it was observed that no information has been provided by TNPL in their annual reports for the selected year for the sub theme "Future of CDM" and "Equipment's used for CDM". Figure 1, Figure 2, and Figure 3 below depicts the percentage of information disclosure by TNPL for "Registration of CDM Projects", "Progress of CDM" and "Accounting for CDM", respectively for the

selected year and figure 4 depicts the % overall information disclosure by TNPL for the selected year.

Figure 1. % Disclosure of “Registration of CDM Projects”



Figure 2. % Disclosure of “Progress of CDM”



Figure 3. % Disclosure of “Accounting for CDM”



Figure 4. % Overall Disclosure



It can be observed from the figure 1 sub theme “Registration of CDM Projects” for the year 2013 till 2016 no information has been provided and for the year 2006 till 2009 and 2011-12, all the selected set of information has been provided by TNPL annual reports. Seeing figure 2 it can be observed that for the year 2013 till 2016 no information has been disclosed and for the year 2008 till 2011, 2012-13 and 2016-17, 66.7%, i.e. maximum selected information has been disclosed by TNPL in their annual reports. It can also be observed from figure 3 that maximum mentioned information for “Accounting for CDM” has been disclosed for the year 2009-10, 2011 till 2014 and 2016-17. Minimum amount of information has been disclosed for the year 2010-11 by TNPL in their annual reports. According to figure 4 minimum % disclosure regarding CDM by TNPL has been done for the year 2014 till 2016 and maximum amount of disclosure for the year 2008-09 and 2010-11. The consistency of information disclosure regarding CDM by TNPL in the annual report for each year need to be assessed by comparing the mean of each theme for all the selected years. For this, following hypothesis is proposed and tested using SPSS software at 5% significance level:-

Ho: - Mean disclosure of all the selected sub theme for CDM disclosure by TNPL in the annual reports is same for the selected year

Ha: - Mean disclosure of all the selected sub theme for CDM disclosure by TNPL in the annual report is not same for the selected year

To test the hypothesis, the normality of the data has been tested using Shapiro- Wilk test in SPSS software at 5% significance level(Zofia Hanusz, 2016). The hypothesis formed for normality of data, is as follows:-

Ha: Data is not normal

Ho: Data is normal

Table 6 depicts the normality of data using Shapiro-Wilk test.

Table 6. Normality of Data

Shapiro-Wilk		
Statistic	Df	Sig.
.781	11	.005
.785	11	.006
.786	11	.006

Since, the significance value is less than 0.05, we reject the null hypothesis for normality and conclude that data is not normal. Hence, we used non parametric test for testing the hypothesis, i.e.Kruskal-Wallis H test for testing the mean of different sub themes formed(handout, 2018). Table 7 and Table 8 depicts below the output of Kruskal - Wallis test.

Table 7: Mean Rank of Different Groups

Ranks			
	VAR00001	N	Mean Rank
VAR00002	1.00	11	40.50
	2.00	11	35.36
	3.00	11	35.14
	4.00	11	14.50
	5.00	11	14.50
	Total		55

Table 8: Output of Kruskal-Wallis Test

Test Statistics	
	VAR00002
Chi-Square	31.138
Df	4
Asymp. Sig.	.000

Kruskal-Wallis test showed that mean disclosure of all the selected sub-theme for CDM by TNPL in the annual report is not same for the selected year, with $\chi^2 = 31.13$ and $p = 0.00$. Hence we reject the null hypothesis and conclude that there is a significant difference between CDM mean disclosures for different sub themes of TNPL in the annual report for the selected years. Hence, there is no consistency in the disclosure of information provided in the annual reports of TNPL Company in the annual reports.

Conclusion and Suggestion

TNPL has undertaken CDM projects (4 registered and 2 in pipeline) and earning income through selling CER's. This study has shown that there is a positive correlation between operating profits and the income from CER'. Hence, the information regarding CDM can be consistently provided by TNPL in their annual report. Seeing the figure1, figure 2, figure, 3 and figure 4, it can be seen that some year information regarding "registration of CDM projects", "Progress of CDM projects, "Accounting for CDM Projects" is high and in some year it is nil or very low. Seeing figure 5 it can be completely seen that % overall CDM disclosure by TNPL company in their annual report for the year 2006-07 till 2016-17 is very inconsistent. According to the output of Kruskal-Wallis test, there is a significant difference between CDM mean disclosures for different sub themes of TNPL in the annual report for the selected years.

It is suggested in this study, that uniform reporting standard for CDM should be followed by TNPL. Even guidance note issued by ICAI for CER's has mentioned the disclosure for "no of CER's held for inventory and basis of valuation", "no of CER's under certification", "Depreciation and operating and maintenance costs of emission reduction equipment expensed during the year" should be mentioned by the company in their financial statements. TNPL has not provided any information regarding "Future of CDM" and "Equipment's used for CDM" for any selected year. Entities should provide these information consistently to investors and related parties. Also, government and other policy formation bodies should provide guideline for disclosure of CDM projects by Indian entities.

This study is limited to TNPL company data for the year 2006-07 till 2016-17, analysing the impact of CER's income on operating profitability. Also, this study has analysed the extent of CDM information disclosure by TNPL Company in their annual report for the year 2006-07 till 2016-17 for only 5 sub themes. No other report like sustainability or environment report has been considered for this study. This study can be further taken with more sub themes or more no of years or more variables, or comparative study can be undertaken between 2 or more Indian companies or International companies also.

References

- Ans Kolk, D. L. (2008). Corporate Responses in an Emerging Climate Regime: The Institutionalization and Commensuration of Carbon Disclosure. *European Accounting Review*, 719-745.
- Bea Chiang, A. P. (2015). Environmental Cost, Social Responsibility and Corporate Financial Performance - A Closer Examination of Japanese Companies. *American Journal of Business Research*, 39-56.
- Bo Bae Choi, D. L. (2013). An analysis of Australian company carbon emission disclosures. *Pacific Accounting Review*, 58-79.
- Burja, C. (2011). Factors Influencing The Companies Profitability. *Annales Universitatis Apulensis Series Oeconomica*, 215-224.
- C J de Villiers, D. S. (2001). Industry differences in respect of corporate environmental reporting in South Africa: A research note. *Meditari Accountancy Research*, 81-91.
- Chen Zhang, C. W. (2011). Carbon Information Disclosure Issues Research in the Listed Company in China. *Management & Engineering*, 91-95.
- Choi Ieng Chu, B. C. (2013). The current status of greenhouse gas reporting by Chinese companies - A test of legitimacy theory. *Managerial Auditing Journal*, 114-139.
- Collins C. Ngwakwe, P. M. (2013). On carbon emission reduction and firm performance: example from 3M Company. *Environmental Economics*, 54-61.
- Gupta, Y. (2011). Carbon Credit: A Step Towards Green Environment. *Global Journal of Management and Business Research*, 17-19.
- handout, G. H.-W. (2018, March 26). *The Kruskal-Wallis test*. Retrieved from <http://users.sussex.ac.uk/~grahamh/RM1web/Kruskal-Wallis%20Handoout2011.pdf>
- Li Yongqing, I. E. (2013). The Impact of Carbon Emissions on Asset Values and Operating Cash Flows: Evidence From Australian Listed Companies. *Journal of Modern Accounting and Auditing*, 94-111.
- Limited, T. N. (2018, March 17). *Clean Development Mechanism (CDM) Projects in TNPL*. Retrieved from <http://www.tnpl.com>: <http://www.tnpl.com/DisplayPage.aspx?file=CDMProject.htm>
- Lodhia, S. (2011). The Australian National Greenhouse and Energy Reporting Act and its implications for accounting practice and research - A Mini Review. *Journal of Accounting & Organizational Change*, 190-198.
- Martinov-Bennie, N. (2012). Greenhouse gas emissions reporting and assurance: reflections on the current state. *Sustainability Accounting, Management and Policy Journal*, 244-251.
- Matthew Haigh, M. A. (2012). Carbon reporting: does it matter? *Accounting, Auditing & Accountability Journal*, 105-125.

- Michael Gillenwater, S. S. (2011, March). *The Clean Development Mechanism: A Review for The First International Offset Program*. Retrieved from <http://www.indiaenvironmentportal.org.in:>
<http://www.indiaenvironmentportal.org.in/files/clean-development-mechanism-review-of-first-international-offset-program.pdf>
- Murat Tunc, R. P. (2012). Impact of the Clean Development Mechanism on wind energy investments in Turkey. *Tunç and Pak Energy, Sustainability and Society*, 2-11.
- Newswire. (2008, May 19). *India 2nd largest seller of carbon credits globally*. Retrieved from <https://www.outlookindia.com:>
<https://www.outlookindia.com/newswire/story/india-2nd-largest-seller-of-carbon-credits-globally/6741>
- Olson, E. G. (2010). Challenges and opportunities from greenhouse gas emissions reporting and independent auditing. *Managerial Auditing Journal*, 934-942.
- Patty McNicholas, C. W. (2011). Can the financialised atmosphere be effectively regulated and accounted for? *Accounting, Auditing & Accountability Journal*, 1071-1096.
- Praveen Kumar, M. F. (2017). The Impact of Voluntary Environmental Disclosure On Cost Of Equity Capital - Evidence from Indian Firms. *The Journal - Contemporary Management Research*, 1-26.
- To, S. H. (2018, March 21). *Durbin Watson Test & Test Statistic*. Retrieved from <http://www.statisticshowto.com:> <http://www.statisticshowto.com/durbin-watson-test-coefficient/>
- To, S. H. (2018, March 21). *Variance Inflation Factor*. Retrieved from <http://www.statisticshowto.com:> <http://www.statisticshowto.com/variance-inflation-factor/>
- Vivek Birla, G. S. (2012). Carbon Trading - The Future Money Venture For India. *International Journal of Scientific Research Engineering & Technology (IJSRET)*, 19-29.
- Xiaoyu Liu, P. G. (2011). Greenhouse Gas Mitigation efforts of Chinese State Oil Companies And Impact On Their Financial Performance. *Journal Of International Business And Economics*, 121-134.
- Yongqing Li, I. E. (2014). Carbon emissions and the cost of capital: Australian evidence. *Review of Accounting and Finance*, 400-420.
- Zofia Hanusz, J. T. (2016). Shapiro-Wilk Test with Known Mean. *REVSTAT – Statistical Journal*, 89-100.