



## THE 3Ms OF CARBON MANAGEMENT – A STRUCTURED APPROACH TO ACHIEVE NET ZERO GOALS IN ENERGY TRADING

### Abstract

Climate change and global warming are a stark reality today. Growing environmental concerns have prompted the need for rapid change in how we live and work. Geopolitical fluctuations, variable market supply and demand, stringent carbon emission standards, and the threat from climate change pose new challenges for traditional energy trading businesses. To diversify portfolios and manage risks, traders and regulators need to adopt a more effective framework and trade in new financial products to keep up with the trend of carbon emission offsets and reduction. Carbon offset trading has resulted in the widespread development of renewable energy and reforestation projects. Nevertheless, the quality of credits, measurements, data recording, and disintegrated carbon trading tools present a challenge. Companies must adopt robust solutions built around a sustainable and pragmatic approach to address these issues. This article proposes the 3M framework to measure, monitor, and monetize a company's carbon data.

## Introduction

Global attention today is on climate change. This aligns with the views expressed by the United Nations Secretary-General Antonio Guterres during the COP25 summit. He said, "To address the climate emergency, we need a rapid and deep change in how we do business, how we generate power, how we build cities, how we move, and how we feed the world."<sup>1</sup> His key message was on the need for swift and significant transformation in business practices and urban development towards greater sustainability. Energy trading has the potential to facilitate the transition to sustainable energy systems by providing flexible and efficient mechanisms to balance demand and supply. Energy trading is the buying and selling of energy commodities, such as electricity, natural gas, oil, and other related products. It helps create liquidity in the market, enabling price discovery while managing risk. Energy trading and risk management (ETRM) is on par with commodity trading and risk management (CTRM), which refers to the trade of various commodities such as agricultural products, metals, renewables, and fuels, among others.

## Transformation in Energy Trading

For over two decades, businesses have been using CTRM/ETRM solutions. However, traditional energy trading companies face various challenges adapting to changes in geopolitical scenarios, variable market demand, and supply, stringent regulations on greenhouse gas (GHG) emissions, climate risks, and more. For effective management of their portfolios and risks, regulators and traders must adopt better frameworks and explore new financial products, such as certificates and renewable fuels.<sup>2</sup>

## The New Norm – Carbon as the Key Driver

The 25th Conference of the Parties (COP25) to the United Nations Framework Convention on Climate Change (UNFCCC) climate management program has brought carbon emissions and reduction into the spotlight. McKinsey estimates the annual global demand for carbon credits to increase to 1.5 to 2.0 (GtCO<sub>2</sub>) by 2030 and 7 to 13 (GtCO<sub>2</sub>) by 2050.<sup>3</sup> As companies, individuals, and investors strive to achieve net zero emission targets and become carbon-neutral, they are buying carbon credits by investing in carbon offset projects.

Carbon offset trading is an approach to develop projects in renewable energy, reforestation, and more. These projects aim at removing or reducing carbon dioxide from the atmosphere, resulting in certificates known as carbon credits<sup>3</sup>. This approach offers several benefits:

- Immediate emission reduction in organizational books
- Potential revenue from renewable certificate trading

- Improved credibility in the eyes of investors owing to compliance with environmental, social, and governance (ESG) policies

**Challenges in Carbon Management** Stakeholders may encounter decision bias, as indicated in a survey that reveals that 97% of businesses require improvement in their planning and choice selection to avoid getting into one-off solutions.<sup>4</sup> The developing policies in climate change require effective planning and decision-making with due consideration for cost effectiveness and climate quality. This challenge often drives organizations to seek convenient, but unsustainable, solutions to design such programs.

While trading in carbon offset credits is crucial to reduce emissions, it also presents inherent risks of credit quality, inaccurate measurements, unreliable data recording, and a lack of integrated carbon trading tools. Barbara Haya of the Berkely Carbon Trading Project<sup>5</sup> explains, "Carbon credits are essentially treated as trades rather than achieving the actual emission reduction."

Purchasing carbon credits through carbon offset has become a sought-after choice, often overlooking the notion of reducing existing carbon emissions. This raises concerns about the sustainability of companies that claim to be balancing their carbon emissions and reductions.

**The Economic Generation of Power** Economic generation is about determining the optimal electricity output to meet system demand at the lowest possible cost. The cost is usually calculated based on the fuels used, such as gas, coal, and biomass, and the amount of carbon emissions generated during the process. ETRM operations use various spreads to account for the cost of power generation and to determine pricing strategies as listed in Table 1.

Table 1 – Spreads in economic generation

Spreads	Accounted costs
Spark spread (SS)	Gas as fuel
Dark spread (DS)	Coal as fuel
Crack spread (CS)	Oil as fuel
Clean spark spread (CSS)	Gas costs+CO <sub>2</sub> cost
Clean dark spread (CDS)	Coal costs+CO <sub>2</sub> cost

The cost of CO<sub>2</sub> carries inherent risks as listed below:<sup>6</sup>

- Direct costs: Power-generating companies may incur significant penalties in the form of carbon tax levied by authorities
- Indirect costs: Power buyers may choose cheaper power over clean energy sources, leading to the accumulation of negative carbon emission certificates

To meet ESG norms and maintain their sustainability reputation, companies often resort to buying carbon offset certificates from the market. However, this does not contribute in real terms towards achieving carbon neutrality. Renewable fuels are not yet a preferred choice in economic power generation, leading to power production companies paying carbon tax and passing the increased cost to end-users.

**Carbon Management Solutions are No Longer an Option**

Taking a myopic approach to carbon reduction policies is not the best solution. Organizations must consider carbon management in the following ways:

- Understanding the sourcing methods and efficiency of raw materials
- Reporting economic generation practices, such as fuel quality and asset optimization
- Setting net zero targets and baselining emissions
- Using the right technology tools for consistent reporting and management of data across the power lifecycle

Considering these challenges, the solutions must be more robust and comprehensive.

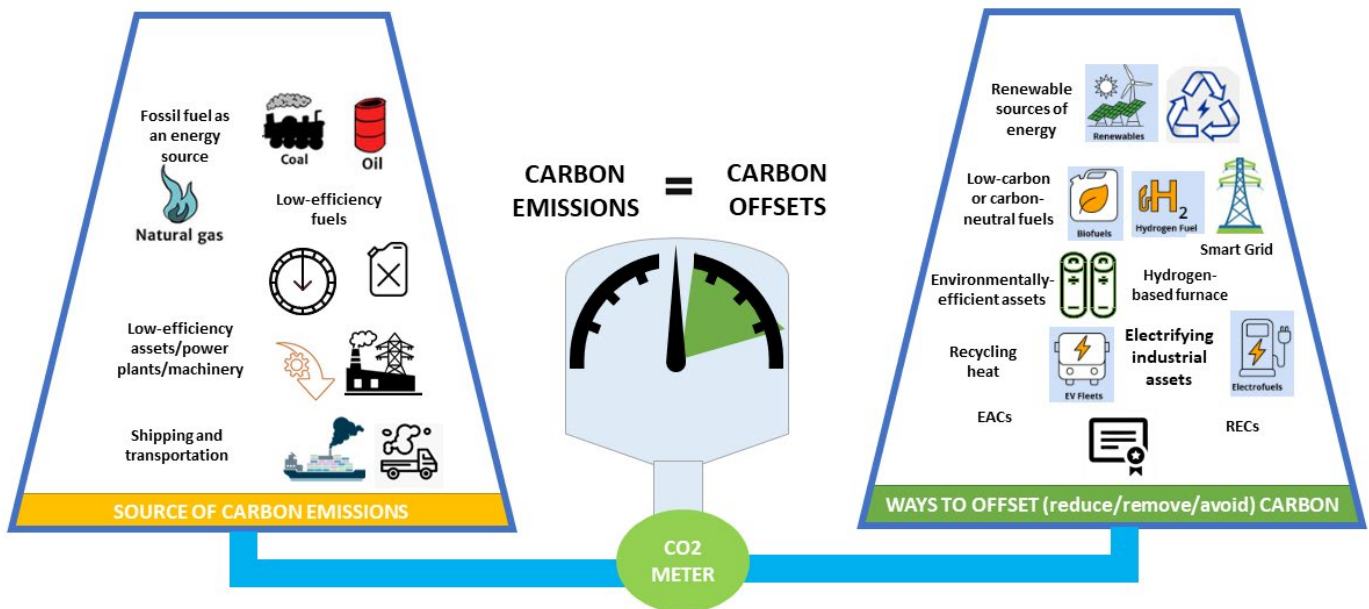
**Emission vs. Reduction: Balancing the Carbon Meter Scale**

To strike the right balance between in-house sustainability and revenue streams, companies must put in place a clear plan to balance emissions and their reduction. They can do this with the help of a carbon meter scale to track the carbon lifecycle.

Exhibit 1 presents the carbon meter scale perspective for a power generation company, emphasizing the need to prioritize emission reduction using renewables and biofuels.

Our proposal for a carbon meter scale serves as a reflection point for companies to assess their carbon footprint and health, in line with our pragmatic proposal for a sustainable 3M framework.

*Exhibit 1 - Balancing scale of carbon meter*



## A Sustainable 3M Framework

To achieve the ambitious carbon neutrality targets and thrive in competitive markets, we propose a robust three-pronged approach called the **3M framework**.

**Its three pillars are: (i) Measure (ii) Monitor (iii) Monetize.**

**Measure:** The objective of this stage is to establish a baseline for the company's emissions.

Companies must set up an emission tracker app to measure the physical carbon and other GHG emissions from direct and indirect generation activities. This would include tracking the economic generation process and its various components including:

- Power plant outputs and fuel/CO<sub>2</sub> costs
- The efficiency of assets/plant age
- Origin of each megawatt (MW) of power produced
- Source of raw materials used
- GHG inventory management process to store the carbon emitted

This would automate and track emissions across the enterprise and facilitate forecasting. The output of this stage will flow into the Monitor phase.

**Monitor:** This is a health check of the framework aimed at strategizing and planning to achieve net zero targets. The objective is to reduce the cost of carbon without affecting financial decisions. Companies must develop a sturdy analytical tool, along with smart meters, to effectively monitor and report the levels of carbon emissions. The tool must:

- Integrate with emission trackers, carbon meters, and carbon calculator apps

- Display real-time information on fuel/raw material efficiency and consumption, as well as power output
- Monitor inventory and carbon tax in real time
- Provide information on renewable energy certificate (REC) prices and market trends

This stage helps risk analysts and stakeholders re-strategize their investments in economic generation and prioritize the use of renewable sources of energy. It also involves developing processes and tools to align the workforce with sustainable power production practices.

**Monetize:** The objective of this last stage is to increase revenue streams by monetizing the carbon accounting data and tools used in the earlier stages of the framework.

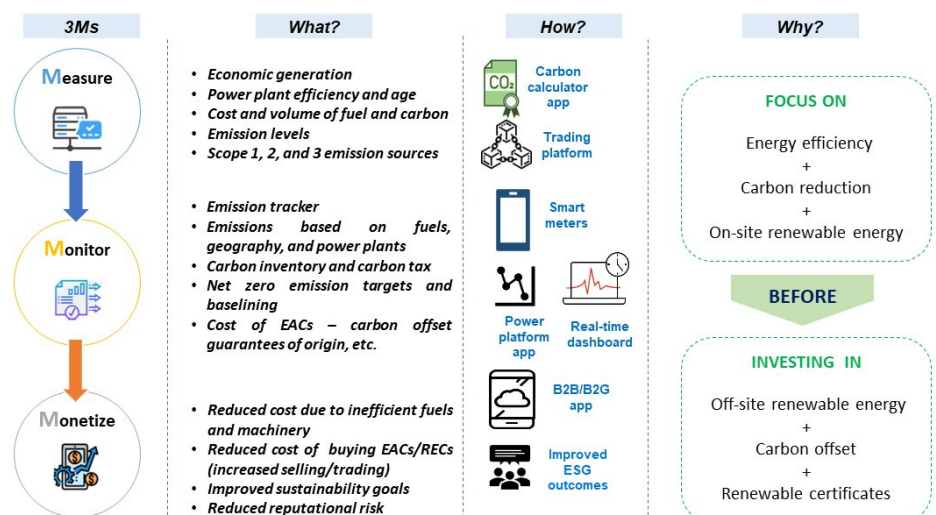
Establishing a unified carbon trading platform for business-to-business (B2B), business-to-government (B2G), and consumer visibility through the following methods can help:

- Integrating renewable energy sources and methods of power production into trade policies by developing a robust ETRM system
- Utilizing high-end data lake management powered by digital cloud-secured technology

**Exhibit 2** explains the sustainable 3M framework in a structured manner. The ultimate objective of the framework is not only to generate revenue but also to attain the following metrics for companies to succeed in competitive and sustainable markets. Some of its key benefits are:

- Reduced cost and expenses incurred from inefficient and unmonitored fuel, machinery, and assets
- Improved carbon credits/offset trading by selling surplus certificates available within the company
- Creating streamlined cash flows, higher job creation rates, improved biodiversity, and greater investor satisfaction

Exhibit 2 – The sustainable 3M framework





## Conclusion

The traditional ETRM systems may help achieve the right degree of hedging, mitigation of risks, and management of revenue using non-renewable fuels. However, with the current stringent policies on carbon reporting, the traditional siloed systems need to be scaled and integrated with renewables. Our approach in this paper offers solutions for companies to re-strategize and implement a robust digital system that accounts for carbon offset and reduction, thereby boosting revenue streams and enhancing their credibility.

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