



# From Data to Strategy

Software Solutions and Strategic Implications on  
Carbon Accounting

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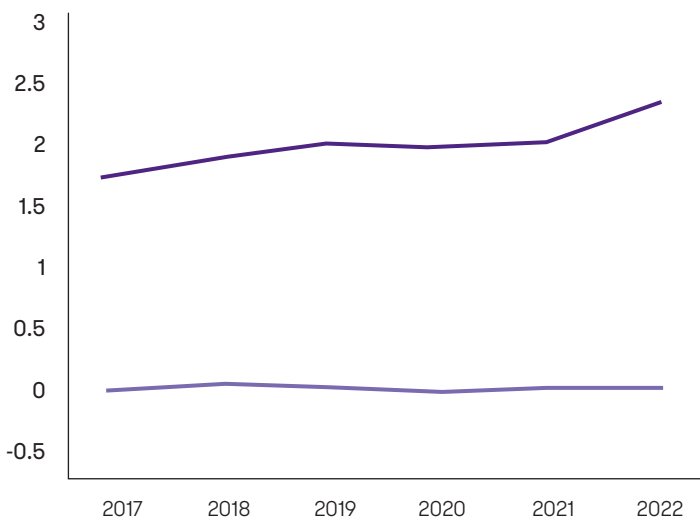
# From Data to Strategy

## Software Solutions and Strategic Implications on Carbon Accounting

### Economy goes resilient, carbon emission crawl gradually

After a downturn caused by COVID-19, Indonesia's economy rebounded significantly in 2022 with a growth rate of 5.31%. The fluctuations in the economic cycle have contributed to Indonesia's resilience and rise. As a result, this has indirectly impacted carbon emissions.

**Figure 1: Carbon & GDP Contribution**  
FY 2017 - 2022



Source: International Energy Agency and Statistic Bureau

Most people believe that a strengthening economy signals positive outcomes, such as a society with strong purchasing power and a smoothly functioning ecosystem.

However, the graph shows a similar trendline for both carbon emissions and GDP between 2019 and 2022. This indicates that emissions and economic growth tend to move in parallel. Let's delve into the industry breakdown. The trend of GDP and emissions within each sector shows a consistent pattern: the greater the percentage contribution to government revenue, the higher the emissions released by those industries. For instance, according to data recorded by the Statistics Bureau in 2022, the highest rates of GDP growth were achieved by the transportation (19.87%), manufacturing (4.89%), and mining and energy (4.38%) sectors.

This data is further supported by the Climate Transparency Report, which shows that these three industries have a high intensity of carbon emissions. Therefore, to stay on track with our national goals of achieving a 1.5°C limit and net-zero emissions while enhancing economic resilience, it's crucial to accurately measure carbon emissions and analyze the relationship between revenue and environmental costs.

### Overview on Carbon Accounting

As Indonesia progress towards a low-carbon future, it is clear that carbon accounting will become increasingly prominent.

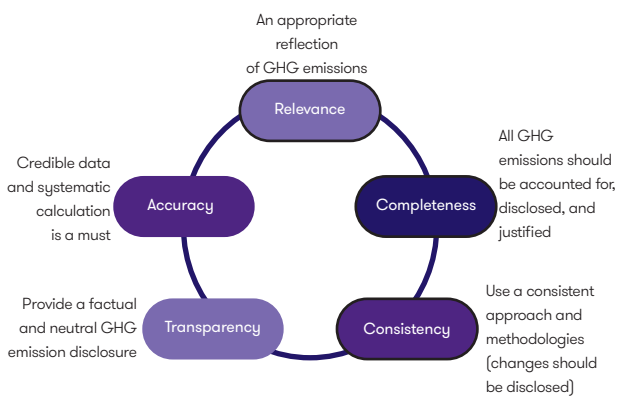
#### Carbon accounting

Carbon accounting is the process of measuring, managing, and reporting a company's carbon emissions to track its footprint and reduce emissions across scopes 1, 2, and 3. Accurate and precise data is required for this calculation. Therefore, the future of carbon accounting will be influenced by technology, emphasizing transparency, comprehensiveness, and disclosure. These advancements will enhance accuracy and effectiveness in reducing emissions, helping to achieve national goals while maintaining economic growth.

## Principle

Compliance with carbon accounting is not an easy task, but fundamental principles provide a solid foundation. Carbon accounting adheres to five key principles that support businesses in their effort to combat climate change, as follows:

**Figure 2: Five Keys Principle of Carbon Accounting**



Source: World Resource Institute

## An Effort of Carbon Combat

A systematic approach to carbon measurement is of paramount importance due to its precision in understanding environmental footprints, strategizing carbon offset targets, and ensuring transparency and compliance for stakeholders. The successful implementation of these initiatives is closely linked to the deployment of a Carbon Management Accounting System (CMAS), which facilitates the development of strategies and plans, the collection of supporting information, and the provision of informed decision-making (Schaltegger & Csutora, 2012).

There are two principal strategic approaches to mitigating carbon emissions:

### Energy Efficiency

Sustainability has become a critical factor in reducing energy consumption by optimizing, controlling, and

improving operational performance. Research by Zublie et al. (2023) demonstrates that enhancing energy efficiency is one of the most effective and impactful strategies for reducing carbon dioxide emissions and associated costs. Energy efficiency represents a low-carbon strategy that not only reduces energy consumption but also leads to significant energy savings (Irfan et al., 2023).and reporting a company's carbon emissions to track its footprint and reduce emissions across scopes 1, 2, and 3. Accurate and precise data is required for this calculation. Therefore, the future of carbon accounting will be influenced by technology, emphasizing transparency, comprehensiveness, and disclosure. These advancements will enhance accuracy and effectiveness in reducing emissions, helping to achieve national goals while maintaining economic growth.

### Environmental Performance

A company's commitment to environmental stewardship is reflected in its environmental performance, which pertains to how effectively it manages and mitigates its operational impacts on the environment. This includes the adoption of efficient and eco-friendly technologies, the reduction of resource consumption, and the implementation of waste minimization strategies.

Several indicators of corporate environmental performance include:

- **Financial and non-financial metrics**  
These encompass aspects such as corporate image, brand reputation, market share, and cost savings (Rahman & Islam, 2023).
- **Emissions and Waste Reduction**  
This includes the management of emissions, waste, and the use of natural resources and raw materials (Delmas et al., 2015).
- **Internal and External Contributions**  
This involves evaluating the impact of both internal operations and external factors on environmental performance.

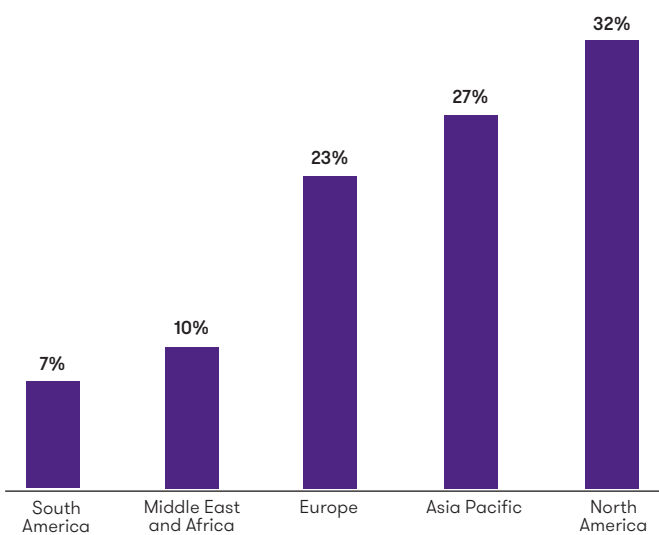


It is evident that energy efficiency, carbon accounting, and carbon management are intricately linked and significantly influence corporate environmental performance. Consequently, adopting precise and accurate methodologies for measuring and reporting carbon emissions should be prioritized to ensure comprehensive and transparent disclosure of environmental impacts.

## An Adoption as A Transformation

One aspect crucial for accuracy according to current regulations is carbon calculation. However, the development of specialized carbon accounting software has diminished the significance of this aspect due to technological advancements.

**Figure 3: Carbon Management Software Market Year of 2023**



Source: Maximize Market Research

There are five distinct domains where advanced software solutions for carbon accounting are available. Among these, three domains feature several key players anticipated to significantly enhance the accuracy of carbon contribution

measurements. As of 2023, North America—encompassing the United States, Canada, and Mexico—holds a 32% market share. Notably, the Asia-Pacific region has emerged as the second-largest market, with Indonesia identified as a key provider according to research conducted in India. This region is experiencing rapid adoption of such technologies, driven by increasing environmental awareness.

The market dynamics are continually evolving as businesses develop innovative solutions and navigate escalating global carbon emission regulations. These regulations underscore the necessity of precise tracking and management of carbon emissions. Governments play a pivotal role by implementing relevant policies; however, challenges persist, particularly in raising awareness about adopting low-carbon infrastructure. There is a notable deficiency in market awareness regarding the selection of infrastructure that minimizes electronic product usage while avoiding additional waste and pollution. This gap could potentially lead to increased carbon contributions, highlighting the critical need for effective measurement and carbon management software.

When considering the implementation of such software, several factors require careful evaluation:

- 1 Scope of Emissions Calculation Coverage
- 2 Reporting and Compliance Capabilities
- 3 Auditability

In conclusion, the advancement of carbon accounting software is a crucial element in the global effort to manage and reduce carbon emissions. As markets evolve and regulatory pressures increase, adopting sophisticated and precise software solutions will be essential for organizations aiming to meet environmental targets and demonstrate their commitment to sustainability. Effective implementation and utilization of these tools will enhance transparency and accuracy, significantly contributing to progress in mitigating environmental impact.

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