ENERGY MANAGEMENT AND STRATEGIES FOR ADDRESSING AND ADAPTING TO CLIMATE CHANGE

Energy management and climate change adaptation are critical challenges for the renewable energy industry today. As the world faces the impacts of climate change, such as rising temperatures and extreme weather events, renewable energy production plays a key role in transforming electricity generation towards cleaner sources. By utilizing environmentally friendly energy, including solar, wind, and hydro power, businesses can not only reduce greenhouse gas emissions but also contribute to a more sustainable future for the planet and communities.

Therefore, transitioning to renewable energy enables BCPG to meet the growing energy demand while minimizing environmental and ecological impacts. Advancing technology and improving production efficiency contribute to long-term energy security. It is essential for BCPG to remain committed to efficient energy management and collaborate with all sectors to address the challenges of climate change sustainably.

Opportunities and Challenges

BCPG is committed to creating value for customers, communities, and society through products and services that meet the demand for clean energy, which is at the core of sustainable growth. However, the rapidly changing environment driven by technological advancements, complex regulations, and stringent policies remains a challenge that requires expertise and adaptability. At the same time, these challenges present opportunities for BCPG to enhance its capabilities by developing and adopting new innovations to meet unmet energy demands-both for customers and society at large. Additionally, this is a crucial opportunity to establish strong partnerships with reliable and capable allies, overcoming various constraints and collectively building a more sustainable clean energy system.

Key Performance and Goals in 2024

Key Performance

The electricity consumption in office buildings is **260.52 megawatt-hours.**

The electricity consumption in office buildings increased by no more than **4%** from 2023.

The electricity consumption of the electricity business is **2,928.43 megawatt-hours.**

The electricity consumption of the oil storage business is **1,392.18 megawatt-hours.**

The ratio of electricity consumption per unit of electricity production increased by no more than **3%** from 2023.

The greenhouse gas emission intensity per unit of electricity production for the electricity business, Scope 1 and 2, is **0.0060 tons of CO_2 equivalent per megawatt-hour.**

The greenhouse gas emission from the electricity business in Thailand, Scope 1 and 2, is **1,873 tons of CO_2 equivalent.**

The electricity production is **313 gigawatt-hours.**

Received certification for greenhouse gas emissions and carbon neutrality for operations in Thailand from Thailand Greenhouse Gas Management Organization (TGO) for **the second consecutive year.**

Awarded the Climate Action Leading Organization (CALO) trophy at the highest level of excellence, earning **3 gold medals** (measurement, reduction, and compensation).

Goals

Reduce electricity consumption in office buildings or increase by no more than **5%** from the previous year.

Reduce the proportion of electricity usage in the power business per unit of electricity production or increase by no more than **5%** from the previous year.

Achieve carbon neutrality where we have operational control by **2030**.

Achieve net-zero greenhouse gas emissions by **2025**.

Key Stakeholders

Key Stakeholders	Actions Taken to Meet the Stakeholders' Needs
Investor /Shareholder	• BCPG is committed to efficient energy management while thoroughly assessing climate-related risks to its assets and operations. This approach aims to reduce costs and risks for BCPG, as well as enhance long-term, sustainable profits for investors.
Employee	• BCPG promotes knowledge and develops skills related to innovation in efficient energy management, while also communicating information and knowledge about policies, technologies, and innovations related to climate change.
Customer	• BCPG communicates policies, energy management activities, and climate change adaptation measures to foster alignment and cooperation, ensuring that customers follow the same practices.
Business Partner	• BCPG strengthens partnerships through activities and project development in energy and climate change management, aiming to create projects or initiatives that enhance efficiency, reduce costs, and expand beneficial outcomes across various sectors.
Community	• BCPG communicates clearly and transparently regarding the impacts of initiatives the Company will implement in communities and areas, while also outlining measures to address any potential negative impacts related to climate or energy that may arise from the projects.

Strategies and Approaches for Environmental Management, Energy Utilization, and Climate Management

Environmental Management

To develop an effective environmental management system, reduce potential risks to the environment, and external stakeholders, the Company has established an Environmental Management Policy under the "Sustainable Business Development Policy" which consists of three operational approaches as follows:

- **Reducing environmental impacts in all aspects**
  - Integrating the concept of "circular economy" into current business operations to efficiently utilize resources while reducing environmental impacts from waste generated by business processes.
- **Grow creatively with environmentally friendly innovations**
  - Promote innovation within the corporate culture and among personnel to encourage the creation and application of environmentally friendly innovations in the Company's operations, ensuring sustainability and maximizing benefits for the Company, communities, and society.
- **Protect biodiversity that may be impacted by operations**
  - Reduce the impact of business operations on biodiversity by avoiding, mitigating, restoring, and compensating for damage to ensure that there is no loss of biodiversity, which is the foundation of natural resources that benefit both the business and all stakeholders.

For the management of clean energy derived from solar power generation, BCPG is fully aware of the potential impacts its projects may have on local communities and biodiversity. Therefore, the Company strictly adheres to its code of conduct to ensure that every business operation minimizes environmental and social impacts. Additionally, all renewable power plants operated by BCPG have been certified under the international environmental management standard ISO 14001. This certification reinforces the Company's commitment to responsible business practices and the highest level of environmental stewardship.

To enhance confidence and operational efficiency in a tangible manner, BCPG has established a comprehensive environmental management framework in alignment with its environmental management policy. This framework ensures coverage across both core and supporting activities, as well as stakeholders throughout the supply chain. By maintaining transparency in data collection, monitoring, and auditing, BCPG ensures compliance with environmental regulations and international environmental management standards. The Company integrates environmental and social management components into every stage of project development. The coverage of BCPG's environmental management policy includes the following activities:

Phase of Operations	Components of the Environmental and Social Management System
Project Development Phase	**Consider environmental and social risks:** • Review relevant laws, regulations, and standards • Assess potential impacts on the environment and community • Identify stakeholders involved in the project • Evaluate the feasibility of project implementation **Environmental and social impact assessment (EIA) and engineering readiness:** • Conduct EIA according to legal requirements • Establish measures to prevent and mitigate impacts • Develop an environmental and social management plan with stakeholders • Design • Select and hire construction contractors and key partners for the project
Construction Phase	**Construction** • Site preparation • Construction and installation activities • Strict adherence to safety standards for employees, contractors, and partners • Transparent communication regarding project implementation, issues stakeholders should be aware of, and how to address them • System-wide testing and inspection before transitioning to the operational phase
Operational Phase	**Operations:** • Management and commitment • Assessing risks and opportunities • Change management process • Goals and development plans • Laws and regulations • Engage with stakeholders • Knowledge, skills, training, awareness, and organizational culture • Management of contractors and partners • Operational control • Preparedness for emergency response • Communication and handling of complaints • Process for managing violations • Monitoring and reporting (Due Diligence) • Evaluation and verification of accuracy • Compliance management process • Management review by executives

Energy Management

BCPG's electricity consumption management is a crucial initiative in achieving carbon neutrality by 2030 and net-zero greenhouse gas emissions by 2050. The Company is committed to managing energy usage within its operations to minimize the environmental impact of its business activities. BCPG adheres to the Code of Practice (COP) for photovoltaic solar power producers and complies with the ISO 14001 environmental management system standards. Furthermore, the Company has implemented energy management measures aligned with legal requirements and international standards, serving as a framework for BCPG and its affiliated companies to operate under.

Energy Reduction Measures

1. Using Electric Vehicles in Operations: BCPG has the initiative to replace vehicles powered by internal combustion engines with electric vehicles for operational purposes.
2. Improving Energy Efficiency
   - There are measures to reduce electricity consumption within the organization, such as campaigning for employees to turn off electrical appliances when not in use, controlling the use of electrical systems along with air conditioning based on the designated working hours, selecting energy-efficient appliances, continuously adjusting temperatures appropriately, as well as the use of green electricity.
   - There is a plan to improve the efficiency of electricity generation from clean energy, including the installation of systems or equipment that are environmentally friendly, as well as monitoring the usage of these installed systems and equipment.
   - Study and monitor the development of technologies and innovations related to the reduction of greenhouse gas emissions, including carbon capture, utilization, and storage (CCUS) for more efficient use and management.

The Use of The SCADA System to Control the Power Generation Processes

The Company has implemented a smart electrical measurement and control system Supervisory Control and Data Acquisition (SCADA), designed to comprehensively monitor and control electrical systems. This system accurately measures voltage and current from power stations and provides real-time status updates on high-voltage switches, indicating whether they are open or closed. As a result, operators at the control center can continuously and swiftly monitor the status of the electrical system.

All measured data is transmitted directly to the power system control center, enabling operators to analyze and assess situations in real time. In case of any malfunctions or abnormalities, the system immediately alerts the relevant personnel, allowing for swift issue resolution and minimizing the impact on power distribution.

Benefits from the Programs

Improve electricity system management efficiency: This helps plan maintenance and repair of the electrical system effectively, leading to reduced operational costs.

Increase the reliability of the electricity system: This helps detect and resolve electrical system issues quickly before they impact consumers.

Reduce electrical energy loss: This helps monitor and control energy usage effectively, reducing energy loss in the process.

Increase workplace safety: This helps reduce the risk of accidents when working with the system by ensuring regular inspection and control of the electrical system according to established standards.

Support business growth: The system can be easily expanded and improved to align with the growth of the business.

Energy Conservation and Energy-saving Campaigns in Office Buildings

BCPG aims to reduce energy consumption and improve energy efficiency within the office by installing energy-saving devices, such as lighting and air conditioning systems in meeting rooms that only operate when in use. The Company also manages electricity and air conditioning usage according to designated working hours and selects energy-efficient appliances while adjusting air conditioning temperatures appropriately.

The campaign also includes training and raising awareness among employees about energy conservation in daily life, such as turning off unused electrical devices and fostering a mindful attitude towards energy use. All these efforts will help reduce energy consumption and support the long-term reduction of greenhouse gas emissions.

Adapting to Climate Change

To achieve the goal of becoming a carbon-neutral organization and reaching net-zero greenhouse gas emissions by 2030 and 2050, respectively, the Company has established the Good Governance and Sustainable Development Committee. This committee is responsible for setting sustainability directions and best practices to achieve these goals in collaboration with the Enterprise-wide Risk Management Committee, which oversees climate-related risks. Additionally, the Corporate Sustainability Committee monitors and reports on operational progress. Furthermore, the Company has integrated the framework of the Task Force on Climate-related Financial Disclosures (TCFD) into its risk management process and financial disclosure related to climate change. The Company has also identified key activities to drive the organization toward these objectives, categorized into various initiatives as follows:

1) **Promote reforestation activities** - Activities aimed at increasing green spaces, carbon dioxide absorption, and storage for the planet. The focus is on planting trees around the Company's power plants, while fostering cooperation with local communities and government agencies to carry out joint activities for the sustainability of the environment, society, and long-term business operations.
2) **Adoption of Electric Vehicles in Business Operations** - BCPG has implemented activities to promote the use of electric vehicles in its related activities or operations as a means of reducing greenhouse gas emissions from travel and transportation.
3) **Process Improvement and Green Power Supply** - BCPG has implemented activities to improve energy management processes and increase the use of green energy in its operations.
4) **Carbon Offset** - BCPG has implemented activities to improve energy management processes and increase the use of green energy in its operations, along with compensating for greenhouse gas emissions through high-quality carbon credits.

BCPG's Climate Objective

BCPG makes the mid-term plan to reach Carbon Neutral in 2030 and the long-term plan to achieve Net Zero in 2050.

- Reforestation
- Electric Vehicle
- Green Power Supply

More information can be found in the section on the climate change response report (TCFD Report). Click

Additionally, BCPG recognizes the importance of developing initiatives that promote climate resilience and a sustainable transition to a low-carbon society, benefiting not only the Company's operations but also its partners and the wider community. This is achieved through innovative projects that enhance energy efficiency, advance climate change knowledge, and improve greenhouse gas emissions management. These efforts enable BCPG, its partners, customers, and other stakeholders to move closer to their climate management goals while mitigating environmental risks sustainably. The key activities undertaken in the past year include:

Battery Development Project for Storing Excess Solar Energy

With the continuous global increase in electricity demand and the growing trend of adopting renewable energy, batteries have become a crucial technology for storing clean energy and enhancing power system stability. Batteries enable the storage of excess energy generated from renewable sources for use during peak demand periods, helping to reduce fluctuations in electricity production and improve overall grid stability efficiently.

To meet this demand, BCPG has partnered with leading global battery manufacturers to study and develop a Battery Energy Storage System (BESS) for implementation in Thailand. The initiative focuses on applications across various sectors, including utilities, commercial and industrial operations, and residential use. This investment reflects BCPG's commitment to leading in clean energy and establishing a sustainable energy system for Thailand.

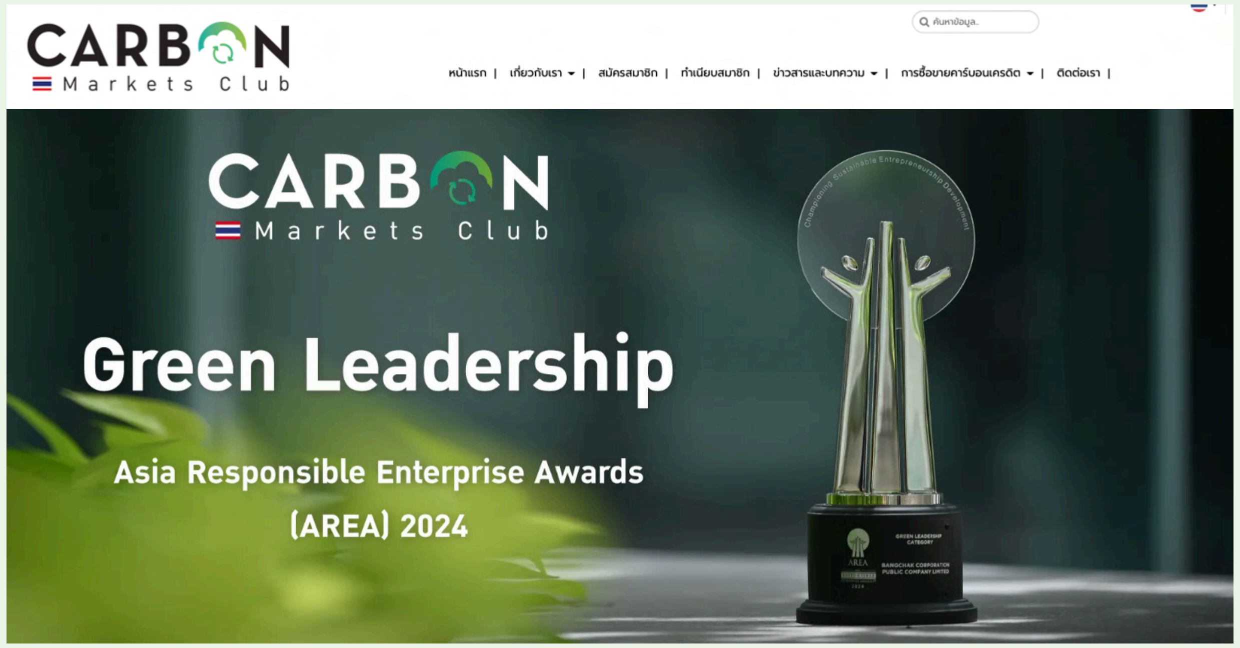
Battery Development Project for Clean Energy Systems and Energy Storage at Bangchak Stations

BCPG has collaborated with Bangchak to study the feasibility of energy management at Bangchak service stations by installing a solar power generation system alongside a battery energy storage system. This initiative is part of a project to develop service stations that rely solely on renewable energy, driving the achievement of Net Zero Emission goal.

Benefits from the Programs

- **Two** Bangchak gas stations, using **100%** solar energy combined with battery energy storage systems.
- Achieving the goal of Net Zero Emissions for the Bangchak Group.
- Effectively enhancing the stability and reliability of the renewable energy system, managing energy sustainably.

Establishing the Carbon Market Club



BCPG is one of the founding members of the Carbon Markets Club, a network aimed at supporting government agencies in promoting the voluntary carbon market. It plays a key role in raising awareness about climate change adaptation among businesses and society, helping them prepare for emerging trade challenges and opportunities. The club facilitates carbon credit trading and the issuance of Renewable Energy Certificates (RECs). Carbon footprint calculation tools for organizations (CFO) and individuals (MyCF). Carbon Markets Club. Additionally, BCPG has contributed to developing a website with educational content on climate change, as well as designing and implementing conducts regular online seminars to disseminate knowledge across all sectors, enhancing awareness and improving greenhouse gas management for businesses and interested stakeholders. These efforts contribute to Thailand's goal of achieving Net Zero emissions.

Key training and educational topics covered in the past year included:

- COP 28 and Thailand, and activities by the Department of Climate Change and Environmental Affairs
- Net-Zero Science-Based Targets
- Instruments Enhancing Climate Transition: Financing & Tools for Financing
- Carbon Capture and Storage (CCS) Technology
- The Bioeconomy และ Sustainable Green Business
- Water Management Strategies, Water Source Development, Irrigation Systems, and Innovations
- Sustainable Packaging

The founding members of the Carbon Markets Club consist of:

bangchak, bcpg, bbgi, C.P. GROUP, BIG, krungsri กรุงศรี, Tetra Pak, BTS

Benefits from the Programs

- In 2024, there were over **20,000 users** on the website who gained knowledge from the content and digital tools.
- More than **10** online seminars were held, with an average of **160** participants per seminar.
- There were over **1,300** members, including **256** organizations and **1,070** individual members.
- Over **13** articles related to climate change management were published.

Signing of the Memorandum of Collaboration (MOC) at the 29th Session of the Conference of the Parties to the The UN Climate Change Conference (COP29)

The Bangchak Group, as a founding member of the Carbon Markets Club, participated in the signing of a Memorandum of Collaboration (MOC) at the 29th Session of the Conference of the Parties to the United Nations Climate Change Conference (COP29. This agreement aims to support the development of the “ASEAN Common Carbon Framework (AACF)” in collaboration with carbon market associations from Thailand, Malaysia, Indonesia, Singapore, and ASEAN. The initiative seeks to establish an effective and transparent regional carbon credit trading framework, promoting sustainable carbon credit development and trade within the region. This effort is a key step in advancing a low-carbon economy and society across Southeast Asia.

Benefits from the Programs

- Support cross-border business collaboration to build a strong carbon market infrastructure and connect within the region.
- Reduce barriers to carbon credit trading between countries and drive the region towards a low-carbon society with standards and transparency.