Carbon Footprint:

Critical Data in the Global Boiling Era



February 2025 Krungsri Research

krungsri Research

A member of MUFG a global financial group

Content

Executive summary	3
What is the carbon footprint?	4
Why does the carbon footprint matter?	5
How can businesses measure their carbon footprint?	7
How prepared are Thai businesses for measuring and reporting carbon footprint?	10
Krungsri Research View: Carbon footprint management is no longer an 'option' but a 'mission' for businesses.	16
References	17

Subscribe Us

For research subscription, contact

krungsri.research@krungsri.com

Disclaimer

Unless explicitly stated otherwise, this publication and all material therein is under the copyright of Krungsri Research. As such, the reuse, reproduction, or alteration of this text or any part thereof is absolutely prohibited without prior written consent. This report draws on a wide range of well-established and trustworthy sources, but Krungsri Research can make no guarantee of the absolute veracity of the material cited. Moreover, Krungsri Research will not be held responsible for any losses that may occur either directly or indirectly from any use to which this report or the data contained therein may be put. The information, opinions, and judgements expressed in this report are those of Krungsri Research, but this publication does not necessarily reflect the opinions of Bank of Ayudhya Public Company Limited or of any other companies within the same commercial group. This report is an accurate reflection of the thinking and opinions of Krungsri Research as of the day of publication, but we reserve the right to change those opinions without prior notice.

Executive summary

As climate change emerges as a pressing global agenda, businesses worldwide must prioritize environmental responsibility. Carbon footprints, or the total greenhouse gases emitted from business activities, serve as essential data for evaluating environmental impact. As a result, both domestic and international regulations increasingly require businesses to measure and report their carbon footprints.

Krungsri Research examined the readiness of Thai companies to disclose carbon footprint data and found that only half of the companies listed on the Stock Exchange of Thailand are able to report their carbon footprints. High-carbon-emitting businesses tend to disclose data more extensively, while large enterprises report at twice the level of smaller ones.

In the coming years, Thai businesses will face growing pressure to report their carbon footprints due to stricter regulations, trade rules, and rising demand from sustainability-conscious consumers and business partners. Nonetheless, businesses that effectively manage their carbon footprints can unlock new opportunities in trade and investment.

Prapan Leenoi

Analyst
prapan.leenoi@krungsri.com
+662 296 6235



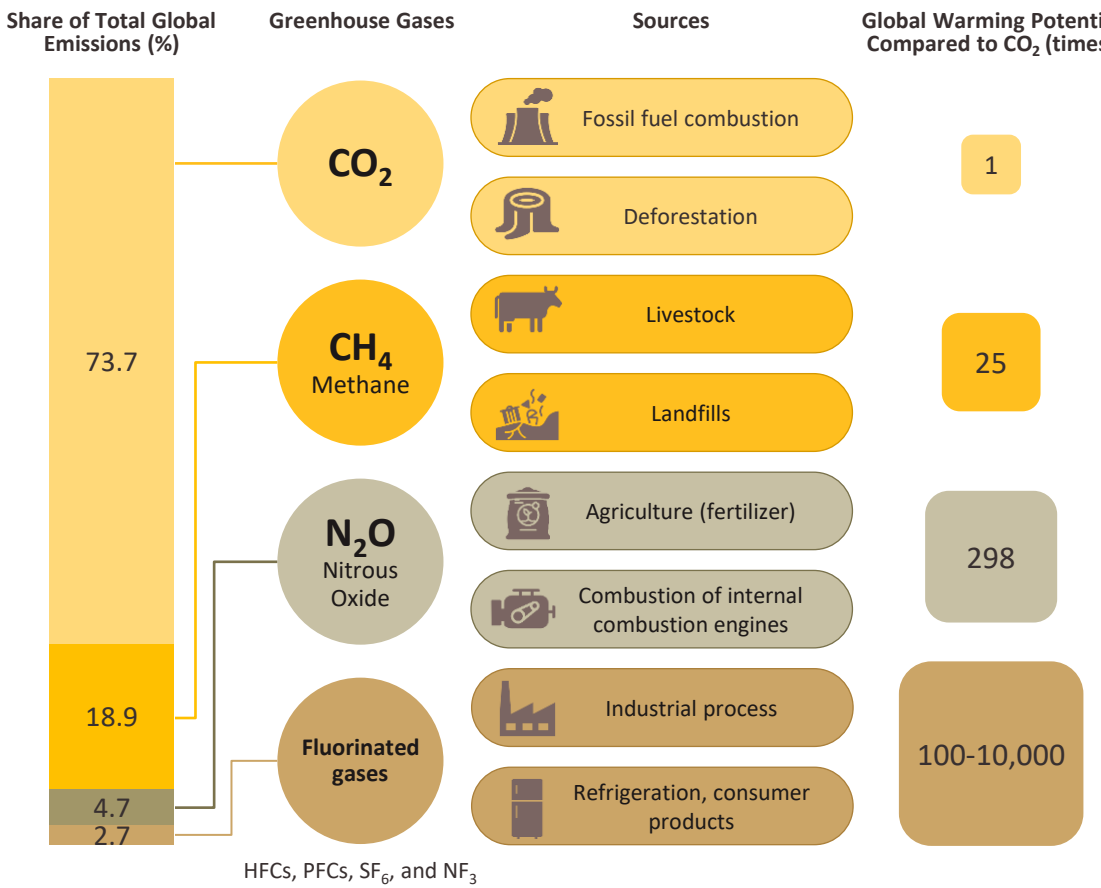
What is the carbon footprint?

The **carbon footprint** refers to the amount of greenhouse gases generated by business activities, products, or services. It includes various gases from multiple sources, such as **carbon dioxide (CO_2)** from fossil fuel combustion, **methane (CH_4)** from livestock activities and landfill waste, **nitrous oxide (N_2O)** from agriculture, and **fluorinated gases (F-gases)** from industrial processes and refrigerants. These greenhouse gases significantly contribute to global warming, with carbon dioxide accounting for approximately three-quarters of total global greenhouse gas emissions. As a result, **emissions are commonly measured in Carbon Dioxide Equivalent (CO_2e) units, combining all gases into a single metric, collectively referred to as the "carbon footprint."**

Despite being emitted in smaller quantities, other greenhouse gases still have a profound impact on climate change. When measuring their Global Warming Potential (GWP) relative to carbon dioxide, methane has 25 times the warming potential, while nitrous oxide is 298 times more powerful than carbon. More alarmingly, certain fluorinated gases have a warming potential exceeding 10,000 times that of carbon dioxide (Figure 1).

Figure 1:

Major Greenhouse Gases



Source: Statista, GHG Protocol, and Krungsri Research

Why does the carbon footprint matter?

In an era when sustainable development is a major global megatrend, businesses need to drive their operations with a greater focus on environmental responsibility. The carbon footprint is a crucial tool for organizations to measure their environmental impact, enabling better management, impact mitigation, and the creation of new business opportunities. Therefore, by measuring their carbon emissions, businesses can reap three main benefits, as follows:

- **Carbon Reduction and Cost Savings**: When a business assesses its carbon footprint, it can plan appropriate measures to reduce carbon emissions, aligning with sustainability goals at both the organizational and national levels[1/]. Additionally, effective carbon footprint management, such as switching to LED lighting and using recycled materials, can reduce energy consumption and resource use, ultimately lowering both the carbon footprint and operating costs.
- **Increased Business Opportunities:** Today, business partners and customers place greater importance on sustainability. Organizations that adhere to environmentally friendly standards and recognize the significance of carbon footprints can enhance their image and **increase competitiveness both domestically and internationally.** Moreover, **businesses that disclose greenhouse gas emissions have opportunities to raise additional funds**, as carbon footprint reporting is one of the criteria for evaluating sustainable stocks or the SET ESG Rating. Stocks that pass evaluation become investment options for the Thailand ESG Fund (TESG) and the Vayupak Fund 1 (Class A)[2/]. Furthermore, businesses that manage their carbon footprint effectively may **seize opportunities in the carbon credit market**, which arises from environmental projects. The demand for carbon credits is expected to grow in line with the global transition to a green economy. At the same time, Thailand's voluntary carbon credit market is expanding. In 2024, the market is valued at THB 85.7 million, reflecting an average annual growth rate of 110% from 2020 to 2024[3/].
- **Preparing for Stricter Regulations**: Globally, environmental measures are being implemented that require businesses to report the carbon footprint of their products and services. For example, the **European Union's Carbon Border Adjustment Mechanism (EU-CBAM)** requires exporters of six product categories—cement, electricity, fertilizer, iron and steel, aluminum, and hydrogen—to provide carbon footprint data for goods exported to Europe starting in October 2023[4/]. Other countries, such as the US, the UK, Australia, and Canada, are also considering the implementation of CBAM. Additionally, the aviation industry has obligations to report carbon footprints from international flights under the **Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)**, which started in 2024 for Thai airlines[5/]. Meanwhile, domestic regulations are becoming equally stringent. **Listed companies on the Stock Exchange of Thailand (SET)** are required to disclose greenhouse gas emissions starting in 2022. The government is also in the process of considering the **draft Climate Change Act**, which will require businesses to report carbon footprints as well[6/] (Figure 2).

1/ Currently, 147 out of 198 countries have set carbon footprint reduction targets, and 1,176 organizations have targets set from a survey of over 2,000 large companies worldwide (Source: https://zerotracker.net/).
2/ SET, https://www.set.or.th/th/about/mediacenter/news-release/article/643-set-announces-228-listed-companies-on-set-esg-ratings-2024
3/ Carbon credit market data from the TGO, Carbon Market Statistics, and further details on carbon credits can be found at Carbon Credit.
4/ For further reading, see Countdown to the CBAM.
5/ For further reading, see CORSIA Paving the Way for Flying Net Zero.
6/ It is expected that the draft Climate Change Act will be presented to the Cabinet in 2025 and will come into effect as early as 2026 and beyond.

Figure 2:

Stricter Environmental Regulations at the National and International Levels

	Regulation	Requirement/Detail	Affected Sectors	Implementation
External Drivers	**EU CBAM**	Carbon footprint MRV and carbon fees	Iron & Steel, Aluminum, Cement, Fertilizers, Electricity, Hydrogen; Potential extension: Plastics, Chemicals	2023
	US CBAM (Clean Competition Act)	Carbon footprint MRV and carbon fees	Iron & Steel, Aluminum, Cement, Petroleum, Petrochem, Fertilizers, Hydrogen, Glass, Paper, Ethanol, Adipic Acid	2026 (tentative)
	CORSIA	Carbon footprint MRV and carbon offsetting	Transport (Airlines)	2024 (voluntary) 2027 (mandatory)
Internal Drivers	**Carbon Tax**	Carbon pricing levied on oil products	Petroleum, Transport, Auto, CBAM sectors	2025 (tentative)
	Climate Change Act	Carbon footprint MRV and carbon pricing	Energy, High-emission Sectors, Others	2026-2027 (tentative)
	Thailand Taxonomy	A voluntary guideline classifying economic activities by their environmental sustainability	Phase 1: Energy, Transport; Phase 2: Manufacturing, Waste management, Agriculture, Construction, Real estates	2024 (Phase 1) 2025 (tentative Phase 2)

Source: Krungsri Research
Note: MRV refers to measurement, reporting, and verification of greenhouse gas emissions.

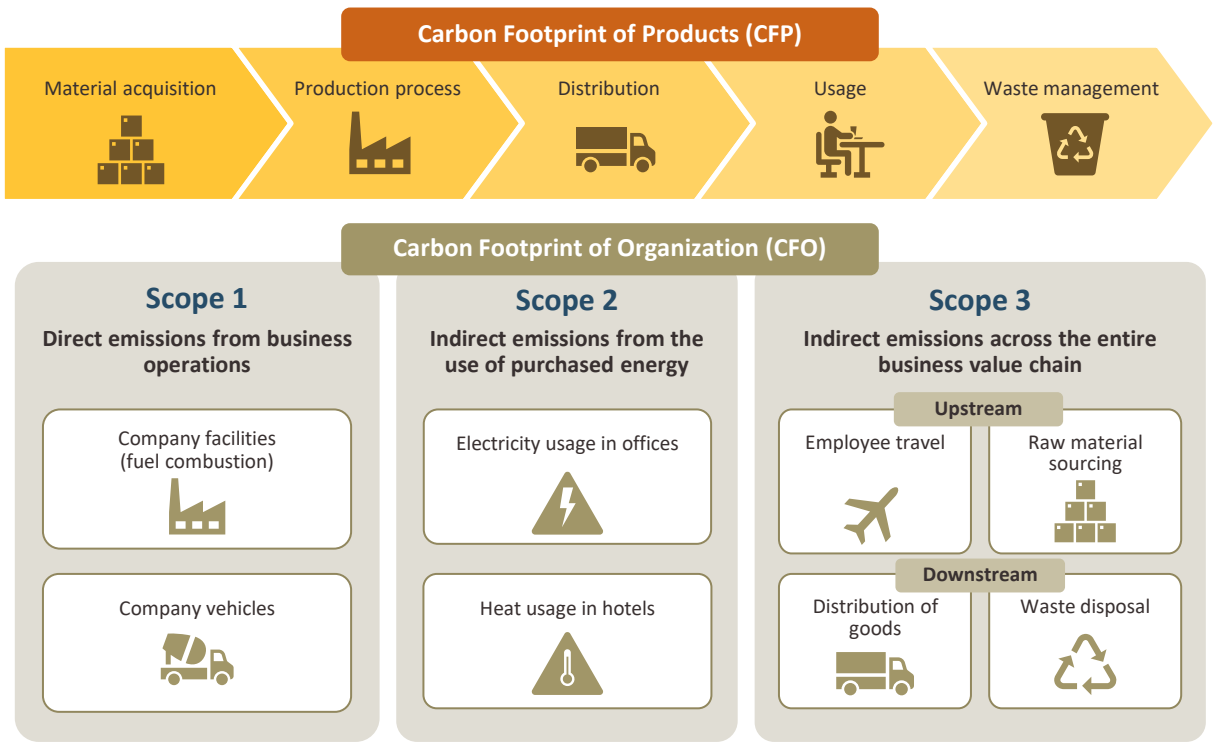
How can businesses measure their carbon footprint?

Businesses typically measure their carbon footprint at two levels: the product level and the organizational level[7/], with distinct measurement details as follows:

1) **Carbon Footprint of Product (CFP)** covers the carbon emissions throughout the entire life cycle of a product, from raw material sourcing, manufacturing processes, distribution, usage, and up to disposal at the end of its life. The CFP helps consumers understand how much greenhouse gas is emitted over the product's lifespan, providing valuable information to guide their purchasing decisions for goods and services.
2) **Carbon Footprint for Organization (CFO)** covers carbon emissions from various business activities, categorized into three scopes as follows:
    - **Scope 1**: **Direct emissions from business operations**, including fuel combustion in company vehicles, industrial machinery, and ovens, as well as refrigerant leaks from cooling systems.
    - **Scope 2**: **Indirect emissions from the use of purchased energy**, such as electricity usage in offices or stores, and the use of air conditioning and heating systems in hotels.
    - **Scope 3**: **Other indirect emissions throughout the business value chain**, covering both upstream and downstream activities beyond the organization's direct control. These include employee travel, raw material sourcing from suppliers, goods transportation, and waste disposal.

Figure 3:

Framework for Measuring Carbon Footprint



Source: Krungsri Research

7/ Businesses can also measure the carbon footprint of their events, while individuals can calculate their personal carbon footprint.

How to calculate the carbon footprint for an organization

Businesses that wish to understand their organization's carbon footprint can calculate it by collecting activity data within various scopes, such as the amount of fuel and electricity used. This data is then **multiplied by the emission factor**[8/], which represents greenhouse gas emissions per unit of activity, to calculate the carbon footprint for each sub-activity. These values are then aggregated to determine the organization's overall carbon footprint. An example of the calculation is shown in Figure 4.

Figure 4:

Example of Simple CFO Calculation

Scope	Activity	(1) Volume of activity	(2) Emission Factor ($kgCO_2e$/unit)	(1) x (2) Carbon footprint ($kgCO_2e$)
Scope 1	Diesel fuel usage for building operations	240 Liters	2.7	650
	Gasohol usage for transportation	300 Liters	2.3	682
Scope 2	Electricity consumption	12,000 kWh	0.5	6,000
Scope 3	A4 paper usage	1,200 Kg	2.1	2,522
	Waste disposal (landfilled)	1,200 Kg	2.3	2,784
Total carbon footprint of organization				**12,638**

Source: Thailand Greenhouse Gas Management Organization (TGO) and Krungsri Research

Tools for measuring carbon footprint

As calculating carbon footprints is no easy task, relevant organizations are striving to facilitate carbon footprint measurement for businesses through various platforms. For example, **SET Carbon** is a data management and calculation tool for the CFO, developed by the Stock Exchange of Thailand (SET), and made available to businesses free of charge since January 16, 2025[9/]. Meanwhile, the Thailand Greenhouse Gas Management Organization (Public Organization) or TGO offers tools designed to assist in carbon footprint calculation, such as the **CFO Platform**, **a simplified carbon footprint calculation program in Excel format**[10/], and the Net Zero Man application for calculating individuals' daily carbon footprints. Additionally, private sector platforms also provide services for assessing and reporting carbon footprints. Among these, **Zeroboard (Thailand) Co., Ltd.** and **Vekin (Thailand) Co., Ltd.** are two platforms certified by the TGO[11/].

8/ The emission factor (EF) varies depending on the standards for measuring and certifying carbon footprints. The EF used for calculating the Carbon Footprint of Organizations (CFO) in accordance with the guidelines of the Thailand Greenhouse Gas Management Organization (TGO) is referenced from various sources, such as the Intergovernmental Panel on Climate Change (IPCC), the Department of Alternative Energy Development and Efficiency (DEDE), and the Thai National Life Cycle Inventory (LCI) Database. For more information, please refer to Emission Factor (CFO).

9/ Learn more about SET Carbon at www.setlink.set.or.th. SET has also partnered with the Department of Climate Change and Environment and the Export-Import Bank of Thailand to link carbon data and increase access to green financing products tailored to businesses (Source: SET, https://www.set.or.th/th/about/mediacenter/news-release/article/655-set-carbon).

10/ TGO, https://thaicarbonlabel.tgo.or.th/tools/files.php?mod=YjNKbllXNXBlbUYwYVc5dVgyUnZkMjVzYjJGaw&type=WDBaSlRFVlQ&files=TlRVPQ

11/ Check the list of certified carbon footprint platforms at https://thaicarbonlabel.tgo.or.th/index.php?lang=TH&mod=Y0d4aGRHWnZjbTFmWVhCd2NtOTJZV3c9.

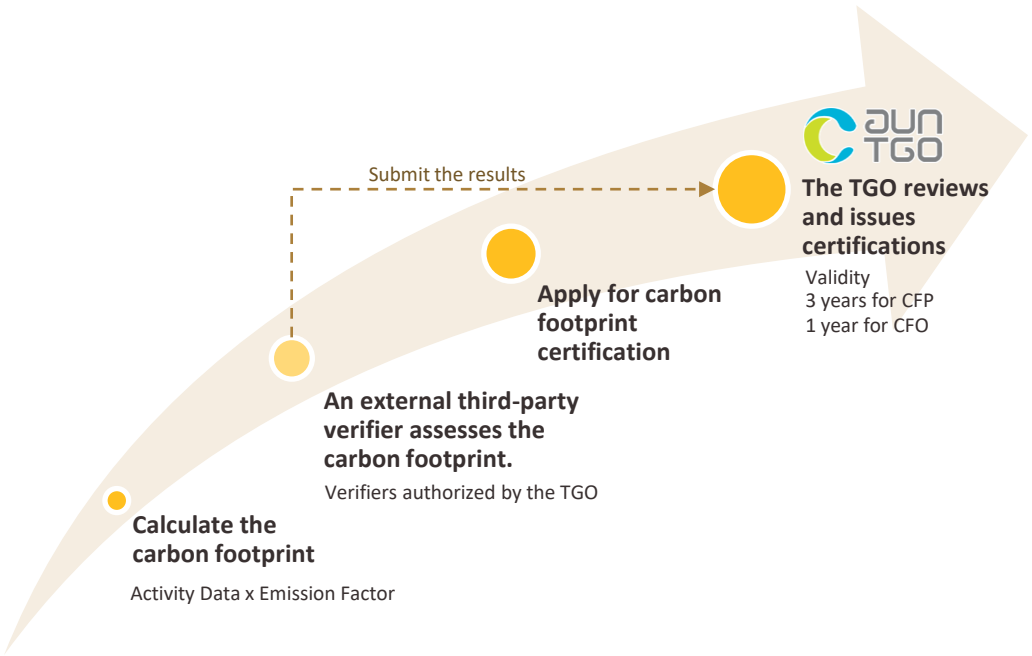
Carbon footprint certification

Businesses that have calculated their carbon footprint, whether through self-assessment, using a platform, or by hiring a consultant, can apply for certification to verify the accuracy of their data, which is used for reporting in compliance with various standards and requirements. In Thailand, the **Thailand Greenhouse Gas Management Organization (TGO) is the authority responsible for certifying carbon footprints based on internationally recognized standards.** The steps for obtaining carbon footprint certification are summarized in Figure 5.

1) Calculate the carbon footprint of the product or organization[12/] internally or by hiring a consultant.
2) Hire an external third-party verifier authorized by the TGO or the relevant standards[13/] to verify the carbon footprint calculation. The verifier will check documents, inspect the establishment, and submit the results directly to the TGO.
3) Apply for carbon footprint certification from the TGO.
4) The TGO will review and issue the carbon footprint certification, with the CFO certification valid for one year and the CFP certification[14/] valid for three years.

Figure 5:

Process for Obtaining Carbon Footprint Certification with the TGO



Source: Thailand Greenhouse Gas Management Organization (TGO)

12/ Currently, the TGO requires reporting of Scope 1 and 2 greenhouse gas emissions for the organization's carbon footprint, while reporting of Scope 3 emissions is voluntary, as stated in the TGO announcement on October 22, 2024 (Source: TGO, https://thaicarbonlabel.tgo.or.th/tools/files.php?mod=WVc1dWIzVnVZMlU9&type=WDBaSlRFVlQ&files=TkRBPQ).

13/ Check the list of external verifiers for carbon footprint certification at the list of verification bodies. Additionally, carbon footprint reporting in accordance with international regulations, such as CBAM and CORSIA, must be verified by authorized bodies only.

14/ The TGO can also issue a Carbon Footprint Reduction label to certify the reduction of the carbon footprint of a product.

How prepared are Thai businesses for measuring and reporting carbon footprint?

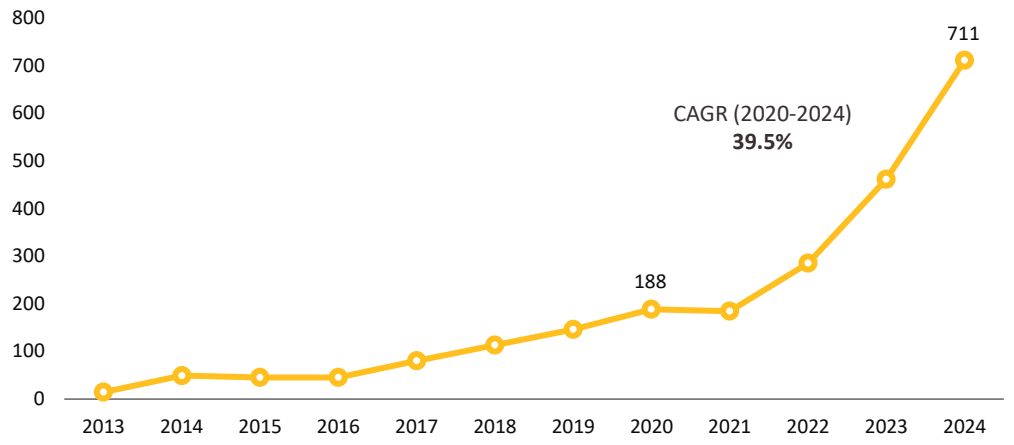
Once we grasp what carbon footprint is, how it is measured, and its importance to businesses, the next interesting question is **how prepared Thai businesses are to measure their carbon footprint.** Krungsri Research explores this by analyzing the extent of voluntary carbon footprint reporting with the TGO and compliance with reporting requirements for Thai listed companies, as follows:

The extent of voluntary carbon footprint reporting to the TGO

Recently, businesses in Thailand have placed greater emphasis on measuring their carbon footprint, as reflected in the number of organizations certified by the TGO for their carbon footprint between 2020 and 2024, showing consistent growth of nearly 40% per year (Figure 6). **As of January 8, 2025, 711 organizations have been certified for their CFO** and are still within the certification period, while **437 companies have been certified for their CFP. These companies have over 6,000 products and services currently under CFP certification.**

Figure 6:

Number of Organizations Certified with CFO Labels by the TGO

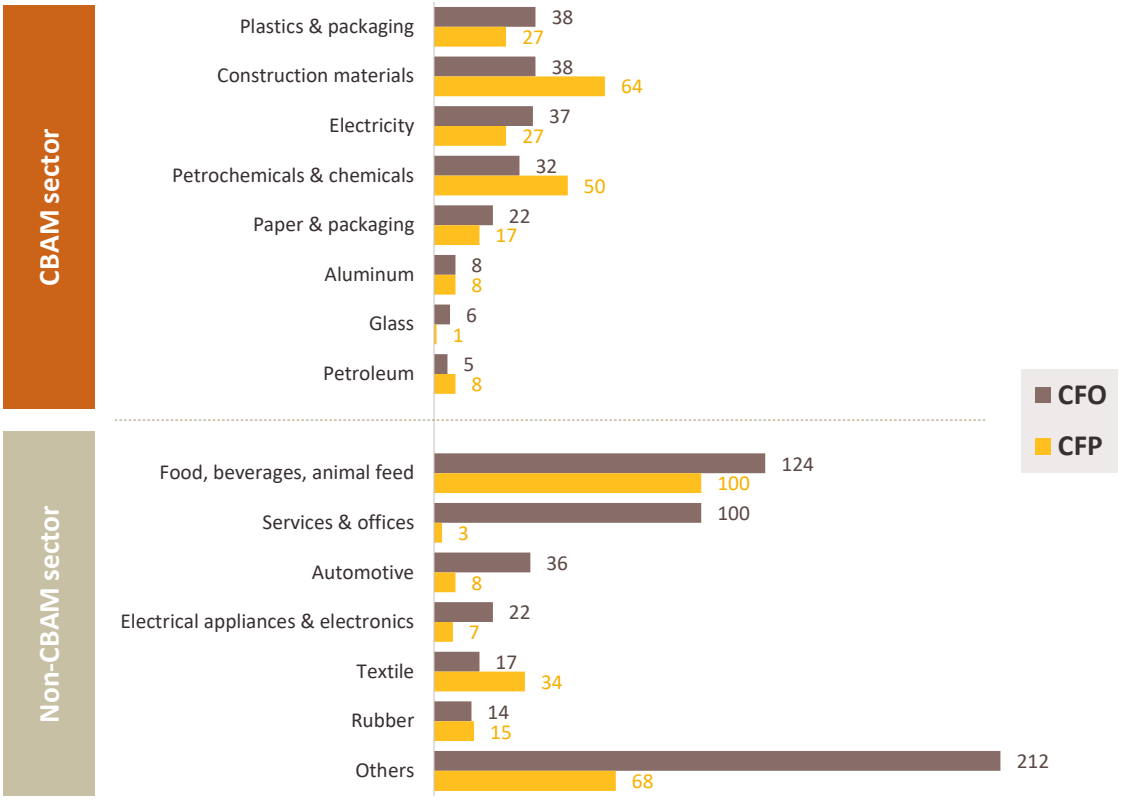


Source: TGO and Krungsri Research (as of January 8, 2025)

An analysis of carbon footprint certification by industry (Figure 7) reveals that **the food and beverage sector holds the highest number of CFO certifications**, followed by the service and office sector, plastics and packaging, construction materials, electricity, automotive, and petrochemical and chemical industries. **The food industry also leads in CFP certifications, with 100 companies having CFP-labeled food products**. Ranked next are the construction materials sector (64 companies) and the petrochemical and chemical sector (50 companies). Overall, the food and service sectors are at the forefront of carbon footprint measurement, followed by heavy industries and carbon-intensive businesses, which are key targets of CBAM measures.

Figure 7:

Number of Organizations with Valid CFP and CFO Certification, by Industry



Source: TGO and Krungsri Research (as of January 8, 2025)

The extent of compliance with carbon footprint reporting requirements for listed companies

The growing awareness of carbon footprint reporting among Thai businesses is driven by both the global emphasis on sustainability and stricter regulations, particularly for **listed companies on the Stock Exchange of Thailand (SET)**, which are overseen by the Securities and Exchange Commission (SEC). **The SEC mandates that listed companies disclose their environmental, social, and governance (ESG) performance in their annual registration statement/annual report (Form 56-1 One Report)**, starting from the financial year 2022. This requirement includes reporting greenhouse gas emissions under Scope 1 and Scope 2 from business operations[15/].

Leveraging data from the SET (SETSMART database), the following notable insights into carbon footprint disclosures are revealed:

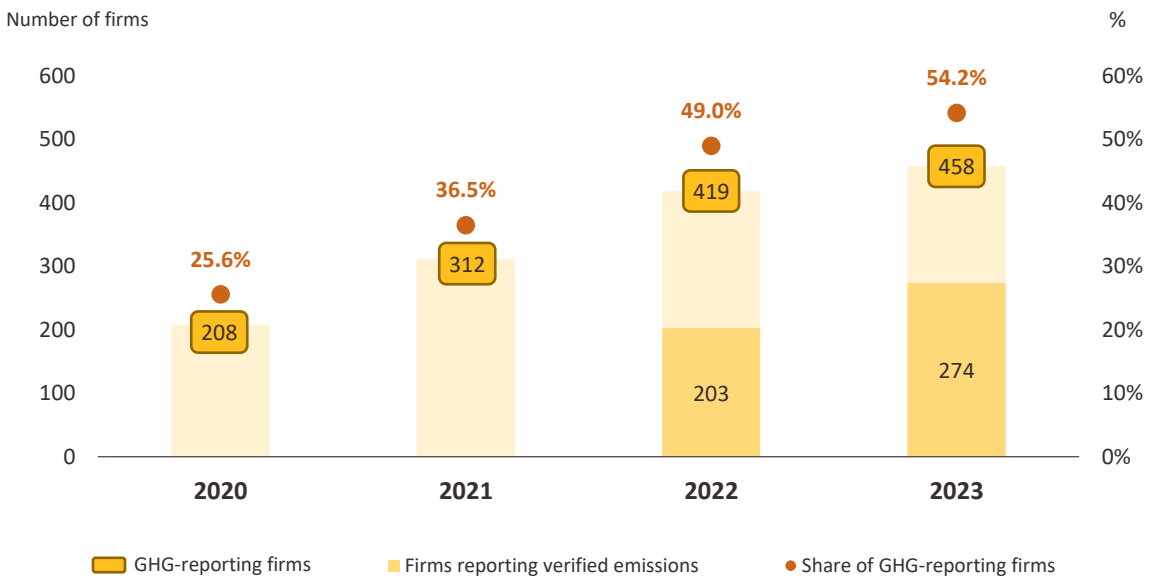
15/ The requirement to disclose Scope 1 and 2 greenhouse gas emissions follows the 'Comply or Explain' principle, which mandates disclosure of the information but permits an explanation if the disclosure is not made. As for Scope 3 disclosures, they remain voluntary.

Despite growth, businesses disclosing their carbon footprints still make up only half of the listed companies.

As of December 20, 2024, **458 listed companies had reported their greenhouse gas emissions for 2023**, **representing about half of all listed companies**[16/]. The number and proportion of companies reporting have steadily increased from 2020 to 2023. **However, only 60% of the reporting companies have had their carbon footprints verified, which accounts for less than one-third of all listed companies** (Figure 8). This highlights the need for continued efforts to promote both the reporting and verification of greenhouse gas emissions data[17/].

Figure 8:

Listed Companies Reporting Greenhouse Gas Emissions



Source: SETSMART and Krungsri Research (data as of December 20, 2024)
Note: The total number of firms includes both those reporting and not reporting GHG emissions, with data available in the SETSMART database for a given year.

More businesses are able to report Scope 1 and Scope 2 carbon footprints than Scope 3 emissions.

Looking at the different scopes of carbon emissions, it was found that **more than half of the listed companies can report Scope 1 or Scope 2 carbon footprints, while only one-third of companies report Scope 3**. As collecting data for Scope 3 emissions is more complex and involves activities across both upstream and downstream parts of the business, only well-equipped companies are able to report Scope 3 emissions, particularly those in the resource and financial sectors, which have the highest levels of disclosure. Nevertheless, even in these sectors, reporting still falls short of half of the companies in the group. **Overall, the industries most prepared to report carbon footprints are agriculture and food, followed by the energy and financial sectors**, as reflected in the proportion of carbon footprint reporting for each scope and the verification of carbon emissions shown in Figure 9.

16/ As of December 16, 2024, there are 925 listed companies on the Stock Exchange of Thailand. Of these, 845 companies have data available in SETSMART.

17/ External verifiers of companies' greenhouse gas emissions data must be registered with the TGO or authorized according to international standards (Source: SET, https://setsustainability.com//download/ixcugobk4zq6f7s).

Figure 9:

Proportion of Companies Reporting Greenhouse Gas Emissions and Their Verification in 2023, by Industry Group

Industry group	Share of GHG-reporting firms to total firms					Average Carbon footprint per firm ($MtCO_2e$)
	All scopes	Scope 1	Scope 2	Scope 3	Verification	
Property & Construction	49.7%	44.4%	49.0%	37.1%	24.5%	1.02
Industrials	55.2%	51.0%	51.7%	30.3%	30.3%	0.43
Agro & Food Industry	66.7%	66.7%	64.0%	38.7%	53.3%	0.35
Services	50.5%	48.4%	45.7%	31.9%	30.3%	0.67
Resources	60.9%	59.4%	59.4%	43.5%	46.4%	10.04
Financials	59.5%	55.7%	57.0%	43.0%	27.8%	0.07
Technology	60.0%	52.3%	55.4%	36.9%	33.8%	0.09
Consumer Products	38.7%	37.1%	35.5%	25.8%	24.2%	0.08
All	**54.2%**	**50.9%**	**51.1%**	**35.3%**	**32.4%**	**1.38**

Source: SETSMART and Krungsri Research (data as of December 20, 2024)

Carbon-intensive businesses are more likely to disclose more emissions data.

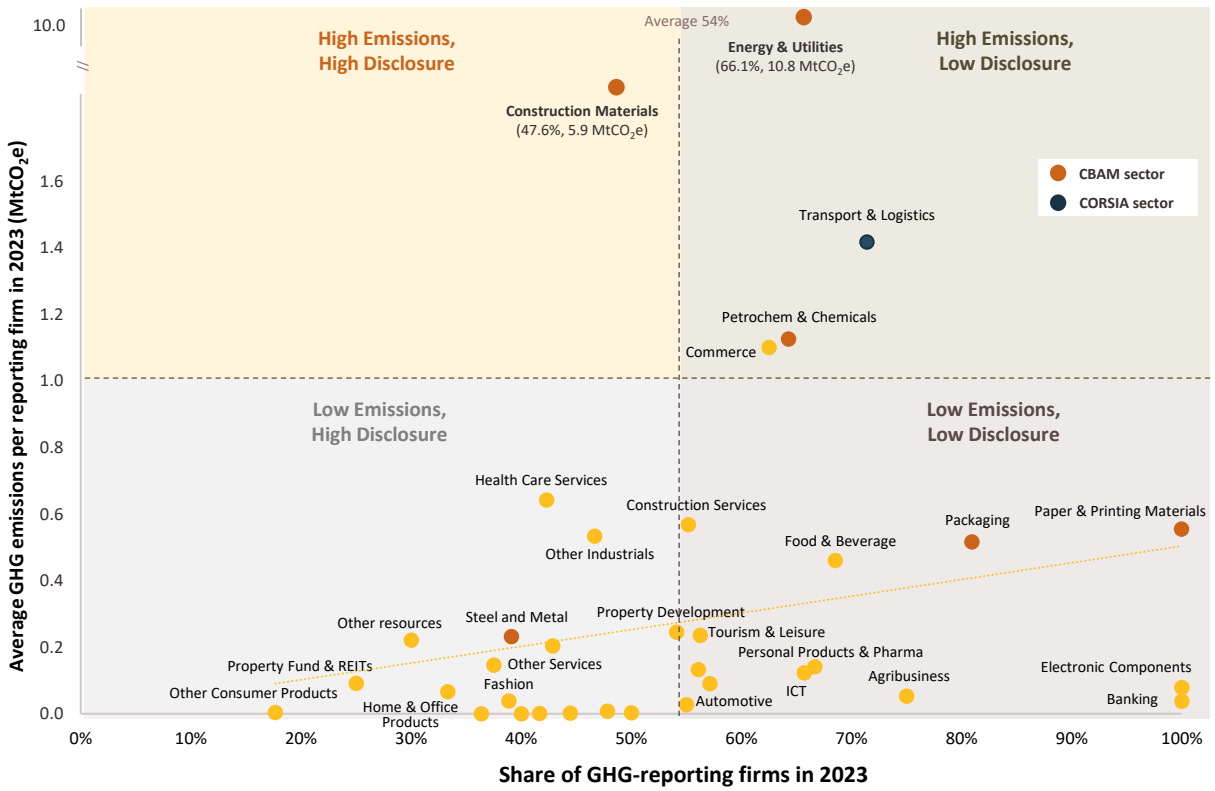
In 2023, listed companies that disclosed data reported a total carbon emission of 633.7 million tons of CO_2 equivalent ($MtCO_2e$), averaging 1.4 $MtCO_2e$ per company. This represents a decrease of -14.2% from the previous year's average of 1.6 $MtCO_2e$. A deeper dive into the business categories shows that **different sectors have varying reporting statuses and carbon emissions levels.** The businesses can be grouped into four categories as follows:

- **High Emissions - High Disclosure:** Carbon-intensive businesses are more likely to disclose greenhouse gas emissions data. This is particularly true for the **energy and utilities** sectors, which account for approximately two-thirds of total carbon emissions. At the same time, two-thirds of energy companies report their 2023 emissions. Other carbon-intensive industries with high disclosure rates include **transportation and logistics** (71.4%) and **petrochemicals and chemicals** (64.3%) (Figure 10). These high-emission sectors are likely to be affected by increasingly stringent environmental regulations, such as CBAM, CORSIA, carbon taxes, and Thailand's draft Climate Change Act. As a result, companies in these sectors must remain alert and prepare in advance.
- **High Emissions - Low Disclosure:** This group includes the **construction materials** industry, which has the second-highest carbon emissions after energy. Yet, only 47.6% of companies in this sector disclose their carbon footprints, which is lower than the average across all sectors. In particular, only 28.6% of small construction materials companies report their emissions data. Despite this, the sector is expected to face increasing pressure, especially the cement industry, which is a key target under the EU-CBAM and similar measures in other countries. These regulations typically require carbon footprint reporting and may impose costs related to carbon emissions.

- **Low Emissions - High Disclosure:** Examples of this group include **banking and electronic component** businesses, both of which disclose 100% of their greenhouse gas emissions data. Although these industries do not create high carbon footprints, they are committed to sustainability, particularly banks that have set ambitious net-zero greenhouse gas targets by supporting loans to businesses that are environmentally friendly or transitioning toward sustainability. This aligns with the Thailand Taxonomy, a classification system for economic activities with environmental considerations.
- **Low Emissions - Low Disclosure:** This group includes **consumer goods industries**, such as household and office products and fashion, which still show low levels of disclosure, with only 38.7% of companies in these sectors reporting their carbon emissions. This could be because these industries face less regulatory pressure compared to others, and many of the players are smaller companies with fewer resources. Nevertheless, businesses in this group should prepare for increasing consumer expectations regarding environmental issues when making purchasing decisions.

Figure 10:

Proportion of Companies Reporting Greenhouse Gas Emissions and Amount of Emissions in 2023, by Sector



Source: SETSMART and Krungsri Research (data as of December 20, 2024)
Note: Average GHG emissions were 1.4 $MtCO_2e$, 0.5 $MtCO_2e$ (excluding energy and utilities), and 0.4 $MtCO_2e$ (excluding energy and utilities, and construction materials)

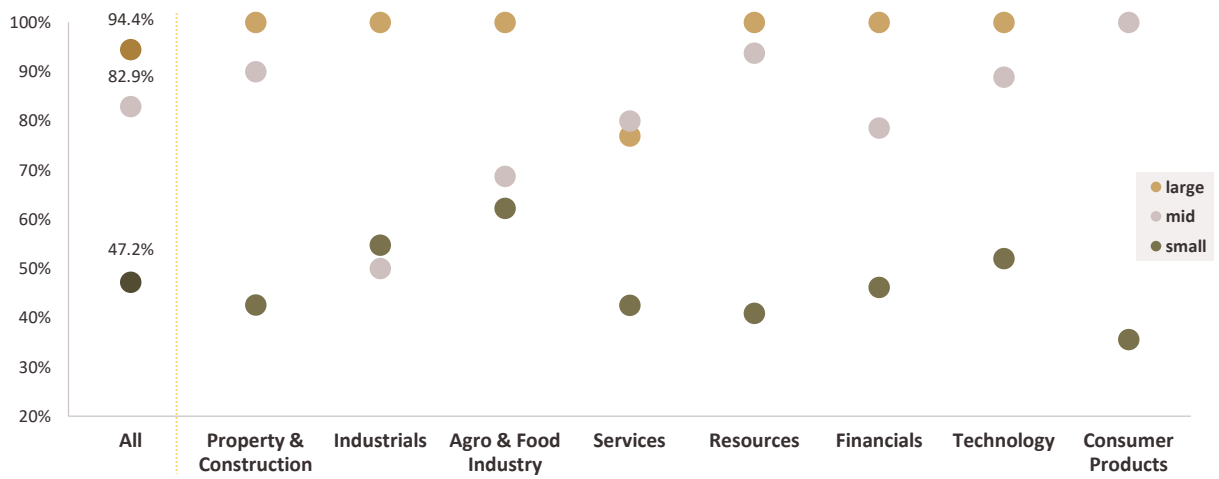
Large businesses are significantly more prepared for carbon footprint reporting than small ones.

A closer look at greenhouse gas emissions disclosure among listed companies, based on their market capitalization[18/], reveals that **in 2023, large-cap companies reported carbon data at a high rate of 94.4%, compared to 82.9% for mid-cap companies and 47.2% for small-cap companies.** This difference stems from the fact that data collection, calculation, hiring consultants, and carbon footprint verification all require significant financial and technical resources. With that, nearly all large-cap companies across sectors report their carbon footprints at a 100% rate, except for the services sector, where only 76.9% of large firms disclose their data (with some commerce and transportation businesses still yet to report).

Mid-sized businesses tend to have disclosure rates similar to their large counterparts in each industry. However, **small companies show a significant gap in reporting**, **with only 47.2% of small-cap companies disclosing their emissions data,** which is **roughly half of the large-cap disclosure rate (94.4%).** To illustrate further, in the consumer goods industry, around 95.2% of businesses are small-cap, yet only about one-third of these small players disclose their emissions data, leading to lower overall disclosure in the sector. On the other hand, industries with a higher proportion of small businesses reporting their emissions include agriculture and food (62.3%), industrial products (54.7%), and technology (52.0%). In fact, despite 94.5% of industrial goods companies being small businesses, these sectors still disclose carbon footprints at relatively high levels. This is particularly evident in industries such as paper, packaging, petrochemicals, and chemicals, all of which are likely to be impacted by the upcoming CBAM and domestic green regulations (Figure 11).

Figure 11:

Proportion of Companies Reporting Greenhouse Gas Emissions in 2023, Classified by Company Size and Industry Group



Source: SETSMART and Krungsri Research (data as of December 20, 2024)
Note: Large-cap companies have a market capitalization of over THB 50 billion, mid-cap companies have between THB 10 billion and THB 50 billion, and small-cap companies have less than THB 10 billion as of 2024.

In summary, data from TGO and SET highlight that **the food and financial industries are at the forefront of measuring and reporting greenhouse gas emissions**, demonstrating strong preparedness among both listed companies and those seeking CFP and CFO certification. At the same time, **carbon-intensive industries such as energy, transportation, and construction materials are becoming increasingly aware that carbon footprints could become a significant cost to their businesses.** However, a notable gap remains in reporting preparedness between large and small businesses across all sectors. The next key challenge, therefore, is how to equip all Thai businesses to assess their carbon footprints which have become an essential data point in the era of global boiling.

18/ Large-cap companies have a market capitalization of over THB 50 billion, mid-cap companies have between THB 10 billion and THB 50 billion, and small-cap companies have less than THB 10 billion as of 2024.

Krungsri Research View: Carbon footprint management is no longer an 'option' but a 'mission' for businesses.

In the near future, measuring and reporting carbon footprints will no longer be just an 'option' for businesses aiming to showcase their commitment to sustainability. Instead, it will become an inevitable 'mission' for survival amid tightening regulations and a globally environmentally conscious consumer base. Krungsri Research anticipates that **Thai businesses will encounter growing pressure to manage their carbon footprints as international trade policies and domestic regulations become increasingly stringent.** However, the challenges and necessary preparations will differ across industries, as outlined below.

- **High-carbon businesses** will be the first required to report their carbon footprints, especially in industries targeted by the EU-CBAM, such as the **construction materials industry (iron and steel, aluminum, and cement)**, as well as **plastics and chemicals**, which may fall under the next phase of EU-CBAM or similar regulations in other countries. Meanwhile, **energy, transportation, and other heavy industries** are expected to be forced to disclose their carbon footprints more extensively under the draft Climate Change Act, which is expected to be enforced between 2026 and 2027. Additionally, Thailand's aviation industry is already obligated to report its carbon emissions under the CORSIA. **Thus, high-carbon businesses face dual pressures: (i) compliance with measurement, reporting, and verification (MRV) requirements and (ii) emission reductions to mitigate carbon costs.**

  Nevertheless, **small businesses will encounter greater challenges**, as the MRV process incurs high costs, from data collection to hiring consultants and verifiers. If smaller players are unable to meet these requirements, they may struggle to compete in the market or be excluded from the supply chain. Therefore, the government should focus on facilitating and providing financial and knowledge support to small businesses. In parallel, SMEs must accelerate the development of methods for collecting and reporting carbon footprints to cope with the pressure that is no less significant than what large businesses face.

- **Low-carbon businesses** will be affected to a lesser extent. However, those already well-prepared with high levels of carbon footprint disclosure, such as **businesses in agriculture and food, finance, and technology, should enhance the reporting of Scope 3 carbon footprints**, which currently have low disclosure levels. This is because, in the future, relevant authorities such as the TGO and the SEC may mandate Scope 3 reporting. As international regulations have begun to establish criteria for verifying sustainability across business supply chains, Scope 3 carbon footprint data will become increasingly important**. Businesses with minimal carbon footprint disclosure, such as consumer goods companies**, need to pay more attention to their carbon footprints, as they are likely to face pressure from business partners and consumers who are more environmentally conscious.

Ultimately, while measuring and reporting carbon footprints present significant challenges, businesses that successfully navigate this process will unlock valuable opportunities in markets where both customers and partners are increasingly prioritizing sustainability. Beyond this, companies committed to carbon footprint management will gain access to financial support for their transition to low-carbon operations, as well as opportunities to raise capital in the evolving green economy. By taking decisive action to manage their carbon footprints, businesses lay a critical foundation for sustainable growth, aligning themselves with the global drive towards Net Zero.

References

Siriyos Chuthanondha. (2024). “SET ESG Data Showcase: Carbon Emissions of Thai Listed Companies”. Retrieved from https://media.set.or.th/common/research/1411.pdf.

Stock Exchange of Thailand. “Sustainability Reporting Manual for Listed Companies”. Retrieved from https://setsustainability.com//download/ixcugobk4zq6f7s.

Thailand Greenhouse Gas Management Organization (TGO). (2020). “Requirements and Guidelines for Calculating Carbon Footprint of Products”. Retrieved from https://thaicarbonlabel.tgo.or.th/tools/files.php?mod=Y0hKdlpIVmpkSE5mWkc5M2JteHZZV1E9&type=WDBaSlRFVlQ&files=TVRFPQ.

Thailand Greenhouse Gas Management Organization (TGO). (2022). “Requirements for Calculating and Reporting Carbon Footprint for Organizations”. Retrieved from https://thaicarbonlabel.tgo.or.th/tools/files.php?mod=YjNKbllXNXBlbUYwYVc5dVgyUnZkMjVzYjJGaw&type=WDBaSlRFVlQ&files=TkRFPQ.

KRUNGSRI RESEARCH

Pimnara Hirankasi, Ph.D.
Head of Research Division and Chief Economist

Macroeconomic Team

Sujit Chaivichayachat
Head of Macroeconomic Research

Wanicha Direkudomsak
Senior Economist

Churailuk Pholsri
Senior Economist (Forecasting)

Thansin Klinthanom
Senior Economist

Krittabhorn Sirichaichingkun
Economist

Supasyn Itthiphatwong
Economist

Analytics & Intelligence Team

Pimnara Hirankasi, Ph.D.
Acting Head of Analytics and Intelligence Research Department

Nathanon Ratanathamwat
Senior Researcher

Narichaya Satafang
Researcher

Parinya Mingsakul
Researcher

Chanatta Thararos
Researcher

MIS and Reporting Team

Thamon Sernsuksakul
Information Analyst

Chirdsak Srichaiton
Information Analyst

Wongsagon Keawuttung
Information Analyst

Industry Team

Taned Mahattanalai
Head of Industry Research

Poonsuk Ninkitsaranont
Senior Analyst (Healthcare, Mobile Operators)

Piyanuch Sathapongpakdee
Senior Analyst (Transport & Logistics)

Thian Thiumsak
Senior Analyst (Energy, Petrochemicals)

Chaiwat Sowcharoensuk
Senior Analyst (Agriculture)

Narin Tunpaiboon
Senior Analyst (Power Generation, Modern Trade, Chemicals, Medical Devices)

Puttachard Lunkam
Senior Analyst (Construction Contractors, Construction Materials, Hotels, Industrial Estate)

Patchara Klinchuanchun
Senior Analyst (Real Estate)

Prapan Leenoi
Analyst (ESG)

Supawat Choksawatpaisan
Analyst (Automobile, Electronics & Electrical Appliances)

Rapeepoom Lapmak
Analyst (Agriculture, Food & Beverages)