ARAB FERTILIZER ASSOCIATION

CBAM: A TECHNICAL ANALYSIS OF ITS IMPLICATIONS FOR THE FERTILIZER INDUSTRY AND PATHWAYS FOR COMPLIANCE

INTRODUCTION

The Carbon Border Adjustment Mechanism (CBAM) is gaining traction globally as a vital measure to address carbon leakage and promote fair competition by imposing tariffs on imported goods based on their embedded carbon emissions. As part of the European Union's Green Deal, CBAM is aimed at reducing global carbon emissions by encouraging industries in non-EU countries to adopt more sustainable production practices.

THE PATH TO A LOW-CARBON FUTURE: HOW CBAM IS RESHAPING GLOBAL TRADE

CBAM reshapes global trade by imposing carbon-based tariffs, incentivizing greener technologies and sustainable practices. It aligns trade with climate goals, ensuring a level playing field for industries worldwide. The mechanism is a key step towards a sustainable, low-carbon global economy.

BRIDGING THE GAP: CBAM AND THE FIGHT AGAINST CARBON LEAKAGE

CBAM prevents carbon leakage by imposing tariffs on imports based on their carbon intensity, ensuring fair competition. It promotes the adoption of cleaner technologies globally and helps countries with stringent environmental regulations maintain competitiveness. CBAM is a critical tool in the fight against climate change.

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CHALLENGES FOR CBAM COMPLIANCE

EMISSIONS MEASUREMENT:

- Accurate measurement requires lifecycle assessments (LCAs), including emissions from raw material extraction, processing, and energy consumption.
- CBAM compliance necessitates detailed reporting, which can be resource-intensive.

COST OF NON - COMPLIANCE

- CBAM prices are linked to the EU Emission Trading System (ETS), with carbon prices averaging €90 per ton in 2024.
- Example: For 1 million tons of ammonia exported annually, a non-compliant producer may face additional costs of €162 million (€90 × 1.8 tons CO_2/ton ammonia).

DECARBONIZATION INFRASTRUCTURE:

- Lack of access to CCS facilities or renewable energy in certain regions increases compliance difficulty.

PATHWAYS TO COMPLIANCE

CARBON CAPTURE, UTILIZATION, AND STORAGE (CCUS):

- Captures up to 90% of CO_2 emissions from SMR and urea synthesis.
- Example: The QAFCO-7 plant in Qatar integrates CCUS to capture 500,000 tons of CO_2 annually.

GREEN HYDROGEN FOR AMMONIA PRODUCTION:

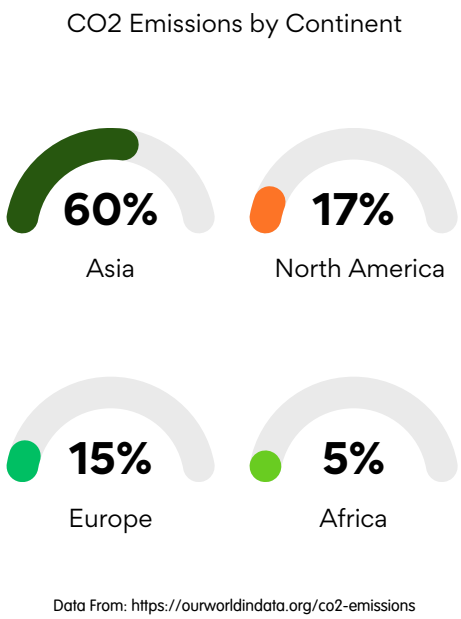
- Replacing natural gas-based hydrogen with electrolyzed hydrogen reduces CO_2 emissions by ~100%.
- Challenge: Requires 3-4 MWh of renewable energy per ton of green hydrogen.

ENERGY EFFICIENCY AND PROCESS OPTIMIZATION:

- Retrofitting plants with waste heat recovery systems and high-efficiency reformers can cut emissions by 20-30%.
- Example: A Ma'aden plant in Saudi Arabia achieved a 20% reduction in energy use through advanced process controls

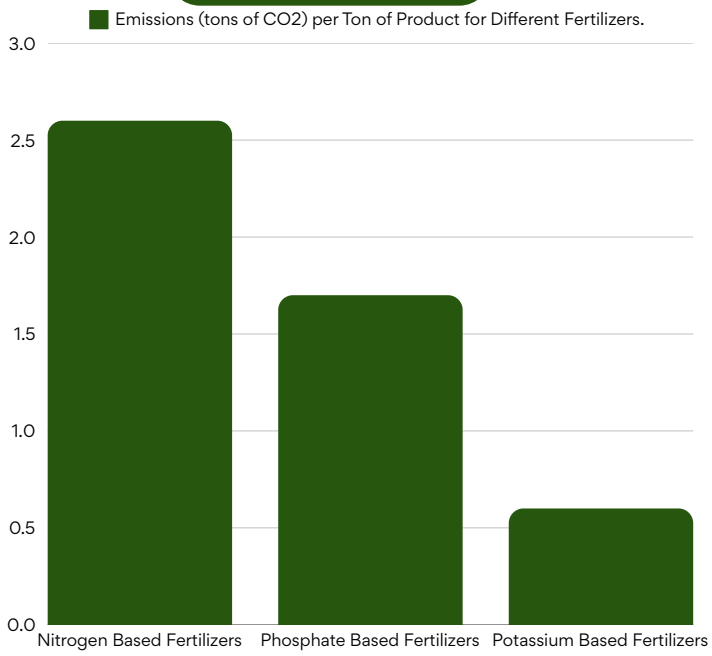
CBAM Implementation: Progress, Emissions, and Global Adoption at a Glance

CO2 Emission Overview by Continent



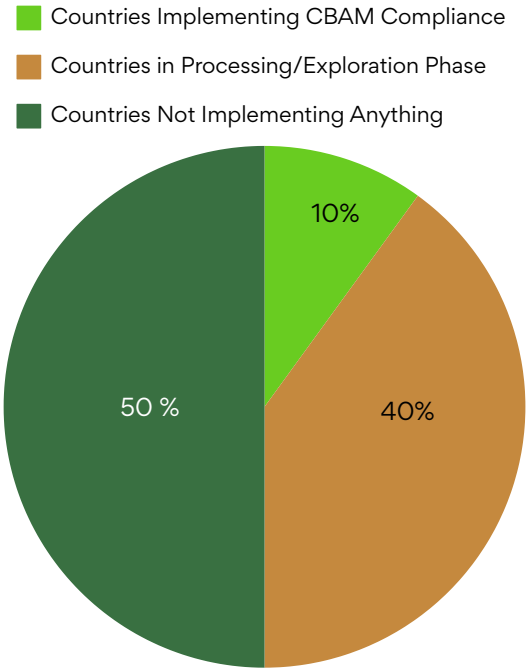
Data From: https://ourworldindata.org/co2-emissions

Emissions of CO2



Data From: https://www.carbonchain.com/blog/understand-your-synthetic-fertilizer-emissions

No of Countries



The implementation of CBAM (Carbon Border Adjustment Mechanism) is driving industries globally to adapt to stricter carbon emission standards and adopt sustainable practices. The progress across companies highlights varying levels of readiness, emphasizing the need for accelerated action in key sectors. The comparison of CO_2 emissions per ton of product for different fertilizers underscores the critical role of innovation in reducing environmental impact. Furthermore, the distribution of countries implementing CBAM reflects growing global alignment on combating climate change, with more nations recognizing the urgency of equitable carbon regulation. Together, these insights reveal a transformative shift toward a greener and more accountable future.

SCOPES EMISSIONS

01

Scope 1
(Direct Emissions)

Scope 1 includes emissions originating from sources directly owned or controlled by an organization, such as those generated by burning fuel in company-owned vehicles that are not electric.

02

Scope 2
(In Direct Emissions)

Scope 2 refers to indirect emissions resulting from the production of energy that a company purchases and consumes. For instance, the emissions generated during the production of electricity used in company buildings are categorized under Scope 2.

03

Scope 3
(Value Chain Emissions)

Scope 3 refers to emissions that are not directly generated by the company itself or from assets it owns or controls, but rather arise from activities along its value chain that the company indirectly influences. An example includes the emissions associated with the purchasing, use, and disposal of products from suppliers. Scope 3 emissions cover all sources outside the boundaries of Scope 1 and 2.

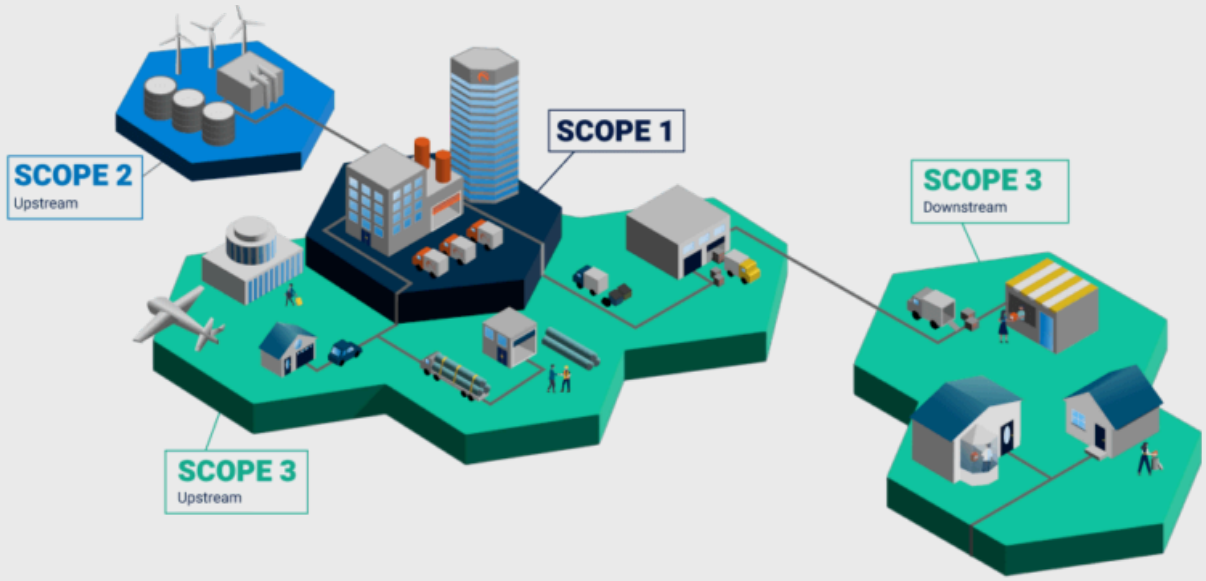


Photo from: https://www.anthesisgroup.com/solutions/net-zero-decarbonisation/scope123/