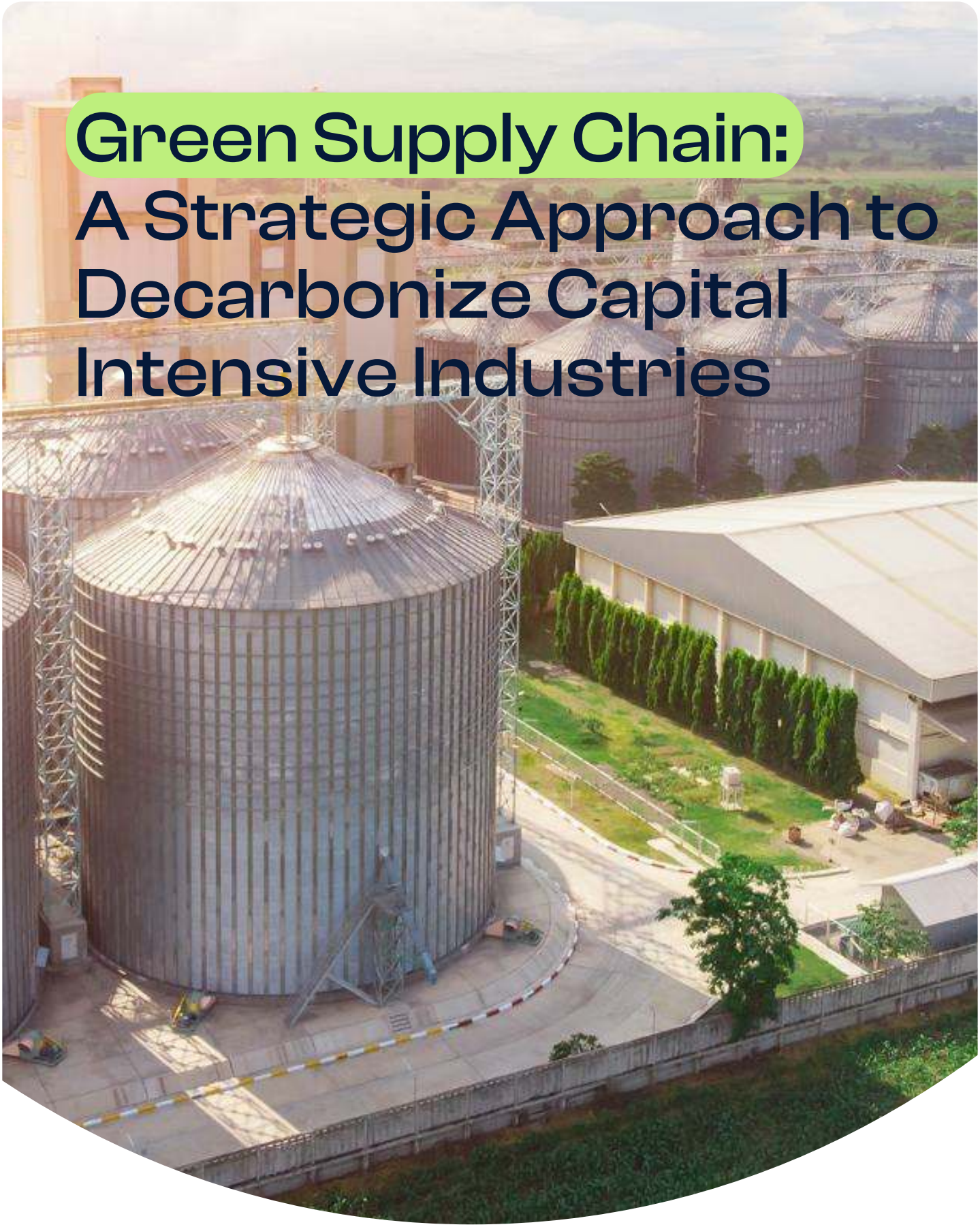

Green Supply Chain: A Strategic Approach to Decarbonize Capital Intensive Industries

finboot

GREEN SUPPLY CHAIN

INDEX

Overview

Capital intensive industries play a pivotal role in the global economy but also significantly contribute to global emissions. The pressure from governments, investors, consumers, and the broader societal push for sustainability is driving these sectors to adopt strategies for decarbonization. While challenges remain, the transition towards more sustainable practices is essential for mitigating climate change and ensuring a healthier planet for future generations.

Green supply chain management (GSCM) embodies a strategic approach, integrating eco-friendly practices from eco-design to green purchasing to mitigate environmental degradation while also enhancing operational efficiency and fostering economic growth. It not only prioritizes environmental sustainability but also aligns with customer expectations for quality and sustainability, significantly contributing to competitive advantages and improved market share.

Advancements in technology, like Finboot's MARCO Track & Trace, play a critical role in accelerating the net-zero transition for capital-intensive industries by optimizing supply chain emissions through visibility and accountability. This transparent approach ensures compliance, drives sustainability, and supports the global movement towards supply chain decarbonization, promising a sustainable future with reduced supply chain carbon emissions and enhanced organizational performance.

The Weight of Heavy Industries on Worldwide Emissions

Heavy industry, which typically carries a high capital cost (i.e. capital intensive) currently accounts for about 30% of global emissions and roughly 37% of global energy consumption (The World Economic Forum). Carbon emissions from this sector need to decline by an astounding 93% by 2050 to achieve net zero carbon emissions.

Capital intensive industries, such as steel manufacturing, oil and gas, mining, and utilities, are characterized by their heavy reliance on physical assets and infrastructure, which often involve energy-intensive processes. As the world grapples with the urgent need to mitigate climate change, these industries are under increasing pressure to implement strategies to reduce their carbon footprint. The significant factors contributing to their high emissions include:

- **Energy Consumption:** These industries consume vast amounts of energy, primarily from fossil fuels, for their operations, making them significant sources of carbon dioxide (CO2) emissions.
- **Process Emissions:** Certain industrial processes, such as the production of cement and steel, release CO2 as a byproduct, contributing to their high emission profiles.
- **Resource Extraction:** Activities like mining and oil extraction disturb large areas of land and release methane, a potent greenhouse gas.

Pressure to Decarbonize

The urgent need to combat climate change has led to increased scrutiny of capital intensive industries. Various stakeholders are exerting pressure on these sectors to decarbonize, including:

- **Government Regulations:** Many countries are implementing strict regulations and policies to reduce GHG emissions, such as carbon pricing, emissions trading, and renewable energy mandates.
- **Investor Expectations:** Investors are increasingly considering sustainability and climate risks when making investment decisions. Shareholders are pressuring companies to adopt greener practices and disclose their carbon emissions and reduction strategies

- **Consumer Demand:** Consumers are demanding eco-friendly products, leading companies to adopt cleaner technologies and practices.
- **Business Priority:** Business partners prefer companies with a sustainable focus due to consumer demand and the global shift towards environmental responsibility. Not following this can pose a risk to business opportunities.
- **Competitive Advancements:** Advancements in technology are enabling industries to reduce emissions more effectively and affordably. Early adopters gain a competitive advantage through increased sustainability.

Strategies for Decarbonization

In response to these pressures, capital intensive industries are exploring and implementing various strategies to decarbonize, including:

- **Energy Transitioning:** Companies are investing in renewable energy sources, such as wind and solar, to power their operations. Therefore, there is a focus on optimizing processes and equipment to reduce energy consumption.
- **Adopting Circular Economy Principles:** Industries are exploring ways to reuse and recycle materials to minimize waste and reduce emissions.
- **Investing in Carbon Capture and Storage:** carbon capture and storage (CCS) technologies are being considered as a way to capture CO2 emissions from industrial processes and store them.
- **Innovating in Low-Carbon Technologies:** Investment in research and development of new technologies that emit less CO2 is critical for long-term decarbonization. For example, sustainable fuels, such as SAF (Sustainable Aviation Fuel) and HVO (Hydrogenated Vegetable Oil) emit less CO2 throughout their supply chain lifecycle.

Key Barriers to Decarbonization in Capital Intensive Industries

FINANCIAL AND TECHNICAL CHALLENGES

- **High Capital Costs:** Implementing decarbonization technologies often requires significant upfront investment, which can be a major barrier for capital-intensive industries. These costs stem from the need to develop or integrate new technologies that are often expensive and not yet widely adopted. For example, adapting vehicles, vessels and aircraft for sustainable fuels or segregating these fuels within industrial processes can be costly, hindering the transition to greener practices in certain sectors.

- **Uncertainty in Carbon Pricing:** The lack of predictability around future carbon pricing and regulations makes it difficult for businesses to plan and justify the investments needed for decarbonization projects. This uncertainty can delay or deter initiatives aimed at reducing carbon emissions.

RESOURCE AND REGULATORY HURDLES

- **Raw Material and Energy Constraints:** Limited availability of essential raw materials for industries like steel production and inadequate access to renewable energy sources for industrial processes are significant obstacles. For example, cobalt and other rare minerals play a crucial role in energy transition as they are used in the production of batteries and wind power systems.

- **Complexity of Regulatory and Administrative Landscapes:** The ever-shifting global regulatory environment, coupled with the expanding administrative intricacies, presents a significant challenge for industries. This complexity is amplified by the necessity for increased collaboration among a growing number of stakeholders involved in the regulatory process. Particularly, the inclusion of Scope 1, 2, and 3 emissions in the supply chain demands an unprecedented level of cooperation, trust, and transparency. Achieving this is nearly impossible to achieve without using digital technologies to streamline processes and ensure compliance with constantly evolving standards, thereby intensifying the operational workload.

HUMAN AND SOCIAL FACTORS

- **Workforce and Technical Integration:** Shortage of qualified staff and challenges in integrating green technologies into existing plants. A pivotal aspect of this digital transformation is the rise of low-code and no-code solutions, which have democratized the development process, making it accessible and enabling businesses to adopt them faster.

- **Social and Environmental Concerns:** Public resistance to industrial changes and challenges in environmental protection can also pose barriers. The recent farmer outrage in Europe against sustainability policies in agriculture is one example.

Strategies for Implementing Green Supply Chains and Reaching net-zero

MANAGEMENT AND COLLABORATION

- **Supply Chain Mapping:** To effectively implement Green Supply Chain Management (GSCM), companies must start by mapping their supply chains to baseline their Scope 3 emissions and identify climate-related risks. This initial step is crucial for understanding the full extent of emissions and pinpointing critical areas for intervention.

- **Strategic Supplier Identification:** Identifying key strategic suppliers is essential for leveraging influence to reduce Scope 3 emissions. By collaborating with these suppliers, companies can significantly impact their overall environmental footprint.

- **Supplier Engagement and Collaboration:** Building strong collaborations with suppliers and business partners is vital. This includes setting shared sustainability goals and engaging in joint projects that focus on emissions reduction. Such collaborations are supported by transparency and continuous communication, fostering a mutual commitment to sustainability.

LEVERAGING TECHNOLOGY AND INNOVATION

The importance of technology in decarbonization efforts and climate change mitigation is widely discussed in numerous studies and articles. McKinsey's article emphasizes the crucial role of technology in protecting the planet and offers resources for organizations to advance toward a low-carbon future. Additionally, the World Economic Forum whitepaper highlights the need for digital transformation in the environment and climate sectors to address urgent global challenges. It explores the potential of blockchain technology to enhance climate action by democratizing ownership, improving transparency, and providing real-time visibility into emissions reduction and sequestration efforts.

We are using digital innovation to help capital intensive industries, such as Energy and

Chemicals, achieve sustainable and traceable operations. Our solutions enable these industries to meet the requirements of digital product passports, including data management, data sharing, and traceability.

Our all-in-one traceability solution, MARCO Track & Trace, positions our customers' low-carbon, renewable, and/or circular products at the center, with our modules and flagship features around Our all-in-one traceability solution, MARCO Track & Trace, positions our customers' low-carbon, renewable, and/or circular products at the center, with our modules and flagship features around these sustainable products to help our clients improve profitability and margins, while mitigating risks. Four flagship modules are already in the market:

- **Automated sustainability credit bookkeeping:** to effortlessly track and manage the inflow and outflow of credits, lowering audit costs and improving customer satisfaction with enriched traceability.

- **Scheme regulation:** streamline compliance and introduce efficiencies in the creation, verification, and distribution of regulatory and voluntary certifications and declarations of sustainability.

- **GHG emissions tracking:** calculate, manage, and reduce your supply chain's carbon footprint with evidence-backed data. Move away from estimates and assumptions on emissions and get closer to more accurate carbon tracking and reporting.

- **Digital Product Passports:** get ahead of upcoming regulatory pressures and embrace the market opportunity and significant returns that can come from investing in sustainability by sharing enriched supply chain data with your customers, covering emissions, credits, certifications, and much more.

These modules meet and comply with the regulatory landscape affecting capital intensive supply chains.

Finboot's MARCO Track & Trace offers an innovative traceability solution to automate ESG and sustainability credits record-keeping, create Digital Product Passports, and manage sustainability declarations and certifications.. MARCO Track & Trace enables trusted shared record-keeping between stakeholders in a supply chain.

Track & Trace was designed with interoperability at its core. MARCO can aggregate emerging technologies into our ecosystems, including legacy systems such as enterprises' ERP or other supply chain and production software, while emerging systems will include the use of IoT devices and the connectivity to different underlying database structures, including the many layer-1 blockchain technologies and frameworks. We also have a proven track record of integrating to legacy systems, without the need for bespoke software development.

PRODUCT POSITIONING ALIGNED WITH GREEN SUPPLY CHAIN MANAGEMENT

Case Studies: Our success stories in industrial decarbonization

Automated Mass Balance in Sustainable and Circular Packaging

SABIC becomes the first in their industry to unlock batch-level traceability from waste to packaging for their TRUCIRCLE products through MARCO Track and Trace. SABIC tracks the use of circular and renewable raw materials, such as plastic waste, and traces it down to the brands and eventually the consumer. The ultimate goal is to provide consumers with visibility into the origin and composition of plastic packaging.

Digital Product Passports in Chemical Supply Chains

Finboot has been working with **CEPSA** – a global energy company with a diverse portfolio spanning oil and gas and petrochemicals – since the start of 2023. Finboot's MARCO Track & Trace has allowed Cepsa to implement digital traceability systems for tracking each batch of vegetable oil from its origin to its use in biodegradable surfactant production, in addition to automating bookkeeping and determining what percentage of output is from renewable and circular inputs.

Full Traceability of Net-Zero Emissions Fuels (HVO)

Repsol has been a client since 2018 and uses our digital traceability solutions extensively across several business areas. They use our digital ecosystems for the traceability of low-carbon fuels like HVO (Hydrotreated Vegetable Oil), and circular chemical products like packaging.

Digital Traceability of Renewable Energy

Finboot and **Amber** have created a fully traceable ecosystem that tracks renewable energy from source to end user. This innovative solution, based on blockchain technology, matches energy generation and use, ensuring a certifiable and accurate means of proving origin. We set-out to build a new application, powered by Finboot's MARCO platform, that allows management of data received from renewable energy plants (such as solar or wind).

We will be able to provide the tools that securely record and validate these newly designed Digital Guarantees of Origin (GOs) because of the underlying blockchain technology on which they were built, thereby avoiding the real issue in the industry surrounding "double spending".

Regulatory Landscape Influencing Green Supply Chains

The transition towards green supply chains is increasingly being influenced by a dynamic policy and regulatory landscape. Governments and international bodies are implementing regulations and guidelines to promote sustainability, reduce greenhouse gas (GHG) emissions, and ensure transparency in environmental, social, and governance (ESG) reporting. This landscape is pivotal in driving organizations towards adopting more sustainable practices across their supply chains.

KEY FOCUS AREAS AND POLICIES:

- **Digital Product Passport (DPP):** Regulations around DPPs are central to enhancing product lifecycle transparency and promoting circular economy principles. The EU has introduced the DPP as a key component of the proposed Ecodesign for Sustainable Products Regulation (ESPR), which is set to be implemented in 2024.

- **GHG Emissions Reduction:** Stringent policies targeting GHG emissions are pushing companies to innovate and adopt greener supply chain practices. Look for the Environmental Protection Agency (EPA) in the United States or the European Environment Agency (EEA) in Europe, for detailed policies and regulations.

- **ESG Reporting:** Mandatory ESG reporting is increasing transparency and pushing sustainability to the forefront of corporate agendas. For instance, in the United States, the Securities and Exchange Commission (SEC) may provide relevant guidelines on ESG reporting.

- **Circular Economy Incentives**: Policies and regulations incentivizing circular economy practices are crucial for minimizing waste and promoting resource efficiency. The European Union's Circular Economy Action Plan, provides a roadmap for transitioning to a circular economy, encouraging organizations to consider environmental and social factors in their purchasing decisions, impacting supply chain sustainability.

COMPLIANCE BENEFITS AND PENALTIES

Businesses must stay abreast of these developments to not only comply with regulations but to also leverage opportunities for innovation and competitive advantage in a rapidly evolving market.

Advantages of Regulatory Compliance: Adhering to the above regulations not only fosters ethical business practices but also enhances company reputations, builds consumer trust, and supports sustainable supply chains. Compliance helps attract socially responsible investors and can provide a competitive advantage in increasingly eco-conscious global markets.

Consequences of Non-Compliance: Companies failing to comply with these regulations face severe penalties, including fines, reputational damage, and potential legal actions. Non-compliance can also lead to exclusion from critical markets and loss of business partnerships, significantly impacting the financial and operational aspects of the business.

Conclusion

The journey to reduce carbon emissions in capital intensive industries presents opportunities for innovation. By using technology and collaborating with others, companies can improve their competitive advantage and contribute to a sustainable future. Partnering with Finboot's expertise in green supply chain management helps businesses accelerate their transition to net-zero, showing their commitment to the environment and operational excellence. This approach aligns with consumer demands and regulations, integrating eco-friendly practices into core business strategies.

Contact us to learn how we can assist you in your journey towards net-zero, ensuring a smooth and meaningful transition for a greener tomorrow.

BOOK A CONVERSATION WITH OUR TEAM

finboot