7.7 Environmental Sustainability Management

Somboon Advance Technology focuses on risk management and discovering ways to cope with climate change. The Company's Board of Directors have set a medium-term greenhouse gas reduction goal of 30% from the base year 2018 for direct and indirect greenhouse gas emission own by the Company (Scope 1,2), where electricity utilization is the primary source, up to 95%. Furthermore, we have started collecting data and analyzing the amount of greenhouse gas emissions throughout our value chain to determine materiality of indirect GHG emission Scope 3. Two of the fifteen categories have been recognized including: Category 1, raw material consumption and Category 3, Fuel- and Energy-Related Activities Not Included in Scope 1 or Scope 2. The Company has prepared to roll out the policy that will be driven jointly with key business partners. Examples include increasing the proportion of raw materials that use more recycled elements. The Company continued to monitor resource utilization management, particularly energy management and GHG emissions, which have a significant impact on production costs as well as the organization's impact on water and waste management. The objectives and outcomes are listed below:

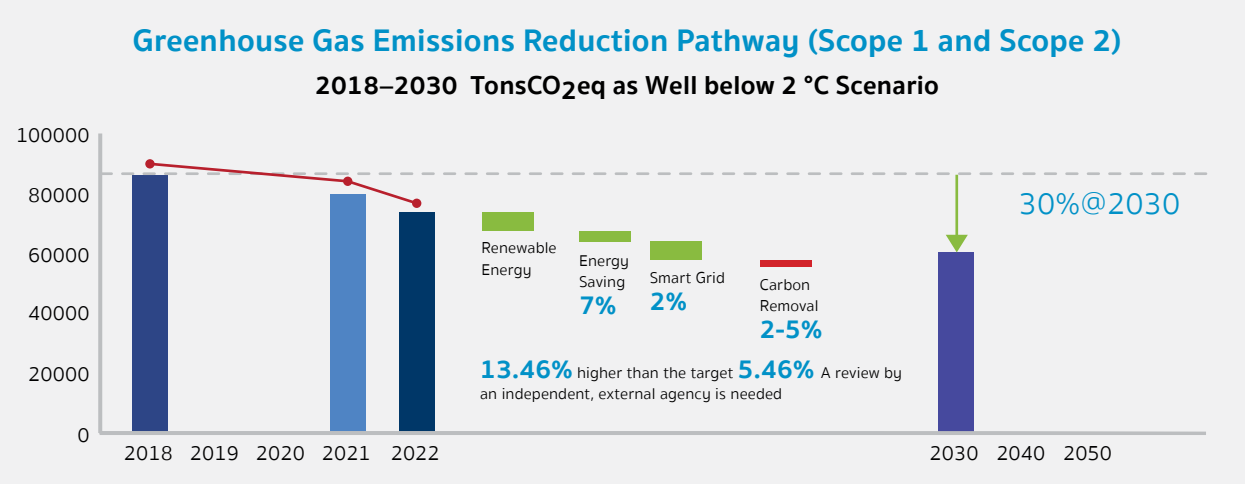
Indicators	2022 Goals	2022 Performance
1. GHG emissions		
1.1 GHG emissions per production[1] (tCO_2e/ Ton of Production and total GHG emissions) has been reduced from 2018 Scope 1+2[2].	Reduction 8%	Reduction 13.46%
1.2 GHG emissions per production[1] (tCO_2e/ Ton of Production and total GHG emissions) has been reduced from 2018 Scope 1+2+3[3]	Reduction 8%	Reduction 6.69%
2. Amount of energy consumption per production[1] (GJ/ Ton of Production) * has been reduced from 2018.	Reduction 3%	Reduction 7.9%[4]
3. Water consumption per production[1] (M3/Ton of Production) * has been reduced from 2018.	Reduction 1%	Reduction 18%[4]
4. Amount of industrial waste disposed perproduction[1] (ton of waste/ton of production) * has been reduced from 2018.	Reduction 2%	Reduction 3.5%[4]

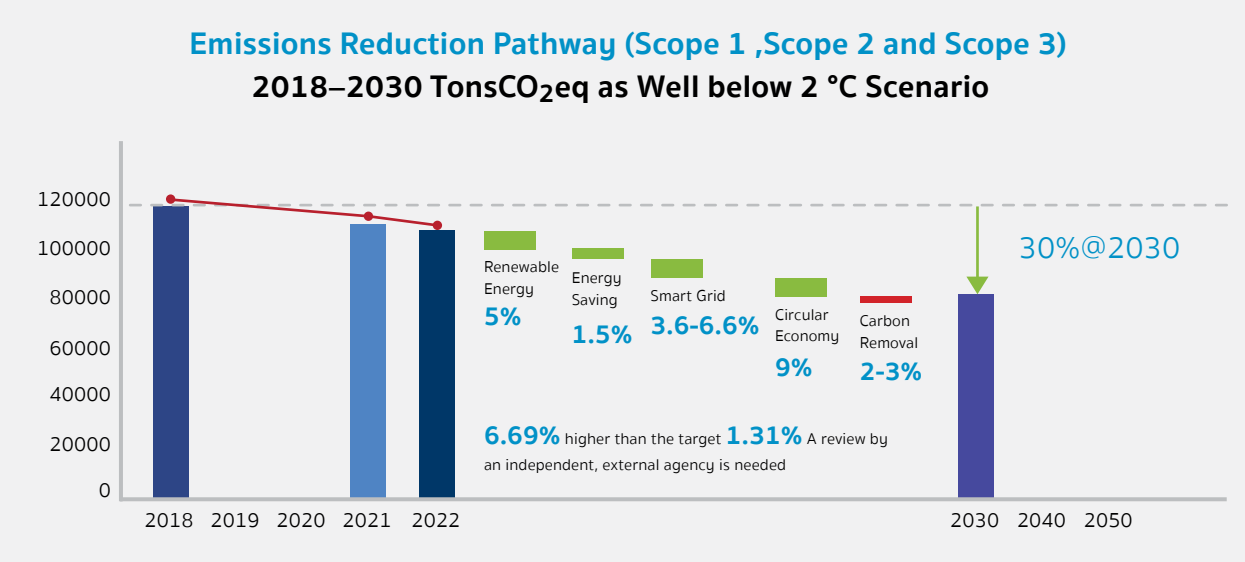
1. A change involves comparing the book weight of production volume to the current indicator data with that of the 2018 base year, as opposed to the unit of weight and the unit of work in the past.
2. GHG data collection and comparison only in Scope 1 and 2 of the Company.
3. GHG data collection and comparison both internally and externally in the Scope 1, 2 and 3.
4. Corporate-level number aggregation was caused by the merger of various forging and castingbusinesses of varying intensity, resulting insignificant overall savings. However, the Company had adjusted the numbers to accurately reflect its business challenges.

Climate change and energy management

Climate change caused by global warming, as well as energy management, are important issues for the organization, particularly as domestic energy resources become scarce and reliance on natural gas as the primary source of electricity generation declines. As a result, the company has to rely on imported foreign energy. Moreover, currency volatility contributes to rising energy prices, which in turn raise production costs. As a result, the company has set a goal of reducing greenhouse gas emissions by increasing renewable energy to 10% and using energy efficiently at a rate of no less than 5% by 2026. This is in order to meet the 30% GHG reduction target by 2030 (baseline year 2018). The Company continues to monitor key changing factors in global aspects. This includes technological advancements such as carbon capture and storage, the use of hydrogen as an alternative energy source, as well as industry trends such as a study of alternative high-efficiency furnace usage and cooperation measures in the automotive industry's GHG Scope 3. The current management guidelines as follows:

Figure 7 shows the goals and scenarios for reducing GHG emissions in the medium term in accordance with the policy of keeping global temperature below 2°C.

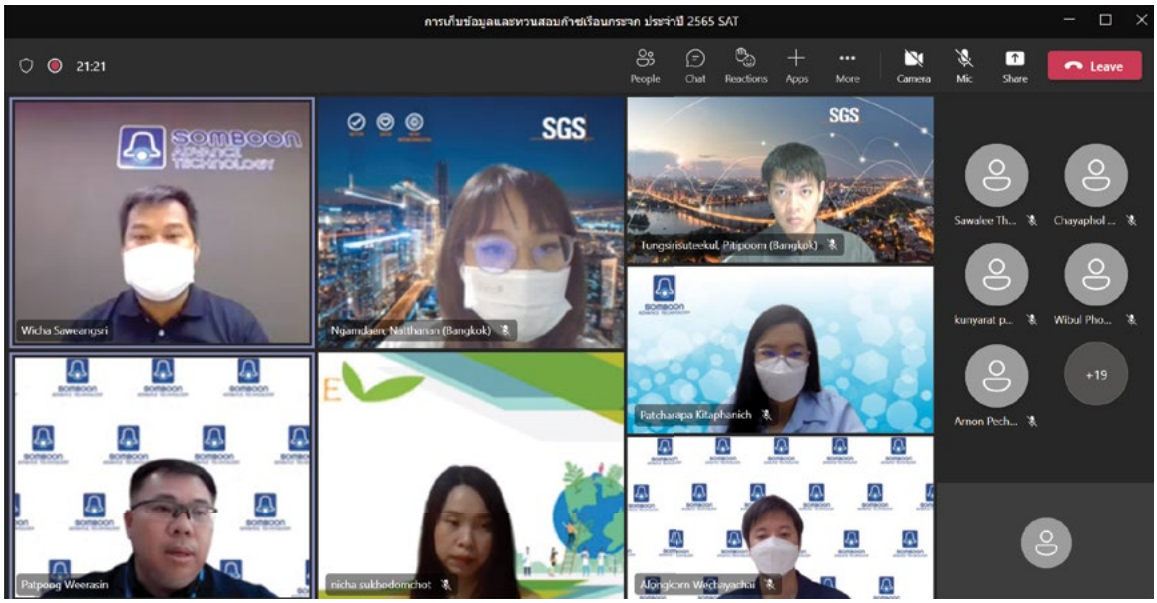




Management Approach

1. Establish a baseline for energy and GHG management.

In terms of greenhouse gases, the Carbon Footprint of Organization (CFO) assessment tool of the Thailand Greenhouse Gas Management Organization (TGO) is used to calculate. The principle considers raw material acquisition, production, and transportation. The result is shown in terms of carbon dioxide equivalent for the year 2022, which has been verified continuously since 2021. The assessment is divided into three Scopes in accordance with the international standard ISO14064-1. The Center of Excellence for Eco-Energy, Department of Chemical Engineering, Faculty of Engineering, Thammasat University, has consulted on the first verified data in 2022. We are currently preparing for the second verification, which will be conducted by an external independent agency registered with the Greenhouse Gas Management Organization, SGS Thailand, to further support the Company to be classified the organization's carbon footprint.



Picture (Carbon Footprint of Organization : CFO)

2. Setting medium-term goals

by planning execution in accordance with the Science Base Target Organization's Scenario, to prevent global warming by limiting temperature rise to below 2°C. This requires a 2.5% annual reduction in GHG emissions. The following five pillar activities have been carried out to reduce GHG emissions:

1 Promote the use of renewable energy

Solar cell installations are expected to account for 10% of total energy consumption by 2030. In 2022, the proportion of renewable energy consumption was 3.23% of total energy consumption, increasing from 1.7% in 2021. The two major renewable energy projects are the installation of 1.5 MW solar cells at the SFT1 plant and the installation of 2.1 MW solar cells at the SBM plant, both of which were completed in late 2021 and fully operational in 2022 respectively. Renewable energy produced from all solar cells totaling 20,625 GJ or 5,713 Mwh in 2022, -equivalent to a cost savings of 7.5 million baht (The project invested in by an energy company in 2022 allows us to reduce 30% of electricity energy costs.) In 2022, we began to investigate the possibility of installing 1MW of solar cells at the ICP1 and SFT2 plants in 2023.

Renewable energy
3.23 %
increasing from 2021
1.7%

Renewable energy produced from all solar cells totaling
20,625 GJ
or 5,713 Mwh

Cost savings
7.5 Million baht

Reduced Greenhouse Gas
2,856
TonsCO_2eq

2 Efficient use of energy in the production process

The high-efficiency compressed air with a capacity of 215 horsepower has been installed at Somboon Malleable Iron Industrial Company Limited, as well as the flow control in the air compressor system has been installed at every plant. The energy consumption has been reduced by 1.848 Mwh, resulting in a greenhouse gas reduction of 964 tCO_2e and a cost savings of more than 4.437 million baht. We continue to promote energy conservation awareness among employees.

Flow Control installation Project

Reduced energy consumption
1.848 Mwh

Reduced Greenhouse Gas
964 TonCO_2eq

Cost savings
4.437 Million baht

3 Promote the use of electricity energy from environmentally friendly sources

with low carbon emissions such as the use of electricity from power plants produced from natural gas. The location of the company that connects with the power transmission system is crucial and listed as factors in fuel consumption policies at the national level. The company has switched to a Green Grid mix transmission line, resulting in a reduction of 3,597 tCO_2e of greenhouse gases in 2022, for a cumulative reduction of 8,134 tCO_2e.

Green Grid mix transmission line

Reduced Greenhouse Gas

3,597

$TonCO_2eq$

Cumulative reduction

8,134

$TonCO_2eq$

4 Encourage business partners to use more recycled materials

in order to reduce the use of natural resources. At the present, recycled materials are used at a rate of 73% across all businesses and 100% in the Casting business group, where melting capacity is available in-house. This allows for direct control of product quality and the use of a high percentage of recycled materials. However, our challenge is to work collaboratively with suppliers to develop finished round bar products in the Forging business group, where recycled materials are limited to 10%.

Recycle Material Usage

73%

Recycle material usage for the Casting business unit

100%

Recycle material usage for the Forging business unit

10%

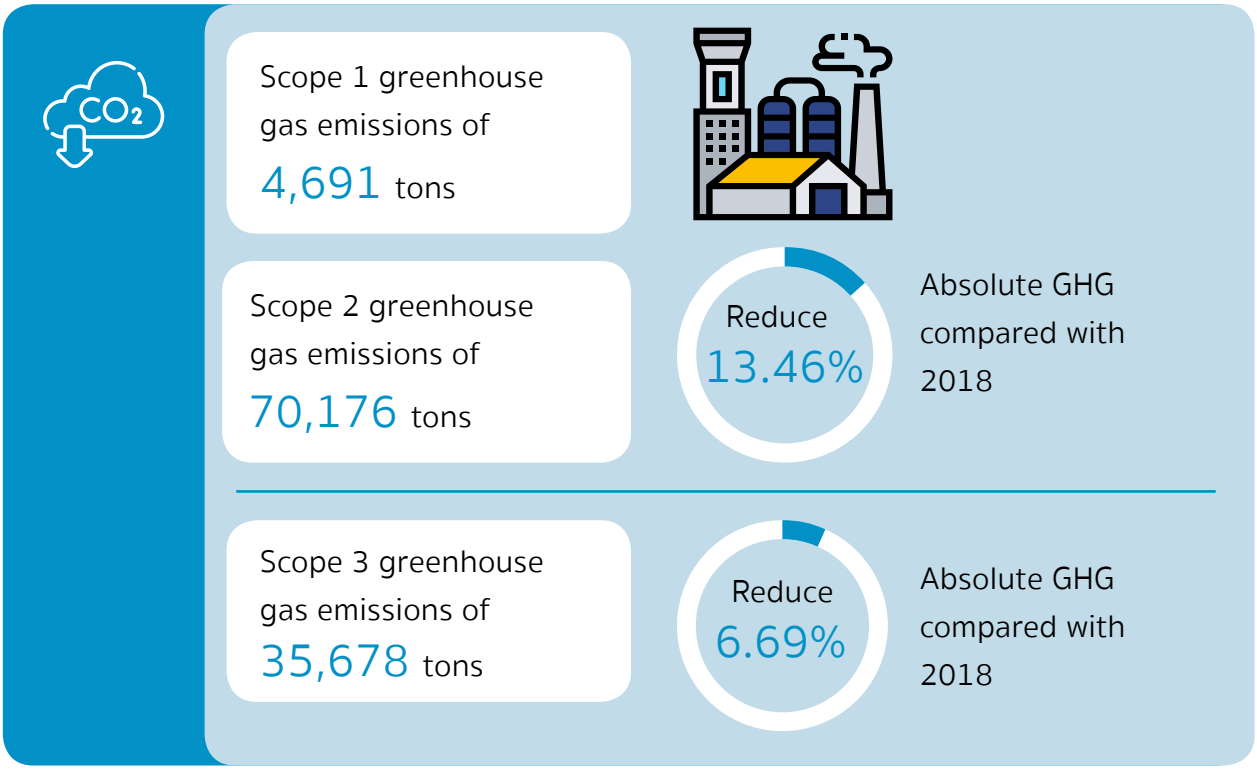
5 Promote and prepare for the implementation of carbon credits

This was intended to foster a key business or activity that had the potential to collect and receive carbon credit credits. such as an initiative with STRON, one of the group's subsidiaries, to request carbon credits from the electric tricycle manufacturing business through the T-VER (Thailand Voluntary Emission Reduction), as well as developing people's knowledge in data collection, calculation methods, and greenhouse gas data verification as well as a platform for carbon credit trading in alignment with the domestic and international standards.

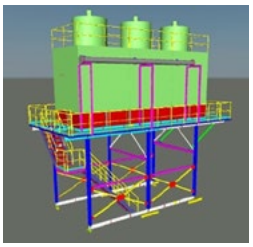
3. Data Assurance Verification and Disclosure of Greenhouse Gas Data

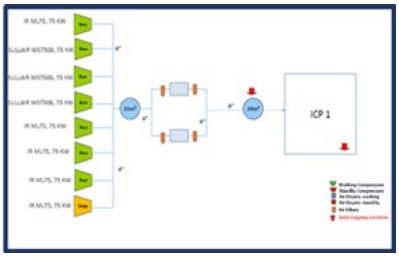
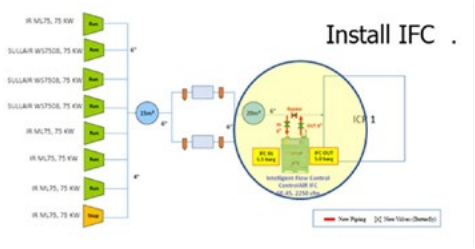
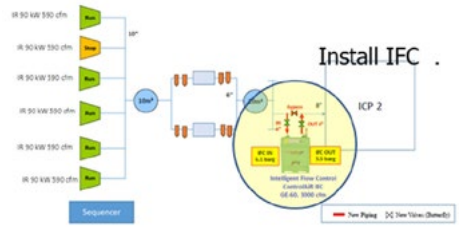
The Company has allowed an external agency certified by the Thailand Greenhouse GasManagement Organization to verify the accuracy of the data before disclosing to the public. The Center of Excellence for Eco-Energy, Department of Chemical Engineering, Faculty of Engineering, Thammasat University has consulted on the first verified data in 2022. We are currently preparing for the second verification, which will be conducted by an external independent agency registered with the Greenhouse Gas Management Organization, SGS Thailand, to further support the Company to be classified the organization's carbon footprint.

The verification results show Scope 1 greenhouse gas emissions of 4,691 tons and Scope 2 emissions of 70,176 tCO_2e, a reduction of 13.46% from 2018. Scope 3 greenhouse gas emissions of 35,678 tons, a 6.69% decrease from 2018 greenhouse gas emissions.



Project	Before	After
1. Replacement Air compressor 215 HP **Support strategy :** GHG and Energy consumption	 • Air compressor effectiveness testing suggested that the air compressor at building 2 used more electricity than the standard. A larger air compressor will cut electricity consumption and produce 20% more air when compared to the original air compressor.	 • A new air compressor of 215 hp can produce 28.7 m³ per minute by the calculation of averaged air volume used in one day in the same volume. After an adjustment, energy consumption will drop to 2,310,144kWh/year (1,299 Ton Co_2/Year)
	CO_2 Emission 1,459 Ton/Year **Energy Usage** 2,593,428 kWh/Year	**CO_2 Reduction** 159 Ton/Year **Energy Reduction** 283,285 kWh/Year
2. Add Economizer Boiler 1,2,3 **Support strategy :** GHG and Energy consumption	 Current : • 500Kg Boilers produce pressure of 4-6 bar • Needs 70-85°C temperature. Water in the production must be 30 °C. • Temperature of 200°C is released from a boiler vent (chimney). • Use averaged NG of 1,863 m^3/day	 After : Use heat from the vent to exchange heat to increase water's temperature before adding it into a boiler. • Install 3 economizer boilers. • Increase the water's temperature from 30°C to 70°C before adding into a boiler. • Use averaged NG of 1,649 m^3/day • Use averaged NG of 554,135 m3/year (1,030 Ton Co_2/Year)
	CO_2 Emission 1,163 Ton/Year **Energy Usage** 625,872 m^3/Year	**CO_2 Reduction** 133 Ton/Year **Energy Reduction** 71,737 m^3/Year

Project	Before	After
3. Replacement New Cooling Tower **Support strategy :** GHG and Energy consumption	 According to the analysis of the cooling tower system design at the building 1, • An installation area is not appropriate so air circulation is bad. Cooling tower ing is affected. • Many water pumps are used because, according to the original design, hot water is kept at a sump before being soaked into the cooling water. • Excessive consumption of electricity and maintenance of many water pumps. **Total electricity consumption** = 577,170 Kwh/Year **CO_2 emission from electricity use** = 324.60 Ton CO^2/Year	 Here are the expected results from the new system design of cooling tower 1 of the Building 1, • Less water pumps lead to less electricity and maintenance costs. • The use of chiller of process 6 HQI is cut because the larger size of cooling water lessens the temperature of cooling water. • The cooling tower can offer better cooling. All water in a sump becomes cooler. **Total electricity consumption** = 317,448 Kwh/Year **CO_2 emission from electricity use** = 178.53 Ton CO_2/Year
	CO_2 Emission 324 Ton/Year **Energy Usage** 577,170 kWh/Year	**CO_2 Reduction** 146 Ton/Year **Energy Reduction** 259,722 kWh/Year

Project	Before	After
4. Installation Intelligent Flow Control Of Air compressor at ICP1 **Support strategy :** • GHG and Energy consumption • Reduce Energy Consumption	 Current : • The air system at the plant lacked an on-duty air pressure control system. As a result, air compressors produced excessive pressure and consumed excessive energy.	 After : • The air intelligent flow control is installed to oversee the air distribution pressure while on duty to ensure consistency. Air compressors consume less electricity.
	CO_2 Emission 1,487.65 Ton/Year **Energy Usage** 3, 670,491 kWh/Year	**CO_2 Reduction** 88.77 Ton/Year **Energy Reduction** 214,095 kWh/Year
5. Installation Intelligent Flow Control Of Air compressor at ICP2 **Support strategy :** • GHG and Energy consumption • Reduce Energy Consumption	 Current : • The air system at the plant lacked an on-duty air pressure control system. As a result, air compressors produced excessive pressure and consumed excessive energy.	 After : • The air intelligent flow control is installed to oversee the air distribution pressure while on duty to ensure consistency. Air compressors consume less electricity.
	CO_2Emission 1,824.36 Ton/Year **Energy Usage** 4,243,694 kWh/Year	**CO_2 Reduction** 106 Ton/Year **Energy Reduction** 247,548 kWh/Year

6. Change Air Compressor : SBM At plant2

Objective Project :

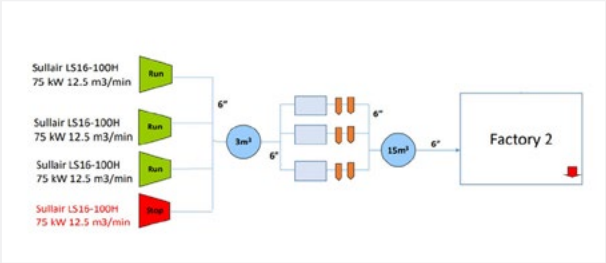
Install three new air compressors of 215 HP (160 W) to replace 75kW

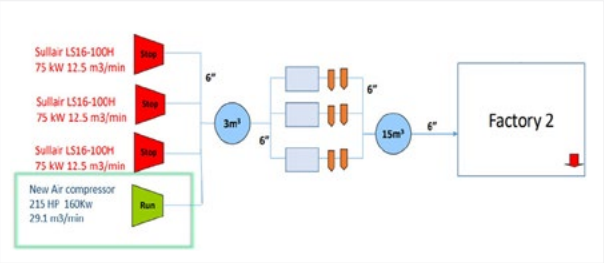
Investment :

1,700,000 Baht

Estimate cost saving

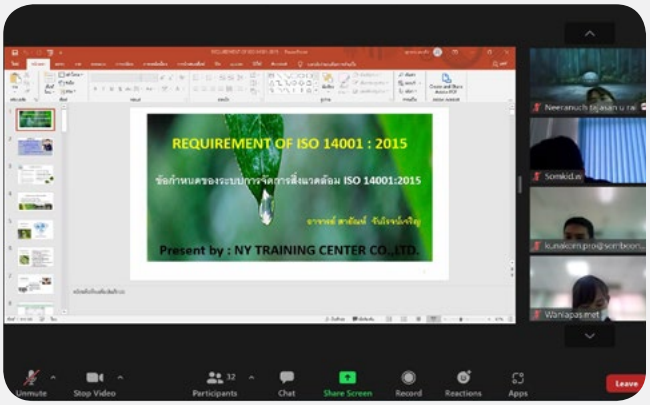
Air Compressor	Electricity cost/Year
Air compressor 75 kW	6,322,176.0
Air compressor 215 HP (160 Kw)	4,515,840.0
Saving	1,806,336.0





Environmental and energy campaigns in 2022

Employee Training



Program

Requirement ISO14001:2015

Program

Energy preservation awareness campaign

Performance

1. The carbon footprint verification at the corporate level was carried out by an independent agency accredited by the Thailand Greenhouse Gas Management Organization.

2. The amount of GHG reduction at the project level in 2022 amounted to 74,867 tons of carbon dioxide; and reduced the accumulated GHG emissions to an absolute level of 13.46% compared to the 2018 base year.

3. Increase the proportion of renewable energy use to 3.23% from 1.7% when compared 2022 to 2021, saving energy costs in 2022 by 12 million baht. This resulted in a decrease in overall cumulative energy consumption in the Intensity unit to 7.9%, as opposed to the 2018 base year.

4. 

Somboon Advance Technology Public Company Limited received certification in the **Science-Based Target (SBT) project from the Center of Excellence for Eco-Energy of the Thammasat University** under supporting by Thailand Greenhouse Gas Management Organization (Public Organization) that shows the company set the greenhouse gases reduction target corresponds to international standard has context menu

Sustainable Water Management

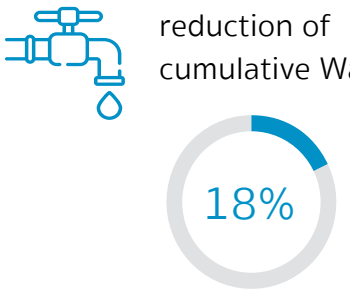
Somboon Advance Technology prioritizes the efficient use of water resources by establishing a policy and guidelines for water consumption efficiency. We have been working on projects to reduce water consumption in the manufacturing process. Water is used sparingly in the organization, primarily in the forging business group for hard coating and cleaning processes.

Management Approach

Reduce the amount of wastewater to outside treatment by maximizing the utilization of water in the manufacturing process while maintaining high quality. In order to reduce the use of water resources, we created a system that re-uses less concentrated wastewater in the processes that require higher concentrations. We have tried switching from RO to soft water for the boiler feed. This reduces the release of Brine/Rejection water from the RO system by approximately 30-35% while still maintaining water quality in accordance with the law. In addition, excess water from the RO system is reused in the sanitary system.

Performance

reduction of cumulative Water



consumption compared to 2018

Waste Management and the Promotion Circular Economy

Somboon Advance Technology is committed to waste management by using the most cost-effective resources. The goal is to reduce waste from production, which is one of our key concerns. We use the 3R principle of **Reduce**, **Reuse**, and **Recycle**, as well as promoting the circular economy at the national level. We have begun a collaboration to recycle steel waste from our key stakeholders in the value chain, in production processes, into high-quality manufacturing using our own furnace.

Operation Excellent

- Lift Cycle Assessment
- Energy Saving Program
- Increase Renewable Energy
- Carbon Footprint Reduction
- Carbon Footprint Product
- Water Saving Program
- Reduce and Recycle Waste

CFP; Circular Economy

Management Approach

The Company follows the waste management approach by primarily applying the 3Rs principle: **Reduce**, reduction of new wastes in the manufacturing process and establishing a system design to reduce mold and model sand loss. **Reuse**, reusing materials in production by developing a storage system to allow bringing back the used black sand into the same process and **Recycle**, recycling black sand qualified as non-hazardous waste to make brick blocks for pave way. Furthermore, we have initiated projects that help reduce pollution and costs in final treatment systems before submitting waste to an external agency for disposal. This includes a project to install a coolant treatment system before delivering to a third-party disposal destination.

Project	Before	After

1. Brick production made of waste black sand

Support strategy :

- Waste Disposal Reduction

Current :

- ICP2 releases waste black sand with mesh value that out of standard sent to disposal process.

After :

- Waste black sand from this process is used as material for brick production. The production ratio - cement: black sand: coarse sand: water (0.5:2:2:0.5)

Waste Disposal	175 Ton/Year @ Y'21

Waste Disposal Reduction	50 Ton/Year

Project	Before	After

2. Coolant Oil Chemical Treatment

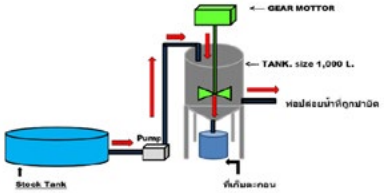
Support strategy :

- Waste Disposal Reduction

Update:
The procurement team is comparing prices of chemical treatment tanks

Current :

- SBM removes coolant oil from the machining process and sells it to a disposal operator. at 1,600 baht per ton.



After :

The coolant oil treatment system has been installed. In a stock tank, wastewater treatment chemical powder is used to raise the pH of the water, COD, oil, and grease. Stir coolant oil and chemical powder together for 10-15 minutes, or until coolant oil separates from water.

Waste Disposal	1,786 Ton/Year @ Y'21	Waste Disposal Reduction	714 Ton/Year

Performance

1 Up to 101,813 tons of recycled steel are brought back into the process per year

Accounting for 73% of the steel used in all plants

2 Reduction of waste disposal costs by 646,884 baht per year from the installation of a Coolant treatment system.

3 Overall, the amount of waste per ton of production can be reduced compared to 2018. 3.5%

Cheerawit Sureerattanan ,Ph.D , Senior Managing Director received Carbon Footprint of Circular Economy Product Certification. from Thailand Greenhouse Gas Management Organization (Public) Organization)