

## CARBON TAX ACT: AN EFFECTIVE MITIGATION TOOL FOR SOUTH AFRICA

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**ABSTRACT:** Amidst growing global urgency to address climate change, South Africa has introduced the Carbon Tax Act as a legislative measure to curb greenhouse gas emissions within the built environment, a significant contributor to the nation's carbon footprint. Utilizing a survey-based methodology, this study gauges the awareness, attitudes, and perceived implications of the Carbon Tax Act among various professionals in the construction sector, including architects, engineers, and quantity surveyors. The findings indicate consensus on the necessity of the carbon tax, with most respondents acknowledging the role of the built environment in exacerbating greenhouse gas emissions. However, considerable variability exists in the awareness of the Act's specifics and its phased implementation, pointing to a substantial information gap. Furthermore, respondents expressed mixed feelings about the tax's potential impact on construction costs, with a tendency towards scepticism regarding its efficacy in reducing emissions without significant economic repercussions. Based on these insights, the study suggests several recommendations to enhance the effectiveness of the Carbon Tax Act. These include intensifying educational and communication efforts to bridge the knowledge gap, engaging more comprehensively with industry stakeholders, and fostering research into sustainable building technologies and practices. The successful implementation of these strategies is critical for ensuring that the Carbon Tax Act achieves its environmental objectives while maintaining economic stability in the built environment sector.

### 1. INTRODUCTION

Rising global climate concerns caused by the harmful presence of greenhouse gases necessitate intervention from all countries. Carbon dioxide is particularly significant among these gases due to its major contribution to adverse climate changes (Mavusa, 2019). The urgency of addressing this issue is underscored by projections that there is a 50% chance that global temperatures will rise by five degrees or more by the year 2100 if current trends continue (Alton et al., 2014). While this projection may seem distant, the effects of global warming, such as severe temperature fluctuations and seasonal shifts, have already been felt in recent years (Klimenko, Mikushina & Tereshin, 2016).

In response to these challenges, South Africa has ratified the Kyoto Protocol, committing to reduce national emissions of six harmful greenhouse gases (Ampofo-Anti, Dumani, & Van Wyk, 2015). This commitment is part of a broader climate change framework, including implementing the Carbon Tax Act. This Act represents a proactive step by the government to reduce local carbon dioxide emissions and demonstrate to international trade partners that South Africa is aligned with global efforts to curb greenhouse gas emissions.

The built environment plays a significant role in these emissions (Adams, Burrows & Richardson, 2019). Brewis (2012) notes that the building sector accounts for approximately 23% of greenhouse gas emissions in South Africa, with manufacturing materials like cement, reinforcing steel, sections, and walling contributing significantly to carbon dioxide emissions. These materials are critical as they represent the top contributors (80%) to the South African market (Brewis, 2012). The emphasis on sustainable design, green building, and sustainable construction has grown in response to the need for intervention in climate change caused by the excessive burning of fossil fuels. These topics are among the most researched within the built environment, aiming to continually refine how the industry approaches building operations in an environmentally friendly manner. Various definitions have emerged to articulate what constitutes green building and sustainable construction. For instance, Kubba (2017) integrates these definitions, suggesting that it involves protecting natural resources and enhancing the built environment to foster a healthier, resource-efficient, and successful lifestyle for the planet's ecosystems, people, businesses, and communities. Additionally, the International Council for Research and Innovation in Building and Construction (CIB) defines sustainable development's goal as creating and operating a healthy built environment based on resource efficiency and ecological design (Kibert, 2016).

As the carbon tax system begins its initial phase of implementation in South Africa (Department of National Treasury, 2019), there is a divide within the built environment regarding the financial impacts and appropriate responses to this legislation. Moreover, there is a broad consensus that the system aims to mitigate carbon dioxide emissions, though limited research publications have resulted in a knowledge gap for the industry. Hence, this study aims to assess the perceptions of built environment professionals in South Africa regarding the effectiveness and necessity of the carbon tax act as a tool for emission reduction.

## **2. RESEARCH METHODOLOGY**

The methodology of this study is focused on quantitatively examining the financial implications of the Carbon Tax Act on the built environment in South Africa. Individuals working within the six professions defined under the Council for the Built Environment Act 43 of 2000 (CBE, 2000)—namely Architecture, Project and Construction Management, Engineering, Landscape Architecture, Property Valuers, and Quantity Surveying—are the primary respondents for this research. Inclusion criteria extended to individuals with academic qualifications in these fields who may not be practising directly but whose roles are pertinent to the built environment. To ensure a comprehensive analysis, the research employs a quantitative approach using a Likert-scale format to assess responses, where participants rate their agreement with statements (Johnson & Christensen, 2014). on a scale from 1 (Strongly Disagree) to 5 (Strongly Agree). This structured quantitative approach aids in objectively measuring perceptions of the tax's impact, thus providing reliable, empirical data that align with the objective nature of the study as delineated by Naoum (2019).

To determine an adequate sample size that reflects the target population while considering the newness of the legislation and potential variability in familiarity and opinions, a sample size calculation was performed using Taherdoost's (2017) formula. The result suggested a sample range of 108 to 132 participants, offering a statistically robust basis for analysis given the study's 95% confidence level requirement. The selection of participants is derived from the researcher's LinkedIn network, an approach validated by the professional nature of the platform as outlined by Whitaker, Stevelink and Fear, (2017). This method ensures that the sample consists of professionals likely to provide informed perspectives on the legislative impacts and facilitate high response rates and ease of data collection via online surveys distributed through Google Forms. This digital tool allowed for efficient, anonymous data collection, supporting the ethical standards of confidentiality and informed consent required in research ethics (Dooley et al., 2017).

## **3. FINDINGS**

### 3.1 Background Information of Respondents

The results section of the research on perceptions towards the Carbon Tax Act in the built environment revealed that of the targeted sample size of 120, only 41 responses were captured, yielding a response rate of over 30%. Demographically, most respondents (81%) came from the construction sector, with smaller percentages from design and manufacturing (17%) and energy generation (2%). Participant experience was well-distributed, with 39% each having 3 to 5 years and more than 10 years of experience and 22% between 5 to 10 years. Professionally, Quantity Surveyors made up 39% of respondents, followed by Construction and Project Managers (29%), Engineers (15%), and Architects (12%). Additionally, a small fraction (5%) included roles like Asset Finance and Construction Admin Support, aligning with the study's inclusive approach to defining professionals in the built environment. This diverse participant base provided a robust dataset for analysing the perceived financial impacts of the legislation across various disciplines within the sector.

### 3.2 Descriptive Analysis Result

This section presents the descriptive analysis (Johnson & Christensen, 2014) of five core questions examining the respondents' awareness, necessity, implementation, cost impact, and financial feasibility of the Carbon Tax Act. Results are presented as the authors' compilation.

Figure 1 illustrates the responses regarding the built environment's contribution to greenhouse gas emissions, showing a consensus, with a mean of 3.29 and a median of 4.00, aligning closely with the mode at 4.00. This indicates that most respondents agree or strongly agree that the built environment is a significant contributor to emissions. The variance and standard deviation, 1.72 and 1.31, respectively, suggest that while there is a strong agreement overall, there remains a moderate range of opinions among the respondents.

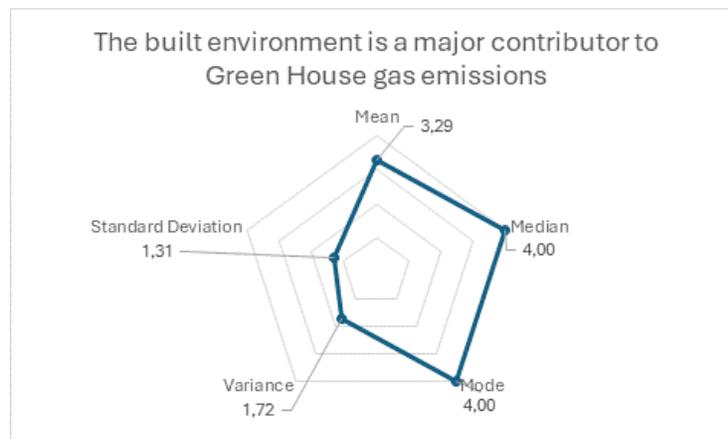


Figure 1: Built Environment contribute to GHG Emission – Descriptive Analysis Report (Authors' compilation)

From Figure 2, it is seen that the introduction of the Carbon Tax Act No. 15 of 2019 seems to be relatively unknown among the respondents, as shown by a mean of 2.71, a median of 2.00, and a mode of 1.00, which is the lowest among all statements (as shown in Figure 2). This suggests a significant lack of awareness or neutrality towards introducing the Act. The higher variance of 2.11 and standard deviation of 1.45 indicate a broad range of responses, highlighting a significant spread in awareness levels.

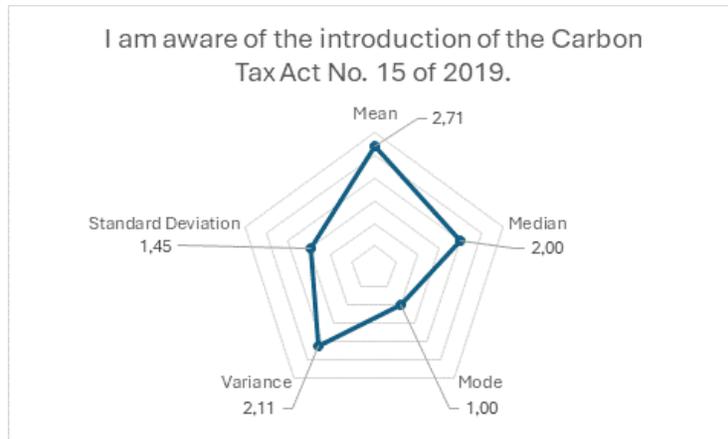


Figure 2: Awareness of the Carbon Tax Act – Descriptive Analysis Report (Authors' compilation)

Figure 3 presents the awareness of the gradual implementation of the Carbon Tax Act, currently in its first phase, appears to be limited among respondents. This is evidenced by a mean of 2.39 and a median and mode at 2.00, indicating a general lack of awareness or disagreement with the statement. The dispersion in responses, with a variance of 1.36 and a standard deviation of 1.17, points to varying degrees of understanding or recognition of the Act's implementation stages among the surveyed group.

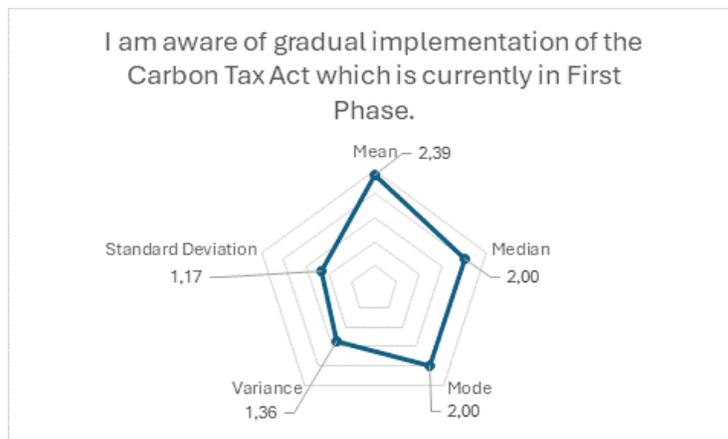


Figure 3: Awareness of Gradual Implementation of Carbon Tax Act – Descriptive Analysis Report (Authors' compilation)

There is a general agreement (Figure 4) on the need for a Carbon Tax Act in South Africa, reflected by a mean of 3.32 and both median and mode at 3.00. This suggests that most respondents either agree or are neutral about the necessity of the Carbon Tax, viewing it as potentially beneficial for the country. While moderate, the variance of 1.24 and a standard deviation of 1.11 indicate that opinions vary but not extensively, suggesting a relatively consistent recognition of the need for such measures within the professional community.

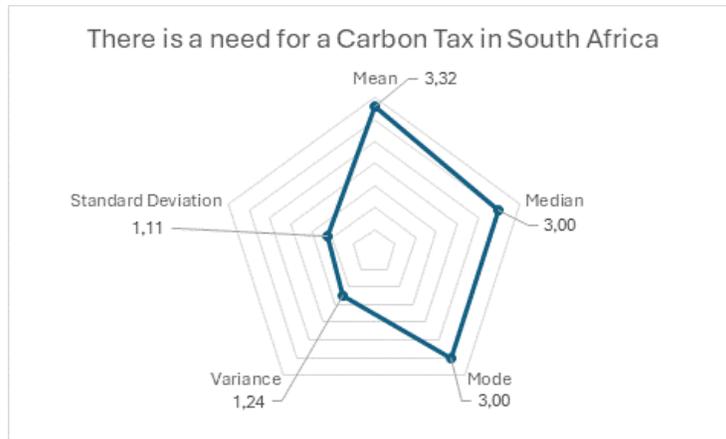


Figure 4: A Need for Carbon Tax in South Africa – Descriptive Analysis Report (Authors' compilation)

As illustrated in Figure 5, the data shows some scepticism regarding the carbon tax's perceived impact on construction costs. The mean of 2.71 and the median and mode at 3.00 indicate a general disagreement or neutrality towards the statement that the Carbon Tax will have a negligible effect on costs. The lower variance (1.04) and standard deviation (1.02) reflect a narrower spread of responses, suggesting that opinions, although varied, are not highly polarized.

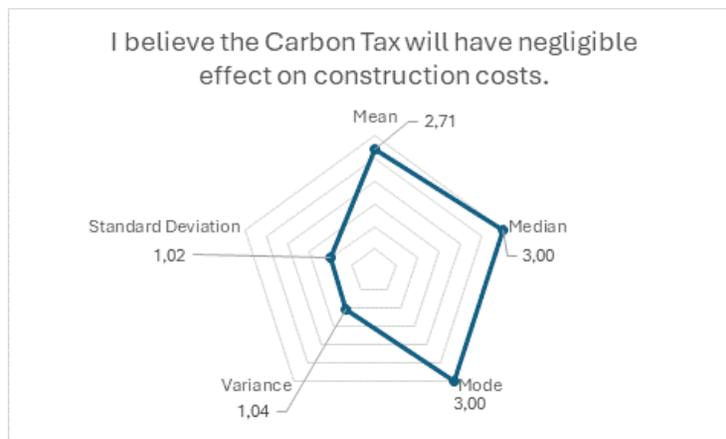


Figure 5: Negligible Effect of Carbon Tax on Construction Cost – Descriptive Analysis Report (Authors' compilation)

The findings highlight low awareness, mixed opinions on necessity, and cost concerns, shaping industry perceptions, which are further expanded and discussed below.

#### 4. DISCUSSION OF FINDINGS

The discussion of the findings from our survey on the Carbon Tax Act in South Africa reveals significant insights into the perspectives held by professionals in the built environment. The mean responses suggest a general agreement that the built environment is a substantial contributor to greenhouse gas emissions, corroborating the findings of Adams, Burrows, and Richardson (2019), who emphasized the critical role of the construction sector in global carbon outputs. This recognition is crucial as it frames the necessity for legislative measures like the Carbon Tax Act, intended to mitigate these impacts as outlined by Alton et al. (2014) and further supported by the Department of National Treasury (2019).

Despite acknowledging the built environment's role in greenhouse emissions, there is a notable variance in the awareness and perceived efficacy of the Carbon Tax Act itself. The survey results indicate a lower awareness of the Act's gradual implementation, suggesting a gap in communication and outreach efforts,

which might be bridged through strategies suggested in the literature by Aspers and Corte (2019) for enhancing the dissemination of qualitative research findings. Furthermore, the scepticism regarding the Carbon Tax's impact on reducing construction costs aligns with broader debates in environmental economics, where the effectiveness of carbon pricing as a deterrent for carbon-intensive practices is contested (Braathen, 2011; Lee et al., 2011).

Moreover, findings show that there is a recognition of the necessity for a Carbon Tax in South Africa, reflecting a growing consensus on the need for economic instruments to address climate change, a sentiment echoed by the International Energy Agency (2006) and supported by empirical evidence suggesting that proactive fiscal policies can significantly influence environmental outcomes (Weber, 2011). This aligns with global trends toward more robust climate action, where fiscal tools are increasingly viewed as essential mechanisms to drive the transition to a low-carbon economy (World Green Building Council, 2019). Expanding on this, it is crucial to compare South Africa's Carbon Tax approach with alternative systems like cap-and-trade, which are implemented in various jurisdictions around the world. Unlike the fixed tax rate of the Carbon Tax, cap-and-trade systems allow for a more flexible market-driven approach to reducing emissions. Firms are allocated or can purchase emission allowances, which they can trade with other firms, thereby creating an economic incentive to reduce emissions (Lee et al., 2011). Comparatively, carbon taxes provide a predictable cost for carbon emissions, which some argue offers a clearer long-term signal for investment in low-carbon technologies (Braathen, 2011). Both approaches have their merits and drawbacks, and situating South Africa's choice within this broader context helps to underline the strategic considerations behind opting for a carbon tax over cap-and-trade. Such an analysis not only enhances understanding of South Africa's environmental policy but also provides a benchmark for evaluating its effectiveness against other global standards.

The overall distribution of responses also suggests a well-balanced mix of expertise and professional diversity among the participants, which lends credibility to the data as representative of the sector's views. This aspect of research design, highlighted by Hammer (2011), ensures that the findings can be generalized to a broader population within the industry, thus providing a solid foundation for policy recommendations and further research.

## **5. CONCLUSION AND RECOMMENDATIONS**

The findings from the survey on the perceptions surrounding the Carbon Tax Act in South Africa provide valuable insights into the built environment sector's views on this significant legislative measure. It is evident from the analysis that there is a consensus on the role of the built environment in contributing to greenhouse gas emissions. Professionals acknowledge the necessity of the Carbon Tax as a tool to combat climate change, aligning with global trends and the urgent need for sustainable environmental practices as supported by the literature. However, the survey revealed varying levels of awareness and scepticism about the specific impacts of the Carbon Tax Act, particularly concerning its effect on construction costs and the broader financial implications for the industry. This suggests a disconnect between the legislative intentions and the sector's understanding or acceptance of these measures, highlighting a critical gap that could hinder implementing and accepting the Carbon Tax.

Based on the conclusions drawn from this study, several recommendations can be made to enhance the effectiveness of the Carbon Tax Act and improve its perception within the built environment:

1. **Enhanced Communication and Education:** There is a clear need for targeted communication strategies to increase awareness about the Carbon Tax Act and its objectives. Educational campaigns could be developed to bridge the information gap and clarify how this tax contributes to national and global environmental goals. These should include detailed explanations of the tax's financial implications and benefits tailored to the diverse stakeholders in the built environment.
2. **Stakeholder Engagement:** Engaging with professionals across the built environment more actively and inclusively could help fine-tune the carbon tax to meet the industry's needs better to meet the industry's needs and expectations better. Regular consultations and feedback mechanisms can ensure the stakeholders' concerns and suggestions are considered, making the policies more robust and acceptable.

3. Monitoring and Evaluation: Implementing a systematic approach to monitor and evaluate the Carbon Tax Act's impact over time is crucial. This would provide empirical evidence of its effectiveness and help make necessary policy adjustments based on observed outcomes and sector feedback.
4. Policy Support Structures: Developing support structures, such as incentives for low-carbon technologies and practices, could complement the punitive aspects of the tax, making it more palatable and economically viable for businesses. This dual approach could accelerate the adoption of sustainable practices in the built environment.
5. Research and Development: Encouraging research into innovative, cost-effective construction practices and technologies that reduce carbon emissions is essential. Investment in research can be facilitated by a portion of the revenues from the Carbon Tax, fostering a culture of innovation and sustainability within the industry.

This study highlights gaps in awareness, incentives, and implementation of the Carbon Tax Act in South Africa's built environment sector. While its necessity is recognized, limited knowledge, inadequate incentives, and unclear enforcement hinder its impact. Future research should explore how project scale and client profiles influence perceptions and compliance, providing deeper industry insights. Strengthening education, financial support, and enforcement will enhance adoption, drive sustainable practices and support South Africa's climate commitments while maintaining industry stability.

The study adopted only 41 professionals to retrieve their opinion on the effectiveness of the carbon tax act as a carbon emission mitigation tool in South Africa. Due to the small sample size, the study's findings cannot be generalised for the South African built environment. Hence, future studies can be carried out by sampling the opinion of professionals across the nine provinces of South Africa with more representation to validate the findings of this study.

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