COLLABORATION
FOR A SUSTAINABLE WORLD

ALL AROUND PLASTICS

Collaboration in Resource Management for a Sustainable World
EDITOR’S NOTE

The outbreak of COVID-19, which emerged early this year, has brought social activities in almost every country to a screeching halt and completely changed how we live, with Thai people having been in lockdown since March. This major crisis has brought about a spate of challenges, both for individuals whose way of life has been affected and for businesses. As it stands, it will take not only empathy but also the collaboration of all sectors to overcome this trial.

In this issue of All Around Plastics, we present the innovations that SCG has co-developed in order to enable medical professionals to combat the COVID-19 crisis safely and promptly. We also focus on environmental problems, which are global issues that can be reversed only with a clear understanding, unity, and the cooperation of all sectors. Featured in this issue are examples of environment management initiatives that you can learn from and apply to your situations, including the PPP Plastics Project – a national-level waste management partnership that seeks to develop a pilot circular economy model in Rayong; a collaborative project between SCG and BDMS that transforms used hemodialysis gallons into plant pots; and the recycle of school milk pouches into plastic chairs project to show students in a tangible way how resources can be kept in circulation.

This issue also includes an interview with Mayuree Paklamjeak, an advisor at the Plastics Institute of Thailand, who shared with us in-depth information about how plastic packaging is used and how it is actually eco-friendly. Let’s dive into these pages and explore how the principles of the circular economy can be applied to the plastic industry for a better world with us.
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ALL AROUND PLASTICS
SCG has always placed great emphasis on sustainable development in its business, and in recent years, the circular economy has emerged as a model that can help foster economic, social, and environmental sustainability. Therefore, this concept has been applied to SCG’s business operations and used as the basis for SCG Circular Way, which promotes resource maximization at every stage of a product’s life, from development, production and consumption to collection back to reuse as raw material, to create a closed-loop system. Today, SCG is working with all sectors to drive the principles of circular economy in communities, to develop tangible solutions to plastic waste problems, and to eventually scale up the initiative to the national level.
Forging a path towards sustainable and systematic plastic waste management on the national level requires the cooperation of government agencies, private businesses, and civil societies. PPP Plastics (Public Private Partnership for Plastic and Waste Management) was created to decrease at least 50% of marine plastic waste in Thailand by 2027. As a co-founder, Chemicals Business, SCG has contributed to the development of the 2018-2030 Roadmap for Plastic Waste Management by the Department of Pollution Control under the Ministry of Natural Resources and the Environment, which aims to reduce the consumption of single-use plastics and increase the reuse of plastic waste to 100% by 2027.

Introducing PPP Plastics and Rayong Model

These goals have ultimately led to the development of a master plan for plastic waste reduction through the circular economy, which consists of four major components, namely the development of integrated waste segregation infrastructure and systems; the promotion of recycling and upcycling businesses to add value to plastic waste; the involvement of the plastic industry, brand owners, and retailers in waste management, and the promotion of responsible consumer behavior and at-source waste sorting. To make the recovery of useful resources as advocated in the circular economy possible, all these components must be developed altogether.

1. Integrated waste collection & segregation infrastructure and systems development

2. Recycling & upcycling business development to create market demand and add value to plastic waste

3. Responsible plastic industry, brand owners and retailers to manage plastics waste at source

4. Responsible consumers behavior for at-source waste sorting

Reduce at least 50% of Thailand plastic marine debris by 2027

Source: Master plan of collaboration for effective plastic waste reduction through the circular economy by PPP Plastics
The master plan serves as guidance for all parties involved. PPP Plastics began with the development of Rayong Model – a provincial- and community-level circular economy model that has been applied to areas under 18 local administrative organizations and Rayong’s provincial administration organization since December 2018 and is set to be implemented across Rayong by 2022.

The major reason Rayong has been chosen to pilot this waste management model is because of its unmatched readiness. Not only does Rayong have a strong network of leaders and communities, but it is also a province in the Eastern Economic Corridor (EEC) that is equipped with the infrastructure for efficient waste management, such as integrated solid waste disposal centers, composting facilities, recycling facilities, with a waste-to-energy plant being constructed. In addition, its coastal location means that it has a high risk of releasing plastic waste into the ocean.

The primary focus of Rayong Model is raising awareness of the value of resources among local
people by educating them about different waste types in their daily life, which are organic, recyclable, general, and hazardous waste. They are also taught how to distinguish different types of plastics, which enables them to sort waste correctly, as well as how to prepare their waste for sale. Waste that has been cleaned, dried, and sorted correctly fetches a high price, and even higher if it is sorted further by plastic type, such as PE and PP, and by color. This model has enabled local communities to generate more income. For instance, Rayong Ban Eau Arthon Community (Wang Wa) has been able to expand its recyclable waste bank and earn over 10,000 THB per month. In addition, well-sorted waste helps maximize recycling efficiency and save waste disposal costs.
Consistent progress tracking, coupled with the cooperation from every party involved, the project started to bear fruit quickly. In 2019, the participating communities successfully collected about 300 tons of cleaned and sorted plastic bags and plastic packaging films for further recycling. In the second phase of Rayong Model, PPP Plastics and local administrative offices aim to expand the initiative to more locations and replicate this success elsewhere by developing models for schools, hotels, and department stores. Their targets are to eliminate all plastic waste from landfills in Rayong by 2022 and ensure that all refuse is disposed of properly across the province.
Other activities of PPP Plastics

In addition to Rayong Model, which demonstrates how circular economy principles can be applied to communities in other provinces, Bangkok Metropolitan Administration has collaborated with seven leading organizations in Khlong Toei District to launch a similar project in an urban context named “Khlong Toei Model.” This initiative seeks to study the amount and types of waste generated locally as well as the current waste management system in order to develop targeted models for specific groups, such as hotels, department stores, and offices, which they hope will be adopted and subsequently scaled up to other locations.

PPP Plastics has also been working with various sectors to launch other plastic waste management projects. An example is a collaboration with the Plastics Institute of Thailand and Chulalongkorn University to create a material flow analysis database to show data of production and consumption of plastic products as well as the management of plastic waste, recycling volume, and the amount of plastics leaked into the environment and the sea. In addition, PPP Plastics has been collaborating with members in its network to push for integrated plastic carrier bag and plastic film packaging management and advocate the use of plastic carrier bags that are thicker than 36 microns, which can be use multiple times before they are recycled. PPP Plastics is also working on a project named “Plastic Bag Circulation Drop Point” in collaboration with modern trade businesses, department stores, gas stations, and other locations to set up drop points for clean plastic carrier bags and plastic film packaging, so that they can be recycled and the “make-use-return” management cycle can be completed.
As the key to economic and environmental sustainability, the circular economy is a set of principles that everyone should be aware of, understand, as well as apply to their own work and daily life. As manufacturers, entrepreneurs and brand owners need to see how their products are utilized by end-users and how their products can be recycled or made use of at the end of their lifetime to achieve sustainability. This is a challenge that business owners can tackle through packaging design, material selection, and the use of innovation along with fostering public awareness of proper plastic use. On the other hand, consumers can do their part by sorting waste correctly and passing on that knowledge to people around them, which will help expand the practice and contribute to successful waste management on the national level.
PPP Plastics is a project that addresses circularity in a tangible way. SCG has joined the project as a co-founder, and I have the opportunity of working with the project right from the beginning. We have built a network of relevant government agencies, businesses, and other players in supply chains, from plastic resin producers, plastic processors, manufacturers, brand owners who use plastic packaging, to department stores and convenient stores. The network also includes other plastic-related organizations, such as the Plastic Industry Club under the Federation of Thai Industries, the Thai Plastic Industries Association, and the Plastics Institute of Thailand, as well as domestic and overseas civil societies. The goal of the network is to jointly develop prototype systems and projects for the government and business sectors adopt in order to reduce plastic marine debris in Thailand and maximize plastic waste reuse.

The main challenge of this project is to change the habit of people in society and encourage them to sort waste at source. To do this successfully, we will have to foster awareness of the importance of waste sorting among all stakeholders, including relevant government agencies and business sectors, waste management investors, the general public, and tourist as well as introduce regulations and put in place holistic management. In addition, we will also require financial support and leverage the expertise of our members to develop prototype systems and projects, so that they could be adopted nationwide.

I would like to encourage everyone to set a good example and start separating waste into at least four types, which are organic waste, recyclable waste (including cleaned plastic containers), general waste (including contaminated plastics), and hazardous waste, so as to facilitate reuse and recycling. By starting with yourself, you will inspire your family and expand the practice of waste sorting to your circles, ultimately improving society at large for our next generations.

Thanachai Piyasrithong
Program Manager Circular Economy
Chemicals Business, SCG
Since the onset of the COVID-19 outbreak in Thailand, Chemicals Business, SCG, has mobilized its teams to innovate products and services that would serve the needs of medical professionals on the frontline and maximize the efficiency of their operation. To this end, the Medical and Well-being team has leveraged its experience on medical equipment design and its expertise on materials science to develop mobile isolation units. During this process, the team worked closely with healthcare workers to better understand medical procedures and listen to the issues and limitations they were facing, so that they could design products and select materials to achieve appropriate properties. In the meantime, the team also joined forces with its partners to manufacture as many units as possible within a limited time frame.
“SCG strives to play a part in helping Thailand get through this COVID-19 crisis as quickly as possible. We are glad and proud that our expertise can be translated into products that keep our doctors and nurses in the frontline safe and enable them to treat patients efficiently,” said Dr. Suracha Udomsak, Vice President and CTO – Innovation and Technology of Chemicals Business, SCG, in his remark on SCG’s determination.

Describing the working process, Supathida Ratanaswasd, Medical and Well-being Business Manager, Chemicals Business, SCG, stated, “We applied the working process for the total service solutions that we had been providing in collaboration with our customers to the development of these innovations. The focus of this process was on working with the customer to identify unmet needs and transform them into products. We worked as one with the doctors to learn how they worked and what functionalities they were looking for, which we then used to inform our product design and development. The main challenge was having to work against time and deliver products in a very short period of time to help healthcare workers as promptly as possible.”

Mobile isolation units are specialized equipment that helps protect medical professionals from COVID-19 while they are working. SCG has developed five types of these innovations as follows.
The negative pressure isolation room is deployed in emergency wards, intensive care units, or patients rooms to enable doctors and nurses to treat patients without having to move them or their life support equipment. The innovation uses negative pressure to prevent germs from leaking out of the unit, and the air inside is pumped out through HEPA filters, which can screen out microscopic particulate matters, such as PM 2.5 and PM 1 as well as bacteria and viruses.

Each unit consists of a metal frame, tarpaulin sheets, and clear PVC sheets and features a two-door and two-way zippers, making it easier to enter or exit. The outer room controls pressure in the main room to prevent the transfer of pathogens and serves as an area where medical staff can change and dispose of infectious waste. The main isolation room comes with openings for inserting respiratory equipment, hooks for hanging essential devices, ports for connecting with equipment, cables, and life-saving medical devices on the outside, as well as glove ports through which doctors can carry out medical procedures from outside.

**Negative Pressure Isolation Room**

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Designed as a cylindrical booth for each individual patient, the negative/positive pressure isolation chamber allows for no-contact swab testing and is equipped with an air pressure regulator to prevent the dispersion of germs. It could be pressurized either positively or negatively according to applications. The pressure is set to negative when the chamber is used indoors and doctors are testing patients under investigation (PUIs) from outside the unit. On the other hand, it is set to positive when doctors operate from inside. This configuration is ideal for performing tests on a large number of out-patients and the unit should be installed in an open space with ample ventilation.

The front part features a clear plastic panel which doctors can see through and communicate with patients and glove ports that enable doctors to perform procedures both from inside and outside the chamber. Each unit is outfitted with a double-zipper pass box system where medical devices can be passed in and out without transmitting pathogens and is mounted with germ-capturing fillet filters. Assembled from an aluminum alloy frame covered with PVC tarps, it offers great mobility and allows for easy and quick installation.
Patient Isolation Capsule

Designed for the transfer of single patients, the isolation capsule features multiple openings around the unit to enable doctors and nurses to perform medical procedures on different locations on the patient’s body safely. Tested by medical experts, it also comes with an opening for IV stand and can be attached to a medical instrument cart.

The capsule can maintain negative air pressure for up to three hours of use. The air inside is pumped out through powered air-purifying respirators (PAPR) with HEPA filters, which screen out H1N1 and other viruses with 99.7% efficiency in accordance with NIOSH standards for P100 filtration. The system helps protect patient transfer staff and others safe from pathogens.

Small Patient Isolation Capsule for CT scan

Used for transferring a single patient for a CT scan, the small patient isolation capsule has been designed to have no metal frame on the top part and tested by medical experts. It features multiple openings around the unit. It can negatively pressurize the air for three hours of use by pumping the air out through powered air-purifying respirators (PAPR) with HEPA filters, capable of capturing H1N1 and other viruses with 99.7% efficiency in accordance with NIOSH standards for P100 filtration, protecting patient transfer staff and others safe from being exposed to pathogens.
Designed to reduce dentists’ exposure to aerosols and droplets during dental procedures and risks of virus transmission, the protective gear fits the standard dentist bed and can be adjusted to fit snugly with beds of different sizes. Featuring openings on the left and right sides as well as above the patient’s head, it allows dentists to carry out procedures with ease. The plastic film with exceptional clarity offers the greatest visibility, while the bottom part is lined with a soft material that diminishes discomfort on the patient’s shoulders caused by their body weight. Consisting of a coated metal frame covered with clear PVC sheets, the Dent Guard is sturdy, lightweight, and can be easily and quickly dismantled for disinfection.

SCG and its partners have delivered these innovations to hospitals to protect medical professionals and healthcare workers, enable them to work more safely and efficiently, and ultimately contribute to the collective effort to combat COVID-19 and help Thailand overcome this crisis speedily.

For information about the products, please contact medandwellness@scg.com.
Consumers across the world, especially younger generations, have grown increasingly eco-conscious, as reflected in a clear shift in their behavior when choosing products or services. In response, brand owners have to put more thoughts into where their products end up after use.

To this end, the principles of the circular economy have been adopted as guidelines for all parties along the supply chain, from manufacturers and brand owners to consumers as well as those involved in the management of post-consumer wastes.
In the plastic industry, packaging makes up the largest portion of plastic usage. Its high demand is thanks to its ability to preserve the quality and prolong the shelf-life of the product inside. Among the many types of plastic packaging is flexible packaging, which is usually made of a film consisting of layers of materials that give the packaging different properties and allow it to serve multiple purposes at the same time. For instance, a flexible packaging can, simultaneously, block oxygen and moisture from getting inside, provide enough strength to protect the product inside, resist to heat, and display sharp and clear prints.

Flexible packaging generally consists of multiple layers, whose functions can be classified into three major categories. For each of these, manufacturers choose materials that have suitable properties.
The outermost layer is for printing labels, logos, or other details that communicate a message to consumers and is generally made of films with high stiffness and low elongation, providing sharp and clear prints. The popular materials for this layer are PET, nylon, and BOPP (biaxially-oriented polypropylene).

The middle layers act as barriers against oxygen and moisture, which are major agents that damage or degrade products in powder form, such as coffee powder and non-dairy creamer, which can easily clump up when exposed to oxygen or moisture. Therefore, these layers need to be made from materials with low oxygen transmission rates (OTR) and water vapor transmission rates (WVTR), such as aluminum foil or metalized films, which are filmed coated with vaporized aluminum.

The innermost layer is called a sealant because its function is to create a perfect seal and prevent leakage. Moreover, it provides strength to the overall packaging, so it has to have good toughness. Some materials can seal through food particles or oil droplets that splash up the sides of the packaging while the product is being packed. Generally, the sealant layer is made of materials with low melting points, such as LLDPE (linear low-density polyethylene) and CPP (cast polypropylene), so that it can be sealed quickly at low heat, thus, increase the productivity.
As flexible packaging consists of inseparable layers of different materials with different properties and melting points, it does not lend itself to recycling; to achieve maximum efficiency, the material has to be homogeneous. When a flexible packaging is recycled as it is, the recycled plastic will be inferior in quality because the melting points of the materials of the three layers usually differ vastly. For instance, a packaging for snacks or coffee usually consists of layers of PET, aluminum, and CPP. When it is melted at a low temperature, the aluminum layer, which has a high melting point, will not melt, and will contaminate in the recycled material. In contrast, if the packaging is melted at a high temperature, the CPP layer, which has a low melting point, will be degraded, destroying its useful properties.

As the market is increasingly seeking to achieve the circular economy by recycling plastic packaging at maximum efficiency, packaging manufacturers are looking for substitute materials, and this is where mono-material packaging comes in.

The key characteristic of mono-material packaging is the use of films that are made entirely out of a single material, such as all PE or all PP in each layer. To achieve the properties of the existing packaging, the challenge for plastic resin manufacturers is to produce the better resin than the existing one with the help from technology and innovation or the use of additives to ensure that their products can replace the materials mentioned above.

Mono-material is an emerging trend in recyclable packaging, and plastic resin producers across the world are pouring their efforts into developing innovative solutions. In response, Chemicals Business, SCG is also developing PP-based and PE-based mono-material solutions to serve all major packaging applications.

As brand owners and manufacturers are reinventing themselves and playing an active role in realizing the circular economy, we, the consumers, will have to not only play our part as responsible consumers, but also change our behavior, starting with simple things such as fully utilize the resources, correctly sort the waste, and properly dispose them. With these simple changes, we can ensure that useful resources can be recovered and recycled whereas non-recyclable materials can be sorted out and handled properly.
Today, plastic is an important material in our daily life due to its various properties that are superior to other materials in terms of strength, toughness, transparency, flexibility and ability to be converted into wide range of applications and also safe for food contact.

In this issue of All Around Plastics, we caught up with Mayuree Paklamjeak, an Advisor of the Plastics Institute of Thailand and a packaging expert, to delve into the world of plastic packaging and learn more about this material through an environmental lens from its manufacturing to consumption by end-users.
Plastics from a usage perspective

Invented 113 years ago primarily as a substitute for natural materials, glass and metal, plastic has since grown in popularity. Thanks to advances in petrochemicals industry, various types of plastics have been developed for a wide range of applications such as packaging, houseware, office equipment, construction materials, automotive parts, electrical & electronic appliances, medical devices and agricultural equipment. The highest plastic consumption is packaging, especially food packaging due to various types of plastics with different properties available to serve food manufacturers’ requirements e.g. safe for food contact, high heat resistance for sterilization, low temperature resistance for frozen food, high water vapor and oxygen barrier for shelf life extension.

Another advantage of plastic is it can be converted into various packaging types e.g. bottles, boxes, cups, tubes, bags, and pouches. Additional features can be added, such as reclose-able zipper, flip cap for easily one-hand open, dispensing pump, etc. It is lightweight.
which can help reduce transportation logistic cost
and the material itself is cheaper than other materials.
Also plastic packaging can be printed nicely. Plastic
has become a perfect material from both marketing
and application perspectives, especially in the ever-
growing food industry.

Plastic from an environmental perspective

What many people are not aware of is that plastic
is an eco-friendly material as the manufacturing of
plastic packaging requires less energy and water,
and emits less carbon dioxide compared to that
of other types of packaging. However, plastic is
often villainized because of where it ends up after
it has been used, which could be attributed to
consumer behavior and a lack of efficient waste
management systems.

Consumers should understand that plastic
packaging plays an incredibly vital role. In a world
without plastic packaging, we would have to rely
on other materials, which would not only be a lot
less convenient to use but would also be heavier
and more expensive, which in turn would cause
a hike in product prices. According to the United
Nations’ report, 1.3 billion tons of food is wasted every
year across the world, and 30-40% of that amount
is due to the use of improper plastic packaging.
Therefore, UN has advocated the use of appropriate
plastic packaging to extend food shelf life, enabling
more food for food shortage population.


**Future trends in plastics**

It is the responsibility of both product manufacturers and consumers to use plastic packaging sustainably by adopting the 4Rs. The first R is **Reduce**, which means reduction of material consumption. This can be achieved by selecting plastic resins with enhanced strength so as to be able to reduce the thickness or the weight of the product, or designing the packaging to suit product dimension, not to be over-sized. The second R is **Reuse/Returnable**. This refers to reusing plastic packaging as many times as possible, switching to returnable such as plastic crates for agricultural products.

The third R is **Recycle**. When designing packaging, product manufacturers should choose recyclable materials. They should even look beyond one-time recycling, as advocated in the circular economy model. Post-consumer plastics are used as raw material for producing the same product or a different product or new & high value products through creative and innovative design, also known as upcycling. However, what’s vital for this R is that consumers must separate plastic waste correctly for collection and recycle processes.
The last R is **Renewable**, which refers to the use of plant-based materials or bioplastics, to reduce carbon dioxide emissions. However, right now they are not yet perfect substitutes for conventional plastics because of inferior water vapor and oxygen barrier. Additionally, its product cost is higher due to much higher cost of bioplastic resin and higher production waste caused by more difficulty in process control. Currently, bioplastic is used in food packaging that only require a few days shelf life such as fresh fruit and vegetable bags in Germany, and sushi rice ball wrappers and bread pouches sold in convenient stores in Japan.

**What brand owners are now seeking from the benefit of plastic packaging is to reduce environmental impacts** – an important global trend and higher consumer awareness. It is recommended that plastic resin producers, packaging converters and brand owners should work closely together to develop and design packaging to serve such trend by 4Rs concept without compromising packing and logistic efficiency, convenience of use and preservation ability. For instance, a newly developed grade of plastic resin only to achieve eco-friendly food packaging related to lighter weight and recyclable is not enough, it also shall keep product quality within the same required shelf life, which means this new resin has the enhanced properties of both better oxygen barrier and higher mechanical strength.
Mayuree concluded that plastic packaging is an indispensable part of modern life. Manufacturers in the entire supply chain must collaboratively work to design plastic packaging to provide same functionalities but has less environmental impact. Effective public communication on the benefits and value of plastics as well as promotion of proper waste separation practice are highly recommended. At the same time, the government should not only lend support to the private sector but also has to put in place efficient waste management systems. The success needs full collaboration and contribution among all of us to ensure the sustainability of the world’s resources.

**Differences between plastic packaging and single-use plastics for food**

**Plastic packaging for food** has basic function of quality protection and shelf life extension. Therefore, it shall be sealed or tightly closed as well as labeled to inform food type, net weight, expiration date, use instructions and manufacturer, etc., according to food labelling law. On the other hand, **single-use plastics for food** are mostly food containers and related products, such as cups, plates, bowls, straws, spoons, forks and plastic bags. They do not necessarily provide seal integrity because they are intended for convenience rather than shelf life extension. They are not required to label. For these reasons, many countries, including Thailand, have launched campaigns to reduce or ban the use of single-use plastics to reduce plastic waste and promote appropriate waste sorting for recycle.
The secret to a successful circular economy is collaboration – a joint effort where organizations brainstorm, exchange knowledge and expertise, and develop innovation together to addresses problems.

That precisely captures the relationship between Chemicals Business, SCG and Bangkok Dusit Medical Services (BDMS), Thailand’s leading healthcare network, who have joined hands to develop better medical equipment for patients and healthcare professionals. Bringing to the table years of experience of design and selecting the right polymers for various projects, SCG has struck up a partnership with BDMS to recycle and transform plastic containers for medical use like hemodialysis gallons into decorative items like plant pots, using the principles of the circular economy.

FROM HEMODIALYSIS GALLONS TO RECYCLED PLANT POTS: A COLLABORATION BETWEEN SCG AND BDMS
Eyes on the same goal

In striving towards their sustainable development goals, both organizations have attached great significance to the principles of the circular economy; while SCG has ‘SCG Circular Way’, BDMS has introduced ‘BDMS Earth Healthcare Policy.’ United in their core belief, both bring together their expertise to achieve the same goal, which is to operate an eco-friendly business and elevate the quality of life sustainably.

Making a remark on his organization’s environmental policy, Sermsak Khampitoon, Customer Experience Management Director, Bangkok Hospital, said that BDMS strives to continuously enhance the quality of life in communities and society and has thus introduced BDMS Earth Healthcare Policy, which consists of four core components: building an eco-mindset, designing a better environment, moving towards a green business and sustaining social engagement.
Therefore, all BDMS personnel have to play their part in fostering positive reinforcement. Bangkok Hospital Headquarters has launched a project named “Be Green” to educate employees on 3Rs; Reduce, Reuse, and Recycle and to ensure a uniform understanding. Once they apply 3Rs, they will be able to reduce and sort waste appropriately, which ultimately extends its useful life.

Thanks to BDMS’ clear policy, SCG, as a polymer specialist, has been invited to join as a partner. Discussing the overall picture of the project, Supathida Ratanaswasd, Medical and Well-being Business Manager, Chemicals Business, SCG, said, “We have joined forces with BDMS, a partner who understands our working processes thoroughly, which is the key to this project. They understood very well, the importance of proper waste sorting and collecting and cooperated with us in providing materials for this project. This excellent management made it possible for us to develop new products. It can be said that we are on the same wavelength, which is why our collaboration has been a success.”
The project consisted of two main components: waste management and product design. It started with the analysis of all waste types generated in the hospital and the selection of non-infectious waste that lent itself to recycling. In this process, hemodialysis gallons were marked out as interesting candidates, not only because they were clean, non-infectious and good quality waste but also because they were made of HDPE – a material that SCG is an expert on. BDMS operates a hemodialysis center, and waste such as gallons are generated every day in large quantities, making it ideal for this project.

Once the material had been selected, the next vital step was to request the cooperation of BDMS staff to obtain these gallons in the best condition. To this end, BDMS begins the projects internally by educating staff in preparing waste to meet the right condition, making sure they were free of contamination. The staff were instructed to record the daily number of the gallons collected (the hemodialysis center generated 150-200 gallons per day), and then remove the caps, foil caps, and labels that were made of other materials. Each gallon was then cleaned thoroughly inside and outside with detergents to remove any adhesive residue, rinsed with water, dried and put away in a clean and dry storage room, waiting to be delivered to SCG.
An important part of the project was product design. Both organizations came together to brainstorm for ideas of products that not only were functional and practical, but had to be aesthetically pleasing as well. The goal was to turn waste into something remarkable through the upcycling of waste, adding value to waste that would have otherwise been thrown away. The whole process of design and development of the product was done under the best of standards, ensuring the measures were taken to create the best product possible. The law dictated that food contact products could not be made with recycled materials. As the hospital was looking to add more green spaces inside its new building, they decided to develop 80-100 cm. tall plant pots. As they could be placed at customer touchpoints, these plant pots could demonstrate in a concrete way that materials that were perceived as waste could be made useful again.

“One of the challenges was to create awareness among consumers that these products, which are made from recycled plastics, were not inferior to those made from virgin resins in terms of quality and aesthetics. Therefore, we developed a new formulation that were composed of recycled plastic and carefully controlled the molding process, so that the final product dovetailed with the image of BDMS as a premium healthcare provider,” said Supathida.

Through the sharing of experience and expertise in this collaborative effort, the two organizations have been able to identify not only what resources were available, but also what they can be effectively transformed into.
The next step of the project

Following the successful development of the recycle plant pot from hemodialysis gallons, which helps increase green spaces and add liveliness to the hospital, the next product that is being invented is a smaller plant pot for Devil’s Ivy, which is known to help reduce pollution inside buildings. The plant pot has been developed to have a unique design and special functions that offer convenience. Also under development are garbage bins where the designs help users sort waste correctly and more easily.

“The recycled plastic plant pot might be a small development that marks the first phase of our project, but we are trying to show that there are platforms through which we can effectively foster public awareness of waste separation,” stated Sermsak. “We are fortunate to have embarked on this project with SCG, who is a leader when turning circular economy into practice. Right from the start, we have worked closely on every parts of the process together and systematically tracked the progress. This is what we have learned from SCG and was a key to the success of the project.”

Supathida believed that the cooperation of everyone was indispensable to practice circular economy, “We are generating endless amounts of waste. The challenge is how to identify its value. This is not a one-man show; it will take the cooperation and expertise of organizations with the same goal of tackling this environmental problem. It all begins with each of us doing our part.”

Sermsak asserted, “We are not alone in our effort to apply the principles of the circular economy to our organization because we have a partner who is a leader in innovation, with the same mindset, allowing us to exchange knowledge and contribute to a better environment. As an employee of BDMS, I believe that every change starts with a change of mindset, the use of reasons, and information, all of which will trigger behavioral change. BDMS is ready to create an environment conducive to the fostering of eco-consciousness to lead the organization towards a sustainable change in accordance with its “Growth, Balance, and Sustainability” concept.”
Consumers nowadays are increasingly eco-conscious when selecting products and services; they not only look for products made with eco-friendly materials but also pay attention to the production as well as post-consumer waste management. Therefore, business owners need to study and be more aware of their environmental impacts, and this is where the circular economy can offer another path towards business sustainability.
The Thai Industrial Standards Institute (TISI) has introduced a standard for the circular economy entitled the Thai Conformity Assessment Standard No. 2-2562: the Framework for Implementing the Principles of the Circular Economy in Organizations – Guide, in accordance with the policy of the Ministry of Industry and the government on the implementation of the BCG Economy Model for the sustainable and exponential economic growth of Thailand. The BCG Economy Model brings together a bio economy (B), which makes further use of agricultural resources through the application of knowledge, technology, and innovation, and a circular economy (C), which places emphasis on efficient resource circulation, under a green economy, which seeks to create less pollution and reduce environmental impacts sustainably.
Every organization can adopt the circular economy standard as guidance for their resources management. The implementation of such a concrete framework will not only create more business opportunities and enhance their competitiveness sustainably, but will also foster confidence among consumers. The circular economy is based on the six following principles.

**Systems Thinking**

Understanding the impact of various activities of an organization on the wider system and seeing the interconnectedness of all systems relevant to the business will enable it to make decisions and cope with changes effectively as well as anticipate long-term consequences.

**Innovation**

Innovation is about looking forward in order to discover new possibilities that can enhance value and efficiency. Innovation can be incorporated in every step, from production design to research and development, working processes and business models that involve suppliers and consumers. However, it should be based on sustainable resource consumption.
## Stewardship

This principle refers to the responsibility towards direct and indirect impacts, both at present and in the future, of decisions and actions taken throughout the process. Since each organization is well aware that every action has environmental, economic, and social impacts, it should choose the optimal solution or create new approaches that bring the maximum benefit to all.

## Collaboration

Every collaboration, whether intraorganizational or interorganizational, creates synergy, adds business value, reduces competition, and decreases segmentation. It also enables organizations to develop new competencies, foster trust and communication, and establish a path towards mutually set goals.

## Value Optimization

This principle involves maintaining products, components, and raw materials at their highest utility and value, such as by making use of what is commonly viewed as waste, enhancing production processes, choosing raw materials that extend the useful life of a product, and taking advantage of underutilized spaces or equipment for the benefit of another internal unit or an external organization.

## Transparency

The full, accurate, and timely disclosure of concepts, decisions, processes, as well as sources of materials, equipment, and chemical ingredients is beneficial for an organization seeking to meet circular economy standards. This does not include disclosing to the public proprietary information or information where privacy obligations are concerned.
The six principles above must be applied in accordance with the circumstances of each organization as each locality and business model involves unique limitations and contributing factors. In fact, even within an organization, these principles may be adopted at different levels across different divisions or different product or service groups. There are six major ways in which the standard for the circular economy can be applied to modern businesses.

**Made to Order**

Thanks to technological advances, which have made instant communication possible, it is now much easier to develop products that cater directly to customer needs. It is also possible to accurately calculate the amount of materials and resources required in advance, which reduces excess capacity, saves inventory spaces, and allows for greater personalization.

**Digital Services**

Businesses can transform tangible products into online services. The best example is a shift from VHS tapes, cassettes, CDs, and DVDs to online streaming services, which save resources and successfully maintain the value that customers seek.

**Product-life Extension**

This can be achieved by designing products to be long-lasting, to be adaptable for multiple functions, or to be modular so their parts can be replaced.

An example is the innovative SCG™ HDPE H112PC, which is used in PE112 industrial pipes. This plastic resin gives PE112 pipes 50% higher resistance to corrosion and 10% higher resistance to water pressure compared to PE100 pipes while using the same amount of resin to produce, resulting in an extended product life and reducing resource consumption.

**Resource recovery and Recycling**

This approach involves the reuse or recycling of used materials or by-products. A case in point is the technological collaboration between SCG and Dow Chemical in which plastic bags were shredded and mixed with asphalt for the construction of a recycled plastic road, which has enhanced durability and resistance to water erosion. In addition, manufacturers should start promoting product returning so that to ensure efficient recycling.
**Product as a Service**

Businesses can rent out products for a set period of time or for the number of uses agreed upon. This model not only helps reduce expenses for consumers and increase the chance of each product being used multiple times but can also extend the useful life of products thanks to proper maintenance by service providers. Examples of the product-as-a-service approach are machinery and car rental services, which simultaneously address specific needs and reduce unnecessary resource consumption.

**Sharing Economy**

This approach involves the creation of platforms for sharing underutilized resources or products so that other consumers can access them without having to buy them and rent them as much or as little as they need. Examples include a platform that allows neighbors to share tools, an accommodation sharing platform like AirBnB, and a bicycle sharing platform in London where good management enables the resources to share in a way that satisfies all members.

The information above is only part of the practices involved in complying with the Framework for Implementing the Principles of the Circular Economy in Organizations, and All Around Plastics is present it here with the goal of helping business owners see possibilities of applying them to their products and services and using them to inform the future direction of their organizations.

Chemicals Business, SCG, is ready to collaborate with suppliers and partners to realize a circular economy and ultimately contribute to the economic, social, and environmental sustainability of both Thailand and the world.
All Around Plastics has previously introduced the Waste-free Community Project, which seeks to cultivate the habit of using all resources to the greatest advantage, sorting waste to facilitate recycling, and converting scrap materials into something useful, which is a hallmark of the circular economy, as well as solve waste problems sustainably through the collaboration of all units of each community, from houses to temples, schools, waste banks, and municipalities. In this issue, we will take a look at the activities that Wat Khod Hin Mitraphap 42 School in Rayong provides to its students to help shape them into quality members of the community.

RECYCLED PLASTIC CHAIRS FROM MILK POUCHES: PROMOTING RESOURCE EFFICIENCY AMONG THAI YOUTHS
Launched by Chemicals Business, SCG in 2019, the Waste-free Community Project began with a survey of the types of waste generated in each locality and how it should be managed to bring the greatest benefit. It was found that a significant portion of school waste came from milk pouches as students drank milk daily, and because these packages are made of LLDPE, they could be recycled and further create value.

SCG has joined forces with the school to teach the students to identify different materials around them, especially the various types of plastics, as well as encourage them to make the most of all resources and sort waste as habits so as to ensure that the waste can be processed to the greatest advantage.

To enable the children to convert waste around them into something valuable, the school has created a learning station entitled Saving the World with Milk Pouches. When students finish their milk, they rinse and cut up the empty pouches and hang them up to dry at this learning station. Once dried, they are then sold to waste banks and recyclers.
In addition, the school has also set up the “Innovative Vegetable Garden,” where the wastewater from rinsing milk pouches is used to grow vegetables that become their lunch. Overweight students are recruited to operate stationary bikes that pump the water into sprinklers, allowing them to exercise while also taking care of the garden and showing them what a closed-loop resource recycling system looks like.

Recently, SCG has created a product prototype that makes use of these milk pouches: a recycled rotomolded plastic chair made from LLDPE milk pouches. Rotomolding has been chosen as it is an ideal manufacturing process for a product that has thick walls and an irregular shape. To produce this chair, milk pouches are shredded into 3-5 mm. particles, which are then melted with other plastic resins and reformulated into a recycled plastic resin. The derived resin is then grounded into powder and placed inside the mold, which is heated to the appropriate temperature and rotated by the machine. Emerging from this process is a beautiful and sturdy plastic chair. Currently, each chair takes about 600 cleaned and dried milk pouches to make, but the team is still working on a new formula that will use more pouches and finding ways to make use of other types of plastic waste.
The plastic chair represents a tangible benefit of recycling; once properly managed, milk pouches, which used to pile up and produce a stench while waiting to be taken to a waste disposal facility, can be transformed into a functional product. All in all, apart from demonstrating how an efficient waste sorting process can help recover useful resources, the project also serves as an example for other schools as well as encourages them to start waste management initiatives and promote resource efficiency as advocated by the circular economy among Thais from a young age, which will in turn contribute to a more sustainable future for the country.

“Everything has intrinsic value. We only need to know how to make the most of it, sort waste, and dispose of it correctly. The recycled plastic chair is made possible because the students sort waste at source. To use their milk pouches to the greatest advantage, SCG has transformed them into beautiful and sturdy chairs for the students to use. These chairs not only show them that plastic waste can be put to good use again but also help reduce the amount of waste leaking into the environment.”

Salin Panichsarn
Managing Director, SCG ICO Polymers Co., Ltd.

“This is a new frontier of waste management education. Students used to donate the bottle caps they collected to prosthetic leg producers or collect bottles to give away for charity. However, Chemicals Business, SCG has successfully transformed the milk pouches that they have cleaned and dried into “recycled plastic chairs” that both the students and their parents can use. This shows everyone that even waste such as milk pouches that they consider useless can be turned into chairs. We have been asked if this also works with plastic scrap, and our answer is that it does. It certainly does.”

Busaba Thanaporn
Director of Wat Khod Hin Mitraphap 42 School

Chemicals Business, SCG specializes in rotomolding and offers a comprehensive range of services, from product design based on requirements and applications, and mold design for specific types of plastic resin to formula development and adjustment as well as consultation with technicians. For more information, please contact us at rotomolding@scg.com.
Clean energy, also known as renewable energy, is energy that can be generated without creating pollution and is thus not only eco-friendly but also an excellent way to add value to existing resources and use them to the greatest advantage. One way to harness clean energy is to use photovoltaic cells to convert sunlight into electricity. In Thailand, solar cells, whether they are mounted on the ground, on rooftops, or water surfaces, have been gaining more traction, and thus Chemicals Business, SCG, has developed Thailand’s first floating solar solution, first deployed in 2018 in a water reservoir on the property of SCG’s plant.
Pisan Uawithya, Emerging Businesses Director of Chemicals Business, SCG, told us about the inception and development of the floating solar solution. “SCG recognized the various benefits of renewable energy. For instance, it can be used to produce power for self-consumption and also reduces carbon dioxide emissions. At the same time, SCG also saw that many water surfaces were underutilized and thus untapped resources. Therefore, bringing to the table its expertise on plastic materials and design, SCG decided to embark on a project with its business partners, and through that collaboration, ultimately developed an integrated floating solar solution – SCG’s proprietary innovative design that has been granted a patent.”

**Special properties from unique materials and design**

The setup of a floating solar farm is essentially the installation of plastic pontoons on the water surface to serve as bases for solar panel assets to be mounted on. Therefore, pontoons need to be durable, buoyant, and eco-friendly. SCG has successfully achieved all these qualities through the meticulously conceived design of the pontoon as well as the choice of material, which is a specially developed HDPE resin that gives the floating structure durability for outdoor use, resistance to UV rays, and a life span of over 25 years. In addition, the pontoon is recyclable and made of food-grade materials, making it safe for reservoir ecology.
The overall floating pontoon system has also been designed to have over 30% opening area, allowing enough sunlight for marine life underneath. At the same time, the structure serves as a cover that reduces evaporation, while the cooling effect of the water increases the power generation efficiency of the solar farm.

The pontoon system consists of two main components. The first component is the solar stand, which solar panels are attached to. This structure has been designed to be compatible with various types of solar panels and able to support the weight of heavier new-generation solar panels. In addition, the angle of the solar stand can be adjusted to maximize exposure to the sun. The second component is the walkway. Designed with the safety of engineers and maintenance personnel who have to walk on the structure to inspect and clean solar panels in mind, the floating walkway has higher buoyancy than regular models on the market and can bear up to 200 kilograms per square meter, allowing users to stand and walk with stability and, more importantly, prevent pontoons from sinking or wobbling, which can put people above them in danger.

Furthermore, the team has developed special mooring and anchoring systems with enhanced durability and high tensile strength. Whether it's the mooring or anchoring option, each system is customized to suit the terrain of each waterbody specifically to ensure that the pontoon system can weather the elements and withstand waves effectively.

Another key feature of the latest model of SCG Floating Solar Solutions is that it is not only designed to be easy to put together to save installation time but can also be assembled in different configurations, such as one row, two rows, or four rows of solar panels per one walkway, known as one-in-a-row, two-in-a-row, and four-in-a-row configurations respectively. These configurations can be chosen as users desire. The more rows of solar panels per walkway will save more space.
SCG Floating Solar Solutions offer a comprehensive range of services, from consultation on feasibility, customizing the design to suit the waterbody, engineering design, procurement and installation, to mooring and anchoring that ensures high safety as well as management and maintenance services while the floating solar farm is in operation. The payback period is about 5-8 years, depending on the size of the floating solar farm and power consumption.

For more information, please contact solarenergy@scg.com.

Floating solar farms: Sustainability for business and the environment

Pisan gave a suggestion on choosing a floating solar farm as a source of energy. “If you have water reservoirs such as ponds in factories or other large bodies of water, such as lakes or hydroelectric dams, you can add value to them by installing a floating solar farm to generate power for use in your factory or building, which contributes to the sustainability of your business and promotes the use of natural resources to the greatest advantage.”

The total capacity of the floating solar farms installed and serviced by SCG Floating Solar Solutions is 14.6 MW as of March 2020.

2018
- Chemicals Business, Rayong
- Sattahip Naval Base, Chonburi
- SERIS, Singapore
- SCG Headquarters, Bangkok
- Wat Sri Sang Tam, Ubon Ratchathani

2019
- TCP2 Project, Prachin Buri
- SSI Project, Saraburi
- SENA Project, Ayutthaya
- Mae Tan Mine, Lampang

2020
- STS Project, Nakhon Si Thammarat
- STL Project, Saraburi
- Mukdahan
- Amata City Industrial Estate, Chonburi
The Sampran Model is a social enterprise that seeks to empower organic farmers in Sampran, Nakhon Prathom. During its first phase, the project delivered fresh produce to Bangkokians for several years through Patom Organic Living, a café in a greenhouse in the heart of Sukhumvit. Today, Sampran farmers are ready to welcome visitors and show them how sustainable farming is done at Patom Organic Farm in Sampran.
From Suan Sampran to an organic farm for all

Patom Organic Farm is a section in Suan Sampran, a destination that has become a household name. Determined to create a business model that is rooted in fairness and serves as a connector between producers and consumers, the third-generation owner has included an organic farming learning center as well as a café in this farm to create a way of life that is in harmony with nature.

Patom Organic Farm not only expresses its care for consumer health through its fresh organic products but also shows its love to the world by injecting the principle of circular economy into every process in all restaurants in the area, namely Inn Chan, a Thai restaurant that has been with Suan Sampran for over 50 years and Rim Nam, serving a variety of Thai and International dishes with Tapas style. Also standing in the area of the farm is Patom Organic Café – the second branch of cozy organic café from the first location in Thonglor, which brings a modern lifestyle to the setting.
Patom Organic Cafe

The only café in Suan Sampran, Patom Organic Café embodies the concept of sustainable architecture just like its first location but is set in a larger greenhouse that offers a 360-degree view of the lush greenery outside and at the same time adds an eye-catching element to the farm. Its commitment to circularity is also very much tangible as the furniture here is made primarily of wood from fallen trees in the farm – a great way to make the most of natural resources and create added value.
Its dedication to circularity permeates into the kitchen and back-office management, where every part of fresh produce is used to the greatest advantage. In addition, their primary ingredients, which meets the IFOAM-EU-Canada organic farming standard, are sourced directly from Patom organic farm and 16 groups; 180 families of farmers in Sampran Model, which not only guarantees the freshness and safety of the organic produce but also reduces the fuel otherwise required for transportation.

Furthermore, the café is phasing out single-use plastic bottles and straws in favor of those made with reusable materials. Leftovers and food scraps from the restaurants and the café are also composted, while used cooking oil is processed into biodiesel for use in the farm, creating a closed-loop system.

Patom Organic Farm is an example of how good resource management can create material cycles that maximize resource efficiency. This model would not have been successful without the understanding of everyone involved in the cycle. This organic farm demonstrates that to successfully realize a circular economy, a business model has to be guided by knowledge that enables it to achieve sustainable growth.

Patom Organic Farm

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www.facebook.com/patom.organics/
Chemicals Business, SCG hosted SCG Chemicals Digest 1/2020, entitled “Shifting Strategies to Keep up with the Digital Era,” to broaden the horizons for plastic business owners and highlight opportunities for adopting digital technology to make proactive strategy shifts and enhance operational and competitive efficiency in an age of rapid and high-impact disruption. The keynote speaker for the seminar was Orapong Thien-ngern, Chief Executive Officer of Digital Ventures Co., Ltd. and a digital finance and banking expert.

Orapong Thien-ngern defined disruption as any change that renders the current state of affair no longer tenable. Brought on by a rapid and continuous technological shift, digital disruption is now taking place in virtually every industry across the globe, and in order to survive, a business must change its way of thinking and start reinventing itself as a tech company. That is, a business should be led by technology and supported by its products or services rather than the other way around.
Technologies to keep an eye on in 2020 are 1) distributed ledgers, which give control over a database to data owners rather than to service providers as in the present; 2) tokenization or a process of turning objects into digital tokens that represent their value in the digital world; 3) 5G, which has been introduced to Thailand this year and sensor technology; and 4) artificial intelligence or AI.

Orapong Thien-ngern concluded that companies should prepare themselves for new business models and new players who will be competing with technology. In addition, they should increase automation to reduce reliance on human labor, equip their human resources with new skills, and learn about the needs of younger generations who will become their customers as well as concepts that they deem important, such as eco-consciousness.

The seminar also featured a session entitled “Trends in the Thai Economy and the Global Economy in the Second Half of 2020,” hosted by Narongvate Vajanapanich, B2B Business Director of SCG Cement-Building Materials Co., Ltd. and joined by Dr. Thanawat Polvichai, President of the University of the Thai Chamber of Commerce, and Dr. Amonthep Chawla, Executive Vice President and Head of Research Office at the CIMB Thai Bank. The event was concluded with a session on “Trends in Petrochemical Business in the Second Half of 2020,” led by Kittipong San-Olan, Demand Management Manager, Chemicals Business, SCG.
รูปถ่ายไม่ทิ้งลงแหล่งน้ำ
Never Let Trash Get into the Ocean
ไม่ทิ้งขยะลงทะเล คัดแยกขยะ
เป็นแก่นนำผู้ช่วยรักษาความสะอาด
ป่าไม้ ชายหาดลำคลอง ฯลฯ

หุ้นใหม่ได้ด้วยเทคโนโลยี
Utilize Technology for Circular Way
SCG ร่วมกับ Dow Thailand Group
เปลี่ยนพลาสติกใช้แล้วเป็นส่วนประกอบ
genบพลาสติกใหม่ได้

หุ้นเป่าเย็นกลับมาใช้
ให้คุ้มค่า
CIRCULATE TO MAXIMIZE ITS VALUE

รู้จักแยก แลกรายได้
Turn Your Trash to Treasure
คัดแยกขยะรีไซเคิลในร้าน
และนำมาจากสร้างรายได้เสริม
ป้าลูก เช่าของจ้านขายของด้วยถุงช้อปปิ้ง

ถุงใหม่กีซิ่งคุ้ม
Re-Use Your Bags to Its Maximum
นำถุงที่ล้างแล้วนำไปใช้
ไม่ว่าจะจะหนุงจะใส่ ก็ใช้ให้คุ้มค่าสุด