Carbon Emission Trading in South African Construction Industry

Ayodeji E. Oke*a, Clinton O. Aigbavboa, Samkeliso A. Dlamini

*Department of Construction Management and Quantity Surveying, University of Johannesburg 2028, South Africa

Abstract

The quest for reduction of greenhouse gases (GHGs) through the use of carbon trading system has been on the increase as a result of the adoption and promotion by notable world agencies such as United Nations (UN), European Union (EU), among others. The mitigating approaches were introduced by the later to curb and minimize amount of GHGs produced by manufacturing, construction and other industrial and heavy engineering based industries. In view of its continuous popularity and adoption by developed countries, this study examines the concept of carbon trading principles and systems and their adoption in the South African construction industry with a view to enhancing sustainability of construction projects geared towards achieving overall sustainable goals. History of emission trading and the concept of GHGs were assessed using previous and relevant literature materials. The study further examines the two emission trading systems, that is, cap and trade as well as baseline and credit, and suggested the earlier for the construction industry based on their benefits and flexibility. Various ways of enforcing the system were also highlighted with emphasis on the willingness and readiness of construction experts, professionals, developers, regulators and other concerned stakeholders in reducing greenhouse gases in the execution, usage and reuse of construction projects.

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1. Introduction

Climate system is a complex and interactive system that consists of living things and the necessary resources that are needed by them to survive. These resources include the atmosphere; lithosphere and the hydrosphere. According to the Australian Academy of Science [1], climate change is the alteration or variation in the pattern of weather and related changes in oceans, land surfaces and ice sheets, occurring over scales of decades or longer. Furthermore,

* Corresponding author. Tel.: +27-84-915-5117.
E-mail address: emayok@gmail.com
Climate change is already a measurable reality and South Africa together with other developing countries are vulnerable to the impacts that global climate change (GCC) brings with it [2].

As climate science and the earth’s climate have shown signs of evolution over the recent decades, there has been increasing evidence of anthropogenic influences on climate change that have been discovered [3]. In summary of the concept, GCC occurs mainly because of the collection of greenhouse gases (GHG) which in turn warm the surface of the earth and the atmosphere above it. This consequently has significant implications on the rainfall we receive; the glaciers and sea ice which are said to retreat and the sea levels to mention a few [4]. When the earth surface warms up, it is a consequence of what is popularly termed the GHG effect. This basically occurs when heat is absorbed in the earth from heat produced by the sunlight. This in turn warms the earth and most of the remaining heat is radiated back to the atmosphere at a longer wavelength than the ones received from the sun. Some of these wavelengths are then absorbed by GHGs trapped in the atmosphere before they escape into space, and the absorption of these wavelength energy tends to warm the atmosphere more than normal.

These GHGs act like a mirror and reflect back to the earth, some of the heat energy which is lost to outer space [5]. Furthermore, research dating back to the early 1990’s has placed emphasis on the threat posed by the production and emission of GHGs. These studies noted that human industry is mostly responsible for climate change, because of the CO₂ and other GHGs emitted by factories (particularly cement factories), power plants, airplanes, trucks, cars and other sources [6,7]. Emission trading (ET) has been introduced and adopted by regulatory bodies including United Nations (UN), European Union (EU), European Commission (EC), and other world leading agencies in combating the challenge of GHGs. Due to high contribution of the architectural, engineering and construction (AEC) industry to the volume of GHGs, this study examined emission trading in the South African construction industry with a view to creating awareness among concerned stakeholders on the provision of sustainable construction projects and general attainment of sustainable goals.

2. Greenhouse Gases in South Africa

There exists studies on GHGs in South Africa. A paper on ‘History on the Climate Change Policy’ discussed the history and agreements of the climate change policies for South African manufacturing, construction and other industries and the country as a whole [8]. Similarly, Chin-Yee [6] explored the place of Africa, including South Africa, in the actualisation of Paris Climate Change Agreement. South Africa took the responsibility and committed to curb their emissions by 34% by 2020 and 42% by 2025 under the Business As Usual (BAU) trajectory [9,10]. It was further claimed that the Minister of Finance, in the 2014 budget, confirmed the carbon tax will be adopted in the Republic of South Africa. The implementation of this carbon tax will be implemented in phases, in order to transit smoothly into a low carbon economy.

Various factors influence the country’s GHG emissions, including economic and population growth, government (infra-) structure, climate and soils, geography, land use management etc. Furthermore, it is these factors and more that make the rainfed nation a contributor to climate change and thus, South Africa has taken steps to mitigate and adapt to potentials of minimizing climate changes. Historically, The Climate Action Tracker [11] concluded that South Africa’s emissions have steadily increased. This is primarily due to the fact that the economy of the country mainly depends heavily on the mining sector as well as the heavy industry sector. Energy consumption in the industrial and buildings sectors depends largely on electricity usage as a source of energy, which is produced with high carbon intensity by adopting domestic coal as a raw product.

3. History of Emission Trading

The Kyoto Protocol (KP) to the United Nations Framework Convention on Climate Change (UNFCCC) was established in 1997 [12,13]. It sets obligations for the reduction of GHG emissions through targets, or what is popularly referred to as caps, for about 37 industrialised countries. It was further noted that for the first period (i.e. the commitment period, which is between 2008 and 2012), there was a need for policy instruments that aimed at meeting the Kyoto commitments.

In the year 2000 the European Commission (EC) presented a green paper on “Greenhouse gas Emissions Trading within the European Union” with some first ideas on the designs of the EU Emissions Trading Scheme/System (ETS)
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