Sustainability Strategy

Bangchak is committed to developing sustainable business innovation in harmony with the environment and society through the 3S (Security, Stability & Sustainability) corporate strategy. The company has also adopted the Sufficiency Economy Philosophy into business operations to create the balance between “profits” and “values” while operating business for the benefit of environment and society. The 3S strategy is in line with the “Evolving Greenovation” vision aiming to create green innovation for society in accordance with the concept of “Greenovate Our Tomorrow”. The company and its subsidiaries have adopted the 3S strategy to create security, stability, and sustainability for their companies and to respond to global changes, sustainability trends and directions, including needs and expectations of all stakeholder groups.

S1 Security

Building Energy Security for the Country

Focusing on the building of energy security for the country through the joint operation of business strategy consisting of refinery and trading business, marketing business, natural resource business and bio-based product business in procuring, producing and distributing oil together with biofuels to meet the demands of the business and people. Despite the introduction and the market growth of the electric vehicles (EV cars), the fossil fuel businesses are necessary for the national energy demands and they are growing continuously.

S2 Stability

Managing Portfolio to Grow and Spread Risks to Business with Consistent Returns

Focusing on the investment in businesses with consistent incomes and returns with low risks from external factors, both in Thailand and overseas, such as the green power businesses which have stable income through the management of production chain in other businesses to cope with business fluctuations.

S3 Sustainability

Developing Business and Extending Core Businesses to Grow and Be Sustainable

This strategy is relating to business development of extended businesses that supports or create new opportunity for core businesses to grow in a sustainable way and to get ready for disruptive technology, emerging risks and changes in the future, such as the lithium battery business to prepare for the growth of EV cars or the development of high value bio-based products, including bio-plastics and bio-materials. The company also embraces innovation that is contributing to environment and society from Bangchak Initiative and Innovation Center (BiiC), an institute seeking for an investment with the startup as well as cooperation with external parties on R&D activities, to find an opportunity to continuously expand green energy businesses and bio-based businesses domestically and internationally. However, the company still employs the 4 Green sustainability strategy as the framework for business operations and investments for corporate sustainability.

4 GREEN Strategy

1. Green Business

Focusing on the investment in new business, extension of the existing energy business in and innovations that are environmentally friendly in order to add more profits and values to the business in a sustainable way. This is not only to increase proportion of revenue from new business, but also good for the environment as it brings about various kinds of green initiatives to develop business operations. Samples of these initiatives are such as the high value biological products made from agricultural products based on bio-technology innovations extended from the original bio-fuel business, i.e. bio-plastic, bio food, bio cosmetic ingredient. Moreover, the company places importance to green energy business and energy management through the Institute of Innovation and Business Incubation (BiiC), as a way leading to the emerging of startup business that can be developed further for the company's business.

2. Green Production

Emphasizing the improvement of production process and operations that are environmentally friendly and the enhancement of safety operation by using resources efficiently, especially water and energy resources. Having in place, the environment and energy management systems in compliance with ISO 14001 and ISO 50001, respectively, including the occupational health and safety management system (ISO 45001) as well as the Process Safety Management (PSM) to raise the level of safety management.

3. Greenovative Experience

Focusing on the creation of new experience and new green innovation to support the modern lifestyle of Thai people in which everyone can live a sustainable life the environment and society, including:

- **Greenovative Product** emphasizing the product quality development to and environmentally friendly products. At present, the company is producing and distributing quality oil that meets Euro 4 standards, including 2 types of oils according to Euro 5 standards: Gasohol E20 S and Hi-Premium Diesel S (Premium Grade Diesel), designed to suit the new engines and help reduce dust from combustion. In addition, the company has developed and distributed a special grade diesel, namely Hi-Diesel B20 S for distribution to transporting truck customers and Hi-Diesel S B10 diesel fuel that is good for the environment and supports palm oil growers. For the non-oil business. Bangchak is the leader in using 100% bio-degradable. Inthanin coffee cup and the strawless lid can reduce the use of plastic straw and these two items are currently the standard practice for Inthanin coffee shops in all branches. Greenovative Service Station has developed a new architecture for service stations with unique and outstanding designs through the 4Rs process, namely renewable, recycle, reuse and reduce, Some of the examples are installing Solar Roof Top in Bangchak Srinakarin service station to produce solar cell power, bidding for a purchase of power with blockchain technology which is a green community energy management system (GEMS), the expansion of the EV Charger branch, saving water by using rain and used water to water plants, the use of energy-saving equipment, increasing shady green spaces and installing amenities, such as bathroom designs that respond to the elderly and disabled society, installing the automatic air inflator to has developed a new architecture for service stations with unique and outstanding designs through the stepping towards “The Most Admired Brand”.
- **Greenovative Mind** is all about the application of technology and IT system to process customer data for the improvement of service works and service delivery to be fast and efficient, the development of member database system, the installation of Point of Sale Automation in service stations in addition to the development of application systems to facilitate various groups of users, i. e. the installation of application BCP Link and the Auto Ordering System: AOS for the group of dealers, the installation of mobile application for the group of general customers and the development of Mobile Application System to support basic operations in response to customer needs and to increase the use of benefits from BCP GreenMiles card.
- **Greenovative Communities** is an idea to create an experience that allows customers to be a part of helping society, environment and maintaining good culture, such as giving oversupply agricultural products to service users or distributing products that are environmentally friendly, hiring the disabled, developing the "BCP Road-Side Assistant" project to provide basic assistance for motorists who need help at Bangchak service stations, such as battery towing, changing spare tires. Another kind of good experience is to develop the project on a plot of organic vegetable at the service stations to improve the quality of life for service staff. In addition, the surplus products can be given to customers.

4. Green Society

is one of the key strategies that the company continuously performed with environmental care participation in improving the quality of lives and well-being of Thai society through projects that promote better society as a whole by introducing the late King’s Sufficiency Economy Philosophy and innovation aiming to expand operations and results to various groups of stakeholders in society. It also expects to create changes and help develop the country in various dimensions in response to the United Nations Sustainable Development Goals (SDGs). Including into it, is the communication on "Sustainable Happiness" that the organization can share with stakeholders in the society through various kinds of projects, either the CSR in Process, or CSR after Process or CSR as Process, under the operation of Bai Mai Pan Suk Foundation.

Progress in Sustainable Development and Business

Strategy 1: Focusing on the investment and value creation to the sustainable and responsible business (Green Business)

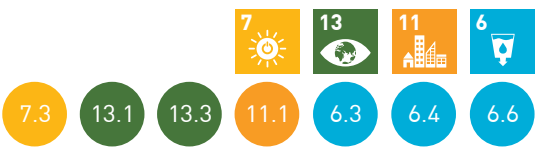
Plans	Results	Targets Y 2024[1]
1.1 Developing electricity generation businesses from solar power, wind power, geothermal and hydropower, and expanding the businesses to be an Asian renewable energy producer	• Generated and distributed power from renewable and clean energy, domestically and internationally, totaling 404.0 megawatts, consisting of - Solar cells project in Thailand: generated 139.0 megawatts (including roof-top installation and all of which have been produced) - Solar cells project in Japan: generated 14.7 Megawatts. - Ligor wind power project in Nakhon Si Thammarat province, with a capacity of 8.97 megawatts, has been operating since April 2019. - Wind power plant project in Philippines : generated 14.4 MW (in proportion to shareholding) - Geothermal power project in Indonesia: operating capacity of 157.5 MW (according to the shareholding proportion) - Investment in water power project in Chiang Khwang Lao People's Democratic Republic with a generating capacity of 69 megawatts, to start in September 2019. **Remark:** Capacity is the power generating capacity under the Power Purchase Agreement (PPA).	• Expanding: focusing on the growth of the company's core business by expanding a large-scale power plant business through organic growth and the acquisition of inorganic growth projects • Extending: extending business in support of the new direction of energy business in the future by penetrating into a new business but still related to the core business of the company such as Digital energy, Energy storage, LNG to Power etc. • Enhancing: developing and enhancing the existing power plants, including work processes in the organization for maximum efficiency. • Evaluating: managing assets of the company through a regular monitoring of its performance and having consideration on the portfolios to ensure satisfactory returns.
1.2 Developing the bio-fuel business and expanding the high value bio-based product businesses	• Operated bio-based product business through BBGI Company Limited with a total production capacity of more than 2,000,000 million liters per day, consisting of : - Bio-diesel production unit: increasing production capacity from 930,000 liters per day to 1,000,000 liters per day with a project to improve production efficiency and a project to build a glycerin refinery, All these operations pushed an average capacity utilization rate of 90% to Bangchak Bio-fuel Co. Ltd. - Ethanol production unit using cassava : consisting of Bangchak Bio Ethanol Company Limited with a capacity of 150,000 liters / day and an average utilization rate of 95% combined with Ubon Bio Ethanol Co., Ltd. with a capacity of 400,000 liters / day and an average utilization rate of 85% to 550,000 liters / day. - Ethanol production unit using molasses : consisting of KGI-BP project, which has expanded production capacity from 200,000 liters per day to 300,000 liters per day and has an average utilization rate of 99%. - Ethanol production unit using molasses : consisting of KGI-NP project with a production capacity of 150,000 liters / day and an average utilization rate of 98% • Prepared for production and distribution of B100 products in accordance with government policies to promote the use of bio-diesel (B100), both B20 and B10 diesel, to support future demand • Prepared for investment opportunities through fundraising on the Stock Exchange of Thailand by 2020 • Screened high value bio-product business that can be developed commercially such as Bio Plastic / Bio Food / Cosmetic ingredient etc. • Provided strategic areas for establishing a Bio Complex to support the expansion of high value biotech products in the future	• Developing a bio-business by establishing Bio-Complex in order to expand the bio-fuel business into a high value bio product that increases business opportunities as well as promoting research and development of commercial energy crops such as sugarcane, cassava, palm oil and algae, which help increase the amount and value of agricultural products for farmers
1.3 Innovative business development to add more value and opportunities to business	• The company established BCP Innovation Pte. Ltd. in Singapore in order to conduct business related to innovation abroad. At present, BCP Innovation Pte. Ltd. has the 2nd shareholding in Lithium Americas Corporation, the upstream business of the battery business. Currently, the first phase of lithium production capacity has been increased from 25,000 tons per year to 40,000 tons per year, including the right to off-take in 2021 to 6,000 tons per year, increasing from right to off-take 2,500 tons per in Y2018.	• Expanding investment in lithium mining business to increase production capacity and the rights to off-take, including finding a partnership and establishing a battery factory in Thailand

Note 1) Setting operational goals for Y2020/Y2024. The company has adjusted the presentation into 2 periods in consistent with the 5-year long-term strategic planning cycle and SDG.

2) ★ Refers to the organizational sustainability performance in consistent with the performance evaluation of the Chief Executive Officer and the President in 2019. (Disclosure 102-28)

Plans	Results	Targets Y 2024[1]
	• Bangchak Innovation and Initiative Center (BiiC) established Corporate Venture Capital (CVC) to invest in the startup through International Incubation and In-house Pitching, with an investment of $ 8 million in bio-technology and through the clean energy business of $ 9 million by investing in a Thai energy startup company. ★ • Having academic cooperation and developing projects with agencies and universities such as Mahidol University (MU), Chulalongkorn University (CU), King Mongkut's University of Technology Thonburi (KMUTT), Rajamangala University of Technology Phra Nakhon (RMUTP), Office of the Promotion Committee Science, Research and Innovation (SorBorSor.), Thailand Institute of Scientific and Technological Research (TISTR), Asian Institute of Technology (AIT) etc.	• Investing in business innovation / incubator and startup by focusing on green energy innovations such as energy storage and bio based- innovations that are beneficial to society and the environment

Strategy 2: Focusing on the improvement of environment and safety management (Green Production)



Plans	Results	Targets Y 2024
2.1 Investing in the renewable energy businesses (Same as 1.1-1.2)	• Same as 1.1 - 1.2 • Defined the organization's success indicators for carbon offset by the carbon offset of the company and the companies in the group which is tied to the key performance indicators of senior management. By the year 2019, the company could reduce the amount of greenhouse gas emissions by carbon offsets from the green power business compared to the baseline in 2015, by 800,000 tons of carbon dioxide equivalent and reduce greenhouse gas emissions from the production unit by 52,000 tons of carbon dioxide equivalent. ★	• Carbon Offset from the green power business of the companies in the group, aiming to become a Carbon Neutral Company by Y2030
2.2 Improving efficiency and stability of energy consumption in production	• Generated power and steam from Combined Cycle Power Plant Unit 3 (GTG3), size 12 MW, to replace the boiler, saving the company from the use of fuel oil and continuously improved production stability. • Operated the YES-R + project to develop Yield Energy Efficiency Safety and Reliability to be stable and sustainable and to reduce productivity loss • Implemented a refinery energy efficiency improvement project with an Energy Intensity Index (EII) equal to 97.9 in 2019 • Operating the construction of 3Es as planned - Continuous Catalyst Regeneration Unit (CCR) - Improvement of distillation units for higher efficiency (Debottlenecking)	• Implementation of the YES-R + project to improve the yield, energy efficiency, safety and reliability to be stable and sustainable in order to successfully reduce the loss of productivity • Proceeding with the construction of 3E as planned • Continuous Catalyst Regeneration Unit (CCR) completed in 2020 • Improvement of distillation unit for higher efficiency (Debottlenecking) completed in 2020
2.3 Increasing the efficiency of tap water usage in the production process by water reduction, reuse and recycled	• Reduced the use of tap water by 3% (compared to the baseline in Y2015 • Improved efficiency of water consumption per production unit to 56.8 the cubic meter / thousand barrel equivalent	• Reducing water usage by 15% (compared to the baseline in 2015) (Y2020 target) • Improving the efficiency of water consumption per production unit to 54 cubic meters / thousand barrels equivalent (target Y2020)
2.4 Conducting Water Footprint in support of water management throughout the product life cycle	• Continued to study the water management in the refinery by applying the Water Footprint of products in collaboration with experts from King Mongkut's University of Technology Thonburi. This is to maximize the efficiency of water management per product.	• Proceeding on the study of water management in the refinery by the Water Footprint of products
2.5 Laying the foundation for Process Safety Management (PSM) in the workplace and expanding the scope of security promotion on the Occupational Health and Environment to cover the surrounding communities	• Established the PSM Governance Committee (PSM GC) to support and operate work assignments • Developed safety management systems for all processes according to the Process Safety Management System (PSM) in 3 cases as planned. These cases included the change management in the production process, Technology And Management of Change Technology-Facilities: MOC-T, F and Pre-Startup Safety Review (PSSR) • Conducted activities and rehearsed safety plans to prepare for emergencies with the surrounding communities. The practices of virtual evacuation plans in the communities around the refinery with cooperation between the company, Phra Khanong District Office and Phra Khanong Fire Station were conducted. In the year 2019, the company was able to rehearse the emergency plans and evacuation for a total of 2 communities	• Developing safety activities to continuously build trust and commitment among stakeholders of the organization • Developing security management systems (PSM) in all 14 elements until becoming a culture of the company. Also, developing software systems to support. • Having safe communities from emergency and evacuation drills in the event of emergencies and disasters in 11 locations (11 safe communities as a target in 2020)

Plans	Results	Targets Y 2024
	• There were no wide spread incidents affecting the community in 2019.	• There is no widespread incidents affecting the community in each year.
	• Monitored air quality online, including air emission from the vent, work area and atmosphere around the refinery to ensure better quality than legal requirements. There was no complaint on air pollution.	• Zero complaint related to air pollution each year
	• Bangchak Bio-ethanol Company Limited could managed waste by 3Rs principles in 83% of total waste while Bangchak Bio-fuel Company could do it by 78% of total waste.	• Encouraging subsidiaries to implement 3Rs waste management principles and receiving the 3Rs Awards together with the Zero Waste to Landfill Awards

Strategy 3: Focusing on creating new experiences and green innovations (Greenovative Experience)

Plans	Results	Targets Y 2024
3.1 Developing service station that are responding to customer centric with the new concept/image and the development of additional service to deliver new experiences to customers service development and additional businesses to deliver new experiences to customers	**Greenovative Product** • Made available 2 types of Euro 5 standard oil (higher than the requirements of the Department of Energy Business), namely Gasohol E20 S and Hi-Premium Diesel S (Premium Diesel) designed to be suitable for new engines and help reduce dust from combustion. • Developed and distributed Hi-Diesel B20 S special grade diesel fuel for distribution to the transportation truck customers and Hi-Diesel S B10 diesel fuel which is good for the environment and supports palm oil growers. • Upgraded service quality to the highest satisfaction for customers and stepped up to becoming number 1 in the minds of users from the Customer Satisfaction Index based on the Net Promoter Score (NPS) assessment this year. ★	• Increasing market share by more than 18 percent • Maintaining the 1st place in the Net Promoter Score (NPS)
	Greenovative Service Station • Applied technology and information systems to develop services for customer information management, fast and efficient service, member database system and to complete the installation of point of sale automation in service stations • Developed an application system that facilitates the use of various customer groups such as business operating groups (dealer groups) • Developed BCP Link Application System, Auto Ordering System (AOS), a system for general customers • Developed Mobile Application Systems that support basic operations according to customer needs • Improved the use of Bangchak GreenMiles' card benefits through the analysis of customer behavior data • Signed a cooperation agreement with the Provincial Electricity Authority to expand the EV charging points at Bangchak service stations	• Aim to be the "Most Admired Brand" • Not less than 62 branches nationwide

Strategy 4: Developing businesses/activities for environmental and social benefits (Green Society)

Plans	Results	Targets Y 2024
4.1 Developing social activities and business that benefit the society and the environment at the same time	• Improved the quality of life of community people, economically, socially and environmentally, to promote a healthy community, livable and sustainable in the areas around Bangchak refinery on all 8 aspects, with activities organized with community groups, family group, school groups and condominium groups. These activities contributed benefits to over 51,445 participants. Community engagement reflected in 83.2%.	• Assessing friendliness, helpfulness, safety, and community engagement to the company of 85%, encouraging the establishment of at least 3 groups of social enterprises to generate income to the community.
	• Developed more service stations with 13 agricultural cooperatives • Improved potential community gas stations and upgraded service levels through the community gas station development program. Used Smart P&L system as a tool for community gas station operators to compare their performance • Conducted COOP Coaching in 40 locations, and COOP Turn pro in 1 location • "Click ..to flip the nation" project Promoted product development through innovation and trial sale through online technology	• Continuously developing service stations with agricultural cooperatives • Upgrading community service to be more of competitive services

Plans	Results	Targets Y 2024
	• Increased the value of agricultural products by buying bananas from farmers in the northeast region, northern and central to make "Happy Banana" as a gift giving to customers visiting Bangchak service stations	• Promoting the development of quality product from farmers to sell in SPAR convenience stores for domestic market and exportation. Also, including them continuously as promotional product in Bangchak service stations every year
	• Extended the sustainability network to partners with sales contracts less than US $ 500,000 by disseminating the Supplier Code of Conduct (SCOC) and having suppliers assess themselves according to the code of ethics, amounting 11 cases	• All suppliers responding to adherence to the Code of Conduct and participating in the self-assessment according to the code of ethics
4.2 Developing social activities that are more responsive to national problems	Took part in solving the plastic waste problem with innovations in the circular economy • Encouraged customers to use private glass/cup for their beverage, getting 5 baht discount • Changed the Inthanin cup into a bio-cup and changed to a drinking lid to reduce straw. The used Bio-cups were taken for reuse in the seedling cup project which was the collaborative project between Bangchak and the Royal Forest Department. The project aimed to reduce the use of black bags in seedling culture • Passed PET drinking water bottles, donations from customers, to Indorama company to make recycled fibers for further made into shirts, hats, bags, products and be given to the public by recycling of 600,000 PET bottles • Recycled cans of engine oil into plastic pellets for reuse	• Changing the Inthanin cup to 15-20 million bio-plastic cups per year and get ready to reduce the use of plastic straw
	Helped farmers on the adaptation and mitigation to alleviate climate change problems with the late King's Sufficiency Economy Philosophy • Water management using the model of "Pansuk Farmers". Farmers practicing the natural agriculture principles can design and improve the area for water management in farming plots of agricultural cooperative group members in Saraburi, Lop Buri, Uthai Thani and Suphanburi. The area covers 12 rai.	• Number of farmers in sustainable agricultural areas (Which has been designed and improved for water management) no less than 30 persons
	• Developed the prototype area in prevention of soil erosion, known as "Stop Soil Erosion, Save Our Future", in the agricultural areas on sloping mountains. The development was done in collaboration with the Department of Land Development, The Pid Thong Lang Phra Institution for Activities Promotion and Development the Royal Forest Department and the Natural Agricultural Foundation Network. The company was finally able to do a prototype area in prevention of soil erosion by applying natural farming principles such as laying terrace rice fields, planting vetiver grass, planting the 5-level forest, laying natural weir and to promote the use of natural fertilizers in the 5 plots of the prototype area, covering 20 rai at Kaen Makrud Sub-district, Ban Rai District of Uthai Thani Province	• Preparing prototype area in prevention of soil erosion in agricultural areas on slope hills in Kaen Makrut Sub-district, Ban Rai District of Uthai Thani Province
	• In collaboration with the Meechai Pattana Foundation and Agricultural Cooperatives, promoted the introduction of agricultural innovations to schools in the Partnership School program • Young Innovative Farmer : This program aims to encourage the use of innovation in cultivation among students who are children of the member farmers of the agricultural cooperatives so that they will have basic knowledge in modern agriculture, saving water through a simple dripping system, growing plants in water or in the sand, tissue cultivation for the agriculture, etc.	• Supporting the expansion of Meechai Pattana school, especially in the application of innovation to agriculture work. This is to allow the opportunity for students to have real practice in school continuously. • Expanding the support for Meechai Pattana school to the 4 Partnership school network in 2019
	• Organized seminars on environmental topics to share knowledge to people in preparation for global warming mitigation in the future. The recommendations included the application of innovations that are in line with the BCG Model economy concept, the utilization of natural resources worthily and sustainably, such as biological economy, circular economy and the green economy. • Organized the seminar on the topic of SynBio Forum:Bio-innovation science changing the world	• Organizing the seminar once a year for no less than 300 participants
	- Took part in solving the problem of literacy of Thai children by developing education for Thai youth. Helped the illiterate (unable to read or write) of 891 students and supported 20 of Pracharat School for future education (Connext ED) schools with more than 5,000 students	• Helping the youth to be able to read and write (to become literate) no less than 800 people / year.