

Information on water resources management

Golden Lime Public Company Limited recognizes the importance of water resources as a component of ecosystems and living organisms. To create awareness and understanding of the value of water towards personnel and stakeholders so they can participate in water management covering water resource conservation, optimizing water use for optimal benefit, reducing water consumption, and reusing water under the circular economy principle. The Committee, therefore, formulated a policy to lay out a framework for water resource management to secure the availability of water and water resources to suffice the production process and consumption for business operations to build confidence that the Company's operations will leave no impact on the community. It is also consistent with the laws and guidelines to proceed with water resource management under Thailand's national strategy including joining the social communities for sustainable water resource management.

Water management plan

The Company's water management plan : Yes

The 4 core strategies are listed below;

1) Governance

The water management is assigned to the Sustainability Development Committee to supervise and assign responsible persons to push forward the implementation of integrated water management by establishing a 10-year strategy to reduce water consumption and creating stability of water resources for production and consumption including managing the risk and mitigating water shortage due to the climate change.

2) Water Stewardship

All water users in the supply chain take responsibility for their influence on a shared resource and work together to manage it sustainably under the responsible planning and management of resources is required for optimizing water use in production and water reuse, finding ways to reduce water consumption, applying technology or innovation to improve water management and wastewater treatment for water reuse including managing clean water for good sanitation for all.

3) A collaboration in water management, initiatives for water management

- Networking with government agencies, private sectors, industrial sectors, and the agricultural industry can achieve water resource management or collectively contribute to the development of sustainable water sources in the conservation and development of water resources, wastewater treatment, clean water production or clean water for consumption, Natural water retention for use, etc.
- Risk assessment of the Company's operations towards the water stress for production and consumption
- Natural water retention measures that aim to safeguard and enhance water storage such as rainwater storage or increasing natural water sources, such as artesian water from underground wells that have been licensed as a sustainable water resource for business operations.
- Monitoring and surveillance for possible drought to ensure sufficient long-term water resources including providing areas to retain rainwater as water reserve to reduce the impact of a drought and groundwater scarcity
- Implementation of water management according to a circular economy with a commitment to reduce water consumption and increase the use of water circulation adding wastewater treatment for the sedimentation process with lime and reusing the slugged water.
- Implementation of preventive measures to prevent effluent wastewater with a high alkaline value released to the outside so as not to affect the social community.

4) Practices guidelines

- **Understand water resources:** studying various factors related to water resources within the organization.
- **Access to water resources:** studying the feasibility and the extent to which water resource management can be undertaken.
- **Water resources development:** analyzing data from the study. Use of technology, innovation, collaboration and participation in the operation to set up a framework for implementation and development towards sustainable water resource management.
- **Understand water resources:**

In respect of the risk assessment in the aspect of water shortage as an impact of water scarcity in general, SUTHA involves its location of the establishment and the use of water in business operations; yearly water demand for production consumption, and consumption in general which entail in the following main areas:

1. **Preparing raw materials before manufacturing** for minimum impurities such as mud or soil left on limestones before conveying to the silo and burning in the kiln, lime stones as raw materials shall be washed to remove dirt or dust and then fed onto the conveyor belt to the kiln.
2. **Reducing Air Pollution** in a Lime manufacturing by wet scrubbing processes so liquid or solid particles are removed from a gas stream by transferring them to a liquid can eliminate and reduce the amount of gas before releasing into the air.
3. **Production of hydrated lime** by mixing with water as a medium to convert quicklime to hydrated lime ($\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$)
4. **Cleaning solar panels** for the efficiency of the solar power generation system
5. **General use of water in the plants** to spray water on raw material and roads to reduce the amount of dust diffusion from storage, conveying and transportation, including watering trees as a source of terrestrial ecosystems to increase trees and forest areas. Planting one perennial plant can absorb an average of 9 – 15 kg of CO₂ per year.



• Access to water resources:

Main water resources are;

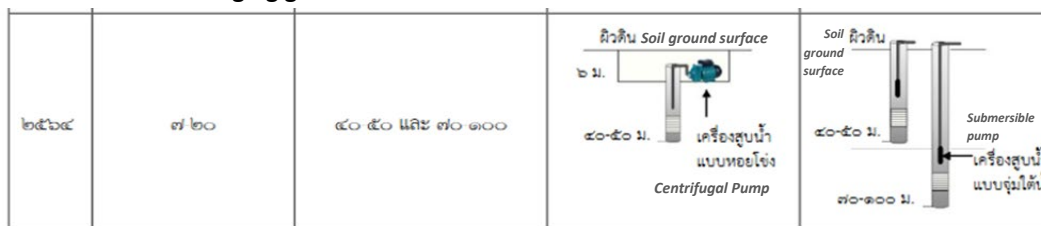
1. **Groundwater** from the artesian that has been legally permitted. Water supplied from artesian wells is used in the production process and general consumption within the establishment.



2. **Ponds for collecting rainwater and water reuse** in the plants. The used water will flow through the pipe to stabilize in the clarifier to circulate the precipitated water then back to the process again as water circulation to reduce water consumption from groundwater.



• Guidelines in managing groundwater sources are as follows:



Note: Picture show the groundwater system

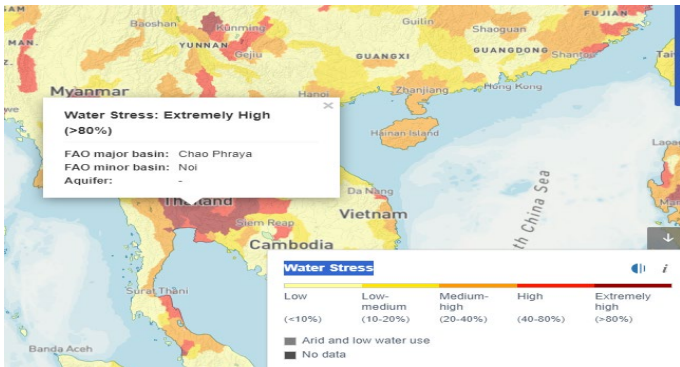
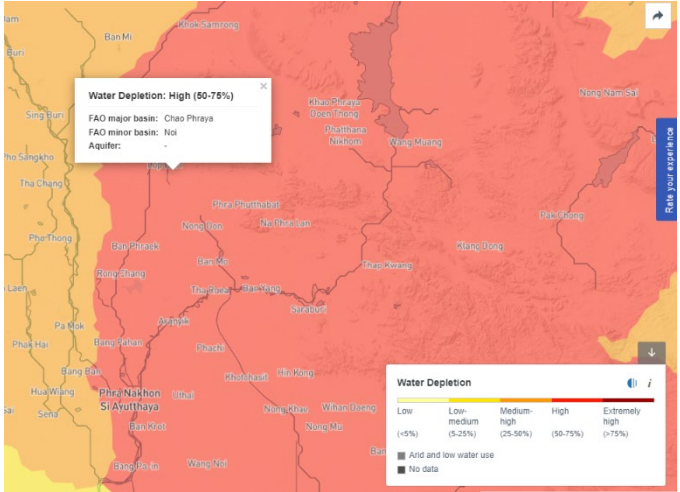
1. In case of new artesian, a legal drilling permit shall be granted in accordance with the rules for granting permission in drilling groundwater wells
2. Maintenance of the pump
3. Measures to reduce water consumption or increasing the water reuse

• Guidelines for rainwater storage, circulation ponds and sediment ponds management

1. More lines for circulating water to for waste treatment at the sedimentation clarifier.
2. Pond Dredging to remove accumulated sediment to increase pond capacity in water retention.
3. Improving the surrounding landscape

Water Resource risk assessment

SUTHA has conducted an evaluation of the risks associated with water resources in light of potential water scarcity by utilizing the Aqueduct Water Risk Atlas 4.0 tool (source: <https://www.wri.org>) created by the World Resources Institute (WRI). This tool analyses the water conditions in diverse regions globally.

Water Stress Risk (From Water Risk Atlas Tool) Freshwater stress in the area Assesed areas in Phra Phutthabat District, Saraburi Province and Phatthana Nikhom District area Lopburi Province 	Risk Level: Extremely high /* Water stress pertains to regions where freshwater resources are being utilized. The worldwide demand for freshwater is projected to rise, particularly in the agricultural sector, which represents 70% of the overall freshwater consumption. The agricultural use of water constitutes merely a segment of the total natural freshwater extraction for human economic endeavors. When assessed against the total renewable freshwater supply, this usage can reflect the degree of water stress in a given area. According to United Nations (UN) criteria, regions where freshwater withdrawal exceeds 25% are classified as water-stressed areas.
Water Depletion Risk (From Water Risk Atlas Tool) Assesed areas in Phra Phutthabat area, Saraburi Province and Phatthana Nikhom District, Lopburi Province 	Risk Level: High Assess the overall rate of water consumption in the region that has access to renewable water resources. (Water Depletion) Water Depletion Description: Baseline water depletion measures the ratio of total water consumption to available renewable water supplies. Total water consumption includes domestic, industrial, irrigation, and livestock consumptive uses. Available renewable water supplies include the impact of upstream consumptive water users and large dams on downstream water availability. Higher values indicate larger impact on the local water supply and decreased water availability for downstream users. Baseline water depletion is similar to baseline water stress; however, instead of looking at total water demand (consumptive plus nonconsumptive), baseline water depletion is calculated using consumptive withdrawal only

Local water resources assessment

The dams in Lopburi and Saraburi are Pa Sak Cholasit Dam Located at Ban Kaeng Suea Ten, Tambon Nong Bua, Lop Buri Province, Pa Sak Cholasit Dam, the longest clay cored dam in Thailand, with a length of 4,860 meters, a height at the highest point of 36.50 meters, and a storage capacity of 765 million cubic meters.



The water stress was conducted particularly where our establishments are located in Saraburi Province and Lopburi Province where groundwater is mainly consumed. By the way, water sources in other areas in the same province, are both groundwater and tap water.

According to the Provincial Waterworks Authority, Lop Buri Branch (data as of September 30, 2019), Lop Buri Province has a water production capacity of 5,456 cubic meters per hour. The amount of tap water produced is 837,446 cubic meters, the amount of water sold to users is 15,796,504 cubic meters, and the amount of water sold for public use is 15,796,504 cubic meters. and leaked 6,511,166 cubic meters, the amount of water used in the system was 438,189 cubic meters.

The number of tap water users is 82,084 users. The highest number of tap water users is Mueang Lop Buri District with 48,961 users, followed by Khok Samrong District. 10,442 users and Ban Mi District 7,465 users, respectively, as shown in Table 9 by Phatthana Nikhom District at line 8th, Chong Sarika where the main production of the Company is located, there is no tap water supply. The water from groundwater, permitted artesian wells and water from the circulation system from natural water basin are used as the main water resources for production.

ตารางที่ ๙ กำลังผลิตและการใช้น้ำประปา

อำเภอ	กำลังการผลิต (ลบ.ม. / ชม.)	น้ำที่ผลิตได้ (ลบ.ม.)	ปริมาณน้ำที่ จำหน่ายแก่ผู้ใช้	ปริมาณน้ำที่จ่าย สาธารณะและ ครัวเรือน	ปริมาณน้ำที่ใช้ใน ระบบ (ลบ.ม.)	จำนวนผู้ใช้น้ำ (ราย)
เมืองลพบุรี	๓,๗๕๐	๒๑,๘๗๔	๑๕,๒๙๕,๗๘๔	๖,๓๒๘,๗๘๙	๔๐๒,๓๒๐	๔๘,๙๖๑
โคกเจริญ	๖๕	๒๒,๗๕๙	๑๖,๐๒๑	๔,๓๗๕	๒,๑๐๐	๑,๔๘๙
โคกสำโรง	๔๐๐	๒๖,๕๑๒	๑๗,๕๕๗	๘๘,๓๐๙	๙,๓๗๘	๑๐,๔๕๒
ชัยบาดาล	๓๗๐	๒๖,๑,๙๒๐	๑๔๐,๑๑๗	๘,๕๒๐	๑๑,๔๙๐	๗,๒๕๖
ทำนุ	-	-	-	-	-	-
ท่าหลวง	-	-	-	-	-	-
บ้านหมี่	๔๐๐	๒๐๐,๖๐๖	๑๒๔,๙๗๐	๖๖,๘๖๐	๗,๗๖๖	๗,๔๖๕
พัฒนานิคม	-	-	-	-	-	-
ลำสนธิ	๓๐๐	๒๙,๑๔๕	๒๐,๔๗๗	๔,๕๗๕	๒,๑๐๐	๔,๓๙๑
สระโบสถ์	๒๑	๕,๘๘๘	๓,๐๓๐	๗๑๖	๑,๘๖๐	๑,๗๙
หนองม่วง	๑๕๐	๓๐,๑๒๐	๒๐,๕๒๘	๙,๐๙๒	๑,๒๐๕	๑,๙๐๑
รวม	๕,๕๕๖	๘๓๗,๔๔๖	๑๕,๗๙๖,๕๐๔	๖,๕๑๑,๑๖๖	๕๓๘,๑๘๙	๘๒,๐๘๔

ที่มา : การประปาส่วนภูมิภาค สาขาลพบุรี, สาขาอำเภอย้ายบาดาล และสาขาอำเภอบ้านหมี่ (ข้อมูล ณ ๓๐ กันยายน ๒๕๖๒)

Assessment of water stress situation in business locations

Groundwater Resources

Following the Office of Natural Resources and Environment, Lopburi Province as of December 31, 2019, groundwater sources; artesian wells and the amount of groundwater granted to private sectors in Lopburi as of 2019 total at 1,035 wells, mostly for an agricultural sector, followed by the business and consumer sectors, respectively. The average water consumption is 134,323 cubic meters/day or 49.028 million cubic meters/year, which SUTHA's water consumption is compared to the total water consumption of the entire area of Lop Buri Province is at 0.39 percent.

SUTHA uses water in the proportion of less than 1 percent of the total water consumption from provincial groundwater sources when compared to the water situation in the area apart from Phatthana Nikhom District and the other 2 districts that have no tap water supply. Other areas with tap water supply were found much less consumption compared to the volume of water produced. The situation of water then still has a low risk of water scarcity. However, to secure water supply as a mean to develop business sustainability needs to find more water resources including reducing water consumption to reduce water demand exceeding the sustainable supply capacity.

The Department of Groundwater Resources, under the Ministry of Natural Resources and Environment, has released a report based on a survey of groundwater sources in Phatthana Nikhom District. This report compares the survey data with published sources to evaluate water use stress, which refers to the ratio of water withdrawal to the total available water in the area. It also assesses the availability of fresh water for local use and maps potential water-related risks for SUTHA's operations. The findings indicate that SUTHA is not significantly impacted by water resource shortages. This conclusion aligns with the groundwater depletion assessment from the Ground Water Table Decline Risk (Water Risk Atlas Tool), which shows that groundwater depletion levels are not significantly reduced. The Lopburi Province benefits from surface water due to local rainfall and water storage from the Pasak Jolasid Dam, as well as overflow from the coast, all of which contribute to groundwater replenishment.

Risk and impact assessment:

According to the report from the Department of Groundwater Resources under the Ministry of Natural Resources and Environment, a survey was conducted in Phatthana Nikhom District to assess groundwater sources. This survey, along with data from published sources, was utilized to evaluate water use stress. This assessment measures the ratio of water extraction in the area to the total available water, indicating the sufficiency of freshwater resources. Additionally, mapping efforts were undertaken to identify potential risks related to water availability.

SUTHA's operations have remained unaffected by the significant water resource shortages. The evaluation findings align with the groundwater depletion assessment performed by the Ground Water Table Decline Risk (utilizing the Water Risk Atlas Tool), indicating that groundwater levels have not experienced substantial decline. This stability is attributed to the Lopburi Province's access to surface water, which is influenced by local rainfall, water storage from the Pasak Jolasid Dam, and the overflow from coastal areas, all of which contribute to groundwater replenishment.



Riverine Flood risk assesment

The evaluation of flood risk along the riverbank reveals significant findings. According to the Aqueduct Water Risk Atlas 4.0 tool, the Riverine Flood risk assessment for the Phra Phutthabat area in Saraburi Province and the Phatthana Nikhom District in Lopburi Province indicates a risk level categorized as extremely high or high.

SUTHA has conducted an analysis of the current natural flood crisis in Thailand, particularly referencing the severe flooding event of 2011 that impacted Saraburi, Lopburi, and Nonthaburi Provinces, where the company operates. Fortunately, the company's facilities were not directly affected, as they are situated in elevated areas above sea level. Additionally, these locations are aligned with the provincial waterworks system, which does not supply water to these high-elevation areas, relying instead on underground water sources or artesian wells.

As a result, SUTHA assesses the risk of flooding impacting its assets and operations to be low.

Nonetheless, there may be indirect consequences stemming from flooding in nearby areas, which could hinder transportation and logistics. To address these potential challenges, the company has established measures and guidelines for managing the impacts of flooding on transportation routes and the movement of goods affected by surrounding flood crises as follows;



- Drain cleaning both in the Company's establishment and surrounding areas to ensure drainage flow
- Providing limestone chips and sand fill for land fill to mitigate effects on the community.
- Provide temporary work station to work instead of the flooded area and temporary accommodation to accommodate employees whose residences are located in the flooded area to facilitate commuting to work and that allow employees to work from home

Water treatment for water circulation and quality of wastewater

As a lime producer, lime is considered a suitable for the chemical wastewater treatment to neutralize acidic wastewater and force contaminants that are dissolved in wastewater to separate more easily for stabilization of sewage sludge.

The water utilized in the business operations mainly for the raw material washing process is circulated for reuse by outflowing wastewater to clarifier for sedimentation then some will seep into the soil and some flows through the drainage system inside the factory to the clarifier for sedimentation for reuse. The sludge from the limestone washing process will be dredged out for useful purposes such as adjusting the plant ground, donating to temples, schools, villagers, for landfill. What cannot be utilized will be properly disposed to the landfill within the Company's area etc.

Water recycles data of the Company following industrial wastewater discharge standards prescribed in the notification of Ministry of Industry, No.2 B.E.2539 (1996), issued under Factory Act B.E.2535, reported the quality of used water as follows:



Quality of effluent from the water recycle system in the factories

For the Company's activities, water is used for the production process, including spraying water to wash stone before entering the burning process in the kilns. A water consumption system includes the pit and installation of piping system to circulate the used water back to the cesspit by sedimentation in the pit. After going through a sedimentation process, the water is reused. Sludge in the pit, which includes bits of earth, mud from washing stone mixed with the dust of lime from the production process, will be dumped, scooped out for utilization such as use to adjust the factory areas, donation to the temples, the schools, the villagers for land fill, etc.

As to Water recycle system based on the standard of industrial wastewater according to notification of the Ministry of Industry No. 2 1996 (B.E. 2539) issued under the Factory Act 1992 (B.E. 2535), the Company has measured the quality of used water as follows:

Water (effluent) discharge

quantity	unit	2023	2024	2025
	cubic meter	No water discharged	No water discharged	No water discharged
Note: The factory's wastewater/process water system is internally recirculated and does not release any water into public utilities. As a result, it does not impact external wastewater discharge.				

Measurement	Method	Standard	2023	2024	2025
pH*	pH Meter	5.5-9	12.2/1	12.400/1	12.000/1
Suspended Solids	Dried at 103-105 °C	50 mg/l	4,670/2	110.000	<3
Total Dissolved Solids	Dried at 103-105 °C	3000 mg/l	1,950	980.000	1050
BOD5	Azide Modification	20 mg/l	<2	<2	<2
COD	Closed Reflux	120 mg/l	<5	9.000	<5
Oil & Grease	Partition & Gravimetric	5 mg/l	<5	<5	<5

(Latest year data presented)

(*) 1) The Water quality test report shown is of the Chong Sarika branch published in the annual report. Every plant obtains this kind of report in accordance with the specified standards, except for the pH value, where the pH value (pH) ranges between 5.5 - 9.0

2) Suspended solids; solid particles that are floating or drifting in the water that remain suspended in water and act as a colloid.

3) Due to the recirculation of water back into the sedimentation pond, measurements of the water from the sedimentation pond will show high levels of suspended solids resulting from sediment accumulation during the process.

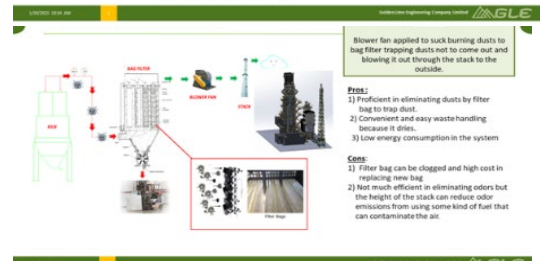
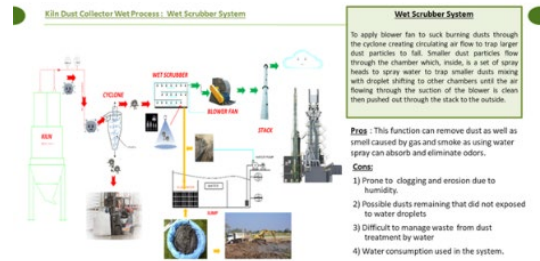
- Water saving Development

- Water saving

The sustainability development team will adopt information obtained from the study and notion regarding the sustainable water resource management to initiate annual activities to manage water resources in order to secure water resources sustainably for business operations.

During Y2022 - 2025, there are water saving scheme taken to reduce water consumption based on continuous water consumption monitoring during the process to be selected to take further action. The regular lime production where water is used for air and gas pollution treatment with current two systems used namely a wet scrubbers and a dry fabric filter.

The Chong Sarika existing wet scrubber observed wear and tear was replaced with the bag filter likely to Huay Pa Wai as an efficient air pollution control approach. In 2022, GLE, a subsidiary, was appointed to install the bag filter for one kiln at Chong Sarika, adding 2 installations in the year 2023 and the other one was installed in 2025, bringing the total number of installed points to four for the Chong Sarika branch.



Setting goals for water management

A new objective has been established for 2026 to further decrease water consumption in production. The aim is to achieve a 5 percent reduction from the 2022 baseline,

- This equates to a reduction of 14,925 cubic meters for Golden Lime Public Company Limited.
- This equates to a reduction of 3,096 cubic meters for Thai Marble Corporation Limited (Subsidiary).

Does the Company's set goals for water management : Yes

Details of Setting goals for water management

Target(s)	Base year(s)	Target year(s)
Reduction of water withdrawal	2022: Water withdrawal 298,502.00 Cubic meters	2025: Reduced by 5% or 14,925.00 Cubic meters in comparison to the base year
Reduction of water withdrawal	2022: Water consumption 61,910.00Cubic meters	2025: Reduced by 5% or 3,096.00 Cubic meters in comparison to the base year

Performance and outcomes of water management

Performance and outcomes of water management : Yes

Water management: Water withdraw by source

	2023	2024	2025
Total water withdraws (Cubic meters)	365,083	320,821	446,968
Water withdraws by groundwater (cubic meters) ⁽¹⁾	365,083	320,821	446,968

Remark : 1) Overall water usage is rising in other branches and subsidiaries because the current recycling system cannot meet total demand, particularly for dust control and pollution reduction.

Water Management performance of Golden Lime Public Company Limited_SUTHA									
Year	Consumption forecast (cubic meter)		Actual Consumption / year (cubic meter)		Cost (THB)		Performance against target		
							Volume	Cost	%
							Consumption reduction target 5% +		
2022	471,536/2	100%	298,502	63%	2.63	783,996.50	Based Year 2022/2565		
2023	471,536/2	100%	278,268	59%	2.63	730,737.88	-20,234	-53,134.93	-7%
2024	471,536/2	100%	265,561	56%	2.63 ³	715,301.13	-32,941	-88,728.14	-11%
2025	471,536/2	100%	338,908	72%	2.63	949,859.76	40,406	106,267.78	14%
Note: 1) Year 2020 - 2024, increased volume of water consumption from solar cell cleaning activities. 2) Revise the target figures to align with the updated water demand from the 2024 report. 3) The adjusted unit water cost for 2025 shows an average of 2.69, while the correct average is 2.63, unchanged. The displayed average of 2.69 resulted from adjustments for minimum usage costs due to faulty equipment, where actual usage was lower than the billed value for groundwater.									

In 2025, some branches reduced water usage by upgrading from wet to dry dust removal systems. However, overall water usage is rising in other branches and subsidiaries because the current recycling system cannot meet total demand, particularly for dust control and pollution reduction. Subsidiaries' increased water usage reflects efforts with government and local businesses to address PM2.5 and PM10 issues, with higher consumption during March–April and October–December to comply with dust reduction policies near concession areas.

Water Management performance of Thai Marble Corporation Limited (Subsidiary)									
Year	Consumption forecast (cubic meter)		Actual Consumption / year (cubic meter)		Cost (THB)		Performance against target		
							Volume	Cost	%
							Consumption reduction target 5% ++		
2022	100,000	100%	61,910	62%	2.63	162,823.30	Based Year 2022/2565		
2023	100,000	100%	86,815	87%	2.63	228,323.45	24,905	65,500.15	40%
2024	100,000	100%	100,776 ¹	101%	2.63	265,040.88 ¹	38,866	36,717.43	63%
2025	100,000	100%	108,060	108%	2.63	284,197.80	46,150	19,156.92	75%

Note: 1) In 2024 (B.E. 2567), the water consumption figures for Marble Co., Ltd. were revised. The reported amount for 2024 was adjusted from 55,260 to 100,776 cubic meters, reflecting the actual total water consumption for the entire year



บริษัท หินอ่อน จำกัด
 บริษัท หินอ่อน จำกัด (มหาชน) TMC มีการบริหารจัดการน้ำ โดยมีแหล่งน้ำใช้จากแหล่งน้ำใต้ดินซึ่งได้รับอนุญาตรวม 3 ฉบับ และมีการควบคุมการจัดการใช้น้ำและลดการใช้น้ำโดยระบบซีดีเคิลน้ำและบำบัดการบำบัดน้ำเพื่อให้น้ำที่บำบัดมาหมุนเวียนใช้ซ้ำในกระบวนการ

ระบบน้ำหมุนเวียนใช้ในโรงงานผลิต
 ใช้ปอดักตะกอน บำบัดน้ำขึ้นไปยัง ระบบน้ำหมุนเวียน water treatment ตั้งบำบัดจะตกตะกอนเป็นครั้งแรก ถึงถังที่ 2 และน้ำจะใสในถังที่ 3 แล้วนำมาใช้หมุนเวียนในการผลิตต่อไป

Thai Marble Corporation Limited_TMC (Subsidiary Company) has water management. The water source is from underground water sources, which has received a total of 3 permissions and has control over water use management and water use reduction with water treatment system for reused in the process.

Recirculating water systems used in manufacturing plants
 Use a sediment trap The pump brings it up to the tank. Recirculating water system, water treatment. The treatment tank will settle in the first tank, the second tank, and the water will be clear in the third tank. Then use it to circulate in production.

Part	Article	Photo Number
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Golden Lime Public Company Limited

Water management of Thai Marble Corporation Limited, subsidiary company