

Carbon Accounting Help Mitigation of Climate Change and Make A Greener World? An Empirical Analysis

Ajith Kumar¹, Anil Kumar M.² and Suraj E.S.³

¹V.V, Faculty, College of Economics and Business Studies, University of Technology and Applied Science, Muscat, Oman

²Research Scholar, Naipunnya Business School affiliated to KUFOS, Madavana, Panangad, Ernakulam

³Associate Professor, Naipunnya Business School, Koratty, Thrissur.
E-mail: surajandsuraj@yahoo.com

Received: 19 March 2023; Revised: 22 April 2023;

Accepted 09 May 2023; Publication: 29 June 2023

Abstract: One of the most serious environmental issues facing the world today is climate change, which has been brought about by humanity in response to issues like food and freshwater scarcity, hazards to natural ecosystems, health, etc. The earth's climate system has undergone a significant global and local change from the preindustrial period. This gigantic concern of the globe is climate change affects the flora and fauna as well as man. So, every nation should scuffle to control the emission of gases which affects nature. The use of fossil fuels and the hazards caused by it should be considered by the authorities, corporate people as well as the common man. The United Nations Framework Convention on Climate Change elucidates that those human activities, whether direct or indirect which cause climate change should be controlled, particularly greenhouse gases. Carbon accounting is an incipient field of business economics that includes a wide range of activities, including the calculation, measurement, monitoring, reporting and auditing of greenhouse gas emissions at various levels like administrative, production process and supply chain levels. The Greenhouse Gas Protocol has various initiatives to support and motivate the industries in carbon accounting and reporting about their accomplishments in this field. There are various procedures for carbon accounting that facilitate industries to quantify their emissions. For the sake of achievement of climate policy and corporate

To cite this paper:

Ajith Kumar, Anil Kumar M. & Suraj E.S. (2023). Carbon Accounting Help Mitigation of Climate Change and Make a Greener World? An Empirical Analysis. *Indo-Asian Journal of Finance and Accountings*. 4(1), 103-113. <https://DOI:10.47509/IAJFA.2023.v04i01.05>

goals, carbon accounting issues should be incorporated into various functional fields. In this study, the effects of greenhouse gases, carbon accounting and related matters are looked into for evaluation.

Keywords: climate change, emissions, greenhouse gases, carbon accounting

1. INTRODUCTION

In order to address climate change and international climate policy, it is vitally necessary to quantify and control carbon emissions from diverse socioeconomic sectors, starting with the publication of greenhouse gas data. During the past 20 years, organisations and academics working in the subject of environmental management accounting have been aware of the issues associated with carbon accounting. Nonetheless, there has been a considerable change in the concerns and unknowns regarding carbon accounting throughout this period. Yet, the European Union's success in reducing carbon emissions while preserving economic development may only be considered a "partial" gain in efficiency and emission reductions. With the relocation of industrial manufacturing to Asia, some carbon emissions might be said to have been "exported". Also, there are significant variations amongst industries. Globalization and the increasing significance of trade are both reflected in the relocation of manufacturing sectors to Asia. Similar patterns have been seen in the US, where an increase in carbon emissions has been linked to the shifting of industrial production to Asia. There isn't a single, clear definition of carbon accounting because it covers a vast range of activities related to computing, measuring, verifying, reporting, etc. carbon emissions (Stechemesser & Gunther, 2012); Burritt & Tingey-Holyoak (2012). This article provides an analysis of carbon accounting, its methods, and emission-reduction initiatives.

2. REVIEW OF LITERATURE

Organizational-level carbon accounting has undergone a substantial metamorphosis over the past 20 years, evolving from a well-defined illustration of a broad functional issue to a specialised area of environmental management accounting. When companies are required to reduce their carbon footprint, they may feel pressure to innovate, find creative methods to reduce emissions and waste associated with them, and develop consumer-friendly, environmentally friendly products (Porter and Van der Linde, 1995). Carbon accounting at the corporate level became a topic of interest to academics and practitioners along with global trends. The Environmental Management Accounting

Network (EMAN), a leading proponent of organizational-level environmental management and later carbon accounting, was established the same year the Kyoto Accord, a key turning point in global climate efforts, was ratified. Although competing for academic dominance over this calculative domain are the natural and social sciences, economics, and politics, environmental accounting study has also made its own contribution (Matthews, 1997). Notwithstanding the requirement to cut carbon emissions, global greenhouse gas releases have gone up (Siskos 2003). According to Deegan and Unerman (2006), it needs society to acknowledge that organisations are viewed as legitimate by a variety of stakeholders, which in turn calls for some sort of discourse that allows stakeholders to participate with and affect corporate environmental policy (Cooper and Owen, 2007). Together with deforestation, biodiversity loss, population growth, poverty, and water shortages, climate change has emerged as one of the world's six main sustainability issues in recent years. It may also be the most basic one (e.g., IPCC 2007, Stern 2007). According to Weber *et al.* (2008), the production of exports accounted for around one-third of China's emissions in 2005, and this percentage has been rising quickly throughout the course of the 21st century. Hence, one of the main focuses of sustainable development is combating climate change (Banuri 2009). Large rising countries like China and India have had astounding expansion, which is primarily to blame for GHG. Other developed economies, especially the United States, have not been able or willing to cut their already extremely high emission levels. Several national tactics can be seen in addition to global initiatives (Karlsson *et al.* 2011; Hovi *et al.* 2010). Some European nations have been successful in separating greenhouse gas (GHG) emissions from Economic growth during the past 20 years (EEA 2010). As burning fossil fuels for electric power generation, transportation, home heating, and industrial usage is the primary cause of carbon dioxide emissions worldwide, these activities are directly responsible for both the causes of climate change and its effects (International Energy Agency 2011). While the industrial sector in Europe has decreased its influence on the environment during the past 20 years, the transportation industry has caused emissions to increase quickly over the same time (IEA 2011). A different perspective contends that accounting is socially created, in contrast to the natural sciences, and that it provides "a method of creating a carbon performance story, and such tales do not always match with emissions reductions" (Hines, 1988). (Bowen and Wittneben, 2011,p.1032). The capacity of accounting to accurately depict the physical

impact of reporting businesses' emissions on the environment has received a lot of critical attention. An emerging field of study is the packaging of greenhouse gases into proxies of carbon dioxide emissions by commensuration (Bowen and Wittneben, 2011). In the accounting academic community, there is disagreement about how to define the term "carbon accounting," according to Francisco Ascuí (2011). In China, the study of carbon accounting theory is still in its infancy. Some authors have outlined a vision of the future that calls for economic progress to be in line with a larger public good and points us in the direction of a world without carbon use (Nair, 2011). China's carbon accounting should at the very least contain carbon financial accounting, carbon cost accounting, carbon management accounting, and carbon audit, among other things, according to Wang patriotic's (2012) proposal. Stechemesser and Gunther (2012) emphasise the global, national, corporate, and industrial levels of carbon accounting, once again emphasising the potentially diverse fields of study. They provide a conceptual viewpoint but only discuss definitional concerns when it comes to accounting for climate change. According to Csutora - Vetné 3 Mozner (2014), the amount of this kind of carbon imported into Hungary from China grew six-fold between 2000 and 2008.

The main goals of carbon accounting are to help managers formalise their climate change strategies, identify and manage climate change risks and opportunities, enhance their carbon management systems, and hit carbon reduction targets (Tang and Luo 2014). Financial accounting (for example, accounting for carbon estate and accountability, carbon disclosure, etc.) and any other standard accounting knowledge and procedures can be used to contribute. Luo and Tang (2013), management accounting (Tang & Luo (2014), including carbon investment appraisal, carbon project budget, and cost control for carbon reduction), and auditing (e.g., GHG statement assurance, Datt, et al, 2015, Tang 2015). Yet, due to the fact that carbon accounting also includes non-financial disclosure of a company's climate effect and carbon appraisal including comparison with a standard (Luo *et al.* 2012), there are inescapable issues with traditional accounting systems. Recent events at the Paris Climate Conference demonstrate that the majority of nations appear to now be willing to cut their carbon emissions (UNFCCC 2016). Although 175 nations had ratified the pact by 2016, there was no appetite for enforceable objectives. According to Liang (2018), the main priority in carbon accounting is the accounting, confirmation, measurement, and information disclosure. The stated goal of the Paris Agreement is to explore efforts to keep the increase in

global temperatures well below 2°C and well below 1.5°C. In order to keep global warming to 1.5°C, the IPCC's special report on 1.5°C states that global CO₂ emissions must be zero by 2050 and global GHG emissions must be zero by 2070. (Rogelj *et al.*, 2018). Despite being India's fastest-growing source of carbon emissions, the transport sector does not have a sector-specific aim in the nation's Nationally Determined Contribution (NDC) (SHAKTI, 2019). A long-term plan explaining how India intends to develop the transportation sector in conformity with the Paris Agreement has still not been made public. A long-term plan offers the opportunity to adopt a comprehensive, long-term approach to achieving the Sustainable Development Goals and the Paris Agreement.

According to studies, there is a significant difference in the outcomes of each choice, with consumption-based options producing substantially higher emission values (Baltar de Souza Leo *et al.*, 2020). The opportunity to choose a production-based rather than a consumption-based approach permits stakeholders to underestimate their effect on consumption, according to Harris *et al.* (2020). Scope 1, 2, and 3 emissions are a typical framing that includes both production- and consumption-based emissions (Linton *et al.*, 2022)

2.1. Research Gap

There is a need for a detailed examination of carbon accounting since a great deal of study has been conducted in the western setting whereas very little research has been done in Indian contexts. The study of environmental preservation and the dangers brought on by pollution and global warming began decades ago in western nations, but it has only just begun in India.

2.2. Objectives of the study

The primary research goal of carbon accounting of power enterprises is to create a thorough and applicable carbon accounting standard, realise the sophisticated accounting of carbon accounting of power enterprises, and improve the quality of carbon accounting information in order to better support the growth of green power. In addition, highlighting the necessity of carbon accounting, learning more about the carbon accounting methodology and the identification of strategies for reducing carbon dioxide and other harmful emissions are the subsidiary objectives.

2.3. Statement of Problem

The future of the planet will be hell because of the high levels of pollution and environmental destruction. Because of what we do now, the next generation

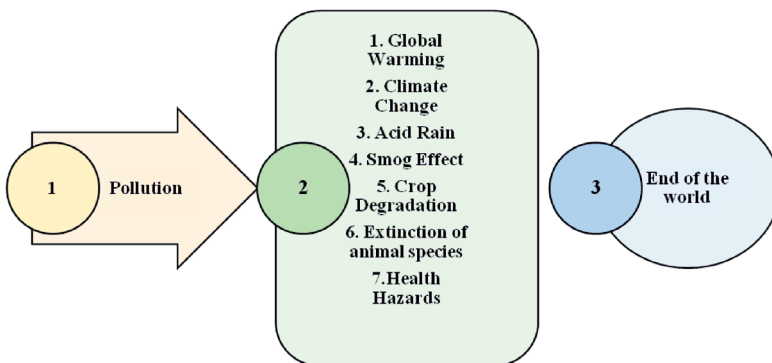
will suffer more. Future generations won't have enough crude oil, food, water, or even fresh air. The current human population should work hard to provide a calm and happy environment for future generations. The biggest issue is ignorance regarding environmental preservation.

3. THEORETICAL STUDY

3.1. Harmful effects of Greenhouse Gas Emissions

Nowadays, there is a high need for emissions management and environmental protection. Global warming, climate change, acid rain, the smog effect, crop degradation, animal species extinction, and health risks are all results of atmospheric pollution (Diagram-1). The examples of endangered species on earth include the Polar Bear, the Adelie Penguin, the North Atlantic Cod, the Staghorn Coral, and the Orange Spotted Filefish. Cancer, Asthma, Bronchitis, Stroke Health risks that people today face includes high blood pressure and heart attacks. As a result of the "Greenhouse effect," which occurs when gases in the atmosphere such as carbon dioxide (CO₂), methane (CH₄), water vapour (H₂O), and nitrous oxide (N₂O), among others, absorb and radiate heat, warming the lower atmosphere and the earth's surface, there is a great deal of heat. The risks of pollution and the requirement for carbon accounting are of utmost importance at this time. The process of figuring out how much carbon dioxide (CO₂) emissions a company is accountable for is known as carbon accounting. Another name for it is greenhouse gas accounting.

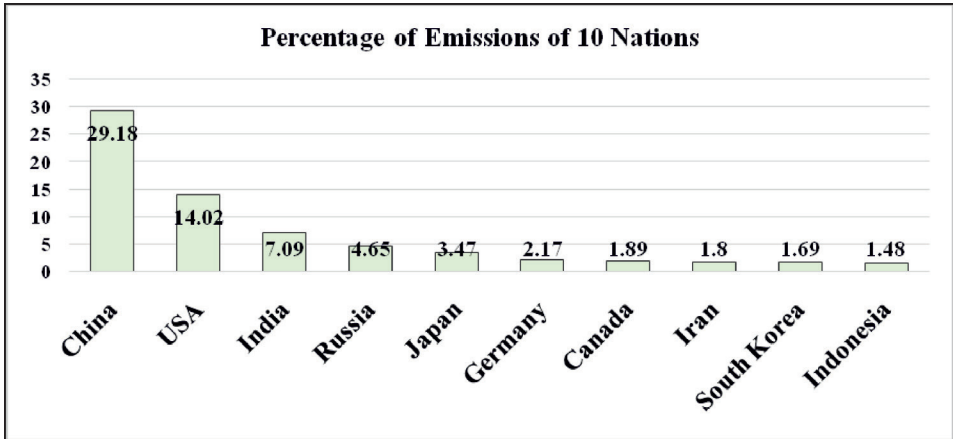
(Diagram-1 Effects of Emissions)



The world's top polluters are China (29.18%), and USA(14.02%) followed by India (7.09%), Russia (4.65%), Japan (3.47%), Germany (2.17%), Canada

(1.89%), Iran (1.8%), South Korea (1.69%) and Indonesia (1.48%). The lowest polluting nation is Greenland, followed by Faroe Island. (Diagram-2)

(Diagram-2 The Percentage of ten major carbon emitting nations)



3.2. Targets and gains of Carbon Accounting

Carbon Accounting allows a company to accurately measure the number of carbon credits that should be purchased in order to offset their previous carbon emissions. The goal of carbon accounting is the assignment of a set value to CO₂ and Greenhouse Gas emissions that can be accurately and numerically depicted as a financial value in the carbon market. Many companies are trying to reduce their carbon footprint and move towards **zero-carbon emissions**. Carbon accounting helps to serve as a quantifiable measure that a company or individual can be held accountable for.

3.3. Categories of carbon emissions

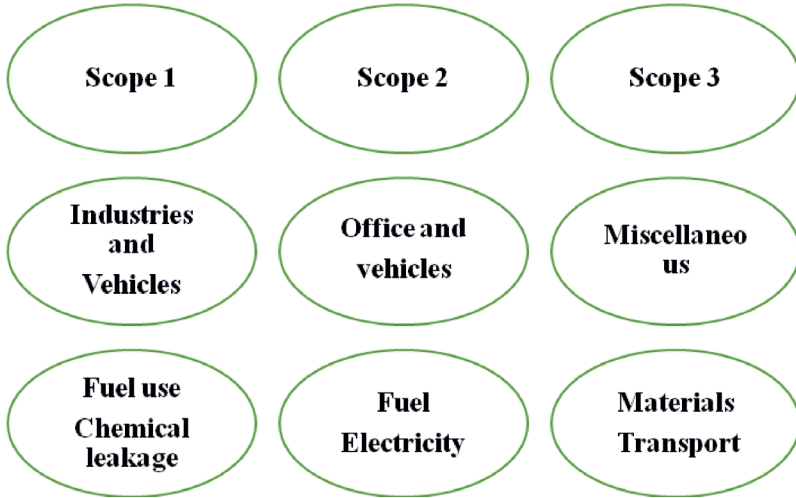
According to the Greenhouse Gas Protocol, the three separate categories of carbon emissions that are measured via carbon accounting are commonly referred to as “Scope” and assist to streamline and organise the process. Whether carbon emissions are classified as coming from automobiles, cooling and heating systems, or the miscellaneous group depends on where they are coming from (Diagram-3).

3.4. The Percentage of Emissions Worldwide

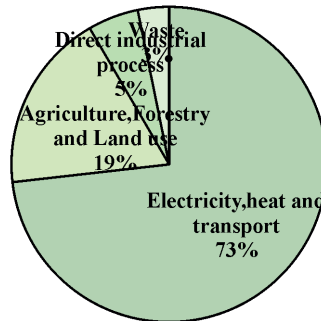
As per the studies of energy agencies, electricity, public transport and heat production units has the maximum amount of CO₂ emissions (73.2%). The

next highest emission is from agriculture, forestry and land use (18.4%), followed by direct industrial process (5.2%) and waste (3.2%) (Diagram-4).

(Diagram-3: Categories of carbon emissions)



(Diagram-4 Percentage of Emissions Worldwide-Sector wise)



4. CARBON ACCOUNTING PROCEDURES

The Expenditure Based Method and the Activity Based Method are the two approaches used for carbon accounting. The economic worth of the product purchased and the pertinent carbon emissions from the product are multiplied to get the quantity of greenhouse gas emissions in the spend-based technique. Environmentally Expanded Input and Output Models are used in the spend-based technique of carbon accounting (EEIO models). It takes less time to calculate and is a straightforward mathematical approach. This strategy is not always accurate because of the state of the economy and the propensity for price fluctuations.

Similar to this, relying on the spend-based technique is challenging due to the fluctuating exchange rates between different foreign currencies. Instead of using the overall value of the product, the activity-based technique uses units of each component. For instance, when using the spend-based method, only the price of the furniture purchased is used to determine the number of carbon emissions produced, whereas when using the activity-based method, the carbon footprint is calculated using the various amounts of the materials used for the product, such as wood, fabric, etc. The activity-based technique of carbon accounting is more precise, accurate, and dependable than the spend-based approach but at the same time it is time consuming and complex. Organizations may estimate their carbon footprint precisely with the use of a hybrid strategy.

4. CONCLUSION

It is clear from the research that the government has to take stern action against the polluters who are destroying the earth. For a brighter future, we require sustainable development, environmental protection, and universal social commitment. In the case of heavy polluters, the government must cancel the licence of manufacturers after giving sufficient notice and time for corrective action. The production of plastic and other polluting substances must be stopped slowly and the substances to replace plastic should be used like glass, ceramic etc has to be used in future.

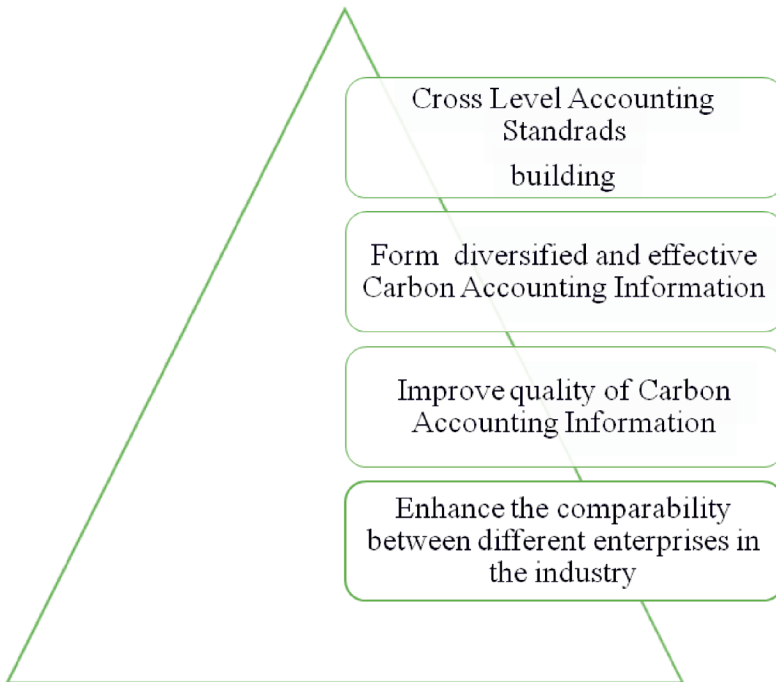
It is recommended to all the users of electrical appliances to switch off heating and cooling systems after usage. Rather than driving their own cars, people should use public transportation systems. We need to plant more trees and refrain from renting out empty places. The slogan **“Go Green”** should be taken into action.

The actions advised are:

- Building a complete set of cross-level accounting standards applicable to the industry
- Formation of diversified and effective carbon accounting information.
- Improvement of the quality of carbon accounting information
- Enhancement of the comparability between different enterprises in this industry
- The entire society, accountants and auditors must position themselves as managers of carbon control and implementation of the climate change strategy.

The first step for electric power businesses should be to create a thorough set of cross-level accounting principles that are appropriate for the industry, consistent with the industry, and have significant practical implications. Second, it should acknowledge the excellent carbon accounting practices used by electricity businesses and offer a variety of insightful data. Last but not least, improving the quality of carbon accounting data and making it simpler to compare various companies operating in this industry are the main goals of carbon accounting in electricity enterprises. The recommendations are given by a Carbon Accounting Pyramid (Diagram-5).

(Diagram-5 Carbon Accounting Pyramid)



References

- Aparna B Rathore (2019). Carbon Accounting: A Tool To Mitigate Climate Change For A Greener World, *International Journal of Education, Modern Management, Applied Science & Social Science (IJEMMASSS)* 6ISSN : 2581-9925, Volume 01, No. 03, July - September 2019, pp. 61-65.
- Ashim Paul (n.d) Carbon Credit and Carbon Trading in India: An Overview.
- Colin Haslam, John Butlin (n.d) Accounting for Carbon and Reframing Disclosure: A Business Model Approach.

- Erwin Saraswati (2020) Carbon Accounting, disclosure and measurement: A systematic literature review, *The International Journal of Accounting and Business Society*, Vol. 28, No. 2 August 2020.
- Geoffrey Heal (2022). The Economics Of Carbon Accounting And Carbon Offsets.
- Jillene Marlowe and Amelia Clarke (2022). Carbon Accounting: A Systematic Literature Review and Directions for Future Research, <http://www.aimspress.com/journal/GF>
- Maria Csutora, Gabor Harangozo (n.d), Twenty years of carbon accounting and auditing – A review and outlook.
- Rong He, Le Luo, Abul Shamsuddin, (2021). Corporate carbon accounting: a literature review of carbon accounting research from the Kyoto Protocol to the Paris Agreement.
- Dr. Suraj. E.S (2016). Business ethnics and corporate governance, ISBN-9789385666179
- Dr. Suraj. E.S (2015). Functional application of management, ISBN-9788193167045
- Tom Baumann (2021). Carbon Accounting Challenges and Solutions-Digitalizing Measurement, Reporting and Verification of Climate and Sustainability Activities for Trust, Efficiency and Utility.
- Yuting Qian Jingjie Wang (2018). Study on Carbon Accounting of Power Enterprises in China, *Advances in Social Science, Education and Humanities Research*, volume 286, *3rd International Seminar on Education Innovation and Economic Management (SEIEM)*.