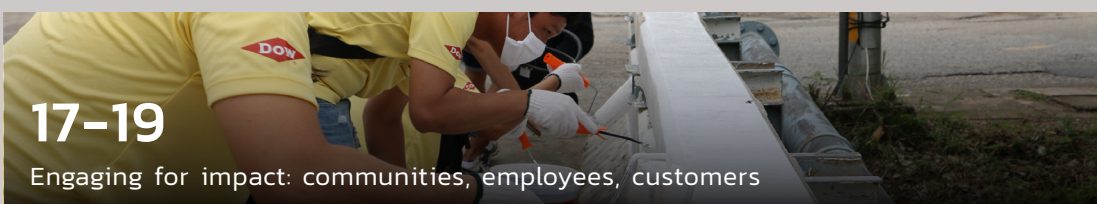
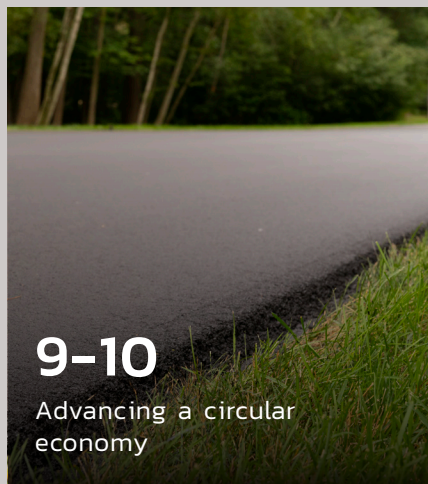




2019 Sustainability report

Dow Thailand Group







Chatchai Luanpolcharoenchai

president of Dow Thailand Group

Today's sprawling urban landscapes with even more digital accessibility, materials science has become a more important player in all walks of life. As a result of the rapid growth in population, an increasing demand for materials takes toll on the world's limited resources. Besides responding to market needs and ever-changing lifestyles, innovative products nowadays also have to satisfy the need for sustainability. This is the challenge the world, including Thailand is facing. Thus, integrating sustainability into business operations together with presenting products that meet customers' demand for a sustainable lifestyle are crucial for businesses from now on.

For over 50 years of operations in Thailand, Dow Thailand Group is committed to its Sustainability Goals which were announced by Dow in the US. Currently, we are in the third set of ten-year goals, called the 2025 Sustainability Goals. The goals' aim is to form effective collaboration and sustainable networks with all units of society, in accordance with the UN's Sustainable Development Goals.

As of last year, Dow has maintained zero recordable injury case. We are also ranked as best trusted organization for reliable product delivery by our customers around the world. With the support of our customers, business allies, partners, communities and other organizations, we run social service projects focusing on young people, local communities and society with the goal of sustainable growth as follows:

- Collaboration with our business allies, customers and partners to solve plastic waste problem using circular economy principles. For example, plastic asphalt for road construction, the first of such work in Thailand; many collaborations with PPP Plastics which help prevent used plastic becoming waste in the environment; collecting and sorting beach waste on the International Coastal Cleanup Day which has been done for

seventeen consecutive years; and many others.

- Dow, with the help of participating organizations, has worked to prepare our youth to be ready for the rapid changes of the 21st century. These comprehensive projects cover from early childhood all the way to university, through a series of education support, i.e., Children's EF skill development, Dow Chemistry Classroom, Zero waste school, Scholarship for Vocation Schools and V-ChEPC or Vocational Chemical Engineering Practice, etc.
- Collaboration with various cooperative networks with an intention to boost local economy such as Punsuk market and many other.

Our success would not have been possible without great support from all. I would like to extend my sincere appreciation to you and those who support Dow Thailand Group. I also hope that the report in your hand will make you proud to be a part of our social contribution. And I wish for us to become one, working toward sustainable growth for many years to come.

With gratitude,
Chatchai Luanpolcharoenchai
President of Dow Thailand Group



SCG

SCG-DOW
GROUP



Dow Thailand Group

Innovation towards Sustainability

Dow is a world-class materials science leader with a vision to become the most innovative, customer centric, inclusive and sustainable materials science company. The company was founded in 1987 by Herbert Henry Dow, one of the world's most prolific chemists and inventors. Today Dow operates 109 manufacturing sites in 31 countries, and employs approximately 36,500 people worldwide.

In 1967, Dow started business in Thailand. Later, in 1987, it formed the joint-venture with SCG (SCG-DOW Group). Today Dow Thailand Group consists of companies solely owned by Dow and SCG-Dow Joint Venture Group. Additionally, there is also a Dow-Solvay Joint Venture in Thailand.

Dow product groups

1. High performance materials and coatings
2. Industrial intermediates and infrastructures
3. Packaging and specialty plastics

Dow Thailand Group's key markets and applications

- Packaging industry
- Building and Infrastructure industry
- Mobility industry
- Consumer Cares industry
- Electrical Appliances industry
- Electronics industry
- Paints and Coatings industry
- Adhesives and Sealants industry

Thailand manufacturing facilities

Today Dow Thailand Group is Dow's largest manufacturing base in the Asia Pacific with facilities at Map Ta Phut Industrial Estate, Asia Industrial Estate and WHA Eastern Industrial Estate (Map Ta Phut) in Rayong province.

Products Manufactured in Thailand

Polyethylene, Polystyrene, Elastomers, Polyurethanes, Binders, and Styrene-butadiene latex products. The group also imports other Dow products. These include solvents, chemicals for construction, silicones and specialty plastics.

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We are committed to developing science-driven innovations and strive to form effective collaborations and networks to bring sustainability to our business, society and the world using Dow's sustainability goal as a compass.

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2025 Sustainability goals

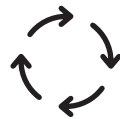
In 2015, Dow announced our 2025 Sustainability Goals which redefine the business's role and impact on society. This third set of Goals evolved from two earlier sets which focus on environment, health and safety. The return value of the 2005 Sustainability Goals is estimated at \$ 5 billion. The third set focuses on product solutions and world challenges such as the need for food and energy, sustainable water resources management and health promotion.

As we proceed with our third set of sustainability goals, Dow is collaborating with like-minded partners to help lead the transition to a more sustainable planet and society.



Leading the blueprint

Dow integrates public policy solutions, science and technology, and value chain innovation to develop sustainable society blueprints.



Advancing circular economy

Dow advances circular economy by delivering solutions to close the resource loops in key markets.



Safe materials for a sustainable planet

We envision a future where every material we bring to market is sustainable for people and our planet.



Delivering breakthrough innovations

Dow delivers breakthrough sustainable chemistry innovations that advance the well-being of humanity.



World-leading operations performance

Dow maintains world-leading operations performance in natural resource efficiency, environment, health and safety.



Valuing nature

Dow applies business decision processes to complete projects that increase business value and are better for ecosystems.



Engaging for impact: communities, employees, customers

Our people worldwide will directly apply their passion and expertise to advance the well-being of people and the planet.

Leading the blueprints

With our expertise in materials science, Dow integrates public policy solutions, science and technology, as well as value chain innovations to develop sustainability blueprints.



PPP Plastics project

Dow in collaboration with government agencies, the business sector and public organizations founded PPP Plastics in response to the need for sustainable plastics and waste management. PPP Plastics actively mediates networks to promote the circular economy, reuse plastics, educate on sorting waste at source, as well as applying innovative solutions to develop waste management infrastructure. PPP Plastics supports the work of government agencies in rolling out the 2018 – 2030 Thailand’s Roadmap on plastic waste management. Its goals also include reducing plastic waste in the ocean by 50% by 2027, and 100% plastic waste recycling.



Successes in 2019

- **Developing a prototype waste management system for communities in Rayong province**
 - 19 municipalities (out of a total of 68) in the province participated.
 - Workshops on sorting waste at source were given to 28 communities and 18 schools.
 - The goal: zero plastic waste in the province’s landfill by 2022.
 - Over 10,000 participants in the project.
 - 265 tons of plastic were recycled.
- **The second year of the plastic waste material flow database.**
 - The database allows us to monitor the routes of plastic waste so places where waste is leaking into the environment can be identified and sealed off.
 - In 2019, PPP Plastics increased coverage from 9 to 22 areas in 11 provinces: Chiang Mai, Lamphun, Samut Sakhon, Prachuab Khirikhan, Krabi, Bangkok, Koh Samet in Rayong, Surat Thani, Nong Khai, Udon Thani and Nakhon Ratchasima.
 - 4 more types of plastics have been incorporated: plastic glasses, plastic wrapping, thin plastic film and plastic cups and plates.



Dow for Sustainable Industry project (DCSI)

Thanks to the collaboration with the Ministry of Industry's Department of Industrial Promotion, the National Research Council of Thailand, the Plastics Institute of Thailand, the Faculty of Engineering at Thammasat University, and the Faculty of Engineering at Kasetsart University, Dow has rolled out the Dow for Sustainable Industry project. The goal is to improve SMEs' operation regarding environment, energy, safety and productivity. Since the first day of the project in 2011, CO₂ emissions have been reduced by 1.5 million kg carbon which is equal to planting 150,000 trees. The project has also reduced industrial waste. The results are an improvement in quality of life and a better environment for 922,000 employees and people in communities nationwide.

Goals of the Dow for Sustainable Industry project (DCSI) in 2019:

- Increase Thai SMEs' readiness for Industry 4.0 based on circular economy principles in accordance with the UN's goals for sustainable development.
- Develop an Industry 4.0 handbook.
- Writing detailed development plans for 20 facilities in the plastic and processed food industries.
- Monitor the results through Internet of Things tools.

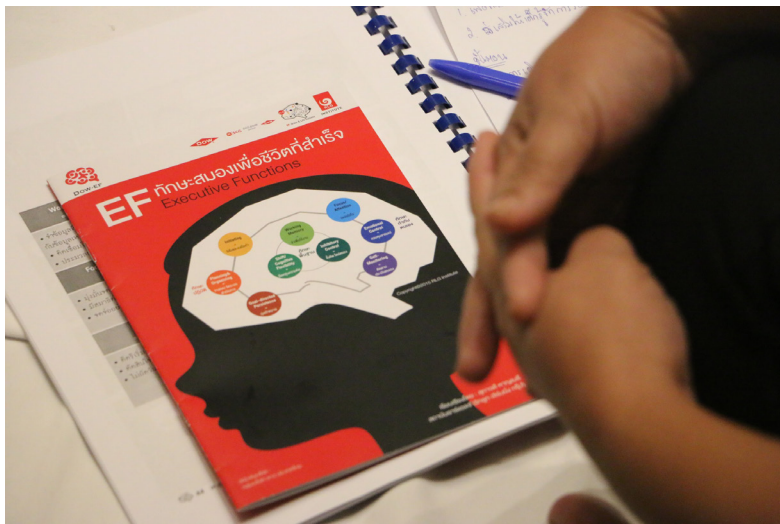


Vocational Chemical Engineering Practice College (V-ChEPC)

This education project is the collaboration between The Federation of Thai Industry's Petrochemical Industry Club, the Green Network, the Petroleum Institute of Thailand, the Office of the Vocational Education Commission, King Mongkut's University of Technology Thonburi, and the Rajamangala University of Technology Thanyaburi. The goal is to present a new approach to teaching and learning in vocational institutes that may better serve the demands of the industry. The aim is to help students relate what they are learning to the real world. Business enterprises participate and contribute resources and assessment of students.

Vocational Chemical Engineering Practice College (V-ChEPC) 2009 to 2019

- Dow Thailand Group has supported the college with a fund of over 8,000,000 baht.
- All 12 years of graduates have been employed on graduation.
- 15 of V-ChEPC students employed at Dow.
- The company's employees also volunteered to lecture classes and workshops.



Dow - EF youth development for success and happiness

To enter adulthood as a successful and happy person, one needs to master the skills of EF or Executive Functions. EF are the cognitive abilities needed to control one's thoughts, emotions and actions. These skills are the mental processes that enable us to plan, focus attention, remember instructions, and juggle multiple tasks successfully. The skills, which govern our IQ and EQ, are grouped into three sets: basic skills, self-regulatory skills, and practical skills. The best age for such skills training is from 0 to 6 years. Once trained, the skills can be further developed until the age of 25.

Activities of Dow - EF in 2019

- **Development of training media and tools:** EF contributed stories and board games.
- **Networking:** There were two committee meetings and four sub-committee meetings. EF materials were donated to 300 organizations which are daycare centers, kindergarten schools, hospitals and local health promoting hospitals.
- **Training over 900** change agents and 40 EF facilitators.
- **EF development activities** for over 10,000 children and parents.

Advancing a circular economy

Circular economy can be achieved by closing resource loops. Circular economy is the transition from a linear economy to one that redesigns, recycles, reuses and remanufactures to keep materials at their highest value and useable for as long as possible. These are some of our highlights.



Tenter Frame Biaxially Oriented Polyethylene (TF-BOPE)

Technical name TF-BOPE resin – XUS 59910.08 is a Gold Edison Awards winning polyethylene packaging product. The food in the packaging stays fresh with a longer shelf life. Its taste is also well-preserved. The material is thin and light with less than 10% opacity. It is more durable and elastic twice as resistant to impact, three times more puncture resistant, and has three times more tensile strength. The packaging can be easily opened with bare hands. Most important, it is environmentally-friendly and is 100% recyclable. Its lightweightness also helps save on the cost of transportation.



INNATE™

INNATE™ resin is outstandingly strong and durable. It was born from a breakthrough molecular catalyst coupled with advanced processing technology that allows accurate and consistent control of the resin chemistry, offering performance levels and combinations of film properties like never before. It enables thickness reduction in flexible packaging by 25%.



AFFINITY™

This is a group of Dow products that can be developed and manufactured to be mono material polyethylene. They are 100% recyclable without sacrificing durability and toughness.



ENGAGE™ Polyolefin elastomers

ENGAGE™ Polyolefin elastomer (ENGAGE™ POEs) has a recyclability for in-process scrap re-use. The result is tough, resilient and flexible. It is a great material for auto parts, both exterior and interior such as bumper fasciae, instrument panels and airbag covers. It is also suitable for footwear foams that are light, resilient and cushioning. Other options are for molded goods such as packaging, toys and household items.



Recycled Plastic Road Project

This project to construct roads made from used plastics was co-developed by Dow Thailand Group and SCG. The roads are made to suit local uses. Dow and SCG have collaborated with other companies to make more plastic roads that will advance Thailand's circular economy.

Dow's first plastic road was developed in 2017 in Indonesia. That prototype has been adapted worldwide. The road is durable and strong. It adds value to low grade plastic waste which is not easily recycled. Instead of ending up in overflowing landfills or leaking into nature, the plastic waste has become a resource within the circular economy. Moreover, plastic road technology makes roads 15 to 33%* more durable.

*test results from the Faculty of Engineering, Chulalongkorn University.

Successes in 2019



Dow and SCG along with Amata Corporation PCL., CP ALL PCL. and SC Asset Corporation PCL. have already built over 4,610 square meters of plastic roads, from 2,305 kilograms of plastic waste which is equal to more than 580,000 of refill bags.



Since the beginning of the project, Dow and our allies have built over 90 kilometers of plastic roads, and reused 190 tons, or 48 million refill bags, of plastic waste worldwide.



In 2019 Dow's plastic road project was listed 26th out of 52 companies worldwide in Fortune's 2019 Change the World list of companies whose business operations are having a positive impact on the environment and society.



Dow charity run

This is a charity run event where all 1,500,000 baht of the proceeds from application fees went to Thai Red Cross's Cleft Lip Cleft Palate project. It will fund cleft lip cleft palate operations in small children as well as activities to prevent the disease during pregnancy. Apart from fund raising, the Dow charity run was an opportunity to practice sorting waste at the event venue with activities on the theme of recycling from Magic Eyes. Every bit of waste and leftover at the event was managed within the principle of circular economy.

Safe materials for sustainable planet

Safety is crucial at Dow, from work processes to the products we bring to markets. Moreover, Dow hands over knowledge and attitudes to safety to our partners and the younger generation, who will take care of our world in the future.



Safety training at the Prostheses Foundation of H.R.H. the Princess Mother

Since 1996 Dow has been donating Polyurethane, the main material for prostheses to the Prostheses Foundation of H.R.H. the Princess Mother, with enough polyurethane to make over 40,000 prostheses. We have also trained the foundation's personnel on how to safely handle chemicals, how to use personal protection equipment (PPE), how to safely store chemicals, and how to draw up and implement safety plans. Safety equipment was also donated to foundation executives and other personnel for use on mobile units.



Dow PRIMAL™ bio-based acrylic emulsion

Dow PRIMAL™ bio-based acrylic emulsion is produced with carbon from plants, replacing significant amounts of petroleum sourced materials. The USDA bio-based certified house paint offers excellent properties of ultra low odor, low VOC, (volatile organic compound), low emissions and a formaldehyde abatement function. This improves indoor air quality effectively. Dow PRIMAL™ bio-based acrylic emulsion won a 2019 Sustainable Award from the Business Intelligence Group. The awards are for distinctive sustainability-driven companies.

Delivering breakthrough innovations

Dow delivers breakthrough sustainable chemistry innovations that advance the well-being of humanity.



Dow chemistry classroom

Dow chemistry classroom, a collaboration between Dow Thailand Group and the Chemical Society of Thailand, under the Royal Patronage of Princess Srisavangavadhana, has contributed to the advance of science teaching and learning since 2013. The small-scale chemistry laboratory, both small and safe, can be used as standard teaching equipment for the class. The lab set uses 2,000 times less chemicals and has been certified by UNESCO to have the same teaching impact as standard chemistry lab equipment.

The project's main activities include delivering small-scale chemistry laboratory workshops to a group of secondary school teachers, a contest for the best application of the small-scale laboratory, and training Dow chemistry classroom teachers. More than 20,000 teachers from 762 schools have been through the training sessions. During the past seven years there have been 78 teachers who have gone through an intensive training. Over 100,000 students have also participated in the project.



WE Are Innovators

WE Are Innovators is a joint project between Dow and WE, a Canada-based non-profit organization with learning programs that engage young people globally and empower them. The program encourages young people to innovate through STEM (Science Technology Engineering and Mathematics) activities to tackle the challenges of providing food and energy and finding new paths to sustainability.

In 2019, the student team from Damrongrat Songkro School, Chiang Rai province, won WE Are Innovators with the project 'Bio-cellulose sheets from pineapple peel waste for orchid nurseries'. Pineapple peels are abundant as local agricultural waste. This material replaces coconut husk or charcoal or non-recyclable Styrofoam. The teacher-students team also represented the Asia-Pacific as delegates on a field trip and social activities in Kenya during June 28th to July 9th, 2019.

World-leading operations performance

Dow maintains world-leading operations performance in sustainable use of natural resources, environment, health and safety.



Implementing AI in work safety

Dow has spent \$400,000 or 12.5 million baht in developing AI to improve work safety and efficiency. For example, an AI that can move vertically with magnetic wheels and tracked wheels. The unit is equipped with lights and a camera to survey and record site analysis and maintenance. A submersible robot helps the maintenance crews examine underwater sites and ponds, and also inspect water cooling pond leakage in large scale facilities without draining

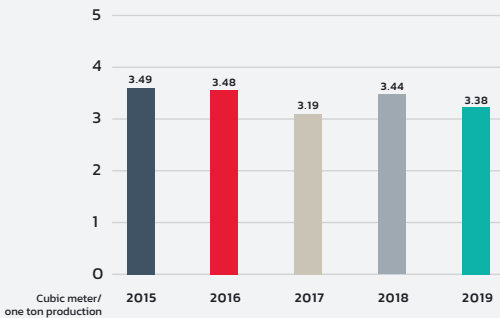
the ponds. It enhances crew safety, saves energy and decreases working hours. With AI, the maintenance crews can collect the data needed for effective protection measures. Within one year of implementing AI in 2019, Dow has decreased risk area working time by 9,400 hours.

World-leading operations performance

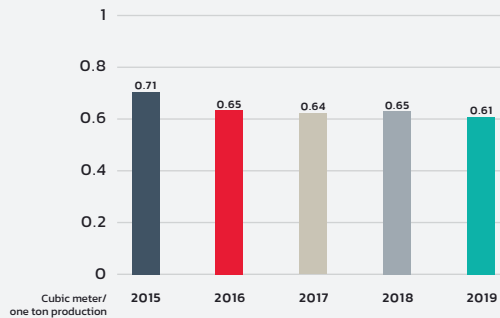
Back in 1995, Dow revealed EH&S (environmental, health and safety) goals for all of its facilities worldwide. \$1 billion was invested in sourcing technology and innovations to increase energy efficiency, water saving, waste elimination and recycling. Later Dow set its 2025 Sustainable goals. It is committed to maintaining its world-leading operations performance, in natural resource efficiency, environment, health and safety, which is good for our communities, and an important step toward creating a more sustainable society and world.

Highlights of Thailand operations performance in 2019

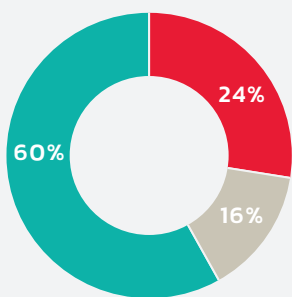
Volume of water per ton production



Volume of waste water per ton production



Waste disposal



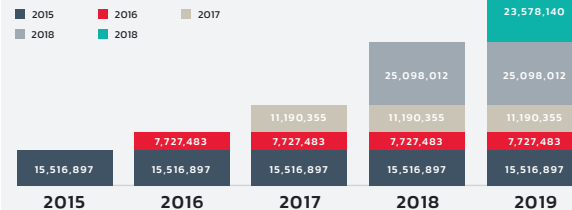
60%
Recycled

24%
Combustion

16%
Energy recovered

0%
Landfill

Decrease in greenhouse gas



In 2019 greenhouse gas emitted from production and transportation decreased by more than 83 million Kg CO₂e

Recorded injuries or work-related sickness = 0



Valuing nature

With our partners and friends, Dow drives sustainability for the business and the ecosystem alike.



Phudon forest

In 2018, Dow Thailand Group worked together with the Ban Chang municipality to improve the environment around the hill of Phudon, especially around the road ascending Paela hill which overlooks a beautiful surrounding area. To complement the area's graceful outlook, the team planted rows of flower-bearing trees along a two kilometer stretch of the road up the hill. In 2019, a total of 1,200 flower-bearing trees and woody plants were planted. The project has improved the environment as well as boosting community's awareness since local people also participate in caring for the young trees.



Mangrove reforestation at Prasae estuary

Mangrove forest absorbs five times more carbon dioxide than land forest. It also acts as natural filter that catches waste before it travels into the sea. Climate change and sea waste are among Dow Thailand Group's environmental concerns. Garbage collection and mangrove reforestation around Prasae estuary have been continuing activities for 11 years. Until 2019, over 2,500 of our employees and people from the local community have volunteered to join the activity.



International Coastal Cleanup Day (ICC Day)

For seventeen years, Dow Thailand Group has initiated and organized the International Coastal Cleanup Day on the coast of Rayong. This world event rallies people on the third Saturday of September to come and get rid of garbage on beaches. In Rayong each year, Dow, together with the Industrial Estate Authority of Thailand, local businesses, non-profit organizations and the communities around the facilities, pitch in. In 2019, Dow and our friends together with 4,500 volunteers collected 9.7 tons of garbage along 15.1 kilometers of coastline. The garbages were sorted into plastic waste, recyclable waste and general organic waste, to be recycled and put into use in the circular economy. The cleanup resulted in protection of the sea and marine lives leaving the beaches clean and pristine. The volunteers also went home with greater awareness of tackling the problem by waste separation.



Engaging for impact: communities, employees, customers

Our people worldwide are encouraged to apply their passion and skills to advance the well-being of people and our planet.



Neighbor care project

For seven years, Dow Thailand Group has encouraged our employees to nominate projects for the environment and surrounding communities. In 2019, Dow's 326 volunteers joined seven social service projects that have benefitted over 3,500 people in our local communities.

1. The improvement of Lan Pun Suk recreation ground in near Ban Chang stadium.
2. The improvement of the sweet potato chips workshop at Ban Chang's agricultural production improvement center, Ban Chang municipality. Sunshades and tool storage shelves have been installed for better working environment and hygiene.
3. Pavement maintenance and the canal-side walkway painting to improve the public safety at Nong Bua Daeng community, Map Ta Phut municipality.
4. The installation of a clean drinking water system at Wat Ta Kuan school, Map Ta Phut municipality.
5. The improvement of the petanque court for better safety at Sam Ice village, Ban Chang municipality.
6. The construction of a playground to encourage EF skills and development, and public safety at the sub-district children development center at Huai Pong, Map Ta Phut municipality.

7. Organizing a safety workshop for the elderly club at Sam Nak Thon Sub-district Administrative Organization (SAO).



Employee Resource Groups (ERGs)

At Dow, equal opportunities and inclusiveness are parts of our corporate culture. All employees are given the opportunity to grow on their chosen career paths, and to be heard, regardless of their religious beliefs, sex and gender, cultural background or age. ERGs or Employee Resource Groups is the open platform where employees from diverse countries and levels come together to share experiences and get mentored. It is an opportunity for Dow's employees to grow, advance their careers and have access to executives who share common interests. At Dow Thailand Group, there are five groups of ERG:

- ADN or Asian Diversity Network
- GLAD, the support group for people of gender diversity
- PRIME, the group of experienced employees
- RISE, Dow's newcomers
- WIN or Women's Inclusive Network



Community Partnership Association (CPA)

This is Thailand's first cooperation between the five industrial enterprises: Dow Thailand Group, PTT Group, SCG, BCP and GLOW. The mission is for the industry to develop and take care of local communities and protect the environment. The five corporations share experiences and taking care of each other so that the industry and the communities can co-exist in a sustainable way. It started as Collaboration then grew into Community Partnership Association.

The highlights of the Association in 2019:

- Encouraging 76 facilities owned by the members to become ECO factories.
- Organizing mobile medical care units for six sub-districts: Map Ta Phut, Map Kha, Huai Pong, Noen Phra, Ban Chang and Thap Ma. The units served 1,769 local people.
- Total of 251 Bachelor degree scholarships for young people in Rayong, and 440 scholarships for seven classes of nursing school were given.
- With our support since 2016, a total of 29 community groups have generated income of 30.72 million baht.
- An environment monitoring network among the society's factories was organized. The facilities, communities and Industrial Estate Authority worked together to set up an emergency drill routine. Evacuation drills were done in the communities of Klong Nam Hu, Nong Nan Yen, Krog Yai Cha, Ta Kuan - Ao Pradu, along with communities in Map Ta Phut.



Punsook Market

The market is the platform where the local products meet the public. It is organized by Dow Thailand Group and our friends from 13 organizations. In 2019, community enterprises earned 3,182,774 baht from sales of their local products.



Dow market and Wednesday market

Increased income can help improve the quality of life in the community. Dow organizes rent-free markets for local products where our employees can shop. For each meet, over 30 shops will be selected and rotated, so everyone has equal access to the markets. The market is on Wednesdays and on the company's quarterly meeting event when many employees attended. In 2019, the communities' total sales were 378,488 baht.



Red Cross-Dow clean drinking water for schools

Clean drinking water is crucial for the health of children in our communities. Dow, Relief and Public Health Bureau and the Thai Red Cross Bureau installed water filter machines with high-performance Reverse Osmosis (RO) water filters for 50 needy schools in Rayong, Chachoengsao, Phra Nakhon Si Ayutthaya, Nakhon Nayok, Nakhon Sawan, Kanchanaburi, Sing Buri, Chai Nat, Nakhon Pathom and Uttaradit.

The donation of water filter machines alone may not be sustainable, so Dow has trained the school staff and volunteers on maintenance. In addition, data about the clean water is collected online, so the drinking water quality can be maintained up to Ministry of Public Health standard. The project runs for five years.

At the end of 2019, 2,880,000 liters of clean drinking water were provided for 5,549 school children. The project will continue to be monitored in the following years.



Dow English experience

Mastering the skill of English is crucial for communication and as an educational tool. Dow English experience aims to develop the communication ability of teachers and children in 14 schools in Rayong. In 2019, 170 school children have participated in classes offer English skills training under the topics of agriculture and environment. There are also English classes for 280 non-language teaching teachers. Listening, speaking, reading and writing skills have been taught and aligned to the teachers' assigned subjects. To help them further develop the English skills, the participants were followed up through the course of four months.

2019 Dow Thailand Group volunteers



Number of Dow volunteers : 685



Total hours of volunteer work : 5,212

Dow Thailand Group

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