

SCG



SUSTAINABILITY REPORT 2018

PASSION FOR
SUSTAINABLE LIVING





“SCG always develops innovation for products and services, including solutions, to enhance community for better living conditions while delivers values to all stakeholders and sustainability for environment under the circular economic concept. SCG is of the vigorous working spirit inherited among the SCG people throughout over 105 years of the inspired organization.”

Our Passion for Sustainable Living

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Message from President and CEO



Roongrote Rangsiyopash
President and CEO, SCG

For 105 years, SCG has conducted its businesses with constant awareness that as its operations directly transform natural resources into goods and services, environmental aspects must also be highly prioritized as well. SCG aims to operate its businesses with strict adherence to corporate social responsibilities, regardless of the periodic challenges such as economic downturns, social or political upheavals, trade wars, or energy price volatilities. SCG continues to adapt and strive towards sustainable growth, while remains committed to providing sustaining values to society through better living environments for all in both Thailand and also abroad, where SCG operates.

Since 2012, SCG has signed with the UN Global Compact (UNGC) and become a registered participant of the UN Global Compact. This is testament to SCG determination to conform to the Principles of Human Rights, Labor, Environment, and Anti-Corruption, and also reflects SCG's aim to operate its businesses in harmony with the practices of Good Corporate Governance and Code of Conduct,

For 2018, SCG is proud to report its unwavering sustainability commitments which creates the balance between the three core dimensions: economy, society, and environment. This is an important part of our Sustainable Development Goals (SDGs), which is a vital challenges for the country, the region, and the world.

Circular Economy

SCG openly strives to operate with the Circular Economy concept, and is actively working in close collaboration within the company and with other external organizations to reduce waste through the usage of recycled materials as either raw materials or an alternative form of energy. This also encompasses the efforts to improve the design of products and services that improvise upon its performance, such as longer service life or enhanced waste reduction. At present, SCG has numerous projects at hand which allows or converts production waste to be recycled as materials for community projects that enhances local skills and uplifts local communities.

In 2018, SCG hosted the “SD Symposium 2018” under the theme of “Circular Economy: The Future We Create”.

The aim was to communicate and inspire the circular economy concept to the society. In addition, SCG also hosted the “CEO Forum” which provided for the continued collaborations amongst the various business sectors towards the circular economy-based initiative projects. One such examples is the “Recycled Plastic Road Project” that turns collected plastic wastes into asphalt mixture for roads within a private industrial estate. Another example is the “Waste Collection Platform” that recycles used corrugated cartons from leading retail superstores into paper grocery bags, thus allowing for decreased usage of plastic bags.

Climate Change

Global Warming and Climate Change are SCG's top priorities. Since 2006, when SCG first disclosed its greenhouse gas inventories, the company has continued to support the reduction of greenhouse gas emission inventories. This is achieved through efficiency enhancements, improved manufacturing equipment and processes, the usage of renewable energy, improvements in clean energy technologies, the installment of solar cells, as well as the development of products and services that reduces both greenhouse gas emission and fossil fuel consumption. An outstanding example of this is SCG's Floating Solar Farm, which SCG has internally developed and is now being offered to external parties as an integrated one-stop service, including design consultancy and product maintenance.

As of 2018, SCG is proud to highlight a greenhouse gas emissions reduction target of 28% from the 2007 base year by 2030. This is in accordance with the Paris Agreement and conforms to the de-carbonization that is required to keep the rise in global temperatures below 2 Degrees Scenario.

Commitment

In 2018, SCG retained its membership in the Dow Jones Sustainability Indices for 15 consecutive years. SCG remains committed to contributing its sustainable value to society through innovations, while striving for a better quality of living for all, in a resilient society, and in a world that is abundance for all.

Message from the Chair of Sustainable Development Committee



Cholanat Yanaranop
President, Chemicals Business
Chair of Sustainable Development
Committee, SCG

SCG is delighted to present the 2018 Sustainability Report which showcases our continued progress and determination towards sustainability in each of the core business units, comprising of Cement-Building Materials, Chemicals, and Packaging.

• SCG's 3 main areas of focus are: 1) Climate Resilience 2) Circular Economy and 3) Transportation Safety. This is in response to the challenges of change in society, economy, and environment.

1. Climate Resilience: As global warming continues to cause extreme weather abnormalities, SCG places tremendous resources and cooperative efforts with global organizations to intensively reduce greenhouse gas emissions. This is to be in parallel with the Paris Agreement targets, and objective of limiting the rise in global average temperature to well below 2 Degrees Scenario (2DS), while seeking to keep warming to below the 1.5 Degrees Scenario target, and further being able to promptly adjust to the changes.

2. With depleting natural resources and ever increasing consumption, SCG openly embraces the circular economy principles. This has been integrated into the company's business model, and includes idea sharing and active communication with SCG staffs, other business enterprises, and society in general. The key towards the success of the circular economy initiatives is through collaboration with all stakeholders, and not only within SCG's value chain.

3. The success factor of the organization ultimately depends upon its people. Health and safety have been SCG's challenges, particularly road safety transportation across the ASEAN markets, from the company's facilities to the consumers and customers. SCG's transportation management focus have been towards the strict adherence and compliance with established industry best practice safety standards. Technology usage continues to be utilized to support and assist driver safety, encompassing

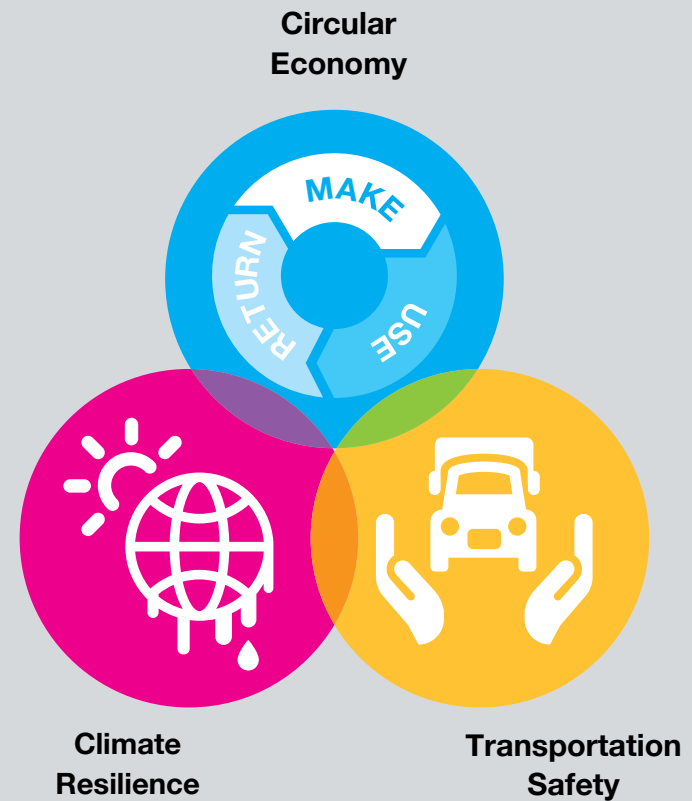
SCG staffs, and contractors, which also benefits the general public on the road. Despite the reduction in road death accidents in 2018 from 2017, SCG is determined to place greater efforts towards our ultimate goal of non-loss of life.

• SCG has adopted His Majesty the late King Bhumibol Adulyadej's royal initiative project "sustainable water management" as the guideline towards suitable water management. This encompasses the upstream, the midstream, to the downstream areas, and is termed as "From Mountain to the Mighty River". This is in addition to restoring and conserving ecology of the reforestation areas back to normalcy, effectively coping with drought and flooding problems, and creating participation among farmers and fisheries to uplift the quality of life for the community in a sustainable way.

Looking ahead, SCG firmly believes in our determination to operate our businesses in a sustainable manner, by creating balance between economy, society, and environment, so as to help the country achieve the Sustainable Development Goals (SDGs), which is in accordance to SCG's "Passion for Better" promise for the next generation.

Even though sustainable development is a common goal for all countries, the problems that are becoming more serious and challenging to sustainability are global warming and climate change that affect every life on Earth, waste and pollution in air, land, and ocean from inefficient use of energy and resources, including quality and safety issues in life.

SCG recognizes the vital role of the organization in participating in solving such problems. With the business to grow steadily following the change of environment, society, and technology, SCG, therefore, has set a sustainable development strategy in 3 focus areas.



Sustainable Development Strategy

Climate Resilience



Climate change is the increasing critical problem for which our global society must join hands to seek proper handling solution to continue our way of living.

- SCG is of 3 strategies to face climate change circumstance, namely:
 1. Reduce energy use
 2. Use renewable or alternative energy
 3. Develop products and services which help reducing greenhouse gas emissions
- SCG has set a definite target to reduce greenhouse gas emissions in accordance with the Paris Agreement as a mean to keep the rise of global temperature below 2 Degrees Scenarios.
- Create awareness and understanding among employees, business partners and stakeholders to enhance cooperation for lesser energy consumption, including alternative energy use and greenhouse gas emissions.

Materiality

- > Product Stewardship
- > Materials Use and Waste Management
- > Energy and Climate Change
- > Biodiversity and Ecosystem

Circular Economy



The world is facing problems of lesser available natural resources. But the requirement for natural resources is increasing alongside the huge amount of waste and environmental impact. Therefore, the circular economy is the way out to enhance effectiveness of natural resources usage while continually create value for surplus materials so that the limited availability of natural resources will be of the most benefit with the left least useless portion and/or landfill.

- SCG is of 3 strategies to drive forward the circular economy, namely:
 1. Reduced material use/durability
 2. Upgrade and replacement
 3. Reuse and recycle
- Every step of SCG value chain is important; from design process, procurement, manufacturing, sell and transportation, use and recycle.
- Cooperate with all sectors - the public, private and civil society, which are all enhancing factors to materialize the circular economy.

Materiality

- > Innovation and Technology
- > Product Stewardship
- > Consumer Experience
- > Social and Community Involvement
- > Materials Use and Waste Management
- > Water Management

Transportation Safety



Responsibility toward quality and safety of one living is the significant basis for sustainable business operation, especially for transportation safety, the risky matter related to SCG employees, business partners, community and society as a whole.

- SCG, accordingly set up 4 strategies to ensure transportation safety which are:
 1. Strictly controlling the system of safety management of required standard
 2. Provide training to operators, both in theory and practices
 3. Develop required technology as the tool to reduce accidental risk
 4. Create awareness and professional pride among all drivers
- SCG sets up the zero target for fatal accident cases
- Pay attention to every step controlling - prior to, during and after transportation.

Materiality

- > Health and Safety
- > Human Rights
- > Sustainable Value Towards Supplier

Sustainable Development Structure

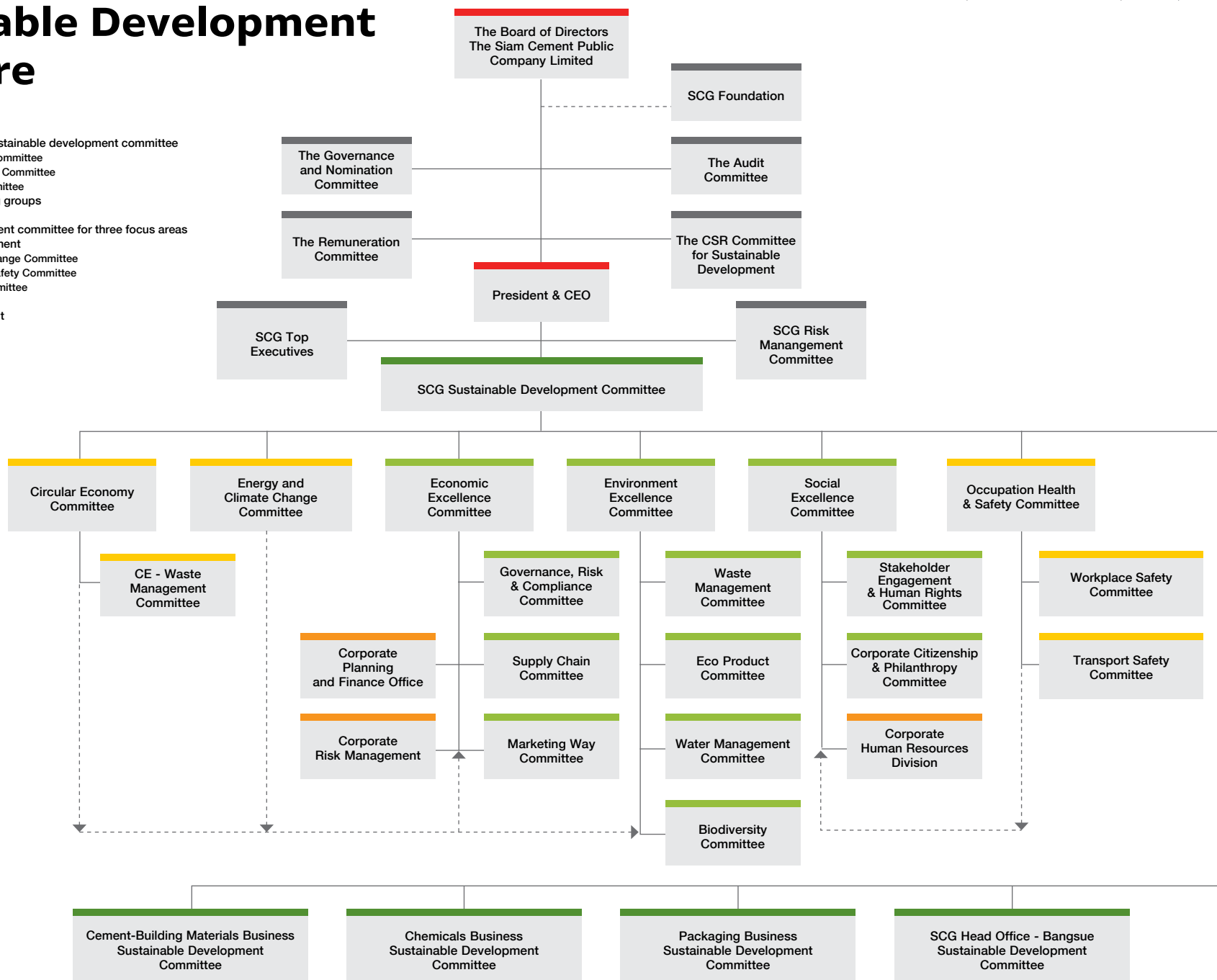
Three dimensions of sustainable development committee

- Economic Excellence Committee
 - Environment Excellence Committee
 - Social Excellence Committee
- Committee and working groups

Strategy and management committee for three focus areas of sustainable development

- Energy and Climate Change Committee
- Occupation Health & Safety Committee
- Circular Economy Committee

Responsible department



Cement-Building Materials Business

The year 2018 is a year of business challenges due to changes in the business environment, competition, changing customer needs and the driving force of digital transformation. Cement-Building Materials Business revised its strategies by focusing on developing innovative products, services, and solutions that meet the needs of customers and applying technology as one of the tools for production process improvement in accordance with the circular economy concept to create sustainability for all stakeholders.



SCG puts our commitments and efforts to create quality and betterment to customers. We promote the caring spirit among our workforce to achieve the best output for further innovation development to continuously create better products, services and solutions so that our customers would be more convenient and better quality of living."

Nithi Patarachoke
President,
Cement-Building Materials Business

Our Passion

- Develop products, services, and housing solutions to enhance the quality of life for safety, comfort and well-being.
- Increase the ability to recycle waste materials from other industries to be used as alternative fuels and raw materials in the production process, such as substituting the recycled glass bottles for the use of sand in the production of fiber glass insulation and bringing fly ash from the power plant to be used as alternative raw materials in the production of roof tiles and brick blocks, etc.
- Care for society and the environment by creating partnerships with community projects such as Fish Home Project by casting fish home from sulfate and chloride resisting cement to help villagers in the South to catch fish during the monsoon, the restoration of the quarry ecosystem to rehabilitate the biodiversity of plants and creatures.



Our Achievements in 2018

- All SCG cement plants in Thailand have been certified for Green Industry Level 5: Green Network by Department of Industrial Works, Ministry of Industry.
- Awarded for Outstanding Social Responsibility by Department of Industrial Works, the Ministry of Industry as the company who is attentive to and responsible for society and environment.
- Awarded for Thailand Green and Smart Mining Award 2019 by the Ministry of Natural Resources and Environment (MNRE) as the role model for mining management of cement production under the concept of circular economy by maximizing resources benefit to serve all required levels.



Chemicals Business

Chemicals Business aims to improve competitive advantage in order to be a leader in the region by innovating high value-added products and services, driving the company towards sustainable development through the circular economy concept, promoting the application of digital technology to increase operational efficiency, improving the production process and developing products and services that are environmentally friendly following sustainable development principles.



R&D is a crucial element to increase competitiveness. SCG collaborates with public sector, private sector and education sector, both in Thailand and abroad, to leverage capability to create innovative products and services that promote good quality of life for consumers.”

Cholanat Yanaranop
President, Chemicals Business



Our Passion

- Focus on developing products that are environmentally friendly, with products and services certified by SCG eco value, 57% of revenue from sales.
- Participating in Thailand Public Private Partnership for plastic and waste management projects with the aim of reducing Thailand marine plastic not less than 50% by 2027.
- Developing renewable energy “Floating Solar Farm”, the first in Thailand, using special grade plastic pellets to be floating buoys installed on non-utilized water surface area which provides better performance than solar rooftop 5-20%.
- Partnership in the coalition of Alliance to End Plastic Waste (AEPW) to tackle plastic waste problems in environment and ocean by announcing and driving collaborative projects such as Collaboration for Waste Management in Large Cities Project, Collaboration with United Nations Environment to enhance management ability of government officers and community leaders with regard to plastic waste.

Our Achievements in 2018

- Map Ta Phut Olefins Co., Ltd. was certified for Green Industry Level 5, the highest level from the Ministry of Industry, for the 4th year.
- Applying the concept of circular economy for community development by creating a prototype “recycled fish home” from plastic waste found on beaches and in community areas and working together with the local fishery group to create fish homes from plastic pipes remaining from the assembly process of more than 1,600 units laid down to the sea, covering areas in Rayong, Chon Buri, Chanthaburi and Trat.
- Inventing the prototype of recycled plastic road following the circular economy concept by separating and collecting used plastic, shredding into small flakes, and mixing during asphalt blending process to pave the road, resulting in increased road strength and better resistance to erosion. The technology was developed with cooperation between SCG and Dow Thailand Group.



Packaging Business

Packaging Business committed to being a leader in total packaging solution provider in the ASEAN region by focusing on the development of high value-added products and services to meet the needs of customers, driving business sustainably with the circular economy concept, developing innovative processes, using the Innovation Management Process (IMP), and promoting the potential of employees in responding to rapid technological changes.



The circular economy can be successful and sustainable through the collaboration of all. Therefore, it must be communicated to create awareness, understanding and certainly, the importance of the concept.”

Tanawong Areeratchakul
President, Packaging Business

Our Passion

- Emphasize on product development by focusing on its designed functions which include the ease of use, the ability to maintain strength with less resources in the production, the reusable and easily recyclable features as well as the development of packaging paper with higher levels of recycled content which remain its strength and contain clean surface property.
- Improve production process across the value chain i.e. reduce water and energy consumption, utilize the alternative energy through “Waste to Energy” project to generate electricity, and install solar rooftop to generate electricity for plant operation.
- Apply digital platform or “Application Tool” for data connection between SCG and business partners to increase the value chain effectiveness.











Our Achievements in 2018

- Develop plastic film packaging (R-1) from Multilayer Laminated: Mono Material to ensure its recyclability.
- Develop food packaging under “Fest” brand, produced from pulp of eucalyptus plantation promoted by SCG to help agriculturalists increase higher incomes as well as the development of biodegradable paper straws from food contact paper.
- Collaborate with retailers and department stores to encourage the use of recyclable and easily-biodegradable grocery bag as an alternative packaging while promoting participation among consumers for sustainable environment and natural resources.
- Organize “Green Mart” for the 5th year to generate more incomes for communities surrounding the plants as well as the creation of social enterprise network.



Stakeholders Engagement

Stakeholder Group	Objective	Engagement Approach	Action	Page
 Shareholder/ Investor/Creditor	<ul style="list-style-type: none"> Regularly disclose Company's information and performance 	<ul style="list-style-type: none"> Annual General Meeting of shareholders Quarterly Analyst Conference Annual company visit/business unit 2 Roadshows/year Communicate performances in the Annual Report and Sustainability Report 	<ul style="list-style-type: none"> Annual Report Sustainability Report 	
 Employee	<ul style="list-style-type: none"> Understand employee's need and facilitate for their happy work life Enhance employees' skills and capability Communicate and inform employees about company's direction, performance and business movement 	<ul style="list-style-type: none"> Acknowledge issues and expectation through formal and informal channels Support employee's learning for new trends and issues Initiate Internal Startup projects which promote employees' competence and skills to create innovation for business Quarterly Leadership Forum Quarterly Meeting with Executives Employee engagement survey / 2 years Facilitate employees' accessibility to information through Employee CONNECT application 	<ul style="list-style-type: none"> HATCH-WALK-FLY Innovative Ideas Challenge 2018 Employees Caring and Development Learning the Digital World Engagement Survey Health and Safety Human Rights Sharing Opportunities Drawing the Future 	30 32 34 36 38 51 62 79
 Supplier	<ul style="list-style-type: none"> Create value for supplier's operation Support and enhance supplier's operation, aiming to maximize efficiency Take care of supplier's working condition and safety Enhance supplier's capacity and skills for safe working 	<ul style="list-style-type: none"> Support knowledge and management of environmental, social and governance (ESG) to leverage supplier's performance, reduce operational risk and reputation damage Share knowledge and trends which might affect supplier's business activity Raise awareness and transform working behavior to safety culture 	<ul style="list-style-type: none"> Transportation Safety Management System: Driven by Technology and Hearts Human Rights Supplier Governance and Enhance towards Sustainability Go Green Together Trainings for Safety Enhancement 	53 62 68 70 71

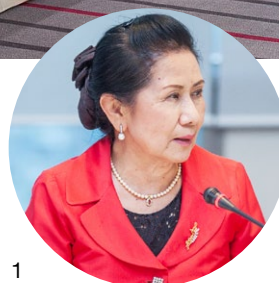
Stakeholder Group	Objective	Engagement Approach	Action	Page
 Customer	<ul style="list-style-type: none"> Respond to multidimension of customer's needs Provide available channels to get customer's feedback on products, services and solutions including requests for advice, solution and complaints 	<ul style="list-style-type: none"> 24-hour respond to customer's grievance, recommendation/ admiration through SCG Contact Center in various channels i.e. telephones, LINE application, e-mail or website Survey customer satisfaction, formally and informally for continual improvement Provide around-the-clock consultation to customers for home building, repair, renovation and extension through Home Buddy Application Co-create with business to business (B2B) customers for product development 	<ul style="list-style-type: none"> Total Home Ventilation Solution Prefabrication Construction Solution Customer Journey Co-creation for Product Development COTTO Water-saving Product 	41 43 48 49 107
 Community	<ul style="list-style-type: none"> Respect community rights and take care of community environment Enhance wellbeing and quality of life of community in which SCG has operations both in Thailand and ASEAN 	<ul style="list-style-type: none"> Monthly visit for dialogue with community to get feedbacks and listen to their needs Annually community satisfaction survey Being community partner to provide consultation and assistance for community development by leveraging company's capability 	<ul style="list-style-type: none"> Social and Community Involvement Waste Process and Development for a New Product Recycling Water for Communities 	72 90 108
 Government Agency	<ul style="list-style-type: none"> Perform as a role model for other organizations in management for transparency and excellence Cooperate with government agencies and provide good approach and practice for sustainable development 	<ul style="list-style-type: none"> Collaborate to present ideas, suggestions toward various government rules and regulations Engage with the public sector to share good practices for further expansion 	<ul style="list-style-type: none"> Our Teachers are Fantastic and Masterful, We Want to Present Water War Room Biodiversity Management Plan Limestone Quarrying Innovation for Biodiversity Conservation 	78 105 114 116
 Media	<ul style="list-style-type: none"> Disclose and communicate information promptly, correctly and timely Promote participation and good relationship with mass-media 	<ul style="list-style-type: none"> Quarterly Operating Results Announcement Quarterly Analyst Conference Occasionally company visit Annually Thank Press 	<ul style="list-style-type: none"> 2018 Opinion Panel 	13
 Civil Society Sector, Academia and Opinion Leader	<ul style="list-style-type: none"> Disclose complete and transparent information Seize opportunity to create partnership for driving sustainable development Enhance social awareness and understanding for key sustainable development issues 	<ul style="list-style-type: none"> Listen to opinion and suggestion from the civil society sector, academia and opinion leaders for further sustainable development and implementation Engage in the projects that promote social sustainability 	<ul style="list-style-type: none"> 2018 Opinion Panel Society and Community Involvement Natural Climate Solution Biodiversity Management Plan Fish Homes and Seagrass in Trang 	13 72 102 114 117

2018 Opinion Panel

- SCG Sustainable Development Committee has organized Opinion Panel annually to listen to stakeholders' perspectives, opinions and suggestions.
- In 2018, the 9th Opinion Panel emphasized the importance of product stewardship which needs insights and opinions from public sector, private sector, academia, and mass media.

Our qualified persons are as follows;

1. **Professor Dr. Supawan Tantayanon**
Department of Chemistry, Faculty of Science, Chulalongkorn University
2. **Kittipong Sirilucktrakul**
Executive Vice President, High-rise Building Construction, Supalai Public Limited Company
3. **Associate Professor Dr. Singh Intrachoto**
Head of Scrap Lab, a Design & Research Center
Department of Building Innovation, Faculty of Architecture, Kasetsart University
4. **Sutavadee Techajunta**
Director of Office of National Standardization Council
Thai Industrial Standards Institute (TISI)
5. **Dr. Jake Pataratanakul**
Department of Marketing, Faculty of Commerce and Accountancy Chulalongkorn University
6. **Monchai Wongkittikraiwan**
Business Editor, The Standard



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Circular economy concept of SCG limits only in supply chain base because SCG believes that the company is able to address an issue of waste and scraps within the close loop production. However, the fact is that circular economy can be catalyzed if SCG agrees to be the centre of network or industry sector by working collaboratively with others even competitors. The sustainable circular economy requires cross-sectoral collaboration even outside our supply chain. The challenge is that how to manage to realize such collaboration.”

Associate Professor Dr. Singh Intrachoto

“



The problems of SCG is that SCG puts mighty effort on long-term planning which could become a trap for SCG. SCG flashes forward to what to do or how to reduce plastic use in the next 10 years but, in fact, there might be other new alternative materials which are non-plastic in the future. Thus, all of our plans are useless. Also, we might have made many plans to continue the existing business but in the future such business would probably being disrupted.”

Dr. Jake Pataratanakul

“



In the digital world, a lot of messages are sent faster and faster. Fake news is viewed by millions of people whereas only hundred thousand people get the right information about the organization and the rest still remember such fake news. This happening becomes a big issue in the digital world. The challenge is that how to convey the new generation and online audiences about what SCG has done and how it is linked to their lives.”

Monchai Wongkittikraiwan

Recommendation from the Opinion Panel



Product and Service Development

- With Sustainable development, we shall pay attention to the well-being of human and non-human beings who can be affected by environmental problems. This idea opens up opportunity for SCG to create products, services, and new business models to address global issues as well as business progress simultaneously.
- Study Green Chemistry to maximize the use of resources throughout the production process for the goodness of earth, health and environment as well as to add long-term value to the business.
- Establish a customer lab for collecting and analysis on customers' data including a system to get feedback, satisfaction, and the effectiveness of products from customers. Those acquired information can be utilized for operation improvement and product & service development to fully serve the need of customers in the future.

- Adjust approach to "Open Source", allowing customers to combine usage of SCG's products with other companies' products and letting customers to share concepts and ideas towards SCG's products and services.
- Develop an original business model that meets the needs of customers, solves their problems, and improves their quality of life. It can be done by understanding the customers' problems and exploring the appropriate business models rather than paying attention to technology or online/offline marketing. SCG should focus to understand customers' lifestyles and get into their lives (Onlife).

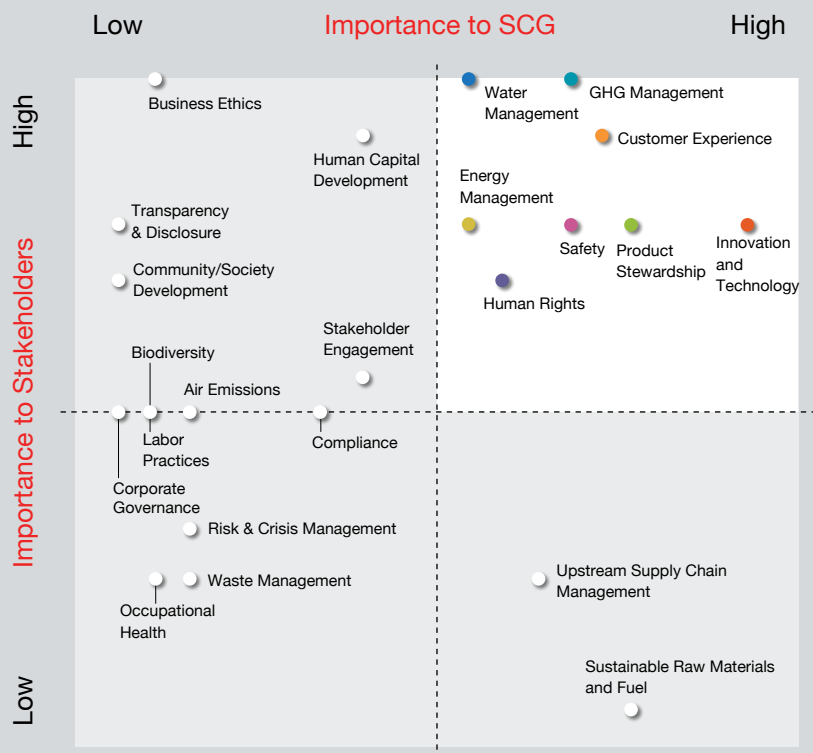
Circular Economy

- To implement the circular economy concept more concretely and extensively, SCG needs to collaborate with all industries instead of working within its supply chain. This will draw more collaboration from others to develop new business models that can address the issue of resources and waste. SCG should provide knowledge for better understanding, and supporting others to implement circular economy in their organizations.
- Pay more attention to the whole process ranging from designing, process shortening, research for the reuse of materials and customizing products and packaging to suit the need of users to maximize material use and minimize waste.

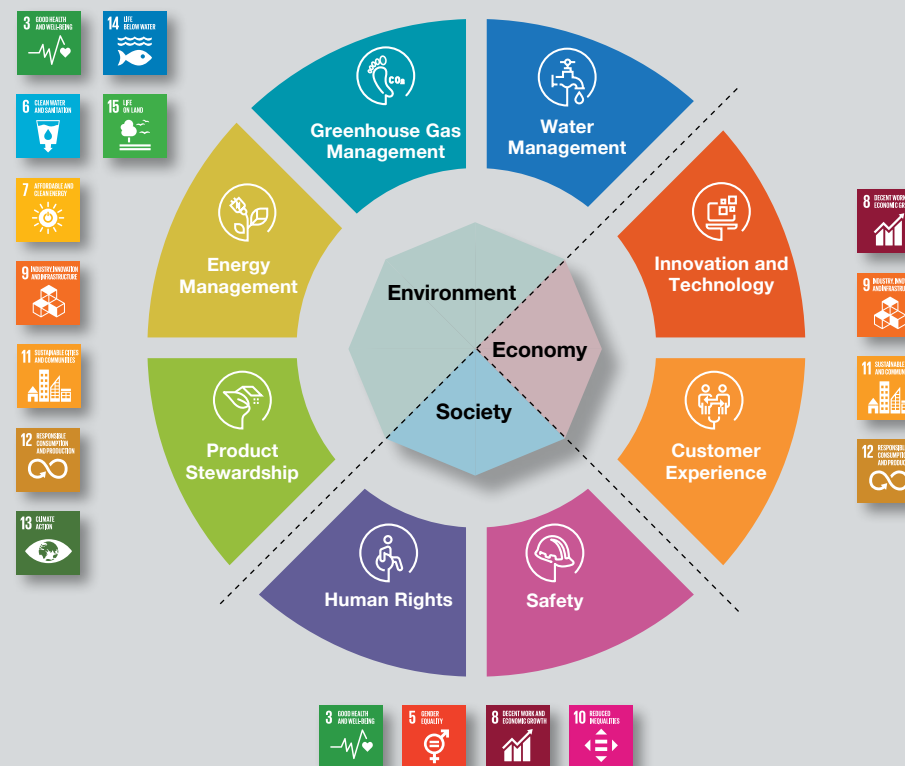
The Challenge of Change

- Long-term planning may not a proper approach in the era of dynamic change in technology and people's behavior. SCG should, therefore, better adjust the strategic plans to be more flexible in order to deal with circumstances and to reduce business risks.
- New generations prefer to study in the fields they believe that they can simply find a job. SCG should have contingency plans to deal with possible risk of workforce shortage in the desired fields.
- Communication via social media plays a vital role in people's understanding, SCG should plan to reach more new generations who have no idea about SCG, by communicating messages that are short, precise, and prompt. Behaviors of the target group should also be taken into account so that SCG will be able to design contents and channels to suit each group's interests.

SCG Materiality



SCG has evaluated and prioritized sustainability issues to which both internal and external stakeholders have attached great importance. It has considered these issues along with risk factors and SCG's sustainability issues throughout the value chain in reference to the Global Reporting Initiative (GRI), GRI Standards. In 2018, 8 key sustainability issues were addressed, as follows:



Summary of Materiality

Economy

Innovation and Technology



- Using digital technology as a tool to optimize business operations, product development, and customer service.
- Expanding investment in research and development of innovations and new business models with new processes and tools.
- Creating an ecosystem which is conducive to innovation and technology development and aiming to establish cooperation with external organizations.
- Promoting innovation culture in which employees serve as a force to create new business models.
- Applying the “Circular Economy” concept to drive innovations and new business models.

2018 Performance

- **4,674** million baht of R&D spending (**1.0%** of revenue from sales)
- **562** copies of patent and petty patent of invention and product design
- **11** new businesses or startups initiated by SCG employees



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Economy

Customer Experience



- Creating participation with business customers in product development to meet consumer needs.
- Analyzing and tracking customer experience to understand customers' problems and needs, product and service purchase behavior and surveying their product and service satisfaction.
- Using digital technology to support services for all groups of customers, business partners, suppliers and contractors.
- Connecting customer experience with online platforms and service points to maximize their convenience and satisfaction.

2018 Performance

- **100%** of overall customer satisfaction based on surveys via SCG Contact Center



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Society

Safety



- Raising awareness and behavioral change to create safety culture.
- Encouraging management or supervisors to act as visible safety leaders who pay close attention to their employees and contractors.
- Using a safety management system to uplift safety standards both in Thailand and regional.
- Developing digital technology as a convenient and fast operation supervision tool to reduce the risk of accidents.

2018 Performance

- **0.038** case/200,000 man-hours of Loss Time Injury Frequency Rate of Employees
- **0.056** case/200,000 man-hours of Loss Time Injury Frequency Rate of Contractors
- **0** case of employee fatality
- **6** cases of contractor fatality
- **59%** of companies in Thailand achieving Safety Performance Assessment Program (SPAP) at Level 4 (Succeeding) or above



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Society

Human Rights



- Announcing Human Rights Policy in accordance with the United Nations Global Compact (UNGC) and the ILO Declaration on Fundamental Principles and Rights at Work.
- Continuously carrying out the human rights due diligence process, consisting of identifying risks, identifying affected groups, planning, and formulating corrective plans and impact mitigation measures, and conducting impact monitoring.

2018 Performance

- **22%** of female employees
- **100%** of suppliers (with over 1 million baht procurement spending) passing the Environmental, Social and Governance risk assessment
- **299** disabled persons employed and received occupational promotion



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Environment

Products Stewardship



- Strive for product development and delivery of total solutions which meet customers' actual needs and are safe and environmentally friendly.
- Product life cycle responsibility, from design, raw material selection, production, packaging, transportation, use, and disposal.
- Using eco-friendly innovations and creating added value to products and services.
- Applying "Circular Economy" concept as an approach to maximize resource use and reduce energy and waste.

2018 Performance

- **202,371** million baht of SCG eco value products and services (**42%** of revenue from sales)
- **75** items of products and services with "SCG eco value" label
- **184,965** million baht of high value-added products and services (39% of revenue from sales)
- **7.3%** of recycled materials compared with total raw materials



Environment

Energy Management



- Improving or modifying processes and equipment to increase energy efficiency.
- Utilizing waste energy in the production process.
- Researching and developing of alternative energy technology with the "Circular Economy" concept as the key strategy.
- Organizing activities to raise employee and contractor awareness on sustainable energy conservation.

2018 Performance

- **189.36** petajoules of total energy consumption
- **7.8%** of energy consumption reduction compared with business as usual (BAU) at base year of 2007
- **11.4%** of alternative energy consumption
- **11** energy projects joining in-house Energy Award program



Environment

Greenhouse Gas Management



- Setting greenhouse gas emissions target in line with the Paris Agreement and the global average temperature rise to well below 2 degrees Celsius.
- Reducing the impacts of fossil fuel use and controlling emissions below legal standards.
- Enhancing the capacity of alternative energy use.
- Developing products and services which help reduce greenhouse gas emissions.
- Reforestation and rehabilitation of forest areas to achieve biodiversity to serve as carbon absorption areas.

2018 Performance

- **24.54** million tons of carbondioxide for Scope 1 and Scope 2
- **7.4%** of greenhouse gas reduction compared with business as usual (BAU) at base year of 2007
- **466** items of products and services certified with the Carbon Footprint Label and the Carbon Footprint Reduction Label



Environment

Water Management



- Reducing water-related risks by means of integrated water management in collaboration with related agencies.
- Applying water footprint assessment to manage and plan water usage.
- Shifting to new technology equipment and machineries to enhance water use efficiency.
- Installing a high technology water treatment system to recycle water to be used within plants and deliver it to outside communities.
- Restoring the ecosystem to conserve external water sources.

2018 Performance

- **110.18** million cubic meters of total water withdrawal
- **8.3%** of water withdrawal reduction compared with business as usual (BAU) at base year of 2014
- **9.3%** of recycled water





We are committed to being an innovation leader on the basis of the sustainable development approach through making changes, being open to collaboration, and self-challenging to upgrade the quality of life for all groups of stakeholders, including customers, employees, suppliers, contractors, communities, and society as a whole and to restore the abundance of natural resources and the environment, which is a cornerstone foundation of a sustainable society.

Passion for Sustainable Living

1

Leading by Innovation

The world society is facing major changes as a result of the advancement of technology, especially digital technology and social media. This has led to obsolescence of various conventional activities, high competition and uncertainty, and new expectations from business organizations. Thus, SCG has set an aim to become an innovation leader which is agilely adaptive to changes and to create a new standard which delivers value to society to ensure its sustainable progress.

What We Do

- **Digital Transformation:** Developing digital technology to be fully utilized in business operations, including the processes of working, product development, transportation and customer service.
- **Coordinating with cooperation networks:** Invention and research of innovations in collaboration with different organizations, including research centers, universities, and experts both national and international, with the SCG Open Innovation Center serving as a space for exchanging ideas and connecting to all parties and sectors. In 2018, there were 598 cooperation projects (399 national projects and 199 international projects).
- **Investment in new business development:** Investing in research and development of high-value products and expanding the investment in startups and high-technology companies with promising future in global markets.
- **Creating innovation culture in the organization:** Training employees in innovation and design thinking and encouraging them to innovate new products and develop them for commercialization.

Project Highlights



◀ **AddVentures:** This company has placed a focus on innovation investment in global markets to look for interesting technologies via direct investment and mutual fund-based investment with a budget of 3 billion baht.

▶ **CiBot™:** Developed by the Chemicals Business, CiBot™, the world's first robot used for cracking furnace pipe inspection, outperforms human beings in terms of precision and speed, which reduces costs and losses.



▲ **Innovative Ideas Challenge:** This internal activity encourages our employees to think, do and present ideas which meet customer needs, whereby interesting ideas are selected to develop commercializable products or solutions.

• **Rudy, intelligent solution:** Developed by the Cement-Building Materials Business as an internal startup, this solution assists construction material shops with introducing interesting products to customers from the beginning to the end of the construction process.

- > Product Stewardship
- > Customer Experience
- > Health and Safety
- > Human Rights

2

Improving Quality of Life

The quality of life of people in society has always been SCG's concern. Thus, we have never stopped inventing or creating useful and high-value innovations to deliver products, services and solutions that meet actual needs of different groups of people while taking into account social and environmental care. Our concern also includes our employees and contractors. Hence, we have been committed to providing strict control of health and safety related practices and continuous enhancement of our employees' capacity.

What We Do

- **Understanding consumer needs:** Analysis has been conducted on diverse customer perspectives and needs to deliver products, services and solutions providing added value throughout the consumer journey.
- **Creating sustainable innovations:** Research and development has been carried out on our products and services by means of new technologies and innovations which are of high value-added, health and environmentally friendly, and meet different customer lifestyles with a wide array of products.
- **Uplifting safety standards:** The risks at work of our employees and contractors have been strictly controlled by creating safety behavior and culture and by continuously assess safety performance.
- **Providing equal treatment for all people based on the human rights principles:** Equal treatment has been provided for all risk groups, such as employees, women, persons with disabilities, indigenous people, local communities, and foreign workers both in SCG and related businesses.

Project Highlights

► Active AIRflow™ system:

A system providing automatic air ventilation and cooling for houses and roof halls, which will make houses to be cool, comfort and save energy from air-conditioner.



◀ **SMX Technology™:** An innovation invented by the Chemicals Business to produce thinner but strong polyethylene plastic resins, which helps reduce resource use, life extension, and reduce environmental impact.

- **Life Saving Rules:** 9 Life Saving Rules which aim to change employees' and contractors' work behavior to ensure their safety, with penalty measures in case of negligence and reward-based promotion measures.



- **FybroZeal:** Paper bag produced by natural fiber with strength, durable and to enhance the high quality of printing on its surface. It is sealed by heat without any plastic film lamination, moreover, it can be recycled and degradable naturally.



- ◀ **FEST:** Clean and highly-safe food packaging made with virgin pulp without bleach or fluorescent substance. It has good heat resistant properties without melting or leaking and is degradable without waste pollution.

3

Enhancing Society

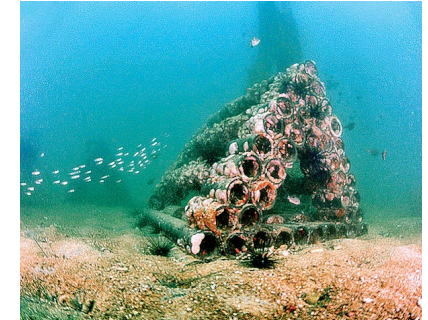
SCG believes that the business will grow sustainably while simultaneously develop communities and society. We started from attentively collaborating and exchanging ideas with all stakeholders, from suppliers, contractors and distributors to communities, private entities and society, to create a sustainable business network. Together with these partners, SCG created a project model that truly benefited the society. It built trust by working with integrity, transparency and fairness to all stakeholders.

What We Do

- **Engaging with every sector:** Deploying SCG's ability, resources and knowledge to engage with employees, private and public sector and communities, and deliver sustainable value to the society and communities.
- **Promoting and developing the capacity of suppliers:** Selecting suppliers with strong potential to ethically conduct business and formulating capacity building plan for suppliers to grow together with SCG.
- **Promoting and developing the capacity of communities:** Passing on knowledge, management skill and sustainable development concept to the communities so that they can independently manage and solve their own issues.
- **Being a role model of sustainable social development:** Organizing cross-sectoral project model to tangibly solve key issues in Thailand and scaling it up to set an example for other organizations.

Project Highlights

► **Fish Homes:** Chemicals Business, together with government agencies and local fishery groups in Chon Buri, Rayong, Chanthaburi and Trat provinces, used PE100 pipes to build fish homes as the nursery of marine life. This project not only increased fishermen's income, but also built a marine conservation network of 37 fishery groups.



▲ **Brain-Based Learning:** Cement-Building Materials Business donated excess materials from the factory to schools, which turned them into brain development playground based on Thai Health Promotion Foundation's pattern. It helped develop the children's brains by 84%.

• **Go Green Together:** In 2018, SCG encouraged 833 suppliers to certify Green Industry Level 2 from the Ministry of Industry and 13 SCG subsidiaries to certify Green Industry Level 5.



▲ **Paper Band:** Packaging Business donated used paper band from paper production process as a raw material for basketwork products to Baan Ta Takraw community in Kanchanaburi province. This created a job and annually generated income over one million baht yearly for the community.

- > Material Use and Waste Management
- > Energy and Climate Change
- > Water Management
- > Biodiversity and Ecosystem



Wealthy of Our Planet

Climate change has become an urgent issue everyone on this planet must address. According to the Paris Agreement, people should participate in reduction of GHG emissions to keep the global average temperature rise to well below 2 degrees Celsius.

Throughout these years, SCG has enhanced the efficiency of its production process, found more sources of renewable or alternative energy, optimized the resource consumption, and optimally recycled waste under the approach of circular economy to mitigate environmental impact of land, air and water pollution.

What We Do

- **Setting the target to reduce GHG emissions:**

Within 2030, SCG aimed to reduce GHG emissions per production unit by 28% compared with business as usual at base year of 2007 in line with the Paris Agreement and the global average temperature rise to well below 2 degrees Celsius.

- **Driving circular economy:** Defining circular economy as the key business strategy to optimize the use of limited global resources and pose the least environmental impact.

- **Environmental innovation:** Conducting research and development on the use of alternative energy, recyclable resource and wasted energy in production process, and controlling the emission of air and water pollution.

- **Restoring biodiversity:** Creating a balanced ecosystem in areas where SCG operate and engaging surrounding communities to sustainably preserve biodiversity.

Project Highlights

- ▶ **Solar-powered cement plant:**

All of SCG cement plants were installed with solar cell system, which has the total production capacity of 51 megawatts and reduces GHG emissions by 41,000 tons carbon dioxide per year.



- ◀ **Power plant powered by non-hazardous industrial waste:** SCG Paper Energy Co., Ltd. generates electricity with 100,000 tons per year of waste rejected from its paper production.

- **Power plant from industrial waste in Map Ta Phut:** In collaboration with the Industrial Estate Authority of Thailand and Department of Industrial Works, SCG under the said partnership has developed the power plant using hazardous wastes from industry as its feed wastes, approximately 65,000 tons yearly. The plant is under construction at Map Ta Phut Industrial Estate, Rayong province.

- ▶ **Asphalt road made from the mixture of plastic waste:** SCG, joining with Dow Thailand Group, invented an innovation that turned plastic waste from the communities such as plastic bags and straws into asphalt roads that made the road stronger.



- **Seagrasses for dugong:** SCG, in collaboration with Dugong Preservation Group in Trang province and experts, planted 4,000 seagrasses by following the academic principles to be the source of food for dugong, the nearly extinct animal of Thailand.

Sustainability Performance in 2018

Social Contribution

748

million baht

Sharing Opportunities, Drawing the Future Program

217 **25**
projects million baht

GHG Emission Reduction
(compared with BAU
at the base year of 2007)

1.95 | **7.4**

million tons carbon dioxide percent

Research and Innovation Spending

4,674 | **1.0**

million baht percent of revenue from sales

HVA Products
and Services

39

percent of revenue from sales

Green Procurement
Purchased

9,698

million baht

"SCG eco value"
Products and Services

42

percent of revenue from sales

Carbon Label Certified
(Carbon Reduction Label and Carbon
Footprint Label)

466

items

Suppliers Being Conducted
Environmental Social and
Governance (ESG) Risk
Assessment

100
percent
(of suppliers with procurement
spending over 1 million baht)

Hazardous/Non-Hazardous
Waste to Landfill

0.0/13.3
percent

Environmental Expense and Investment

3,465 **0.72**
million baht percent of revenue from sales

Energy Consumption Reduction
(compared with BAU
at the base year of 2007)

16.08 | **7.8**

petajoules percent

Alternative
Energy

11.4

percent

Recycled Water

9.3

percent

Water Withdrawal Reduction
(compared with BAU
at the base year of 2014)

10.03 **8.3**

million cu.m.

percent

Lost Time Injury
Frequency Rate
(cases per 200,000 man-hours)

Employee **0.038**

Contractor **0.056**

Logistics Drivers Trained from
"SCG Skills Development School"

17,024

persons



Number
of Check Dam

84,266

units



Materiality

Innovation and Technology



Global communities are facing a big change caused by the advancement of technology; especially, digital technology and social media which render many forms of activities obsolete. They also give rise to intense competition, uncertainty and new expectations imposed on business organization. SCG therefore aims to be an innovation leader who is agile and adaptive to changes; ever ready to set new standards that deliver value to, and move the society forward sustainably.

Target

- SCG is committed to being a leader in innovation and technology related to SCG's business operations, both at the national and ASEAN levels.

Strategy

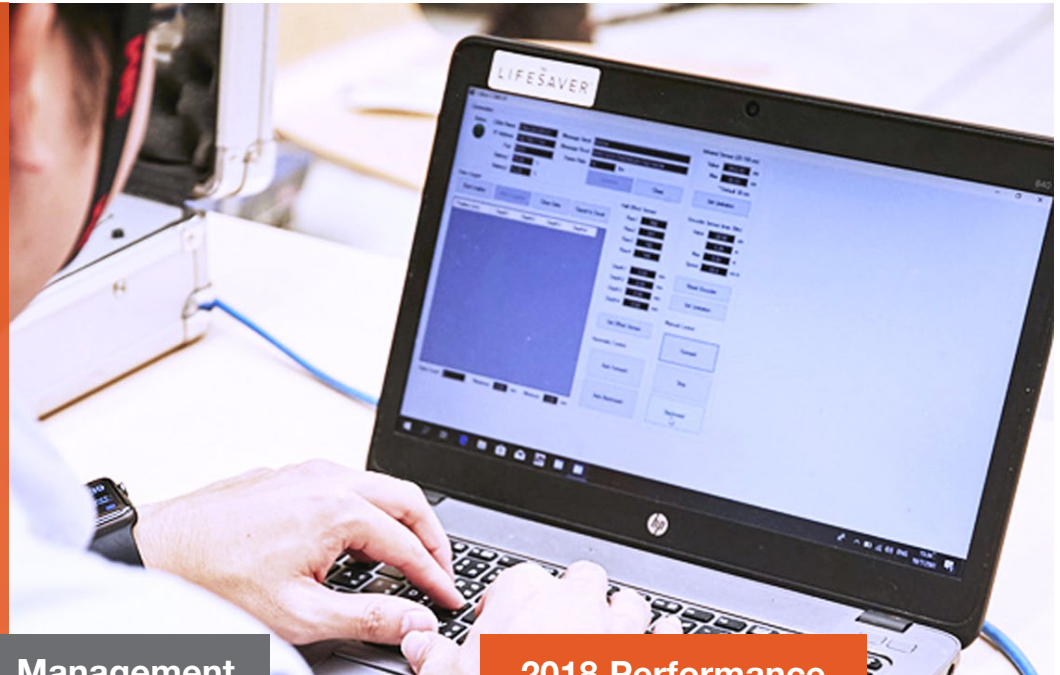
- 1 Use digital technology as a tool to increase efficiency in businesses, product development, transportation and customer service.
- 2 Further invest in research and development of innovative new business models through new processes and tools.
- 3 Create an ecosystem that is conducive to innovation and technology development, and aim to collaborate with external agencies.
- 4 Promote the culture of innovation, driven by a new creative business force within the employees.
- 5 Apply circular economy concepts to drive innovation and new business models.

Management

- Established the SCG Innovation Committee with a role in determining the direction of innovation and support the creation of culture conducive to innovation and technology application in order to become the business that meets the need of the markets at the national, regional and global levels.
- Established the SCG Open Innovation Center housing an exemplary innovation display area, laboratories, and conferences for exchanging ideas and networking with various organizations-universities and research centers-and experts, both at home and abroad.
- Develop innovation creation processes using the Innovation Management System concept.

2018 Performance

- **4,674** million baht of R&D spending (**1.0%** of revenue from sales).
- **562** copies of patent and petty patent of invention and product design.
- **11** new businesses or startups initiated by SCG employees.



CiBot™ Industrial Furnace Coil Inspection Robot

Strategy ②

- SCG invented CiBot™, the first petrochemical industry metal pipe inspection robot in Thailand.
- CiBot™ can measure the degree of carburization, and the degrees of bulging, and bowing of the pipes simultaneously.
- It works 7 times faster than humans.

One important task in the industrial work process is inspecting various machinery and equipment if their conditions meet the standard. Unfortunately, some pieces of equipment are difficult to access or pose the risk of accidents; especially those in confined spaces or at high elevation common in the petrochemical industry. SCG therefore developed CiBot™, an innovative robot that monitors the condition of metal pipes in the olefins plant reactors. Because the metal pipes are pieces of equipment that are continuously exposed to heat released from the reactors, they can bulge, bow and crack; hence, the need for consistent monitoring.

Using the CiBot™ robot reduces the operational risks the staff is exposed to. CiBot™ can measure the degree of carburization, and the degrees of bulging, and bowing of the pipes simultaneously-accurately assessing the conditions and evaluating the life of the pipes at any point while working 7 times faster than humans.



2018 Performance

- **10** CiBot™ units has been manufactured and deployed.
- Having served over **10** petrochemical plants and refineries around the world.

Click
Video



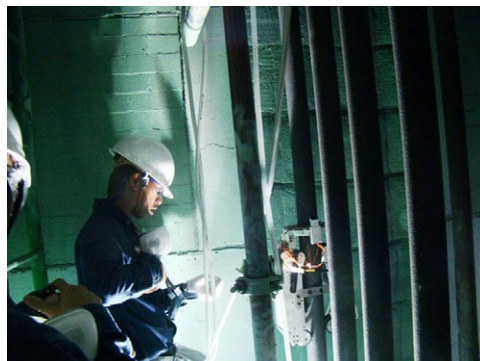
“

I felt proud when I saw the reaction of foreign customers who were surprised that it is a robot completely made in Thailand and it is the world's first robot that can measures carburization, bowing and bulging. Also, it has already been patented.”

Phisarn Pandum
Robotics Engineer

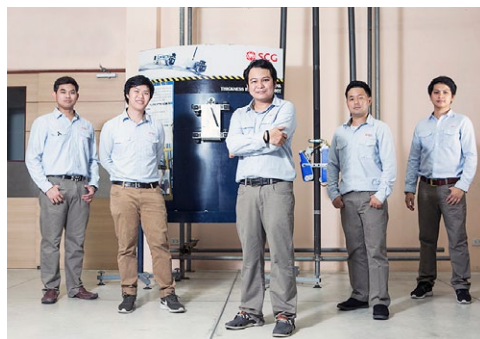
Rayong Engineering and Plant Services Co., Ltd.,
Chemicals Business

Chemicals Business's Robot Innovation Development Journey



Commenced the research and development of the first CiBot™ (Carburization Inspection Robot)

2009



Pursued the development of the tank inspection robot

2013

Improved the performance of CiBot™ and commenced the development of a tank inspection robot

2014

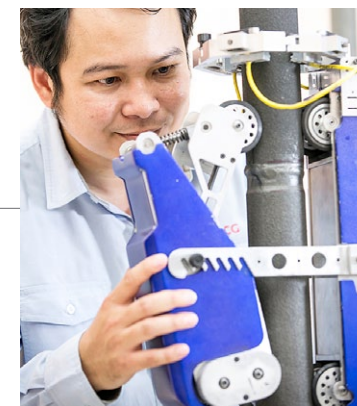


Enhanced the efficiency of the tank inspection robot and CiBot™

2015

Developed an Aerial Visual Inspection Robot

2016



AddVentures Seeks New Innovations in the Global Market Strategy ② ③

- AddVentures' investment plan aims to support startups in Thailand and abroad in order to connect SCG with and attract external innovations.

SCG adjusts to the changes in technology of today's world by establishing the company AddVentures, aiming to build cooperation with the startups around the world so that SCG can search for and bring in interesting innovations to develop SCG businesses, and to quickly respond to the needs of modern consumers.

AddVentures is a CVC (Corporate Venture Capital) type of company officially launched in 2017. It invests through Fund of Fund investment and carries out direct investment with startups in Thailand, ASEAN and the global technology centers such as Silicon Valley in USA, Tel Aviv in Israel and Shenzhen in China, with a focus on technologies that meet and align with SCG's core businesses, including Cement-Building Materials Business, Chemicals Business and Packaging Business.

At the same time, the investment by AddVentures increases the growth opportunities for startups via SCG support on technical know-how, experts, and capital as well as SCG's network of business partners and allies throughout ASEAN.



2018 Performance

- Invested through the Fund of Fund investment, **2** of which are Wavemaker and Vertex Ventures.
- Carries out direct investment in **9** startups such as Builk-a construction business management platform, GetLinks-a recruitment platform by Thais focusing on 3D (Developers, Designers, Digital Marketers), and GIZTIX-a Thai logistics platform bringing in transport management innovations to enhance SCG's logistics business efficiency, etc.



AddVentures is ready to be a platform for startups globally working with SCG in many ways; such as being a technology user, conducting direct investment, pursuing joint development of a new business in the market where SCG operates. Working with these startups will accelerate the digital transformation of SCG, where by adapting more quickly and opening up to more new business opportunities."

Dusit Chairat
Corporate Venture Capital Fund Manager

HATCH-WALK-FLY: Incubate Ideas, Shift the Gear of the Startup Businesses

Strategy ③ ④

- SCG strives to promote innovation culture within the organization.
- HATCH-WALK-FLY is the SCG's startup support project providing the platform for its employees to present and develop ideas into new business models, assisted and advised by SCG and external agencies.

Under the concept of bringing innovation and technology to business in order to meet rapidly evolving customers' demand, SCG not only seeks cooperation with external startup groups but also strives to encourage its employees, especially the new generation, to think, take actions, and adopt an entrepreneurial mindset. This is the origin of the internal startup project named HATCH-WALK-FLY, which provides opportunities for employees to present interesting new business models. Through this project, SCG provides both the technical know-how and funds to develop the new ideas into new businesses.

The HATCH-WALK-FLY project consists of 3 phases:
HATCH - Search for customer needs or interesting issues.

WALK - Build and test a way to respond to needs or solve problems.

FLY - Expand or develop into a business

There are now several teams of SCG employees, which have presented their business models and have passed the HATCH phase, entering the WALK phase.



2018 Performance

- There are startup projects by SCG staff, of which **35** teams are in HATCH phase and **9** teams are in WALK phase.

MeZ, an Online Agricultural Market Platform

MeZ is one of the HATCH-WALK-FLY projects that has been developed into a business under the concept of Farm-to-Table Platform, allowing farmers to sell products directly to consumers without having to go through middlemen. This is achieved by using online channels including Facebook, Instagram, and MeZ's LINE@ account. MeZ also helps farmers with marketing, pricing, order management, packaging and logistics systems.

From the beginning in mid-2017 until now, there have been more than 20 farmers participated, who own fruit orchards in Rayong, Chanthaburi, Chumphon, and Surat Thani. The platform offers agricultural products (fruits) for sale, including durian, pomelo, oranges, yellow Marian plum, etc. It has served almost 2,000 customers ordering the products.



“This project was originated from our team getting involved with the farmers and finding that they often suffered the problems where the prices of agricultural products were forced down by middlemen. We therefore came up with the ideas to help farmers to sell their produce directly to customers. We started with the durian, and then expand to other fruits, helping the buyers get fresh products and the seller get a good price. In the future, we aim to increase the monthly income, increase the number of participating farmers, and offer a wider variety of produces. When consumers come to MeZ, they can choose to buy from a variety of fruits selection without having to look elsewhere. That is, if you think of fruit, think of us.

The MeZ business does not involve SCG at all. We have worked full time. The job is different from the previous one which has well-defined duties and work plans. But for this job, we must learn and do everything by ourselves.”

Pharanee Busayapal
One of the MeZ Creator



2018 Innovative Ideas Challenge

Strategy ③ ④

- Promote the culture of innovation in the organization.
- Encourage employees to think then take actions, and foster a customer centricity mindset and collaboration between departments or business groups.

SCG has held the Innovation Award contest since 2005, focusing on projects of which the products had already been commercialized. In 2018, SCG changed the concept and renamed the event Innovative Idea Challenge to return to the beginning of its all: creating new ideas through nurturing a culture that dare the employees to think, take actions, and understand that innovation permeates the daily life and everyone can contribute. The contests also encourage cooperation within the department, across the departments or across business groups.

This time, there were 150 teams of staff interested and applying to join the contest (2-3 persons per team).



The selection committee then selected 30 teams to join the workshop during the Incubation Program where experienced coaches helped refine and realize the ideas. Each team also learned the concept of Design Thinking, which are about empathizing and defining customers, ideation, as well as creating business model with Business Model Canvas tool.

After learning and going through the workshops on each topic, every team was required to put the ideas to the test or find customers in the real market to get feedbacks upon which the team then modified or re-developed the ideas to better serve the customers.

The final phase of the contest was Pitching Day. Every team had the opportunity to present their fully developed ideas to the committee-comprising of relevant departments from each business group-to consider the possibility of continuing with the ideas.



2018 Performance

- Out of **30** teams participating on Pitching Day, there are **2** teams that won the Best Pitch award: the Thai Mai team and the COLD-DE PACKAGING team.
- Even though some projects did not receive the awards, the staff did learn and tried to make the idea come true. Those ideas can be applied in their own departments or in collaboration with other departments.

Team COLD-DE PACKAGING

Methee Phattananurak R&D, Packaging Business
Karatphet Kaneungpien Account Executive-E-Commerce, TCG
Hansawanthana Daojaratsaengchai Product Development Specialist, TCG



Deliverable: At present, products requiring temperature control (such as fruits and vegetables) must be transported through the Cold Chain (temperature-controlled/refrigerated cargo). Therefore, they cannot be transported via general package transportation channels. COLD-DE PACKAGING was designed to allow transportation of this type of packages together with the other general packages, saving the cost and reducing the sorting time of the packages. COLD-DE PACKAGING's main feature is the maintenance of constant cooling throughout transportation period without water leakages. Importantly, it is made from environmentally friendly and easily degradable materials. Currently COLD-DE PACKAGING is being implemented and tested with customers in order to fully meet their needs.



The 2018 Innovation Idea Challenge contest is a very good project, promoting and supporting SCG's new innovations. Throughout the entire program, I learned new things about the business models, and enjoyed the atmosphere and the colleagues participating the project, all of which were very facilitative and conducive to the continuing development of other innovations."

Hansawanthana Daojaratsaengchai

Team Thai Mai

Prathaya Nitchot
Dumrongwit Mahisaya

Special Project Department, B2B Business Division
SCG Cement-Building Material Co., Ltd.



Deliverables: Because the traditional materials used to create Buddhist art designs for temple decorations, are often difficult to find and expensive because they are folk-wisdom based. One example of these traditional materials is "Poon Tum," a traditional stucco, etc. Additionally, specialized craftsmanship-currently considered rare and insufficient-is required to produce these materials. The Thai Mai team therefore had an idea to make decorative pieces using modern material: polyethylene (PE) which is durable, easy to install, standardized and allowing precise control of the construction budget. The 2 decorative pieces the team presented are 1) the pattern for temple doors and windows and 2) the pattern of gable of the temple. These pieces can replace the use of wood and stucco. The workpieces made from PE help to reduce both the material and labor costs for construction work, by approximately 30% in total.



This Innovation Idea Challenge contest gave the team an opportunity to try new things, encouraging us to decide and take action. We also learned the theories and processes of creating and launching the new workpieces to market. We better understand customers, gaining new experience and ideas from participants in the seminar for further developing the work."

Prathaya Nitchot

Employee Caring and Development



The current business world is fiercely competitive. There are volatility, uncertainty, complexity, and ambiguity (VUCA) changes which employees have to be ready to answer the ever-changing business direction. SCG, therefore, creates flexibility in learning so that employees can learn new skills and knowledge at all times and keep up with the situation by supporting basic factors for learning to occur quickly, efficiently, and with maximum effectiveness. There is a close monitoring system for the development of employees individually.

Target

- All 100% of employees in Thailand are evaluated for their competency and the development of Individual Development Plan (IDP) on all learning management system (LMS) continuously every year.
- Every employee has a number of learning and development days through the 70 : 20 : 10 process (including training days); an average of 13 days.

Strategy

- 1 Create learning with the same standard across the region by adhering to the Role-based Competency.
- 2 Create a culture of learning and coaching by employees responsible for their own learning and development with supervisors as supporters.
- 3 Connect the learning of employees to the Talent Management System for maximum efficiency and support the business needs.
- 4 Develop the ability of employees to meet business competition and develop leaders to have attitudes, knowledge and abilities, and be able to develop subordinates to have potential as an important force of SCG.
- 5 Create supporting factors for learning by using the Learning Management System (LMS) that has the same quality and standard throughout the region as well as learning in the form of a digital classroom.





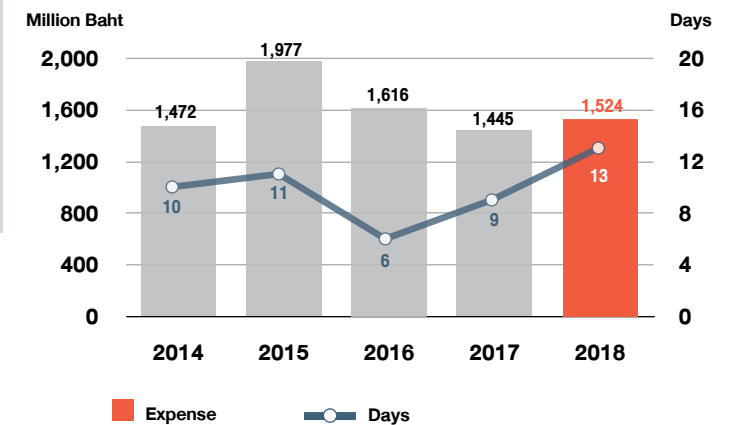
Management

- Establishment of committees and responsible functions for employee learning ranging from SCG Learning Council, BU Academy Committee to Professional Academy Committee to ensure that every employee will receive knowledge and development.
- Establish a Learning Policy to enable learning management to have the same standard everywhere, with emphasis on 70 : 20 : 10 learning process.
- Expand the development of Individual Development Plan (IDPs) on the Learning Management System (LMS) for employees in Indonesia, Vietnam and the Philippines.

2018 Performance

- **100%** of employees in Thailand are evaluated for their competency and the development of Individual Development Plan (IDP) on the Learning Management System (LMS).
- Every employee has a number of learning and development days through the 70 : 20 : 10 learning process (including training days); an average of **13** days.
- Expense for learning and development of internal and external employees is of **1,524** million baht.

The Expense of Learning and Development and the Number of Average Training Days of Employees.



Learning in the Digital World

Strategy ⑤

- SCG uses digital technology for employee learning and development, from individualized learning management system (LMS) to develop training courses in a digital classroom format instead of regular classroom.
- Improve and add content in training courses on digital technology so that employees have the potential to respond to new business operations.

At present, digital technology is rapidly changing society and business operations. In response to this change SCG has supported the use of digital technology in learning management services and staff development in many areas in order to increase the efficiency and capabilities of employees in line with the business direction.

- The iPMS Platform is a platform developed for individual employee performance management to make staff management clear, fair, and have good communication between supervisors and employees on a regular basis.
- Employee Connect is an application developed to facilitate employees to search for information about work, regulations, welfare, including requests for leave and overtime work, etc.



- Improve training contents through digital technology integration from the classroom level towards higher learning efficiency by which employees will become familiar with the higher approaching dimension and increasing result responsibility based on the 2017 pilot project. In 2018 the Young Leader with ABC (Abridged Business Concept) attended by most employees has been adjusted to be the 100% digital training course with additional workshop projects to enhance digital knowledge applying.

- Apply digital technology and Micro Learning to use in general skills and knowledge courses so that employees have the flexibility to learn more anytime, anywhere.
- Bring Gamification system, AR technology to use in activities of some courses such as Welcome to SCG (SCG Warm Welcome) to provide a new learning experience for employees.
- Improve and add training content in the field of knowledge about technology that comes into society such as A.I. Blockchain IOT, etc., to allow employees to acquire new knowledge and skills that are essential to sustainable change and growth. In addition, the curriculum is developed jointly with the university, such as cooperation between cement and building materials business together with King Mongkut's University of Technology, North Bangkok in exchanging knowledge in new businesses.

In the future, SCG plans to expand its Learning Networking by focusing on the knowledge that is consistent with the new business guidelines and the mutual benefits of the network.

2018 Performance

- There are approximately **1,000** employees entering the digital learning system and the average satisfaction is **4.50** (full score 5).

Executives Keep Pace with the World

Strategy ④

- Improve the curriculum for the development of staff at the executive level in order to be in line with the situation and new business practices and the transition from products-oriented to services and solutions-oriented.

Any change in the organization will not be successful if the executive of the organization itself cannot be a leader in the change or lack of knowledge and understanding of new business situation and direction. SCG, therefore, gives importance to the development of executives continuously by designing and developing courses for the development of executives at various executive levels and has constantly updated the curriculum to be up-to-date.

In 2018, there are curriculum improvements such as Management Development Program (MDP), Management Acceleration Program (MAP) and Business Excellence through Service Transformation (BEST). The SCG courses are co-designed with leading institutions of the world DukeCE by more recent knowledge in line with the current situation, such as Design Thinking, Agile Process, Business Model Canvas. The curriculum focuses on creating thinking processes in order to understand the problems of customers deeply and to bring a variety of perspectives for creating new ideas, testing and improving to get new business model. Also, it is the shifting from a business that focuses



on providing product-oriented to providing service and solution or innovation-oriented that shall respond to rapidly changing customer needs, as well as seeing an overview of the business and assessing the risk of managing more efficiently.



2018 Performance

- The BEST course has **35** executives in a 6-month learning period.
- MAP courses allow **40** executives to travel and study abroad for a period of 7 days. The assigned report will be prepared from learning and experience, in line with SCG's international business expansion approach.

Organization Commitment Surveys

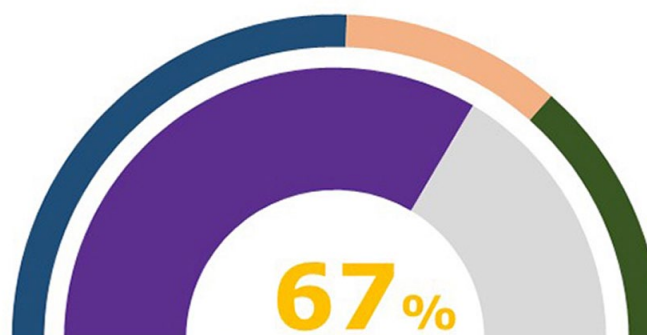
Strategy ④

- SCG has conducted organization commitment surveys covering both domestic and international employees, jointly with the Aon consultant firm.
- The surveys which covered 67% of all employees identified organization commitment at the medium to high levels.

SCG recognizes employees are the company's resource of the highest value who have driven their organization toward sustainable business development in all successful sectors and every performing country. Accordingly, it extremely requires how to create nurturing environment to have everyone willingly work with the organization. SCG, thereby, had continually surveyed employee's commitment until 2016 when the project was jointly launched with Aon, the world-class consultant firm to study employee's commitment to the organization and excellent employers. The survey mainly aims to have feed backs to enhance organization improving development and adjust employee's caring standards up to that of the international company level. This survey has been planned for every 2 years to allow sufficient period for practical implementation prior to the following study.

In 2018 the second survey was launched, following the first one in 2016, covering all employees both in Thailand and other countries where SCG has business operation including Cambodia, Indonesia, Myanmar, Philippines and Vietnam. The two main questions are of employee commitment and the driving factors, i.e., the pride in their organization, opportunity for career advancement, quality of the working life, etc.

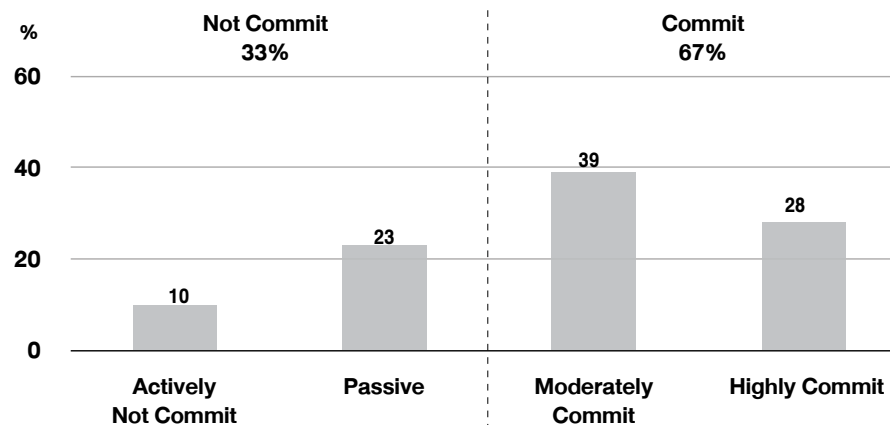
Organization Commitment



22,584 persons from 33,875 persons are of organization commitment

- Bottom Quartile (0-51%)
- Moderate Zone (51-73%)
- Top Quartile (73-100%)

Organization Commitment Level



2018 Performance

- The 2018 survey outcome reveals that **67%** of the responding employees are of organization commitment which is **1.5%** higher than that of the former one (in 2016) at the coverage of **67%** of the overall employees (34,822 persons from 51,922 persons), higher than the former survey by **25%**.
- The feedback, that SCG needs to focus for continual improvement identify Talent and Staffing, Collaboration and Career Opportunities.

Products Stewardship



The exponential development of technology affects the changes of consumer behavior. Therefore, the product and service development must be done to meet the demand of the consumer in each segment. SCG focuses on delivering the integrated solutions that comprehensively solve the customers' problems and offering them benefits or value creation, especially good quality of life and environmental care by using innovation and digital technology as tools to develop safe and high value-added products and services. Furthermore, SCG implements the concept of circular economy to reduce energy as well as waste and resource consumption.

Target

- To achieve two-third of total revenue in 2030 from SCG eco value products and services.
- To achieve 50% of total revenue from high value-added products and services.
- Within 2019, all Business Units must implement the product and service liability assessment cover all companies.

Strategy

- 1 Develop trustworthy products and services that sustainably serve the customers' needs.
- 2 Develop value-added products and services that meets the customer's requirement.
- 3 Create affordable innovation that meets the standard by all customer segments.
- 4 Create a standard of eco-friendly products and services.



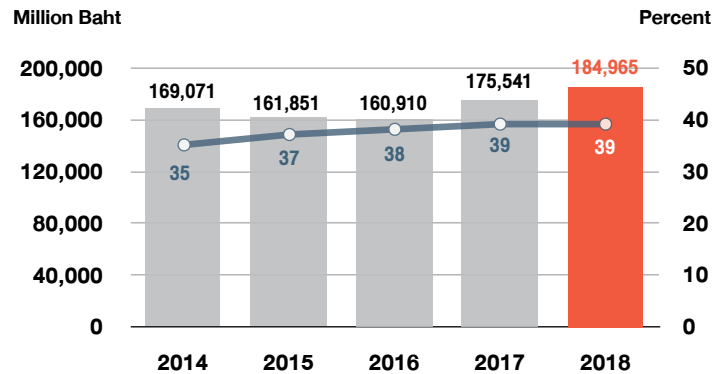
Management

- Implement circular economy concept to optimize resource utilization and reduce waste and energy consumption.
- In 2018, Chemicals Business set a direction of product and service development and assessed both positive and negative impact on environment, health and safety throughout the product lifecycle, from the process of designing, raw material selection, production, packaging, product delivery, marketing, utilization and disposal.
- In 2018, Chemicals Business established a committee to manage hazardous substances. SCG formulated strategies to reduce hazardous substances in the products, decrease the consumption, and find a substitute for hazardous substances by conducting both internal and external R&D and applying best practices.

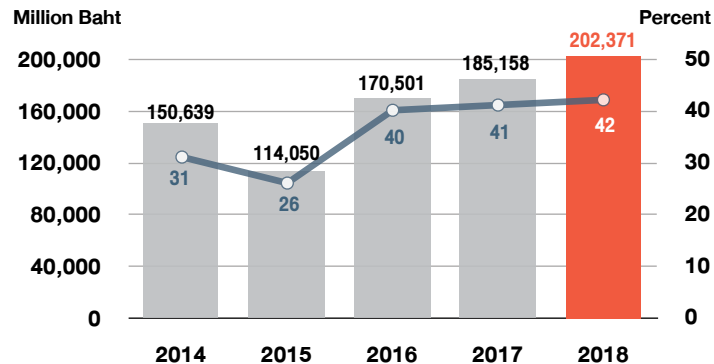
2018 Performance

- **202,371** million baht of SCG eco value products and services (**42%** of revenue from sales).
- **184,965** million baht of high value-added products and services (**39%** of revenue from sales).
- **75** products with SCG eco value label.

Revenue from Sales of High Value-Added Products and Services



Revenue from Sales of SCG eco value Products and Services



Certified Environmentally Friendly Products and Services



SCG eco value

75
products



Green Label

78
products



Carbon Footprint Label

426
products



Carbon Footprint Reduction Label

57
products



Carbon Reduction Label

40
products



High-efficiency Label

145
products

Total Home Ventilation Solution

Strategy ①

- A stuffy house usually has high indoor temperature in the evening, leading to high energy consumption of air conditioning system. As a result, good air ventilation is a crucial factor and can be managed by diverse methods.
- SCG has come up with a number of innovative solutions such as Active Airflow™ System, Well Air, and SCG Roof Ventilation Solution to improve air quality and quickly ventilate airflow and heat from the house, resulting in lower electricity consumption of air conditioning system.

“Hot” is a commonly used word among urban people because of drastically increasing of higher temperature in Thailand. Including with the behavior of urban living people who usually leave their home to work all day and keep the house closed, the heat shall be accumulated in the house without good ventilation. As a result, the house becomes warm and stuffy.

Cement-Building Materials Business has invented a variety of innovations to keep houses cool under the principle of “temperature cooling down faster but increasing temperature slower”, focusing on ventilating hot air from the house and through the attic and reducing heat flowing into the house.



- **Active Airflow™ System** is a solution that quickly ventilates air and heat from the house under the principle of thermal convection. It allows the external air flow into the lower floor through an intake air grille and then a ceiling ventilator brings the indoor heat to the roof. Eventually, the heat is ventilated from the house through a solar roof tile ventilator, which may consume solar energy from rooftop solar panel as the alternative hybrid source of energy. This system not only reduces the stuffiness, but also saves 16-20% electricity consumed by air conditioners.

Active Airflow™ System



• SCG Roof Ventilation Solution

is the innovation that ventilates heat under the attic by using low-speed natural wind under aerodynamic principle instead of electricity. As a result, the indoor temperature will be increased more slowly in the morning and will be decreased faster in the evening.

• Thermal wall and Insulation

The effectiveness of heat reduction in the house depends on construction materials that reduce heat transfer to the house. SCG designed lightweight concrete wall (Q-CON) and ceiling fiberglass insulation (Low Thermal Bridge Ceiling System: Stay cool) that reduce the energy consumption of air conditioner by 20%. The high-quality fiberglass insulation lasts longer than 10 years. It is safe because it is made from 100% recycled glass, which has been certified by green label and SCG eco value label.

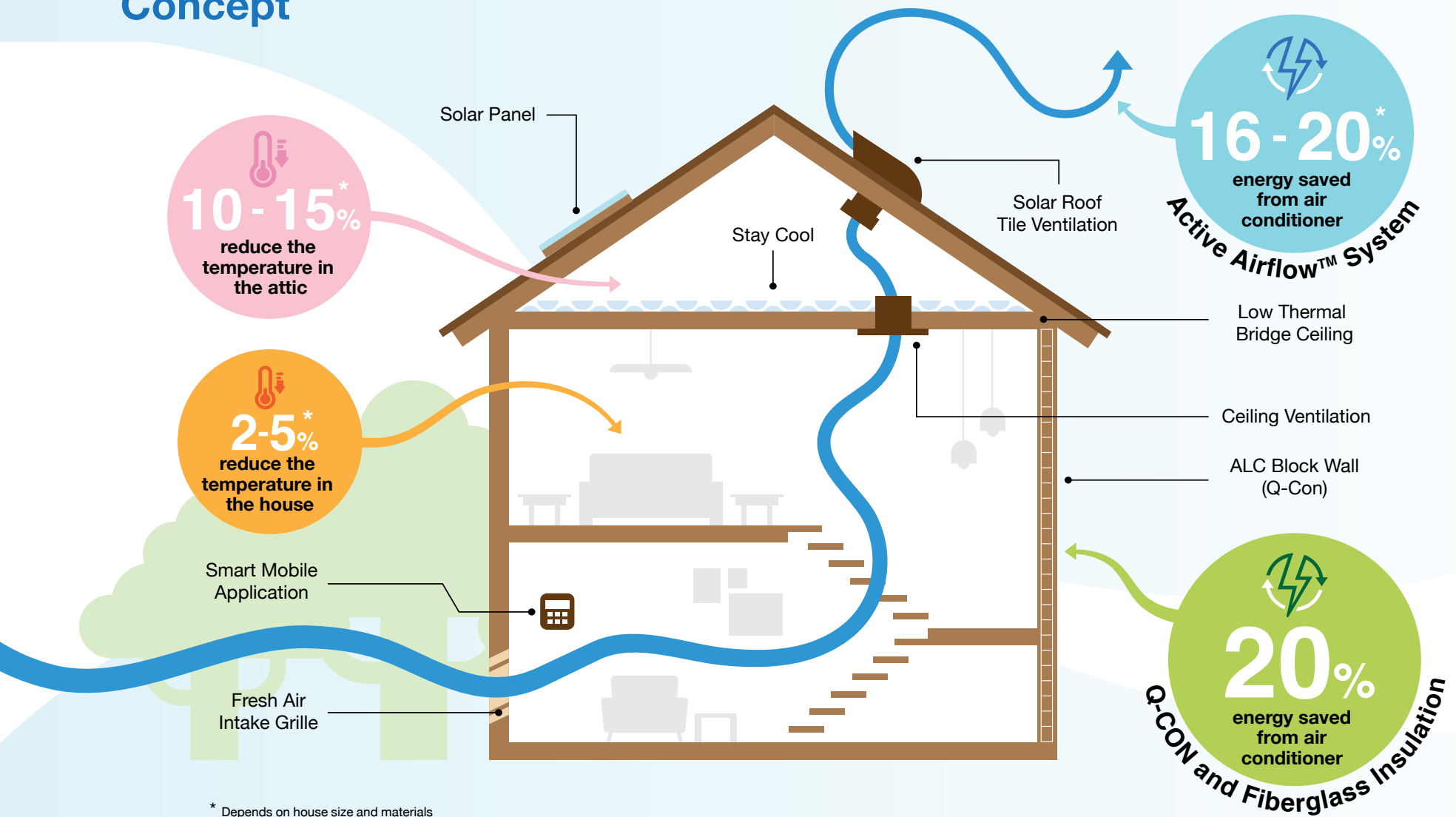


- **Well Air** Besides the heat, another crucial factor for cool and comfortable house is air quality control. Well Air is the innovation that controls indoor air quality by ventilating polluted air from the house to reduce pollutants such as Volatile Organic Compounds (VOCs), relative humidity and CO₂. It creates the perfect quality of the room living throughout the day.

Active Airflow™ System



Total Home Ventilation Concept



Prefabrication Construction Solution

Strategy ① ③

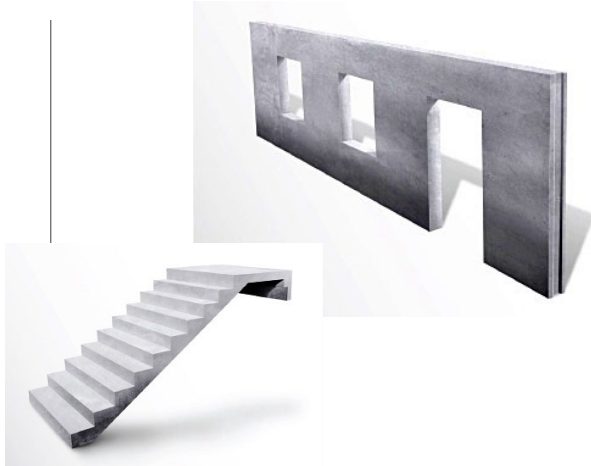
- For construction solution, SCG has designed and produced parts based on building structure and application. Once having been completely built up by the factory, these parts are promptly assembled and installed at the job site. This reduces the construction period, the number of workers, dust and construction waste at the site, leading to less resource consumption under the principle of circular economy.
- SCG focuses on developing a variety of prefabrication construction solutions with a highly accurate automation system that meets the quality standard.

“No workers”, “delay”, and “sub-standard work” are common construction problems when everything is managed at the job site. This solution starts from the need-based design. Then, prefabricated work pieces will be produced at the factory, which controls standard and quality, before being installed at the job site. The construction can therefore be completed faster while requiring a small number of workers. The work pieces also match the drawing and meet the desired quality. Most importantly, they reduce dust and construction waste. SCG focuses on developing prefabrication construction solution in line with the concept of circular economy, which optimizes resource utilization and minimizes waste and energy consumption during operation.



- **SCG HEIM** is a house with 80% of the structure and pieces are prefabricated by high-standard modular system at the factory. The system uses automated robots to produce parts and different modules of the house are transported and assembled at the job site. That is why the construction can be completed in a short period of time and reduce construction waste at the job site.





• **PRECAST Concrete System**, which is computerized system, controls the production to reduce human errors and defects of precast equipment. It therefore delivers precise and accurate precast concrete that has consistent quality and is ready for on-site installation. During the operation, the site looks tidier because the system reduces construction waste to less than 5%. It also decreases noise pollution and dust, which impacts the overall environment and surrounding communities. Furthermore, the system lowers the cost because it shortens the construction period and saves labor cost.

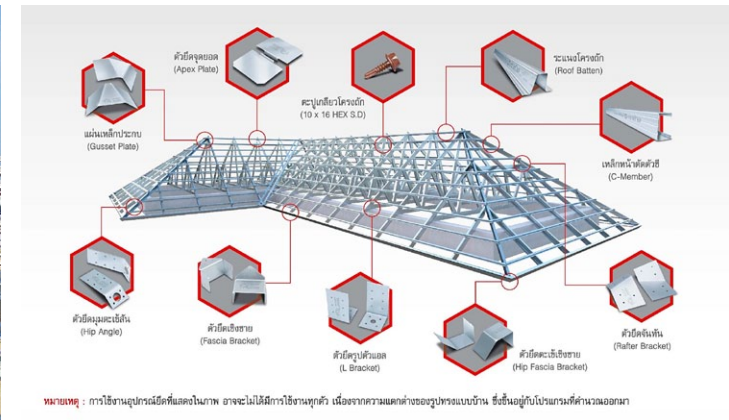


• **Roof Truss System** produces parts of a roof structure from the factory based on the owner's or architect's drawing and the actual area measurement at the job site. The size and length of each piece are designed and calculated under the principle of engineering. These products are assembled at the job site by using screws, with no welding required. As a result, fast and accurate installation can be delivered.



• SCG Modular Bathroom

is designed according to the area size and the customer's needs before being produced at the factory in order to not only control quality, but also ease and minimize on-site installation. Furthermore, we select PEX cold water pipes for the bathroom, which have fewer connections and reduce leakage. They are also lead-free to lower the risk of heavy metal contamination in the human body and environment.



2018 Performance

• Prefabrication construction solution is very popular among customers who are in the business of commercial building construction. That is because it is not only fast and convenient, but also can control the quality of work to ensure standard consistency.

Eco-Friendly Packaging Strategy ① ③

• Packaging Business maintains its focus on developing a diverse range of packaging using high quality and eco-friendly materials; for instance, a recyclable plastic packaging or biodegradable food packaging made from natural fibers.

Feeling responsible for the earth where every life co-exist, especially for the waste problem of packaging that is difficult to degrade or non-recyclable, Packaging Business therefore, focuses on producing eco-friendly packaging in different designs and applications.



• **R-1**, a recyclable plastic film packaging, is manufactured with Multilayer Laminated: Mono Material which is used in packaging production for various industries.



• **Fest**, a biodegradable food packaging made from natural fiber, is well-served for hot and cold food, manufactured with natural fiber from contract farmers, encouraged by SCG to plant trees and earn extra income. The packaging itself is strong, durable, easy-to-use, and microwavable.

• **Fest Paper Straws** are made of food contact paper which can be used up to 4 hours. The straw features with recyclable and biodegradable properties.



• **FybroZeal**, a paper pouch, made from natural fiber, is durable and recyclable. In addition of its high quality printing property, the packaging can be sealed by heat without any plastic film lamination.

Click Video



PE112 World-Class Standard for Water Pipelines

Strategy ① ②

- SCG™ HDPE H112PC is the black polyethylene compound for pressure pipe. It is manufactured with the patented technology with the strength at the level PE112 as the world's first manufacture according to ISO 12162 standard.
- This polyethylene plastic compound has higher strength more than normal PE100 sold in the market, has more safety for use especially in the projects with limitation of installation and repair.

With the industrial demand growth of plastics in many piping application such as water, gases and mining, a highly performance plastic made from High Density Polyethylene (HDPE) called SCG™ HDPE H112PC was invented by Chemicals Business and named SCG™ HDPE H112PC. This innovation aimed on piping for high-pressure application with pressure resistance at PE112 on the Exova's standard (International Testing Organization). It's 10% stronger than the PE100, which is generally available in the market. With the same specification, the manufacturers can reduce the pipe thickness by 10%. It transports larger water volume, reduces raw material consumption, and saves time in welding and installation.

Furthermore, PE112 pipe has 50% higher corrosive resistance than PE100, leading to longer lifetime, lower



cost incurred to entrepreneurs, especially in mining industry that mainly focuses on longer pipe lifetime.

Both domestic and international users in the mining and the high-pressure water application have demonstrated confident in SCG™ HDPE H112PC plastic compound. It is one of innovation from of Chemicals Business that creates sustainability in infrastructure system and piping industry.



2018 Performance

- In 2016, SCG™ HDPE H112PC was selected for "Samui Submarine Water Pipeline Construction" project implemented by Provincial Waterworks Authority, which hired Wiik & Hoeglund Plc. to design and supervise 20-kilometer-long undersea HDPE piping work from Kanome district, Nakhon Si Thammarat province, to Koh Samui district, Surat Thani province. It is the first largest undersea piping project in Thailand and the pipe will be ready for service in 2019.

Customer Experience



Aiming to truly be a customer-centric organization, SCG studies various customer needs to gain an in-depth understanding and develops the ability to properly and comprehensively respond to their demand. It also applies digital technology and social media as tools to conduct activities that facilitate the customers faster. Furthermore, SCG focuses on building a close relationship with them throughout the customer journey to create innovation for a high-quality and sustainable life.

Target

- To make SCG the top-of-mind brand every time the customers consider purchasing products or services in the same category as SCG's.
- To increase revenue earned from products, services and solutions based on good relationship between brand and customers.

Strategy

- 1 To build participation with the customers in B2B2C segment.
- 2 To build participation with the customers in B2C segment.

Management

- Analyzing and monitoring customer experience, starting from understanding of customers' pain points, needs and behaviors show they select and use products and services, including conducting satisfaction survey.
- Applying digital technology to support SCG's service provided for all suppliers, partners and customers.
- Connecting online customers' experience with points of service to ensure customers' utmost convenience and satisfaction.
- Delivering innovative products, services and solutions to sustainably meet the customer demand.

2018 Performance

- **100%** of overall customer satisfactions based on survey via SCG Contact Center.





Understanding Customer Needs

- Thinking from customers' need and perspective
- Deeply understanding customers' current and future needs
- Understand diverse needs for each type of customers.

??

Problem of roof endurance, and scarcity of trustworthy repairmen.

??

Problem of house repair, renovation, and extension, scarcity of repairmen or contractor.



Customer Journey

SCG values the customers throughout journey they experienced with SCG

Creating Customer Experience

- Involve customers participation during product and service development.
- Delivering solutions which benefit and create value to customers.
- Delivering a comprehensive range of service to ensure customers' convenience.

Customer Journey Development by Cement-Building Material Business



Roof Innovation and Roof Experiences

- Consultation of roof design, renovation and installation.
- SCG heat protection system, leakage protection system and fixing solution system.
- Mobility Roof Assistant application that could recommend customers how to select roofing products.
- Online quotation service that could calculate roof area from Google Earth.



Developing an Omni Channel CBM Digital Platform Using Online Channel for Research, Transaction and Payment

- SCG Online Store website that provide information of product, repairmen, product orders and installation service.
- Home Buddy application that provides a complete range of assistance such as construction, repair, renovation and extension.
- Chatbot, artificial intelligence that could answers online customers' inquiries.
- SCG Wallet application that could receive electronic payment from retails stores under SCG Group.



Conducting Customer Satisfaction Survey

- Evaluating customer satisfactions in all experiences
- Using all channels such as telephone, online and questionnaires.
- Improving the operations to enhance customer satisfactions.

Product Co-Creation for Business Customers Strategy ①

- Packaging Business, partnering with business customers, developed new eco-friendly packaging that met the consumer needs.
- Chemicals Business, partnering with business customers, conducted research and development on new synthetic materials and plastic with special specifications that enhanced the production efficiency and ensured safe and high-quality products.

SCG customers include not only consumers, but also valued business customers that co-create new products to serve the consumer needs. SCG builds trust and collaboration with this customer segment to jointly learn the consumers' pain points, conduct R&D and testing, improve products, conduct market trial, and follow up the result. All of these are done through two-way communication that promotes constant knowledge sharing.



2018 Performance



◀ **SCG™ HDPE TR117WC**, the specialty polyethylene compound for fiber optic cable jacket, is the result of joint research between Chemicals Business, SCG and TOT PCL., telecommunications service provider. That is to elevate safety of the communities by preventing fire accidents on telecom cables.

Click Video



- **SCG™ PP P639AT** is the polypropylene resin for non-painted car bumper developed by Chemicals Business, SCG and a Japanese compounder company. It aimed to reduce painting process while maintaining the cars' beautiful appearance.

● Best Performance Award 2018

from LG Electronics India Pvt. Ltd. and Best Cooperation Award 2018 from LG Electronics (Thailand) Co., Ltd. were offered to suppliers who were outstanding for product and service quality. Chemicals Business closely worked with these companies on production planning as well as product storage and delivery. This enhanced the collaboration efficiency between both companies.



◀ **FybroZeal:** Packaging Business, partnering with Doi Tung Project, designed and developed a paper bag made from natural pulps to contain premium-graded products. Packaging Business listened to the briefing of customer requirements and developed the products with the customer, starting from material selection, product design that takes product category, ease of use and appearance into consideration for production and product delivery. FybroZeal paper bag with high-quality printing on the surface is durable and can be sealed with heat instead of plastic film lamination. Moreover, the recyclable and bio-degradable bag can answer the customer's need for eco-friendly packaging.

▶ **Mooncake Boxes:** Packaging Business, partnering with S&P Syndicate Plc., designed and produced the limited edition of premium mooncake packaging. The Packaging Business jointly developed packaging graphics and structure with S&P Syndicate Plc. to serve its need for long-lasting packaging that could protect and preserve the product, be easy to use and environmentally friendly, captured attention, added value to the product, and could be reused. The shape of mooncake packaging resembled a food carrier made of recycled paper and its material could be recycled into new paper as well.



The Challenge - Packaging Design Contest 2018

Click Video



Packaging Business has hosted “The Challenge – Packaging Design Contest 2018” for three consecutive years to offer the new generation a platform to express their packaging design capacity and learn the concept of customer-centricity. The contest received cooperation from leading companies such as S&P Syndicate Plc., Better Way (Thailand) Co., Ltd., Malee Group Plc. and Taweepong Industry Co., Ltd., serving as a judge panel of the contest. The selected items would then be developed for actual use in the market.

In 2018, 271 youths from 15 universities countrywide joined the contest and 12 entries were selected and developed by Packaging Business designers, turning the ideas into actual packaging that was later introduced to the market.



Health and Safety



SCG is committed to reducing work related injuries and deaths, of both employees and contractors by continuously controlling risks through the use of the Occupational Health and Safety Management System (SCG Safety Framework). It has been launched together with the use of Safety Performance Assessment Program (SPAP) and Life Saving Rules. This practice aims to create safety working behavior and safety for the whole organization (Total Safety Culture) in any countries where SCG has businesses. The addition, SCG promotes the innovation of accident reduction safety in operations.

Target

- Zero Fatality in every year.
- Reduce the Lost Time Injury Frequency Rate in 2018 and year 2019 to 0.023 and 0.16 respectively, and zero by 2022.
- Continuously reduce Occupational illness and disease.

Strategy

- 1 Raise awareness and change work behavior to be a safety culture.
- 2 Promote managers or supervisors as Safety Leaders to demonstrate “Caring” for employees and contractors.
- 3 Use safety management systems to raise safety standard in both domestic and overseas.
- 4 Develop digital technology as a supervision tool for more convenient and agility to reduce the risk of accident.

Management

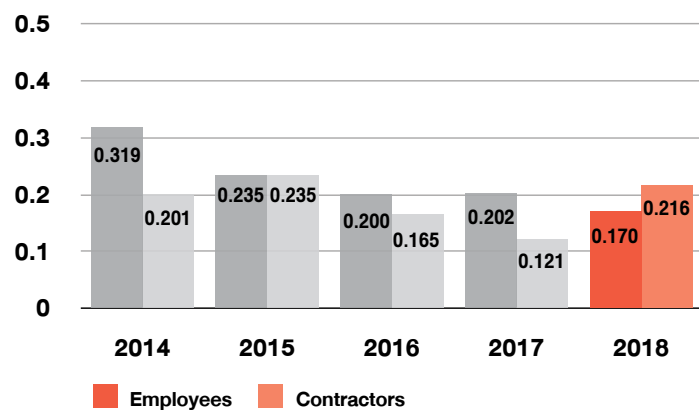
- Establish strict enforcement of Life Saving Rules for employees and contractors in order to prevent severe accidents that may result in fatality.
- Continuously directing the use of assessment tools on Safety Performance Assessment Program (SPAP).
- Organize training and curriculum development to encourage leaders to show leadership in safety while monitoring and evaluating leadership levels for continuous improvement.

2018 Performance

- **0.038** case/200,000 man-hours of Loss Time Injury Frequency Rate in employees
- **0.056** case/200,000 man-hours of Loss Time Injury Frequency Rate in contractors
- **0** case of employee fatality
- **6** cases of contractor fatality
- **59%** companies in Thailand achieving Safety Performance Assessment Program (SPAP) Level 4 (Succeeding) or above

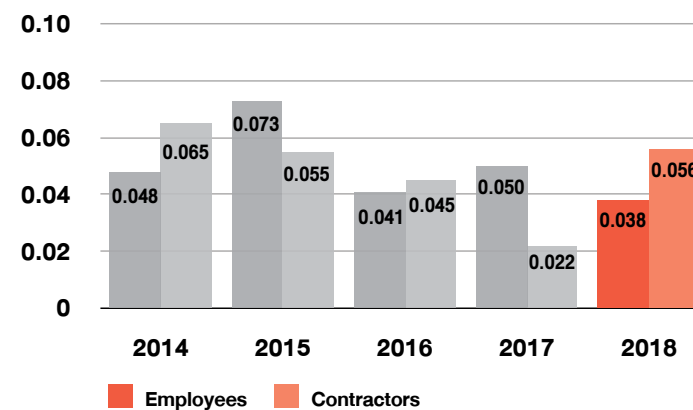
Injury Frequency Rate

Case/200,000 man-hours



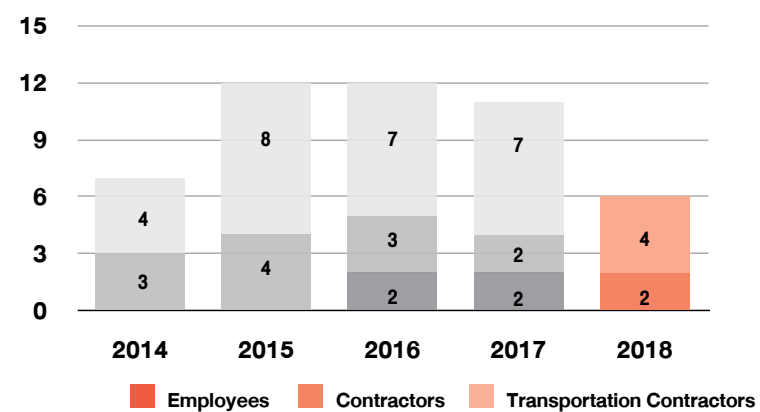
Loss Time Injury Frequency Rate

Case/200,000 man-hours



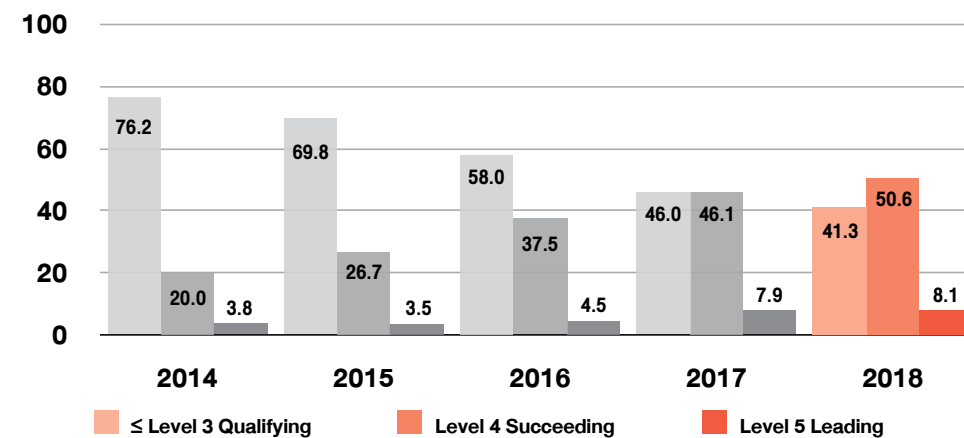
Fatality Cases

Cases



Number of SPAP-Certified Companies in Thailand

Percent



Transportation Safety Management System

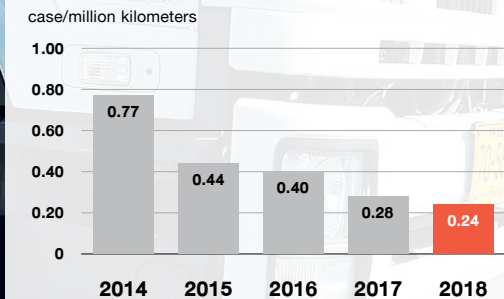
Driven by Technology and Hearts

The information from the World Health Organization revealed that in Thailand the number of road accident deaths in 2018 is 32.7 per 100,000 people, making Thailand become the highest ranking in road accident mortality rate among the countries in Southeast Asia ... the champion title that no one wants.

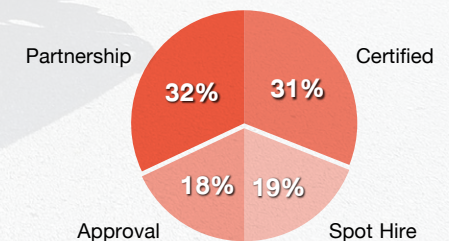


With the determination to make the SCG road accident become zero, SCG uses modern technology and established the transportation management system governing every step. This ensures that all personnel involved, both SCG Logistics and its transportation contractors will take care transportation of products safely. With the awareness that “Drivers” are important key mechanism of transportation safety. These individuals not only have to possess driving skills but also need to understand the transportation system, products handling, care of the vehicles, especially, the service mind, caring and responsibility for the life of the others on the roads and the society as a whole. SCG therefore regards them as high quality drivers, so called “Smart Driver”.

Transportation Accident Statistics 2014-2018*



Transportation Spending*



*SCG Logistics only

Developing Transportation Contractors

Transportation contractors play a major role in transporting SCG products. In 2018, SCG has 340 transportation contractors. SCG therefore plans to develop its transportation contractors so that they operate with highest safety. All transportation contractor ratify the SCG Supplier Code of Conduct and assessed performance annually in both general operational supervision, such as selection of drivers, work planning, customer service, etc. and assurance of safety operations such as driver health examination, vehicle condition management, transportation route management, etc.

SCG classified the transportation contractors into 4 levels: Partnership, Certified, Approval, and Spot Hire according to the annual evaluation score and transportation spending. Also, the partners are classified into large trucks (10-18 wheels) and small trucks (4-6 wheels), the latter of which have a greater role in transporting for SCG due to the expansion of B2C business.




The Partnership is a group on which SCG places the highest priority, followed by Certified and Approval. Each year, SCG will formulate a development plan together with a Certified Transportation contractor with potential and upgrade them to a Partnership level.

Skills Development School

SCG established “Skills Development School” as a non-formal education school in the category of vocational training in 2011. The goal is to be an organization playing the role in developing skills in transportation to a professional level so as to support economic expansion of Thailand and foreign trade partners.

Driver Centric Safety Management System

It is a management system that focuses on “Driver” by defining the roles and duties of the important team involved such as participation in various operations in order to ensure that the driver will manage the products transportation safely throughout the entire route.

	Before the Transportation	During the Transportation	After the Transportation
 Professional safety officer and Logistics Command Center	<ul style="list-style-type: none"> • Set driver standards such as training, health examination • Set rules such as Life Saving Rules • Set standards for transportation routes, rest areas, risk areas • Set vehicle standards regarding vehicle equipment, products loading, etc. 	<ul style="list-style-type: none"> • Track risky driving behavior via GPS system installed in all vehicles • Randomly check risky driving behavior with cockpit camera information • A random check during transport regarding alcohol, drug abuse, etc. • If an accident occurs, investigate and find ways to prevent recurrence 	<ul style="list-style-type: none"> • Summary of risky behavior and corrections • Safety Audit • Summary of the activities performed • Communicate/obtain suggestions from drivers
 Transportation contractor/ Operation team	<ul style="list-style-type: none"> • Assess the driver's readiness (alcohol, drug abuse, etc.) • Check the working hours and rest before getting on with work • Inform the drivers about the route map, rest areas and risk areas • Check the vehicle condition every month and according to the mileage • Screen the driver for drug abuse every 3 months 	<ul style="list-style-type: none"> • Monitor risky driving behavior using web-based GPS system • Monitor any risky driving behavior with cockpit camera information 	<ul style="list-style-type: none"> • Evaluate the performance of the driver • Prepare a maintenance plan • Communicate/obtain suggestions from drivers
 Drivers	<ul style="list-style-type: none"> • Passed the safe defensive driving training from Skills Development school • Check the vehicle condition daily before making a trip • Prepare emergency equipment in each vehicle 	<ul style="list-style-type: none"> • Respect traffic rules, control the speed according to the regulations • Strictly follow the transportation route plan and safety rules • If unsafe conditions are found, alert the supervisor or the delegated individuals. • Respond to emergencies according to the Emergency Response Guideline 	<ul style="list-style-type: none"> • Follow the safety rules of the factory/end customer • Wholeheartedly provide the services to customers

At present, there are two types of teaching courses provided: “Road Traffic” for trucks, cars, pickup trucks and motorcycles and “Warehouses” for warehouses and forklifts. The school provides qualified trainers and a standard driving training area for those interested in driving a truck as well as employees of the transportation contractors who must be trained with Skills Development School before joining the transportation business with SCG.

From 2011 to 2018, more than 87,947 people have passed the training by Skills Development School.

Logistics Command Center Enhanced with GPS

SCG Logistics uses GPS technology in the Logistics Command Center with 24-hour supervision staff. The center acts as a Safety Monitoring Center providing drivers with alerts which can be categorized into 5 types as follows:

1. Limit-exceeding speed alerts for normal routes.
2. Alert when entering the prohibited area, such as not park alerting on the roadside and cement purchase point.
3. Speed alert in the community area or at intersections.
4. Alert when drivers work continuously for more than 4 hours and
5. Alert when working for 10 consecutive hours without stopping to rest, which is a factor leading to dozing off and accidents.

In addition, there is an Auto Alarm system via the microphone system and the speakers in the cabin to prevent and suppress behaviors that increase the risk of accidents.

Smart Driver

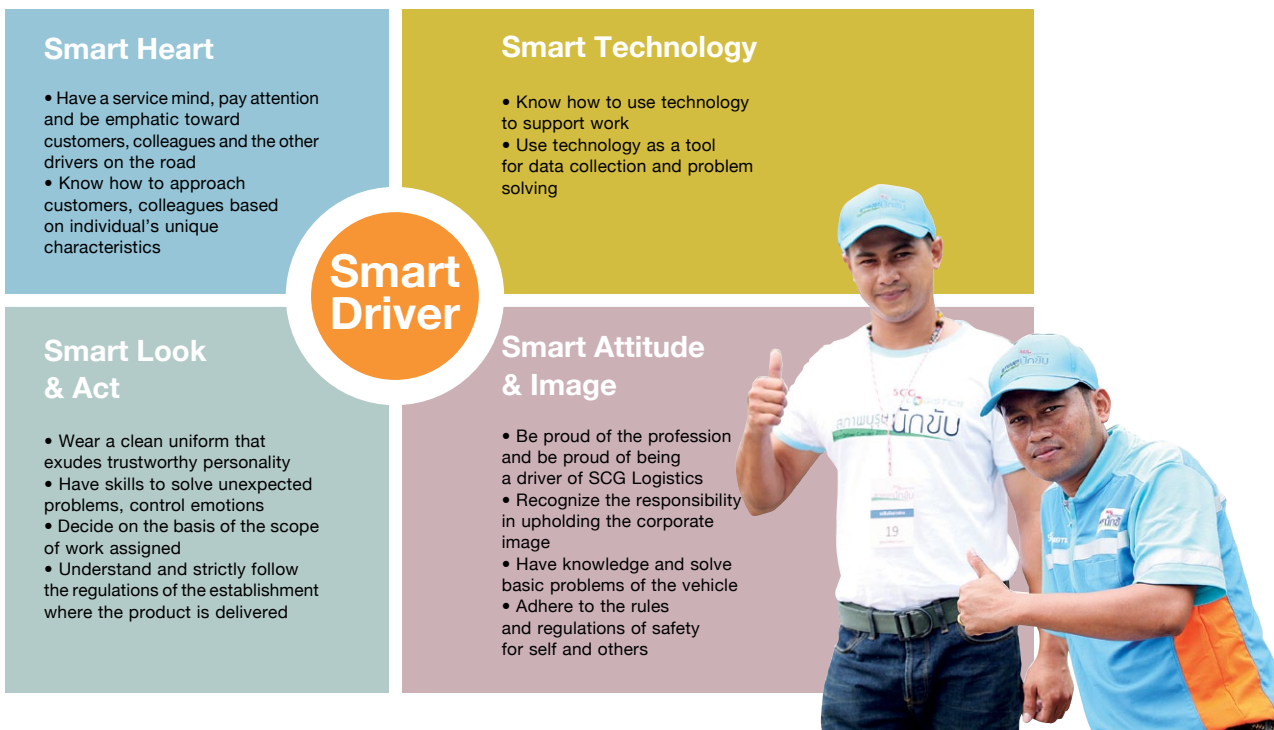
In order to meet the zero transportation accident target, SCG has developed the “Smart Driver” concept since 2015 and has continuously brought up the potential of and trained the drivers who work with SCG to be qualified as “Smart Driver” characterized by 4S: Smart Heart, Smart Look & Act, Smart Technology, Smart Attitude & Image.

SCG put in place the measures to encourage and promote “Smart Driver” by enhancing pride for being a smart driver, and to support the family of drivers in various areas such as scholarships for children. This leads to the increasing number of quality drivers. Additionally, activities are organized to build relationships among smart drivers, creating a strong network.

The driver who is a Smart Driver must pass the safe driving criteria such as being in an accident through no fault of one’s own, having no record of complaints from customers, no driving warning reports from Logistics Command Center.

In 2015, SCG had only 45 Smart Drivers. Until 2018, the number of Smart Driver around the country has increased to more than 2,300, representing approximately 44% of all drivers.

Upgrading the drivers caused the statistic of the Smart Driver’s road accident rate to be significantly reduced, in the year 2018, to 0.11 case/million kilometers, compared to the statistics for all drivers of 0.24 case/million kilometers.



Enhance Safety Leadership

Strategy ②

- SCG emphasizes the role of managers and supervisors to be role model in demonstrating example of behavior and lead creating of safety culture in the organization by using various measures to enhance the safety leadership.
- Accidents is preventable and unsafe behavior can be reduced by regularly observing the work of the supervisor. When the supervisor encountered risky actions during the observation, the supervisor must use appropriate methods to change employee behavior.



Accidents during working are mostly caused by negligence, bringing oneself into the risks, and lacking of proper knowledge of workers in working safety. The accident which is not only harms themselves, but may also affect the other people and business operations. These accidents can be prevented or the severity can be reduced by the managers and the head of the department to regularly observe at the workplace, and when the unsafe environment is found, it can be ordered to improve quickly. The unsafe working behaviors or risky actions of the employee will be corrected and adjusted accordingly. It represents the leadership that give importance of working safely and response to employees with respect and care for each other.

SCG, therefore, gives importance to lead creating safety culture to employees in the organization by managers and supervisors. The practices that supervisors should follow regularly are Leader Standard Work that covers Coaching, Leadership Line Walks, Monitoring of Safety Performance with Visual Board (Visualization), Safety Observation Program.

- **Safety Observation Program** is a systematic observation and planning operation. Behavior is observed, recorded and reported. There is plan for improvement and to measure the performance of corrective actions. The supervisor will receive training on how to observe the work, which emphasizes that the supervisor shows concern to the worker when



When I enter the Leadership Line Walk, the staff will not think that I go to find faults, but it is a space for everyone to express all their feelings, opinions, which it can make more trust. I do it all for nearly three years. What has changed significantly is the working environment are safer, everyone helps each other, with teamwork that strong to strive for success according to the goal with happiness.”

Vijai Homsakmongkol
Production Division Manager 1
Siam Kraft Industry Co., Ltd. Ban Pong Complex

finding unsafe actions and showing appreciation when seeing good actions in safety according to principles. “When one makes mistake, warns with concern, when one does good, be appreciated”. The atmosphere that supervisors and workers can talk to each other should be created. The program also makes the operator aware of the concern of the supervisor and self-aware of the risks in various behaviors, with the requirement that the supervisor must make a Safety Observation Program at least once a week to create a culture in the organization.

“

Line Walk regularly, understand the situation, correct, prevent and respond promptly, pass on the concern from generation to generation.”



Parinya Thikawiwath
Khon Kaen Production Manager,
CPAC Roof Tile Co., Ltd.

- **The Leadership Line Walk** is a walk-through of the executives to observe the work, talking, giving advice and listening to the staff in a friendly manner that not only reduces the rate of accidents but also builds trust, reduces the gap between the supervisors and employees.

- **Safety Leadership Program** is a “Change” method starts from assessment of leadership level in occupational health and safety of all management staff, whether there are production, transportation, or office works such as accounting, purchasing, and human resource, etc. Individual will evaluate himself in the following 3 dimensions, 1) The level of commitment to work safely 2) The expected level of safety performance 3) The level of participation and importance of safety. The result from the assessment will be used to initial the next two processes, namely

1. Diagnosis Phase is to analyze the cause and source of the problem by interviewing the individual in depth, face-to-face and/or from the feedback of staff in the department. The result matrix mechanism (Know/Believe/Feel/Act) will be used to gain knowledge and awareness until being able to



express their promise and commitment to drive serious changes throughout the organization.

2. The Area Transformation Phase is to drive practicing of safe work in all departments throughout the organization. Each leader is required to behave in accordance to Leader Standard Work.

By consequence, the employee participation will be increased so that each person can develop themselves to work safely and effectively according to their roles and responsibilities, such as improving communication methods, training to increase knowledge, understanding, precautions and protect themselves from accidents and so on.

“

From the experience of the Leadership Line Walk, I found that the employees were of good morale in the workplace. The problems onsite have been presented and corrected quickly and accurately. Employees learn through the supervisor’s advice, good relationships, smooth work, fast and safe, while supervisors can learn and exchange work experience with employees.”



Mongkol Hengrojanasophon
Vice President-Olefins Business and Operations,
Chemicals Business

2018 Performance

- In 2018, the Safety Leadership Program assessed the **1,790** management level of employees (Total of 1,866 people). Only **32%** of people declared their own safety leadership strength beyond the acceptable qualification line of the SCG. The people from different business unit have different levels of strength and issues that should be resolved. In this regard, the office work style shows leadership less than the manufacturing work style.

Promoting Life Saving Rules

Strategy ③

- Since the announcement of the Life Saving Rules in 2017, SCG has continuously and seriously carried out activities in communication and campaigning to reduce severe accidents.
- Bangsue Headquarter Office conducted a questionnaire to explore understanding and attitude towards Life Saving Rules in order to bring information back for improvement and development.

SCG sets up nine Life Saving Rules to emphasize the consciousness and to change behavior to a culture of work safety for employees and contractors. It is a mutual agreement of all companies, both domestic and overseas. If Life Saving Rules are neglected, strict punishment measures will be imposed as specified. SCG, therefore, has regularly conducted communication, campaigning with various channels i.e. via email, poster board, and organizing events. As well as, having a continuous monitoring and close supervision, if the violate is found, the punishment will be enforced.

In addition, the head office at Bangsue also collaborated with foreign experts to develop a survey of understanding and attitude towards Life Saving Rules in order to bring information back to furthering improvement plans to expand in-depth results in 2019.



2018 Performance

- In 2018, total **710** cases of violations of Life Saving Rules were found, which consisted of 18 employees and 692 contractors. Approximately **81%** of the violation is from drinking alcohol before driving or working. (The control level of alcohol at SCG is 0 mg percent).

- Although number of violations was increase from 2017 due to more stringent monitoring and controls in 2018, zero accident was found due to alcohol consumption in SCG.

Promoting Life Saving Rules at Regional

Indonesia

In 2018, SCG organized the SCG Indonesia LSRs Better Practice Awards 2018 for the second year in order to raise awareness and create participation for employees to search and improve their work to reduce risks in their work areas. Each company has a contest and presented the projects in the SCG contest to 13 projects. 3 projects that have been awarded, namely:

1st prize, High Elevation Elimination Program, Work of Cleaning PHE by Hot Water Bubbling Method from PT. Chandra Asri Petrochemicals, Tbk, reduces the risk of cleaning at Height by developing the cleaning equipment instead of people.

2nd prize, Screaming Hook project from PT. KIA Plant Karawang by installing the equipment and hazard warning sound when the Full-Body Harness hook is removed from the Life Line, which helps supervisors to inspect work more easily.

3rd Prize, Elimination Risk Project of Work at Height by Mobile Borders from PT. KIA Plant Cileungsi creates platform for work at height that can be conveniently moved, reducing the risk of Work at Height.

All 3 projects can be used to expand the results to reduce the risk and increase safety at the work for employees and contractors.



The Screaming Hook project, despite being a small improvement, but I believe that it will help employees to work more cautiously and allows supervisors more easily to monitor the Work at Height. I am proud to help everyone to work safely, reduce the violation of the factory Life Saving Rules. This is an important goal because we care about the safety of everyone."



Nanang Irwansyah
Foreman Maintenance and Engineer
PT. KIA Plant Karawang

Cambodia

SCG organized SCG Cambodia Life Saver Contest 2018 to raise awareness and participation of employees in exhibiting creativity as a short video clip. It aimed to instill safety consciousness according to Life Saving Rules in working hours and outside working hours. There are 52 employees participating in the event, with 19 submissions and 7 awards.

Champ of The Champ Award: "Wear Your Seat Belt" from the team of Mr. Meak Pkey, Kampot Cement presented the story reflecting the importance of seat belts, which helps to reduce violence in accidents, create behavior for all employees to be aware of safety, fasten seat belts at all times on cars, both drivers and passengers.



The reason why I chose to make 'Car seat belt' video because of seat belt is unlikely used by the Cambodian. Once, a severe car accident happened and I lost my friend who sit beside me but didn't fasten his seat belt. He flied off the car and immediately died. I hope this video can remind my peers and all Cambodian in general always use seat belt because it is our lifesaver."



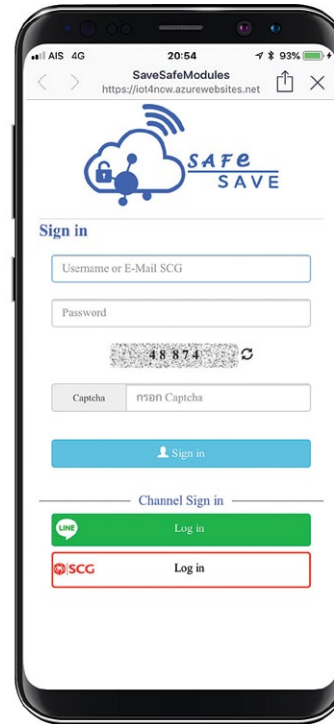
Meak Pkey
Operator - Quality Control
Kampot Cement Co., Ltd., Cambodia

SAFEsave, Innovation for Safety Strategy ⁴

- Packaging Business develops SAFEsave program with digital technology which has advanced data analysis capabilities and central electronic database instead of paper data recording. It can alert the danger in real time to control the risk and let all employees to be safe at work.
- The SAFEsave has four components: 4S, Safety, Security, SPAP and Soft Side. At present, SAFEsave has successfully developed 6 modules and has continuously improved the system to ensure safety, accuracy, precision, and speed.

Packaging Business has given priority to safety; therefore, it has developed a centralized security information system with digital technology to link employee security through advanced analysis using artificial intelligence (AI) and machine learning (ML).

The SAFEsave has 4 components or 4S, including Safety, Security, SPAP and Soft Side, focusing on providing assistance in safety, prevention, observation, and anticipation. Examples of SAFEsave such as:



- **Site Information** Reporting safety information via Mobile Application in real time to monitor and randomly check, such as the number of workers, work related risk, etc.

- **Site Audit:** Recording of safety inspection via Mobile Application, recording the unsafe action and unsafe condition that needs to be improved, pictures, as well as, the responsible person and completed date by being able to alert the responsible person according to the time of the due date.



- **Tools Inspection:** inspection of equipment/tools with QR Code for each tool passed into the work area.



- **Restricted Area:** Installation and control of CCTV (CCTV) in restricted areas or controlled areas, image processing to analyze if someone enters the area, immediately sending a warning signal to the mobile phone of the person responsible for that area.

Checklist กังดับเพลิง

เลือกการตรวจสอบ * มาตรฐาน Performance

กดดูรายการ คำปกติ สีเขียว / คำขาด สีแดง

รายการ

1. ตรวจสอบระดับ CO2 (ในถังเก็บ CO2) ไม่เกิน 10%
2. ตรวจสอบระดับน้ำในถังเก็บน้ำ
3. ตรวจสอบระดับน้ำในถังเก็บน้ำ
4. ตรวจสอบระดับน้ำในถังเก็บน้ำ
5. Fire rating ขึ้นตามมาตรฐานของโรงงาน (BA 20B)
6. ตรวจสอบจุดติดตั้งวิธีใช้ไม่ครบถ้วน
7. จุดติดตั้งต้องไม่มีสิ่งกีดขวาง ในระยะ 60cm

SCG Log in

4. สถานการณ์ไม่ปกติ ไม่มีการพบ

5. Fire rating ขึ้นตามมาตรฐานของโรงงาน (BA 20B)

6. ตรวจสอบจุดติดตั้งวิธีใช้ไม่ครบถ้วน

7. จุดติดตั้งต้องไม่มีสิ่งกีดขวาง ในระยะ 60cm

8. ตรวจสอบ 2-3 รอบ ถ้ายังไม่เรียบร้อย (ยังไม่เสร็จ)

9. อื่นๆ (ไม่ปกติระบบ)

รูปภาพจุดชำรุด

Choose File 12344.jpg

รายละเอียดจุดชำรุด

หน้าสำนักงาน

กำหนดเสร็จ

03/06/2019

บันทึก ปิด

Fire Extinguisher Form

สถานะ Standard : พกมีใช้งาน

สถานะ Performance : เครื่องมือชำรุด

Complex

Banpong-SCGComplex

Code กังดับเพลิง

ABC-6

ชนิดกังดับเพลิง

CO2

ขนาดกังดับเพลิง

-

Fire Rating

-

น้ำหนักกังดับเพลิง

Aa

แผนกที่ดูแลรับผิดชอบ

BP Emergency and Security System

ส่วนงานสังกัด

BP Administration Department

บริษัทสังกัด

Siam-Kraft

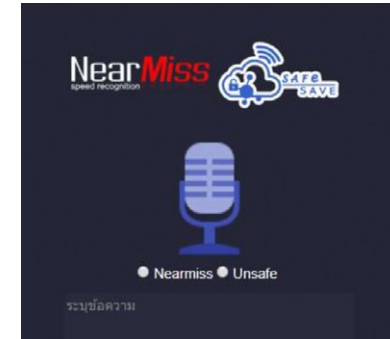
รูปถ่ายจุดชำรุด

อื่นๆ

Aa

ตรวจสอบ

- **Fire Extinguishers Inspection:** Inspection of fire extinguishers with QR Code for easy tracking of availability status and accessing data in real time.



- **Near Miss:** Reporting Near Miss via Mobile app, recording data and informing the area owners and related parties to jointly consider and find measures to prevent accidents to workers.
- **Work Permit:** Reducing paper usage by recording data and approving work permit in the Mobile Application, which stores data in a central database system, allowing tracking tasks conveniently and quickly.

2018 Performance

- **6** SAFEsave have been developed, including Site Information, Site Audit, Tools Inspection, Restricted Area, Near Miss and Fire Extinguishers Inspection.
- **6** modules were started in pilot plant at Wang Sala Complex, Ban Pong Complex, and Engineering Division, Packaging Business has planned to expand to all company.

Human Rights



The implementation of human rights policies covers all groups of affected people, such as employees, children, women, people with disabilities, indigenous groups, local communities, business partners, and foreign workers, across the value chain from SCG's own operation through business partners and joint ventures.

Target

- Being a role model in human rights, supporting and promoting the business value chain both directly through operations by SCG and indirectly through business partners and joint ventures to realize, protect, and respect human rights in business operation. All identified risks are well managed through mitigation and preventive plan with remediation actions 100%.

Strategy

- 1 Fully implement "SCG's Human Rights Policy" and follow international laws and treaty where each country has an obligation.
- 2 Fully implement the Human Rights Due Diligence Process continuously.

Management

- Announced SCG Human Rights Policy based on international standards of the United Nations Global Compact: UNGC) and the ILO Declaration on Fundamental Principles and Rights at Work.
- Continuously implement the Human Rights Due Diligence Process, consisting of 4 steps:
 - (1) Identification of human rights risk issues
 - (2) Identification of vulnerable groups
 - (3) Preventive or mitigation plans including remediation actions, and
 - (4) Monitoring results.

Human Rights Due Diligence Process

Identification of human rights risk issues

Identification of vulnerable groups

Preventive or mitigation plans including remediation actions

Monitoring results

2018 Performance

- The proportion of all female employees per employee is **22.5%**, with female management staff accounting for **25.2%**.
- Promote and support people with disabilities to have a career and income by hiring **41** permanent employees and promoting self-employment for **299** local disabled people.

SCG Implementation of the Key Human Rights Risk Issues

Scope	Salient Human Rights Issue	Impact Potential	Mitigation Plan and Remediation Actions	Monitoring Results
SCG's Own Operations	Labor rights The payment of wages is not lower than the minimum wage rate as required by law of Thailand announced in 2018.	Subsidiary company	<ul style="list-style-type: none"> • Check the status of wage payment • Consideration for adjusting wages according to the law • Consideration for adjusting the wage rate for other employees according to the performance/job evaluation to ensure fairness within the organization 	All subsidiary companies in Thailand comply with law
	Occupational Health and Safety Lost time injury and fatality	Subsidiary company	<ul style="list-style-type: none"> • Communicate to educate, raise awareness, and safety culture through the Occupational Health and Safety Management System or the SCG Safety Framework • Communicate, campaign, and continuously monitor compliance and violations of Life Saving Rules • Raise standards and evaluate safety performance according to the SCG Safety Performance Assessment Program (SPAP) 	59% of subsidiary companies passed SPAP assessment 13 sites of subsidiary company with lost time injury case
Operations of Joint Venture (where SCG has no management)	Labor rights The payment of wages is not lower than the minimum wage rate as required by law of Thailand announced in 2018.	Joint venture company	<ul style="list-style-type: none"> • SCG determination to be the joint venture with organization comply with Human rights • Jointly setting up employment and labor rights policy, including follow up to enhance policy implementation as representative from SCG • Providing knowledge for Human rights practices • Providing channels for grievance and information on unusual practices through SCG Whistleblower 	All joint venture companies in Thailand comply with law

Scope	Salient Human Rights Issue	Impact Potential	Mitigation Plan and Remediation Actions	Monitoring Results
Operations Business Partners	Labor rights and Human rights Non-discrimination, labor protection, no forced-labor, wages and benefits and working hours	Business partner company	<ul style="list-style-type: none"> • Selection for business partners by taking into account the commitment to comply with the business code of conduct covering labor rights and human rights • Assess the environmental, social, and governance risks (ESG) that cover the criteria of labor rights and human rights of business partners 	83% of business partners signed for SCG Supplier Code of Conduct 100% of business partners with procurement spend of over 1 million baht, passed ESG assessment
	Occupational Health and Transportation Safety Lost time injury and fatality from work-related and transportation	Business partner company	<ul style="list-style-type: none"> • Clarify all enforced safety rules and sign the agreement to comply with SCG Life Saving Rules • Clarify all enforced safety rules prior to bidding process and clearly stated in the employment contract • Check and control business partners before entering the factory area and before starting work including risks review and clarification with workers • Established Transportation Safety Committee to develop safe transportation standards and control the transportation business partners to comply with the rules and standards of work required • Encourage the transportation business partners to comply with laws and continuously monitor the drivers through GPS and In-Cap Camera • Promote business partners to continually develop safety and become a Business Partnership 	100% of business partners are assessed for safety standard 31 sites of business partner company with lost time injury case 6 sites of business partner company with fatality case

Sustainable Value towards Supplier



Suppliers, which include manufacturers, contractors and traders, are a crucial part of SCG sustainable supply chain. To manage all operational and reputational risks from suppliers due to ethics, legal compliance, environmental friendliness, accidents and safety which may cause disruption to business operations, SCG therefore carefully selects suppliers and creates opportunities for collaboration to enhance the competency of suppliers to grow sustainably together.

Target

- 90% of the procurement spend comes from suppliers who commit to comply with Supplier Code of Conduct by 2020.
- 95% suppliers of the procurement spend pass the annual environmental, social and governance (ESG) risk assessment every year.
- 100% of operation contractors certified under SCG Contractor Safety Certification every year since 2012.

Strategy

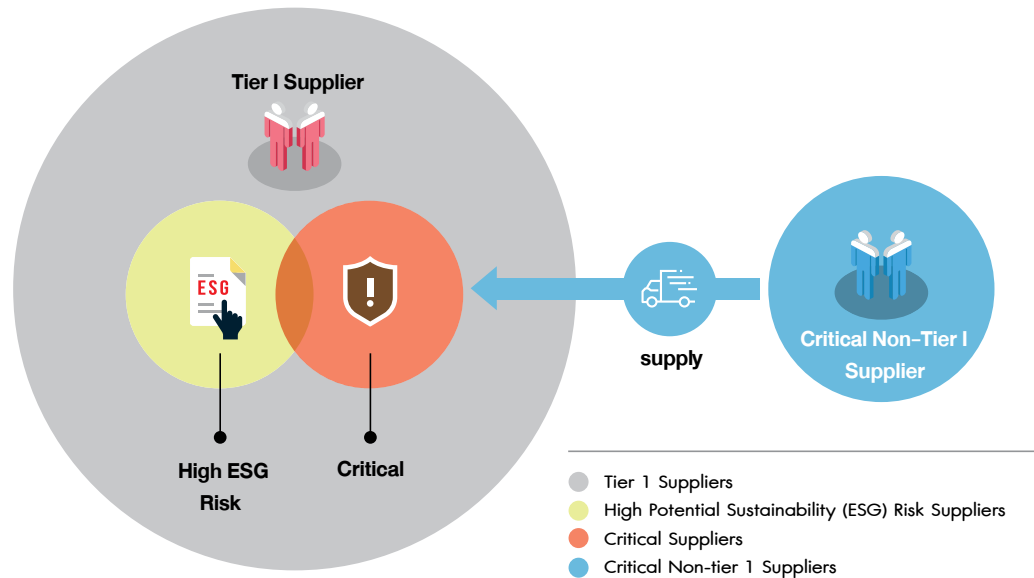
- 1 Select and assess suppliers with the capability for sustainable business.
- 2 Assess risks and classify suppliers into groups in order to frame strategies and supplier development plan corresponding with the risks.
- 3 Develop and enhance supplier's capability towards sustainability.
- 4 Raise awareness, knowledge and ability of employees to ensure efficiency in the procurement process.



Management

- Regularly conduct a risk assessment and certify all supplier every year by applying an enterprise risk management framework, which covers environmental, social and governance (ESG) criteria together with a spend analysis.
- Classify suppliers into four groups; namely, general tier 1 supplier, critical supplier, high potential sustainability (ESG) risk supplier and critical non-tier supplier.
- Organize and plan a development program to continuously and successfully strengthen suppliers' capability.
- Establish a committee to enhance the knowledge and competency of employees in the purchasing, procurement and logistics groups while sharing knowledge, information and practices with procurement entities in both public and private sector.

Supplier Segmentation 4 Groups



Critical suppliers refer to manufacturers and distributors of products and services that are significant to SCG's business operations, such as high purchasing volume, critical component, or non-substitutable products.

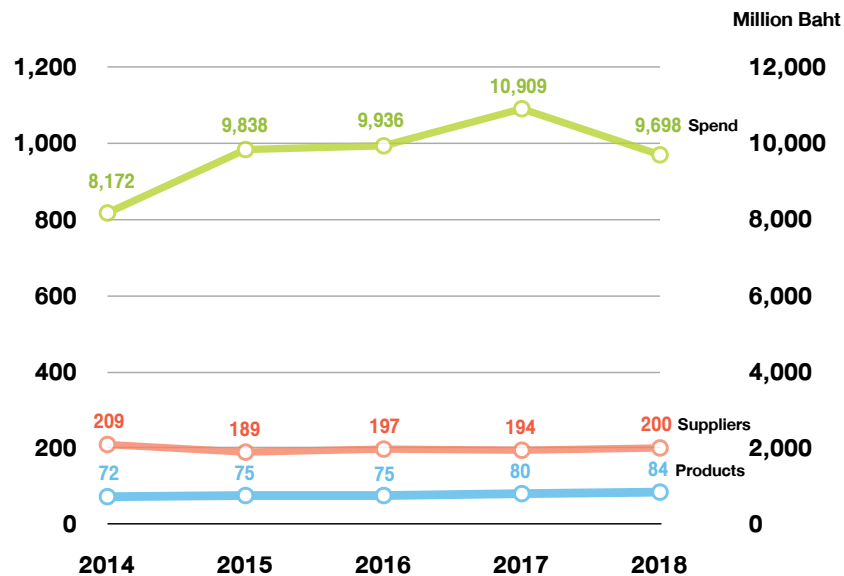
High Potential Sustainability (ESG) Risk Suppliers refer to manufacturers and distributors that are likely to cause negative impacts from their improper operations in the social (e.g. human rights, employee and labor care), environment (e.g. waste management) and governance (e.g. legal compliance) aspects.

2018 Performance

8,430 active suppliers in 2018 (Total Tier-1 Suppliers)

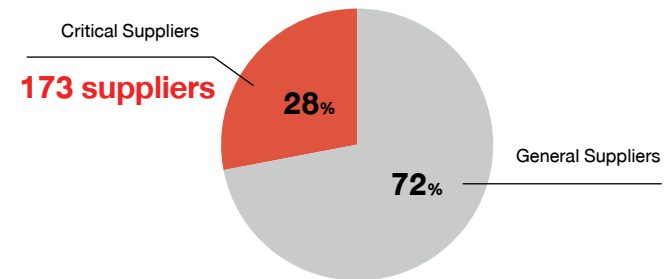
- **5,546** Suppliers committed to comply with the SCG Supplier Code of Conduct, accounting for **83%** of the procurement spend.
- **100%** suppliers of the procurement spend passed the assessment of environmental, social and governance (ESG) risks.
- **486** operation contractors certified under SCG Contractor Safety Certification System, representing **91%** of total operation contractors.
- **136** transportation contractors certified under Fleet Carriers Standards, representing **100%** of all major transportation contractors.

Green Procurement Spend and Products in the Green Procurement List

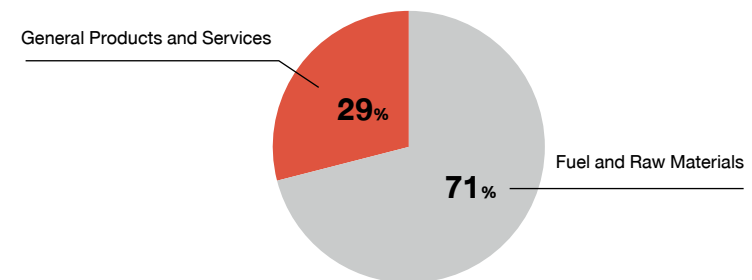


87% of general products and services spend are local procurement spend.

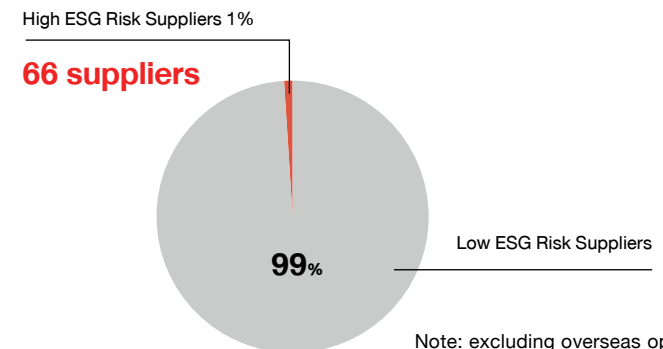
Ratio of Procurement Spend on Products and Services by Group of Suppliers in 2018



Ratio of Procurement Spend on Products and Services by Category in 2018



Ratio of Procurement Spend of High Potential Sustainability Risk Suppliers in 2018



Supplier Governance and Enhance towards Sustainability

Strategy ① ②

	Strategy	Implementation	Measurement	2016	2017	2018	Target
Economic	• Select and assess suppliers with the capability for sustainable business.	• Evaluate vendors in terms of quality, cost and delivery (QCD Supplier Evaluation).	• Evaluate suppliers under Approved Vendor List (AVL) with vendor evaluation (QCD Supplier Evaluation).	100%	100%	100%	100% suppliers under Approved Vendor List (AVL) receive vendor evaluation (QCD Supplier Evaluation).
	• Assess risks and classify suppliers into groups in order to frame strategies and supplier development plan corresponding with the risks.	• Conduct a supplier assessment program and segmentation of critical suppliers with a systematic approach.	• Assess and classify critical suppliers.	100% procurement spend	100% procurement spend	100% procurement spend	
	• Assess risks and classify suppliers into groups in order to frame strategies and supplier development plan corresponding with the risks.	• Conduct sustainability risk assessment and supplier segmentation since 2013.	• Assess sustainability risks (ESG Risk).	89% procurement spend	98% procurement spend	100% procurement spend	95% suppliers of the procurement spend pass the annual ESG risk assessment every year.
Environment	• Develop and enhance supplier's capability towards sustainability.	• Promote and audit suppliers for registration in the Green Procurement List.	• Green procurement and products on the Green Procurement List.	9,936 million baht	10,909 million baht	9,698 million baht	-
		• Purchase products and services according to the Green Procurement List. 100%.		75 products	80 products	84 products	
		• Promote and support suppliers to participate in the assessment of Green Industry (GI)	• Suppliers achieve the Green Industry Level 2 certification.	-	777 suppliers	883 suppliers	-

	Strategy	Implementation	Measurement	2016	2017	2018	Target
Social	<ul style="list-style-type: none"> Develop and enhance supplier's capability towards sustainability. 	<ul style="list-style-type: none"> Raise awareness and behavioral change to create safety culture. Use safety management system to uplift contractors safety standard. Having contractors informed and signed for Life Saving Rules in every access for work. 	<ul style="list-style-type: none"> Operation contractors certified under SCG Contractor Safety Certification System. 	100%	89%	91%	100% Operation contractors certified under SCG Contractor Safety Certification System every year from 2012 onwards.
			<ul style="list-style-type: none"> Major transportation contractors certified under Fleet Carriers Standards. 	100%	100%	100%	100% major transportation contractors certified under Fleet Carriers Standards.
			<ul style="list-style-type: none"> Lost Time Injury Frequency Rate (LTIFR) for contractors. 	0.045 case/200,000 man-hours	0.022 case/200,000 man-hours	0.056 case/200,000 man-hours	Reduce Lost Time Injury Frequency Rate in 2018 and 2019 to 0.023 and 0.016 respectively, and target for zero by 2022.
Governance	<ul style="list-style-type: none"> Select and assess suppliers with the capability for sustainable business. 	<ul style="list-style-type: none"> Developed SCG Supplier Code of Conduct in 2013. Started supervising new and main suppliers to commit to comply SCG Supplier Code of Conduct continuously since 2014. 	<ul style="list-style-type: none"> Suppliers committed to comply with SCG Supplier Code of Conduct. 	-	48% of procurement spend	83% of procurement spend	90% of the procurement spend comes from supplier who commit to comply with SCG Supplier Code of Conduct by 2020.

Go Green Together

Strategy ③

- SCG attended the Green Industry Certification under the Ministry of Industry and set its sights on Level 5: Green Network, while elevating its suppliers to achieve Green Industry Level 2: Green Operations.
- In 2018, 883 SCG's suppliers were certified for Green Industry Level 2 : Green Operations.

As a sustainable business with a focus on environmentally and socially friendly operation, SCG attended the "Green Industry" set by the Ministry of Industry for being a benchmark of environmentally friendly industry, to create a green economy and increase the value of Green Gross Domestic Product (Green GDP).

All SCG business sets its sights on Green Industry Level 5: Green Network and elevating suppliers, the SCG upstream supply chain which includes manufacturers, contractors and traders, to achieve Green Industry Level 2: Green operations.



Previously, our business did not seriously pay attention on environmental impacts. After SCG had provided suggestions, we got the idea of making a truck wheel washing pond before leaving the site and back onto the road to prevent dust dispersal. Another advice from SCG is about the green area or Green Belt to help guard against dust dispersal from the factory. We grew trees in front of the plant to increase green area. We have got a good feedback and admiration for increasing green area in the community from villagers around the area."



Yongchai Hoonwongkotwichian
Sales and Marketing Department Director
Eastern Pearl Company Limited

SCG has applied its business experience and achievement in sustainable development to support and strengthen suppliers' capability through various projects, such as the Greening Supply Chain project, Green Procurement and supplier development projects for environmental management system according to the criteria, etc.

SCG has classified suppliers into groups align with the levels of risks and opportunities for environmental impacts. Along with suppliers, SCG sets goals, action plans, implementation, evaluation and monitoring in order to achieve clearly successful results.

2018 Performance

- In 2018, SCG encouraged **883** suppliers to achieve Green Industry Level 2: Green Operation as follows:
 - **108** suppliers from Cement-Building Materials Business
 - **70** suppliers from Chemicals Business
 - **705** suppliers from Packaging Business
- Since 2014, **12** SCG companies have been certified Green Industry Level 5: Green Network as follows:
 - **8** companies from Cement-Building Materials Business
 - **2** companies from Chemicals Business
 - **2** companies from Packaging Business

Trainings for Safety Enhancement

Strategy ③

- SCG provides safety training in various forms to reduce safety operational risks from contractors which helps diminish work-related accident, injury and fatality rates among contractors.

Contractors' safety poses a significant risk and target for SCG's sustainable development strategy. Training and communication are emphasized to create knowledge and understanding among contractors, especially about safety awareness, in order to truly achieve business sustainability.

Various safety training and communication activities are organized, such as

- Training on environmental and safety management
- Workshops on environmental and safety risk assessment in specific work, such as welding and scaffolding
- Seminars and exhibitions for safety knowledge
- Safety awarding to encourage contractors to develop safety management system
- Transportation contractors development to strengthen drivers' competency to be high quality drivers, so called "Smart Driver"

2018 Performance

- Packaging Business: **124** contractors from **8** companies joined transportation safety training for carriers and **169** contractors from **4** main task groups participated in an environmental and safety risk assessment workshop.



- Chemicals Business: "Safety Day 2018" was held on 7 November 2018 to communicate safety policy and guideline to contractors with the concept of Passion for Zero Incident with Safety Standard. Activities in the event included academic seminars and booth display on safety standards, games, etc., as well as certificate presentation ceremony to represent thank you to contractors worked without accidents in 2018. There were over **750** employees and contractors attended the event.

- Chemicals Business: **300** contractors from **43** companies attended the MTT CSM Forum 2018 seminar. There were **24** contractors receiving safety awards.



- Last year, the nationwide number of Smart Drivers in the SCG Logistics' project has increased to more than **2,300** people, accounting approximately **44%** of all drivers. The continuous operation caused the statistic of the Smart Driver's road accident rate to be reduced, in the year 2018, to **0.11** case/million kilometers, compared to the overall drivers' rate of **0.24** case/million kilometers.

Social and Community Involvement



SCG believes that business will grow sustainably, if it as well develops the community and society for sustainable growth and it must be recognized, trusted, with confidence by the community and society in business operations, including creating participation with all sectors to promote the improvement of quality of life both locally and throughout the region.

Goal

- Raising the quality of life and reducing inequality of society in various dimensions to enhance immunity for the community to cope with potential disasters from the economy, society and environment.

Strategy

- 1 Enhancing the community's capability to ensure that they have career security and competence to build up stronger and more sustainable community as well as to expand the outcome to the network community.
- 2 Promoting an involvement of employees and stakeholders in all sectors to create sustainable value for society.



Management

- Establish “CSR Committee for Sustainable Development”, consisting of members from the Board of Directors and SCG top Executives to determine policies and guidance on social development.
- “SCG Foundation” has a key mission in people development focus on maximizing human capability and having them equipped with knowledge and integrity.
- “Community Relations Units” at local sites contribute to carry out activities for community enhancement, supporting them to attain a better quality of life and self-reliance.

- Corporate Social Responsibility projects are classified in 4 categories.



Water Conservation:

From Mountain to the Mighty River

Vital to all lives, water is used by human beings for domestic and agricultural use. For over 10 years, SCG has adopted His Majesty the late King Bhumibol Adulyadej's ideas concerning "sustainable water management" as an approach to suitable water management for respective areas, from upstream, midstream to downstream areas through the process of participation with local community members in order to equip them with a true understanding about water management in their own areas and encourage their shared ownership. This has been achieved by constructing check dams in watershed areas in order to recover the balance of nature, effectively resolve the drought and flooding issues, and deliver water to interconnected ponds at the foothills or distribute water in plain areas through the monkey cheek system so that farmers can use water for agricultural purposes to achieve maximum benefits. This has also been achieved by restoring and conserving the coastal ecosystem by building fish homes as habitats and nurseries for small marine creatures to return the abundance to Thai seas. Finally, SCG has developed the project "Water Conservation: From Mountain to the Mighty River."



Check Dams and Interconnected Ponds: Restoring Upstream Areas

Since 2007, starting with upstream areas, SCG has collaborated with local communities to rehabilitate watershed areas by constructing check dams based on royally-initiated ideas in many provinces across the country. This activity has brought back water to communities experiencing drought and has been scaled up to distribute water from the check dams to be stored in interconnected ponds. Interconnected ponds consist of the "mother pond," (large pond), which transfers water into "child ponds" and "grandchild ponds," the sizes of which reduce proportionately, to ensure thorough and adequate distribution of water to be stored for agricultural purposes.

At Ban Sa Phae, Chae Hom district, Lampang province, seven interconnected ponds were built at the foothills, which retained 30,400 cubic meters of water transferred from the check dam and covered 500 rai of agricultural land. The water allowed the community to cultivate low water-consuming plants, e.g. pumpkin, luffa gourd, yard long bean, and bitter cucumber up to seven times a year, generating an income up to 18 million baht to the community.

At the Khao Yai Da Community, Mueang district, Rayong province, check dam related activities featured saving the community from drought, reviving orchard productivity, and generating more income to the community. Furthermore, it led to the establishment of a learning center "The Khao Yai Da Water Conservation Station" to share about using check dams as a tool to secure water for agricultural use and conserving the environment, which can become a tourist attraction, bringing income to their community.

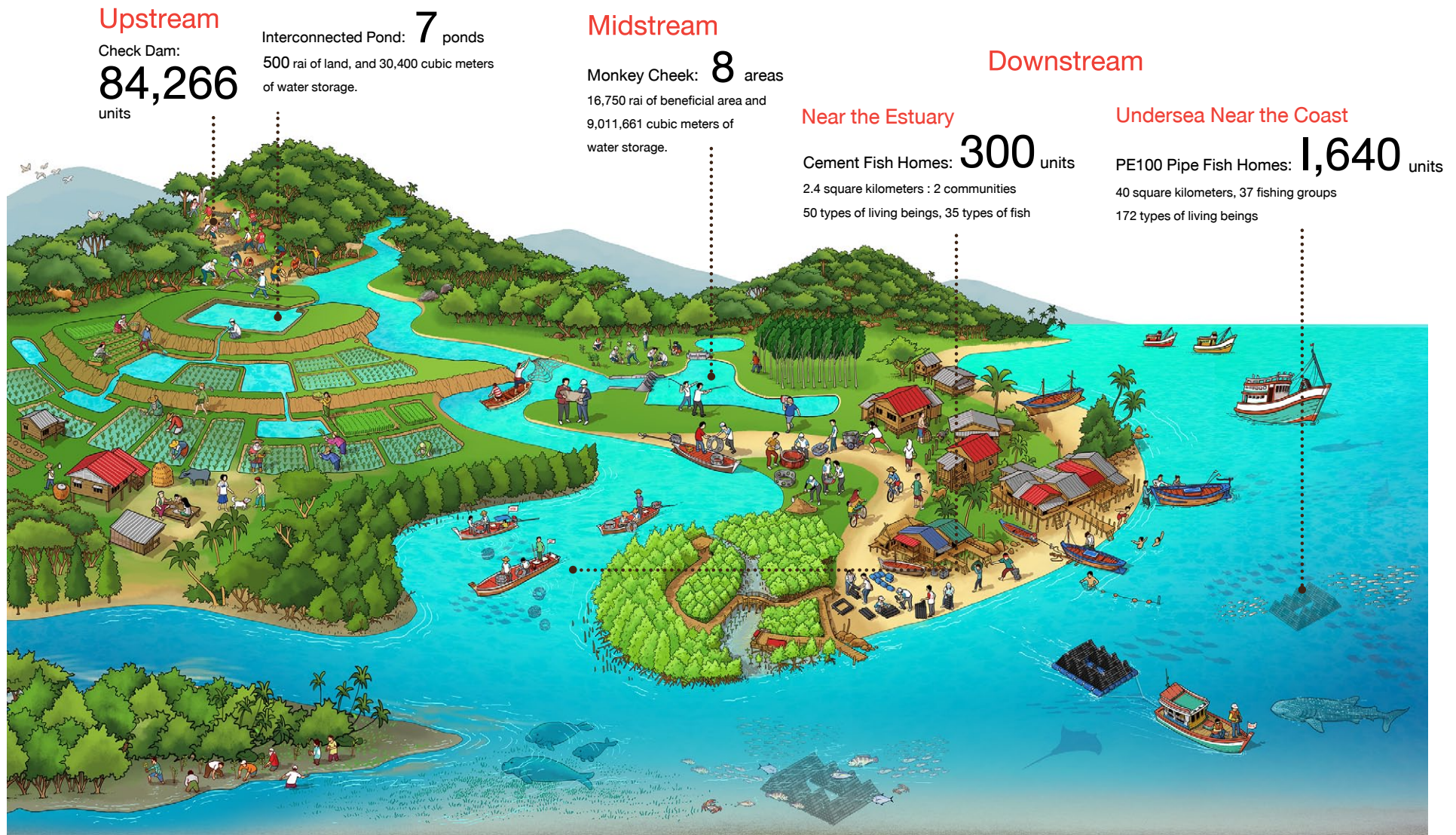
Monkey Cheeks: Water Bodies for Agriculture in Midstream Areas

For midstream areas, SCG has built monkey cheeks as water retention areas for various agricultural areas. For example, at Ban Non Khewa, situated in Waeng Noi district, Khon Kaen province, SCG, in collaboration with the Utokapat Foundation under the Royal Patronage of H.M., conducted canal dredging

to connect water courses from the Chi River to swamps in agricultural areas within the community following the “monkey cheek” system. They became water storage areas for agriculture, helped mitigate drought and flooding for agricultural areas spanning over 250 rai, and served as fish farms, providing the community members with an increase in their income amounting to at least 30,000 baht per year.

Fish Home: Creating Natural Richness in Downstream Areas

The Fish Home Project has been implemented since 2012 in Rayong province. Chemicals Business learned from local fishing communities in Rayong province that the number of fishes and marine animals experienced a significant reduction. Chemicals Business, therefore, developed fish homes made of PE100 pipes to place under the sea, which have



brought back an abundance of aquatic animals and resulted in fishermen catching more fish and other aquatic animals.

The innovative fish homes by Chemicals Business are made of PE100 pipes which are resistant to high pressure and corrosion. They are certified under international standards as being environmentally friendly, without exposing hazardous chemicals or contaminants to the sea. Assembled to form pyramid shaped fish homes, when placed under the sea, they become nurseries of young aquatic animals and habitats for fishes and other living beings.

In 2012, the first fish home was placed at the estuary of the Klaeng Canal in Rayong province. Six years later, in 2018, the Fish Home Project expanded to 37 local fishing groups in Rayong, Chonburi, Chanthaburi, and Trat provinces. A total of 1,640 fish homes have been laid down in marine resources conservation areas spanning over 40 square kilometers. Over 11,500 volunteers have provided assistance and local fishing networks have looked after these areas to ensure they are safe from fishing to serve as aquatic animal nurseries. This has restored the abundance of marine resources, resulting in a continual increase in the number of fishes and other aquatic creatures.

A survey in December 2017 revealed that the fish homes were home to over 172 types of living



beings, including economic fishes such as yellow stripe scad, grouper, bass, stone crab, green mussel, some ornamental fishes such as batfish, ray, and cockfish and others such as coral, phytoplankton and zooplankton.

Expanding the “Fish Home” Project to Southern Communities

In 2017, the Fish Home Project was expanded to the southern region, a fishing community at Ban Mot Tanoi, Kantang district, Trang province. During the monsoon season, waves and winds in the sea are strong and dangerous to small fishing boats. Thus, during the season, the local fishermen go fishing at the Lat Chao Mai Canal instead, the mouth of which connects to the sea. The area consists of mangrove forests, which provide wind and wave protection, however, they result in congestion in fishing and makes aquatic animals become less and less without a chance to grow.

Supporting and carrying on the local community members' shared idea that there should be fish homes to serve as nurseries for small aquatic animals, Cement-Building Materials Business invented and developed fish homes using marine cement which is seawater resistant, more opaque than normal cement, resistant to chloride and sulfate corrosion, and are safe to the environment. Their design is characterized by a circular shape similar to round concrete pipes with hollow holes around for fish to swim through or flee from hunting and for corals to stay on and expected to have 20 year service life. A survey in 2018 revealed that the fish homes were home to over 50 types of economic animals and other living beings, including 35 types of fish. The most common economic fishes were Russell's snapper and streaked spinefoot, which generated the greatest amount of income to the community.



Next Steps

SCG still determines to continue “Water Conservation: From the Mountain to the Mighty River” Project in various areas across the country. For the past years, SCG, in collaboration with local communities and volunteers, have built more than 84,000 check dams, excavated 7 interconnected ponds at the foothills to transfer water for agriculture, created the monkey-cheek system in 8 midstream areas, and laid down 1,940 fish homes.

SCG believes that community participation is the heart of sustainable development and that networking to create strong power is the key to creating good upstream areas and rich downstream areas, which will result in equilibrium nurturing people in all areas and will upgrade the quality of life of local people.

SCG will continue to pursue good projects carried out with different communities across the country and transfer and scale up the concept of natural resource conservation, which is vital capital for all lives.

Model of Circular Economy for Communities

Strategy ① ②

• SCG applies the concept of circular economy as the main scheme to carry out activities for society by circulating waste materials to be used as resources that help add economic value and improve the quality of life of communities.

Brain-Based Learning Playground; Child Brain Development

> Project Type 1

Brain-Based Learning is a learning management consistent with the development of the brain, allowing children to learn both in and outside a class and stimulating brain development with appropriate physical activities. In addition to the well complement of brain and organ systems, Brain-Based Learning also helps boost confidence, self-awareness, and good personality for children.

The Concrete Products and Aggregate Co., Ltd: CPAC (Ubon Ratchathani Ready Mixed Concrete Factory 2: Ubon-Warin) has introduced the Brain-Based Learning concept of the Office of Health Promotion Foundation (SSO) by creating a playground for CPAC Brain-Based Learning following the circular economy principles. The project is a collaboration among contractors, communities and schools by bringing waste materials such as old tire, crushed concrete specimen, concrete pipe, sand, rock, community's old radio tower, etc. to create a playground at Ban Kham



Charoen School. There are 11 bases such as wheel wall base, spiderman base, air pocket base, happy tree base etc.

The results of providing one-hour playtime on the playground for students from kindergarten to grade 6 before attending the morning class showed that children's skill has been improved from previously 26% to 84% after project implementation, including the better education results.

The company has prepared a manual for CSR CPAC Brain-Based Learning as a guideline to expand the project to 16 schools in the surrounding communities.

One-Million Square Meters of Lan Ploen CPAC Project

> Project Type 2

The Concrete Products and Aggregate Co., Ltd., having plants spreading throughout the country, initiated the project "One-million square meters of Lan Ploen CPAC" since 2011 by using circular economic principles. It utilized excess concrete from delivery to customers and made a cast of "Concrete Slabs" to be used as floor coverings "Lan Ploen CPAC" in the form of a multi-purpose playground or pedestrian walkway which communities, temples and schools can use as public space for social activities in a beneficial, happy and sustainable manner.

The company aims to deliver 1 million-square meters of Lan Ploen CPAC within 2020. From 2011 to 2018, the total amount of Lan Ploen CPAC has reached 628,500 square meters, covering more than 1,257 locations, 37,710 involving participants, with value of 282 million baht.



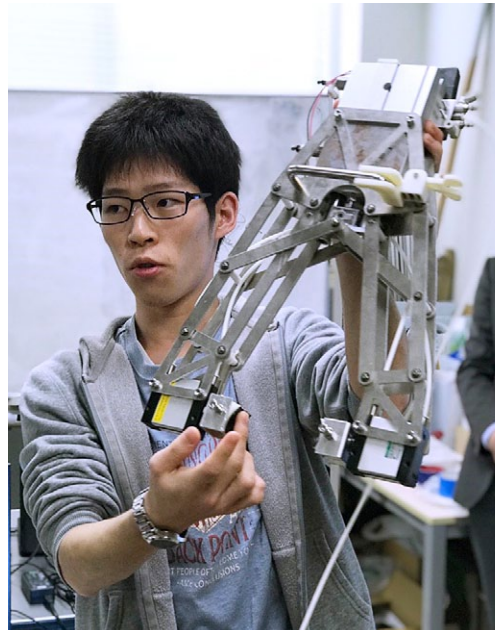
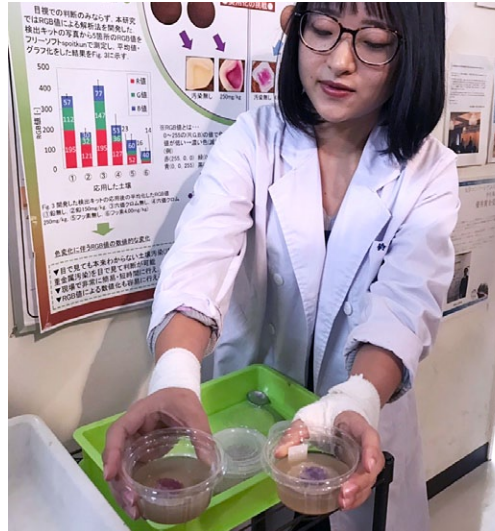
Creatively Promote Education Strategy ②

• SCG Foundation do believe that the quality of the society is derived from having smart and decent citizens. It, therefore, focuses to build potentiality among children and youth to enhance the nation's future development while promoting awareness for social responsibility through proper education-promotion

Our Fantastic and Masterful Teachers, We Are Proud Of

> Project Type 1

The way the children will be in the future depends on the ability of teachers in supporting, developing, and nurturing their students' potential, especially those of vocational students. SCG Foundation, which operates the project "Skilled Professional for the Future" since 2013, has focused on the promotion and development of vocational teachers. In the year 2018, we organized a program "Our fantastic and masterful teachers, we are proud of" It provides opportunities for youths studying at vocational levels across the country to present the stories of vocational teachers who are of the impression to be selected as a vocational model teacher. Through a selection process by committee and public voting, the 10 selected vocational teachers will be granted training and field trips in Japan.



Vocational Model Teacher: Benjawan Bungthong

Teaching fashion and textile technology, Udonthani Vocational College

Proposed by Jesada Sibnok, 2nd-year vocational certificate student, Udonthani Vocational College

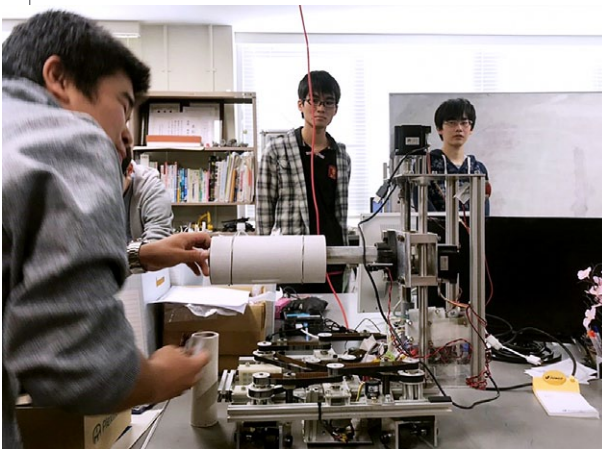
"Teacher Benjawan Bungthong or Kru Pom always encourages us to participate in various activities such as teaching friends in the community home, prison, or even the group of drug users ... Every time I have learned new experiences, turned roles from students who have to learn according to the instruction to act as a teacher who is happy to convey to others. It makes me feel that the value of life is not just a square of the classroom."

"These images reinforce me to love and honor teachers like no other. The teacher who watched the students making the dress until late at night, supporting meals for us to eat for nothing in return, just to fulfill her hope to make our dream come true. The teacher once told me that even though she had received many awards from many agencies across the country, she was never as happy as seeing us doing what we love, loving what we did, and made out the best"

The vocational model teacher is a teacher with good behavior, knowledge and skills who contributes substantially to the development of students, able to educate and advise the students and keep up with new knowledge and insights for self development.

Vocational students across the country presented stories of 437 vocational teachers. Subsequently, the 10 vocational teachers from various colleges nationwide have been selected to attend a training in constructionism thinking process to get inspiration to develop quality vocational students. They were also granted a travel trip to study the KOSEN teaching system at the National Institute of Technology, Tokyo College, which is a learning model that focuses on practical action which can be applied to the Thai vocational education system.

In addition to this activity, SCG Foundation also works with King Mongkut's University of Technology North Bangkok to conduct research on "Vocational Teacher Model for Thailand 4.0" in order to study the competencies of vocational teachers including curriculum guides for teacher development to keep up with changes in the 21st century.



Vocational Model Teacher: Atthapon Pholprueksa

Teaching projects, computer programming,
Ranong Technical College
Proposed by Somkiat Saetang, 3rd-year vocational
certificate student, Ranong Technical College

"Teacher Aath asked me to innovate a semi-automatic broom grass attaching machine for the occupation of the elderly and the disabled. It turns community enterprises to earn more than 2 times, reduces chronic injuries of broom makers, creates job, generates income for the elderly and people with disabilities ... The teacher also taught us that we must reward society. We did it by deducting 5% of profits from selling semi-automatic broom grass attaching machine to buy clothes, school uniforms, and giving them to the Morgan children. We also sought funding to create other innovations for the community and society and being accepted at the national level, such as 3 in 1 saline solution pole for rehabilitation patients, flood warning buoys via SMS system, etc."

"Teacher Aath encourages us when we feel tired and discouraged, teaches us how to think systematically and creatively, and apply the philosophy of sufficiency economy for our activities."



Mobile Library to Create Environmental Awareness for Children and Youth 7th

> Project Type 2

Since 2006, the SCG Foundation has initiated "Sharing Opportunities Drawing the Future Project" to support and encourage SCG employees to take part in improving the quality of life for the society through the presentation of creative thinking processes which is beneficial to society in various fields. Until 2018, there were 217 selected projects to be carried out, from a total of 406 projects and more than 3,000 SCG employees, collaborating with communities to create projects for society.

The "Mobile Library, Environmental Bookworm Project", is considered one of Sharing Opportunities Drawing the Future Project that has been continuously implemented for the 7th year, in collaboration with the Lampang Children and Youth Creative Network, Pattamasevi Learning Center, Lampang province. It aims to cultivate reading habits for children and youth by arranging a mobile library once a month, circulating to 20 schools in Lampang province. Teerayuth Wongboonrueang, the staff of the Siam Cement (Lampang) Company Limited, who has personal interest in environmental issues, especially



the smog problem from burning forests, burning farms, or burning waste then teamed up with a group of friends in Lampang factory to present environmental activities to join the mobile library of the Pattamasevi Learning Center until it became a Mobile Library, Environmental Bookworm Project.

Activities include monthly traveling to schools to promote reading and providing fun knowledge about the environment through activities in the form of games and media and various annual activities in the form of environmental camps during the month of September – October. It is for students in the upper elementary school level, there are 3 students from various schools participating in each school, a total of 60 people. The main content of cultivating environmental awareness of the camps are varied each year, such as waste separation and reduction, global warming, building weir to maintain moisture, etc., which is a way to help reduce forest burning that eventually causes haze problems.

The “Mobile Library, Environmental Bookworm Project” is considered a success and supporting Sharing Opportunities Drawing the Future Project, with the importance of nurturing people to be smart and decent citizens with social and environmental awareness.



Having seen that the children are happy, we have the motivation to continue the project. I believe that we all always have the opportunity and ability to help others, it depends on whether we see that opportunity or not. The success of the project is not only from the team, but also from many people around it. Although facing some obstacles, it makes us understand more. I believe that helping others is good and worth to continue."

Thirayuth Wongbunruang

HRBP Assistant Manager
Siam Cement (Lampang) Company Limited



Scholarships to the Children of Thai Rangers

> Project Type 4

Thai rangers are one of the occupation at risk of life-threatening by encountering illegal logging and hunting in protected forest areas as well as the danger of living in the forest. Their income and welfare are not equivalent to those of the civil servants. SCG Foundation recognizes that protecting natural resources is a very important task in the country, in which workers must sacrifice both physical and mental strength. Therefore, building morale in performing duties as well as supporting the security and stability in the life and family of the rangers are extremely important.

Since 2015, the SCG Foundation has started granting scholarships to the children of the Thai rangers to provide educational opportunities and strengthen support for family of the forest guardian totally 6 scholarships. The number of scholarships has been increasing every year in order to cover all of the rangers in various conservation areas by working closely with the Department of National Parks, Wildlife and Plant Conservation.

In 2018, the Foundation provided 160 additional scholarships to a total number of 366 scholarships. The scholarships to the children of the forest protection officer is part of the Sharing the Dream Scholarship Project by the SCG Foundation.

Sharing the Dream Scholarship

SCG Foundation has launched this project since 1981 to provide scholarships to children and youth, who have good behaviors and committed to continuing their education, but lack a financial support. This grant is awarded completely, there is no obligation to return it especially for the least opportunity groups in various remote areas all over the country. This scholarship is without any repayment obligation and available up to the graduation level.

Thailand:

The local scholarship projects managed by SCG Foundation

1981: Started the Sharing the Dream Scholarship Project

2006: Started supporting scholarships for children of public service providers throughout the country

2015: Started supporting scholarships for children of the Thai rangers

80,000 scholarships 800 million baht

the amount of scholarships and all budgets since the project started

4,000 scholarships 74 million baht

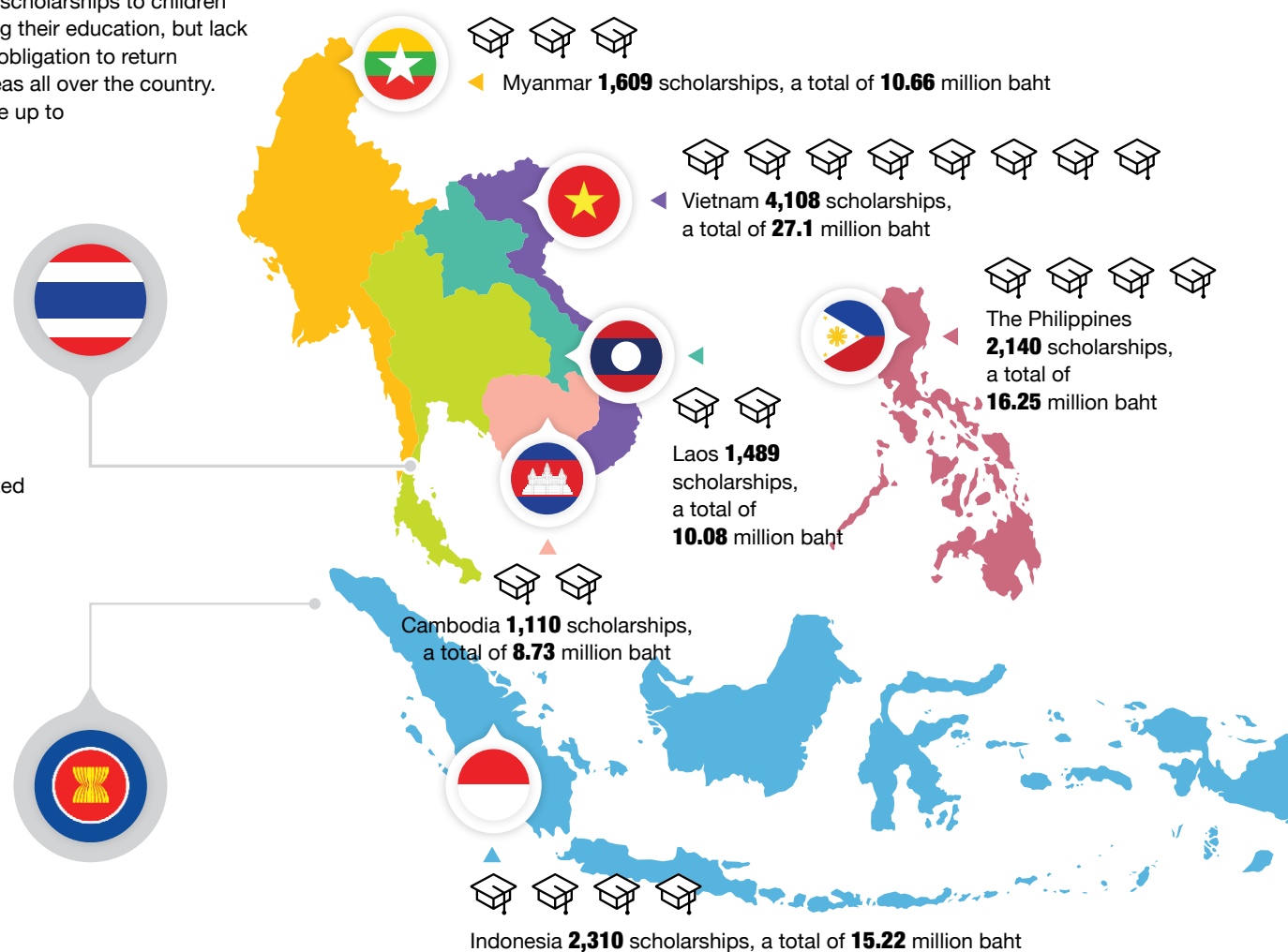
the amount of scholarships and budget in current year

ASEAN:

The ASEAN scholarship projects managed by SCG

2007: Started supporting scholarships in ASEAN countries in Vietnam. After that, it expanded to various countries where SCG has operation i.e. Vietnam, Indonesia, Myanmar, Cambodia, Laos, and the Philippines. It is the scholarship for students up to the secondary level.

2018: Expanded scholarships at the university level for students who have received the Sharing the Dream scholarship and are studying a bachelor's degree in the field significant for national development or relevant to SCG's operation.



Promote Health and Safety

Strategy ① ②

• Health and safety are the basic and most important aspects of having a good quality of life for people in society. SCG, therefore, collaborates with experts, communities and various sectors to help prevent, alleviate and solve problems that occur in each area of SCG's operations both in the country and overseas.

The Lifesaver for Community

> Project Type 2

Thailand is one of the countries with high statistics of road accidents in the world ranking. The accidents are mostly caused by carelessness and non-compliance with traffic rules, resulting in the unfortunately loss of many lives and property. Chemicals Business, which operates in Rayong province, has initiated the Lifesaver for Community Program to prevent accidents and reduce road accidents in Rayong. The program aims to promote community safety with the 7 life saving rules, which are related to neglecting behaviors i.e. drink don't drive, wearing helmets, fasten the seat belt, don't drive above the speed limit, don't use mobile phones, driving or riding against the traffic flow, and carrying a driving license.

This project has been implemented since 2017 at Nern Phayom community, in cooperation with



Rayong, Map Ta Phut Municipality, and Nern Phayom community. The collaboration entails a series of activities range from meeting, driving training, installation of signage, and organizing awareness raising campaign, including correcting risk points such as cutting tree branches obscuring the driving vision, attaching the glass to reflect the blind corner, etc. In addition, the project also builds cooperation with all sectors, including local police and volunteer teams from villages which have organized campaign activities every month, especially during the Songkran festival.

As a result of continuing operations for more than 1 year, the number of wearing helmets increased from 10% to 70% and fastening seat belts increased from 10% to 81% in 2018.

At present, the project is in the process of expanding to neighbouring communities.



Sharing a Brighter Vision

> Project Type 3

Cataract is caused by corneal lens degeneration, and if it is not treated properly, the patient may eventually suffer vision loss. The treatment of cataracts is also limited due to the need of specialized medical equipment, mostly available in the city hospital, causing patients to wait for a long time and facing the risk of health deterioration. SCG, therefore, cooperated with Ban Phaeo Hospital. (Public Organization) and Mawlamyine Cement Limited (MCL), SCG's first cement manufacturing plant in Mawlamyine City, Mon State, Myanmar, to organize a cataract surgery program (Sharing a Brighter Vision) to help needy patients in Mon State. The program has organized the team of skilled ophthalmologists with modern medical equipment to provide treatment for the patients in the area since 2015, and has recovered the eyesight of 867 patients. Mawlamyine General Hospital is a center for surgery.

For the year 2018, the project expanded cooperation to the Karen State. During the 4-day period of the project, surgical treatment was provided for 97 patients from Karen State and 148 Mon State, totalling 245 patients. It also got support from the staff of the SCG, MCL and volunteer students from SCG Sharing the Dream Scholarship who are the important force to help facilitate the patients during the surgery.

In addition to surgery for patients, since 2016, the project also provides general knowledge about eye care, cataract in the eye through publications, online society, and TV programs to raise awareness for eye problems for the Myanmar people.

HANDS FOR HEROES: Join Hands for Ranger

> Project Type 4

In addition to providing scholarship for rangers' children, SCG Foundation launched HANDS FOR HEROES project to create a public awareness about the work of rangers. The foundation also cooperated with different allies by inviting and providing an opportunity to different sectors including private sectors, public sectors, press and public to participate in different activities under this project. The activities included Paint for Heroes, Run for Heroes and Song for Heroes. The revenue without the deduction of prior expenses from the project was used to purchase 3,635 sets of safe patrolling equipment for the rangers, worth 3.7 million baht.



Accordingly, the Children Scholarship and HANDS FOR HEROES projects have enhanced morale and encouraged rangers to operate "without struggling worries".

Development Model of Community Enterprise Strategy ① ②

• SCG is committed to raising the level of community development to be self-reliant, sustainable, through integrating establishment of community enterprises with standardized quality of products, having wide distribution channel, creating career and income for the community in a sustainable way by cooperating with various sectors, including the government sector and professional agencies in product development.

SCG Community Enterprise

> Project Type 1

Community enterprise is a form of business activity operated by the community which must be incorporated by not less than 7 persons who intend to work together to produce products or services. It has been certified according to the law, which is a way that supports the community in forming a group with self-reliance and stable income.

However, the establishment of community enterprises sometimes has encountered many obstacles and difficulties. SCG viewed it is essential to provide support and facilitate the establishment of community enterprises. Therefore, Chemicals Business and government sector collaborated to improve community products since 2016 until the year 2018.



The product development program begins with the assessment of the community's potential group and existing product in order to plan for group formation, enterprise registration, product development and improvement until getting product registration for sellable all over the country. This helps generate stable income and become expandable community enterprise model through collaboration with government sector.

Examples of successful community enterprises are Tamarind Flavored Candy Recipe Project, Shelf Life Extension of Ban Phet Kitchen Chili Paste Project, Frozen Moon Cake Project, Rayong Curry Recipe Project, Mangosteen-Indigo Leaf Fabric Project etc.



From 2016 until 2018, SCG has participated in the development of 10 community enterprises in Rayong province, totaling 26 products, generating income for the community by 14.4 million baht.

In addition, SCG also supports training for various courses to enhance community enterprises, including product development, marketing, channel for distribution, brand building. All these courses are designed to enable community to create unique products with local identity for income generation and sustainable progress for local community.

In 2018, the training on community enterprise and morality in Lampang province resulted in 15 potential products that can be developed in accordance with local identities. The training will be expanded to community in the area of SCG operations in Nakornsrihammarat, Saraburi and Kanchanaburi provinces.

Material Use and Waste Management



Limited availability of natural resource is a key factor driving every sector aware of the access and acquisition of raw materials, the risk of future shortages, and the increasing amount of waste from the expansion of the industrial sector that may affect the environment. Therefore, SCG sets the guidelines for managing raw materials and waste according to the circular economy principles: starting from the design, the reduction of materials used, increasing production efficiency and using innovations to recycle waste and endlessly transform it into added value products.

Target

- Since 2012, zero waste from production processes to landfill.
- By 2025, reduce the volume of waste disposal per production unit by 60% compared with 2014.
- Recycle waste to continuously create value added.

Strategy

- 1 Reduce the amount of waste generation at sources.
- 2 Implement the circular economy by researching and developing innovations to recycle raw materials and waste and increase the value of waste (R&D).
- 3 Industrial waste management without landfill.
- 4 Reduce waste disposal by incineration which does not generate value.

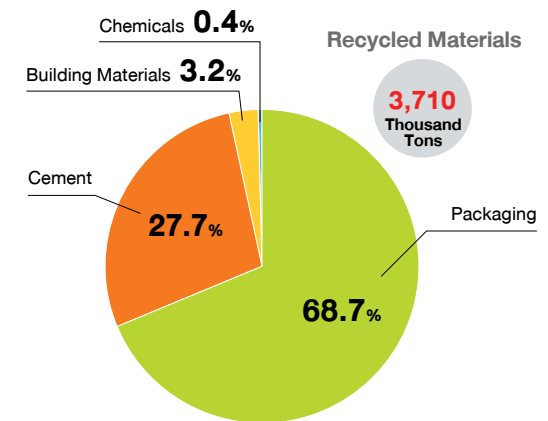
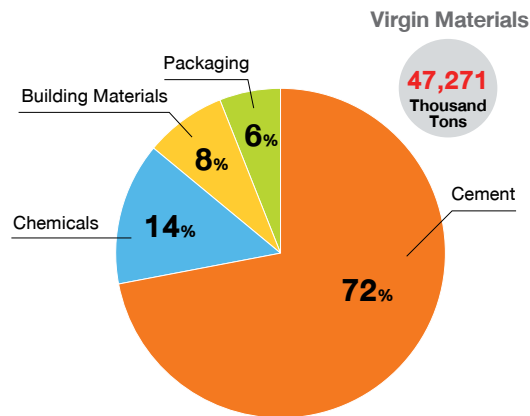
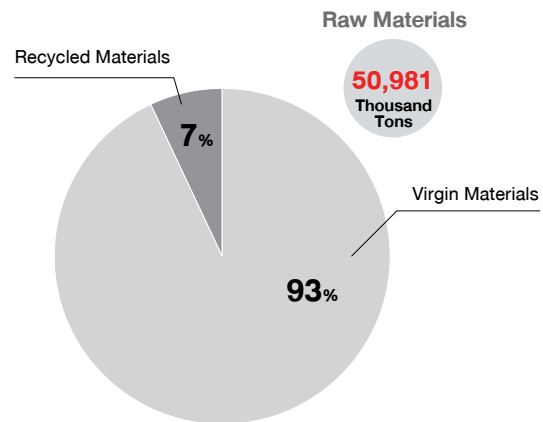
Management

- It is SCG policy to highlight circular economy as the key corporate strategy and SCG intention to drive the result. Every department in the organization looks for an opportunity seriously to utilize waste. Furthermore, the company collaborates with various sectors; government sector, private sector and public sector, and promotes innovation and eco-friendly process as the foundation of sustainable development.
- SCG uses 3 strategies to drive the circular economy:
 1. Reduced material use/durability.
 2. Upgrade and replacement.
 3. Reuse and recycle.

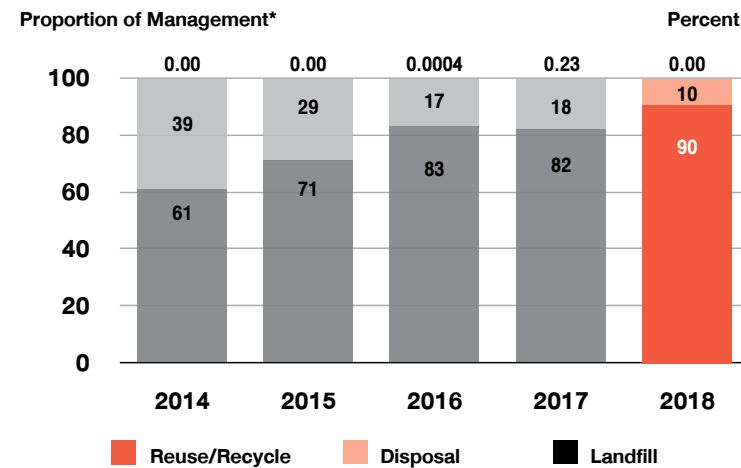
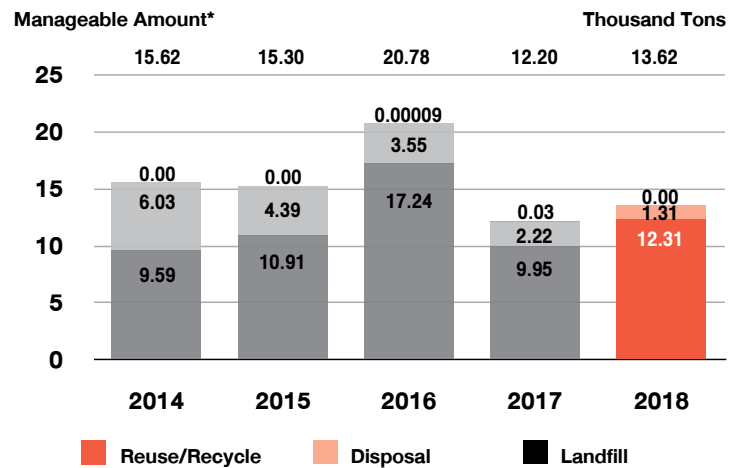


2018 Performance

Use of Raw Materials

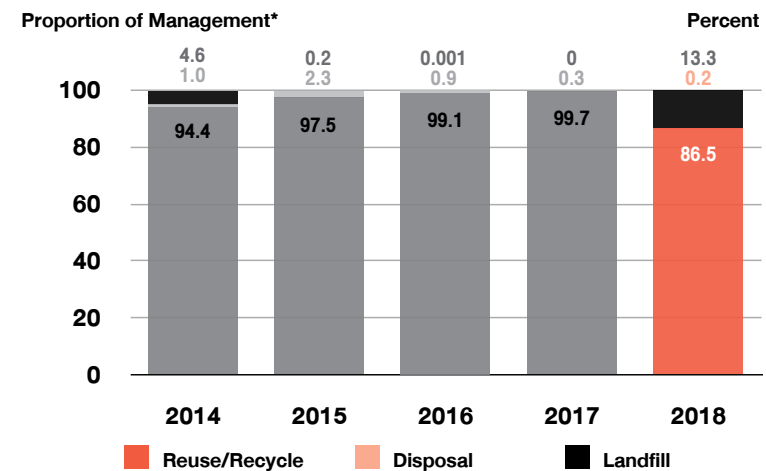
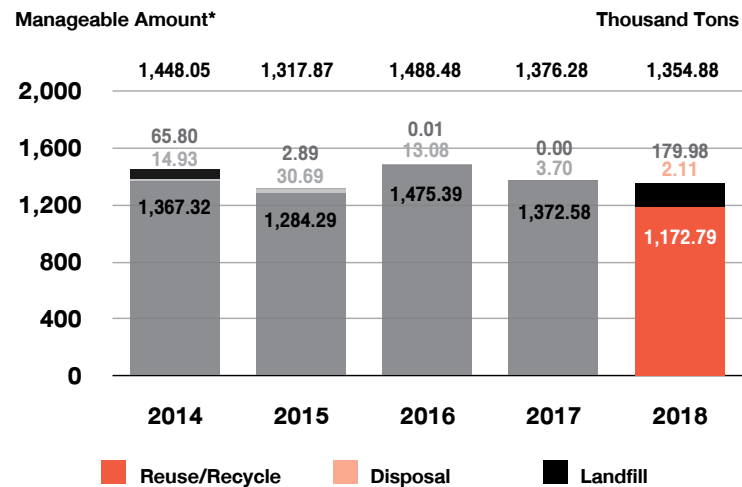


Hazardous Waste



*Waste in the storage waiting for waste management is excluded.

Non-Hazardous Waste



*Waste in the storage waiting for waste management is excluded.

SCG reuses and recycles more than 86% of waste, and no hazardous waste is landfilled. However, in 2018, SCG expanded the scope of landfill to cover land reclamation and used the remaining ready-mixed concrete which was non-hazardous waste for the land reclamation.

In this regard, SCG has implemented and applied circular economy for maximum utilization of residual ready-mixed concrete waste such as concrete slabs making for communities.

Alternative Raw Materials and Fuels from Waste

Strategy ② ③ ④

- SCG studies, researches and innovates to recondition waste from production processes so it can be used as alternative raw materials and fuels of suitable quality. This helps reduce waste disposal costs, raw material costs, waste to landfill and environmental impact.
- SCG cooperates with both internal and external organizations in order to enable waste recycling, generating alternative raw materials and fuels for maximum benefits to all parties.

Cement-Building Material Business

- **SCI Eco Services Co., Ltd.** invented an innovative way to transform industrial waste and community waste. There are variety of different types of waste that are sorted and reconditioned to be an alternative material such as limestone, clay, and sand for cement plants. In addition, some of the waste is repurposed to be an alternative fuel that meets a quality criteria, replacing fuel oil or coal, that can be used for co-processing in cement kiln. This innovation helps reduce the consumption of fossil fuel, which causes global warming, and reduce



waste disposal by landfill method. In 2018, industrial waste can be converted into alternative raw materials at 313,000 tons of waste per year, and alternative fuel at 131,000 tons of waste per year.

• Pulverized Fuel Ash replaces Clinker:

Cement-Building Material Business uses Pulverized Fuel Ash (PFA) produced from coal-fired power plants in a huge quantity each year to replace clinker in cement production. Because PFA has qualities that help reduce greenhouse gas emissions, landfill area and soil contamination.



• Synthetic Gypsum replaces Natural Gypsum:

The Siam Cement (Lampang) Co., Ltd., in collaboration with the Electricity Generating Authority of Thailand adjusted their production process to turn artificial gypsum which is the waste of power plant to completely replace the natural gypsum in cement production. Additionally, there are collaborative studies of adding value and utilization of other wastes from power plants, such as PFA that does not meet the criteria, and bottom ash with specific properties.



• Fly Ash Replace Rice Husk Ash:

The Siam Fibre-Cement Co., Ltd., C-Tech Consultant Co., Ltd. and SCI Eco Services Co., Ltd., having plants in Thung Song district, Nakhon Si Thammarat province, conducted a joint research on replacing RHA with fly ash which was a perfect raw material for fiber cement roof tiles. Biomass power plant yield monthly about 200-300 tons of fly ash, sufficient to serve the company's need of only 150 tons of fly ash. Furthermore, SCG Landscape Co., Ltd. uses the rest of 120 tons of fly ash to produce paving block.



Packaging Business

• Siam Sanitary Ware Industry Co., Ltd.

studied the properties of sediment, a waste material from the production of high-quality ceramic sanitary ware and found that the sediment has the good properties for ceramic tableware production. In 2018, the Company delivered 2,300 tons of sediment as a raw material to the ceramic tableware factory of TPS Material Co., Ltd. This reduced the company's expense of waste disposal while reducing TPS' cost of production.



• **SCG Paper Energy Co., Ltd.** generates electricity using over 300 tons per day of waste rejected from the paper production of Siam Kraft Industry Co., Ltd. and Thai Cane Paper Plc. by applying advanced European Technology to control the pollution, as obligated by EIA, in regards to industrial waste management. Moreover, waste from power plant such as fly ash is used as a substitute material in eco brick production and some are used as a substitute material in cement plant.

• Used Paper for New Paper Project

receives used paper from agencies, organizations and schools and recycle it into new paper. Those who brought used paper will receive new photocopy paper in exchange. This project not only encourages people to optimize the use of resources, but also promotes people awareness and engagement in waste segregation and waste reduction. In 2018, the Project received more than 120 tons of used paper.



Waste Process and Development for a New Product

Strategy ②

- SCG studies the properties of non-recyclable waste for an alternative raw material or fuel in the production process of SCG for processing of value added new product.

Cement-Building Material Business



• Soil Fertilizer Pellets for Parachute Rice Transplanting:

Soil fertilizer pellet project for parachute rice transplanting promotes career for local farmers in Sam Pak Paew sub-district, Kaeng Khoi district, Saraburi province. This project is driven by Siam Sanitary Ware Industry Co., Ltd., in collaboration with Land Development Department in Saraburi province, providing farmers with sludge and sediment-the waste materials from the company's ceramic production process. The farmers can use it for parachute rice transplanting instead of buying soil from other sources. Thirty members participated in the project and planted rice on 80-rai plot of land. Consequently, the plant reduces the disposal of sludge and sediment by 1,600 tons per year and the communities annually saves cost of soil purchase from the previous source 111,000 baht per year. The members also earned 120,000 baht per year from the fertilizer and rice sold in this project, including hiring fee from parachute rice transplanting.

Packaging Business



• Disinfectant from Lime Kiln Dust:

Phoenix Pulp & Paper Plc., in collaboration with Corporate Technology Office and leading universities conducted research and developed the lime kiln dust into high-quality disinfectant for livestock farms, killing 99% of the germs that cause gastrointestinal and respiratory tract disorders, while equally effective at 20% less quantity than other lime disinfectants available in the market. Additionally, it is not corrosive to metal, gentle to skin and can be easily rinsed off. The commercial implementation started at the end of 2018 and is expected to consume 6,000 tons of lime kiln dust in 2019, earning 13.8 million baht revenue, and save 20 million baht on industrial waste management in Phoenix plant.



• Paper Bags from Recycled Cartons for the World Environmental Day:

Packaging Business, together with Tesco Lotus, saves the environment under the concept of circular economy by bringing back used cartons from Distribution Center countrywide to the paper factory and recycling them into high-quality, heavy-duty paper bags as a packaging option for customers.



- **Transforming of Paper Band:** Siam Kraft Industry Co., Ltd., Wangsala Complex, joining Ban Ta Takraw Basketry Community Group in Kanchanaburi province, holds "Weaving for the Community" project. The company provides 2,000 kilograms per year of paper bands for the community, which uses their local wisdom to turn it into various woven handicrafts in different shapes such as beautiful bags, baskets and vases. The project helps create a job, increase an income, build the community's capacity, and enhance the quality of life. In 2015 when the project was established, Ban Ta Takraw community earned 90,000 baht income from the sales of handicrafts. In 2018, the income increased to over 1 million baht and the project annually welcomes 300 more participants.

“How-To-Throw” Bangsue Model

Strategy ① ③ ④

• SCG studied the problem of waste segregation incorrectly and designed garbage bins in 6 different colors, which are easy to understand, then installed them around the Head Office area. Simultaneously, SCG has launched several campaigns encouraging the employees to segregate the garbage and dispose them in the right bin, reducing the amount of waste disposal by Bangkok Metropolitan Administration and significant increasing of the recycling waste.

For SCG to conduct business under the principle of circular economy, the first step to recycle waste into other products is waste segregation, which is relevant to everyone. However, most Thai people do not understand this concept well. SCG therefore began with itself by building employee awareness in “Bangsue” pilot model, which aimed to set an example and create the culture of waste segregation. SCG studied the issues of improper waste segregation, designed garbage bins in 6 different colors that are easy to understand, and placed these bins in 180 locations around the Head Office. It promoted behavioral change of 8,000 employees in “How-To-Throw” communication campaign to ensure that they disposed of the waste in the correct bins.

Collected plastic drinking water bottle, plastic, paper, metal and glass will be recycled. Food scraps will be degraded into soil improvement material. Hazardous waste will be appropriately treated and disposed. Non-recyclable waste such as paper and dirty plastic are collected and turned into Refuse Derived



Fuel (RDF). Proper waste segregation and management will optimize the use of wastes from houses or offices and leave only a small amount of waste.

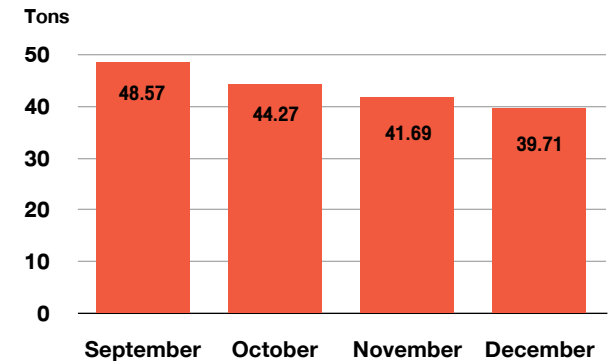
The success of Bangsue model will be expanded to other organizations to solve the rapidly growing waste issues.

2018 Performance

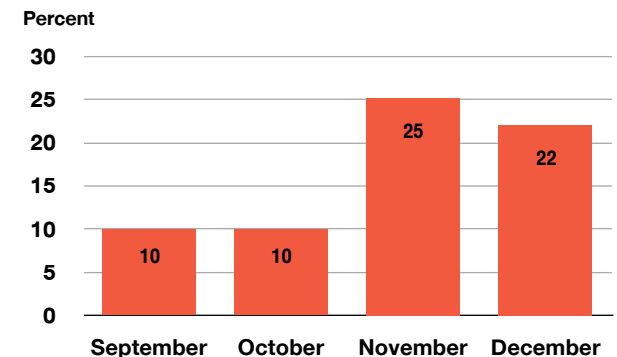
After launching the Bangsue Model Project in October 2018, 3 months later it was found that,

- The amount of garbage disposed of in the bins has been decreased continuously from over **48.57** tons in September to **39.71** tons in December 2018.
- Segregated waste for further recycling has been increased **twice**.

The Amount of Garbage Dumped in the Bins



Proportion of the Amount of Recyclable Waste



Energy and Climate Change



Due to fluctuations in oil prices, limit of energy sources, global warming and climate change, and cooperation in reducing greenhouse gas emissions in accordance with the Paris Agreement in order to keep the global average temperature rise to well below 2 degrees Celsius, SCG therefore aims to reduce energy consumption and greenhouse gas emissions by improving energy efficiency in the production process, increasing the proportion of renewable energy and alternative energy to reduce dependence on fossil fuel energy, and promoting efficient use of resources according to the principle of circular economy whereby waste is reused as energy.

Target

- Within 2020, reduce the greenhouse gas emissions by 10% compared with business as usual (BAU) of the base year of 2014.
- Within 2030, reduce the greenhouse gas emissions by 28% compared with business as usual (BAU) of the base year of 2014

Strategy

- 1 Mitigate the impact of fossil fuel use and control emissions below legal standard.
- 2 Improve or modify processes and equipment to increase energy efficiency.
- 3 Research and develop alternative energy technology using the concept of circular economy as the key strategy.
- 4 Develop products and services that reduce greenhouse gas emissions.
- 5 Organize activities to raise employees and contractors awareness on sustainable energy conservation.
- 6 Restore and rehabilitate of forest areas to achieve biodiversity to serve as carbon absorption areas.





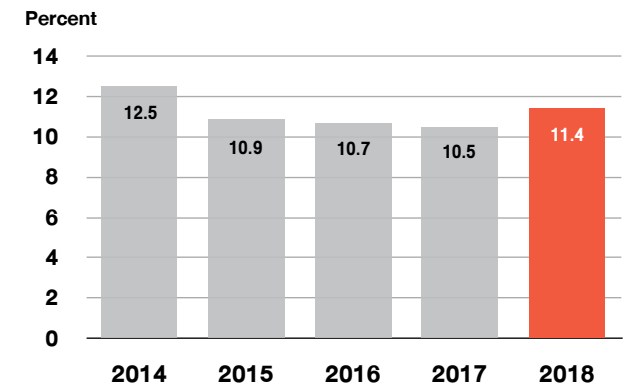
Management

- Set the targets for reducing greenhouse gas emissions with according to the Paris Agreement and to keep the global average temperature rise to well below 2 degrees Celsius.
- Formulate various measures to continuously increase energy efficiency of all business units.
- Secure energy from many sources and increase the use of environmentally-friendly alternative energy to reduce dependence on fossil fuel energy.
- Develop products and services which help reduce greenhouse gas emissions.

2018 Performance

- **189.36** petajoules - the total energy consumption.
- **7.8%** - the energy consumption reduction compared with business as usual (BAU) at the base year of 2007.
- **11.4%** - the proportion of alternative energy use.
- **24.54** million tons of CO₂ - Scope 1 and Scope 2 greenhouse gas emitted.
- **7.4%** - the proportion of greenhouse gas emissions reduction compared with business as usual (BAU) at the base year of 2007.

Alternative Energy



Chronology of Commitment in Energy and Climate Change Management



- SCG announced its environmental and safety policy.

1991

- Various countries signed the Greenhouse Gas Reduction Agreement, a part of Kyoto Protocol.

1997



- SCG issued its sustainable development report.
- First used industrial waste as alternative fuel co-processing in cement production.

2001

2000

- Cement business issued the first environmental report.



2006

- All business units completed the reports on greenhouse gas emissions.

- Established SCI Eco Service Co., Ltd. to provide waste management services for use as alternative fuels and raw materials.

2007

- Establish the SCG Energy Committee to set energy management guidelines.
- Cement business installed Waste Heat Generator (WHG).
- Packaging business improve steam boiler to use biomass and wastes.

2008



- Establish SCG Sustainable Development Guidelines.
- Set up a long term goal to reduce greenhouse gas emissions by 10%, comparing with business as usual at base year of 2017, within 2020.
- Replaced all lamps with T5 model.
- Ceramic factories installed Gasifier.
- Developed Cool Roof System.

2009

- Developed industrial furnace coatings for energy saving: emisspro®.



For SCG, the energy and climate change issues are still very challenging. It is also a risk to the business in the future. SCG therefore aims to move toward clean energy and look for ways to reduce greenhouse gas emissions to the minimum, including searching technology and innovation. This will be accomplished through the adherence and cooperation to sustainably drive the SCG business development."



Somchai Wangwattanapanich
Advisor attached to the Office of the President, and the President of the Water and Environment Institute for Sustainability, The Federation of Thai Industries
Former Vice President-Operations, Chemicals Business, SCG and Chair of the Energy Committee



- The Earth Summit meeting set the environmental and development practices for the global community.



- Implemented Green Logistics.
- Improve energy efficiency at all business and mitigate greenhouse gas emissions.

2010

- Head Office Building 1, 2 and Building 5 received LEED EB: OM Platinum.
- Developed RDF (Refuse Derived Fuel) by transformation of municipal wastes.

2012



- SCG 100-Year Building received LEED BD+C Platinum.
- Commenced the Energy Award project.

2014



- Announced SCG Environment and Energy Policy.
- Launching the solar energy project and its expansion.
- Replaced the light bulbs with 300,000 LED bulbs.

2016



- Established SCG Paper Energy Co., Ltd. to produce electricity using waste rejected from the production of paper according to the circular economy principle.
- Announced the goal of reducing greenhouse gas emissions by 28% by 2030, compared with business as usual at the base year of 2007.

2018

Target GHG
year 2030
↓28%

2011

- Promoted the products to be certified for carbon footprint reduction labels and carbon footprint labels.

2013

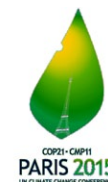
- Established the Climate Change Committee.

2015

- Packaging business started using biogas generated from wastewater treatment and lesser coal use.
- Various countries signed "Paris Agreement" to keep the global average temperature rise to well below 2 degrees Celsius.

2017

- Cement business started using alternative fuels from wastes.
- Packaging business started using natural gas to reduce coal consumption.
- Developed a floating solar farm.



Examples of Major Greenhouse Gas Emission Reduction Projects

Solar Power Project



Cement Business

41.46 GWh/yr
22,816 GHG ton/yr



Building Material Business

1.10 GWh/yr
605 GHG ton/yr



Chemicals Business

1.41 GWh/yr
560 GHG ton/yr



Packaging Business

1.13 GWh/yr
658 GHG ton/yr

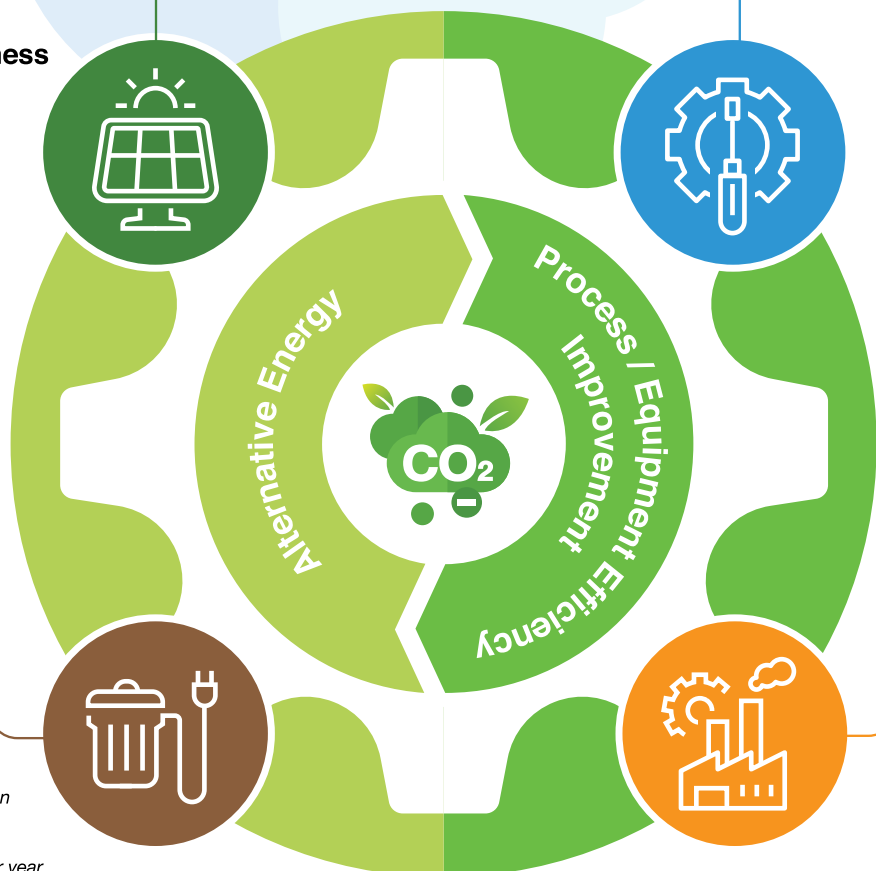
Waste to Energy Project



Packaging Business

770,000 GJ/yr

MW : Megawatt
GWh/yr : Gigawatt hours per year
GJ/yr : reduce/replace energy consumption in Gigajoules per year
GHG ton/yr : equivalent to reducing greenhouse gases in tons of carbon dioxide per year



Equipment Efficiency Improvement Project



Cement Business

Improvement efficiency of Pre-heater Cyclones
Reduce electricity consumption

13 GWh/yr | **46,800 GJ/yr**
7,200 GHG ton/yr



Building Material Business

Switch to the LED light bulb

1.57 GWh/yr | **914 GHG ton/yr**



Packaging Business

Install the pulp separation unit to save energy in the pulp washing

44,600 GJ/yr | **19,352 GHG ton/yr**

Process Efficiency Improvement Project



Chemicals Business

Increasing production efficiency

- Olefins **381,185 GJ/yr** | **20,455 GHG ton/yr**
- Polyolefins **44,079 GJ/yr** | **1,560 GHG ton/yr**
- Vinyl **53,638 GJ/yr** | **2,052 GHG ton/yr**
- Downstreams **19,916 GJ/yr** | **762 GHG ton/yr**



Packaging Business

Reduce energy consumption in the production of corrugated paper

39,600 GJ/yr | **3,380 GHG ton/yr**

Solar Energy Project

Strategy ③

- SCG studied and developed solar energy technology to enhance technological capability and energy security.
- Committed to using solar energy for every business and utilizing all forms: Solar Farms, Floating Solar Farm and Solar Rooftop.

Using alternative and clean energy is an important energy and greenhouse gas emissions reduction strategy. SCG has developed a solar energy project to the point where technology and material prices are balanced. Therefore, SCG moved to invest in installing solar energy sources for every SCG business: Cement-Building Material Business, Chemicals Business and Packaging Business, and utilize all forms: Solar Farms, Floating Solar Farm and Solar Rooftop in the way that is suitable for each area and sufficient for effective electricity generation.



2018 Performance

- Installed 10 solar energy projects, consisting of
 - 5 Solar Farm Projects.
 - 3 Solar Floating Farm Projects.
 - 2 Solar Roof Projects.
 - Total 33.08 megawatts, reduced greenhouse gas emissions **25,517** tons of carbon dioxide per year.
- From 2014 to 2018, in total 14 projects have been implemented in Thailand. With the total capacity of 44.46 megawatts, they have generated electricity of 60.65 gigawatt hours per year and have reduced greenhouse gas emissions at **34,143** tons of carbon dioxide per year.

Floating Solar Farm

Strategy ③ ④



Click Video

- SCG has developed the floating solar farm of buoy design produced from special grade polyethylene for installation of the solar cells panel. This Eco Innovation is applicable in the industrial sector.
- Installed on the water surface where there is no other use for it. The floating solar farms perform better than solar roof by 5-20%.



Installing solar cells on the roofs of buildings or on the ground to convert solar energy into electricity is gaining popularity in the industrial sector. However, this kind of installation may face limitations of finding the right space.

SCG is committed to supporting the use of alternative energy that does not harm the environment and saw the opportunity that every industrial plant had a water reservoir. Additionally, in Thailand the water bodies cover 14,600 square kilometers. Therefore, SCG moved to invent and develop a floating solar farm by using special grade polyethylene as the material for a buoy installed with solar panels, to be deployed on a variety of water surface conditions. No toxic contamination of the water source occurs, and the buoy last for more than 25 years.

The floating solar farm has the advantage of increasing the generation efficiency by 5-20% from the cooling effect compared with the installation of solar farm on the rooftop. Thus it saves the solar panels installation space by 10% at the same capacity. It also helps to shield the sun, reducing the evaporation of water to the atmosphere-an added benefit for arid areas.

SCG provides the first fully integrated floating solar farm service in Thailand, from the design, the buoy manufacturing, the installation and the buoy attachment system including the maintenance.

2018 Performance

- Installed pilot solar farms on floating buoys at Thai Polyethylene company's water storage pond, with a maximum electricity generating capacity of **980** kilowatts and at the Bangsue Headquarters' pond with a maximum electricity generating capacity of **48.6** kilowatts.

Energy Award

These Projects Do Save!

Strategy ② ③ ⑤

- SCG initiated the first Energy Award contest in 2014 and have held the event continuously every 2 years to encourage the employees to create energy conservation and alternative energy projects based on real operations, and further develop these projects until they become innovations with high added-value.

SCG aims to raise creativity and initiative-taking attitude, among employees, in relation to energy management. Therefore, the Energy Award contest has been held for employees in all business to submit and showcase their energy conservation and alternative energy projects based on real operations or work, for trophies and rewards. The showcased projects are the ones that can be further developed into high value-added innovation showing excellence in sustainable energy conservation. SCG invites internal experts from all business units and the external experts to join the judging committee who also provide a variety of perspectives: technicality, business and implementation.

SCG expects the Energy Award to be a model for the energy conservation project contest for other agencies in both public and private sectors.



2018 Performance

- 2018 saw the 3rd contest being held with 3 categories of showcasing: Energy Management at the Factory Level, Creative Energy Project (Energy Conservation) and Alternative Energy Project. Pre-selected projects from 3 business units entered this contest, totally **11** projects submitted from both domestic and regional affiliates, with a value of more than **437** million baht in energy saving and a decrease of more than **237,000** tons of greenhouse gas emissions per year.
- Examples of award-winning projects: Reducing Coal Costs by Improving the Combustion System of Hot Air Generator for Spray Dryer Process by Prime Pho Yen Joint Stock Company (Vietnam), Reducing Fuel Gas Consumption by Installing Heat Recovery Unit by Thai Plastic and Chemicals Public Company Limited,

Energy from Waste by SCG Paper Energy Public Company Limited, Installation of floating solar panel at Kaeng Khoi Cement Plant by Cement Thai Energy Conservation Company Limited.

- Organized a panel discussion at the Energy Day event with SCG Energy award winning speakers and prepared themselves for the national level and ASEAN competitions in order to inspire the employees to create energy conservation and alternative energy projects.



“

This project helps reduce coal consumption costs by 35% and reduce carbon dioxide emissions, making the factory environmentally friendly.”

**Reducing Coal Costs by Improved the Combustion System of Hot Air Generator for Spray Dryer Process Project
Prime Pho Yen Joint Stock Company (Vietnam)**

The Winner of Energy Conservation Project



“

We produce biogas from wastewater. Then biogas is used as alternative energy for fuel oil and coal to reduce greenhouse gas emission.”

**Energy to Waste Project, Gold Gas Team
SCG Paper Energy Co., Ltd.**

The Winner of Renewable Energy Project



“

It is the plant energy management project, focusing for all staff engagement to enhance yearly performance improvement.”

**GSC Dee Dee Team
Grand Siam Composite Co., Ltd.**

The Winner of Energy Management (Factory Category)

“

This year contest gives the developing in profile of contestants who need to use their own knowledge in collaborating with various parties. Many projects required very small financial investment. Certain projects are of returning profits in a short period. This indicates creative problem solution without depending on technology or a high investment.”



Numpol Limprasert
Director, Sustainable Development Office
Judge of Energy Award Contest

“

SCG has a new generation of passionate and creative staff who add values to the organization by using valueless waste materials for energy production. This helps to reduce costs, and at the same time, it helps to protect the environment. I hope that the contestants will use their creativity to further develop their projects so that SCG and the country will continue to drive renewable energy development and energy conservation into the future.”



Dr. Yaowathir Achawanggul
Senior Professional Mechanical Engineer
Department of Alternative Energy Development and Energy Conservation,
Ministry of Energy
Judge of Energy Award Contest

Energy Day for Energy Awareness

Strategy ⑤

• 2018 Energy Day Activities are to enhance energy awareness under the theme Towards Sustainable Energy with the slogan of “Close when not use, Control to comfort, Change for better” or 3C: CLOSE, CONTROL, and CHANGE.

“Do you believe that we can change the world by these three words: Close, Control and Change, for which everyone can do?” This is part of the media campaign to create awareness for energy conservation; the activity continually carried out by SCG on the constant basis to cultivate and establish normal organization practice and culture.

In 2018 SCG organized the Energy Day 2018 on the 5th September 2018 at SCG Bangsue under the theme Towards Sustainable Energy: “Close when not use, Control to comfort, Change for better”. Employees were invited to be the creative chef to introduce how to reduce energy consumption by the 3C formula of Close, Control and Change by the individual approach and share ideas among friends for practices. Furthermore, the executives and Energy Ambassador participated for idea sharing on how to reduce energy consumption as well.

The activities also had a seminar to provide knowledge on energy and climate change including how SCG is preparing to cope with the global average temperature rise well below 2 degrees Celsius.



CLOSE



CONTROL



CHANGE

“Reduce energy and electricity used.”

Do with “Changing” the normal lamp to energy saving lamp, then “Control” the brightness suitable for work. This can reduce the use of energy.

Somchai Wangwattanapanich
Senior Vice President, Chemicals Business and Chairman of Energy Committee

“Reduce energy used and global warming.”

By using “Reuse” paper and then “Recycle” instead of dispose to reduce cutting the trees that absorbing greenhouse gas.

Tanawong Areeerachakul
President, Packaging Business

“Reduce heat and energy used.”

With “planting the trees” instead of cutting to help absorbing greenhouse gas and build good environment for ourselves and our world.

Mongkol Hengrojanasophon
Vice President-Olefins Business and Operations, Chemicals Business and Chairman of Energy Professional Committee

2018 Performance

- More than **200** employees participated in this project.

“Let’s reduce travel.”

With “Change” to use technology instead of traveling.

Nithi Patarachoke
Vice President, Building Products and Distribution Business, Cement-Building Materials Business

“Reduce energy used from air condition.”

By “Control” the temperature at 25 degrees Celsius or “Close” when not use, this can reduce energy used.

Chana Poomee
Vice President - Cement and Construction Solution Business, Cement-Building Materials Business

“Reduce energy used by using the ladder.”

“Change” from using lift to use the stairs instead in case of 1 floor.

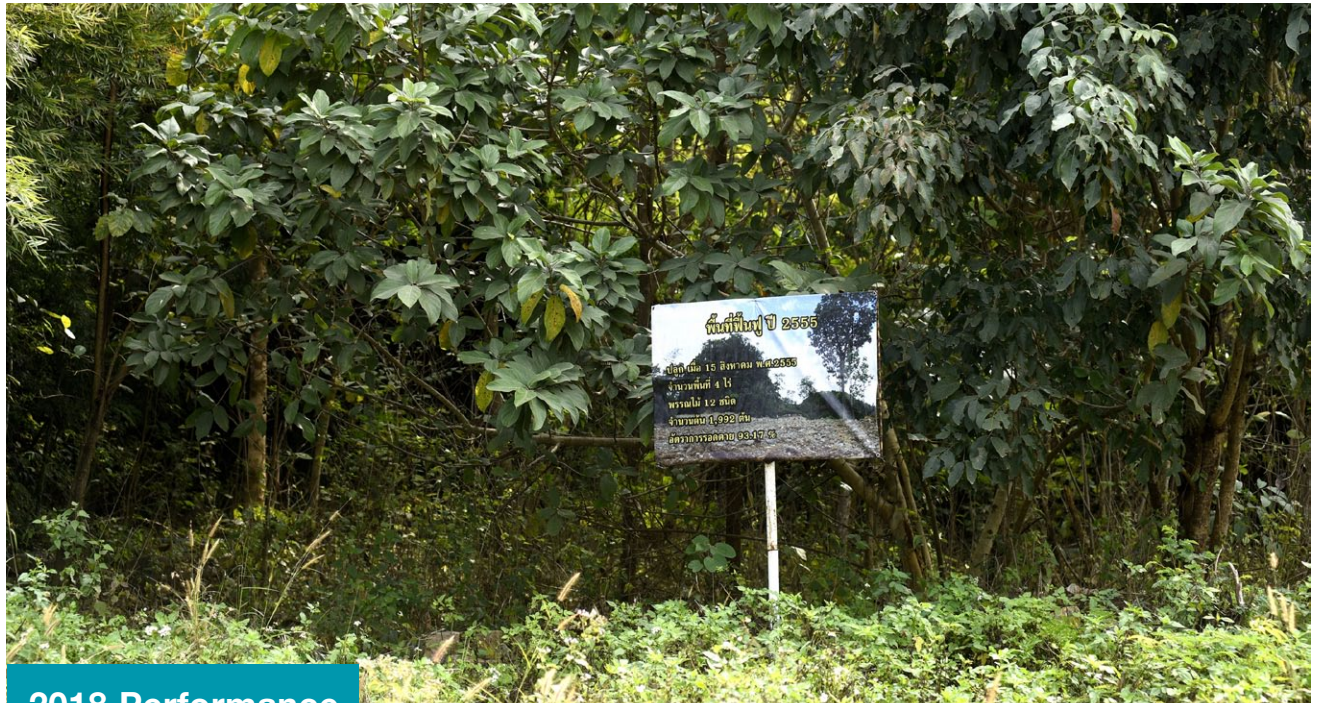
Yuttana Jlamtragan
Vice President-Corporate Administration

Natural Climate Solution

Strategy ⑥

- Natural climate solution is an approach to mitigate global warming by giving priority to the conservation of natural forests.
- SCG presented its Natural Climate Solution related activities at the Global Cement and Concrete Association (GCCA) conference in London, England.

Natural Climate Solution (NCS) is an approach to mitigating global warming, which is currently attracting worldwide attention. Up until now, every sector has made an effort to focus on reducing greenhouse gas emissions from various activities, such as using alternative energy and enhancing energy efficiency. At the present, scientific research provides new knowledge indicating that conservation and increasing of natural forest areas as much as possible is key to reducing the amount of carbon dioxide in the air via the absorption and store carbon dioxide in trees. The other key elements to reducing carbon dioxide are maintaining and sustaining the natural ecosystem. SCG is therefore interested in this approach and is ready to drive the organization toward leadership in implementing Natural Climate Solution as a strategy to further conserve biodiversity and manage greenhouse gas.



2018 Performance

- Cement-Building Materials Business attended the Global Cement and Concrete Association (GCCA) meeting in London, England, presenting 2 major projects that reduce greenhouse gas emissions by rehabilitating and preserving woodland, mangrove forests and seagrass ecosystems. These projects include check dam project, watershed forest rehabilitation project, which has been continuously going on for more than 10 years, and coastal conservation project planting of mangroves and seagrass in Trang Province.

- Collaborating with cement companies in Asia, namely Taiheiyo, Japan and Asia Cement Corporation, Republic of China (Taiwan), in developing the NCS Initiative projects to drive NCS in the region.

Water Management



Climate variability in 2018 as a result of El Niño and La Niña caused unseasonal raining and change in the amount of water storage in main dams in each area. To ensure water security in the areas where SCG's plants and manufacturing units were located, there was a need to conduct risk assessment and formulate drought prevention plans and drought countermeasures for the eastern and northeastern regions, which had experienced drought.

SCG made every effort to reduce the usage of water from external sources by optimizing manufacturing processes, increasing the water recycling percentage, and developing less water consuming products.

Target

- Within 2025, reduce the water withdrawal by 23% compared with business as usual (BAU) at the base year of 2014.

Strategy

- 1 Reduce water-related risks.
- 2 Reduce water usage by increasing the efficiency of production processes and products.
- 3 Reuse treated wastewater.
- 4 Capability building of water management personnel.
- 5 Rehabilitating the ecosystem to conserve external water sources.

Management

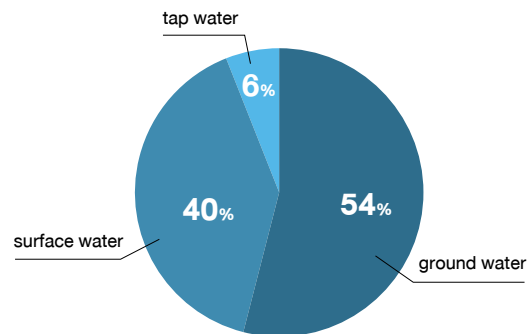
- The Water Management Committee was established in 2014 consisting of representatives from all business units to collaborate in defining a clear direction and strategy for integrated water resources management.
- Assessing risk and impact quarterly and report the result to the top management of the organization.
- Developing water scenario plans to forecast the amount of water from external sources, assessing business continuity management (BCM), and preparing a business contingency plan (BCP).
- Participating in the formulation of the water resource management policy and the analysis of water situation trends with the government and industrial sectors.
- Applying Water Footprint framework to assess the water efficiency.



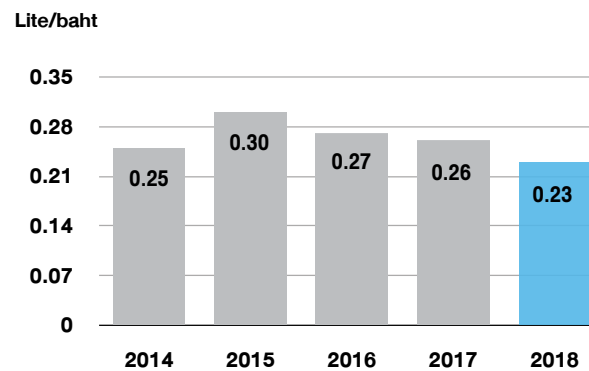
2018 Performance

- **0.23** liters/baht – The water withdrawal intensity (revenue from sales) reduced continuously from 2015 and reduced by 8% from the year 2014.
- **9.3%** of recycled water.
- **8.3%** of water withdrawal reduction compared with business as usual (BAU) at the base year of 2014.

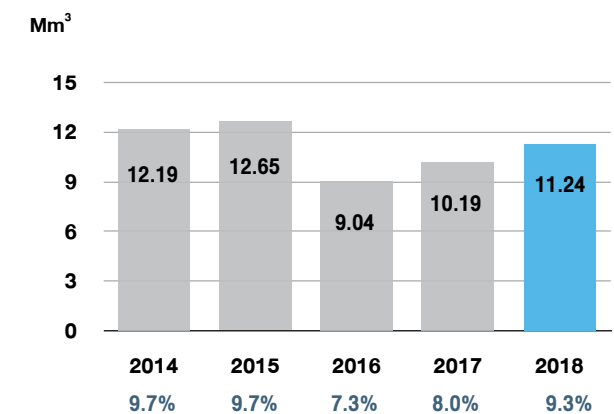
Ratio of Usage from External Water Sources



Water Withdrawal Intensity (Revenue from Sales)



Recycled Water*



*The figures are different from the report in 2017 due to the boundary is covered all business units

Water War Room

Strategy ①

- SCG joined the Eastern Water War Room with the government agencies.
- All parties shared relevant information and assessed situations and potential impact together to formulate water management plans.
- SCG had a plan to expand the Water War Room to the northeastern region.

Due to the fact that water resources are limited while there is great water demand from various parties, SCG, along with stakeholders in the eastern region, comprising the Royal Irrigation Department (RID), the Industrial Estate Authority of Thailand (IEAT), the Federation of Thai Industries (FTI) and other business operators, established the Eastern Water War Room in 2013. This aimed to undertake water management by taking into account potential risks in the future as a result of different situations and formulating drought or flood prevention plans. In addition, SCG participated in the meetings with



the sub-committee on monitoring and analyzing water situation trends, which consisted of representatives from the government sector, at the Smart Water Operation Center (SWOC), Royal Irrigation Department (RID), to ensure for disaster-risks preparedness.

SCG had a plan to scale up the outcomes of water management through the Water War Room to other regions, for example, the northeastern region (in Khon Kaen province). This aimed to establish a water management network with government agencies in charge of overseeing water resources development and water allocation, local water users, and other local stakeholders to expose them to the same information and to align their understanding about water-related situations, especially on the management of water in the Ubol Ratana Dam, the main water body in the northeastern region.

Chemicals Business

- Attended monthly Eastern Water War Room meetings to monitor the situations concerning water and water quality in the local areas and expedite water management projects to be in line with their plans.

- Formulated the 2018 Plan on Preventing Water Problems in the Eastern Region, including the diversion of water from reservoirs containing high rainfall to those with great water usage. For example, water from the Prasae Reservoir was diverted to the Nong Pla Lai Reservoir and the Khlong Yai Reservoir to reserve water for the dry season, including reduce water level in Prasae Reservoir to support inflow from storms entering the local areas.
- To serve water demand from all sectors which will increase in the next 10 years as a result of the development of the Eastern Economic Corridor (EEC), the Water War Room planned to develop new high-potential water bodies, e.g. construct the new reservoirs in Kaeng Hang Mao district, Chanthaburi province and increase the capacity of reservoirs in Rayong province.



Packaging Business

- Phoenix Pulp and Paper PCL was involved in water situation monitoring with the sub-committee on monitoring and analyzing water situation trends in Northeastern Region through biweekly meetings.

Reducing Water Withdrawal and Reuse Treated Wastewater

Strategy ② ③

- SCG gives priority to a continuous water withdrawal reduction by improving the efficiency of production processes and treating wastewater to reuse based on the Circular Economy principle.

SCG has provided replacement equipment and machinery featuring new technology to reduce water withdrawal in production processes and installed a high-tech water treatment system to reuse treated water and deliver it to surrounding communities.

Examples of interesting actions in 2018:

Chemicals Business

- Grand Siam Composites Co., Ltd. improved its manufacturing processes by installing a recirculation tank to recycle water from Vacuum Unit for internal use instead of discharging it as wastewater. This could provide 30,000 cubic meters decrease in water withdrawal per year, which represented 25% of the water withdrawal.
- In 2016, Thai Polyethylene Co., Ltd. started to implement the project “The Improvement and Sustainment of RO Unit Site#1” by improving the quality of water before treating it in the reverse osmosis system, which resulted in a 27,093 cubic meters increase in the amount of recycled water.



2018 Performance

- Amount of reuse treated wastewater in 2018:
 - 2.71** million cubic meters from the Cement-Building Materials Business.
 - 1.46** million cubic meters from the Chemicals Business.
 - 7.07** million cubic meters from the Packaging Business.

- Thai Plastic and Chemicals PCL improved the efficiency of its sand filter tanks. This was achieved by shifting from old technology, which filters only a partial amount of wastewater, to a new technology featuring turbulence backwash, which can filter all the treated wastewater from the wastewater treatment Unit No. 2. This provided better-quality filtered water, which was used as a substitution for industrial water purchased from external sources, amounting to approximately 136,000 cubic meters per year.

Packaging Business

- Siam Kraft Industry Co., Ltd. improved the water use efficiency by installing a device which controls the use of machine cooling water, which resulted in a 2,000,000

cubic meters reduction in water use per year. It also scaled this up to the improvement of the water filtration and shower system of the paper machine, which provided a 650,000 cubic meters reduction in water withdrawal per year.

- Thai Paper Co., Ltd. was able to control its production continuously using the same amount of water in production processes, which resulted in a reduction in water use per production unit, which was equivalent to an 800,000 cubic meters decrease in water use per year.

COTTO Water-saving Products

Strategy ②

- The Cement-Building Materials Business has developed water saving products to ensure that society as a whole has water for sustainable use.
- COTTO Eco Faucet, a water-saving faucet, was designed to efficiently control water flow rates and save extra 40% of water from Thailand's standard of green-label water saving faucets.

Water is a resource which is valuable and essential for all lives. Currently, water is extravagantly used, which may result in water shortages in the future. Siam Sanitary Ware Industry Co., Ltd., the manufacturer of COTTO sanitary ware, has designed water saving products as a new alternative for consumers, including Eco Faucet and Z10 OXI-Plus Showerhead.



◀ The Eco Faucet

has been designed to be environmentally-friendly, which efficiently controls the rate of water flows from the faucet at 3.85 liters per minute, which can save extra 40% of water from Thailand's standard of green-label water saving faucets.



The Company has paid attention to the creation of innovative products and services which meet customer needs while ensuring sustainable economic, environmental and social development in line with the Circular Economy approach, which focuses on recycling and reusing resources in the value chain in order to minimize the use of new resources and minimize benefits."

Kittiphong Photaranon, President.
Siam Sanitary Ware Industry Co., Ltd.

2018 Performance

- With water efficiency and an attractive look, COTTO Eco Faucet has won various international design awards, e.g. Demark Thailand, GoodDesign Japan, GoodDesign USA, and German Design Award Germany.

▶ The Z10 OXI-Plus

showerhead uses technology which combines air molecules with water molecules, which provides soft water & save water with a flow rate of 4.42 liter per minute.



Recycling Water for Communities

Strategy ③

- The Packaging Business treated water to reuse based on the Circular Economy principle it shared the treated water with local communities to reduce farming costs for farmers and increase their incomes.
- Strengthening the relationship between SCG and society and creating sustainable security in agricultural communities.



The Packaging Business developed the project “Water Management for Agriculture,” which pertained to the delivery of wastewater from manufacturing processes which underwent a treatment process to communities surrounding its plants. This aimed to provide local farmers with water for farming, including those working on rice paddy fields, vegetable farms,



sugarcane plantations, and corn plantations. This helped to generate jobs and incomes for local people all-year-round. SCG has conducted water management in line with area conditions and community needs and provided continuous examinations of water quality and agricultural products which used treated water delivered by plants.



2018 Performance

- The project delivered **4,157,113** cubic meters water to agricultural areas, which covered beneficiary areas of **4,066** rai.

The plants where this water management project was implemented consisted of the Siam Kraft Industry Company Limited (Ban Pong Plant and Wang Sala Plant) and the Thai Cane Paper Public Company Limited (Kanchanaburi Plant and the Prachinburi Plant).

Water Footprint

Strategy ④

- Water Footprint assessment as a tool for water use analysis and assessment.
- SCG participated in the project “Product Water Footprint Assessment” in collaboration with the Department of Groundwater Resources and the Water and Environment Institute for Sustainability, under the FTI.
- The products assessed in 2018 consisted of structural cement and paper products from Siam Kraft Industry Co., Ltd.

Water Footprint assessment serves as a key tool for the analysis and assessment of water quality and water use. Thus, SCG has initiated the application of this tool to different functions within its organization, prepared its personnel to utilize this tool in an efficient manner, developed experts in the tool, and establish a water footprint assessment network.

The Cement and Construction Products Business under SCG Cement Co., Ltd. and the Packaging Business under Siam Kraft Industry Co., Ltd. participated in a pilot project entitled “The Development of the Water Footprint Product Assessment Guidelines” in collaboration with the Department of Groundwater Resources and the Water and Environment Institute for Sustainability, under the FTI, adhering to the Water Footprint principle under ISO14046 (Life Cycle Assessment), which deals with direct and direct water use assessment.



2018 Performance

- SCG products which underwent Water Footprint assessments consisted of:
 1. SCG Portland Cement type I for structural work.
 2. Corrugating medium paper under the trademark “Siam Kraft Industry, Model CA 105” and liner board paper under the trademark “Siam Kraft Industry, Model KI 125.”



Asst. Prof. Natanee Vorayos, Ph. D.
Water Footprint Assessment Expert, Faculty of Engineering, Chiang Mai University

“Water Footprint” is the device to assess the source of water usage, its volume and how various activities do affect the water quality. It is applicable to manage risk mitigation and handle water shortage based on season changing as well as fast and critical climate change. Such management is possible within the organization, various communities or the supply chain of goods, services and stakeholders.

“SCG Water Footprint assessment has identified that water usage per 1 product unit generally being of the average international standard. The outstanding point is of water circulation in several processes while leakage in certain activities has been reduced to 5% of the total water consumption. Continuation of this process alongside the developing data collection system will certainly enhance the better water usage management.

“SCG Water Footprint, in addition to promote water sources conservation to ensure sufficient volume and good quality as the direct approach to reduce water shortage problem also provides learning example to the community and the new generation so that they shall be of awareness for water sources conservation, the very crucial factors, to reduce existing environmental problems while preventing the coming up future problems”.

Biodiversity and Ecosystem



At present, stakeholders have higher expectations for environmental performance, compounded with more stringent laws and practices in the conservation of natural and biological resources at the national and international levels. Over the years, SCG has been committed to protecting the environment and conserving biodiversity as evidenced by the rehabilitation of limestone quarries by planting local trees for conditions renewal to its nearest previous ecosystem, and building fish homes as a nursery for aquatic animals.

Target

- Biodiversity index in the rehabilitated areas must be comparable to that of the natural forest buffer zone with Similarity Index of over 60% by 2022.
- Develop Biodiversity Management Plans based on knowledge and experiences gained from all SCG quarry rehabilitation by 2020.
- Achieving 10% coverage of biodiversity conservation area as certified by FSC standard at 2 agroforestry sites (Kanchaburi and Kamphangphetch) by 2018.

Strategy

- 1 Execute sustainable biodiversity management using both national and international guideline.
- 2 Be a role model of biodiversity conservation and extend the effort to other areas.
- 3 Engage communities and stakeholders on the cause of biodiversity conservation.

Management

- Announced Biodiversity Conservation Policy in 2018.
- Established the SCG Biodiversity Committee to oversee and steer operations in accordance with international standards for biological resource management.
- Create a “positive net impact” on every related process.
- Communicate with and promote understanding among the community and external agencies to sustainably promote a positive image of the company.
- Create a limestone quarry rehabilitation fund facilitating both quarry rehabilitation and related study during operation and closure period.

2018 Performance

- FSC Biodiversity Conservation Area has reached **4,970** Rai, representing **19%** of the forest park area.

ตัวชี้วัดทางนิเวศในงานฟื้นฟู Ecological Indicators in Forest Rehabilitation

โครงสร้างของระบบนิเวศ

สำหรับระบบนิเวศป่าไม้เราสามารถติดตามการเปลี่ยนแปลงของโครงสร้างป่าได้โดยใช้ภาพตัดขวางของสังคมพืช (forest profile) ระบบนิเวศป่าที่สมบูรณ์ควรมีชั้นเรือนยอดมากกว่า 1 ชั้นและประกอบด้วยชนิดพรรณพืชที่หลากหลาย ได้แก่ สัก เสียดอกขาว เสียงมัน และสะแกแดง

Rehabilitating the Quarry, Rehabilitating Lives

Limestone quarrying involves explosion process to break up and extract limestone. This inevitably causes changes to ecosystems and forest resources. However, cement is an important material in the construction of building and infrastructure. Therefore, it is considered to be a fundamental factor of national development. The rehabilitation of post quarrying area is then vital and requires a systematic planning to create a balance of socioeconomic development, coupled with the conservation of the environment and biodiversity.



Throughout the operation, SCG has been paying attention to this matter very seriously by continuously striving for quarry rehabilitation, along with conserving biodiversity in the four limestone quarries operated by SCG, including Kaeng Khoi Limestone Quarry, Ta Luang Limestone Quarry, Thung Song Limestone Quarry, and also Lampang Limestone Quarry at Chae Hom district, which is an example of the successful and satisfactory completion of biological resource rehabilitation in various aspects such as a growing number of species of plants and wildlife, and natural return of plant species. Recently, SCG has established “Lampang Quarry Rehabilitation Learning Center” to be a repository of knowledge and experience of quarry rehabilitation work and to disseminate such knowledge and experience to those interested through a fun and easy-to-understand storytelling method.

Limestone Quarrying Innovation

The limestone quarry of the Siam Cement (Lampang) Co., Ltd., located in Chae Hom district, Lampang province, covers a 4,987 rai of limestone concession area. The topography is characterized by rounded-spires mountains and intermountain plateau.

All limestone quarry projects of SCG, including the one in Lampang use a method called “Semi Open Cut”, an innovation by SCG. It entails an explosion-based quarrying that create cone-like quarry pits on a mountaintop, preserving the natural forest area around the edge of the quarry in a state of a green area or “buffer zone”, acting as a fence to prevent visual pollution and to preserve the scenery of the mountainous landscape that is still in perfect natural condition. It is the best practice for quarrying (published in Toward Sustainable Cement Industry by World Business Council for Sustainable Development, 2002).

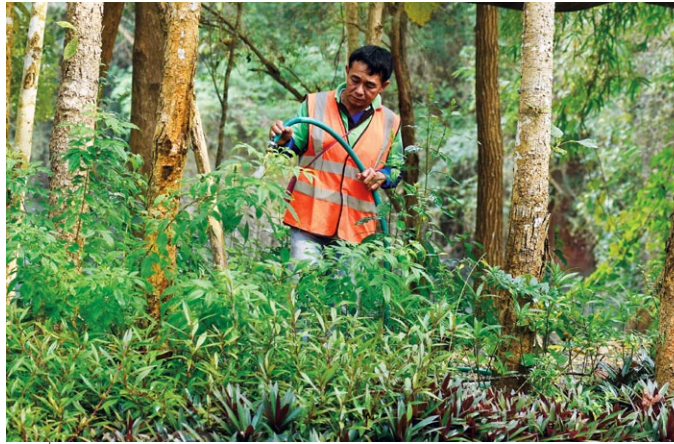
To begin the quarrying process, the area is divided into smaller plots. Once a plot has undergone a rock blasting process, it will be immediately returned for rehabilitation by planting trees.

The SCG quarry rehabilitation approach is aimed at improving the ecological conditions of the area to be as close to natural conditions before opening the quarry as possible. However, the 1st phase of the Lampang limestone quarry rehabilitation, from 2000 to 2011 was highly experimental with a trial-and-error in every step. As a result, the trees that were grown in the rehabilitation area did not exhibit a high survival rate.

Until later, during 2012-2015, SCG really learned how to rehabilitate the quarries according to academic principles by collaborating with experts and educational institutions specialized in forestry. This caused various steps of the rehabilitation process into being more effective, including the area preparation for tree planting, the study of local plant species, the seedling and nursery management, transfer of seedling to the rehabilitation area and monitoring of the seedling at the beginning so that they would grow further.

To Rehabilitate the Nature, Learn from the Natural Forest

The area that has been quarried become bare, top soil loss and fully exposed to the sun and wind. This condition is unfavorable for the growth of plants, requiring the appropriate area preparation. For example, a steep slope around the edge of a quarry pit must be transformed to a multi incline slope. Then holes and cracks are formed by blasting the rock, allowing the roots of the trees to grow deeper. The next step is to fill the blasted area with black soil high in organic material to increase soil fertility.



The plant selection, both pioneer species and climax species, to be introduced to the rehabilitated area, should be local species for well growth and high biodiversity similar to natural forests.

Survey and study of local plants, seedling nursery and tree planting in the rehabilitation area at Lampang limestone quarry are the main responsibility of the quarry rehabilitation staff, led by Somchai Larpmak.

Born and raised in Lampang, he is familiar with the local plants. Even more, through years of work experience of rehabilitation, he has known almost all kinds of plants in the forest.

Each year, Somchai and his team have to walk around the forest to explore the local plants, pick various types of fruits or wild plant seeds produced through the seasons, and bring back to the nursery.

Deep experience gained from repeatedly exploring the forest allows him to obtain information benefitting the annual planning for the seed collecting. It also enables him to determine the appropriate time and route for collecting each type of plant seeds.

From Nursery to Planting Areas

The seedling nursery is located behind the building of the Lampang Quarry Rehabilitation Learning Center. Those interested in visiting the educational center can continue walking to see the work in the nursery easily.

When entering the nursery, in the front, there is a large whiteboard with a calendar of annual work plans. On the board, there appear a list of various local tree species, and the 12 month schedule boxes that specify which seeds of tree species need to be collected, which time period they need to be collected, how long it take to cultivate, and in which month the seedlings should be transferred to the planting area.

The list of tree that appears on the board includes So, Indian gooseberry, black rosewood, beleric myrobalan, almond-wood, Protium serratum, padauk, iron wood, asna, trumpet flower, etc. All of these are local tree species in the natural forests around the quarry and they are proven to have high survival rate and growth rate well once transferred to the planting areas.

Somchai explained that the seed sowing of each species differ in details, such as soaking the seed in water, sowing seeds into the planting hole,



nourishing by adding fertilizer, and the preference toward the sun exposure or humidity.

The rehabilitation staff spent their time learning these matters carefully until they are able to nurse the seedlings from sprouts to big and sturdy trees.

When the seedlings become strong and of the right size, they will be moved out of the shelter. As for care at this stage, the seedlings may get less water than usual, such as a watering at 7 day interval to encourage them to be more “tolerant” and adapt to the outside environment and possible drought conditions similar to that of the rehabilitation areas.

Rehabilitating Forest, Rehabilitating Lives

In addition to work in the seedlings nursery, the rehabilitation officers must also periodically patrol and monitor the growth of the trees that are planted in the rehabilitation areas.

When entering the quarry and looking down from a high ground, there appear a variety of topography at the same time. Beginning with the limestone mountains, their spires line up in the distance outside the quarry. Next is the green forest strip of the buffer zone that spans around the edge of the quarry pit.

Inside the quarry pit, one of its corners is undergoing a quarrying process, the blasting sound of machinery, the trucks carrying stones coming in and out incessantly. But in a far distance is a quarry areas which has been returned for rehabilitation, including the latest rehabilitation areas that were planted last year, and the older plots sequenced chronologically.

In the newest plot of 5 rai, recently planted in 2018, the trees are still small. Each tree is no more than 1 meter tall, planted in a series of holes in bare ground. Somchai said that in this plot, the ground cover species is hamata bean and a group of pioneer



species, which is a variety of pioneer species local trees, such as So, purple bauhinia, paper mulberry, and Indian coral tree interspersed with a climax species that have longevity and provide shade; namely beleric myrobalan, iron wood, teak, padauk.

This rehabilitation areas with small trees like this requires special care while in the older areas the trees are continually growing larger. For example, the rehabilitation area of 2015 shows the front signboard indicating that the trees grown in this area have the survival rate higher than 90 percent. The condition of the area is therefore characterized by a dense grove similar to natural forests. The deeper you walk into the area, the shadier you will feel about the atmosphere, full of tall and perennial plants of which the canopy spreads far and wide covering the sky. There are shrubs, vines and ground covering plants all over the place. It is exactly as Somchai explained that although this area is a planted forest, it is full of local tree and get a good monitoring until the trees

grow strong. Nature will take care of itself. That is, when the climax species grow tall and large, providing shades, the pioneer trees will gradually die. After that there will be various plants growing naturally, from the seeds that have brought here by the wind and those carried by animals such as birds that excrete around the area.

There are other rehabilitation areas that are similarly rich in plant species. Additionally, there is a survey of various animals coming into the area. The survey of biodiversity in Lampang limestone quarry area in 2017 shows there were 111 species of birds, 30 species of reptiles and 27 species of mammals. This is an example of the success of the quarry rehabilitation program of which SCG has accumulated the knowledge for more than 20 years. It also reflects the commitment to and the determination of making the industry and forests coexist sustainably.

Biodiversity Management Plan

Strategy ②

- Biodiversity Management Plan is a distillation of SCG's knowledge gained from the restoration of limestone quarries. It covers the management of plants, wildlife, insects, degraded zone rehabilitation and irrigation systems.

SCG has been working on the quarry and biodiversity rehabilitation for a long time. By studying, researching and experimenting in collaboration with various academic agencies in order to restore the ecology and biodiversity, SCG has been successful in the rehabilitation of the four quarries. Therefore, SCG proceeded to collect and distill all the knowledge into the Biodiversity Management Plan, serving as a manual for the conservation of natural resources, including plant and animal species, and other living organisms so that the ecology and biodiversity are maintained during and upon the end of the quarrying operations. Biodiversity Management Plan was formulated through collaboration between SCG and the Faculty of Forestry, Kasetsart University, Faculty of Science, Chiang Mai University and Faculty of Science, Prince of Songkla University.



2018 Performance

- The Biodiversity Management Plan of Kaeng Khoi, Khao Wong, Lampang and Tungsong quarries is to be completed in 2019.

Examples of Biodiversity Management Plan



Flora: Preserve local plant species of the ecosystems in Buffer Zone; Put rehabilitation as a requirement both during and after quarrying operations; Rehabilitate and prevent the plant species in the areas from being disturbed and impacted by other factors.



Fauna: Protect against and reduce impacts from quarrying operations on wildlife living in the area by installing nest box, curving hollow holes and making artificial salt-licks in the appropriate area; Encourage animals to utilize the area.



Rehabilitation of the Degraded Areas: Maintain, improve and develop balanced diversity in the target area; Take care of and successively improve various elements of the ecosystem, such as adding and maintaining a variety of forest-floor plant species and ground-covering by plants, etc.



Management of Water Irrigation Systems: Monitor and rehabilitate the areas which have been quarried so that they are properly irrigated given the terrain and ecology, preventing erosion of the soil.

Lampang Quarry Rehabilitation Learning Center

Strategy ② ③

- Lampang Quarry Rehabilitation Learning Center is a center for disseminating knowledge about SCG quarry rehabilitation, accumulated for over 20 years.
- Lampang Quarry Rehabilitation Learning Center promotes awareness and participation for natural resources conservation among local students by encouraging them to become its guides.

The Siam Cement Company (Lampang) Co., Ltd. established the Lampang Quarry Rehabilitation Learning Center to be a center for transferring knowledge about quarry rehabilitation and reforestation, that has been accumulated for 20 years to interested individuals and other quarry operators, as well as showcasing the intention of Lampang Limestone Quarry to take care of the environment according to the concept “Where the factory is, the forest must be green.”

Lampang Quarry Rehabilitation Learning Center was officially opened on February 9, 2018. The walls of its buildings are constructed from brown clay no longer used in the mining process so that they look perfectly harmonious with the environment. The exhibition building displays the story of the rehabilitation of the quarry by means of a fun, easy-to-understand story telling. It is of 12 stations. Visitors will gain knowledge of the Lampang quarry history and the quarry rehabilitation process from the reconditioning of the area, study of local plants, the growth of trees in the rehabilitation plots, etc. The visitors can also walk into the adjacent



seedling nursery and see things with their own eyes; both the seeds of various plants collected from the forest, the calendar of the rehabilitation officers' responsibilities, the tiny seedlings that have just spouted to the trees that have grown to the right size ready for use in rehabilitation work.

While enjoying the Learning Center, there are Young Guides, who are Grades 5-6 students from Ban Paen School, and who will navigate and narrate the exhibition to the visitors. The Young Guide project is a collaboration between SCG Lampang and surrounding communities in order to encourage children to express themselves and be the harbingers of environmental awareness to society. There are currently 8 students participating in the project, and there are plans to expand the project to other schools in Chae Hom District.



My name is Nong Kwang. I'm in Grade 5, Ban Paen School. The teacher asked if anyone wanting to be a guide. She said, 'Who wants to, please raise your hand.' I would like to try it once. First, it was difficult, but practicing made it easy. My duty is to explain the biodiversity. It is fun because I have a chance to talk to people. I also learn a lot and feel very proud."

Little Guide
Amphawan Phimphu

2018 Performance

- The Learning Center already welcomed **2,247** visitors both Thai and foreigners, comprising of important persons from the government and private sectors, for examples, the Ministerial group of Natural Resources and Environment, the Secretariat group of Natural Resources and Environmental Policy and Planning Office. The working group of the Thai Cement Industry Association, consisting of The Siam Cement Public Company Limited, Siam City Cement Public Company Limited, TPI Polene Public Company Limited, Asia Cement Public Company Limited, Jalaprathan Cement Public Company Limited, Thai Pride Cement Co., Ltd. and Globe Cement Co., Ltd. visited the quarry rehabilitation area of Siam Cement (Lampang) Co., Ltd. to exchange ideas for the quarry rehabilitation among representatives from the other cement plants in order to expand the knowledge base and generate recommendations from the working group to be further applied by the learning center.

Limestone Quarry Model for the Biodiversity Conservation

Strategy ① ②

- The Kaeng Khoi quarry set up the First ASEAN model to enhance the ecosystem service review provided by the cement industry, aiming to seek guideline for both physical and economic value and “Net Positive Value” throughout the mining process.
- Khao Wong Limestone Quarry set up Biodiversity Corridor and constructed closed-system limestone conveyors helping to promote biodiversity conservation.



New Crusher Installation and Closed-System Limestone Conveyor Project

Khao Wong limestone quarry eliminates the transportation by trucks over 2.7 km distance, removing the need to cut more roads in the quarry areas, and reducing disturbance on biological resources in the ecosystem. As a result, living organisms can enjoy the area. In addition, this technology has been deployed at SCG's quarries in Indonesia and Myanmar.

Net Impact Assessment of Biodiversity

Kaeng Khoi and Khao Wong quarries have been selected as the pilot quarry of Methodology for the Net Impact Assessment of Biodiversity in the Cement Sector by Cement Sustainability Initiative. World Business Council for Sustainable Development (WBCSD CSI) assess the net impact of biodiversity throughout the mining period to compare relative affection prior to mining, during and after its ending. If revival mining is based on biodiversity and ecosystem it is expected that after 25 years closing term the revival area shall become of the net positive impact.

SCG remains committed to research which promotes biodiversity conservation and development of the rehabilitation and quarry process to minimize the impact on the biodiversity

Ecosystem Services Review

Kaeng Khoi Quarry collaborates with the National Metal and Materials Technology Center (MTEC) to create an ecosystem service assessment project for the cement industry to develop the principles of analyzing the ecosystems services in various aspects, and assess the economic value from the quarrying operations of the Siam Cement (Kaeng Khoi) Co., Ltd. in order to garner a net positive impact in the quarry area before and during the quarrying operations, as well as after the relinquishment of the quarry area. The project is expected to be completed in 2019.

Establishment of a Biodiversity Corridor and Water Sources for Wildlife at Khao Wong Limestone Quarry

To promote biodiversity, Khao Wong limestone quarry therefore created a Biodiversity Corridor between the Buffer Zone and the rehabilitation area by planting trees and restoring local woods serving as a food source for animals and built 4 artificial ponds with Concrete Fabric, an SCG technology that is easy to install and can hold a large amount of water while remaining inconspicuous and environmentally friendly.

Fish Home and Seagrass Project at Trang Province

Strategy ② ③

- SCG established the coastal conservation and the marine ecosystem project by collaborates the fishing community at Ban Mod Tanoi, Trang Province to design cement fish homes and placed them at the Lat Chao Mai Canal. It increases more aquatic animal resources; especially for fishing in the monsoon season when deep sea fishing is not possible
- SCG, together with various stakeholder, support the planting of seagrass, an important food source of Dugong at Libong island, Trang Province.



Cement-Building Materials Business promotes biodiversity in the Trang area by building cooperation with local communities and authorities.

Fish Home by Marine Cement (Seawater Resistant)

SCG dialogues with the community fishermen, Ban Mod Tanoi, Kantang District, Trang Province illustrated the problem that small fishing boats would not be able to go out fishing in the monsoon season. Thus SCG collaborates with them to create the community fish home as the nursery for small aquatic animals, while attracting fishes and other living creature to come for its benefits. The fish homes are

found in Lat Chao Mai Canal, connected to Andaman sea and of salt water. Local fishermen, thus go fishing there in the monsoon season.

The Cement fish home is built by the seawater resistant cement which is more opaque than normal cement, resistant to chloride and sulfate corrosion and safe to the environment. Their design is characterized by a circular shape similar to round concrete pipes with hollow holes around for fish to swim through and for corals to stay on.

Click Video



Seagrass Planting for the Conservation of Dugongs

Libong island, Trang province, is a habitat of dugongs, a reserved wild animal at risk of extinction due to illegal fishing and other crises that threaten the dugong population and reduce the abundance of seagrass, the food source of the dugong. SCG therefore cooperates with dugongs-loving Libong island community in Libong subdistrict, Kantang District, Trang Province, together with Dugong Protection Network and government agencies such as Prince of Songkla University, Rajamangala University of Technology Srivijaya and Libong Wildlife Conservation Office. This supporting group provides equipment to prevent distinction of dugong and other aquatic animals in the critical situation. It also promotes seagrass growing theoretically around Libong island to increase food resources for dugong while conserving sustainable ecosystem in good balance.



Click Video



The villagers want to revitalize the natural resources here. We found more fish coming in to enjoy the area. Not just the economic fish groups, there are also ornamental fish groups. We saw Lionfish, Spinefish, Goby, Barnacle and other small creatures. We surveyed the area every 2 months. We found plenty of seagrass which help absorbing carbon dioxide, so that it partly reduces problem of climate change caused by increasing CO₂ in the atmosphere. We do hope as well to expand the knowledge and lessons learned here to other areas."



Assoc. Prof. Dr. Anchana Prathep

Director of the Institute of Excellence for Biodiversity of Peninsular Thailand



2018 Performance

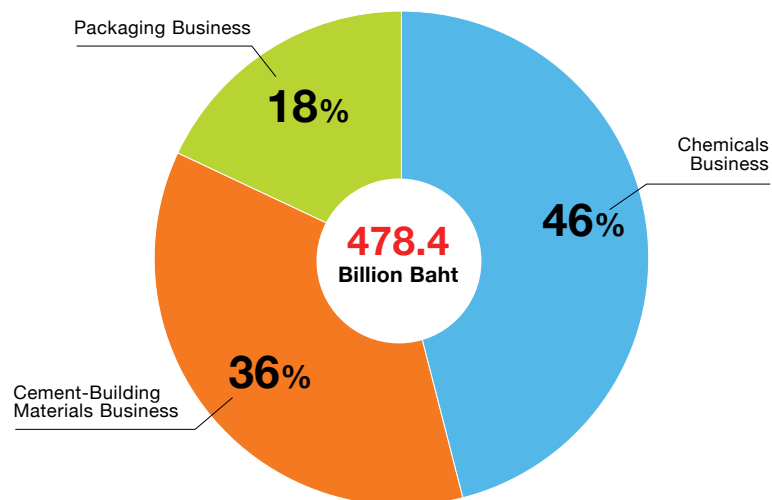
- Installed **300** fish homes. The survey of biodiversity around fish homes after 8 months by the Excellence Center for Biodiversity of Peninsular Thailand, Prince of Songkla University, found that there are over **50** species of organisms and **35** species of fish coming to take benefits of the fish homes.
- Planting of **400** mangrove trees to enhance the coastal ecosystems and planting **4,000** seagrass to increase food resource for dugongs.

- The project to measure social outcome of the "Water Conservation From Mountain to the Mighty River" project at Ban Mod Tanoi, Trang province, conducted by students of the Faculty of Commerce and Accountancy, Thammasat University, has identified the Social Return on Investment (SROI) at **1.23**. This means that 1 baht investment will give the social return of 1.23 baht which is worthwhile. It is also the strategic success to respond to the community needs within a short period.

Appendices

Sustainability Performance Data

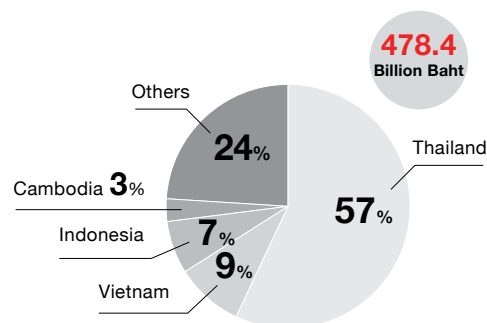
Revenue from Sales



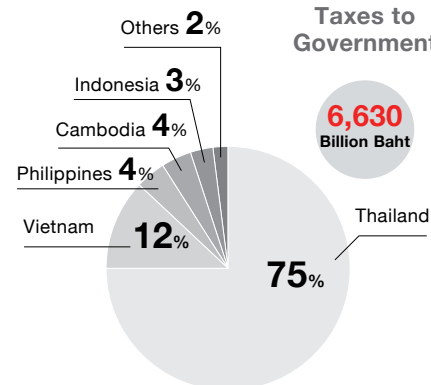
Performance Data	2014	2015	2016	2017	2018	GRI Standards
Economic Performance						
Revenue from sales (Billion Baht)	487.5	439.6	423.4	450.9	478.4	GRI 201-1
Profit for the year (Billion Baht)	33.6	45.4	56.1	55.0	44.7	GRI 201-1
EBITDA (Billion Baht)	66.5	82.7	97.8	102.1	86.6	GRI 201-1
Benefits to employees comprising salary, wage, welfare and regular contributions (Million Baht)	35,356	40,172	42,458	43,674	43,960	GRI 201-1
Dividend to shareholders (Million Baht)	15,000	19,200	22,800	22,800	21,600	GRI 201-1
Interest and financial expenses to lender (Million Baht)	7,266	9,076	7,572	7,112	6,836	GRI 201-1
Taxes to government and local government authorities such as income tax, local maintenance tax, property tax and other specific taxes (Million Baht)	5,362	5,430	6,938	6,959	6,630	GRI 201-1
Privilege tax and others from investment promotion, and research and development (Million Baht)	1,294	3,599	4,827	4,300	1,905	GRI 201-4
Contributions to organizations (Million Baht)*	3.8	5.6	5.3	5.2	9.8	
Investments and expenditures regarding community development, social infrastructure and environment (Million Baht)	555	591	710	689	748	GRI 201-1
Environmental expense and investment (Million Baht)	2,542	3,016	2,686	2,154	3,465	

* The first six organizations contributed by SCG are World Business Council for Sustainable Development, The Federation of Thai Industries, Thailand Development Research Institute, Board of Trade of Thailand, Thailand Management Association and Thai Institute of Directors

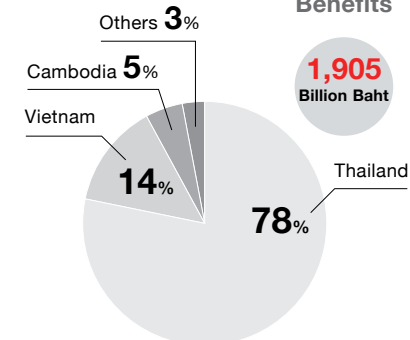
Revenue from Sales by Country



Taxes to Government



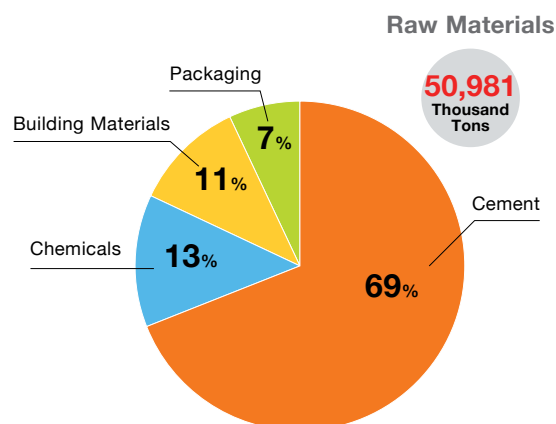
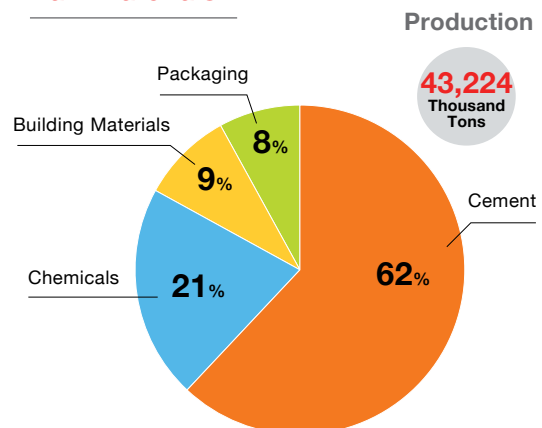
Tax Benefits



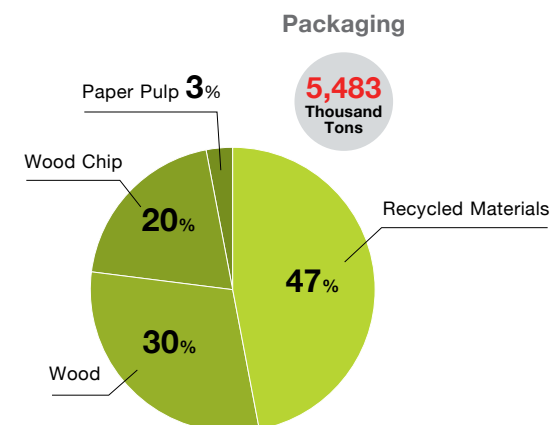
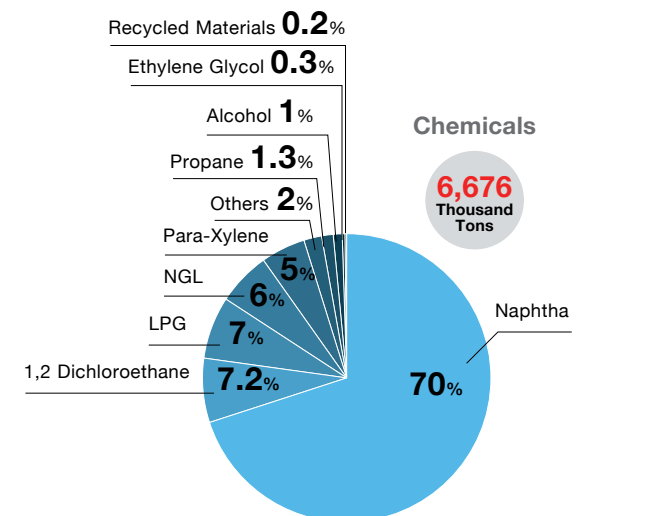
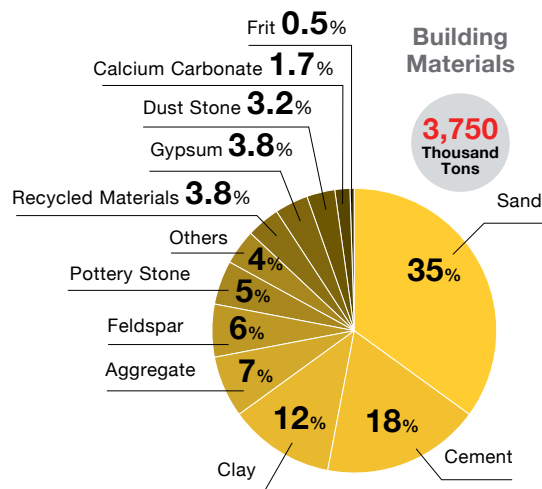
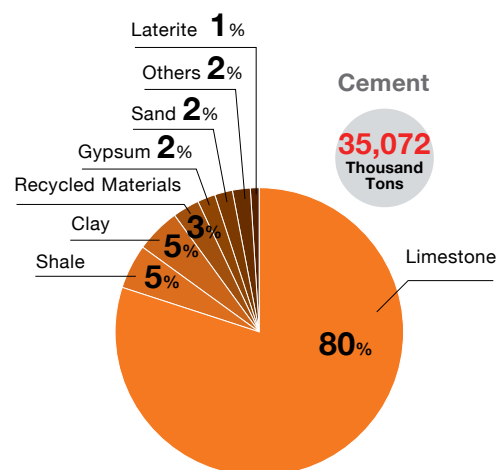
Performance Data

Environmental Performance

Production and Raw Materials



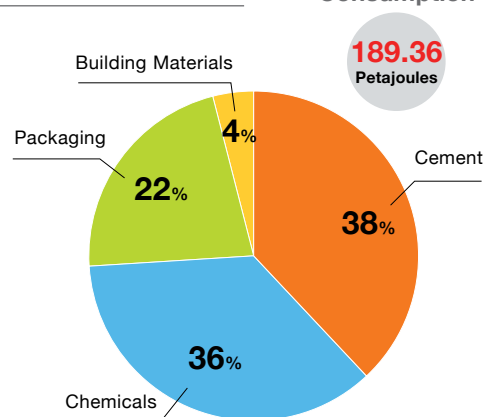
Proportion of Raw Materials



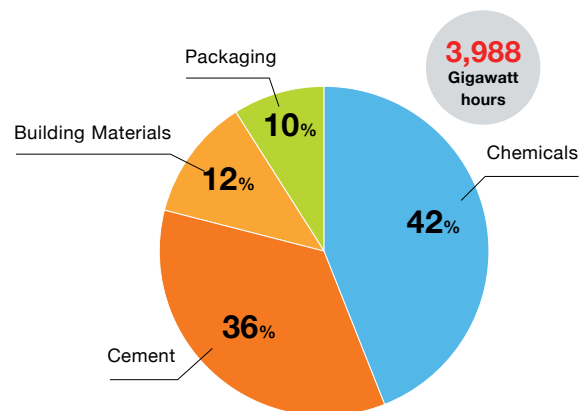
Performance Data Environmental Performance	2014	2015	2016	2017	2018	GRI Standards
Production (Thousand Tons)	40,471	40,770	39,506	42,048	43,224	
Raw Materials (Thousand Tons)	47,294	49,432	49,684	48,787	50,981	GRI 301-1
Recycled Materials (Thousand Tons)	2,932	3,253	3,438	3,877	3,733	GRI 301-2

Energy Consumption

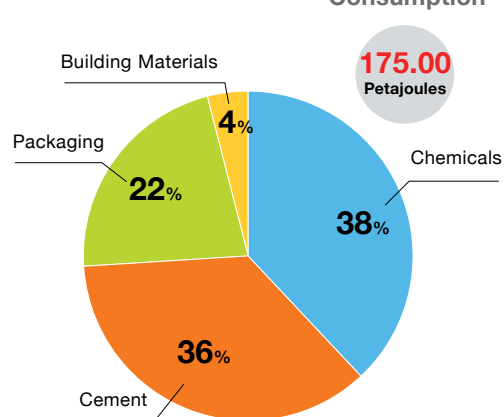
Total Energy Consumption



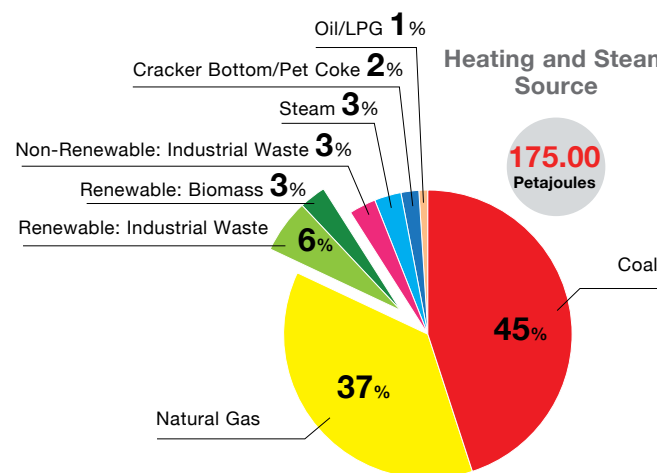
Electrical Consumption



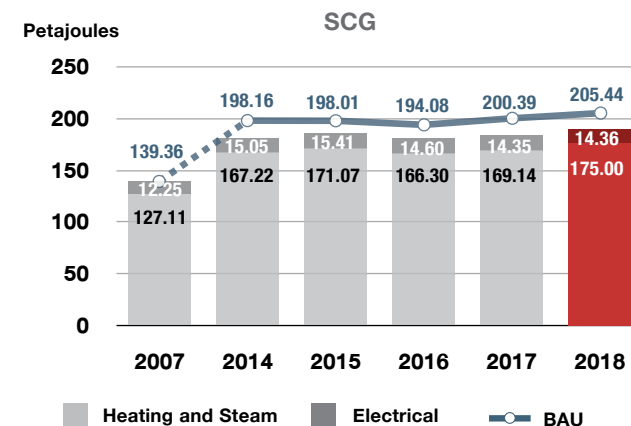
Heating and Steam Consumption



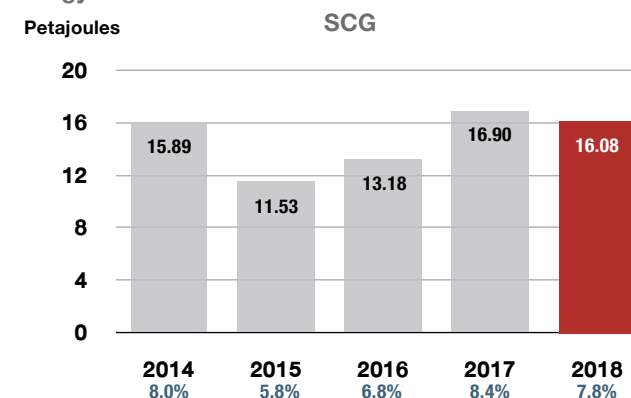
Heating and Steam Source



Total Energy Consumption



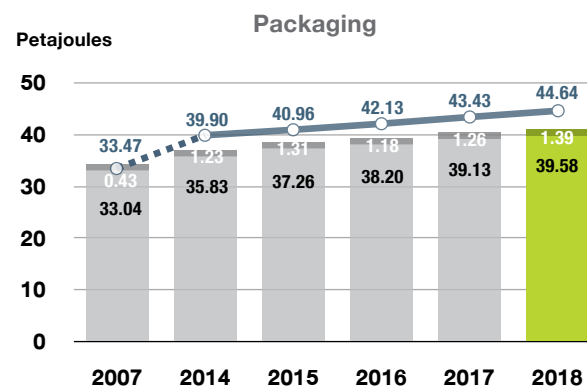
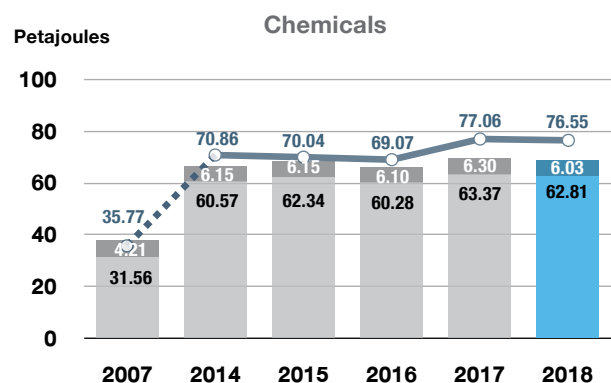
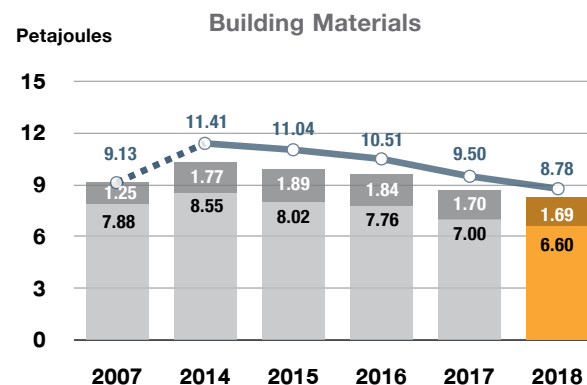
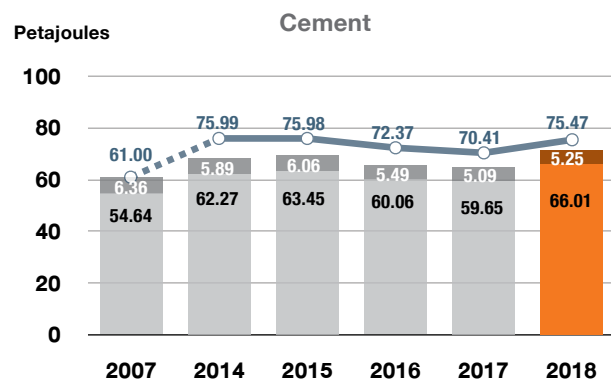
Energy Reduction



Performance Data	2014	2015	2016	2017	2018	GRI Standards
Total Energy Consumption (Petajoules)*	182.27	186.48	180.90	183.49	189.36	GRI 302-1
Heating and Steam Consumption (Petajoules)*	167.22	171.07	166.30	169.14	175.00	GRI 302-1
Alternative Energy (Petajoules)						
• Renewable: Biomass	9.50	6.65	5.50	5.10	5.66	GRI 302-1
• Renewable: Industrial Waste					9.80	GRI 302-1
• Non-Renewable: Industrial Waste	11.44	11.99	12.37	12.64	4.42	GRI 302-1
Electrical Consumption (Gigawatt hours)*	4,180	4,281	4,057	3,985	3,988	GRI 302-1

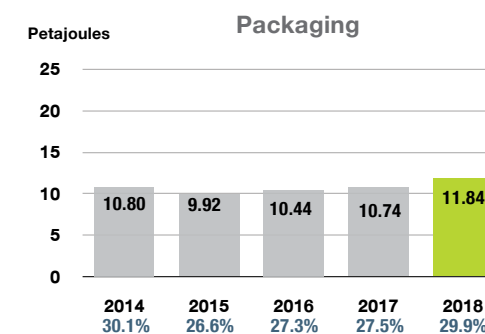
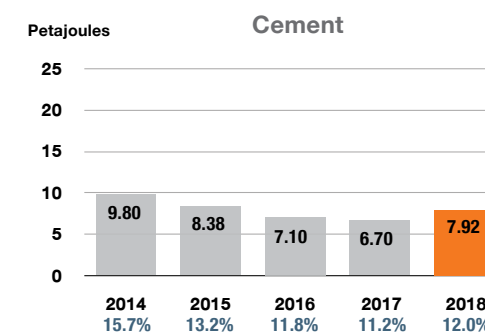
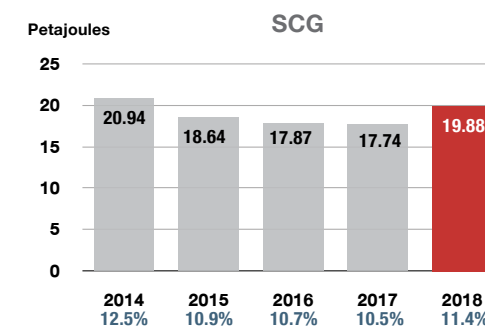
* Within KPMG's limited assurance scope (page 159)

Energy Consumption



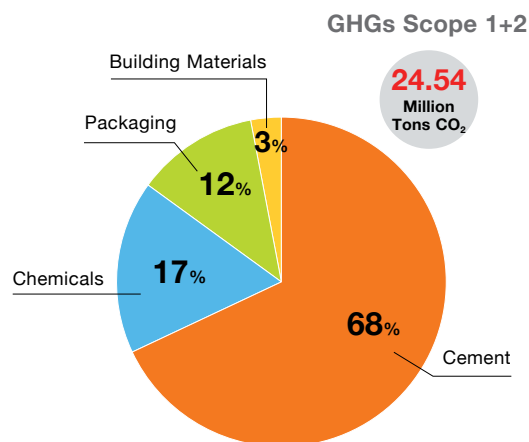
■ Heating and Steam ■ Electrical — BAU

Alternative Energy*



* Cement and Packaging are main utilizers of alternative energy

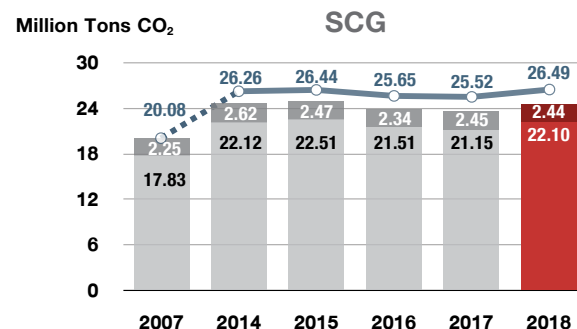
GHGs Scope 1+2



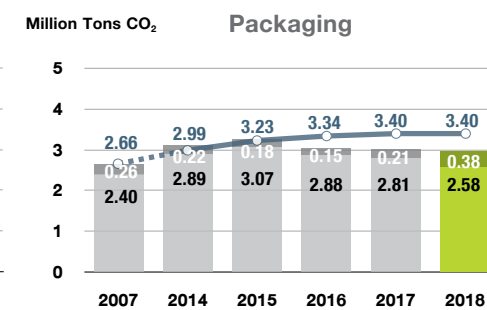
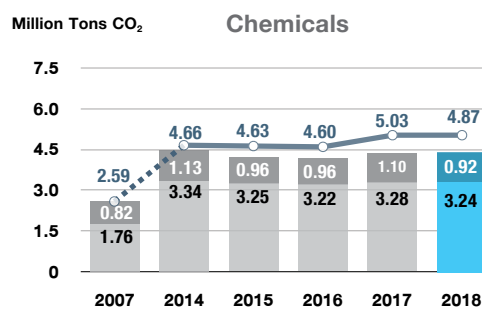
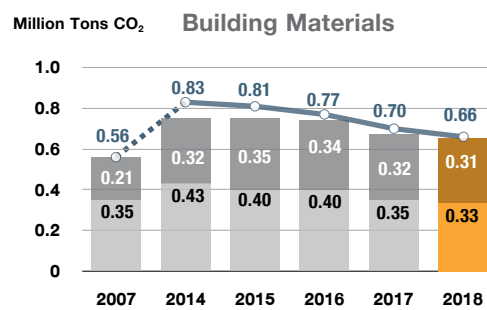
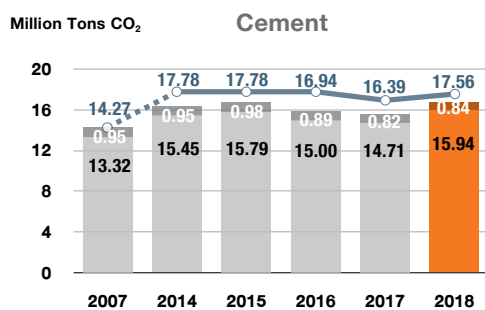
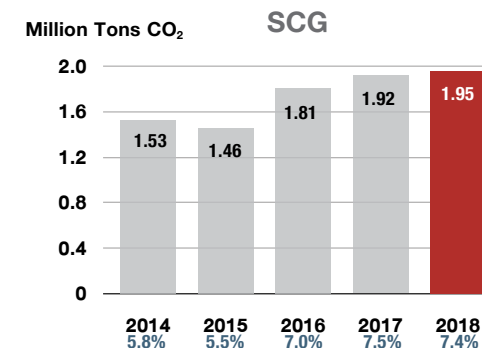
Performance Data	2014	2015	2016	2017	2018	GRI Standards
GHG Scope 1 (Million Tons CO ₂)*	22.12	22.51	21.51	21.15	22.10	GRI 305-1
GHG Scope 2 (Million Tons CO ₂)*	2.62	2.47	2.34	2.45	2.44	GRI 305-2

* Within KPMG's limited assurance scope (page 159)

Greenhouse Gas Emissions

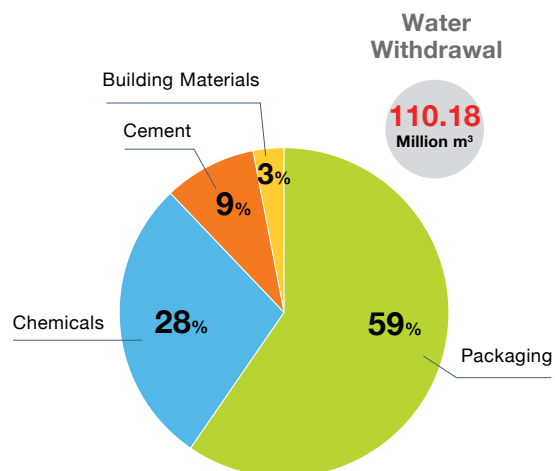


Greenhouse Gas Reduction



Scope 1 Scope 2 BAU

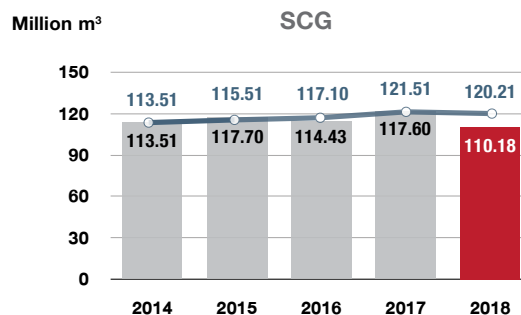
Water Withdrawal



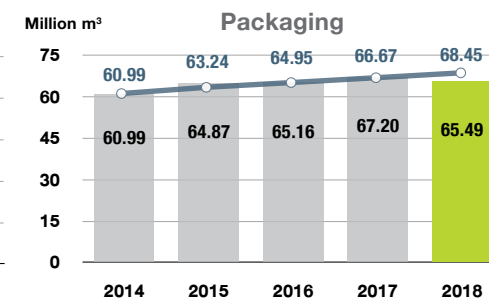
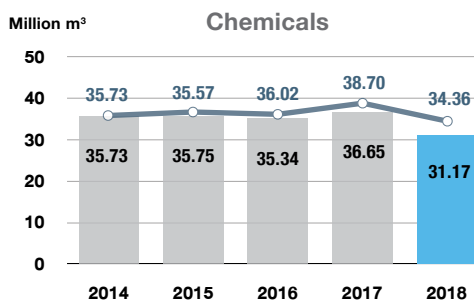
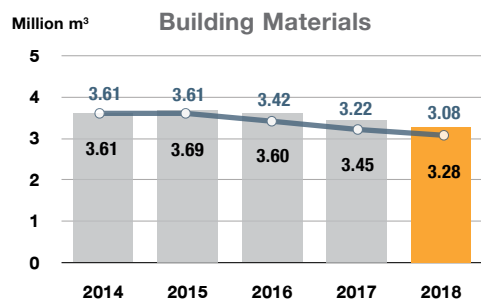
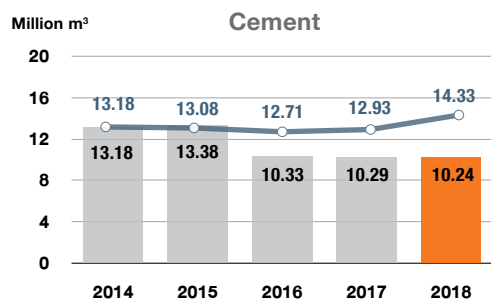
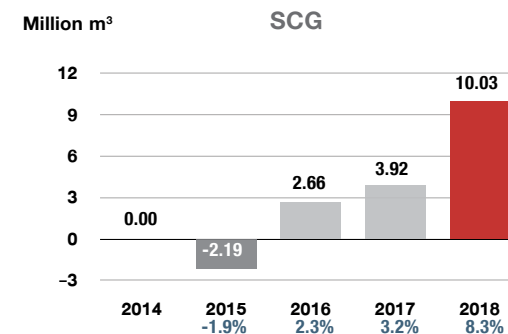
Performance Data	2014	2015	2016	2017	2018	GRI Standards
Water Withdrawal (Million Cubic Meters)*	113.51	117.70	114.43	117.60	110.18	GRI 303-1
Proportion of Recycled Water (%)**	12.19	12.65	9.04	10.19	11.24	GRI 303-3
BOD (Thousand Tons)	0.49	0.42	0.46	0.39	0.24	GRI 306-1
COD (Thousand Tons)	6.73	6.53	6.75	6.32	5.39	GRI 306-1
TSS (Thousand Tons)	1.02	0.90	0.92	0.97	0.79	GRI 306-1

* Within KPMG's limited assurance scope (page 159)
 ** Building Materials' data are collected from 2014 onwards

Water Withdrawal

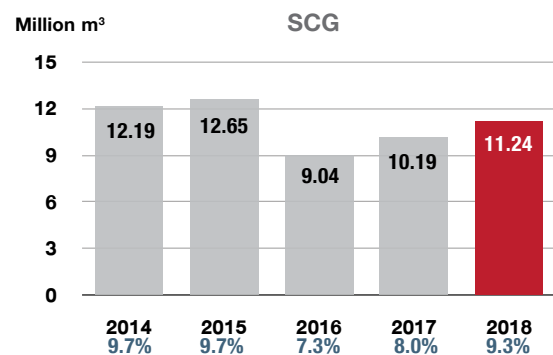


Water Withdrawal Reduction

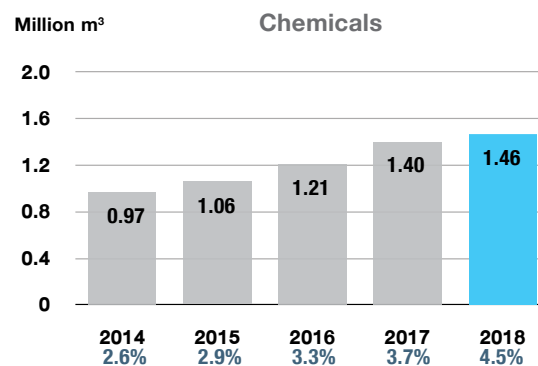
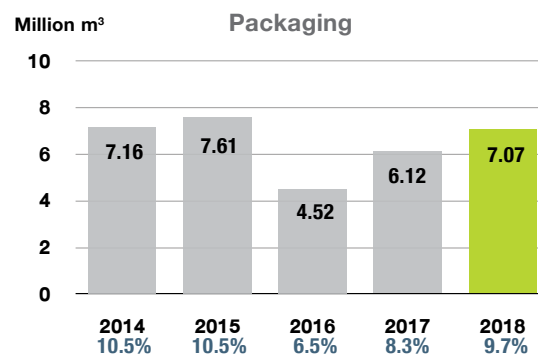
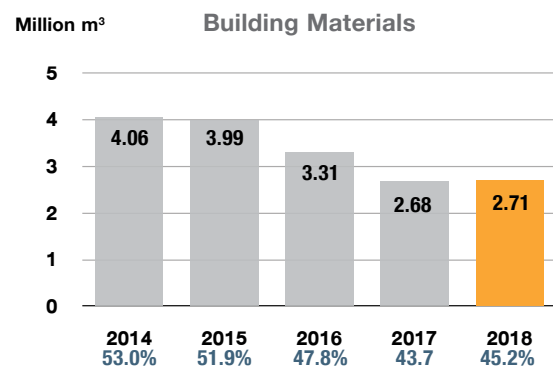


■ Amount —●— BAU

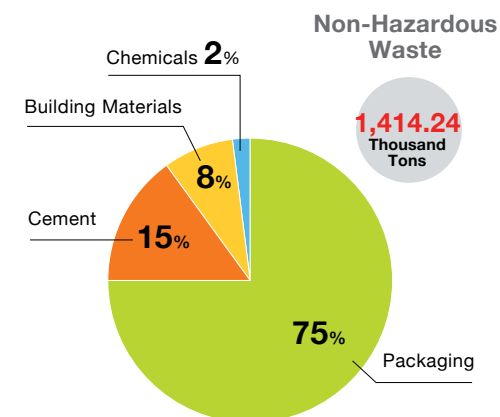
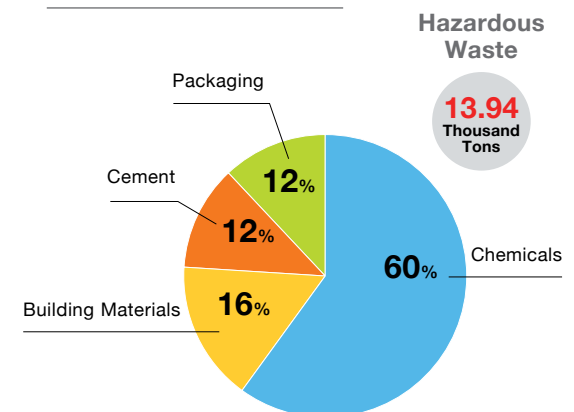
Recycled Water



Remark: Building Materials' data are collected from 2014 onwards



Hazardous Waste and Non-Hazardous Waste**

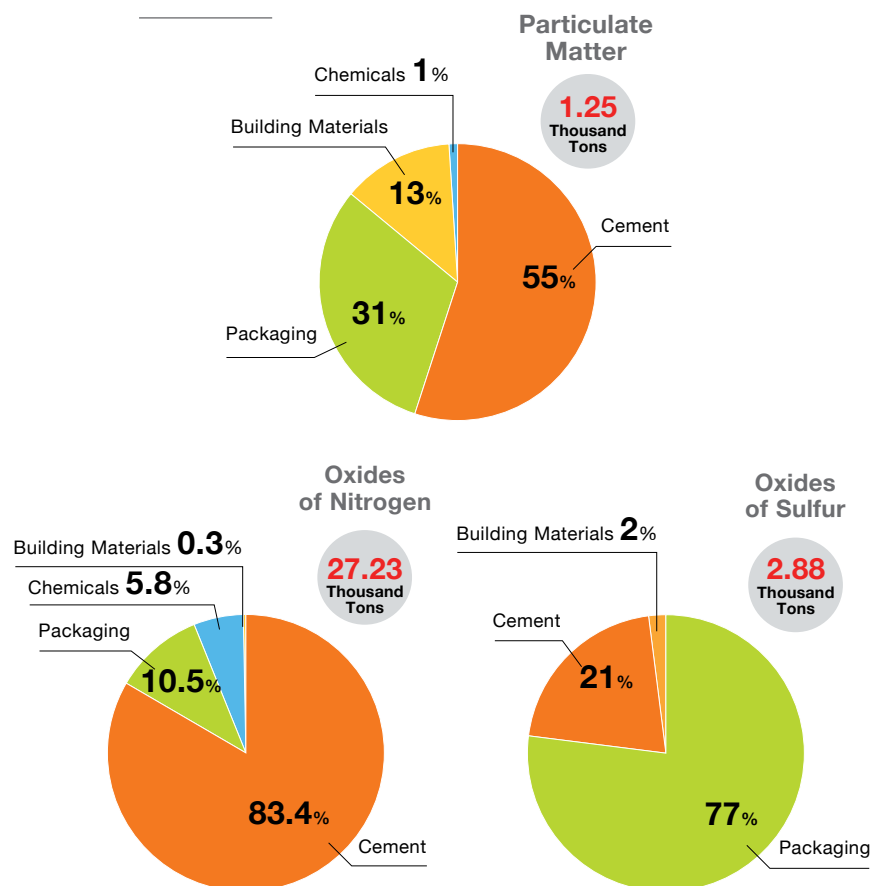


** Amount and proportion of waste management are shown on page 86-87

Performance Data	2014	2015	2016	2017	2018	GRI Standards
Hazardous Waste (Thousand Tons)*	15.29	15.66	21.26	12.08	13.94	GRI 306-2
Non-Hazardous Waste (Thousand Tons)*	1,209.46	1,373.36	1,348.19	1,394.45	1,414.24	GRI 306-2

* Within KPMG's limited assurance scope (page 159)

Emissions



Social Performance Data

Performance Data	2014	2015	2016	2017	2018	GRI Standards
Health and Safety Information						
Total Incident Rate (Cases/200,000 Man-Hours)*						GRI 403-9
• Employee	0.319	0.235	0.200	0.202	0.170	
• Contractor	0.201	0.235	0.165	0.123	0.189	
Incident Rate (Lost Time Cases) (Cases/200,000 Man-Hours)*						GRI 403-9
• Employee	0.048	0.073	0.041	0.050	0.038	
• Contractor	0.065	0.055	0.045	0.022	0.056	
Severity Rate (Days/200,000 Man-Hours)						GRI 403-9
• Employee	1.629	1.273	0.906	0.819	0.537	
• Contractor	1.955	1.430	1.334	0.338	1.200	
Number of Fatalities (Cases)*						GRI 403-9
• Employee (Male : Female)	0 : 0	0 : 0	2 : 0	2 : 0	0 : 0	
• Contractor (Male : Female)	7 : 0	12 : 0	10 : 0	9 : 0	5 : 1	
Number of Fatalities from Motor Vehicle Accidents (Cases)*						GRI 403-9
• Employee (Male : Female)	0 : 0	0 : 0	1 : 0	1 : 0	0 : 0	
• Contractor (Male : Female)	4 : 0	8 : 0	7 : 0	7 : 0	3 : 1	
Occupational Illness (Cases/200,000 Man-Hours)						GRI 403-10
• Employee	0	0	0	0	0	
Number of Chemicals Spillage (Case)						GRI 406-3
• Level 1 : High Severity	1	1	0	0	1**	
• Level 2 : Moderate Severity	1	1	4	0	1	
• Level 3 : Low Severity	2	0	8	4	4	

* Within KPMG's limited assurance scope (page 159)

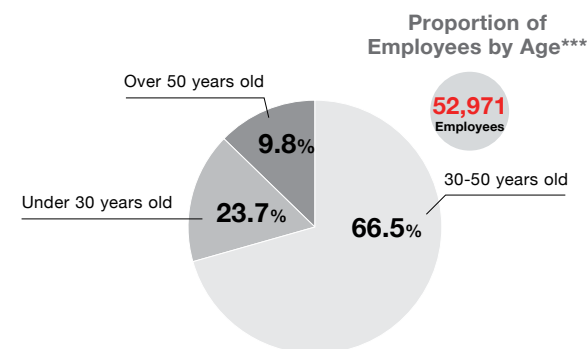
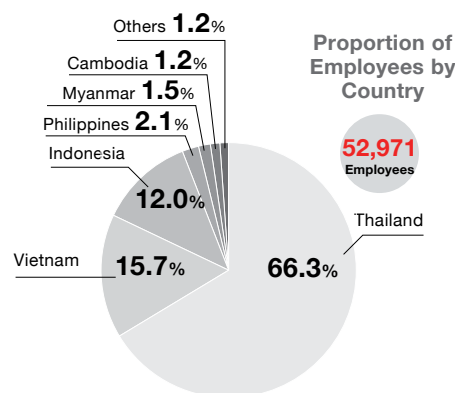
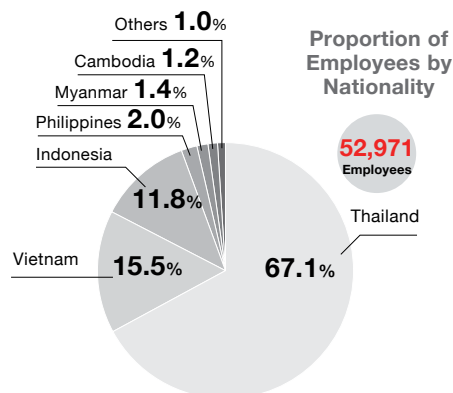
** 5 m³ of Spent Caustic leaked from HDPE pump discharge pipe. Spills were collected and cleaned up with no harm to employees or environment. Company had surveyed and fixed all possible pipe defects from welding and developed additional HDPE-piping specification for design and construction.

Level 1 : High severity means that the volume of chemicals spills is more than 2,500 kg (plastic powder or granule is more than 5,000 kg) that leak from primary containment or any spills to environment or causes injury.
 Level 2 : Moderate severity means that the volume of chemicals spills is between 500-2,500 kg (plastic powder or granule is between 2,500-5,000 kg) that can be contained (not reaching the environment), and no injury occurred.
 Level 3 : Low severity means that the volume of chemicals spills is between 50-500 kg (plastic powder or granule is between 500-2,500 kg) that can be contained (not reaching the environment), and no injury occurred.

*** Excludes flammable gas and utility chemicals, e.g. raw water, filtrated water, distilled water, Nitrogen gas, instrument air, service air, or carbon dioxide.

Performance Data	2014	2015	2016	2017	2018	GRI Standards
Oxides of Nitrogen (Thousand Tons)*	23.94	25.45	22.16	25.48	27.23	GRI 305-7
Oxides of Sulfur (Thousand Tons)*	3.25	3.34	2.84	3.50	2.88	GRI 305-7
Particulate Matter (Thousand Tons)*	1.84	1.91	1.37	1.09	1.25	GRI 305-7

* Within KPMG's limited assurance scope (page 159)

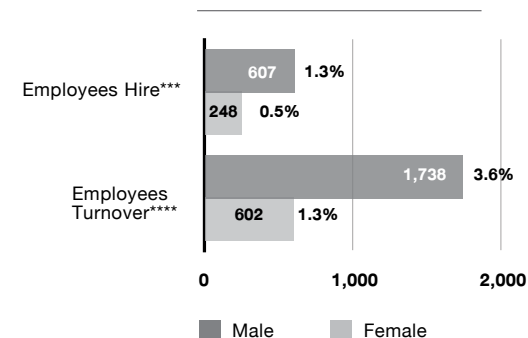


Performance Data	2014	2015	2016	2017	2018	GRI Standards
Social Performance						
Number of Employees	51,100	53,096	53,728	53,670	52,971	GRI 102-8
Proportion of Employees by Level						GRI 102-8
• Management	3.4	3.5	3.5	3.6	3.8	
• Male	76.3	76.4	76.1	74.9	75.2	
• Female	23.7	23.6	23.9	25.1	24.8	
• Supervisor and technical staff	28.3	28.1	28.6	28.3	29.2	
• Male	66.4	66.2	66.5	66.7	66.9	
• Female	33.6	33.8	33.5	33.3	33.1	
• Operator	68.3	68.4	67.9	68.1	67.0	
• Male	80.4	80.5	81.4	82.1	81.9	
• Female	19.6	19.6	18.6	17.9	18.1	
Proportion of Employees by Gender						GRI 405-1
• Male	77.5	76.9	76.9	77.4	77.2	
• Female	22.5	23.1	23.1	22.6	22.8	
Proportion of Basic Salary of Female to Male						GRI 405-2
• Management	0.83 : 1.00	0.83 : 1.00	0.83 : 1.00	0.82 : 1.00	0.85 : 1.00	
• Supervisor and technical staff	0.94 : 1.00	0.93 : 1.00	0.93 : 1.00	0.92 : 1.00	0.94 : 1.00	
• Operator	0.94 : 1.00	0.89 : 1.00	0.89 : 1.00	0.89 : 1.00	0.91 : 1.00	
Proportion of Local Senior Management*	20.8	20.5	20.8	19.0	18.7	GRI 202-2
Proportion of Participation in Labor Union/Labor Organization	N/A	22.3	26.0	24.1	23.7	
Proportion of Absence by Type						GRI 403-2
• Sickness	15.0	15.6	14.4	14.0	14.0	
• Work-related injuries	0.3	0.2	0.1	0.1	0.1	
• Others	84.7	84.2	85.4	85.9	85.9	
Return to Work after Parental Leave of Female Employees**						GRI 401-3
• Number of employees that took parental leave	235	330	210	375	339	
• Number of employees who returned to work after parental leave ended	231	325	203	358	311	

* Calculate from percentage of overseas senior management and supervisor over total overseas staff

** Under Thai laws, only female employees can take parental leave

Number of New Employees Hire and Turnover****



*** Compared with all employees of SCG

**** Employees turnover includes resignation, dismissal, retirement and death

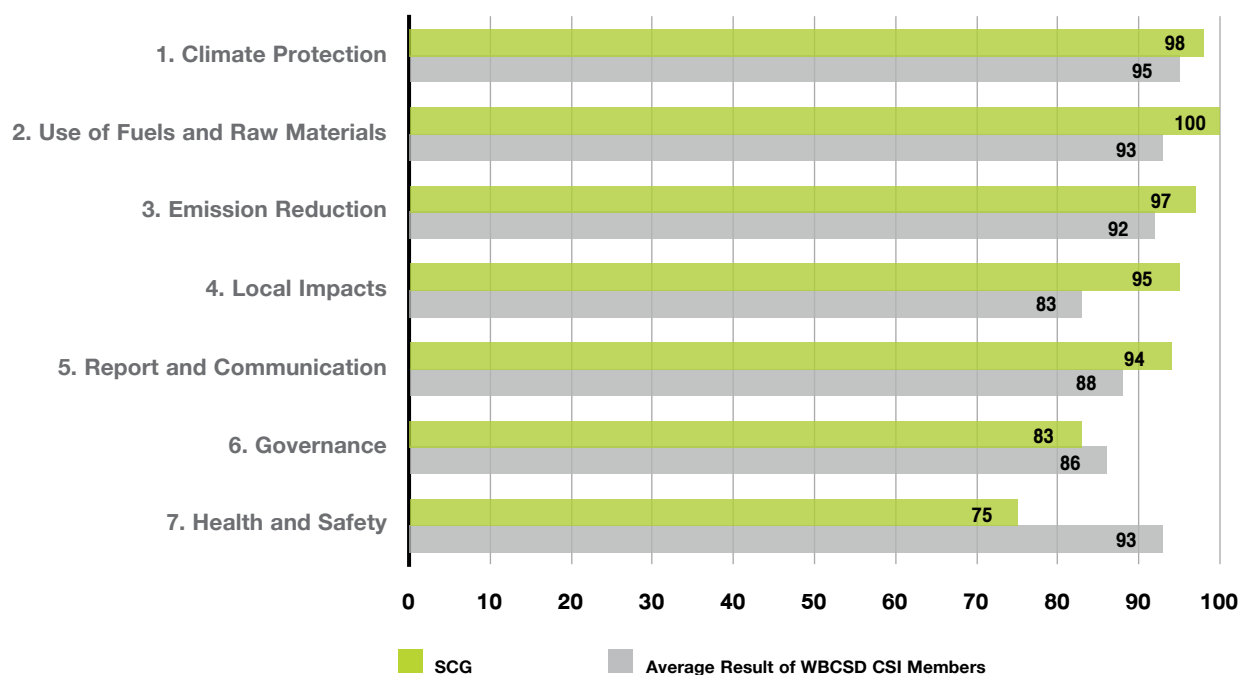
Sustainable Development in Cement Business

SCG Cement Company Limited, as one of the founder and core members WBCSD Cement Sustainability Initiative (WBCSD CSI) since 1999, continues to operate under the sustainable development initiatives of cement industry. WBCSD CSI incorporated with the qualified third party to conduct the operational assessment for the members every 4 years. For the result of 2018, Cement Business achieved higher scores than the average of the members totaling 5 out of 7 issues. Cement Business has committed to comply with the protocol and improve further.

The substantial change in cement industry in 2018 is underlined by the launch of the Global Cement and Concrete Association (GCCA) headquartering in London, England to advance the sustainable development of the cement and concrete sectors in their international level. Under the formation of a strategic partnership between WBCSD CSI and GCCA, the member companies of WBCSD CSI will be officially transferred to GCCA memberships, together with the information and working guidelines conducted by WBCSD CSI in order for GCCA to continue the work and foster the development to the next level.



WBCSD CSI Assessment Results for the Year 2018



Climate Protection

Cement Business discloses CO₂ emissions data in line with WBCSD CSI Cement CO₂ Protocol. In 2018, CO₂ Scope 1 emission recorded 15.91 million tons with 658 kgCO₂/ton cementitious, increasing from 2017 due to Thailand economic impact on cement consumption downturn leading to higher export of clinker. The usage of biomass fuel generally was declined owing to price competitiveness. CO₂ emission Scope 2 from the purchased electricity was 0.80 million tons. The Company has installed more of Solar Farms to help reduce the country's Gross CO₂ emission.

In this regard, Cement Business agrees to support Thailand Nationally Determined Contribution in line with Paris Agreement by collaborating with other domestic cement producers in the name of Thai Cement Manufactures Association to increase hydraulic cement usage as it contains less clinker compared to ordinary portland cement. Hydraulic cement is currently being tested for qualifications by related government agencies. The company's hydraulic cement (under the brand Hybrid Cement) had been the first product being certified with Green Label criteria also.

In addition, the company considered the reduction target of greenhouse gas emissions conforming to the challenging target controlling the increase in the global average temperature to well below 2 Degrees Scenario (2DS) within the year 2030 through the increasing of alternative fuel proportion, the conduct of the research on producing cement with less clinker content but with similar or higher performance, the use of other substitute raw materials, the adoption of internal carbon pricing scheme as the criteria to approve the projects that facilitate the reduction of GHG emission.

Climate Protection Performance ^(1, 2)	Unit	2014	2015	2016	2017	2018
Number of facilities adopting WBCSD Cement CO ₂ protocol	number of factory	6	6	6	6	6
	%	100	100	100	100	100
Absolute CO ₂ emissions-gross	million tons of CO ₂	15.62	16.04	15.24	14.92	16.17
Absolute CO ₂ emissions-net	million tons of CO ₂	15.45	15.79	15.00	14.68	15.91
Specific CO ₂ emissions-gross	kgCO ₂ /ton Cementitious	636	653	651	662	669
Specific CO ₂ emissions-net	kgCO ₂ /ton Cementitious	629	643	641	651	658
Heat consumption	MJ/ton clinker	3,292	3,317	3,319	3,372	3,455
Alternative fossil fuel	% by heat	3.6	5.0	5.0	5.0	4.9
Biomass	% by heat	12.2	8.3	6.9	6.1	7.0
Alternative raw materials	% by weight	2.78	2.79	2.83	2.73	2.93
Clinker factor (Cementitious)	%	75.5	76.7	76.0	75.6	74.8

1. The data collection and reporting of GHGs data is accordance with WBCSD CSI, The Cement CO₂ Protocol Version 3 base on company's own control

2. Cement plants in Thailand

Pollution Reduction

Cement Business has started reporting dust, oxide of nitrogen (NO_x) and sulfur dioxide (SO₂) emission with Continuous Emission Monitoring System (CEMs) in 2017 and CEMs was able to report 90.15% of emission.

Other substances are measured and reported by using spot measurement in accordance with Thai regulations, results of which being also complied with the laws.

Emission Reduction Performance ^(1, 2, 3)	Unit	2014	2015	2016	2017	2018
Clinker produced with monitoring of Dust, NO _x , SO ₂ , VOC/THC, Heavy Metal, PCDD/F (KPI 1)*	%	99.23	99.23	99.17	99.17	99.24
Clinker produced using CEMs of Dust, NO _x and SO ₂ emissions (KPI 2)*	%	-	-	-	86.56	90.15
Dust emissions (KPI 3)*	ton	971	925	603	498	635
Specific dust emissions (KPI 3)*	g/ton clinker	52	49	34	29	34
NO _x emissions (KPI 3)*	ton	18,872	20,222	16,919	21,015	22,631
Specific NO _x emissions (KPI 3)*	g/ton clinker	1,005	1,064	941	1,205	1,201
SO ₂ emissions (KPI 3)*	ton	355	239	158	717	561
Specific SO ₂ emissions (KPI 3)*	g/ton clinker	19	13	9	41	30
Clinker produced with monitoring of Dust, NO _x , SO ₂ (KPI 4)*	%	100	100	100	100	100
VOC/THC emissions (KPI 3)	ton	825	694	864	801	632
Specific VOC/THC (KPI 3)	g/ton clinker	44	37	37	46	34
Mercury emissions (KPI 3)	kg	22.56	16.51	14.95	14.53	112.28
Specific Mercury (KPI 3)	mg/ton clinker	1.21	0.87	0.84	0.84	6.00
Clinker produced with monitoring of VOC/THC and Mercury (KPI 4)	%	99.23	99.23	99.17	99.17	99.24
Dioxin emission (PCDD/F) (KPI 3)	mg	3,870	2,035	1,048	237	271
Specific Dioxin (PCDD/F) (KPI 3)	ng/ton clinker	206.07	107.84	63.96	18.64	14.47
Clinker produced with monitoring of Dioxin (PCDD/F) (KPI 4)	%	99.23	99.23	91.08	72.96	92.14

1. The data collection and reporting of each emissions (KPI 1, KPI 2, KPI 3, KPI 4) is accordance with WBCSD CSI, The Guidelines for emissions Monitoring and Reporting in the Cement Industry Version 2.0

2. Dust, NO_x, SO₂ collection and reporting by Continuous Emission Monitoring system (CEMs)

3. Cement plants in Thailand

* Within KPMG's limited assurance scope (page 159)

Local Impact

SCG Policy on Quarry and Biodiversity has been announced in 2018 and also shown the company's robustly determination in biodiversity conservation throughout applying on-going Biodiversity Management and addressing Mitigation Hierarchy. Cement Business also collaborated with all stakeholders including governmental agencies, research institutions, and local communities to protect biodiversity by constructing check dams on mountain areas and monkey cheek: water bodies in midstream areas, as well as to restore and conserve the coastal ecosystem by building fish homes and planting sea grass and mangrove trees.

Cement Business in collaboration with the National Metal and Materials Technology Center (MTEC) initiates the Ecosystem Service Review and Valuation Implanting on Cement Industry to evaluate the Provisioning Service, Regulating Service and Cultural Service, and converts those services into an economic value. The pilot project is established in quarry of The Siam Cement (Kaeng Khoi) Co., Ltd. This project will present the relevant analysis and recommend development guideline to achieve Net Positive Impact in the period of pre-quarring, quarry operation, post-quarrying, along with

providing research based guidance from the expertise in the areas of forestry, fishery, groundwater resources, and economics. At present the project is currently on-going in the economic analyzing phase. The project is expected to be completed within 2019.

Local Impact Performance ⁽¹⁾	Unit	2014	2015	2016	2017	2018
Quarries with rehabilitation plans in place	number of site	4	4	4	4	4
	%	100	100	100	100	100
Quarries with community engagement plans in place	%	100	100	100	100	100
Quarries with on-going study Biodiversity Management Plan in place	number of site	4	4	4	4	4
	%	100	100	100	100	100
Total water withdrawal	million cubic meter	11	13	10	10	10
Specific water withdrawal	liter/ton cementitious	511	545	442	448	433

1. Cement plants in Thailand

Health & Safety

In 2018, Cement Business documented 3 fatalities, all of which related to outside transport accidents. The Company had put in place additional preventive measures to reduce the probability and severity of transport-related accidents and other incidents in the factories:

- Managing basic factors causing accidents, emphasizing the reduction in unsafe acts and unsafe conditions as well as risk assessment in the workplace.
- Enhancing safety culture through Safety Caring by measuring both safety observation and coaching.

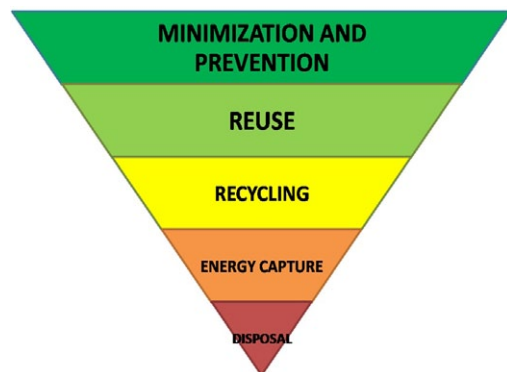
- Adopting digitalization in safety management, such as Smart Entry program which creates the authorization access into the operation area, and Safety Observation Application which allows the effective report in order to eliminate undesired incident.
- Applying Coaching and Feedback working culture for all employee to reinforce the sustained safety culture in aspects of controlling and conducting.

Health and Safety Performance ⁽¹⁾	Unit	2014	2015	2016	2017	2018
Number of fatalities						
• Directly employed	case	0	0	0	0	0
• Indirectly employed	case	1	6	1	2	0
• Third Party	case	4	2	4	4	3
Fatality Rate (Directly employed)	case per 10,000 employed	0	0	0	0	0
Number of lost time injuries						
• Directly employed	case	1	0	1	0	2
• Indirectly employed	person	2	5	2	1	8
Lost time injury frequency rate (Directly employed)	case per million man-hour	0.18	0	0.19	0.06	0.07

1. Cement plants in Thailand

Circular Economy

Heretofore, Cement Business has performed under Circular Economy concept through “Cement Plant as a Cluster of Industrial Waste Management” and Waste Hierarchy principles as per below image



In practice, the industrial waste could be processed as alternative fuels and raw materials. Since 1999, the adoption of knowledge and technology from France to trigger the sustainable change led to the test on reusing the used lubricant oils and vehicle tyres, or the first type of waste to be turned into alternative fuel for cement production.

In 2001, Cement Business has started utilizing alternative raw materials by implementing Co-Processing and alternative fuel combustion which brought about different usage and qualification analysis of each residual. SCG was the 1st company being granted

the license to operate the central waste treatment plant no. 101 from Department of Industrial Work, meanwhile, carrying out the commercial test on using Biomass such as rice husk and sawdust which was considered the beginning of Circular Economy concept in Thailand. With the extended results of biomass use, attributable to its easy usage and an abundant amount of biomass from agricultural availability, every cement plant could find various ways to make use of biomass in their operations.

Then, in 2002, SCI Eco Services Co., Ltd. was the 1st waste treatment plant being granted with the operating license no. 106 from the Department of Industrial Works with the enhanced industrial waste treatment process through the use of advanced and continuously developed technology suitable for waste conditions.

The highlight in 2007 was the installation of machines to handle semi-solid waste that was difficult to transport to the kiln when compared to the solid waste as previously used. Meanwhile, to maximize the use of biomass from agriculture, 1 MW Gasifier was installed at The Siam Cement (Thung Song) Co., Ltd. to generate fuel for cement production to partially replace the conventional fuel while embarking on planting energy crop in cement factory area to be used as alternative fuel afterward.

In 2008, for the 1st time in Songkhla Province, the Company commenced the study and converted municipal waste into Refuse Derived Fuel (RDF). The establishment of a small size plant for waste

sorting and conditioning, as well as pre-treated RDF at landfills marked the beginning of the waste utilization from municipal waste, industrial waste, and agricultural waste. SCG, then, was the 1st company with the most diversified waste utilization in Thailand.

In 2009, the utilization of imported biomass from waste wood from Singapore underlined the first international Circular Economy activity. The development of RDF project in collaboration with Chiang Mai Provincial Administrative Organization modified the existing fertilizer and municipal waste pretreatment plants in 4 sub-districts to transform RDF for The Siam Cement (Lampang) Co., Ltd. In 2010, Solid Waste to Energy Plant project was commenced to improve solid waste conditions to be more consistency and easier to use while debottlenecking the machines for the consecutive operations including Calcliner modification at The Siam Cement (Kaeng Khoi) Co., Ltd. by adjusting its rotary valve to reduce leaked air, and Biomass feed system improvement at The Siam Cement (Thung Song) Co., Ltd. At the same time, RDF development had been extended to Nakhon Pathom Province comprising the sorting of burnable waste from municipal waste landfills being transported from Bangkok to be disposed at Kamphaeng Saen District, and the establishment of RDF manufacturing plant, project in collaboration between Khitkhin Municipal District, Saraburi Province and The Siam Cement (Ta Luang) Co., Ltd. with the expansion plan for the second plant in the future.

Utilization of Alternative Fuels and Alternative Raw Materials in Cement Business



- Started waste utilization in the form of liquid waste, and used lubricant oils and vehicle tyres as alternative fuel.

1999

- Started biomass utilization at Ta Luang.
- Started using alternative raw materials in cement production.

2001

- Joined Voluntary Emission Reduction Project (VER).

2006

- Utilized wastewater sludge as alternative raw materials at Kaeng Khoi.
- Utilized waste heat to reduce moisture content in biomass at Thung Song.
- Started waste pretreatment for alternative solid fuel manufacturing project in Songkhla.

2008

- Conducted performance test on wood shredding machine and shredding wood from Singapore at Ta Luang.
- Commenced Solid Pre-treatment Plant for solid fuel manufacturing from industrial waste project.
- Started the study on waste pretreatment project at On Nut fertilizer plant.

2010

2000

- Tested on biomass utilization at Kaeng Khoi and Thung Song (rice husk, log, woodchip, cassava rhizome, palm bunch, saw dust).



2005

- Started biomass utilization at Lampang (rice husk, saw dust).
- Developed biomass utilization (bark, coal, palm tree, rubber tree root, palm leaves, palm bunch).



2007

- Utilized biomass gasification at Thung Song.
- Started the utilization of sludge from water treatment as alternative raw materials.



2009

- Planted energy crops at Kaeng Khoi.
- Imported waste wood from Singapore in preparation for biomass fuel.
- Commenced waste sorting project for alternative solid fuel manufacturing at Chiang Mai.





- Modified Calciner to support biomass combustion and alternative fuel at Kaeng Khoi.
- Supported municipal waste pretreatment project for 6 communities in Bangkok.
- Started waste pretreatment project at Ban Mo District, Saraburi Province.
- Started waste pretreatment project at Ban Sa Sub-district, Lampang Province.
- Started waste pretreatment project at Thung Song District, Nakorn Si Thammarat Province.

2011



- Installed the Mechanical Feed System at Kaeng Khoi.
- Utilized biomass gasification at Lampang.
- Collaborated with leading companies to conduct study on gasifier utilization.
- Modified Recycle Used Oil Plant.
- Produced the municipality solid waste sorting machine (Spinner).

2013



- Planted prototyped energy crops at Ta Luang.
- Started the project on receiving municipal waste from Phatthalung municipality for alternative fuel manufacturing plant.
- Commenced alternative fuel manufacturing project at Phitsanulok Province.
- Modified the municipality solid waste sorting machine and being granted the petty patent.

2015

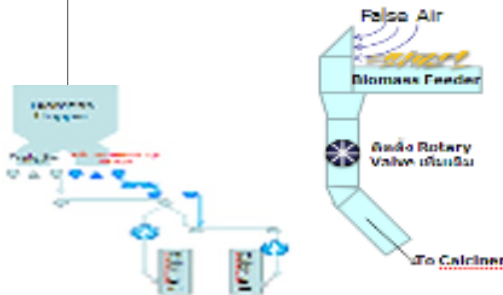


- Planted energy crop at Kaeng Khoi.

2017

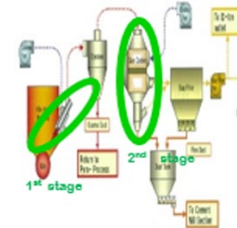
2012

- Installed and debottlenecked the rotary valve for feeding biomass and solid waste at Thung Song District.
- Started waste pretreatment project at Kamphaeng Saen District, Nakhon Pathom Province.



2014

- Installed Chloride Bypass System for alternative fuel combustion at Kaeng Khoi.



2016

- Modified the biomass fuel feed system at Kaeng Khoi and established the alternative fuel manufacturing plant at On Nut.



2018

- Modified the municipality solid waste sorting machine at On Nut.

In 2011, following the mega flood in Thailand, SCG, in cooperation with governmental agencies, initiated Circular Economy projects by rendering support on the disposal of waste after flood around Bangkok areas until project completion.

In 2013, the RDF plant was established at The Siam Cement (Thung Song) Co., Ltd. as the RDF Quality Development Center in the Southern provinces, project of which was in cooperation with all municipalities, such as Phatthalung Province. As for the Central region area, the machine modification by improving air feed system aimed at increasing RDF usage efficiency. Then, SCG and the company in Austria worked in collaboration to develop gasification for electricity generation from variety of fuel leading to the electricity generation from Gas Engine for sale to Nakhon Sawan Provincial Electricity Authority. Increasing waste utilization volume, and waste conditions are detrimental to the performance and machine condition of cement manufacturing. In 2014, SCG, therefore, installed Chloride Bypass System to reduce chloride residue in the cement kiln at The Siam Cement (Kaeng Khoi) Co., Ltd.

In 2015, the plantation had extended to the area of The Siam Cement (Ta Luang) Co., Ltd. involving two types of plants, namely Napier Grass and *Leucaena leucocephala*. Then, in 2016, biomass utilization had been extended to the Southern region through the capacity expansion of waste heat power generation project to facilitate the alternative fuel in the area with more electricity being generated.

In 2017, the installation project of Mechanical Feeding System had been approved and successfully installed at The Siam Cement (Kaeng Khoi) Co., Ltd. with the plan to extend the RDF utilization from municipal waste. This project was warmly welcomed by all related parties attributable to the outcomes of landfills waste decrease, the environment protection, and greenhouse gasses emissions reduction.



About this report

SCG has published the sustainability report every year since 2001 by presenting the performance in 3 core business units, namely Cement-Building Materials Business, Chemicals Business, and Packaging Business.

The selection of Sustainability Performance information included in this report is based on what is determined by SCG's management to be responsible, relevant and of value for its stakeholders when measuring sustainability performance.

Reporting Scope

The reporting scope, particularly economic data, cover the performance of subsidiaries, joint ventures, associates and other companies both domestic and regional in line with the SCG Annual Report 2018.

Environmental and safety data from all business units were included in the report using the combined criteria of equity share of 50% and over and controlled associates, except for overseas operations, the newly established companies (less than 3 years), the merging and acquisition companies (less than 4 years). Exclusivity of the data is as shown on page 141-147. The reporting period for the information in this report is from 1 January 2018 to 31 December 2018.

This 2018 Sustainability Report and its data were prepared in accordance with Global Reporting Initiative ("GRI Standards"): Comprehensive Option. The information in this report disclosed a Progress on the Advanced Level of United Nations Global Compact (UNCG) as shown on page 156, as well as a progress towards each target set forth in the United Nation's Sustainable Development Goals (SDGs)

and operating results of cement business according to WBCSD CSI/GCCA as shown on page 129-137.

Reporting Assurance

Financial data was derived from financial management system similar to those presented in SCG Annual Report 2018 and is verified by certified accounting firm.

The integrity and the transparency of environmental and safety data in this report has been assured by an external party to verify and assess the selected data against GRI Standards as shown in details on page 159.

Environment

The environmental data cover those activities that could have a significant impact on the environment together with sites with production process while sites with activities considered not to have a significant impact are not included, for examples; sales offices, R&D laboratories, services and holding companies. The environmental data, i.e. accounting evidence, meter reading, data from production system, and estimation with ground rule have been presented in absolute value. For the specific consumption/emission, since 2016 the disclosure of energy, greenhouse gas emissions and water withdrawal have been improved with greater visibility by comparing the absolute consumption/emission of the current year with the business as usual (BAU) of the base year prior to the reduction measures. The energy and greenhouse gas emissions use the base year of 2007 and water withdrawal use the base year of 2014.

The report of cement business is in line with WBCSD CSI/GCCA framework. Air emission and heat rate effectiveness indexes are calculated from tonnage of clinker while greenhouse gas emissions and water consumption effectiveness indexes are calculated from tonnage of cementitious. In the year 2016, Cement business made a retrospective adjustment of cementitious production tonnage to reflect the inclusion of other alternative raw materials used in cementitious manufacturing, such as pulverized fuel ash (PFA), and limestone that are commonly used in production of cement and mortar cement.

Energy

Total energy consumption includes heating & steam and electricity used in the companies/plants areas. For the details on heating & steam, the amount and ratio of alternative energy utilization is also presented, together with the addition of renewable energy and non-renewable energy from the year 2018.

Heating & Steam energy consumption =
fuel weight or steam volume
(estimated from volume purchased
or stockpile change)
x heating value of each fuel type
(provided by laboratory test or suppliers)

Greenhouse Gas Emissions (GHGs)

GHGs data in this report represent the amount of GHG emissions from the operation based on the calculation according to “Guidelines to disclose and measure greenhouse gas emissions” from WRI/WBCSD GHG Emissions Protocol as per the following scopes:

1. Reporting Scope

1.1 Direct GHG emissions (Scope 1):

GHG emissions occur from manufacturing process or other activities that are owned, controlled, and managed by SCG, for example emissions from combustion of coal or natural gas in boilers, furnaces, vehicles, etc. In addition, this scope also includes GHG emissions associated with chemical production process such as calcinations in cement plant and lime kilns while excluding emissions from the combustion of biomass, alternative fuels, waste water treatment process and landfill.

1.2 Indirect GHG emissions (Scope 2):

GHG emissions occur from the imported energy, such as electricity, as well as purchased energy, in form of steam and hot air.

2. Report of GHG Inventory:

2.1 Direct GHG emissions calculation (Scope 1)

- From combustion

- The calculation based on quantities of fuel consumption (weight or volume) such as: amount of fuel oil and natural gas x emission factor which was referred to Thailand Greenhouse Gas Management Organization (Public Organization) (TGO). Apart from TGO emission factor, the Intergovernmental Panel on Climate Change 2006 (IPCC) emission factors can be referred.

- The calculation based on fuel consumption (based on heating value) such as: amount of coal x heating value x emission factor

which was referred to TGO. Apart from TGO emission factor, the Intergovernmental Panel on Climate Change 2006 (IPCC) emission factors can be referred.

- The calculation will be based on carbon mass balance from fuel consumption.

- From chemical reaction in production process e.g. limestone and lime mud is calculated using mass balance.

- For cement business, reference is made to WBCSD CSI/GCCA.

2.2 Indirect GHG emissions (Scope 2)

will be calculated from purchased electricity, steam or hot air consumption x emission factors based on TGO, manufacturers, or supplier.

3. The type of GHG emissions to be reported

includes CO₂, CH₄, N₂O, HFCs, PFCs and SF₆ converted and reported as CO₂ equivalent by Global Warming Potential (GWP). Referred GWP factors are defined by IPCC. NF₃ will be reported in the future.

Air Emission

Air emissions are the quantity of air pollution (such as NO_x, SO_x, Particulate Matter) deriving from combustions and being the components during the production process. Types of air pollutants depend upon each production process in which chemical substance is produced. The results and measurement methods shall refer to laws such as US EPA or equivalent standards.

Reporting of quantity of air emission will be calculated based on concentration measured from random spot check being conducted by laboratories which is certified and registered to the Department of Industrial Works, multiplied by hot air flow rate and working hours.

In addition, Chemicals business and Cement business measure their air emissions from stack using Continuous Emission Monitoring Systems (CEMS). Cement business refers the measurements to WBCSD CSI (see details on page 130-131).

Water

Water management (comprising water withdrawal, treated water, water discharged, and recycled water) is the assessment of water usage efficiency and any risks that may arise from water withdraw from various sources.

Water withdrawal is the quantity of fresh water taken from external sources including water used in production process, offices, maintenance and utilities, information of which is obtained from accounting evidences or meter reading. Sources of water are divided into surface water, ground water and tap water.

Recycled water is the quantity of treated water returned to the process excluded non-treated reused water such as cooling water. Since 2018, the recycled water quantity of Cement-Building Materials Business has been included retrospectively from 2014 onwards.

Effluent Water Quality is the quality of water discharged to external sources such as BOC, COD with the quality of discharged water which is measured by standard test method and volume of discharged water.

Industrial Waste

Waste Management is considered in order to assess the efficiency of production process, improvement of product quality and a decrease of production cost. SCG has established “SCG Waste Reporting Guideline” in March 2010 for waste data collection and calculation.

The quantity of industrial waste is the amount of waste being generated from production process excluding the waste that can be recycled in the production process (work in process, WIP), industrial wastes are divided into 2 categories comprising hazardous waste and non-hazardous waste as listed in the Ministry of Industry's 2005 Decree on the Disposal of Waste and Unused Materials.

The disclosure of data on industrial waste being generated from production process and being treated by ways of recycle, disposal or landfill will be collected from the weighting scale or estimation in accordance with academic principles.

Safety

Data on number of employees and contractors

Safety data includes information from three work streams: SCG employees, contracted employee and contractors with the following definitions;

1. Employee - a full time worker according to SCG employment contract.

Employees as defined in items No. 1 and 2 are categorized into 3 levels: operational, supervisor, and management.

- Operational level is a front line worker who uses their skills and technics in their daily operations.
- Supervisor level is a front line manager who is responsible for daily management or having a control over subordinates.
- Management level is a manager who is responsible for addressing business strategies or policies, delegating, and controlling supervisor level employees who implement policy and daily jobs.

2. Contracted employee - a temporary worker being employed on a specific period.

3. Contractor is any individual who gets consent from SCG to perform any job on SCG behalf but not an SCG's employee, which could be divided into 3 groups as follows:-

- Routine contractor is a contractor who performs the regularly assigned job or on a day-to-day basis under SCG's working procedures.
- Non-routine contractor is a contractor who performs any specific job or technical skilled required job using their own working procedures.
- Transport Contractor is a contractor engaged in transportation of raw materials or products under SCG's management (both with and without SCG Brand Logo on the vehicles) and those without SCG's management but having SCG Brand logo on their transportation vehicles.

All contractors data covered in the report will be calculated for number of man-hours while data on non-routine contractor is being excluded. Data on transportation contractors under SCG Logistics Management Co., Ltd., will be reported in kilometre.

Third party who does not fit in any above definitions is not covered in this report.

Calculation of Working Hour

1. Data from clock-in system, HR database, accounting unit or relevant administrative unit.

2. In case the companies/plants do not have a clock-in system or HR database, the below formula shall be employed to estimate the average man-hours.

$$\begin{aligned} &\text{Number of man hours (man-hours)} \\ &= \text{Number of Employees/Contractors} \\ &\times \text{Number of working days} \\ &\times \text{Number of normal working hours (per day)} \\ &+ \text{Number of total working hours-over time} \\ &\quad (\text{only operational employees and contractors}) \end{aligned}$$

Recording of Safety Data

SCG records data on safety at work by dividing into 3 categories:

1. Number of fatality; death resulting from work-related accident where the victim is passed away suddenly at the scene or thereafter due to such accident.

2. Incident Frequency Rate; number of cases per 200,000 man-hours.

3. Lost Time Injury Frequency Rate; number of lost time cases per 200,000 man-hours.

Lost Time Injury (LTI) is a work-related injury causing the absence of one or more working days (or shifts). This includes any work-related injury or illness which prevents that person from doing any work the day after the accident.

The electronic file of this report and the previous ones can be downloaded from SCG website
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E-mail: info@scg.com
and website: www.scg.com

Subsidiaries included in Sustainability Report 2018*

Business / Company		Production	Environment												Safety
			Energy		Air				Water				Waste		
			Heating	Electricity	Dust	SO _x	NO _x	GHG	Water Withdrawal	Recycled Water	BOD	COD		TSS	
SCG															
1	The Siam Cement Public Company Limited														
Cement-Building Materials Business															
Subsidiaries															
1	SCG Cement-Building Materials Co., Ltd.														✓
2	SCG Cement Co., Ltd.														✓
3	The Concrete Products and Aggregate Co., Ltd.	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	✓	✓
4	The Siam Cement (Kaeng Khoi) Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	NR	✓	✓
5	The Siam Cement (Ta Luang) Co., Ltd. (Ta Luang/Khoa Wong)	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	NR	✓	✓
6	The Siam Cement (Thung Song) Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	NR	✓	✓
7	The Siam Cement (Lampang) Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	NR	✓	✓
8	Siam Mortar Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	NR	✓	✓
9	The Siam White Cement Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	NR	✓	✓
10	The Siam Refractory Industry Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	NR	✓	✓
11	Cement Thai Energy Conservation Co., Ltd.	Data included in The Siam Cement (Ta Luang) Co., Ltd., The Siam Cement (Kaeng Khoi) Co., Ltd., The Siam Cement (Thung Song) Co., Ltd. and The Siam Cement (Lampang) Co., Ltd.													✓
12	ECO Plant Services Co., Ltd.	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	✓
13	Siam Research and Innovation Co., Ltd.	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	✓
14	SCI Eco Services Co., Ltd.	✓	NR	✓	NR	NR	NR	✓	✓	NR	NR	NR	NR	✓	✓
15	Q Mix Supply Co., Ltd.														✓

Business / Company		Production	Environment												Safety
			Energy		Air				Water				Waste		
			Heating	Electricity	Dust	SO _x	NO _x	GHG	Water Withdrawal	Recycled Water	BOD	COD		TSS	
16	Silathai Sanguan (2540) Co., Ltd.														✓
17	Green Conservation Solution Co., Ltd.														
18	Silasanon Co., Ltd.														✓
19	SCG Building Materials Co., Ltd.														✓
20	The Siam Fibre-Cement Co., Ltd. (Saraburi/Ta Luang/Thung Song/ Nongkhae)	✓	✓	✓	✓	NR	✓	✓	✓	✓	NR	NR	NR	✓	✓
21	Siam Fibre Cement Group Co., Ltd.	✓	✓	✓	✓	NR	✓	✓	✓	NR	NR	NR	NR	✓	✓
22	SCG Landscape Co., Ltd. (Khonkaen/Thung Song/Ladkrabang/ Lamphun/Sriracha/Nongkhae)	✓	✓	✓	NR	NR	NR	✓	✓	NR	NR	NR	NR	✓	✓
23	Siam Fiberglass Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	NR	✓	✓
24	Cement Thai Gypsum Co., Ltd.														
25	Cement Thai Ceramics Co., Ltd.														
26	SCG Distribution Co., Ltd.														
27	BetterBe Marketplace Co., Ltd.														
28	SCG International Corporation Co., Ltd.														✓
29	SCG Logistics Management Co., Ltd.														✓
30	SCG Trading Services Co., Ltd.														
31	SCG Sourcing Co., Ltd.														
32	SCG Experience Co., Ltd.														✓
33	SCG Skills Development Co., Ltd.														
34	The CPAC Roof Tile Co., Ltd. (Saraburi 1/Saraburi 2/ Nakorn Prathom/Chonburi/Nakorn Rajchasma/Lamphun/ Khonkaen/Nakorn Sri Thammaraj)	✓	✓	✓	✓	NR	NR	✓	✓	NR	NR	NR	NR	✓	✓
35	Thai Ceramic Roof Tile Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	✓	✓
36	MRC Roofing Co., Ltd.														
37	The Siam Sanitary Fittings Co., Ltd. (Pathumthani/Nakorn Rajchasma)	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	NR	✓	✓

Business / Company		Production	Environment												Safety
			Energy		Air				Water				Waste		
			Heating	Electricity	Dust	SO _x	NO _x	GHG	Water Withdrawal	Recycled Water	BOD	COD		TSS	
38	Saraburirat Co., Ltd.	✓	✓	✓	NR	NR	NR	✓	✓	NR	NR	NR	NR	✓	✓
39	Siam Sanitary Ware Co., Ltd.														✓
40	Siam Sanitary Ware Industry Co., Ltd.	✓	✓	✓	✓	NR	✓	✓	✓	✓	NR	NR	NR	✓	✓
41	Siam Sanitary Ware Industry (Nongkae) Co., Ltd.	✓	✓	✓	✓	NR	✓	✓	✓	✓	NR	NR	NR	✓	✓
42	Quality Construction Products Public Company Limited	✓	✓	✓	✓	NR	NR	✓	✓	NR	NR	NR	NR	✓	✓
43	Q-Con Eastern Co., Ltd.	✓	✓	✓	✓	NR	✓	✓	✓	NR	NR	NR	NR	✓	✓
44	SCGT Automobile Co., Ltd.														
45	Panel World Co., Ltd.														✓
46	Sosuco Ceramic Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	✓	✓
47	SCG-Sekisui Sales Co., Ltd.														✓
48	SCG Yamato Express Co., Ltd.														
49	Jumbo Barges and Tugs Co., Ltd.	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
50	SCG Ceramics Public Company Limited	✓	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	✓	✓
51	Nexter Digital Co., Ltd.														
52	Nexter Retail Co., Ltd.														
53	SCG Retail Holding Co., Ltd.														
54	SCG-Boonthavorn Co., Ltd.														
Associates, Joint Ventures and Other Companies															
1	Sekisui-SCG Industry Co., Ltd.	✓	NR	✓	NR	NR	NR	✓	✓	NR	NR	NR	NR	✓	✓
2	Noritake SCG Plaster Co., Ltd.	✓	✓	✓	✓	NR	✓	✓	✓	NR	✓	✓	✓	✓	✓
3	SCG Nichirei Logistics Co., Ltd.	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
4	Bangkok Interfreight Forwarding Co., Ltd.	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

Business / Company		Production	Environment												Safety
			Energy		Air				Water				Waste		
			Heating	Electricity	Dust	SO _x	NO _x	GHG	Water Withdrawal	Recycled Water	BOD	COD		TSS	
Chemicals Business															
Subsidiaries															
1	SCG Chemicals Co., Ltd.														✓
2	Thai Polyethylene Co., Ltd.	✓	✓	✓	NR	NR	NR	✓	✓	✓	✓	✓	✓	✓	✓
3	SCG Plastics Co., Ltd.														✓
4	SCG Performance Chemicals Co., Ltd.														✓
5	Rayong Engineering & Plant Service Co., Ltd.														✓
6	Protech Outsourcing Co., Ltd.														✓
7	RIL 1996 Co., Ltd.	NR	NR	✓	NR	NR	NR	✓	NR	NR	NR	NR	NR	✓	✓
8	Texplore Co., Ltd.														✓
9	Vina SCG Chemicals Co., Ltd.														
10	Rayong Pipeline Co., Ltd.														✓
11	Thai Plastic and Chemicals Public Company Limited	✓	✓	✓	NR	NR	✓	✓	✓	✓	✓	✓	✓	✓	✓
12	TPC Paste Resin Co., Ltd.	✓	✓	✓	NR	NR	✓	✓	✓	✓	✓	✓	✓	✓	✓
13	The Nawaplastic Industries (Saraburi) Co., Ltd.	✓	✓	✓	NR	NR	NR	✓	✓	NR	NR	NR	NR	✓	✓
14	Nawa Plastic Industries Co., Ltd.	✓	✓	✓	NR	NR	NR	✓	✓	NR	✓	✓	✓	✓	✓
15	Nawa Intertech Co., Ltd.	✓	✓	✓	NR	NR	NR	✓	✓	NR	✓	✓	✓	✓	✓
16	Total Plant Service Co., Ltd.														
17	SCG Ico Polymers Company Limited	✓	✓	✓	NR	NR	NR	✓	✓	NR	NR	NR	NR	✓	✓
18	Map Ta Phut Tank Terminal Co., Ltd.	NR	✓	✓	NR	NR	NR	✓	✓	NR	NR	NR	NR	✓	✓
19	Map Ta Phut Olefins Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	NR	✓	✓
20	Rayong Olefins Co., Ltd.	✓	✓	✓	NR	NR	✓	✓	✓	✓	✓	✓	✓	✓	✓

Business / Company		Production	Environment												Safety
			Energy		Air				Water				Waste		
			Heating	Electricity	Dust	SO _x	NO _x	GHG	Water Withdrawal	Recycled Water	BOD	COD		TSS	
21	Flowlab & Service Co., Ltd.														✓
22	SMH Co., Ltd.														
Associates and Other Companies															
1	Rayong Terminal Co., Ltd.	NR	✓	✓	NR	NR	NR	✓	✓	NR	NR	NR	NR	✓	✓
2	Thai MMA Co., Ltd.	✓	✓	✓	NR	NR	✓	✓	✓	NR	✓	✓	✓	✓	✓
3	Grand Siam Composites Co., Ltd.	✓	✓	✓	✓	NR	NR	✓	✓	NR	✓	✓	✓	✓	✓
4	Thai MFC Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	✓	✓
5	Siam Tohcello Co., Ltd.	✓	✓	✓	NR	NR	NR	✓	✓	NR	✓	✓	✓	✓	✓
6	Bangkok Synthetics Co., Ltd.	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Packaging Business															
Subsidiaries															
1	SCG Packaging Public Company Limited														✓
2	Thai Paper Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	✓	✓
3	Thai Union Paper Public Company Limited														
4	Siam Kraft Industry Co., Ltd. (Kanjanaaburi/Ratchaburi)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	The Siam Forestry Co., Ltd.	✓	✓	✓	NR	NR	NR	✓	NR	NR	NR	NR	NR	NR	✓
6	Panas Nimit Co., Ltd.														NR
7	Thai Panason Co., Ltd.														NR
8	Thai Panadorn Co., Ltd.														NR
9	Thai Panaram Co., Ltd.														NR
10	Suanpa Rungsaris Co., Ltd.														NR

Business / Company		Production	Environment												Safety
			Energy		Air				Water				Waste		
			Heating	Electricity	Dust	SO _x	NO _x	GHG	Water Withdrawal	Recycled Water	BOD	COD		TSS	
11	Siam Panawes Co., Ltd.	✓	✓	✓	NR	NR	NR	✓	NR	NR	NR	NR	NR	NR	NR
12	Thai Panaboon Co., Ltd.														NR
13	Thai Wanabhum Co., Ltd.														NR
14	Phoenix Pulp & Paper Public Company Limited	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
15	Phoenix Utilities Co., Ltd.														
16	SCGP Excellence Traning Center Co., Ltd.	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
17	SCG Paper Energy Co., Ltd.														
18	Thai Cane Paper Public Company Limited (Kanjana-buri/Prachinburi)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
19	Thai Containers Group Co., Ltd. (Navanakorn/Pathumthani/ Samutprakarn/Ratchaburi/Songkhla/Chonburi/Prachinburi/ Saraburi/Kamphaeng Phet)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
20	Thai Containers Khonkaen Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	NR	✓	✓
21	Thai Containers Rayong Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	NR	✓	✓	✓	✓	✓
22	Invenique Co., Ltd.														
23	TC Flexible Packaging Co., Ltd.														
24	Dyna Packs Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	NR	✓	✓	✓	✓	✓
25	Orient Containers Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	NR	NR	NR	NR	✓	✓
26	Tawana Container Co., Ltd.	✓	✓	✓	✓	✓	✓	✓	✓	NR	✓	✓	✓	✓	✓
27	D-In-Pack Co., Ltd.	✓	✓	✓	NR	NR	NR	✓	✓	NR	NR	NR	NR	✓	✓
28	Prepack Thailand Co., Ltd. (Samutsakorn/Samut Songkhram/ Rayong)	✓	✓	✓	✓	✓	✓	✓	✓	NR	✓	✓	✓	✓	✓
29	Precision Print Co., Ltd.														
30	Conimex Co., Ltd.														
31	SCGP Solutions Co., Ltd.														

Business / Company		Production	Environment												Safety
			Energy		Air				Water				Waste		
			Heating	Electricity	Dust	SO _x	NO _x	GHG	Water Withdrawal	Recycled Water	BOD	COD		TSS	
32	SCGP-T Plastics Company Limited														
Associates															
1	Siam Nippon Industry Paper Co., Ltd.	✓	✓	✓	NR	NR	NR	✓	✓	NR	NR	NR	NR	✓	✓
Other															
Subsidiaries															
1	Cement Thai Holding Co., Ltd.														
2	Cement Thai Property (2001) Public Company Limited														
3	Property Value Plus Co., Ltd.														
4	SCG Accounting Services Co., Ltd.														
5	SCG Legal Counsel Limited														
6	CTO Management Co., Ltd.														
7	Siam Innovation Product and Solution Co., Ltd.														
8	SCG Learning Excellence Co., Ltd.														
9	Bangsue Industry Co., Ltd.														
10	AddVentures Capital Co., Ltd.														
11	AddVentures Capital International Co., Ltd.														
12	Siam GNE Solar Energy Co., Ltd.														

* Economic performance covers all significant subsidiaries, associates, joint ventures and other companies according to Annual Report 2018

NR = Non Relavance

 Office/Investment/Sales/Service where the collection of environmental and safety data is not necessary

 Greenfield (less than 3 years) or newly acquired companies (less than 4 years) is not required to incorporate data into SCG

GRI Content Index

SCG follows the Global Reporting Initiative's (GRI) Sustainability Reporting Standards in our Sustainability Report

This report has been prepared in accordance with the GRI Standards: Comprehensive option.

General and topic-specific disclosures with a reference to external assurance in the GRI content index have been externally assured by an independent third party KPMG Phoomchai Audit Ltd. The Independent Assurance Reports are available in SCG's Sustainability Report

on page 159 and 160, respectively.

The index below shows where the GRI disclosures are addressed in the Annual Report (AR), the Sustainability Report (SR) on SCG's website.

Standard	Disclosure	Location (AR, SR, others)	Disclosure/Comment	Assurance
GRI 102: General Disclosures				
Organizational profile				
102-1	Name of the organization	AR Cover, AR305		
102-2	Activities, brands, products, and services	AR10-23		
102-3	Location of headquarters	AR305		
102-4	Location of operations	AR26-45		
102-5	Ownership and legal form	AR305		
102-6	Markets served	AR9		
102-7	Scale of the organization	AR9		
102-8	Information on employees and other workers	AR79, SR128		
102-9	Supply chain	SR65-71		
102-10	Significant changes to the organization and its supply chain	AR8		
102-11	Precautionary Principle or approach	AR126-132		
102-12	External initiatives	AR112, SR120, SR129		
102-13	Membership of associations	SR120		
Strategy				
102-14	Statement from senior decision-maker	SR3-4		
102-15	Key impacts, risks, and opportunities	AR127-132		

Standard	Disclosure	Location (AR, SR, others)	Disclosure/Comment	Assurance
Ethics and integrity				
102-16	Values, principles, standards, and norms of behavior	AR20, AR78, AR110-112		
102-17	Mechanisms for advice and concerns about ethics	AR110-113		
Governance				
102-18	Governance structure	AR104		
102-19	Delegating authority	AR 94-96, AR99-100		
102-20	Executive-level responsibility for economic, environmental, and social topics	AR99-100		
102-21	Consulting stakeholders on economic, environmental, and social topics	AR87-93		
102-22	Composition of the highest governance body and its committees	AR104		
102-23	Chair of the highest governance body	AR104		
102-24	Nominating and selecting the highest governance body	AR107-108		
102-25	Conflicts of interest	AR86		
102-26	Role of highest governance body in setting purpose, values, and strategy	AR80-81		
102-27	Collective knowledge of highest governance body	AR53-62		
102-28	Evaluating the highest governance body's performance	AR98-99		
102-29	Identifying and managing economic, environmental, and social impacts	AR126-128		
102-30	Effectiveness of risk management processes	AR127		
102-31	Review of economic, environmental, and social topics	AR51-52	Frequency of the board's review of sustainability impacts, risks, and opportunities	
102-32	Highest governance body's role in sustainability reporting	AR2-3, AR49, AR80-81		
102-33	Communicating critical concerns	AR127		
102-34	Nature and total number of critical concerns	AR126-132		
102-35	Remuneration policies	AR76-77		
102-36	Process for determining remuneration	AR76-77		
102-37	Stakeholders' involvement in remuneration	AR76-77		
102-38	Annual total compensation ratio	AR76-77		
102-39	Percentage increase in annual total compensation ratio	AR77		

Standard	Disclosure	Location (AR, SR, others)	Disclosure/Comment	Assurance
Stakeholder engagement				
102-40	List of stakeholder groups	AR86-92, SR11-12		
102-41	Collective bargaining agreements	-	100% of employees are covered by collective bargaining agreements	
102-42	Identifying and selecting stakeholders	AR86-92, SR11-16		
102-43	Approach to stakeholder engagement	AR86-92, SR11-16		
102-44	Key topics and concerns raised	AR86-92, SR11-16		
Reporting practice				
102-45	Entities included in the consolidated financial statements	SR141-147		
102-46	Defining report content and topic Boundaries	SR138-140		
102-47	List of material topics	SR16-18		
102-48	Restatements of information	SR138		
102-49	Changes in reporting	SR138		
102-50	Reporting period	SR138		
102-51	Date of most recent report	SR138		
102-52	Reporting cycle	SR138		
102-53	Contact point for questions regarding the report	SR140		
102-54	Claims of reporting in accordance with the GRI Standards	SR140		
102-55	GRI content index	SR148-155		
102-56	External assurance	SR157-160		
GRI 103: Management Approach				
103-1	Explanation of the material topic and its Boundary	SR16-18		
103-2	The management approach and its components	SR16-18		
103-3	Evaluation of the management approach	SR16-18		
GRI 200: Economic				
GRI 201: Economic Performance				
201-1	Direct economic value generated and distributed	SR120		
201-2	Financial implications and other risks and opportunities due to climate change	AR128, SR92-102		

Standard	Disclosure	Location (AR, SR, others)	Disclosure/Comment	Assurance
201-3	Defined benefit plan obligations and other retirement plans	-	Under company rules and regulations	
201-4	Financial assistance received from government	SR120		
GRI 202: Market Presence				
202-1	Ratios of standard entry level wage by gender compared to local minimum wage	SR128		
202-2	Proportion of senior management hired from the local community	SR128		
GRI 203: Indirect Economic Impacts				
203-1	Infrastructure investments and services supported	SR120		
203-2	Significant indirect economic impacts	SR120		
GRI 204: Procurement Practices				
204-1	Proportion of spending on local suppliers	SR67	Share of General Products and Services Spend are Local Procurement Spend (suppliers in Thailand)	
GRI 205: Anti-corruption				
205-1	Operations assessed for risks related to corruption	AR113		
205-2	Communication and training about anti-corruption policies and procedures	AR113		
205-3	Confirmed incidents of corruption and actions taken	AR114		
GRI 206: Anti-competitive Behavior				
206-1	Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	AR114		
GRI 300: Environmental				
GRI 301: Materials				
301-1	Materials used by weight or volume	SR86, SR121		
301-2	Recycled input materials used	SR121		
301-3	Reclaimed products and their packaging materials	-	Information of reclaimed products and packaging materials are collected by business unit for efficient production and quality improvement	
GRI 302: Energy				
302-1	Energy consumption within the organization	SR122-123		Yes
302-2	Energy consumption outside of the organization	-	Data were collected by SCG Logistics of it's Inbound/ Outbound but for internal use only	
302-3	Energy intensity	SR122-123, 142		

Standard	Disclosure	Location (AR, SR, others)	Disclosure/Comment	Assurance
302-4	Reduction of energy consumption	SR92-102, 122-123		
302-5	Reductions in energy requirements of products and services	SR41-42		
GRI 303: Water				
303-1	Water withdrawal by source	SR104, SR125-126	Rainwater is counted as part of surface water	Yes
303-2	Water sources significantly affected by withdrawal of water	SR103-105	No water sources significantly affected by withdrawal of water	
303-3	Water recycled and reused	SR104, SR126		Yes
GRI 304: Biodiversity				
304-1	Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	SR111		
304-2	Significant impacts of activities, products, and services on biodiversity	SR111-118		
304-3	Habitats protected or restored	SR114-118		
304-4	IUCN Red List species and national conservation list species with habitats in areas affected by operations	-	None	
GRI 305: Emissions				
305-1	Direct (Scope 1) GHG emissions	SR124		Yes
305-2	Energy indirect (Scope 2) GHG emissions	SR124		Yes
305-3	Other indirect (Scope 3) GHG emissions	-	Data were collected by SCG Logistics of it's Inbound/ Outbound but for internal use only	
305-4	GHG emissions intensity	SR124		
305-5	Reduction of GHG emissions	SR124		
305-6	Emissions of ozone-depleting substances (ODS)	-	Non-materaility	
305-7	Nitrogen oxides (NO _x), sulfur oxides (SO _x), and other significant air emissions	SR127		Yes
GRI 306: Effluents and Waste				
306-2	Waste by type and disposal method	SR86-87		Yes
306-3	Significant spills	SR127		
306-4	Transport of hazardous waste	-	Information of waste transportation are reported directly to the Minister of Industry comply with the Notification of Ministry of Industry on Industrial Waste Disposal 2005	

Standard	Disclosure	Location (AR, SR, others)	Disclosure/Comment	Assurance
GRI 307: Environmental Compliance				
307-1	Non-compliance with environmental laws and regulations	-	No significant non-compliance with environmental laws and regulations in 2018	
GRI 308: Supplier Environmental Assessment				
308-1	New suppliers that were screened using environmental criteria	SR67-68	Environmental, Social and Governance (ESG) risk assessment were conducted 100% of procurement spent, including new suppliers	
308-2	Negative environmental impacts in the supply chain and actions taken	SR67	Number and coverage of supplier identified as having high Potential Sustainability (including environmental) Risk	
GRI 400: Social				
GRI 401: Employment				
401-1	New employee hires and employee turnover	SR128		
401-2	Benefits provided to full-time employees that are not provided to temporary or part-time employees	-	Employment contract of temporary or part-time employees	
401-3	Parental leave	-	Under company rules and regulations	
GRI 402: Labor/Management Relations				
402-1	Minimum notice periods regarding operational changes	-	Under Labor Protection Act	
GRI 403: Occupational Health and Safety				
403-1	Workers representation in formal joint management-worker health and safety committees	-	Under Thai OH&S Law, at least 50% of workers at operational level must join Safety Committees	-
403-2	Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	SR127, SR128		Yes, excluding occupational diseases and absenteeism.
403-3	Workers with high incidence or high risk of diseases related to their occupation	AR127, SR127		
403-4	Health and safety topics covered in formal agreements with trade unions	-	Health and Safety topics, i.e. PPE and health surveillance, are covered in formal agreements with trade unions	
GRI 404: Training and Education				
404-1	Average hours of training per year per employee	AR90, SR35		
404-2	Programs for upgrading employee skills and transition assistance programs	AR79		
404-3	Percentage of employees receiving regular performance and career development reviews	SR35		

Standard	Disclosure	Location (AR, SR, others)	Disclosure/Comment	Assurance
GRI 405: Diversity and Equal Opportunity				
405-1	Diversity of governance bodies and employees	SR128		
405-2	Ratio of basic salary and remuneration of women to men	SR128		
GRI 406: Non-discrimination				
406-1	Incidents of discrimination and corrective actions taken		Incidents of violations involving rights of indigenous peoples	
GRI 407: Freedom of Association and Collective Bargaining				
407-1	Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	SR62-64	No case found	
GRI 408: Child Labor				
408-1	Operations and suppliers at significant risk for incidents of child labor	SR62-64	No case found	
GRI 409: Forced or Compulsory Labor				
409-1	Operations and suppliers at significant risk for incidents of forced or compulsory labor	SR62-64	No case found	
GRI 410: Security Practices				
410-1	Security personnel trained in human rights policies or procedures	-	100% of security personnel were trained by contracted company in accordance with SCG Supplier Code of Conduct	
GRI 411: Rights of Indigenous Peoples				
411-1	Incidents of violations involving rights of indigenous peoples	SR62-64	No incidents of violations involving rights of indigenous peoples were found in 2018	
GRI 412: Human Rights Assessment				
412-1	Operations that have been subject to human rights reviews or impact assessments	SR62-64, Human Rights policy		
412-2	Employee training on human rights policies or procedures	SR62-64, Human Rights policy		
412-3	Significant investment agreements and contracts that include human rights clauses or that underwent human rights screening	SR62-64, Human Rights policy		
GRI 413: Local Communities				
413-1	Operations with local community engagement, impact assessments, and development programs	SR22, SR72, SR84		
413-2	Operations with significant actual and potential negative impacts on local communities	SR22, SR72-84	No operations with significant actual or potential negative impacts on local communities in 2018	

Standard	Disclosure	Location (AR, SR, others)	Disclosure/Comment	Assurance
GRI 414: Supplier Social Assessment				
414-1	New suppliers that were screened using social criteria	SR67-68	Environmental, Social and Governance (ESG) risk assessment were conducted 100% of procurement spent, including new suppliers	
414-2	Negative social impacts in the supply chain and actions taken	SR67	Number and coverage of supplier identified as having high Potential Sustainability (including social) Risk	
GRI 415: Public Policy				
415-1	Political contributions	-	None, in accordance with SCG Code of Conduct	
GRI 416: Customer Health and Safety				
416-1	Assessment of the health and safety impacts of product and service categories	-	All products and services are assessed regarding health and safety impact by using the SCG Product Hazard Analysis guideline	
416-2	Incidents of non-compliance concerning the health and safety impacts of products and services	-	No significant fines and non-compliance with laws and regulations for health and safety impacts of products and services in 2018	
GRI 417: Marketing and Labeling				
417-1	Requirements for product and service information and labeling	SR39-46, SR67, SR86, SR121	https://www.scg.com/wp-content/uploads/SCG_eco_value_Guideline_EN.pdf https://www.scg.com/wp-content/uploads/List_of_SCG_eco_value_EN.pdf	
417-2	Incidents of non-compliance concerning product and service information and labeling	-	No significant fines and non-compliance with laws and regulations for product and service information in 2018	
417-3	Incidents of non-compliance concerning marketing communications	-	No significant fines and non-compliance with laws and regulations for marketing communications in 2018	
GRI 418: Customer Privacy				
418-1	Substantiated complaints concerning breaches of customer privacy and losses of customer data	AR133, SR12, SR49 SCG Code of Conduct (page 35)		
GRI 419: Socioeconomic Compliance				
419-1	Non-compliance with laws and regulations in the social and economic area	-	No significant non-compliance with laws and regulations in the social and economic area in 2018	



United Nations Global Compact (UNGC)

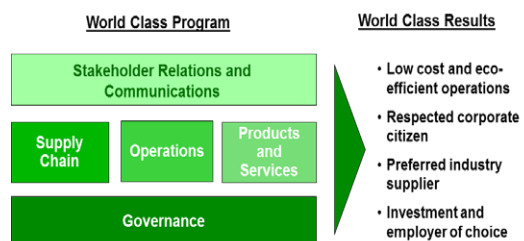
Communication on Progress - Advanced Level

Criteria of UNGC Advanced Level		Disclose	
		AR	SR
Implementing the Ten Principles into Strategies & Operations	Criterion 1: The COP describes mainstreaming into corporate functions and business units	1	3-5
	Criterion 2: The COP describes value chain implementation	3-4, 22-25	11-12, 39-46, 47-50, 65-71
Robust Human Rights Management Policies & Procedures	Criterion 3: The COP describes robust commitments, strategies or policies in the area of human rights	89	62
	Criterion 4: The COP describes effective management systems to integrate the human rights principles	85-86	62
	Criterion 5: The COP describes effective monitoring and evaluation mechanisms of human rights integration	-	63-64
Robust Labour Management Policies & Procedures	Criterion 6: The COP describes robust commitments, strategies or policies in the area of labour	-	11-12, 34-38, 51-61, 71
	Criterion 7: The COP describes effective management systems to integrate the labour principles		
	Criterion 8: The COP describes effective monitoring and evaluation mechanisms of labour principles integration		
Robust Environmental Management Policies & Procedures	Criterion 9: The COP describes robust commitments, strategies or policies in the area of environmental stewardship	4-5	5-6, 39-46, 85-118, 121-127
	Criterion 10: The COP describes effective management systems to integrate the environmental principles	22-25	
	Criterion 11: The COP describes effective monitoring and evaluation mechanisms for environmental stewardship		
Robust Anti-Corruption Management Policies & Procedures	Criterion 12: The COP describes robust commitments, strategies or policies in the area of anti-corruption	111-114	-
	Criterion 13: The COP describes effective management systems to integrate the anti-corruption principle		
	Criterion 14: The COP describes effective monitoring and evaluation mechanisms for the integration of anti-corruption		
Taking Action in Support of Broader UN Goals and Issues	Criterion 15: The COP describes core business contributions to UN goals and issues	-	16-18
	Criterion 16: The COP describes strategic social investments and philanthropy		22, 72-84
	Criterion 17: The COP describes advocacy and public policy engagement		5-10
	Criterion 18: The COP describes partnerships and collective action		88-90
Corporate Sustainability Governance and Leadership	Criterion 19: The COP describes CEO commitment and leadership	-	3-4
	Criterion 20: The COP describes Board adoption and oversight		7
	Criterion 21: The COP describes stakeholder engagement		11-15

Assurance Statements

Environmental Performance Assurance Statement, 2018

SCG started implementing the Environmental Performance Assessment Program (EPAP) since 2001. Up to 2018, 59 subsidiaries in total have participated, which totals to 212 assessments conducted. The participating subsidiaries are those required by SCG criteria considering the business type, and activities with potential environmental impacts. Since 2013, the assessment criteria reference sustainable development framework, with relevance to the environment. This enables benefits to the assessed subsidiaries, drives for environmental performance improvement and ensuring the alignment with SCG's sustainable development policy. Notably, the scope of assessment comprises of 5 main elements: Governance, Supply Chain, Operations, Products and Services, and Stakeholder Relation and Communication. Each participating subsidiary is assessed every 3 years.

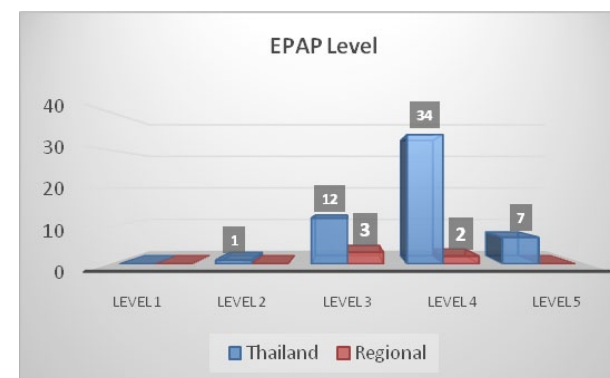
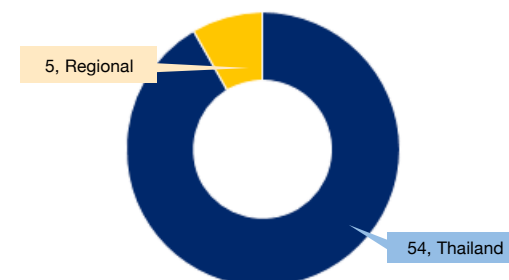


EPAP Level

- Level 1:** Denial
Level 2: Reactive
Level 3: Assurance
Level 4: Business Integration and
Level 5: Leadership

Assessment result from each company will be categorized into 5 levels, with considerations given to Management System, Compliance, Effectiveness, and Performance of the operations according to the assessment criteria.

Number of Subsidiaries in Thailand and Regional



Past assessment results demonstrate that, for the most parts, each subsidiary in SCG has continuous improvement in environmental management. Until presently, there are 59 companies eligible for the assessment, with 54 companies basing in Thailand, and 5 other companies internationally. Overall, 12% (7 companies) has their environmental performance at level 5, 61% (36 companies) at level 4, 25% (15 companies) at level 3, and 2% (1 company) at level 2.

2018 Assessment results covers 10 companies in total. The overall management in each aspect and issue, which received an emphasis from SCG, in order to ascertain achievement of sustainable business goals, are as follows.



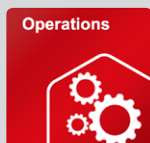
Governance

Top management of each subsidiary is involved in defining sustainability strategy, targets, and sustainable development plans, in establishing the organization and functions responsible for monitoring and reporting of environmental performance to achieve the defined targets. There are also risk assessment process, control measures, and mitigation measures, to ensure effectively management of key risks. Furthermore, the Company also gives priority to enhancement of knowledge, sustainable development capacity for companies basing outside Thailand. This is to ensure that the performance is consistent and alignment in the same direction throughout the entire Company. However, some subsidiaries should review non-technical risks, which may generate environmental impacts, such as changes in chemicals being used for air pollution treatment, and type and specification of products in production process, etc. Some subsidiaries should enhance their emergency preparedness and response plans to be more comprehensive, such as conducting drill in the case of gas leak from gasifier, and coal gas piping (international plant).



Supply Chain

There are risks management process and expansion of partnership opportunity with suppliers and contractors, in order to elevate environmental work of critical suppliers and contractors according to SCG's Greening the Supply Chain program. The program is implemented in subsidiaries operating internationally, by applying the mentioned process in the selection and contract management systematically. This is because the implementation may differ for each business and subsidiary. Therefore, some subsidiaries should integrate environmental issues in supplier and business partner management to increase the efficiency, such as the integration of selection criteria and contracts to be thorough and specific to environmental and social risks, as well as the development and establishment of performance evaluation of suppliers and contractors, to infer to effectiveness of environmental performance.



Operations

There is a process of environmental risk analysis, to establish a control measure of critical risks. Mostly, the operations are in compliance of the law, a minimum standard. In addition, some subsidiaries in regional areas enhance the improvement of working environmental conditions including installation of air emission controls in order to reduce environmental impacts and community concerns e.g. dust collector and desulfurizer for the tile operation plant in overseas. However, most subsidiaries need to review and enhance the program to reduce energy consumption and GHG emission. As well as, a few subsidiaries should review the program of soil and groundwater monitoring for alkaline solution to ensure the correct results are presented. Moreover, the effective environmental data verification should be extended to international companies.



Product and Service

Most subsidiaries implemented the new product research and development which is in lined with circular economy policy of SCG and also obtained the certifying of the product and the organization (CFP & CFO) for carbon footprint labels, Life Cycle Analysis (LCA) is conducted to evaluate key impacts arise, in order to assess impacts from the operation and from the subsidiary. Furthermore, subsidiaries have expanded the environmental label certification, SCG eco value, to international companies. However, some subsidiaries should clearly integrate environmental aspects in the new product development process and establish a guideline for the utilization of LCA's results, to facilitate the reduction of environmental impacts in the critical process or component of the products' life cycle, as well as creating business opportunities for these products, including data verification of impact assessment at an appropriate duration (such as every 3 years) by third party.



Stakeholder Relation and Communication

Stakeholder identification and prioritization are thoroughly conducted, including establishing approach for collaboration with external parties, as well as surveying critical stakeholders' opinions for improvement in the subsidiary's sustainability operation. However, some subsidiaries should expand the scope of stakeholder survey to contractors to enhance the level of engagement. Some subsidiaries should establish the regularly engagement program for employee and community survey e.g. at least once a year, including corporation with other organization to ensure the survey program is conducted by competent people and the reliable results are obtained.

Plerngtape Chamikorn
Country Manager
ERM-Siam Co., Ltd., 17 April 2019



ERM is a global provider of environmental, social and corporate responsibility consulting and assurance services. We have worked with over half of the world's 500 largest companies, in addition to numerous governments, international organizations and NGOs.



Independent limited assurance report

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To the Sustainable Development Committee of The Siam Cement Public Company Limited (“SCG”)

Conclusion

Based on the procedures performed, as described below, nothing has come to our attention that causes us to believe that the selected subject matters (“Subject Matters”) identified below and included in the Sustainability Report 2018 (the “Report”) for the year ended 31 December 2018, are not, in all material respects, prepared in compliance with the reporting criteria (the “Criteria”).

Our Responsibilities

We have been engaged by SCG and are responsible for providing a limited assurance conclusion in respect of the Subject Matters for the year ended 31 December 2018 to be included in the Report as identified below.

Our assurance engagement is conducted in accordance with the International Standard on Assurance Engagements ISAE 3000 Assurance Engagements other than Audits or Reviews of Historical Financial Information and ISAE 3410 Assurance on Greenhouse Gas Statements. These standards require the assurance team to possess the specific knowledge, skills and professional competencies needed to provide assurance on sustainability information, and that we plan and perform the engagement to obtain limited assurance on whether the Subject Matters are prepared, in all material respects, in compliance with the Criteria. We have complied with the requirements of the Code of Ethics for Professional Accountants issued by the International Ethics Standards Board for Accountants to ensure their independence. The firm applies International Standard on Quality Control 1 and accordingly maintains a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

We have not been engaged to provide an assurance conclusion on any other information disclosed within the Report.

Subject Matters

Subject Matters comprised of the following data expressed numerically or in descriptive text for the year ended 31 December 2018:

a) GRI Standards disclosure topics

- GRI 302-1 Energy consumption within the organization
- GRI 303-1 Water withdrawal by source
- GRI 303-3 Water recycled and reused
- GRI 305-1 Direct (Scope 1) GHG emissions
- GRI 305-2 Energy indirect (Scope 2) GHG emissions
- GRI 305-7 Nitrogen oxides (NO_x), sulfur oxides (SO_x), and other significant air emissions
- GRI 306-2 Waste by type and disposal method
- Types of injury, injury rate, lost day rate, and work-related fatalities, for all employees, with a breakdown by region and gender, where appropriate
- Types of injury, injury rate, lost day rate, and work-related fatalities, for all workers (excluding employees) whose work, or workplace, is controlled by the organization, with a breakdown by region and gender, where appropriate

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- b) WBCSD CSI Emissions Monitoring and Reporting key performance indicators
- o % of clinker produced by kilns covered by a monitoring system (dust, NO_x, Sulfur Dioxide (SO₂), VOC/THC, heavy metals, and PCDD/F) (KPI 1) (%)
 - o % of clinker produced by kilns covered by a continuous monitoring system (dust, NO_x, and SO₂) (KPI 2) (%)
 - o Dust emission (KPI 3) (tons)
 - o Specific dust emission (KPI 3) (g/ton clinker)
 - o NO_x emission (KPI 3) (tons)
 - o Specific NO_x emission (KPI 3) (g/ton clinker)
 - o SO₂ emission (KPI 3) (tons)
 - o Specific SO₂ emission (KPI 3) (g/ton clinker)
 - o % of clinker produced by kilns covered by a monitoring system (dust, NO_x, SO₂) (KPI 4) (%)

Criteria

The Subject Matters were assessed according to the following criteria:

- o The Sustainability Reporting Standards of the Global Reporting Initiative (“GRI Standards”): Comprehensive Option;
- o The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard issued by the World Business Council for Sustainable Development and World Resources Institute (“WBCSD/WRI-GHG”); and
- o The Cement Sustainability Initiative guidelines issued by the World Business Council for Sustainable Development (“WBCSD CSI”), including WBCSD CSI Guidelines for Emissions Monitoring and Reporting in the Cement Industry (updated March 2012, version 2.0).

Sustainable Development Committee's responsibilities

The Sustainable Development Committee of SCG is responsible for the preparation and presentation of the Subject Matters, specifically ensuring that in all material respects the Subject Matters are prepared and presented in accordance with the Criteria. This responsibility also includes the internal controls relevant to the preparation of the Report that is free from material misstatement whether due to fraud or error.

Procedures performed

In forming our limited assurance conclusion over the Subject Matters, our procedures consisted of making enquiries and applying analytical and other evidence gathering procedures including:

- o Interviews with senior management and relevant staff at corporate and operating sites;
- o Inquiries about the design and implementation of the systems and methods used to collect and process the information reported, including the aggregation of source data into the Subject Matters;

- o Inquiries about managements practices and procedures related to identifying stakeholders and their expectations, determining material sustainability matters and implementing sustainability policies and guidelines;
- o Visits to 4 sites, selected on the basis of risk analysis including the consideration of both quantitative and qualitative criteria;
- o Agreeing the Subject Matters to relevant underlying sources on a sample basis to determine whether all the relevant information has been included in the Subject Matters and prepared in accordance with the Criteria.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement and consequently the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed. Accordingly, we do not express a reasonable assurance opinion.

Inherent limitations

Due to the inherent limitations of any internal control structure, it is possible that errors or irregularities in the information presented in the Report may occur and not be detected. Our engagement is not designed to detect all weaknesses in the internal controls over the preparation and presentation of the Report, as the engagement has not been performed continuously throughout the period and the procedures performed were undertaken on a test basis.

Restriction of use of our report

Our report should not be regarded as suitable to be used or relied on by any party wishing to acquire rights against us other than SCG, for any purpose or in any other context. Any party other than SCG who obtains access to our report or a copy thereof and chooses to rely on our report (or any part thereof) will do so at its own risk. To the fullest extent permitted by law, we accept or assume no responsibility and deny any liability to any party other than SCG for our work, for this independent limited assurance report, or for the conclusions we have reached.



KPMG Phoomchai Audit Ltd.

Bangkok
17 May 2019



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