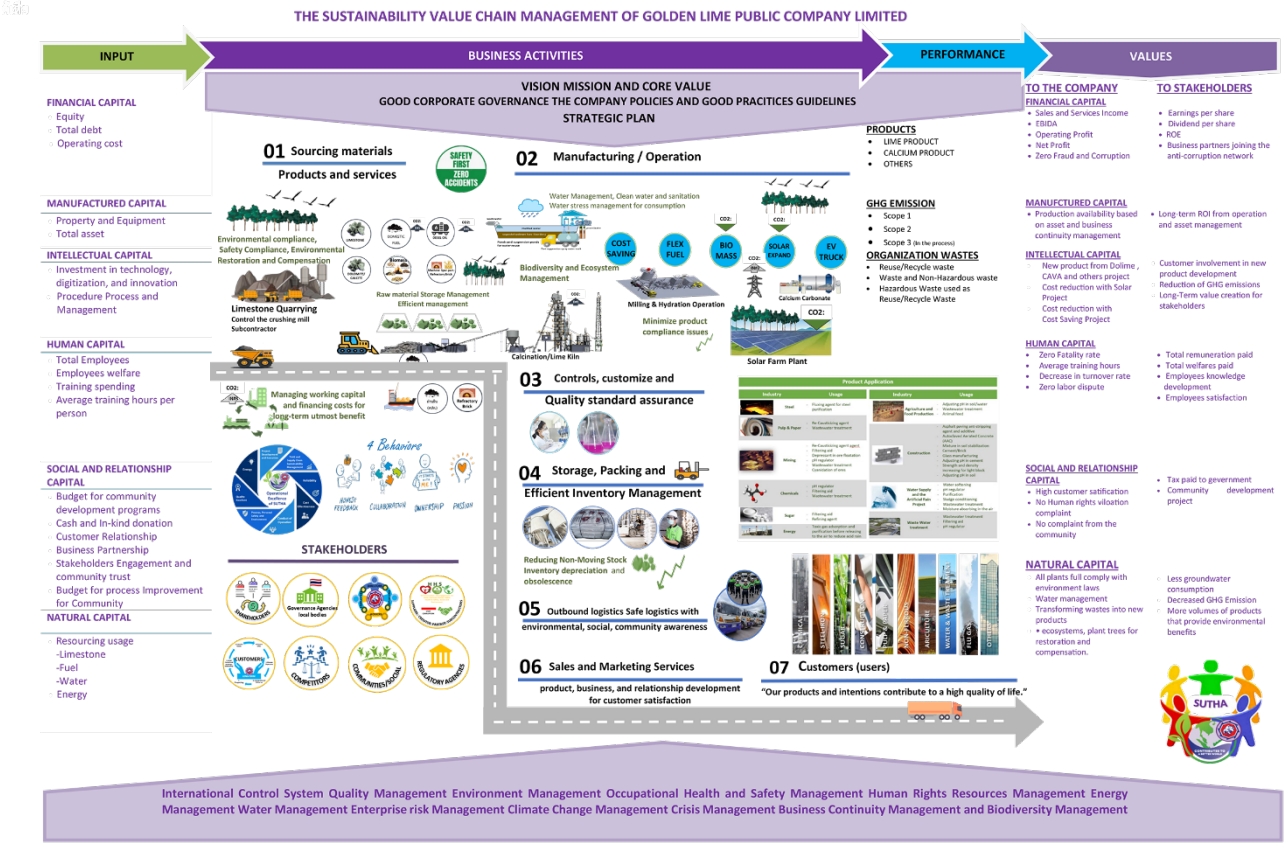
Business value chain

SUTHA implements supply chain management to deliver maximum value and benefits, positioning itself as a partner that offers products and services that provide optimal advantages and is recognized by customers. To achieve this objective, the management of the business's value chain involves primary and support activities, encompassing seven core processes and three functional areas.



· **Management of limestone mining and production, procurement of raw materials, fuels, machinery and equipment, transportation and production process support services.**

01 | Sourcing materials , Product and Services

1) Quarry management
2) Domestic Sourcing and International Sourcing
3) Inbound Logistics
4) Receiving Process, quality control, inventory management of raw material Payment and settlement

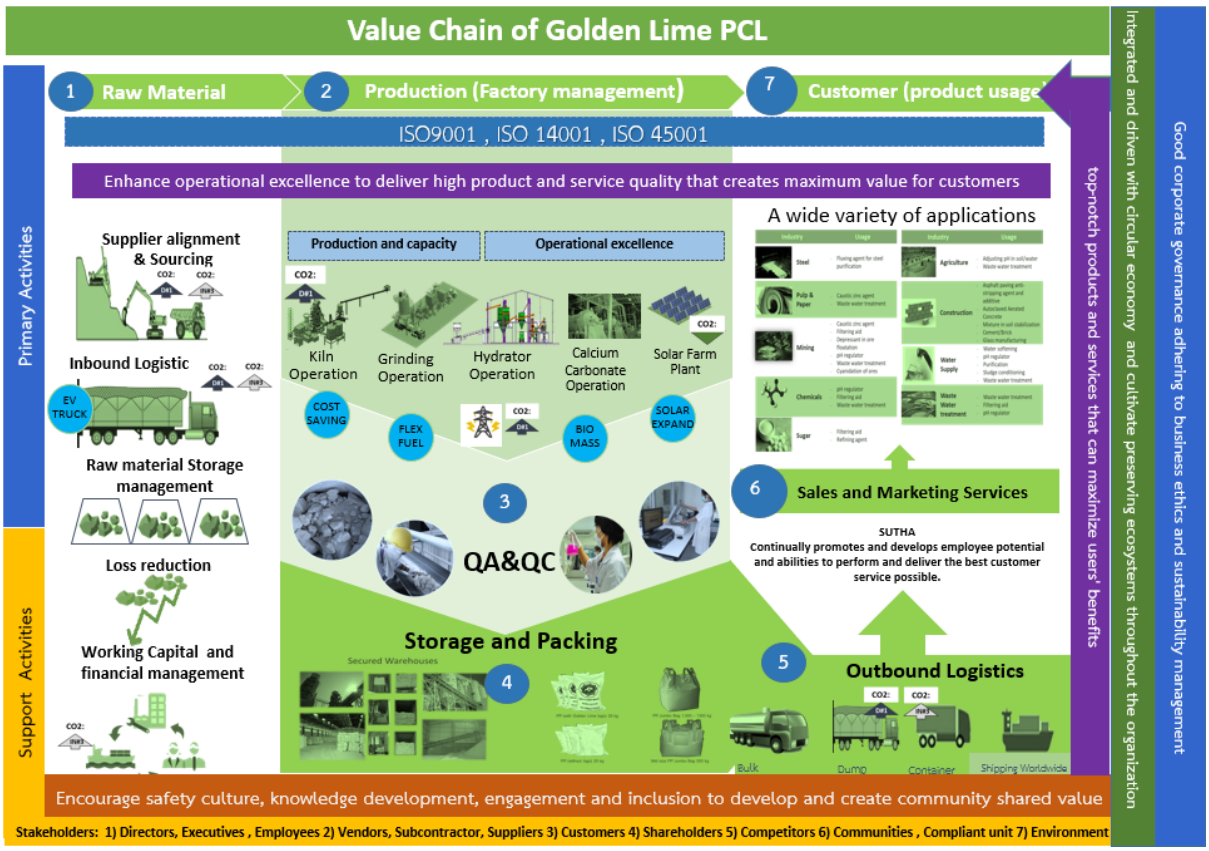
• **Operations: Plant and production management, storage, packaging, inventory management, quality control and assurance.**

02 | Operation: Manufacturing (plant management)
03 | Controls, Screen/Customize and Quality Standard Assurance
04 | Storage, Packing and Efficient Inventory Management

• **Outbound logistics Services, Sales, Marketing, Business and Product Development, Support, and Management**

05 | Outbound logistic Safe logistic with environmental, Social, Community awareness
06 | Sales and Marketing Services product, business, and relationship development for customer satisfaction
07 | Customer (users)

Products and Services Sourcing



1 Raw Material supply alignments and Sourcing

1.1) Sourcing of raw material, fuel and products/service (Supply alignment & Sourcing)

- **Raw materials for lime production and calcium carbonate production**

The main raw materials for lime production and Dolime product are limestone or dolomite and fuel. The major raw material for coated and uncoated calcium carbonate production is calcite, and the main raw material for producing calcium powder is marble chips. At present, the Company sources limestone from Saraburi Province and Lopburi Province sources with quality that meets the Company's requirements. The Company purchases limestone, dolomite and calcite from up to 4-5 suppliers. A team of geologists, along with control and quality assurance team are dispatched to explore limestone quality and collect samples from both current and new sources of purchases.

- **Limestone**

Limestone is the main raw material for the production of calcium oxide and calcium hydroxide. Limestone is a sedimentary rock mostly composed of calcium carbonate ($CaCO_3$) probably in the form of calcite mineral and other substances, e.g. Magnesium oxide (MgO), silica (SiO_2) etc.

The Company has entered into a long-term TMC-GL Kiln Feed Limestone Supply Agreement, which includes the establishment of a quarry management team to oversee operations at the Khao Khao quarry, as per concession number 32517/16065. This agreement enables the Company to obtain high-quality limestone with a significant calcium carbonate content from the quarry. Approximately 80% of the Company's kiln feed stone is sourced from TMC, with the remainder supplied by local vendors in Saraburi and adjacent provinces.

The limestone acquired from TMC's quarry is of superior quality, characterized by a high calcium carbonate content, making it ideal for lime production. The long-term Kiln Feed Limestone Supply Agreement with TMC is exclusive, granting TMC the sole right to supply this limestone with the Company.

In 2023, SUTHA achieved its objective of securing production supply by successfully renewing the concession for the Khao Khao quarry, which is operated by Thai Marble in Saraburi Province. This subsidiary is responsible for supplying kiln feed stone necessary for producing the required quality of quicklime. SUTHA acquired Thai Marble Co., Ltd. through

the purchase of common shares from the original shareholders in 2020 and successfully renewed the concession certificate, which was set to expire in October 2023, for an additional 20 years. This renewal ensures SUTHA's ability to address growth challenges and maintain security and stability for its business and stakeholders.

The quarry management of Thai Marble Corporation Co., Ltd.
(a subsidiary)

The supply of Limestone, which constitutes 80% of the key raw material for lime production, is secured through a long-term Arm's Length Basic agreement with the quarry management of the Khao Khao quarry, as per concession number 32517/16065. This concession was successfully renewed in October 2023 and will remain valid until October 29, 2043. The Company has engaged quarry management to guarantee compliance with performance obligations.

Limestone quarrying at Khao Khao quarry	Internal controls
Core process; 1) PLANNING, EXPEDITION 2) STRIPPING 3) DRILLING - BLASTING 4) HAULING 4.1) weighing limestone at the quarry before delivering to the mill 5) CRUSHING – SEAVING 6) WEIGHING and transfer limestone to the mills 6.1) weighing KFS_L and KFS_S at the mill front before delivering to GL 6.2) weighing Ready Mix and aggregates for TMC's customers  7. Risk management practices conducted to the quarrying contractors to ensure safe and complaint process	1. The quarrying management is responsible for planning and controlling, supervising, and monitoring the contractors for carrying out the plans and work processes at the quarry. 2. Upon blasting, weighed quarried limestones are transported from the quarry to the mill by internal trucks and an external fleet of contractors which transport limestone to the mill. 3. A contracted mill that receives quarried and weighed limestone. To proceed milling according to the assigned plan; 3.1 High-Calcium Limestone -KFS_L sized 65-115 mm -KFS_S sized 30-35 mm to deliver to the GL plants 3.2 Ready Mix sized 15-25 mm for construction and cement to be distributed to GL customers and to the mills to supply their customers. 3.3 Construction aggregates - ROM Aggregate sized 0-1,000 mm - Stone Chips sized 0-25 mm - Stone Dust sized 0-3 mm and scraps as by products from milling process to be sold to stone mills and to other customers. One controlling point is weighing each product type as stringent control is conducted to each product type, grade, quantity, and storage practices. Internal Controls are implemented to the invoicing and receiving process conducted by TMC Accounting Department and the Stone Mill to oversee and inspect and risk mitigating practices such as CCTV ,Stock counting by the company or independent external auditors on a periodic basis to confirm and calibrate the actual counted quantities with the stock quantities of the stone milling plant, etc.
Quarrying management is conducted and controlled by Golden Lime Public Company Limited, including subcontractors who pass the suppliers evaluation as for internal control and risk management according to the supply chain management that includes ;	

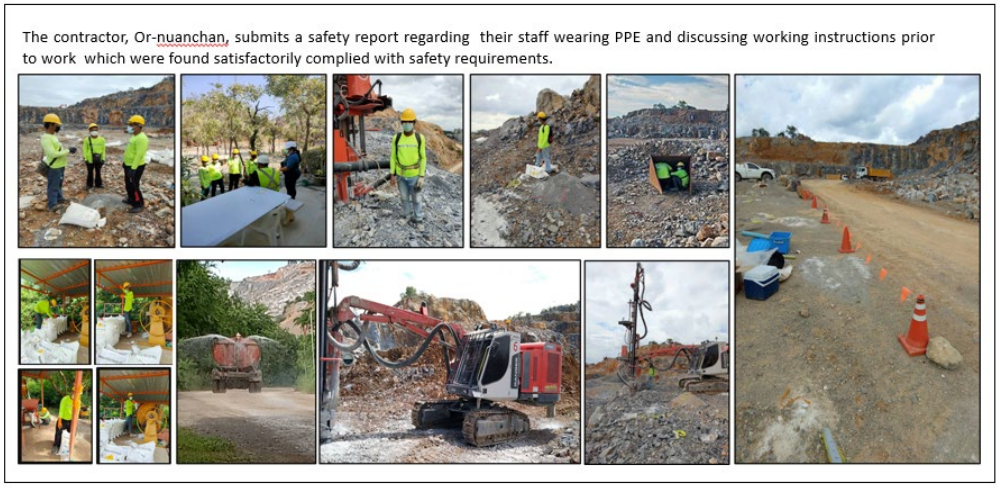
Limestone quarrying at Khao Khao quarry	Internal controls

1) ensure compliance with legal and occupational health and safety standards, while adhering to human rights principles, to prevent any negative effects on stakeholders involved.
2) regulating production to guarantee that limestone quantities align with the plan and meet product demand, while also managing production costs for optimal efficiency.
3) Internal controls and risk management involve verifying production volume accuracy, proper sorting and storage of products, overseeing Ready Mix stone inventory, and managing unsold stone inventory to avoid loss or depreciation. The limestone quarry management will collaborate with the accounting department of Thai Marble Co., Ltd. to monitor and confirm the inventory of stones received for production and those sold to customers, as well as checking unsold stock against recorded inventory values.
4) Managing business partners, particularly contractors involved in limestone production at the mine and stone mill, is crucial. Important business partners will be categorized into a Tier 1 group for close monitoring, with scheduled Supplier Site Visits for relevant personnel to assess operations and ensure adherence to internal control processes and risk management for trading partners.
5) Management will establish control and oversight measures to reduce impacts related to legal compliance, financial performance, and operational processes, while also mitigating risks associated with these impacts.

Preventive measures in quarrying

Controls and preventive measures to ensure procedural safety for operators and stakeholders are conducted by mean of the Supplier Site Visit.

- Set a mutual safe work practices and required standards in arranging safety training by professional safety officers to educate and monitor safety at work control as well as environmental impacts from the subcontractors work process to develop safe work practices leaving no impact to both social and environmental aspects.



- Locating geologists to survey and identify potential impact to set preventative measures.

- Allocate budget for the rockfall protection barriers at limestone slopes as mitigation measure limiting limestone rolling away from mining areas.

The mitigation measure in case the raw materials of the subsidiary cannot suffice the production demand is that the Company will purchase raw materials from other limestone producers as an offset to missing quantity and maintaining relationships with them to secure limestone supply and safe inventory stock to ensure business stability and continuity.

- **Dolomite / Dolomitic Limestone**

Dolomite is the main raw material for the production of Calcium Magnesium Oxide or Dolime. Dolomite is one of the Limestones mostly consists of Calcium Magnesium Carbonate ($CaMg(CO_3)_2$) and other substances such as Silica ($SiO2$). Dolomite has the same origin as Calcite found in Dolomitic Limestone by the secondary deformation by replacing the existing Lime by Magnesium or occurs in the Lead or Zinc which cut through Limestone. Dolomite has a dense texture visible in white, grey, pink, green, brown or black and well dissolve in water. In Thailand, Dolomite is prevalent in Karnchanaburi, Suratthani, Krabi and Song-Kha etc.

- **Calcite**

Calcite is the most stable carbonate mineral in the mineral group with chemical formula, i.e. calcium carbonate ($CaCO_3$). This is the crystalline rock with non-toxic properties, normally white or colorless, shiny like transparent to translucent glass, highly bright and can disperse well. In Thailand, calcite is common in limestone provinces and prevalent in Lopburi Province, Saraburi Province, Chanthaburi Province, Kanchanaburi Province, Chumphon Province, Surat Thani Province, Nakhon Sawan Province and Phetchaburi Province [2]

[1] *Information from the Department of Mineral Resources, Ministry of Natural Resources and Environment and Wikipedia.*

[2] *Mining operators must request patents and relevant licenses such as licenses for purchase, use, and transport of explosives.*

The Company uses calcite crushed into flakes as raw material to produce Uncoated Calcium Carbonate and Coated Calcium Carbonate. This is suitable for use as Filler in the rubber and plastic industry or as the whitening enhancer. The Company orders calcite from about 3-5 domestic suppliers. Selection is based on the quality of calcite rock, whiteness, price and service of suppliers. The Company is responsible for the costs of goods and transportation. The Company dispatches a geological and quality assurance team to randomly check the quality of calcite rock at the quarries regularly to ensure the quality of calcite ordered.

- **Marble Scrap for Calcium Carbonate Powder of TMC (subsidiary)**

TMC converts the marble scrap excess from the production of the marble-finished goods into calcium carbonate powder (CaCO3) to maximize the use of raw material. The raw material for the production of Ground calcium carbonate is derived from the by-product of the marble blocks production process, which is known as a source of fine raw materials and high quantity of natural calcium carbonate and can be used as primary raw material of other industries as well.

Rocks that have been shredded and prepared for use as raw materials for calcium carbonate production.

- **Fuel – Coal**

The Company has purchased fuel, a fuel source with better thermal properties and will help achieve better combustion efficiency for use in production. The Company has purchased from two overseas manufacturers regularly, including procurement from other sources. There will be a process to collect the prices offered for sale each time from 3 to 5 quotations before selecting the vendor for the next delivery with the lead time plan. Also, in order not to delay the delivery of fuel imported from abroad, the Company has prepared to reserve fuel by conducting inventory management according to the needs of the Company for a period of not less than 3 - 8 months, depending on the management of the working capital of the Company which the Company has managed the risk from managing working capital by choosing to use the capital with the low financial cost including having to manage fixed and floating interest rate risks to be appropriate and regularly monitor interest rate trends.

In addition to the imports of overseas fuels, the Company has developed each branch's production process to support varied types of fuels procured domestically and internationally in accordance with the FLEX_FUEL project that aims to enable the kiln fuel consumption applicable for coal supplied by both domestic and foreign suppliers.

There are suppliers who import bituminous or Steam Coal then deliver by the sizes as required by demand of each industry. The Company has procured fuel from 6 domestic suppliers and manufacturers which are sufficient to meet the production demand.

Core change on fuel procurement in Y2023

1) Oversea manufacturer or distributor

Based on changing fuel cost, GL contracted Premthai Energy Limited ("PEL") to procure from suitable fuel sources , at a reasonable price , select shipping service providers, complete insurance as necessary then propose to the Company to enter into transaction by opening L/C.

The coal import apart from its lower price than the domestic's shall align with the allocated storage area, L/C credit opening, and appropriate freight cost to Koh Sichang following the demand period.

When the Company considers purchasing coal from Indonesia, a supplier's background check and the identity verification of the supplier before entering into a sales contract to prevent the risk of non-compliance according to the agreement signed.

The shipment control including its risk management is to ensure coal delivery in time according to the L/C conditions to avoid cost on idle ship and late delivery.

The Company is aware of screening suppliers, business partners, time appropriately allocated for preparing inventory, marine and in-land insurance documents for mitigating the impact or damages from risks.

The Company also manages logistics to ensure laws compliance , zero effect to the environment and community by following and supervising relevant contractors as per below practice.

Logistics practices

The Company adheres to Thailand Inland transportation legislation and Driving legislation including all laws and regulations related to transport and logistics; carriage and carriage of goods in order for efficient transportation of our products with environmental and societal awareness.

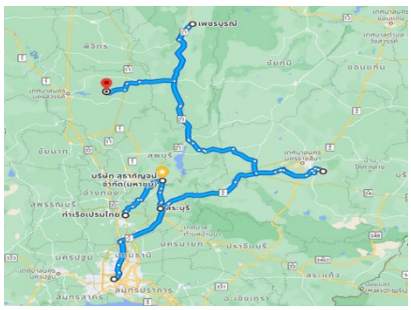
Practices in receiving raw material ; coal and other goods

All transportation-related processes comply with all laws and regulations related to transport and logistics by organizing timing , traffic and routes as obliged by laws and regulations .

In-plant transportation is managed under a rule of flow and non-congestion to prevent awaiting trucks from parking outside and then blocking neighborhood roads.

In festive seasons when some of surrounding roads are packed with people travelling, the Company opts other routes to avoid the busy traffic , not adding more jams onto the roads and less pollutants.

No parking on the roads outside the area: Transport trucks, both the company and subcontractors, do not park the truck on the roads surrounding the factory area, which may obstruct traffic or transportation routes and affect the community.



Dust prevention in bulk material transportation and handling to reduce Dust Exposure

Marine logistics	In-land logistics
Using canvas to reduce airborne dust	
	

- **Materials for Mable Slabs Production and Handicraft**

In producing marble slabs, it uses marble rods from the mining of TMC or marble rods imported from other countries. It passes on to the process to achieve standard size or the sizes according to the customer's requirements.

- **Quarrying of TMC**

The initial stage of the production process; TMC cut marble from marble quarries as received concession certificate granted to produce marble bars and supplies marble bars from overseas as a raw material for processing marble slabs for further sale, according to the company's data. The TMC's marble production capacity equals to approximately 12,000 cubic meters per year, TMC, therefore, has been recognized as the Thailand's biggest source of Marble blocks as seen in the quarrying process presented in the following diagram.

Diagram: The marble quarrying

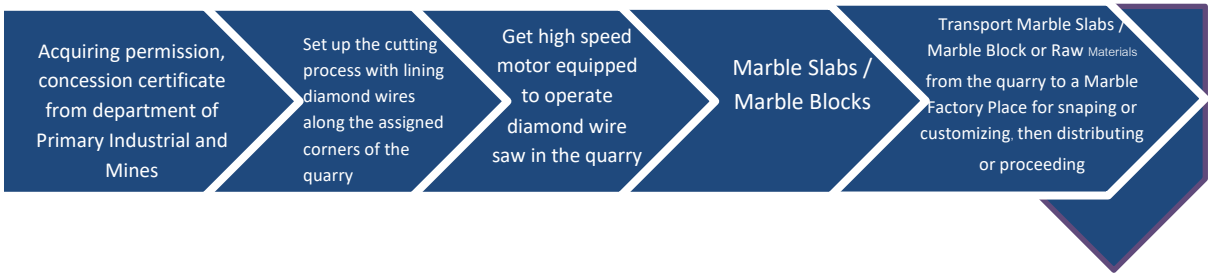
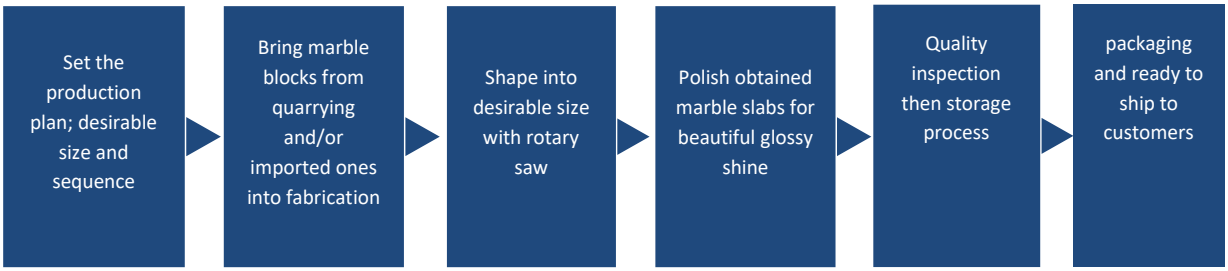


Photo of TMC quarrying operation and organization chart. The concession certificate no. 32499/15852 (Kao Ngob)



- **Trading Products**
  Trading products are produced by the Company , e.g. calcium hydroxide, calcium oxide, calcium carbonate, and dolomite ,the Company somehow orders from other oversea lime manufacturers or domestic producer nearby in case of its insufficient products for delivery.

- **By-Products from Lime Production and Others**

In addition to the high-grade calcium, limestones supply to kiln feed stone of Golden Lime Public Company Limited; by-products are excess from various production processes such as from the limestone sorting process or excess from the crushing process. These excess by-products will be sold by TMC, a subsidiary to different stone mills or customers according to the type or grade required by the customers.

- **Machinery and Equipment**

Core process activities

The operation department including production planning, process engineers, and maintenance department work together for yearly maintenance plan to ensure operation continuity and cooperate with critical suppliers for below activities.

o Critical equipment inventory. All 9 kilns that share the same type of spare parts are readily stocked with spare parts imported. Some spare parts available in the country are purchased via domestic distributors.

- Planned shutdowns. Shut down for maintenance routinely occurs during low season only with production split to other kilns available to meet sales demand with well-prepared staff, process, equipment, and contractors to execute during the kiln shutdown.
- Prompt shutdowns in case of irregularities to do quick maintenance, change belts, equipment, or damaged, broken parts to improve and rectify the process using spare parts in the stock or immediately buy from trusted distributors.
- General maintenance by their distributors or contractors such as air compressors (Blowers), motors, and vehicles are serviced by external proficient contractors. The purchasing department and engineering staff also consider screening and selecting proficient contractors to be registered as regular suppliers.

The purchase department executes procuring appropriate machinery and equipment according to purchase requests. A special maintenance project that needs controls or extra management will be supervised by engineers from GLE, as well as contractors selected by GLE or trusted contractors.

GLE additional service

GLE distributes machinery and equipment and offers engineering and design services including commissioning both within the country and abroad according to the sales contract.

The GLE 2nd kiln machine and equipment distribution and commissioning contract in Indonesia was delayed from Covid pandemic then restarted and made 90% progress remaining wiring and radio signal system to be completed in early 2024. Commissioning by GLE will be completed by 2024.

GLE also carries out installation projects and machinery and equipment distribution for other projects for SUTHA and TMC including SUTHA's and TMC's customers and delivers in line with the agreed plans and timelines.

1.2) Inbound Logistic

The Company owns a fleet of trucks for inbound logistics. A management process is available to control transportation in compliance with the law and so as not to affect the environment and the communities.

The Company also considers EV Truck for short logistics by collecting and comparing investment-related information including EV Truck/Car charging layout to be proposed to the executive committee meeting to consider and make decisions for safe investment.

Next phase, EV trucks for regular product delivery is to be considered in driving a low-carbon society towards the goal of reducing greenhouse gas emissions in Scope 1 of the organization, including reducing the amount of greenhouse gases from business activities.

1.3) Raw Material Storage Management

The Company manages the main raw materials of fuel and limestone using stockpiles as a reserve for continuous production without disruptions to its production process or business or other raw materials to produce other products Limestone inventory is kept for approximately 1.5 - 3 months to meet the demand.

Fuel is bought in bulk shipments and stored for 1 months in a contained area. The storage is maintained in a way to not impact the environment.

Taking a physical count of stock and inventory to verify a match to the accounting records by the accounting department and independent external auditors added with measuring device for limestone stock, fuel, or piled stocks supported with reports from external auditors can trace and verify the inventory of the Company.

1.4) Waste Reduction

The Company manages waste reduction during lime processing leaving limestone waste smaller than 12.5 mm. which will be sorted out and brought back to the manufacturing process. Lime stone waste smaller than 12.5 mm but larger than 5 mm so called the undersized limestone that are clean and free of contaminated sand which hence can still be applicable in the kiln process will be sorted out to sell to power plants and chemical industry to grind limestone for further use or sell to construction sector as Ready-mix is common materials used to manufacture cement.

Partial limestone waste smaller than 0.5 mm (Fill sand) will be given to help communities for landfilling to repair deteriorated roads due to flooding for community problem solutions or for community benefits and public purposes, such as filling roads to factories, temples, schools, or public places of the communities.

Managing manufacturing waste in the form of particles follows environmental rules and regulations in minimizing and reusing as landfill. Non-hazardous scraps will be used beneficially and sold to those in need.

TMC can manage its warehouse and storage of raw materials effectively to reduce loss as TMC has stored in a large open wide area with the strong and stable structures with effective management providing TMC insignificant loss in raw material from storage.

1.5) Working Capital and Financial Management

SUTHA focuses on creating stable and sustainable growth in the long run while strictly upholding corporate governance principles and maintaining holistic financial management within the Company Group to prevent risks concerning financial liquidity and volatility in terms of interest and currency exchange rates. The Company, therefore, developed an investment plan to expand its business in the most careful manner by considering various capital sources and determining a capital structure that is capable of maintaining major financial ratios at an appropriate level and considering the benefits gained from the long-term investment including creating the business opportunity in order to create sustainability for business and the objective of financial policies as follow:

1. To determine a capital structure that can maintain major financial ratios at an appropriate level compared to those in the same industry or on a comparable basis on the terms of the funding sources.
2. To manage the risks for creating appropriate business opportunity by acquiring loans from various financial institutions who offer the best conditions, lower interests or fee, provide flexible credit and financial support services and can be adjusted appropriately according to the capital utilization in order to create the business opportunity and increase smooth financial management in time
3. To manage and control the working capital utilization both short-term and long-term appropriately and timely.
4. To monitor the change of factors related to the financial support for the working capital or investment to maintain the business continuity including a stable business expansion in the future.

The Significant Policy

- **Controlled financial ratio indicators.**
  - Debt to Equity Ratio shall not exceed 2 times
  - Net Debt to Equity Ratio shall not exceed 1.75 times
  - Debt Service Coverage Ratio shall not be less than 1.2 times
  - Leverage ratio shall not exceed 3 times

- **Annual Budgetary and Investment plan**
  The Company and its subsidiaries shall provide the Annual Budgetary and Investment plan to monitor the subsidiary level's liquidity and the Company's overview in the future. Additionally, there shall be a review to see if there are any significant changes in situations to ensure timely and appropriate financial monitoring and control.

- **Financial Support and Guarantees**
  The Company does not have a policy for the financial support or guarantees for the persons, executives or any company who are not a subsidiary.

- **Capital Management and Implementation for Debt Default**
  In managing the allocated capital or loans acquired from the financial institutions to use for the investment projects shall be controlled and monitored. Withdrawal of such capital or loan must meet the purpose, conditions and agreements agreed by both parties, including debt monitoring to ensure that the debt repayment is on time. In case there are unpredictable situations or the likelihood of the unable to transfer the cash into the debt repayment account in time, the Company shall immediately inform the financial institutions in advance or negotiate to defer the debt repayment period or switch to use other loan facilities to repay the debt in time and appropriately in order to reduce the chance of debt default or for appropriate financial liquidity management.

From the management of the storage of raw materials and fuel, there is a need to manage the working capital of the Company to be sufficient for the raw materials that are reserved. The Company has managed the risk from managing working capital by choosing to use low-cost capital or have financial costs with low-interest rates by managing fixed and floating interest rate risks appropriately and regularly monitoring interest rate trends.

Regarding very high interest rates and increasing fuel price in Y2023, less liquidity of working capital is also resulted from the acquisitions of Saraburi quicklime Co., Ltd and Thai Marble corporation Co., Ltd.

According to the resolution of the Extraordinary General Meeting of Shareholders No. 1/2023 on January 6, 2023,the Company managed liquidity risk by selling non-core assets and as proposed by the Board for EGM to resolve on the increase of the company's registered capital from the 300 million baht to 375 million baht by allocating the capital increase shares via RO to all existing shareholders of the Company in total of 62,393,057 ordinary shares at 4 baht per share, total 249.57 million baht. Additional costs from fees and other related expenses were recorded as capital expenditures totaling 2.48 million baht, the net capital increase allocated hence totaled 247.09 million baht. The Company reported the utilization of the capital increase proceed to the SET as per SET requirements.

The proceed from the capital increase is partly utilized as working capital to lessen high financing cost by means of early repayment to ease the financing burden from high-interest rate.

As in marble production, raw material cost is incurred in the TMC owned quarrying marble with 2 main advantages; raw material condition less deteriorates than other goods and marble prices are mainly referring to the market trend the management of working capital in aspect of raw material is consequently found at low level of risk in term of deterioration. The TMC raw material management are principally sufficiency and appropriate.

The Company has managed the working capital risk by opting low cost working capital or low interest rate financing cost for efficiency in competition appropriately and sustainably.

2 Industrial Management (Production Process)

The Company is the largest manufacturer of calcium oxide and hydrated lime in Thailand and a major calcium carbonate producer. The Company also has a subsidiary that the lime manufacturing in Saraburi and a subsidiary that engages in engineering and trade in lime kiln equipment and machinery. Currently, the Company and its subsidiary (Saraburi Quicklime Co., Ltd.) has 4 main factories in Saraburi Province and Lopburi Province. The head office is located in Nonthaburi Province.

Production and capacity

There are 3 Production Plants as follows;	
Branch 2: Chongsarika, Pattananikom, Lopburi (CS plant) Lime Production Plant (6 kilns: K1-K6) Lime Capacity: 328,500 tons/annum ML Capacity: 91,000 tons/annum HL Capacity: 157,000 tons/annum CaCO3 Capacity: 26,000 tons/annum	
Branch 3: Huai Pa Wai, Prabuddhabaht, Saraburi (HW plant) Lime Production Plant (1 Kiln: K7) +(1 Kiln: K8 in future) Lime Capacity: 55,000 tons/annum	
Branch 4: Pukrang, Prabuddhabaht, Saraburi (PB plant) Lime Production Plant (2 Kilns: K9-K10) Produce Quicklime and new product Dolime Lime Capacity: 110,000 tons/annum ML Capacity: 92,000 tons/annum	
Note: Referring to the kiln capacity data 1 year as 365 days and kiln capacity at 150 TPD or 150 tons / day / Kiln (excluding lost hours or hours of Kiln shutdown maintenance)	

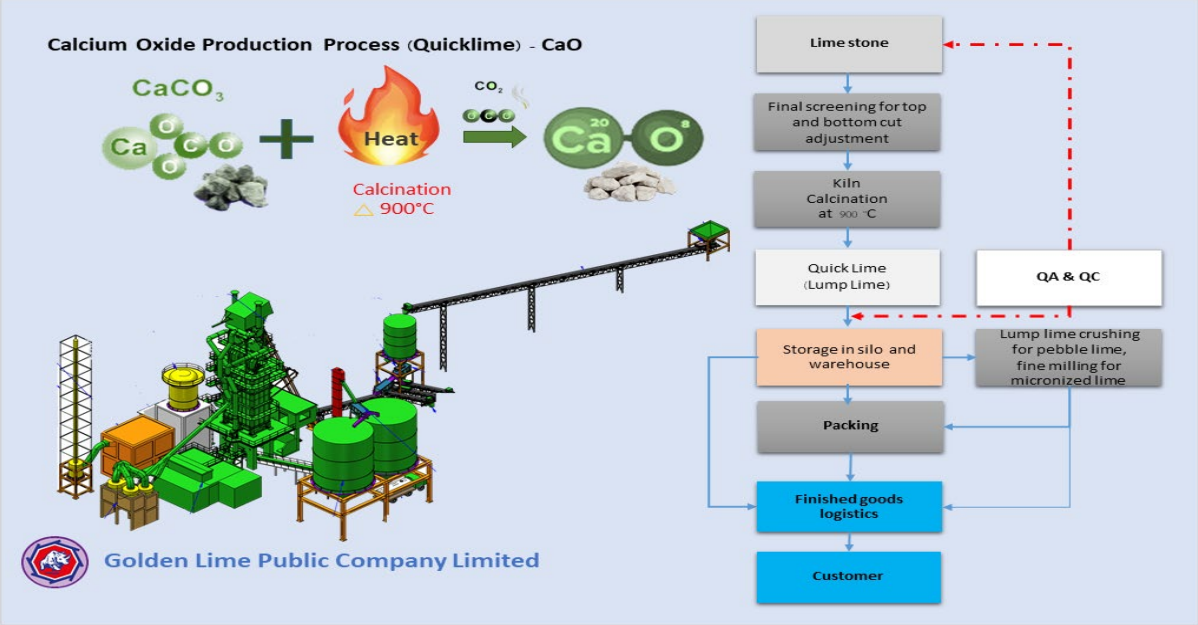
The Company, along with its subsidiary, operates three production facilities: the Chong Sarika factory, the Huai Pa Wai factory, and the Prabuddhabaht factory. Each facility is equipped with essential machinery, including lime kilns and various production equipment. In 2022, the total number of kilns utilized for production are nine, with an annual production capacity of 492,500 tons. Additionally, the Dolime Briquetting machine has a capacity of 52,000 tons per year, while the calcium hydroxide production machine can produce over 157,000 tons of hydrated mortar annually.

The primary production process involves the operation of lime kilns, which function continuously, 24 hours a day. These kilns operate as closed systems that require sustained heat to achieve the necessary burning temperature. Consequently, any prolonged disruptions to the kilns necessitate a significant amount of time to reignite and heat them to approximately 900 degrees Celsius. The Company has scheduled regular maintenance and repair intervals for the kilns; however, the production process remains uninterrupted outside of these planned maintenance activities. Major refractory maintenance is typically conducted every five years, contingent upon the condition of the brick walls, as well as the types and properties of the raw materials and fuels used.***ถึงแค่ตรงนี้

The company's production capacity

	Production capacity	Total utilization (Percent)
-Lime Capacity (Quick lime&Dolime): Tons	493,500	61%
-Mill Lime (ML)	183,000	59%
-Hydrated Lime (HL)	157,000	34%
-Calcium Carbonate (CaCo3)	26,000	13%

- **Manufacturing and production process**
  Calcium Oxide Production Process



1. Limestone stored in the stone hopper will be transported into the sizing machine to get the desired stone size. Water is also sprayed to clean the stone for removing soil. Limestone in the production process will go through a quality inspection by the QA & QC Department to select quality limestone for production.
2. Limestone will be conveyed through the belt and put in the bucket by automatic limestone handling system to convey limestone to the kiln.
3. The limestone is then burned by heating at a temperature of around 900 degrees Celsius in a closed kiln. The burning process is controlled by software and takes approximately 18 hours.

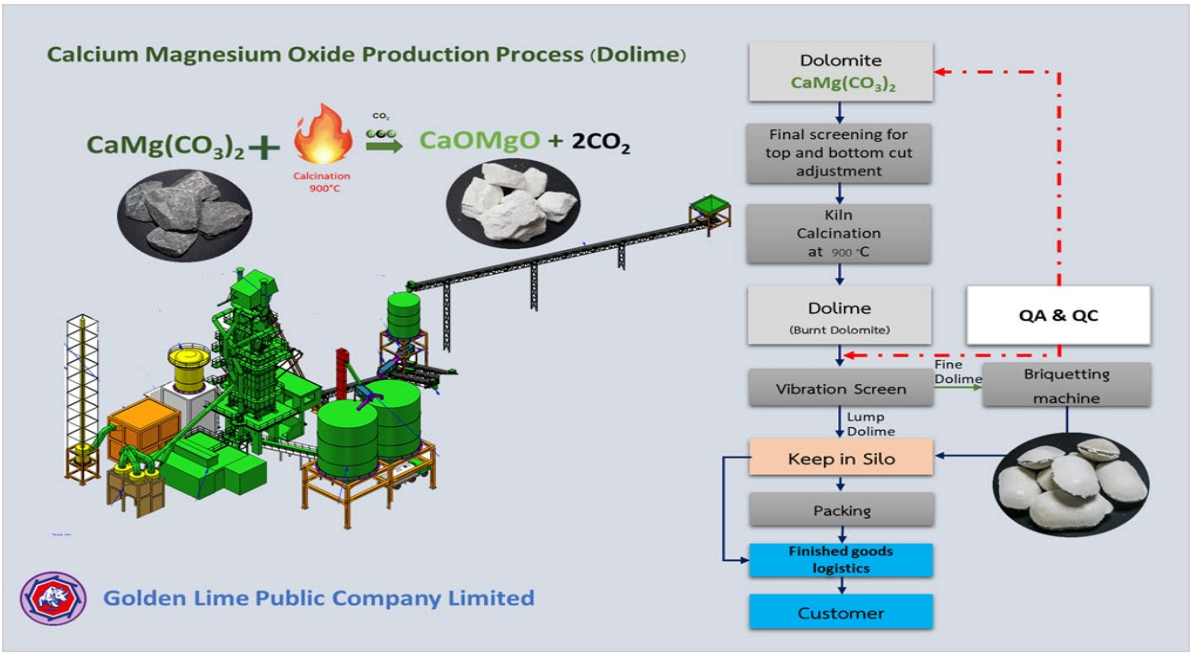
4. Upon completion of the limestone burning process, the next step is air blowing to reduce the temperature of quick lime. Then, lime with physical properties not meeting the requirements will be sorted out. Solubility in water is initially checked. Samples of calcium oxide from the conveyor belt are collected and given to the QA & QC Department. The QA & QC Department has a process of quality inspection and sampling from the production process for analysis and verification, including inspection before storing the products in silos or warehouses.

5. Calcium oxide is conveyed for storage in silos and/or warehouses.

6. In a customer demands pebble lime, lime will be reduced in size by the machine to produce pebble lime. Or if the lime powder is required, lime will be sent to the mill for grinding to get the desired size.

7. The calcium oxide/flake lime/lime powder packaged in bags as required by customers or put in truck /bulk vehicles for delivery. In addition, the Certificate of Analysis (COA) will be issued (if requested by the customer).

Calcium Magnesium Oxide Production Process (Dolime)



1. Limestone stored in the stone hopper will be transported into the sizing machine to get the desired stone size. Water is also sprayed to clean the stone for removing soil. Limestone in the production process will go through a quality inspection by the QA & QC Department to select quality limestone for production.

2. Limestone will be conveyed through the belt and put in the bucket by automatic limestone handling system to convey limestone to the kiln.

3. The limestone is then burned by heating at a temperature of around 900 degrees Celsius in a closed kiln. The burning process is controlled by software and takes approximately 18 hours.

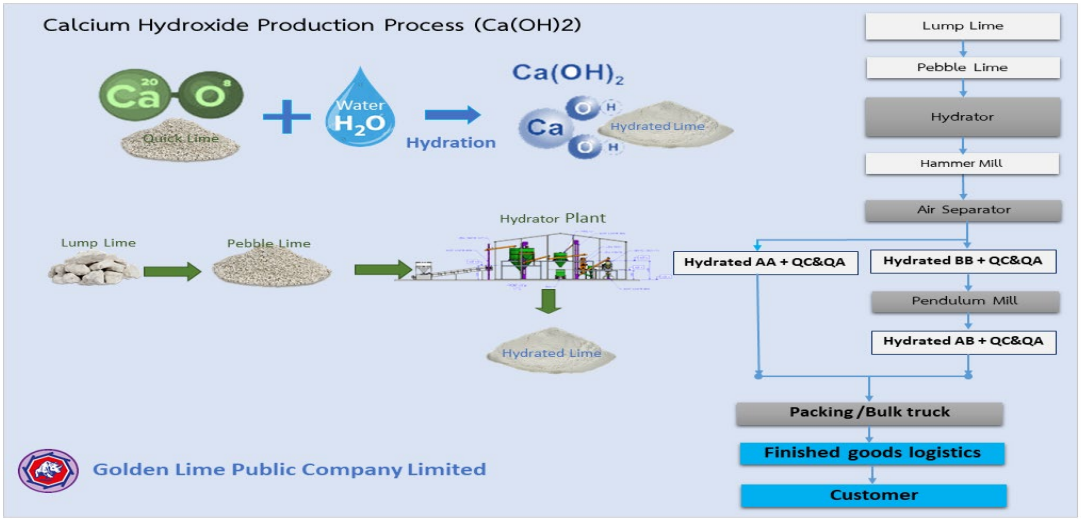
4. Dolime that has been burned then conveyed through a sizing sieve. The lumpy product is transported to the silo for storage but powdery ones or small in size are processed by a briquetting machine.

5. Upon completion of the limestone burning process, the next step is air blowing to reduce the temperature of quick lime. Then, lime with physical properties not meeting the requirements will be sorted out. Solubility in water is initially checked. Samples of calcium oxide from the conveyor belt are collected and given to the QA & QC Department. The QA & QC Department has a process of quality inspection and sampling from the production process for analysis and verification, including inspection before storing the products in silos or warehouses

6. Dolime is conveyed to silos storage.

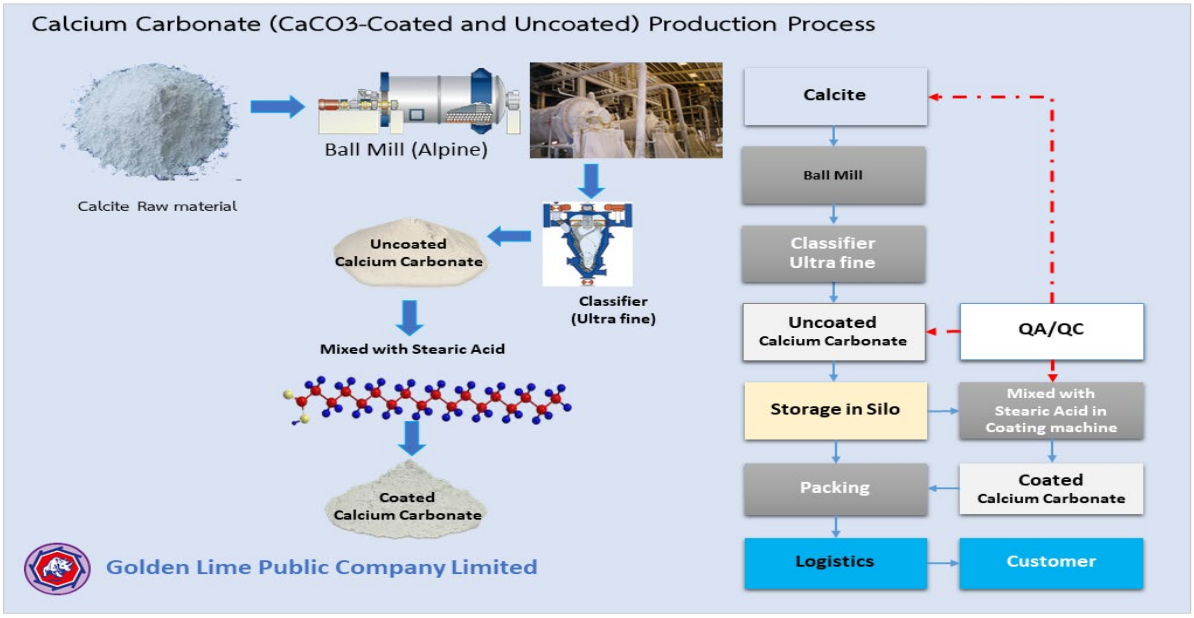
7. The calcium oxide/flake lime/lime powder packaged in bags as required by customers or put in truck /bulk vehicles for delivery. In addition, the Certificate of Analysis (COA) will be issued (if requested by the customer).

Calcium hydroxide production process (Ca (OH)2)



1. Crushing calcium oxide from calcium oxide production.
2. Bring Crushing calcium oxide to react with water in Hydrator.
3. Go through the machine to beat the product finely to get the required size. Samples of the product are randomly collected and sent to the Quality Control Department for quality inspection.
4. Package according to the customer need or store in silos for loading onto trucks /bulk vehicles for delivery to customers. The Certificate of Analysis (COA) will be issued (if required by customer).

Calcium carbonate production process (CaCO3)



1. Check the quality of calcite in physical terms.
2. Grind calcite finely by Ball Mill to get the desired size.
3. Random sampling for sending to the Quality Control Department (QC).
4. Uncoated Calcium Carbonate will be packaged as required and delivered to customers.
5. For Coated Calcium Carbonate, ground calcium will be coated with fatty acids through the mixer. Then packaged as required by the customer.

The manufacturing process management of Thai Marble Company Limited, a subsidiary, is as follows:

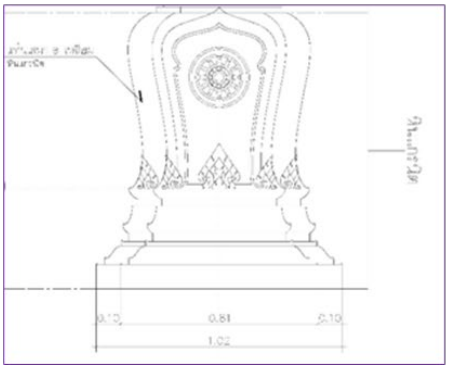
TMC's marble slab manufacturing process can be divided into five main steps: planning, sawing, polishing, quality inspection and warehouse storage. TMC's domestic marble main distribution channels come from sales offices in Bangkok and Saraburi, as well as selling marble slabs to projects and contractors.

TMC is also able to create other marble products that are not just prefabricated marble slabs, such as marble handicraft products. The marble products are carved by both artisans and from Water jet flow /PLC forming machine /5D Automation Machine. These marble blocks and slabs are value added by handicraft from TMC marble blocks to enhance the handicrafts to be architectural works Beautifully by Thai craftsmanship which is considerably equivalent to architecture in Europe or abroad. Past Marble handicraft products are all eminent such as public religious places, education institutions, residence and government agencies offices. Furthermore, TMC also supports government policy to produce so-called OTOP products from Saraburi to promote traditional occupations and hence generate income to the local community, such as dining table sets and reception sets, altar tables, vases, clocks, and name tags for placing on the table, carving work, etc. The main distribution channels for marble handicrafts are through various construction projects and the construction contractors. By this, TMC is to procure and provide marble as raw materials to local crafters to lathe and carve for sake of their traditional occupation and community income.

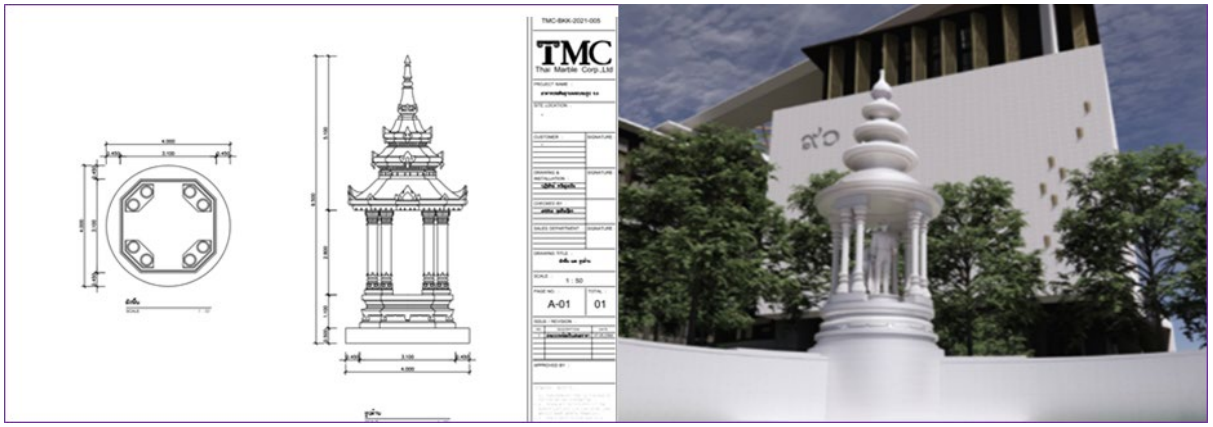
1. •Set the production plan ; desirable size and sequence
2. •Bring marble blocks from quarrying and/or imported ones into fabrication process
3. •Shape into desirable size with rorary saw
4. •Polish obtained marble slabs for beautiful glossy shine
5. •Quality inspection then storage process
6. •packaging and ready to ship to customers

Marble blocks and cutting process


Polishing process and obtained marble slobs



Handicraft process by CNC machine and sample outcome



Handicraft process by CNC machine and sample outcome

Calcium Carbonate Powder Production Process produced by Thai Marble Corporation Limited

Process		Calcium Carbonate Powder
1	Production Planning	    
2	Taking stones from the mine into the process	
3	Breaking down the stone size	
4	Grounding with stone grinding machine	
5	Sizing Classifier	
6	Calcium Carbonate Powder Product	
7	Quality testing	
8	Storing in the Silo	
9	Packing / Bulk	
10	Customer	

3 Quality control and assurance process (Q.C & QA)

The Company has a check process to control the quality of goods up until finished products. Management manage to meet ISO9001 international standard system for checking raw materials before use by a team dispatched to explore the mines, a process of quality inspection during production, a post-production quality check process and a finished product management process, including checking the quality of products purchased from external manufacturers. The objective is to control all processes for quality assurance of products before delivery to customers.

- Marble products and calcium carbonate powder.

TMC conducts Inspection process to control product quality starting from raw material to finished products to ensure requirements and standards meet. For marble slabs, their quality in accordance with size, thickness and gloss are taken into consideration.

Marble product quality is recognized basically on its colors and vein patterns. It is therefore also important to handle with these artistic compatibilities. TMC with long experience and in-depth expertise can reflect their performance through handling customer requirements mainly focusing on artistic and decorative compatibility according to requirements and objectives of customers.

TMC has built trust and confidence for their Calcium carbonate products and quality by certification of GMP Codex Alimentarius TAS 9023-2007 from SGS.


THAI MARBLE CORPORATION LTD.
TAS 9023-2007
GMP Codex Alimentarius

4 Storage and packing

- **Lime products and coated and uncoated calcium carbonate**

The Company has a storage and packing process, which is wholly implemented in compliance to ISO9001 international standard starting from receiving raw materials, packaging inspection, rejection request in case of not meeting packaging standard , random inspection of packaging in stock.

- Marble product and Calcium Carbonate Powder

We set the control system for storage surely in appropriate warehouse classified by natural born colors and veins for further matching conveniently.

For calcium carbonate power, suitable packaging such as 1,000 kgs, 25 kgs big bags are provided as convenient storage for logistics and use. In addition, we also provide storage in a bulk carrier (truck) that will be most convenient to transfer to large tank of customers. Every packing and shipment, our product quality shall be inspected by the company quality control process including traceability and quality issue problem shooting and handling customers complaints and claims to ensure customers' most satisfaction in delivering finished goods systematically and efficiently.

5 Outbound Logistics

Compliance with ISO 9001 international standard and safety standard, we manage outbound logistics using both our own internal fleet and external logistics partners.Our current fleet consists of ten-wheeler, single bulk truck, bulk trailer, dump ten-wheeler, dump-trailer, pick-up trailer, and trailer than we can conveniently and professionally opt to use suitably with the type of freight, packing, including differed destination areas and weighing is controlled according to industry standards.

Apart from on time delivery commitment, our logistics team also follows road safety regulations for safety of drivers and all stakeholders.

- Marble product and Calcium Carbonate Powder

TMC manages the delivery of goods to customers according to the company practice starting from receiving sales orders then arranging transportation in which the Company uses both Company own vehicles and transportation service from partners for both prefabricated marble products and handicrafts which need proper wrap as protection to prevent damage during transportation. Likewise, our professional care is taken to calcium carbonate product transportation as also requires special attention to prevent contamination in compliance with GMP standard and safety standard by grouping vehicles as four-wheeled vehicles, six-wheeled vehicles, ten-wheeled vehicles, single-bottom trucks, tow-trucks, dump trucks, ten-wheel dump trucks to suit the product type, packing, including receiving area of each customer to provide appropriate delivery service to customers with the standardized weighing scale and practice. Delivering goods on time and effectively managing freight costs for each customer are our core goal for this process.

6 Sales and marketing services

Golden Lime Public Company Limited

In addition to compliance with ISO 9001, the Company sales and marketing department includes a logistics team ensure professional delivery of both products and service in the below process.

- Product price offer, Shipping cost offer, Delivery of samples
- New Customers' verification
- Collecting and validating customer orders, confirming with current inventory, logistics arrangement
- Delivery follows up.
- Meeting with customers to discuss improving or developing products for customer's application.
- Sales planning to foresee sales and logistics.
- Controlloing credit notes in the case of mismatched quantity and / or other cases
- Participation in vendors engagement activities
- Join quality assessment conducted by customers either ESG or other aspects.
- Invite customers to onsite visit or inspection according to quality audit program.
- Provide a team of application engineers to work with new products, collaborating with clients, creating state-of-the-art developments, and facilitating customers for their best benefits.
- Involve engineering panel to improve and develop for customers cost saving process
- Conduct a customer satisfaction survey to obtain their expectations, insights, and potential needs to improve both products and services.

Thai Marble Co., Ld.

Following sales and marketing management policies help our staff can provide products and service to meet customers' requirements. TMC comprehensive sales and services strategy are from thoroughly understanding customers' requirements in aspect of designers and architectures, contractors, project owners, wholesalers, trade partners and retail customers until after-sales service with a team of technicians and restore after using marble product for a long time in systematic management and proper budget.

Unlikely to marble products, Calcium carbonate as categorized in industrial products is managed by specific operation for responding industry need and customers' requirements.

We assure that our extensive sales and services management for both different products are able to meet the needs of customers in a complete and professional manner.

Golden Lime Engineering

The Company has created its own engineering and trading business called Golden Lime Engineering (GLE), a fully owned subsidiary., GLE provides machinery and electrical engineering solutions internally as well as to external customers in South East Asia. The Company started to market its 150tpd Easy Operation Double shaft (EOD) PFR type of kilns in 2014. The advantages of an EOD kiln are:

- Lowest operational cost due to minimize fuel consumption and high level of automation

- High-value preservation over20 years
- Minimal environmental impact, compliance with present and any future regulations
- High-quality lime and dolime, low residual carbonates, high reactivity

7 **Customer use (Product End-use)**

Overall, lime is a highly versatile product that is broadly used in many different industries and for many different applications. Steel manufacturing, chemical industry, sugar industry, pulp and paper manufacturing, fuel gas desulfurization, water and wastewater treatment, environmental treatments, construction, agriculture, glass making, energy exploration, and recreational applications comprise the key markets that the Company supplies and serves.

Many industrial uses of lime and limestone greatly benefit the environment. From clean air and water to soil remediation, lime and limestone affect the world in which we live in a positive way.

- AIR-the treatment and removal of harmful flue gas emissions from boilers, steam generators, process furnaces, and incinerators.
- WATER-the purification of liquid runoffs and discharges from many industrial manufacturing processes.
- SOIL-treating soils that have been contaminated by industrial generated by intensive agricultural production.

Lime is used to remove impurities from the ores of non-ferrous metals such as gold, copper, and aluminum. In agriculture and in the Agrofood industry, calcium carbonate and lime product are widely used as a soil stabilizer and as an additive in animal feed and human food. Lime also eliminates the mineral and organic impurities in the production of sugar. In addition to such benefits, in commercial, lime and calcium carbonate are also products that are supported by the main objects of industrial products in a variety of industries, which are considered economic support and development and continuous growth in many businesses, services, and communities.

TMC, our marble sector, makes use of natural resources in a most effective and beneficial way as equivalent to marble from Italy in terms of marble quality itself, production process and applications. What differs from Italy marble are just types/colors and naturalness of marble. Another factor that differs is the holding the concession certificate as it means stability of continuous manufacturing capability and the Company is holding more than one concession certificates as follows;

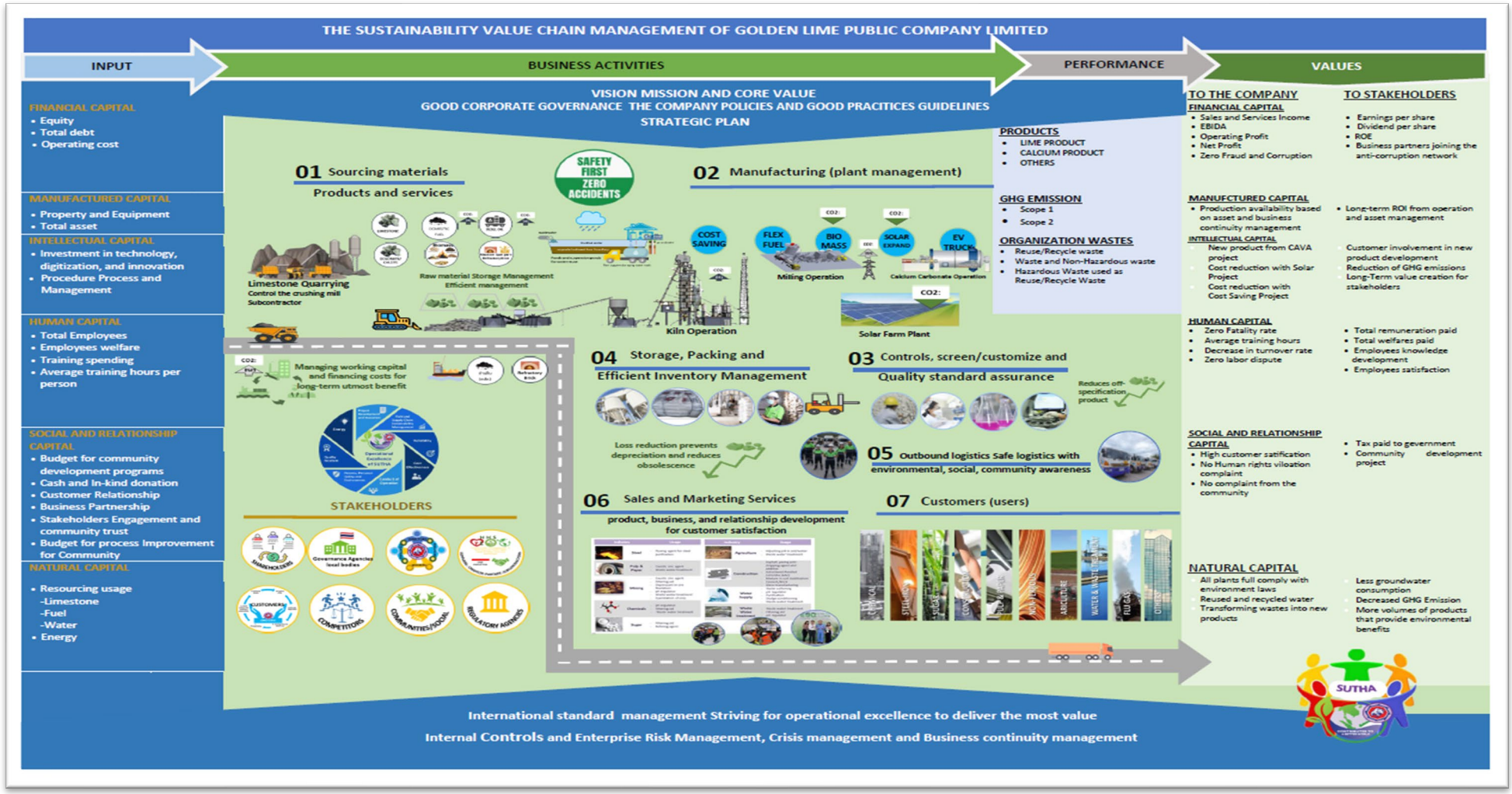
1. **Concession Certificate No. 32499/15852 (Khao Ngob)** permitted to mine marbles located in Na Phra Lan Subdistrict, Chaloem Phrakiat District, Saraburi province, an area of 148-0-54 Rai, with a concession certificate aged 17 years from 21 April 2019 to 20 April 2034, to produce white-gray marble – red stripes marbles, with a mining lease hazing marble yield rate per falling stone panel ("Yield")[1/] at approximately 10.00 – 15.00%. the yield of marble bars that do not have sufficient properties to be processed into finished marble slabs will be used to produce calcium carbonate powder.

Figures: Concession Certificate No. 32499/15852 (Khao Ngob)

2. **Concession Certificate No. 32517/16065 (Khao Kao)** permitted to mine limestone industry and marble quarries Located in Na Phra Lan Subdistrict Chaloem Phrakiat District Remember, Saraburi, area of 227-1-80 Rai. The concession certificate is valid **for 10 years from 29 October 2013 to 28 October 2023. The concession certificate renewal is succeeded in October 2022 gaining another 20 years valid until October 29th 2043** for Khao Khao quarry to produce black marble and limestone for the lime industry. The concession certificate has the production rate of marble blocks per total rock fall[1/] of approximately 25.00 - 30.00%.

Figure: Concession Certificate No. 32517/16065 (Khao Kao)

Managing Impacts of Stakeholders in the Business Value Chain



Value Chain of SUTHA

SUTHA emphasizes supply chain management to deliver maximum value and benefits as a partner who always offers products and services that bring the best benefits to SUTHA's customers. To achieve such goals, SUTHA implements the following primary and support activities in the 7 core process as per the supply chain management.

01 | **Sourcing materials:** Procurement and management of raw materials, either limestones, minerals or fuel, to create finished products, including inbound / intra-transportation

Process/Activity		Issue	Corporate	Stakeholders
01.1	Quarry management and stone mills	- legal compliance - stable raw material management - Occupational health and safety - Human rights - Proper quality and quantity of raw materials and fuel - Biodiversity and Environment: Conservation - Qualified and reliable fuel suppliers - Impacts from the process -Supply chain management - Rising cost of fuel and financing -Working capital management - Pollution and environmental management - Responsibility to customers and Stakeholders - Asset Integrity and crisis management	Executives/employees Agency - Manage mines and operations - Procurement - Quality control - Logistics - Produce and support production - Financial accounts -HR and Administrative - Civil Defense Officer - Thai Marble Corp., Ltd.,subsidiary company - Sales and Marketing	-Government agencies and related regulatory units - Contractors - Suppliers - Stone mills - Survey - Consultant - Community - Traders -Loan provider -Insurance Company -Shareholders
01.2	Domestic Sourcing and International Sourcing			
01.3	Inbound Logistics			
01.4	Receiving Process, quality control, inventory management of raw material			
01.5	Working capital and loan management			

Implementation and foundation for developments

Activities	Economic	Environment	Society
Legal permission for business continuity	✓		✓
Safe operation / operational risk management			✓
Supply chain management: Sustainable supply chain management policy / Assessment of Supplier code of conduct / Supplier selection / Supplier code of conduct / Anti-corruption policy /Supplier segmentation/Supplier evaluation/ conflicts of interest	✓		
Supply security	✓		
Human Rights implementation/ community engagement			✓
Biodiversity implementation		✓	
Corporate Governance, Internal Controls, Risk Management, crisis management, Asset Integrity	✓		
Cost Controls for opportunities in competition /internal cost saving program	✓		✓

Practices for Short-term, Medium-term, and Long-term Goals

Contractor Agreement Review / Supplier tiering / risk assessment of suppliers and contractors / identification of Supplier for Site Visit and ESG site visit/ Suppliers' evaluation/ Partners development/Specification and characteristics of raw material/Delivery requirements/Prevention of depreciation and obsolete inventory /Sustainability Policy review / Risk and crisis management.

02 | 03 | 04		**Operation:** Manufacturing (plant management), Quality Control and Assurance, Storage packing and Inventory Management			
Process/Activity		Issue	Corporate	Stakeholders	Implementation and foundation for developments
02	Operation: Manufacturing (plant management),	- Legal Compliance - Occupational health and safety - Human rights - Resource Optimization - Sufficient capacity - qualified products - Pollution and environmental management - Responsibility to customers and Stakeholders - Asset Integrity and crisis management - LTI - Cost saving -CO2 reduction -Resources and energy optimization - Investment for business continuity	Executives/employees - Operations; - Quarrying - production - Procurement - maintenance - Quality control and assurance - inventory - Finance / accounts - Admin - Safety Officer - Public relations - TMC - Sales and Marketing	Government agencies and related regulatory units - Contractors - suppliers - Stone mills - Survey - Consultant - Community - traders - Loan providers -Insurance -shareholders	
03	Quality Control and Assurance,				
04	Storage packing and Inventory Management				

Activities (details in next pages)	Economic	Environment	Society
Legal Compliance	ü		
Operational Excellence	ü		
ISO 9001	ü		
ISO 14001	ü	ü	
ISO 45001	ü		ü
Green Industry (level 3 certified)	ü	ü	
Human rights implementation, equitable treatment, development program	ü		ü
Community survey for community support and engagement	ü		ü
Complaint management	ü		ü
Biodiversity management		ü	
Innovation (EOD), New product development, bag house filter	ü	ü	ü
Flex fuels	ü	ü	
Biofuel investment	ü	ü	ü

Practices for Short-term, Medium-term, and Long-term Goals

- Process improvement for stable product quality
- Product responsibility for customer satisfaction
- Crisis management for business continuity

05 | 06 | 07		Operation: Factory management, production processes, storage, packing, inventory management, quality control and assurance.			
Process/Activity		Issue	Corporate	Stakeholders	Implementation and foundation for developments
05	Product delivery / transportation	- legal compliance - Occupational health and safety - Human rights - Product quality compliance - Standard Compliance - Inventory management /depreciation - responsibility to customers and stakeholders -customer satisfaction - responsible communication -Competition -Complaint management -Employee development -Lack of labor -Employee and stakeholder engagement -sustainability report	Executives/employees - Operations; - Quarrying - production - Procurement - maintenance - Quality control and assurance - inventory - Finance/accounts - Admin - Safety Officer - Public relations - TMC - Sales and Marketing	- Government agencies and related regulatory units - Contractors - suppliers - Stone mills - Survey / Inspector - Consultant - Community - traders - Loan providers -Insurance -shareholders	
06	Product responsibility and Product satisfaction				
07	Product Application				

Activities (details in 01 – 04)	Economic	Environment	Society
- Scrap Management	✓	✓	
-Waste Compliance Management and Zero Waste to Landfill		✓	
- Hazardous waste management		✓	
-Resource optimization	✓	✓	
-Water management for less use of ground water		✓	✓
-Production capacity to supply all industries demand			
-Product responsibility for customer satisfaction	✓		✓
-Product safe delivery (GPS tracking)	✓		✓
-Product storage for long term saving	✓	✓	✓
-Application consultancy service for less impact	✓		
-New product / Business development	✓	✓	✓

Practices for Short-term, Medium-term, and Long-term Goals

- product development to support better quality of life and sustainable environment
- sustainability development in response to stakeholders expectations identifying sustainability performance benchmark, reporting and disclosure as per international standards.