SUSTAINABILITY HIGHLIGHTS 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
Sustainable Development Strategy

- Cement-Building Materials Business
- Chemicals Business
- Packaging Business

Passion for Sustainable Living

- Leading by Innovation
- Improving Quality of Life
- Enhancing Society
- Wealthy of Our Planet
Materiality

• Innovation and Technology
• Customer Experience
• Safety
• Human Rights

Role Model of Passion

• Endless Circular Resources
• Water Conservation: From Mountain to the Mighty River
• Rehabilitating the Quarry, Rehabilitating Lives
• Transportation Safety Management System
• Sustainability Performance in 2018
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 three focus areas.

Sustainable Development Strategy
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.

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

• 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 National 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.

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
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.

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 percent 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, Chonburi, 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.

"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

- 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 properties.
- Improve production processes 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 rooftops to generate electricity for plant operation.
- Apply digital platforms or “Application Tools” for data connection between SCG and business partners to increase the value chain effectiveness.

“...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 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 bags 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.
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, eight key sustainability issues were addressed, as follows:
**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% 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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**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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**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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**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
**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
- **24.54** million tons of carbon dioxide for Scope 1 and Scope 2
- **7.4%** of greenhouse gas reduction compared with business as usual (BAU) at base year of 2007

**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

**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.

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**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

**Environment**

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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.
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.

- **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.

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

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

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

- **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.
CG believes that the business will grow sustainably while simultaneously developing 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 Chonburi, 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%.

- **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.

- **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.
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, recycle 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 plant was 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 animals of Thailand.
Endless Circular Resources

Thai people dispose at least one kilogram of waste a day per person. When the garbage from each house is combined with industrial waste, the entire land and ocean on this planet will be overwhelmed with waste in a few years. What if we create the world with waste? “Circular Economy” is the answer to this issue.

The key idea of circular economy is to create an endless value for waste materials. It aims to optimize the use of limited natural resources or waste from production process and to minimize the rest materials to landfill. This concept applies three strategies: 1. Reduce material use and Durability 2. Upgrade and Replace and 3. Reuse and Recycle.

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.

Management of Waste into Alternative Fuels and Alternative Raw Materials in Cement Plants

• SCG Eco Services Co., Ltd. focuses on providing industrial waste management service. This waste posts environmental impacts unless it is properly managed. The company therefore invented innovation that segregates various types of industrial waste and community waste and turns them into alternative raw material such as stones, soil and sand for cement plants, and alternative fuel which has the same quality to replace fuel oil or coal. The waste is then co-processed in cement kiln. This reduces the consumption of fossil fuel, which causes global warming, and reduces waste disposal to landfill to achieve the goal of zero waste to landfill.

• In 2018, the company turned industrial wastes of 313,000 tons a year into alternative raw materials and 131,000 tons a year into alternative fuels.

Generating Electricity from Waste Rejected of Paper Production Process

• Over 300 tons a day of waste rejected from the paper production of Siam Kraft Industry Co., Ltd. and Thai Cane Paper Plc. cannot be recycled as paper.

• SCG Paper Energy Co., Ltd., established as industrial waste processor, generates electricity with these wastes by applies advance European Technology, control the pollution under EIA regulation and manage its industrial wastes. Moreover, waste from this 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.

• From the source, used paper can be recycled while waste rejected from paper production is used to generate electricity. The waste from electricity generation is used in brick production or as a substitute material in cement production. Throughout the process, the waste is comprehensively utilized under the concept of circular economy.
Alternative Raw Materials from Power Plant

- Cement-Building Materials Business replaced clinker in cement production with Pulverized Fuel Ash (PFA) which produced in a large amount by coal-fired power plants annually, because PFA has the good properties and thus helps reduce GHG emissions, landfill area and soil contamination.

- The Siam Cement (Lampang) Co., Ltd. and Electricity Generation 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. Both jointly conducted study on adding value to and making use of other wastes from power plant such as sub-standard PFA and bottom ash.

- One of raw materials of fiber cement roof tiles produced by The Siam Fiber-Cement Co., Ltd. is rice husk ash (RHA), industrial waste from fuel combustion in biomass power plant, because it makes the tiles durable and long-lasting. The company tried to seek for substitute materials and discovered an interesting raw material, Pulverized Fuel Ash (PFA) from biomass power plant which is normally used as alternative raw material for cement plant.

- The Siam Fiber-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 joint research on replacing RHA with biomass fly ash and discovered that fly ash was a perfect raw material for fiber cement roof tiles. Biomass power plant monthly yields about 200-300 tons of fly ash, sufficient to serve the company’s need only 150 tons of fly ash. Furthermore, SCG Landscape Co., Ltd. uses the rest of 120 tons of fly ash to produce paving block.

Sediment as Raw Material of Ceramic

- Siam Sanitary Ware Industry Co., Ltd. studied the properties of sediment, waste material from the production of high quality ceramic sanitary ware, to find possibilities to use the sediment as a substitute material in other industries. It turned out 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.

Innovation of Asphalt - Plastic Road

- Single-use plastic is the waste that poses environmental impact, which is an issue in global attention. Recognizing how hard it is to recycle plastic, SCG and Dow Thailand Group jointly invented an innovation, which mixes plastic waste such as plastic bags, HD or PP bags, straws, coffee cups and plastic pouches with asphalt as another option to sustainable plastic waste management. Used plastic is separated, collected, shredding into small flakes and mixing the plastic during the asphalt blending process to pave the road. It can replace asphalt by 8%.

- The effectiveness testing of asphalt-plastic road compared with general asphalt roads revealed that the asphalt-plastic road is stronger, can support heavier weight, and increases road adherence at the same cost of production as asphalt.

- The first model of asphalt-plastic road is built in RIL Industrial Estate, Rayong province, with 220 meter length, three meter width and six centimeter thickness. Plastic bags from the communities in Map Ta Phut Municipality were used as a raw material. Under the concept of circular economy, this innovation adds value to used plastic, enhances road efficiency, and builds public awareness of plastic waste management.
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, under the “9101 in Father’s Footsteps Project” to restore agricultural career for flood-affected farmers. Siam Sanitary Ware Industry Co., Ltd. joining Land Development Department in Saraburi province, provided farmers with sludge and sediment, 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.

- In this project, farmers mix the factory’s soil with other soils in the community and bio-fermented extract before putting it into a pellet mill, sun drying the pellets, putting them in the sacks, and selling the fertilizer to the members who use it for parachute rice transplanting. This method not only requires less labor and fewer seeds, but also lowers the cost by 50%.

- As a result of recycling the waste as a substitute material, the plant reduces the disposal of sludge and sediment by 1,600 tons a year and the communities annually saves 111,000 baht a year cost of soil purchase from the previous source. The members also earned 120,000 baht a year from the fertilizer and rice sold in this project, including hiring fee from parachute rice transplanting.

Disinfectant from Lime Kiln Dust

- During the production of pulp bleaching chemicals at pulp mill of Phoenix Pulp & Paper Plc., lime particles captured at the electrostatic precipitator in Lime Kiln and are normally disposed. With strong intention to make the concept of circular economy possible, Corporate Technology Office joined hands with leading universities and Phoenix plant in conducting research to find possibilities to use lime kiln dust. The findings revealed that it could be developed into high-quality disinfectant for livestock farms.

- Disinfectant made from lime kiln dust effectively kills 99.9% germs that cause gastrointestinal disorder and respiratory tract disorder. Having light weight and small particle, it widely spreads across the area, using 20% smaller quantity than other lime disinfectants available in the market. Additionally, it is not corrode the metal, gentle to skin and can be easily rinsed off.

- This project shows a good example of value added to industrial waste, which can be used in another industry. The commercial implementation started at the end of 2018 and is expected to manage 6,000 tons of lime kiln dust in 2019, earn 13.8 million baht revenue, and save 20 million baht on industrial waste management in Phoenix plant.

Transforming of Paper Band

- Siam Kraft Industry Co., Ltd., Wangsala Complex, has waste materials, 2,000 kilograms of paper bands a year, from the production of packaging paper. Committed to bringing value to the society, the company, joining Ban Ta Takraw Basketry Community Group in Kanchanaburi province, holds “Weaving for the Community” project. The company provides paper bands, long length, water resistant and moisture-resistant, for the community, which uses their local wisdom to turns 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 their 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 one million baht and the project annually welcomes 300 more participants.

- Currently Packaging Business is expanding the project to many surrounding communities and increasing distribution channels to sell community products.
Paper Bags from Recycled Cartons

- 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 as high-quality, heavy-duty paper bags as a packaging option for customers.

- Packaging Business produces recycled paper with eco-friendly process that controls resource consumption and effectively manages waste. After being used, the paper is recycled in circular economy.

Used Paper for New Paper

- Instead of throwing used paper away, Used Paper for New Paper project by Packaging Business receives used paper from agencies, organizations and schools to be recycled 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.

“How-To-Throw” Bangsue Model

- For SCG to conduct business under the circular economy concept, the first step to recycle waste as other products is waste segregation, which is relevant to everyone. However, most Thai people do not understand this concept well. SCG therefore started from 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 six different colors that were easy to understand, and placed these bins in 180 locations of the Head Office. It promoted behavioral change of 8,000 employees in “How-To-Throw” communication campaign to ensure that they segregate waste in the correct bins.

Circulating Pallets

- SCG mainly transports products by wood pallets, which are easily damaged and broken after a few times of use and most of which are not returned. Concerned about wasting the wood resource, Chemicals Business collaborated with Sri Thai Superware Plc. in producing plastic pallets from high performance PP impact copolymer resins, which are lightweight, impact proof, heavy duty and long lasting.

- Furthermore, SCG follows the reuse principle by managing the circulation of plastic pallets among SCG, suppliers and customers. This reduces the duplicate use of pallets by all parties related, reuses pallets for many times, and lowers maintenance expense.

- Plastic drinking water bottle, plastic, paper, metal and glass are recycled. Food scrap is degraded into soil improvement material. Hazardous waste is appropriately treated and disposed. Non-recyclable waste such as dirty paper and plastic is 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 waste issues.
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.

**Upstream**

Check Dam: **84,266** units

**Midstream**

Monkey Cheek: **8** areas

16,750 rai of beneficial area and 9,011,661 cubic meters of water storage.

Interconnected Pond: **7** ponds

500 rai of land, and 30,400 cubic meters of water storage.
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.
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.

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 first 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
Lampang Quarry
Rehabilitation Learning Center

The Siam Cement (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 so 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. 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 little guides, who are grades 5-6 students from Ban Paen School, and who will navigate and narrate the exhibition to the visitors. The Little Guide project is a collaboration between The Siam Cement (Lampang) Co., Ltd. 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.

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.

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
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*

<table>
<thead>
<tr>
<th>Year</th>
<th>Case/million kilometers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>0.77</td>
</tr>
<tr>
<td>2015</td>
<td>0.44</td>
</tr>
<tr>
<td>2016</td>
<td>0.40</td>
</tr>
<tr>
<td>2017</td>
<td>0.26</td>
</tr>
<tr>
<td>2018</td>
<td>0.24</td>
</tr>
</tbody>
</table>

Transportation Spending*

- **Partnership**: 32%
- **Certified**: 31%
- **Approval**: 18%
- **Spot Hire**: 19%

*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.
## 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.

<table>
<thead>
<tr>
<th>Professional safety officer and Logistics Command Center</th>
<th>Before the Transportation</th>
<th>During the Transportation</th>
<th>After the Transportation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Set driver standards such as training, health examination</td>
<td>• Track risky driving behavior via GPS system installed in all vehicles</td>
<td>• Summary of risky behavior and corrections</td>
<td></td>
</tr>
<tr>
<td>• Set rules such as Life Saving Rules</td>
<td>• Randomly check risky driving behavior with cockpit camera information</td>
<td>• Safety Audit</td>
<td></td>
</tr>
<tr>
<td>• Set standards for transportation routes, rest areas, risk areas</td>
<td>• A random check during transport regarding alcohol, drug abuse, etc.</td>
<td>• Summary of the activities performed</td>
<td></td>
</tr>
<tr>
<td>• Set vehicle standards regarding vehicle equipment, products loading, etc.</td>
<td>• If an accident occurs, investigate and find ways to prevent recurrence</td>
<td>• Communicate/obtain suggestions from drivers</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transportation contractor/Operation team</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Assess the driver’s readiness (alcohol, drug abuse, etc.)</td>
<td>• Monitor risky driving behavior using web-based GPS system</td>
<td>• Evaluate the performance of the driver</td>
<td></td>
</tr>
<tr>
<td>• Check the working hours and rest before getting on with work</td>
<td>• Monitor any risky driving behavior with cockpit camera information</td>
<td>• Prepare a maintenance plan</td>
<td></td>
</tr>
<tr>
<td>• Inform the drivers about the route map, rest areas and risk areas</td>
<td></td>
<td>• Communicate/obtain suggestions from drivers</td>
<td></td>
</tr>
<tr>
<td>• Check the vehicle condition every month and according to the mileage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Screen the driver for drug abuse every 3 months</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Drivers</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Passed the safe defensive driving training from SCG Skills Development school</td>
<td>• Respect traffic rules, control the speed according to the regulations</td>
<td>• Follow the safety rules of the factory/end customer</td>
<td></td>
</tr>
<tr>
<td>• Check the vehicle condition daily before making a trip</td>
<td>• Strictly follow the transportation route plan and safety rules</td>
<td>• Wholeheartedly provide the services to customers</td>
<td></td>
</tr>
<tr>
<td>• Prepare emergency equipment in each vehicle</td>
<td>• If unsafe conditions are found, alert the supervisor or the delegated individuals.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Respond to emergencies according to the Emergency Response Guideline</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SCG Skills Development School

SCG established “SCG 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.

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 SCG Skills Development School before joining the transportation business with SCG.

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

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**Smart Heart**
- Have a service mind, pay attention and be emphatic toward customers, colleagues and the other drivers on the road
- Know how to approach customers, colleagues based on individual’s unique characteristics

**Smart Technology**
- Know how to use technology to support work
- Use technology as a tool for data collection and problem solving

**Smart Look & Act**
- Wear a clean uniform that exudes trustworthy personality
- Have skills to solve unexpected problems, control emotions
- Decide on the basis of the scope of work assigned
- Understand and strictly follow the regulations of the establishment where the product is delivered

**Smart Attitude & Image**
- Be proud of the profession and be proud of being a driver of SCG Logistics
- Recognize the responsibility in upholding the corporate image
- Have knowledge and solve basic problems of the vehicle
- Adhere to the rules and regulations of safety for self and others
## Sustainability Performance in 2018

<table>
<thead>
<tr>
<th>Category</th>
<th>Unit</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHG Emission Reduction</td>
<td>Million tons</td>
<td>1.95</td>
<td>7.4</td>
</tr>
<tr>
<td>(compared with BAU at the base year of 2007)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research and Innovation Spending</td>
<td>Million baht</td>
<td>4,674</td>
<td>1.0</td>
</tr>
<tr>
<td>“SCG eco value” Products and Services</td>
<td></td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Carbon Label Certified</td>
<td></td>
<td>466</td>
<td></td>
</tr>
<tr>
<td>Green Procurement Purchased</td>
<td>Million baht</td>
<td>9,698</td>
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<tr>
<td>Suppliers Being Conducted</td>
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<td>100</td>
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</tr>
<tr>
<td>Environmental Social and Governance (ESG) Risk Assessment</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Hazardous/Non-Hazardous Waste to Landfill</td>
<td></td>
<td>0.0/13.3</td>
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<tr>
<td>Energy Consumption Reduction</td>
<td>Petajoules</td>
<td>16.08</td>
<td>7.8</td>
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<tr>
<td>(compared with BAU at the base year of 2007)</td>
<td></td>
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<tr>
<td>Environmental Expense and Investment</td>
<td>Million baht</td>
<td>3,465</td>
<td>0.72</td>
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<tr>
<td>Recycled Water</td>
<td>Million cu.m.</td>
<td>9.3</td>
<td>10.03</td>
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<tr>
<td>Water Withdrawal Reduction</td>
<td></td>
<td></td>
<td>8.3</td>
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<td>Lost Time Injury</td>
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<tr>
<td>Frequency Rate</td>
<td></td>
<td>0.038</td>
<td>0.056</td>
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<tr>
<td>(cases per 200,000 man-hours)</td>
<td>Employee</td>
<td></td>
<td></td>
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<tr>
<td>Contractor</td>
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<td>Logistics Drivers Trained from “SCG Skills Development School”</td>
<td>Persons</td>
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<tr>
<td>Number of Check Dam</td>
<td>Units</td>
<td>84,266</td>
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<tr>
<td>Social Contribution</td>
<td>Million baht</td>
<td>748</td>
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<tr>
<td>Sharing Opportunities, Drawing the Future Program</td>
<td>Projects</td>
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<td>25</td>
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