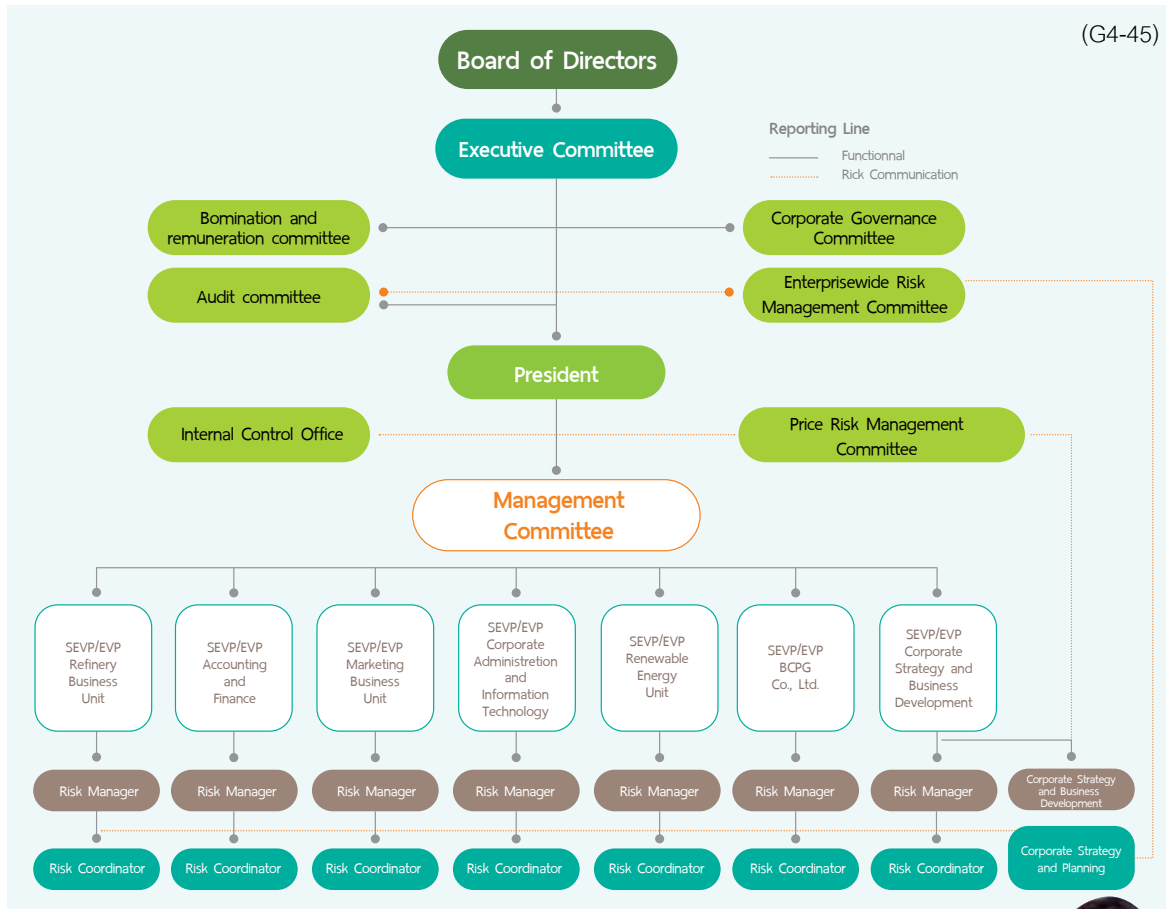




Corporate Risk Management

To ensure that Bangchak operates a sustainable business while continuing to achieve its goals and remaining agile and prepared for constant changes facing the company, it has implemented risk management measures inline with international standards; COSO, ERM, and ISO 31000 at every level of the organization. In addition, clear risk management structure, reporting channels, and systematic monitoring of risk mitigations are in place throughout Bangchak and its affiliates.



Bangchak's Risk Management Framework consists of our components

-  **Operation Risk Management**
-  **Strategic Risk Management**
-  **New Business Investment Risk Management**
-  **Business Continuity Management**





“Besides applying international-standard risk management processes, we keep our eyes on other megatrends. Part of the megatrends was obtained from the approach of The Global Risks Report 2016, 11th Edition (World Economic Forum), in which risks are viewed from economic, environmental, geopolitical, social, and technological perspectives, their probability, and potentially severe impacts on the organization ... issues like failure of climate-change mitigation and adaptation, water crisis, extreme weather events. All these issues are reviewed for risk analysis and strategic planning, leading to implementation plans by each group.”



Ms. Nintira Apising
Senior Vice President, Corporate Strategies and Planning

Risk Management Measures

The slow down in the economy in both the manufacturing sector as well as household consumption, coupled with the continue decline in world oil price which began in 2014, have direct impacts on Bangchak's petroleum business and thus, its main source of revenue. Bangchak has implemented risk management measures as per below:

Risk	Impact	Risk Mitigation Measures
 1. Economic Risk		
<p>High oil price volatility</p> 	<p>High degree of uncertainty in oil refining revenue</p>	<p>Increase the proportion of new businesses that generate steady income. Expand investment to 118-MW solar PV power generation and bio-fuel business.</p> <p>Power Generation Business</p> <ul style="list-style-type: none"> Established a subsidiary, BCPG Co., Ltd., to expand investment in the power generation and renewable-energy businesses both domestic and international. <p>Bio-fuel Business</p> <ul style="list-style-type: none"> Increased the capacity of the biodiesel plant 450,000 liters/day resulting in a 810,000 liters/day production from 360,000 liter/day. Commercial operation is expected in 2016. Planned to acquire shares of a 150,000 liter/day cassava-based ethanol plant. With the current 400,000 liters/day, Bangchak will command a capacity of 550,000 liters/day, lowering the risk of B100 and ethanol shortage for its production of alternative-energy products, while supporting the increasing needs of alternative energy in Thailand.
 2. Social Risk		
<p>Emergencies resulting from operations</p> 	<p>Erosion of communities' and society's confidence and reduction in refining capacity</p>	<p>Elevate safety standards to improve operation by:</p> <ul style="list-style-type: none"> Constructing a natural gas cogeneration power plant, which is cleaner than the current fuel oil plant. The project will also strengthen the refinery power stability, once coming online in 2017. Managing operational risks through SIL (Safety Integrity Level), RCM (Reliability-Centered Maintenance), and RBI (Risk-Based Inspection) for both hardware and processes. Improving safety standard under TIS/OHSAS 18001; revising HAZOP (Hazard and Operability Study) covering all refining units; and implementing PSM (Process Safety Management system).

Risk	Impact	Risk Mitigation Measures
		<ul style="list-style-type: none"> Adopting an emergency preparedness system and firefighting systems at all sites to contain internal incidents and support surrounding communities, including upgrading firetrucks, adopting digital CC cameras at the Fourth Refining Unit for quick and precise review, and improvement to the firefighting piping system. Staging regular activities for school, temples, and condos within the surrounding communities to educate and cultivate their safety awareness through training on evacuation and firefighting; installing communication and warning systems in all communities; and inviting community representatives to observe in Level 3 emergency drills.



3. Environmental Risks

Emerging Risk

Water Stress



Insufficient water for production processes / change in raw-water quality / rising costs for raw-water reconditioning

- Carry out a project to reduce water consumption and water discharge by applying RO (reverse osmosis) to raw-water processes and wastewater treatment in addition to existing systems so improve water quality to that point that it can be reused. This year, Bangchak successfully cut its discharge and water consumption by 28%.

Oil spills into the river



Impacts on environment / society and corporate image

- Appointed a Refinery Water Management Taskforce to study long-term raw-water saving and discharge
- Require double-hull vessels for crude oil and refined-product transport.
- Stage additional oil spill removal equipment is set aside at the oil tankfarm of Thai Public Port Co., Ltd., in addition to the refinery wharf
- Improve spills and fire preparedness from transport vessels through joint drills at Si Racha Depot and in transit.

Flaring



- Completing the enclosed-ground flare project to ease the impacts of flaring on communities by 2016. Improve hardware for work readiness, environmental friendliness, and greater safety.

Climate change




- Implementing energy and green house gas reduction projects through 3Es Project (Efficiency, Energy and Environment Improvement Project)
- Natural gas cogeneration plant project to replace fuel oil with natural gas including a plan to construct a second cogeneration power plant to increase energy efficiency and lower carbon dioxide emissions.

Risk	Impact	Risk Mitigation Measures
		<ul style="list-style-type: none"> • Energy efficiency projects in refinery (details in energy efficiency chapter) • Energy saving project in office buildings which received ASEAN energy award.

4. Business Continuity Management

To ensure stakeholders that Bangchak can deliver products and operate during crises, emergencies and incidents, it organized BCM drills by simulating the handling of a 6-Richter earthquake which result in crude tank fires and leaks of crude-oil dispensing pipes.

Risk	Impact	Risk Mitigation Measures
<p>Business interruption</p> 	<p>Business and corporate image</p>	<ul style="list-style-type: none"> • Conform to ISO 22301:2012 by preparing 10 crisis management plans and 6 BCM plans together with emergency response plans for safety units to prepare Bangchak's resources and crisis response strategies. • Put in place the continuous monitoring and review of work processes to ensure conformity to the system. • Stage annual BCM drills. This year, Bangchak simulated the handling of a 6-Richter earthquake that resulted in crude tank fires and leaks of crude-oil dispensing pipes, causing Bangchak to suspend refining processes and direct oil distribution to a safe and intact oil depot. The resulting outcomes then found their way into an operating procedure