



CARBON PRICING AS A REGULATORY MECHANISM FOR GREEN TECHNOLOGICAL TRANSITION: COMPARATIVE LESSONS FROM SOUTH AFRICA AND THE EUROPEAN UNION FOR NIGERIA

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Abstract

Carbon pricing is a major regulatory tool in international climate change policies and has transformed environmental law from command-and-control to market-based approaches and finally to decarbonisation. Carbon pricing mechanisms, such as carbon taxes and emissions trading systems (ETS), are mechanisms that put an economic price on Greenhouse Gases (GHGs) which embed environmental externalities and encourage technological innovations that are practical and friendly for climate change control. The EU has a well-established carbon market (EU Emissions Trading System – EU ETS), while South Africa has implemented a carbon tax regime designed for its developmental context. Although Nigeria has committed to a climate transition under the Paris Agreement and the Climate Change Act 2021, they have yet to establish a coherent framework for carbon pricing that is beneficial for a meaningful technological transition. This paper is a critical investigation of the concept of carbon pricing as a regulatory tool for green technological transition, with comparative lessons from the EU and South Africa for Nigeria. It uses a doctrinal and comparative legal approach to examine international climate instruments, regional climate law and domestic climate law. The piece challenges the notion of carbon pricing as a pure fiscal measure and instead calls for it as a more powerful regulatory tool to support the growth of renewables, industrial decarbonisation and innovation. It recommends that the Nigerian government should put in place a hybrid carbon pricing framework based on institutional enhancement, legal adjustments, and adoption of green technology solutions for the country to meet its Net-Zero targets.

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1.0 INTRODUCTION

Climate change is an erratic long-term change in the average weather conditions of an environment. It is one of the greatest environmental and governance issues of the twenty-first century.⁴ The increasing global temperature, flooding, desertification, loss of biodiversity and emissions from industries have raised concerns in the global arena of sustainable development and environment protection. The Intergovernmental Panel on Climate Change (IPCC) reports that greenhouse gas emissions are responsible for large portions of global warming, so states and international institutions have increasingly implemented regulatory approaches to decarbonise the economy and promote sustainable economic growth.⁵

Conventional environmental laws were mainly of the “discipline of crisis” and the “command-and-control” type, with regulations based on bans, licenses and sanctions. These mechanisms have, however, been subject to criticism for limited capacity to foster innovation in technologies and low enforcement power, leading to a gradual shift towards market-based regulatory approaches, such as carbon pricing, in climate governance.⁶

The basic principle of carbon pricing is the Polluter Pays Principle (Principle 16 of the Rio Declaration on Environment and Development), which places a financial cost on environmental externalities of pollution.⁷ carbon pricing is operationised and based on the economic rule of assigning a monetary value to carbon emissions, in order to internalise the negative externalities of carbon.⁸ It is traditionally thought of in two ways: carbon taxation and emissions trading systems (ETS). Emissions trading systems are designed to control emissions by operating through carbon markets and carbon allowances, whereas carbon taxes are direct taxes on emissions.⁹

The EU ETS under Directive 2003/87/EC of the European Union has been one of the most advanced carbon pricing systems, and the Court of Justice of the European Union (CJEU) has consistently confirmed the legality of the EU ETS.¹⁰ In both *Arcelor Atlantique et Lorraine v Premier ministre* and *DK Recycling und Roheisen GmbH v European Commission*, the Court has

⁴ Getachew Mihret, ‘Climate Change Governance and Law: Causes, Challenges, and Pathways Forward’ (2025) 2(9) International Journal of Sciences and Innovation Engineering 191–196 <<https://doi.org/10.70849/IJSCI0209202502>>

⁵ Intergovernmental Panel on Climate Change, Climate Change 2023: Synthesis Report (IPCC 2023).

⁶ Neil Gunningham and Darren Sinclair, ‘Integrative Regulation: A Principle-Based Approach to Environmental Policy’ (1999) 24 Law & Social Inquiry 853.

⁷ Nicholas Stern, *The Economics of Climate Change: The Stern Review* (Cambridge University Press 2007) 29; Rio Declaration on Environment and Development (1992) Principle 16, UN Doc A/CONF.151/26.

⁸ Arthur C Pigou, *The Economics of Welfare* (Macmillan 1920).

⁹ David M Driesen, *Economic Dynamics of Environmental Law* (MIT Press 2003) 57.

¹⁰ Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community [2003] OJ L275/32.



upheld differentiated treatment within the emissions trading regime on the basis of discretion in the field of environmental policy.¹¹ The Court has again validated differentiated treatment within the EU ETS in *Arcelor Atlantique et Lorraine v Premier ministre and DK Recycling und Roheisen GmbH v European Commission*, both on the ground of discretion in the field of environmental policy.¹²

South Africa has put in place a carbon pricing framework based on the Constitution in Africa through the Carbon Tax Act 2019.¹³ The right to an environment that is not harmful to health and well-being is also protected in Section 24 of the South African Constitution, which was further reinforced in *Earthlife Africa Johannesburg v Minister of Environmental Affairs*, where the High Court stressed the need to give due consideration to climate in environmental authorisation processes.¹⁴

On the other hand, though Nigeria has a legislative carbon pricing mechanism, the Climate Change Act 2021, it has not been a success, but the judiciary in Nigeria has become more aware of environmental rights in constitutional law.¹⁵ Furthermore, the Federal High Court in *Gbemre v Shell Petroleum Development Company Nigeria Ltd* held that gas flaring infringed upon people's rights to life and dignity.¹⁶ The Supreme Court, in *Centre for Oil Pollution Watch v Nigerian National Petroleum Corporation*, confirmed the accountability of the state for environmental degradation.¹⁷

This paper takes a comparative perspective to critically explore the use of carbon pricing as a regulatory tool for green technological transition and lessons learnt for Nigeria. It claims that carbon pricing is not only a fiscal instrument but also a powerful governance tool for environmental change that can foster technological innovation, decarbonisation of industry and sustainable development.

2.0 CONCEPTUAL AND THEORETICAL FRAMEWORK

2.1 Carbon pricing

Carbon pricing is a regulatory and economic tool that uses a price on greenhouse gas emissions (GHGs) to signal their actual social and environmental impacts. Economic theory suggests that emissions are a good example of a negative externality—the private cost of producing emissions is

¹¹ *Arcelor Atlantique et Lorraine v Premier ministre* [2008] ECR I-9895; *DK Recycling und Roheisen GmbH v European Commission* EU:C:2016:469.

¹² *Ibid.*

¹³ Constitution of the Republic of South Africa 1996, s 24.

¹⁴ *Earthlife Africa Johannesburg v Minister of Environmental Affairs* [2017] ZAGPPHC 58.

¹⁵ The Nigerian Climate Change Act 2021

¹⁶ *Gbemre v Shell Petroleum Development Company Nigeria Ltd* (Unreported) FHC/B/CS/53/05.

¹⁷ *Centre for Oil Pollution Watch v Nigerian National Petroleum Corporation* (2019) 5 NWLR (Pt 1666) 518.



less than the social cost in the form of impacts on the climate, health effects and environmental damage caused by emissions.¹ Carbon pricing thus acts as a corrective measure to internalise external costs in a market system.

Moreover, the World Bank describes carbon pricing as any policy that explicitly puts a price on carbon emissions to encourage emitters to reduce their greenhouse gas output.¹⁸ This may take the form of a carbon tax, which imposes a fixed price per unit of emissions, or an emissions trading system (ETS), which sets a quantitative cap on emissions and allows market trading of permits. On this note, both a carbon tax and an emissions trading system (ETS) are forms of carbon pricing because they both use a price signal to encourage—rather than require—carbon emitters to reduce their emissions of greenhouse gases.¹⁹

2.2 Polluter Pays Principle

The Polluter Pays Principle (PPP) is a key normative principle of carbon pricing, whereby the cost of environmental damage should reside with the polluter. The principle is commonly accepted in international environmental law and can be found in the Rio Declaration on Environment and Development 1992, Principle 16, which states that national authorities should strive to promote the internalisation of environmental costs and the application of economic instruments, including the polluter pays principle.²⁰

In legal theory, the PPP fulfils two different roles: it brings fairness into environmental governance and at the same time, helps to motivate abatement of pollution. Carbon pricing is, thus, a straightforward way of implementing this idea into current regulatory frameworks.

2.3 Environmental Fiscal Reform Theory

Environmental Fiscal Reform (EFR) theory offers the economic rationale for carbon pricing, suggesting that tax system reforms are needed to support environmental sustainability.²¹ EFR is a reallocation of taxes from productive activities (labour and capital) to environmentally negative activities (carbon emissions), which means that environmental taxation can be used to achieve both better environmental results and economic efficiency.²²

The Organisation for Economic Co-operation and Development (OECD) has been a strong advocate of EFR as a policy instrument for sustainable development, claiming that well-designed

¹⁸ World Bank, State and Trends of Carbon Pricing 2024 (World Bank 2024).

¹⁹ Organisation for Economic Co-operation and Development (OECD), Effective Carbon Rates 2023 (OECD Publishing 2023).

²⁰ United Nations Conference on Environment and Development, Rio Declaration on Environment and Development (1992) Principle 16.

²¹ OECD, Environmental Fiscal Reform for Poverty Reduction (OECD 2005).

²² OECD, Taxing Energy Use 2023 (OECD Publishing 2023).



carbon pricing mechanisms can simultaneously achieve emission reductions and provide fiscal revenues for green investments.²³

2.4 Ecological Modernisation Theory

Ecological Modernisation Theory (EMT) offers a governance/sociological approach to the rationale for carbon pricing. EMT believes that environmental protection and economic development do not necessarily contradict one another but can be combined via technological innovations and institutional reforms.²⁴ In this context, environmental regulation is not perceived as a brake on growth but as a factor for the transformation of industry. This study views carbon pricing clearly in EMT, as it encourages companies to innovate to keep costs of compliance down. It raises the cost per carbon of carbon-intensive production, thus incentivising investments in renewable energy, energy efficiency technologies and low-carbon industrial processes.

2.5 Sustainable Development Theory

The intergenerational equity principle, stated in the Brundtland Report, calls for sustainable development to be considered in economic planning, which means environmental protection.²⁵ The theory of sustainable development is meaningful with regard to carbon pricing, and it helps in making the economic incentives in line with long-term environmental sustainability. In a nutshell, it ensures that environmental costs are not passed on to the next generation but rather are taken into account in current decision-making.

2.6 Theoretical Synthesis: Carbon Pricing as a Regulatory Instrument

This study believes that the above theoretical backgrounds can be summarized as showing that the carbon price is much more than just a revenue-raising fiscal policy measure. Instead, it is a flexible regulatory framework that is used to shape market behaviour, internalise environmental externalities, and encourage low-carbon technological change. The convergence of the Polluter Pays Principle (PPP), Environmental Fiscal Reform (EFR), Ecological Modernisation Theory (EMT), and Sustainable Development Theory sheds light on the multidimensional nature of carbon pricing in the current climate governance.

At the legal and normative level, the Polluter Pays Principle forms the basis for carbon pricing, which asks that the costs of GHG emissions be passed on to those that pollute the environment. The principle aims to avoid external costs associated with pollution by making pollution costs explicit in production and consumption. International environmental agreements such as the

²³ Ibid.

²⁴ Arthur P J Mol and Gert Spaargaren, 'Ecological Modernisation Theory in Debate' (2000) 4(1) Environmental Politics 17.

²⁵ World Commission on Environment and Development, *Our Common Future* (Oxford University Press 1987).



United Nations Conference of Environment and Development (UNCED) Principle 16 demand the use of economic instruments to externalise the environmental costs imposed on polluters.²⁶ To emphasize, Environmental Fiscal Reform also complements this by considering taxation and market-based instruments as ways of fixing market failures. In conventional markets, the social costs of carbon emissions are not paid, and resources are allocated inefficiently, causing environmental degradation. Carbon pricing tackles this distortion by raising prices on carbon-intensive activities while encouraging investment in renewable energy, energy efficiency, and cleaner technologies.²⁷ In addition, Ecological Modernisation Theory makes this case even stronger since it argues that there is no conflict between environmental protection and economic development. The theory, however, is that technological innovation, institutional changes, and market signals can promote economic growth and environmental sustainability. Carbon pricing is thus not just a punitive mechanism but a regulatory mechanism that can be innovative and drive the industrial transition towards low-carbon production systems. Finally, Sustainable Development Theory extends the rationale for carbon pricing to intergenerational equity and embedding environmental protection in economic planning.²⁸ Sustainable development is the idea that people in the present need to develop but not in a way that will make it difficult for people in the future to do the same. Carbon pricing is aligned with this objective by incentivising environmentally sustainable patterns of production and consumption and providing potential revenues for green infrastructure, renewable energy investments, and climate adaptation programmes.²⁹

In summary, the regulatory logic of carbon pricing can thus be expressed as follows: Carbon pricing works by making it more costly for carbon-intensive activities to be carried out, which then incentivizes behaviour change and industrial adaptation, which in turn leads to a decrease in GHGs, a boost in green technological innovation, and a shift towards a low-carbon economy. The sequence provides an example of a cyclical interaction between law and the economy in relation to technological change. Carbon pricing changes the market incentives, leads to behaviour change, facilitates investment in cleaner technologies, and will have a long-term effect on the transformation of industrial and energy systems. The system thus establishes a feedback loop in

²⁶ United Nations, Rio Declaration on Environment and Development (adopted 14 June 1992) UN Doc A/CONF.151/26 (Vol I) Principle 16; Organisation for Economic Co-operation and Development, *The Polluter Pays Principle: Definition, Analysis, Implementation* (OECD 1975).

²⁷ Nicholas Stern, *The Economics of Climate Change: The Stern Review* (Cambridge University Press 2007) 312–340; Gilbert E Metcalf and David Weisbach, 'The Design of a Carbon Tax' (2009) 33(3) *Harvard Environmental Law Review* 499.

²⁸ Arthur P J Mol and Gert Spaargaren, 'Ecological Modernisation Theory in Debate: A Review' (2000) 9(1) *Environmental Politics* 17; European Commission, *EU Emissions Trading System (EU ETS)* https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets_en accessed 26 May 2026.

²⁹ World Commission on Environment and Development, *Our Common Future* (Oxford University Press 1987) 43; Edith Brown Weiss, *In Fairness to Future Generations: International Law, Common Patrimony and Intergenerational Equity* (United Nations University 1989).



the economy in which the pressure induces innovation and innovation makes emissions reduction easier. The theoretical synthesis is especially important in the development of a developing country like Nigeria. It shows that carbon pricing can not be mutually exclusive of developmental goals. Thus, carbon pricing is not only a governance tool to protect the environment but also a policy choice to drive long-term economic change in the emerging markets.³⁰

3.0 CARBON PRICING: IMPLICATIONS FOR GREEN TECHNOLOGICAL TRANSITION

Carbon pricing is now considered a key policy tool in the arena of climate economics and environmental law for facilitating structural change towards low-carbon and resource-efficient economic systems.³¹ It is not only about the revenue or emission reduction but also a regulatory catalyst for the green technological transition, which can change the incentives for production, adjust the flow of investments and promote innovation for clean technologies.³² Carbon pricing's essence is the capacity to internalize the environmental costs of GHG emissions, putting a price on emissions to provide constant incentives to companies to lower emissions by investing in efficiency gains, switching fuels, and implementing low-carbon technologies.³³ Hence, the need to interrogate its implication on green technological becomes imperative.

3.1 Carbon Pricing as an Innovation Driver

One of the most important implications of carbon pricing is its capacity to stimulate technological innovation. Empirical studies show that predictable carbon pricing mechanisms increase investment in research and development (R&D) for clean technologies by making carbon-intensive processes more costly relative to low-emission alternatives.³⁴

Under a carbon pricing regime, firms face two strategic options:

a. pay for emissions; or

³⁰ World Bank, State and Trends of Carbon Pricing 2024 (World Bank 2024) 21–37; International Monetary Fund, Nigeria: Selected Issues Paper on Climate Policy and Carbon Pricing (IMF Country Report No 23/221, 2023).

³¹ Organisation for Economic Co-operation and Development (OECD), Investing in Climate for Growth and Development (OECD Publishing 2025); Organisation for Economic Co-operation and Development (OECD), Driving Low-Carbon Innovations for Climate Neutrality (OECD Publishing 2023).

³² S Lim & A Prakash, 'Does Carbon Pricing Spur Climate Innovation? A Panel Study, 1986–2019' (2023) 395 Journal of Cleaner Production 136459 <https://doi.org/10.1016/j.jclepro.2023.136459>

³³ Ibid; OECD, Effective Carbon Rates 2021: Pricing Carbon Emissions through Taxes and Emissions Trading (OECD Publishing, Paris 2021); World Bank, State and Trends of Carbon Pricing 2026 (World Bank, Washington DC 2026).

³⁴ OECD, Effective Carbon Rates 2023: Pricing Greenhouse Gas Emissions through Taxes and Emissions Trading (OECD Publishing 2023) <https://doi.org/10.1787/b84d5b36-en>



b. innovate to reduce emissions.

This creates what is often described in environmental economics as a “dynamic efficiency effect,” where long-term innovation becomes more attractive than short-term compliance costs.

Evidence from the European Union Emissions Trading System demonstrates that firms covered by carbon pricing schemes are more likely to invest in renewable energy, energy efficiency technologies, and industrial decarbonisation processes.³⁵

3.2 Mechanisms of Technological Transition

Carbon pricing facilitates green technological transition through several interrelated mechanisms:³⁶

(a) Cost Internalisation

By attaching a price to carbon emissions, carbon pricing ensures that environmental costs are reflected in production decisions. This shifts demand toward cleaner technologies.

(b) Relative Price Effect

Carbon-intensive technologies become more expensive relative to low-carbon alternatives such as solar, wind, and hydrogen energy systems.

(c) Investment Reallocation

Capital flows gradually shift from fossil fuel-based industries to renewable energy and green infrastructure due to improved risk-return profiles.

(d) Learning-by-Doing Effects

Increased deployment of green technologies reduces costs over time through economies of scale and technological learning.

3.3 Empirical Evidence from Carbon Markets

Carbon pricing, is unequivocally confirmed by empirical evidence, to be a driver of technological transition within the EU ETS. Research indicates that there has been measurable gain in emissions

³⁵ European Environment Agency, *Technical background document – Accompanying the report trends and projections in Europe 2023*, Publications Office of the European Union, 2023, <https://data.europa.eu/doi/10.2800/779346>

³⁶ World Bank, *State and Trends of Carbon Pricing 2024* (World Bank 2024)



intensity in regulated sectors, especially in the power generation and industrial manufacturing industries.³⁷

Additionally, the money earned with carbon markets has been repurposed for innovation funds and subsidies for green technology, further strengthening the transition process. Large-scale deployment of hydrogen energy, carbon capture and storage (CCS) and integration systems for renewables is supported by the EU Innovation Fund funded by ETS revenues.³⁸

furthermore, jurisdictions with carbon taxes like South Africa have seen small but discernable trends towards energy efficiency improvements, although this is tempered by transitional allowances and comparatively low effective carbon prices.³⁹

3.4 Carbon Pricing and Systemic Industrial Transformation

Carbon pricing is not a standalone policy and works in the context of other industrial policy measures to catalyse the system change. Advanced economies have carbon pricing as part of:⁴⁰

- i. energy policy;
- ii. industrial strategy;
- iii. innovation funding; and
- iv. trade regulation.

A structural approach is taken to carbon pricing, such that it becomes a policy instrument rather than a purely fiscal measure. In the EU context, for instance, carbon pricing is tightly tied to the European Green Deal, which brings cohesion in climate, energy, and industrial policies, which facilitates the EU targets for climate neutrality.⁴¹

3.5 Implications for Developing Economies

For developing economies such as Nigeria, carbon pricing has particular significance as a tool for leapfrogging carbon-intensive development pathways. Rather than following the historical

³⁷ Joseph E Aldy and Robert N Stavins, 'The Promise and Problems of Pricing Carbon: Theory and Experience' (2012) 21(2) The Journal of Environment & Development 152–180, doi:10.1177/1070496512442508.

³⁸ European Commission, 'Innovation Fund' <https://climate.ec.europa.eu> accessed 6 June 2026.

³⁹ OECD, 'Taxing Energy Use 2023' (n 19).

⁴⁰ European Commission, The European Green Deal COM (2019) 640

⁴¹ Ibid.



high-carbon industrialisation trajectory of developed countries, carbon pricing allows for earlier integration of clean technologies into economic development strategies. The key implications include:⁴²

- a. Encouraging decentralised renewable energy systems;
- b. Supporting off-grid solar and hybrid energy solutions;
- c. Promoting energy efficiency in industrial expansion;
- d. Reducing long-term dependence on fossil fuel infrastructure.

However, the effectiveness of carbon pricing in developing contexts depends on institutional capacity, energy market structure, and access to climate finance.

3.6 Carbon Pricing as Structural Transformation Policy

Carbon pricing should therefore be understood not merely as an environmental regulation but as a structural transformation policy instrument. It operates at the intersection of environmental law, industrial policy, and innovation economics. Its transformative effect lies in its ability to:⁴³

- a. Redirect investment flows.
- b. Restructure industrial production systems.
- c. Accelerate technological diffusion
- d. Align economic incentives with climate goals.

Overall, carbon pricing is a key enabler of green technological transition, by putting a price on carbon emissions, and driving innovation in various sectors. Advanced carbon pricing jurisdictions have proven that, with good design and execution, carbon pricing can be a key driver of technological innovation and decarbonisation in industry.

⁴² JC Steckel, G Schwerhoff and O Edenhofer, 'Enabling Low-Carbon Development in Poor Countries' (2017) 3 *Climate Policy* 1; International Monetary Fund, *Fiscal Policies for Paris Climate Strategies—From Principle to Practice* (IMF Policy Paper, Washington DC 2019) <<https://www.imf.org/en/publications/policy-papers/issues/2019/05/01/fiscal-policies-for-paris-climate-strategies-from-principle-to-practice-46826>> accessed 31 August 2026; UNFCCC, 'About Carbon Pricing' <<https://unfccc.int>> accessed 31 August 2026

⁴³ Jonas Meckling, 'Making Industrial Policy Work for Decarbonization' (2021) 21(4) *Global Environmental Politics* 134–147 https://doi.org/10.1162/glep_a_00624



The case of Nigeria is a good example because it emphasises the need for the adoption of carbon pricing as a climate compliance measure, as well as a development strategy for a sustainable industrialisation and technological upgrading.

4.0 CARBON PRICING IN INTERNATIONAL CLIMATE LAW

Carbon pricing has its origins in the development of international climate law. International environmental governance has gradually developed from voluntary environmental commitments to structured market-based environmental governance mechanisms to reduce greenhouse gas (GHG) emissions over the past 30 years. This shift is driven in part by a growing understanding that as well as obligations to take action on climate change mitigation, there also needs to be economic incentive that changes the behaviour of industry and technology. The international climate law is a normative and institutional framework that enables and legitimises the use of carbon pricing as a regulatory instrument, via a series of multilateral environmental agreements, including the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and the Paris Agreement. They all validate the application of carbon markets, emissions trading, and carbon taxation as instruments for achieving climate goals.

4.1 United Nations Framework Convention on Climate Change (UNFCCC)

International climate governance started in 1992, when the United Nations Framework Convention on Climate Change (UNFCCC) was adopted at the Rio Earth Summit. The Convention established the overarching objective of stabilising greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with the climate system.⁴⁴ For emphasis, the UNFCCC did not explicitly introduce carbon pricing mechanisms but it facilitates the legal and policy groundwork for market-based climate regulation by introducing into its framework principles such as:

- i. Common but differentiated responsibilities (CBDR);
- ii. Sustainable development;
- iii. Protective environmental management; and
- iv. Cost-effective mitigation strategies.

Article 3(3) of the Convention explicitly encourages the parties to pursue measures that are "cost-effective", thus providing the conceptual underpinning for emissions trading systems and carbon market mechanisms.

⁴⁴ United Nations Framework Convention on Climate Change (adopted 9 May 1992, entered into force 21 March 1994) 1771 UNTS 107 art 2.



4.2 The Kyoto Protocol and Market Mechanisms

The Kyoto Protocol was the first legally binding international climate agreement to implement market-based approaches. The Kyoto Protocol was adopted in 1997 and became effective in 2005, setting specific legally binding emission reduction targets for the developed countries set out in Annex I of the Convention.⁴⁵ One major innovation of the Kyoto Protocol was the creation of the flexible market mechanisms to lower compliance costs. These mechanisms included:

a. International Emissions Trading (IET)

This was a mechanism that enabled countries that had more emission units than they needed to trade the remainder to the countries that needed more. It is an effective mechanism that established the first international carbon market.

b. Clean Development Mechanism (CDM)

The CDM was especially important for African nations as it had the potential to connect climate mitigation with their sustainable development goals.⁴⁶

c. Joint Implementation (JI). This mechanism allowed for the possibility of using emission reduction projects from industrialised countries to earn emission reduction credits in other industrialised countries.

Over all, the Kyoto mechanisms demonstrated that it was possible to integrate economic aspects into environmental policy. However, criticism was raised on various issues, including lack of equal participation, inadequate enforcement, and excessive dependence on carbon offsets.⁴⁷

4.3 The Paris Agreement and the Evolution of Carbon Markets

The Paris Agreement was a major shift away from the old climate change regime. The Paris Agreement creates a global agreement for all parties, mandating each to submit Nationally Determined Contributions (NDCs) to the Paris Agreement on climate change, as opposed to the Kyoto Protocol, which had obligations primarily for developed countries.⁴⁸ The Paris Agreement was the first to give carbon pricing greater validity, namely through Article 6, which offers a legal structure for:

⁴⁵ Kyoto Protocol to the United Nations Framework Convention on Climate Change (adopted 11 December 1997, entered into force 16 February 2005) 2303 UNTS 162.

⁴⁶ Ibid art 12.

⁴⁷ Daniel Bodansky, Jutta Brunnée and Lavanya Rajamani, *International Climate Change Law* (Oxford University Press 2017).

⁴⁸ Paris Agreement (adopted 12 December 2015, entered into force 4 November 2016) UN Doc FCCC/CP/2015/L9/Rev1 art 4.



- a. cooperative approaches to emissions reduction;
- b. internationally transferred mitigation outcomes (ITMOs); and
- c. sustainable development mechanisms.

Article 6 also allows States to engage in cooperation on the basis of carbon trading arrangements while preserving environmental integrity and transparency.

It is consequential, in the opinion of this study, to emphasis that this international climate law is particularly crucial as it provides developing countries with a pathway towards accessing global carbon markets and accessing climate finance. Hence, Countries in such cases, like Nigeria, with substantial renewable energy may therefore gain advantage from participation in the carbon market if the necessary domestic regulatory frameworks are in place.

4.4 Carbon pricing and global climate governance.

There is no doubt that the global institutions are increasingly calling carbon pricing a necessary condition to reach global decarbonisation goals. Carbon pricing has been a recurring theme in the World Bank and International Monetary Fund's thinking on climate governance reforms.⁴⁹ Likewise, the Organisation for Economic Co-operation and Development (OECD) has suggested that carbon pricing is one of the most cost-effective ways of cutting emissions, as it lets markets choose the cheapest routes to reduce them.⁵⁰

This reflects the growing attention on global carbon pricing as a regulatory tool and the implementation of a number of trade policies, including carbon budgeting, carbon taxation and carbon markets, to manage climate change, especially in view of the global accent on carbon emissions reduction to achieve the Net-Zero target. For instance, the European Union Carbon Border Adjustment Mechanism (CBAM) that introduces climate-related tariffs on imports from countries without comparable climate measures, with critical implications for developing, carbon-intensive economies like Nigeria, where exports could lose competitiveness if domestic climate legislation is weak.⁵¹

4.5 International climate law on Carbon Pricing: Implications for Nigeria

Nigeria's role in international climate governance is legally secured. Nigeria is a party to the United Nations Framework Convention on Climate Change, the Kyoto Protocol and the Paris Agreement,

⁴⁹ World Bank, *State and Trends of Carbon Pricing 2024* (World Bank 2024); International Monetary Fund, *Fiscal Policies for Paris Climate Strategies* (IMF 2019).

⁵⁰ OECD, *Effective Carbon Rates 2023* (OECD Publishing 2023).

⁵¹ Regulation (EU) 2023/956 of the European Parliament and of the Council establishing a Carbon Border Adjustment Mechanism [2023] OJ L130/52.



which places procedural binding obligations on Nigeria to progressively strengthen its climate commitments through NDCs, starting from its current target of a 20% reduction in emissions unconditionally, with a progressively stronger target of 47% reduction by 2030 conditional on its domestic climate legislation.⁵²

However, despite the commitment, Nigeria has not yet implemented a full carbon pricing system (CPS) that is neither a carbon tax nor an emissions trading system (ETS).⁵³ The Climate Change Act 2021 Nigeria provides for a mechanism for governance of climate action through carbon budgeting and institutional coordination but not yet a working carbon pricing mechanism to directly put a price on emissions at scale.⁵⁴ This creates a structural gap between international obligations and domestic regulatory implementation capacity in Nigeria. Thus, this gap limits Nigeria's participation in global carbon markets in the following ways:

(a) Disconnect between international commitments and domestic enforcement

From a legal perspective, Nigeria's commitments under the Paris Agreement are "in substance flexible" with a lot of domestic implementation mechanisms that are only binding "in form". On this note, Nigeria's NDC recognises the "bottom-up" nature of the Paris Agreement regime (under which states design their own emission mitigation pathways), but without domestic carbon pricing, the NDC could simply be policy-level ambition without robust market-based protocols for enforcement.⁵⁵

In sum, the lack of economy-wide carbon pricing instruments with the potential to cut emissions in Nigeria's NDC framework is a challenge to regulatory coherence and the effectiveness of emission mitigation measures, especially in high-emission sectors like the oil and gas sector, transport and power generation.⁵⁶

(b) Limited participation in international carbon markets

Nigeria's most notable consequence of the lack of domestic carbon pricing is its weak situation in international carbon markets as provided for in Article 6 of the Paris Agreement. More countries with well-functioning domestic carbon pricing programmes are likely to be able to create verifiable

⁵² Paris Agreement (adopted 12 December 2015, entered into force 4 November 2016) UN Doc FCCC/CP/2015/L.9/Rev.1; International Energy Agency, 'Nigeria: Nationally Determined Contribution Update' (2025) <https://www.iea.org/policies/29100-nationally-determined-contribution-ndc-to-the-paris-agreement-nigeria> accessed 6 June 2026; Climate Change Act 2021 (Nigeria) ss 1–3.

⁵³ UNEP Law and Environment Assistance Platform, 'Climate Change Act 2021 Nigeria' <https://leap.unep.org/en/countries/ng/national-legislation/climate-change-act-2021> accessed 6 June 2026.

⁵⁴ Ibid.

⁵⁵ Daniel Bodansky, Jutta Brunnée and Lavanya Rajamani, *International Climate Change Law* (Oxford University Press 2017).

⁵⁶ Izoukumor Afedolor Noah, 'Nigeria's Climate Change Act, Conditional and Unconditional NDCs' (2025) 146 *Environmental Law Review* 1.



carbon credits and engage in international carbon trading based on cooperative approaches and internationally transferred mitigation outcomes (ITMOs). Nigeria is having challenges with:

- i. Creating high-quality carbon credits
- ii. Accurately measuring the emissions reduced by performing the certification process according to internationally recognised standards
- iii. Negotiating favourable conditions for bilateral or multilateral carbon trading.

This restricts Nigeria's options to mobilise climate finance and generate carbon credit revenues from Nigeria's vast natural carbon sinks (forests and wetlands).

(c) Restricted access to climate finance and green investment

The notion that carbon pricing signals regulatory certainty for climate-related investment is gaining traction. Carbon pricing systems are often employed as tools for measuring policy readiness for green finance allocation by international financial institutions and development agencies.⁵⁷ The lack of a comprehensive carbon pricing system in Nigeria is therefore less attractive to: Foreign direct investment (FDI) for climate change; Sustainability-linked financing (SLF) and green bonds; Multilateral climate funds based on emissions reduction targets. This is particularly relevant as a global estimate indicates that developing countries will need trillions of dollars per year to achieve climate goals, many of which will be sourced from “blended finance” and carbon market-linked financing.⁵⁸

(d) Weak incentive structure for green technological innovation

Carbon pricing has been essential in driving technology change by making carbon-intensive technologies pricier and viable alternatives more competitive. Empirical studies indicate that carbon pricing regimes, which are predictable, can effectively accelerate the investments in renewable energy, energy efficiency technologies, and industrial decarbonization systems.⁵⁹ In the case of Nigeria, there are no such pricing mechanisms, so economically, it is still dominant to produce using fossil fuels. Market signals are less favourable for investments in renewable energy; hence, green technology innovation is not sufficiently being driven by the private sector. This slows Nigeria's shift to a low-carbon economy in the face of its immense potential for renewables, especially solar and hydro resources.

(e) Exposure to emerging carbon trade regulations

⁵⁷ World Bank, State and Trends of Carbon Pricing 2024 (World Bank 2024).

⁵⁸ International Monetary Fund, Fiscal Policies for Paris Climate Strategies (IMF 2019).

⁵⁹ Organisation for Economic Co-operation and Development, Effective Carbon Rates 2023: Pricing Greenhouse Gas Emissions through Taxes and Emissions Trading (OECD Publishing 2023) OECD Series on Carbon Pricing and Energy Taxation <https://doi.org/10.1787/b84d5b36-en>.



Global trade is increasingly being shaped by carbon-related border measures, such as the European Union Carbon Border Adjustment Mechanism (CBAM). Countries with no domestic carbon pricing system could be disadvantaged in international markets if these mechanisms begin to impose carbon costs on imports. If these mechanisms start imposing carbon costs on imports, countries without domestic carbon pricing systems could be disadvantaged in international markets.⁶⁰ This will likely reduce the competitiveness of exports in the country, especially in industries like energy-intensive or manufacturing industries, unless domestic carbon pricing is compatible with international standards. This establishes a strategic interest for early implementation of carbon pricing to prevent trade distortion and carbon sustainability of exports.

(f) Carbon pricing as an economic diversification tool

There is no doubt that opportunities are available for Nigeria in the context of carbon pricing, despite the extant structural gaps—as challenges. Thus, with proper structures, carbon pricing can:

- i. Create financial resources for renewable energy investment.
- ii. Minimize reliance on oil money.
- iii. Industrial diversification.
- iv. Increase the capacity of environmental governance.

In addition, scholarly studies have demonstrated that carbon taxes can be effective in raising significant revenues in low-income countries, which can facilitate structural change in the economy when the revenues are used appropriately.⁶¹

Overall, This paper opines that Nigeria's lack of a fully fledged carbon pricing mechanism is a major regulatory shortfall between international climate commitments and the level of implementation capacity. It also restricts opportunities for carbon trading in the global market, reduces access to climate finance, reduces innovation incentives and creates new carbon-based trade risks for the economy. On the other hand, the legal implementation of carbon pricing in Nigeria presents strategic pathway for aligning environmental sustainability with economic diversification and industrial transformation.

5.0 Legal Frameworks for Carbon Pricing: EU, South Africa and Nigeria

Carbon pricing has increasingly become an important component of contemporary climate regulation because it places an economic cost on greenhouse-gas emissions and thereby creates

⁶⁰ Regulation (EU) 2023/956 establishing a Carbon Border Adjustment Mechanism [2023] OJ L130/52.

⁶¹ Richard S J Tol, 'The Fiscal Implications of Stringent Climate Policy' (2023) 80 *Economic Analysis and Policy* 495 <https://doi.org/10.1016/j.eap.2023.09.004>



incentives for emission reduction and low-carbon investment. The legal frameworks of the European Union, South Africa and Nigeria demonstrate three different approaches: an established emissions-trading regime in the EU, a statutory carbon-tax regime in South Africa, and an emerging legal framework in Nigeria that expressly contemplates carbon pricing but has not yet established a comprehensive operational mechanism.

5.1 European Union

The European Union's principal carbon-pricing instrument is the EU Emissions Trading System (EU ETS), established by Directive 2003/87/EC. The system commenced in 2005 and operates principally through a cap-and-trade model under which a declining cap is placed on emissions and regulated entities must surrender allowances corresponding to their verified emissions. Allowances may be auctioned or traded, thereby allowing the market to establish a carbon price.⁶² The EU ETS has subsequently undergone several amendments, particularly under the Fit for 55 reforms, to strengthen its contribution to the Union's climate objectives.⁶³

The legal framework is reinforced by comprehensive monitoring, reporting, and verification requirements and financial penalties for non-compliance.⁶⁴ Carbon-pricing revenues also support renewable energy, energy efficiency and low-carbon innovation through national expenditure and mechanisms such as the Innovation Fund and Modernisation Fund.⁶⁵ The EU framework therefore demonstrates how legislation can integrate carbon pricing with broader climate, industrial and technological policies.

5.2 South Africa

South Africa adopts a fundamentally different model through the Carbon Tax Act 15 of 2019. The Act imposes a tax on greenhouse gas emissions expressed in carbon dioxide equivalent and came into operation on 1 June 2019.⁶⁶ Its stated rationale expressly incorporates the polluter-pays principle and recognises carbon pricing and economic incentives as instruments for moving the economy towards more sustainable development.⁶⁷

⁶² Directive 2003/87/EC of the European Parliament and of the Council establishing a system for greenhouse gas emission allowance trading within the Union [2003] OJ L275/3

⁶³ European Commission, 'About the EU ETS' (2026) https://climate.ec.europa.eu/areas-action/carbon-markets/about-eu-ets_en accessed 24 August 2026.

⁶⁴ Directive 2003/87/EC (n 46); European Commission, 'Monitoring, Reporting and Verification' (2026) https://climate.ec.europa.eu/eu-action/carbon-markets/eu-emissions-trading-system-eu-ets/monitoring-reporting-and-verification_en accessed 24 August 2026.

⁶⁵ European Commission, 'About the EU ETS' (n 60).

⁶⁶ Carbon Tax Act 15 of 2019 (South Africa).

⁶⁷ Ibid.



The South African framework adopts a gradual and development-sensitive approach. It provides substantial sector-specific allowances and other reliefs, thereby reducing the effective tax burden during the transition period and giving carbon-intensive industries an opportunity to invest in cleaner technologies.⁶⁸ Administration and collection are undertaken by the South African Revenue Service, with the carbon tax implemented as an environmental levy under the Customs and Excise Act framework.⁶⁹ This model demonstrates how carbon pricing can be incorporated into an existing fiscal and regulatory system while accommodating developmental and competitiveness concerns.

5.3 Nigeria

Nigeria presents a different legal position. The Climate Change Act 2021 establishes the principal statutory framework for national climate governance and creates the National Council on Climate Change. Significantly, section 15(1)(e) expressly identifies ‘carbon tax and emissions trading’ as potential sources of revenue for the Climate Change Fund.⁷⁰ This provision is important because it demonstrates that Nigerian legislation already recognises both principal forms of carbon pricing.

However, the statutory recognition of carbon tax and emissions trading should not be confused with the actual establishment of a comprehensive operational carbon-pricing regime. The Act provides the institutional foundation for climate governance, carbon budgeting and climate financing, but it does not establish a detailed economy-wide carbon tax or an operational ETS comparable to the EU ETS or South African carbon tax. Consequently, Nigeria remains at an earlier stage of carbon-pricing development.

The Nigerian framework nevertheless provides a legal foundation upon which a more comprehensive carbon-pricing regime could be developed. In particular, the statutory recognition of carbon tax and emissions trading within the Climate Change Fund creates scope for subsequent regulations or legislative reforms establishing the applicable tax base, rates, covered sectors, emissions-monitoring requirements, compliance mechanisms and revenue-allocation arrangements.

6.0 Comparative Analysis: EU, South Africa, and Nigeria

A comparison of the EU, South Africa and Nigeria shows three stages of development of carbon pricing: advanced institutionalisation (EU), transitional adaptation (South Africa) and regulatory

⁶⁸ South African Revenue Service, ‘Carbon Tax’ (2026) <https://www.sars.gov.za/customs-and-excise/excise/environmental-levy-products/carbon-tax/> accessed 24 August 2026.

⁶⁹ Ibid.

⁷⁰ Climate Change Act 2021 (Nigeria) s 15(1)(e).



emergence, but no implementation (Nigeria). This disconnect is indicative of the legal capacities, economic structures and considerations of political economy in climate governance.

6.1 The European Union: Mature Market-Based Carbon Governance

The European Union Emissions Trading System (EU ETS) under Directive 2003/87/EC is probably the most developed carbon pricing regime in the world, and it is legally binding, market-based and operates in a number of sectors.⁷¹ The Key features under the European Union's side market-based carbon governance include:

- i. A legally binding emissions cap.
- ii. Complete allowance trading market.
- iii. Effective monitoring, reporting and verification (MRV) systems.
- iv. Integration with industrial and trade policy (including CBAM).

In addition, the EU model serves as an epitome of how carbon pricing laws are best integrated into a comprehensive legal framework that connects environmental law and principles with industrial development and fiscal policy, while providing regulatory stability and predictability for the long term, which can propel technological innovation and energy transition.

6.2 South Africa: Adaptive Carbon Tax Model in a Developing Economy

South Africa represents the most advanced African model of domestic carbon pricing through its Carbon Tax Act 15 of 2019.⁷² Unlike the EU's market-based ETS, South Africa adopts a tax-based approach, reflecting administrative simplicity and fiscal integration. For emphasis, the South African Carbon Tax regime is characterised by the following exceptional provisions:⁷³

- i. Gradual implementation with phased increases.
- ii. Extensive sectoral allowances and exemptions.
- iii. Revenue recycling into energy transition and efficiency measures;
- iv. Integration within national fiscal and climate policy frameworks.

It is clear from the South African model that carbon pricing is possible to design development sensitively, in a way that is both environmentally ambitious and addresses industrial

⁷¹ Directive 2003/87/EC establishing the EU ETS [2003] OJ L275/32.

⁷² Carbon Tax Act 15 of 2019 (South Africa).

⁷³ Ibid.



competitiveness concerns. The effectiveness of its contribution to reducing emissions is, however, limited by the relatively low effective CPs resulting from the transitional allowances.⁷⁴

6.3 Nigeria: Emerging Framework without Carbon Pricing

Nigeria represents an early-stage climate governance system with legal and policy foundations but without operational carbon pricing mechanisms.⁷⁵ Thus, the Climate Change Act 2021 provides institutional coordination but does not establish either a carbon tax or emissions trading system.⁵ in a nutshell, Nigeria's approach is characterised by:⁷⁶

- i. Policy-based rather than market-based regulation;
- ii. Heavy reliance on international climate finance;
- iii. Sectoral mitigation measures rather than economy-wide pricing;
- iv. Weak emissions data infrastructure for pricing systems.

This paper opines that the Nigerian approach to carbon pricing places Nigeria at a structural disadvantage in global carbon governance architecture today.

6.4 Key Comparative Dimensions

The comparative analysis of laws and practices in the EU, South Africa, and Nigeria, particularly in their respective approaches to carbon pricing as a tool in climate governance, is polycentred in the following dimensions for clarification:

(a) Legal Institutionalisation

Comparing the legal and institutional frameworks of the European Union (EU), South Africa, and Nigeria shows that the field of carbon pricing has progressed further in the EU than in South Africa and Nigeria. The EU has implemented a very formally specified supranational legal framework in which carbon pricing is backed by a binding legal framework, institutional structures, and enforcement. In contrast, South Africa has national legislation that includes carbon pricing via fiscal policy, notably the carbon tax legislation. Nigeria has been in a large framework stage, passing laws focused on climate change and emissions reduction, but has yet to have a fully functioning carbon pricing instrument. The EU provides an example of the significance of coordination and enforcement of the law at a supranational level, while the South African example

⁷⁴ OECD, *Effective Carbon Rates 2023: Pricing Greenhouse Gas Emissions through Taxes and Emissions Trading*, (OECD Series on Carbon Pricing and Energy Taxation, OECD Publishing, Paris 2023). <https://doi.org/10.1787/b84d5b36-en>.

⁷⁵ Fwawwabea, T., David, F.A., Amos, K.G., Bature, M.A. 2025. Building Nigeria's carbon market: Policy framework for domestic and international trading. *International Journal of Research and Scientific Innovation (IJRSI)* 12(6):266-274. <https://doi.org/10.51244/IJRSI.2025.12060024>

⁷⁶ Ibid.



shows how national law can be used to operationalise the carbon pricing mechanism via fiscal integration. However, Nigeria is yet to establish a comprehensive climate-policy pledging system that leads to a comprehensive climate-policy pledging system into a robust and binding carbon pricing policy.

(b) Market Mechanism Design

The design of a market mechanism. Such differences are also apparent in the design of market mechanisms. The EU implements an emissions trading system (ETS) with the cap and trade model for regulating emissions; the total emissions cap is set, and regulated entities can trade emission allowances. This results in a viable carbon market where the carbon price is determined by the market power of demand and supply. South Africa takes a different route with the implementation of a carbon tax supported by a range of allowances and incentives to cap the price that the regulated entity will have to pay for its carbon footprint. The South African model is thus based mainly on a price-based fiscal instrument instead of a traditional emissions trading market. Nigeria, however, does not currently have an operational carbon pricing mechanism in place. The lack of a working emissions trading mechanism and carbon tax is a notable constraint on Nigeria's capacity to leverage economical price signals to encourage corporate change, to discourage carbon-intensive activities, and to promote investments in cleaner technology.

(c) Technological Transition Impact

The technological implications of such a difference are also consequential. There is empirical evidence in the EU that carbon pricing, well complemented by the right regulatory and institutional arrangements, can create greater incentives for the deployment of renewables, more efficient use of energy in industry, and innovation in low-carbon technologies. Carbon pricing places a cost on carbon, encouraging companies and investors to rethink their carbon-intensive production practices and move towards cleaner solutions. The EU experience thus shows that carbon pricing can not only be a tool to tax or abate emissions but also be a regulatory tool that can encourage technological transformation and contribute to a low-carbon economy. South Africa's carbon-tax regime is also starting to offer a structure to incentivize industrial behaviour. This paper believes that Nigeria should learn from both models and go beyond the framework legislation to have a well-structured carbon pricing policy that fits its developmental needs, institutional capacity, energy structure, and technological transition goals.⁷⁷

For emphasis, South Africa demonstrates moderate impact due to transitional design constraints, while Nigeria shows minimal impact due to absence of pricing signals.

(d) Economic and Developmental Considerations

⁷⁷ European Environment Agency, Trends and Projections in Europe 2023 (EEA 2023).



It is also important to note that the economic and development frameworks are distinct among the three jurisdictions, which could also account for their differing approaches to carbon pricing. The EU is the predominantly high-income, advanced industrial economy with a high level of regulatory and institutional capacity, which allows it to enact advanced climate and carbon-market policies. The middle-income economy of South Africa has to strike a balance between the necessity of decarbonization and the requirement to ensure continued economic growth, industrial activity and jobs. Nigeria is a developing economy with heavy reliance on fossil fuels, heavy fiscal pressures and a large reliance on petroleum resources, and has different constraints. Partly, these structural realities account for Nigeria's conservative stance on explicit carbon pricing despite the fear that extra carbon costs may impact energy affordability, energy security, competitiveness of industries and public revenues. Hence, the implementation of any carbon-pricing mechanism in Nigeria must be well conceived, taking developmental needs into account, and gradually improving the forces for emissions reduction.

(e) The integration with the Global Climate Regime

The three jurisdictions are also signatories to the Paris Agreement, which has varying degrees of integration into the new global carbon-governance system. The EU has also become a front-runner in establishing international carbon-governance standards, including the Carbon Border Adjustment Mechanism (CBAM), which aims for carbon leakage mitigation and the "carbonization of carbon markets". South Africa is involved in the global carbon pricing conversation, albeit with a South African developmental and economic twist, through its domestic carbon-taxing framework and its involvement in international climate programmes and schemes. In contrast, Nigeria has limited experience of participation in operational carbon markets, although it has pledged under the Paris Agreement and its broader climate-policy goals. The differences will have significant implications for the ability of the jurisdictions to effectively contribute to the cooperative measures envisioned in Article 6 of the Paris Agreement, including international carbon trading and shipping of internationally transferred mitigation outcomes. More recognisable is the aspect of a limited carbon-market infrastructure coupled with a gap in the domestic regulatory environment, which may also limit the country's ability to maximise its potential gains from the evolving international carbon-market opportunities.⁷⁸

6.5 Synthesis of Lessons for Nigeria

The comparative analysis yields the following key lessons for Nigeria:

- a) Institutional strength is critical

⁷⁸ Paris Agreement 2015 art 6.



Carbon pricing requires strong legal, administrative, monitoring and enforcement institutions to ensure effective implementation and compliance.

b) Design must reflect economic context

South Africa demonstrates the importance of phased and flexible implementation in developing economies, particularly where economic growth and decarbonisation must be pursued simultaneously.

c) Market-based mechanisms provide stronger incentives

The EU experience shows that directly pricing carbon can create stronger incentives for emission reductions, technological innovation and investment in cleaner production than policy measures that lack an effective price signal.

d) Global trade pressures are increasing

Nigeria risks competitiveness challenges if it fails to develop a carbon-pricing framework that responds to emerging international measures, particularly the EU's CBAM.

e) Revenue recycling enhances legitimacy

Carbon-pricing revenues should be channelled towards developmental priorities such as clean energy, infrastructure, social protection and green technology. This can improve public acceptance and strengthen the political legitimacy of carbon pricing.

In summary, the comparative evidence demonstrates that carbon pricing effectiveness depends on institutional maturity, legal design, and economic integration. The EU represents a mature carbon market system, South Africa illustrates adaptive fiscal carbon taxation, while Nigeria remains at a preparatory stage without operational pricing mechanisms. However, the key policy implication for Nigeria is that carbon pricing is not merely an environmental reform tool but a strategic necessity for economic competitiveness, technological advancement, and integration into global carbon governance systems.

7.0 RECOMMENDATION

Drawing attention to the Nigerian context and lessons that Nigeria stands to learn from comparative analysis, this paper recommends the following:

i. Introduce a Phased Carbon Tax Regime

Nigeria should commence carbon pricing through a phased carbon tax system applicable to major emitting sectors such as oil and gas, electricity generation, manufacturing, and transportation. A phased approach would minimise economic disruption while gradually introducing a carbon price



signal into the economy.⁷⁹ For instance, the South African experience demonstrates that gradual implementation accompanied by sector-specific allowances can improve political acceptability and reduce resistance from carbon-intensive industries.⁸⁰ Thus, such a system would enable Nigeria to balance climate objectives with economic realities.

ii. Develop a National Emissions Trading System (ETS)

In addition to carbon taxation, Nigeria should have a domestic emissions trading system (ETS) that could grow into a regional carbon market in Africa. An ETS would give flexibility as companies would find the most cost-effective ways to cut emissions and encourage technological development.⁸¹ This step would be in line with the European Union, where ETS has proven effective, as it has led to substantial reductions in emissions while encouraging investment in renewable energy and in decarbonising industrial processes.⁸²

iii. Strengthen the Climate Change Act 2021

Climate Change Act 2021 gives a sound institutional basis, albeit there are still a number of legislative developments needed to include carbon pricing provisions. Thus, amendments should:

- a. Create a legal framework for carbon tax and emissions trading.
- b. Outline the roles and responsibilities for emissions monitoring.
- c. Create compliance and enforcement mechanisms.
- d. Provide clear institutional roles in the administration of carbon markets.

These proposed amendments would improve regulatory certainty and enhance investor confidence in Nigeria's green transition agenda.

iv. Invest Carbon Revenues in Green Technology

International experience indicates that public acceptance of carbon pricing increases significantly when revenues are visibly reinvested in socially beneficial and environmentally sustainable projects.⁸³ Hence, revenue generated from carbon pricing should be ring-fenced and channelled into:

⁷⁹ World Bank, State and Trends of Carbon Pricing 2024 (World Bank 2024).

⁸⁰ Carbon Tax Act 15 of 2019 (South Africa).

⁸¹ Paris Agreement (adopted 12 December 2015, entered into force 4 November 2016) art 6.

⁸² Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community [2003] OJ L275/32.

⁸³ OECD, Taxing Energy Use 2023 (OECD Publishing 2023).



- a. Renewable energy development.
- b. Green industrial infrastructure;
- c. Research and development in clean technologies;
- d. Sustainable transportation systems;
- e. Climate adaptation projects.

V. Establish Robust Monitoring, Reporting, and Verification (MRV) Systems

Accurate emissions measurement is crucial to effective carbon pricing. Nigeria should thus establish comprehensive Monitoring, Reporting and Verification (MRV) systems that are in line with international best practices.⁸⁴ Thus, these systems should make use of digital technologies, satellite monitoring and emissions databases in the centre to be transparent, accountable and market compliant.

vi. Promote Public-Private Partnerships and Climate Finance

Nigeria should leverage carbon pricing as a mechanism for attracting climate finance and green investment. Public-private partnerships should be encouraged in renewable energy, sustainable infrastructure, and clean technology development. Therefore, Participation in carbon markets—established under Article 6 of the Paris Agreement—would also provide opportunities for accessing international climate finance and technology transfer.⁸⁵

vii. Enhance Institutional Coordination

The current climate governance responsibilities in Nigeria are fragmented among several agencies. For effective carbon pricing, better coordination is needed among the following:

- a. The National Council on Climate Change (NCCC) is a body that advises the government on climate change matters.
- b. Federal Minister of Environment.
- c. Federal Ministry of Finance.

⁸⁴ Intergovernmental Panel on Climate Change (IPCC), 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC 2006, updated refinements 2019).

⁸⁵ Paris Agreement, art 6.



- d. The Nigerian Upstream Petroleum Regulatory Commission (NUPRC).
- e. Regulatory institutions of energy and electricity.

The integrated governance would help to minimize policy overlap and better optimize the implementation.

viii. Align Carbon Pricing with Economic Diversification Policies

Carbon pricing should not be viewed solely as an environmental measure to prevent climate change but as part of Nigeria's broader economic diversification strategy. If it is thus viewed as a revenue-generating means, it can support industrial transformation, reduce dependence on fossil fuel revenues, and stimulate growth in emerging green sectors. A well-designed carbon pricing framework can therefore contribute simultaneously to climate mitigation, fiscal sustainability, and economic competitiveness.

8. CONCLUSION

It is certain that the concept of carbon pricing is now a vital market-based instrument to address climate change, reduce Green House Gases (GHG) and catalyze green technological/economy transition. It can help to change the production decisions, encourage investment in renewable energy, and promote low-carbon innovation by internalising the environmental costs of emissions.

The comparative analysis section in this study indicates that the EU has implemented an extremely institutionalised carbon pricing system, the EU ETS, while South Africa has implemented a phased carbon tax system appropriate for their developmental context. Although Nigeria has enacted the Climate Change Act, 2021, adopted the Energy Transition Plan and signed the Paris Agreement, it does not have a complete and operational carbon pricing framework. This regulatory deficit marginalizes Nigeria's contribution to international carbon markets, reduces the incentives for developing green technological innovations and places its economy at risk from new carbon-based trade barriers such as the EU Carbon Border Adjustment Mechanism. Nigeria's context-specific hybrid carbon pricing policy should thus be a mix of carbon taxation and emissions trading, with the institutions, emissions monitoring and carbon revenues reinvested in green technologies.

In all, It is imperative for Nigeria to adopt carbon pricing as one of the most powerful market-based regulatory and policy tools for catalyzing the green technological transition in today's climate governance framework. It because, the concept of carbon pricing can assist a developing country like Nigeria to put a price tag on carbon emissions that will incentivise behavioural change, drive technological innovation, double up the uptake of environmentally friendly practices in critical sectors of the economy, and attain its Net-Zero goal. Therefore, Nigeria has to focus on the integration of effective carbon prices into its environmental and economic policy framework as



the world move towards the decarbonisation agenda. Hence, this needs to be backed up by a well-designed legal and institutional framework that allows for effective implementation, regulatory certainty, and compliance with internationally recognized best practices. Thus, Nigeria can have a competitive edge in the evolving global green economy with sustainable economic growth and environment protection.