



2021 Sustainability Report Dow Thailand Group



President's Message

Since 1995, Dow has announced a strong commitment to Sustainable Development Goals. In 2021, we were on Phase 3 of our target (2016–2025), which focuses on collaborating with all sectors to bring the world and society towards sustainability, according to the UN's Sustainable Development Goals.

In 2020, Dow announced additional goals that focus on climate change and plastic waste—two main issues that directly affect the world economy, society, and environment—by setting goals to reduce carbon, recycle used plastics, and closing the recycle loop. We have been working hard towards these goals and established good process as reported in the document currently in your hands.

While navigating the COVID-19 pandemic for the past two years, Dow Thailand Group continued to run operations safely and complied with customer needs continuously. Our employees and related persons maintained good occupational safety without recordable injuries while achieving goals as set. In addition, we continued projects for sustainability and consistently maintained activities for society alongside strict COVID-19 preventive measures. Moreover, we leveraged opportunities to use our resources to help and relieve the situation in Thailand.

Dow Thailand Group is able to continue our processes towards our goals despite challenging situations because we have good collaborations with our employees, business partners, clients, and across all related sectors. I really appreciate everyone's efforts and hope we will continue to work towards creating a sustainable environment and society together.

Thank you very much,

Mr. Chatchai Luanphonchareonchai
President of Dow Thailand Group



Dow Thailand Group

The Biggest Dow Production Base in Asia-Pacific



Dow, the world's leading company in Materials Science, develops and produces various materials by using scientific methods with a commitment to excellence in innovation and sustainability, while working with customer centricity and encouraging diversity in our workplace.

Dow has a goal of creating a globally sustainable future with our scientific experts and through collaborating with global partners. Dow's scientific products and solutions include a wide range of plastics, industrial chemicals, coatings, and silicones, focusing on differentiation to meet the needs in high-growth markets, e.g., packaging, mobility, building and infrastructure, and consumer goods.

Dow was established in 1897 by Herbert Henry Dow, one of the world's chemists and inventors, to produce new chemicals and materials leading to a better quality of life for people at that time. Now, Dow has 106 production bases in 31 countries and an estimated 35,700 employees.

Dow started its business in Thailand in 1967; collaborating with SCG Co., Ltd. to establish the SCG-Dow joint venture group in 1987. Dow Thailand Group now consists of subsidiary companies, of which Dow is the sole proprietor along with SCG-Dow joint venture group, while there are also joint venture companies between Dow and Solvay in Thailand.

Dow's Main Product Groups

1. Performance Materials & Coatings
2. Industrial Intermediates & Infrastructures
3. Packaging & Specialty Plastics

Dow Thailand Group's Markets

1. Packaging Industry
2. Building & Infrastructure Industry
3. Mobility: Automotive and Transportation Industry
4. Consumer Care: Consumer Product Industry
5. Electrical Appliances Industry
6. Electronic Industry
7. Paints & Coatings Industry
8. Adhesives & Sealants Industry

Thailand Production Base

Dow Thailand Group currently has thirteen factories, which is Dow's biggest production base in Asia-Pacific. The factories are in Map Ta Phut Industrial Estate, Asia Industrial Estate, and WHA Eastern Industrial Estate (Map Ta Phut), Rayong province.

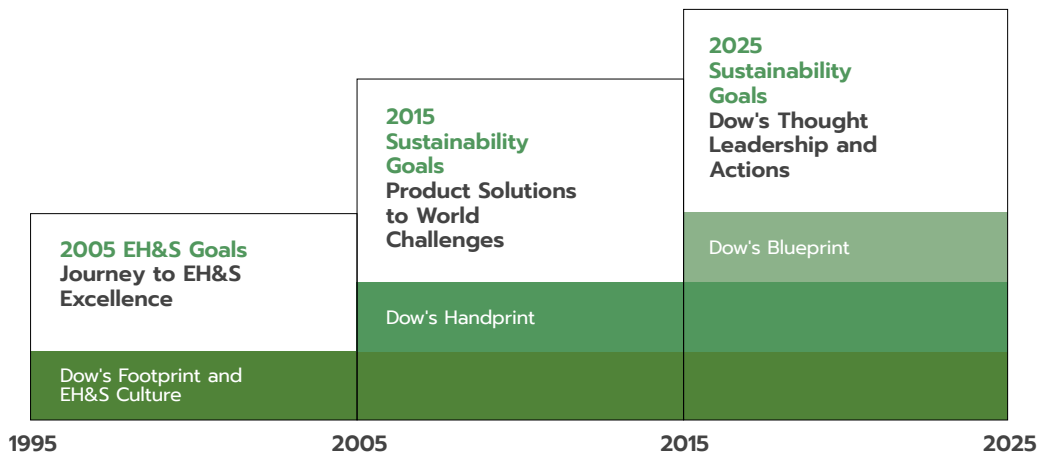
Products in Thailand

Polyethylene, polystyrene, elastomers, polyurethane, and styrene butadiene latex; with products imported into Thailand from Dow in other countries, such as solvents, construction chemicals, silicone, and specialty plastics.

Sustainability Goals

Dow has announced and been committed to its sustainability goals since 1995, in accordance to the vision of its founder, Herbert Henry Dow. While supporting our customers with quality products, we are also prepared to contribute to creating a better environment and society together.

Dow's sustainability goals span 30 years, with clear ten-year benchmarks:



2005 EH&S Goals

- Spanning 1995 to 2005
- Footprint goals: promote safety and better environments at Dow's factories.
- Focus on efficient production and reduce unnecessary use of resources, waste, and environmental safety risks.

2015 Sustainability Goals

- Our 2015 target is to continue improving on existing sustainability goals at Dow's factories.
- Handprint goals: deliver sustainability to customers and partners.
- Focus on product design and the efficiency of manufacturing processes, as well as offer products that are environmentally friendly and with advanced innovations for customers.

2025 Sustainability Goals - the Blueprint Goals

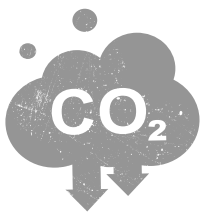
- Our 2025 targets are the third phase and currently in-process.
- Blueprint goals: promote sustainability standards and practices by maintaining them across different sectors--from use of raw materials to handling processes--once products are being used by consumers.
- Cooperate with various organizations to create templates and processes for solving urgent world matters with focuses on climate change and marine plastic waste.



Dow 2025 Sustainability Goals are aligned with the United Nations Sustainable Development Goals.

	Leading the blueprint	
	Delivering breakthrough innovations	
	Advancing a circular economy	
	Valuing nature	
	Safe materials for a sustainable planet	
	Engaging for impact: communities, employees, customers	
	World-leading operations performance	

In 2020, Dow announced our focus on climate change and the problem of plastic waste.



1. Protect the climate

Dow will develop and use advanced technologies to produce products that consume less resources. Dow's products will also help customers reduce their greenhouse gas emissions.

Mission: By 2030, Dow will reduce its net annual carbon emissions by 5 million metric tons versus its 2020 baseline (15% reduction). By 2050, Dow intends to be carbon neutral. Dow's products and programs will reduce greenhouse gas emissions by an amount equivalent to Dow's greenhouse gas emissions.



2. Stop the waste

Dow is investing and collaborating with all sectors around the world in technology and infrastructure to significantly increase recycling.

Mission: By 2030, Dow will enable 1 million metric tons of plastic to be collected, reused or recycled through its direct actions and partnerships.



3. Close the loop

Dow is dedicated to providing solutions that can be used to design packaged products that are reusable or recyclable.

Mission: By 2035, 100% of Dow products sold into packaging applications will be reusable or recyclable.



The Highlight of Dow Thailand in 2021

Commitment to Continually Reduce Carbon Emissions and Energy Consumption

SE Plants reduced carbon emissions by up to



2,500

MT CO₂



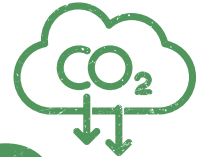
SPE Plants reduced carbon emissions of up to

507

MT CO₂



In 2021, the production processes of Dow Thailand Group utilized innovations and technologies to reduce carbon emissions by up to



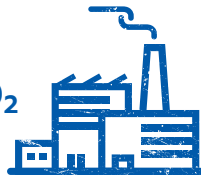
4.2%

compared to last year (2020).

In 2021, every factory in Dow Thailand Group reduced carbon emissions by up to

46,785

MT CO₂



PO Plants reduced the steam energy consumption by up to

70

kilograms

per each ton of production.



0%

plastic from the production appeared in the environment from the "Operations Clean Sweep" project.

5

products from Dow Thailand Group have been certified with the Carbon Footprint Product Labels and Global Warming Reduction Labels.

Carbon Reduction and Supporting the Economic Cycle with Partners in Every Dimension

Using polystyrene as materials for electrical appliances and toys, helped reduce carbon emissions by up to



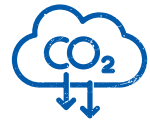
22,978

MT CO₂ per year.



Cooperating with clients incorporating the **UCARSOL™** product, synthetic amine chemicals for refineries, helped our customers to reduce steam energy consumption by up to 30% and carbon emissions by approximately

20%.



Developing Shrink Film Packaging from Post-Consumer Recycled Resin



Developed "**Greenplas Pallet,**" a wood composite pallet made from recycled plastics for industrial transportation, which reduces waste by over

100  tons per year.

Dow for Sustainable Industry Project in 2021 provided consultation for improving productivity and reduced the amount of waste from 20 factories valued at 1.27 million baht. The project also helped the participating factories to reduce cost of production by 2.89 million baht, increase production capacity by 2.55 million baht, and reduce carbon dioxide emissions by



4,043.2  MT CO₂ per year.

Launched an online activity : "**Save Safe Earth**" for collecting and separating waste on International Coastal Cleanup Day, with over **1,500** volunteers collecting waste totaling to 1.9 tons.



Planted over

7,000

mangrove trees, covering an area of 5 rai.



Received the Low Emission Support Scheme (LESS) certification from the TGO in 5 projects of used plastic management, which reduced greenhouse gas emissions by **147 MT Co₂ per year.**

Carbon Reduction Management

Dow Thailand Group commits to pursuing sustainability goals against climate change. By 2030, Dow will reduce 15%, or 5 million tons of carbon emissions. All of our operations have taken the goals seriously.

Direct Carbon Emissions Reduction and Energy Indirect Emissions Reduction (Scope I and Scope II)

In 2021, Dow Thailand Group implemented several projects to reduce carbon emissions in the factories as follows:

- The Polyethylene Specialty Elastomer (SE) Plant has changed the catalyst in the production process, reducing energy consumption by up to 50%, while producing approximately 25% more product and reducing carbon emissions by 8%. In Q2 of 2021, the SE plant reduced carbon emissions by 2,500 tons.
- Siam Polyethylene (SPE) Plant has installed an additional plug flow reactor in the original reactor, which helps reduce energy consumption by 20% and reduced 507 tons of carbon emissions in just 2 months.
- The Propylene Oxide (PO) Plant has reduced steam consumption in the methanol distillation tower through Steam Optimization, which reduces the steam consumption by 70 kg for each ton of production.



Other Indirect Carbon Emissions Reduction (SCOPE III)

In 2021, Dow Thailand Group had many projects in cooperation with partners to develop innovations for reducing carbon. The outstanding projects are as follows:

1. Developing Products with a Low Carbon Footprint

Dow Thailand Group's products have been certified for "Carbon Footprint of Products" and "Carbon Footprint Reduction" by the Greenhouse Gas Management Organization (TGO), for they can reduce greenhouse gas emissions in the life cycle of products more than the criteria set by TGO (more than 2% from the base year calculation) according to calculations of acquisition of raw materials and the production process.

A total of five products have been certified for the Carbon Footprint Product Label and the Global Warming Label: DOWLEX2047G, ELITE 5220G, ELITE 5400G, ELITE 5401G, and ELITE 5500G, which are LLDPE polyethylene resins used for production of refill bags, stretch film, food packaging, and the industrial packaging sector produced by Siam Polyethylene Co., Ltd. which is under Dow Thailand Group. In addition, these five products have been registered in the database of the Department of Pollution Control for products and services that are environmentally friendly.

2. Helping Refineries Save Energy with UCARSOL™ Innovation

Dow has developed the UCARSOL™ product, a synthetic amine compound used in refineries, which can help reduce steam energy by up to 30% and reduce carbon dioxide emissions by approximately 20% without investing in any new machinery or additional construction, as well as not affecting current work environments. IRPC Public Company Limited is utilizing UCARSOL™ to reduce the cost of energy by over 41 million baht per year. In addition, the remaining steam power can be used for other projects, saving more than 385 million baht in factory expansion costs. The energy-saving result of Dow's UCARSOL™ product has led to IRPC Public Company Limited receiving the Thailand Energy Award 2020 from the Department of Renewable Energy Development and Energy Conservation.



3. Supporting Entrepreneurs to Reduce Greenhouse Gas Emissions by Using Polystyrene in the Production of Electrical Appliances and Toys

Dow recognizes the importance of improving production to meet more environmental needs. We support entrepreneurs to use polystyrene in the production of electrical appliances and toys, which will save energy in production, reduce production cost, and create fewer environmental impacts than regular materials.

Dow recommends High Impact Polystyrene (HIPS) plastic to manufacturers because it is suitable for applications requiring shock resistance, lightweight, and low moisture absorption. This plastic uses lower temperatures in production than other materials, saving energy, and reducing production cost—which results in a lower carbon footprint for products, as well as making them recyclable and environmentally friendly.

From 2019-2022, Dow helped entrepreneurs in Thailand reduce carbon emissions by converting 22,978 tons of carbon per year from main materials; equivalent to planting enough trees to cover up to 68,779 rai of land per year.



4. Developing Low-Carbon Frozen Food Packaging Trays

Dow Thailand Group collaborated with Thepvimol Plastic Company Limited, one of the biggest manufacturers of polystyrene packaging in Thailand, to use an innovative formula of polystyrene resins in developing Frozen Foam Packaging. This innovation enables 87% of scrap content to be utilized in manufacturing sustainable foam trays which shortens the production process, lowers resource consumption, and reduces greenhouse gas emissions up to 50%. The first phase of the new packaging development can reduce up to 2,056 tons of carbon emissions annually; equivalent to planting over 6,340 rai of trees per year.





Collaboration for Global Warming Prevention

1. “Dow & Thailand Mangrove Alliance” Project

Dow collaborates with the Department of Marine and Coastal Resources, the Ministry of Natural Resources and Environment, and the International Union for Conservation of Nature (IUCN) to promote mangrove planting—aiming to cover over 5,000 rai in 5 years (2020-2024). The project is implemented at a mangrove forest in the Pak Nam Prasae area, serving as a model on mangrove conservation in other coastal provinces which can be replicated. Key activities include:

- Building a natural outdoor learning center
- Driving the first carbon credit mechanism from the mangrove forests in Thailand
 - Promoting sustainable waste management in the area and sharing knowledge to the community and visitors
 - Promoting community enterprise and additional income from ecotourism on blue carbon destinations

Progress in 2021

- Project steering committee and working group appointed.
- 7,000 mangrove trees planted in 2021, with an accumulation of 23,346 trees planted (2009-2021).
- 557 kilograms of waste collected from the mangrove tree forest (2009-2021).
- Pak Nam Prasae nature classroom innovated and knowledge given on mangroves installed.
- Photo contest of mangrove forest organized.
- Influencers and media invited to visit and learn about the mangrove community's livelihood.

2. “Dow for Sustainable Industry” Project

Dow collaborated with experts from the Department of Industrial Promotion, Ministry of Industry, Plastics Institute of Thailand, National Research Council, Faculty of Engineering at Thammasat University, and Faculty of Science at Kasetsart University on the “Dow for Sustainable Industry” project, to implement medium-sized and small-sized (SMEs) industries in efficiency, safety, and environmental friendliness. The initiative was a part of the “Big Brother” project, in which large private organizations were mentors for SME businesses to strengthen the sustainable economy and environment in Thailand.



In 2020-2021, the “Dow for Sustainable Industry” project undertook renovation through in-depth consultation at no cost for twenty factories in the food and plastic industries. In addition, 4.0 Industrial Manuals were produced, including an assessment form as a guideline for scaling SMEs, modeling for industry 4.0 how to increase production efficiency and promote safety and the environment. The progress that had been achieved since the beginning of the operation in 2020 to 2021 was: reducing the amount of waste from 20 factories at a value of 1.27 million baht, reducing production costs by up to 2.89 million baht, and increasing production power at a savings of up to 2.55 million baht. The cumulative savings across all benefits received from all twenty factories was 6,719,877.80 baht. Moreover, this process could reduce carbon dioxide emissions by up to 4,043.2 tons of carbon per year.

Since the project initiation in 2011, the project has conducted an in-depth consultation in improving more than sixty factories. The consultation also built the abilities of over 6,600 quality employees through knowledge sharing, reduced production, and energy costs by up to 150.72 million baht, and reduced greenhouse gas emissions by up to 5,500 tons of carbon per year.

Moreover, the project improved the quality of over 20,500 employees’ lives by promoting safety, a better working environment, and a systematic energy and waste management—which directly affects the community in a radius of five kilometers of all sixty factories; with over 1 million people who indirectly receive benefits from this project.



3. TBCSD Member

Dow Thailand Group is a member of the Thailand Business Council for Sustainable Development: TBCSD, whose mission is “to accelerate the transition to a sustainable world by making more sustainable businesses in Thailand more successful.” In 2021, Dow served as a member of TBCSD and working on climate change; aiming to determine the direction and the role

of the business sectors in driving climate change issues in Thailand, alongside—as advisors to the group—the Office of Natural Resources and Environmental Policy and Planning (ONEP) and Thailand Greenhouse Gas Management Organization (TGO). The action plans consisted of quarterly training for the organizational members, pushing to become a model business in sustainability (Low Carbon Business), and driving climate change issues. At the policy level of Thailand, together with ONEP and TGO, the projects for reducing greenhouse gas emissions and increasing places to store the greenhouse gas have been established for the long term.

“Stop the Waste” and Promote the Circular Economy



Operation Clean Sweep

Operation Clean Sweep (OCS) is a project of the American Chemistry Council's Plastics Division and Plastics Industry Association (ACC), which has been running for twenty-five years. The purposes of the project are to help operators work closely with plastics and prevent resins or plastic scraps escape into nature; preserving the environment and saving valuable resources. Dow Thailand Group has participated in this project since 2018.

Significant progress was made in 2021 with support and collaboration from the production department, supply chain, and supplier teams as follows:

- Analyzing possible points where plastic can escape from production processes, storage, and transportation. This includes physical equipment (machineries, pipes, containers) and the process of transferring resins from manufacturing to storage areas. We have also installed grilles to trap plastic pallets from wastewater.



- Adding restrictive measurements to prevent plastic resins from escaping into nature such as product storage arrangement, regular cleaning to help prevent the spread of plastic resins on grounds, drainage nets cell installation surrounding storage areas as well as the plastic resins cutting and packing sections, and daily factory inspection.

- Adding compulsory courses on the prevention of plastic leakage to employees in the production section, providing training on related topics and technologies for specific operators, promoting leak prevention, and recruiting more employees to participate in the project by taking responsibility for monitoring leaks.

- Evaluations of logistic providers who also attend “Operation Clean Sweep”.

The progress results in 2021 were successful in meeting the goal of “no plastic escaping into nature” from the production processes of Dow Thailand Group.



Plastic Waste Management Projects Certified Low Emission Support Scheme (LESS) from TGO

Dow Thailand Group operated five projects on plastic waste management. The project was under the Low Emission Support Scheme (LESS) by Thailand Greenhouse Gas Management Organization (TGO). These projects reduced greenhouse gas emissions by up to 147 tons of carbon dioxide.

The five projects include:

1. Recycled Waste Management project under both Bangkok and Rayong offices of Dow Thailand Group.

2. Community Model for Integrated Management project at Ko Klang, Khlong Toei, Bangkok.

3. Save the World project: a collaboration with Ban Chang municipality, Rayong province to run a campaign on waste collection and recycling at sources using three-wheeled electric vehicles.

4. International Coastal Cleanup project at Ban Chang District, Rayong Province.

5. "Dow Stop Wasting Plastic Challenge" project under the campaign #PullingOurWeight and "Save Safe World," promoting waste recycling. This project helped separate used plastics from household waste and promotes reusing / recycling them according to the principles of the Circular Economy.

These five projects not only focused on managing plastic waste but also separating and managing other recyclable materials such as paper, aluminum, steel, glass, etc.



Presenting Innovations for Reducing Plastic Waste —Feeding the Perception of "Plastic...Not Waste"

Dow Thailand Group, collaborating with the Department of Marine and Coastal Resources (DMCR), organized an exhibition area for comprehensive waste management on the occasion of a forest visit by Mr. Varawut Silpa-archa, Minister of Natural Resources and Environment of Thailand, at Kodpor public park, Mueang Rayong District, Rayong Province. The exhibition aimed to raise awareness and change the perception of the community to view used plastic as valuable resources and encourage to collect plastic from the environment; by incorporating marine plastic debris into construction materials to create additional commercial value. In addition, water bicycles were built to collect the garbage in the water and preventing it from contaminating the ocean. The exhibition also encourages tourists' cooperation and promotes recycling according to the circular economy.



First Time in Thailand - Eco-Friendly Packaging Films Made from Recycled Plastic

Dow has registered to collaborate with Thai Packaging Manufacturer (TPK) to develop the packaging "Collation Shrink Film" from a special formulation of plastic resins mixed with post-consumer recycled resin (PCR), which has the same quality as film made from new plastic resins and addresses brands' environmental concerns.

This innovation of plastic resin mixed with PCR is called "XUS 60921.01" and can reduce carbon dioxide emissions by approximately 17% and save energy by up to 30% compared to new plastic resins. The innovation is the first to produce "Collation Shrink Film" using new technology in Asia Pacific and Thailand.



The Online Activity "PullingOurWeight" Promotes Waste Collecting and Separating on the Occasion of International Coastal Cleanup Day

Dow Thailand Group, along with the Industrial Estate Authority of Thailand (IEAT), industrial entrepreneurs, and local governmental organizations in Rayong Province – organized the online activity "#PullingOurWeight" to encourage people to collect waste from nearby water sources and separate it to prevent waste from polluting the environment. This activity was organized on the 2021 International Coastal Cleanup Day. The event was attended by over 1,500 volunteers in the country. Over 1,960 kilograms of waste were collected and separated. The waste is recyclable under the principle of the circular economy for sustainable solutions to marine debris.

The global coastal waste collecting mission was initiated by the Ocean Conservancy on International Coastal Cleanup Day 36 years ago, and the activity in 2021 was the 19th year organized in Thailand. To ensure safety during the spread of COVID-19, the activity format was changed from collecting garbage as a big group of volunteers to collecting garbage in nearby water sources or separating it in their own respected households, counting the amount of collected garbage, taking pictures of the collection, and sending the amount of collected garbage to accumulate with the other garbage collected by environmentally conscious volunteers all over Thailand.



Encouraging Communities to Generate Income from Construction Materials Mixed with Used Plastic that Meet Industrial Standards.

Dow Thailand Group, in cooperation with research communities such as the National Research Office (NRCT), Kasetsart University, and the Rajamangala University of Technology Thanyaburi, formed the partnership “Marine Debris Network to Increase Income in Rayong Communities,” with the collaboration of community groups and community enterprises. The partnership promotes occupations within the Ko Kok community and Eua Athon Village, Rayong Province (Wang Wa); promoting innovative construction material produced from used plastic for the community to generate income, increase their quality of life, and sustainably reduce the marine debris problem.

Construction materials produced from this project meet the industrial standard of the products; and can be used for external construction, such as paving blocks, concrete blocks, and stone curb edges. The materials can replace the stone and sand with plastic at the ratio of 0.4-1.5 kilograms per piece, or approximately 6-10% of total weight—which makes the product lighter and reduces the usage of

unrecyclable materials such as sand and stones. If the bricks are used for paving outside of buildings, they reduce the surface’s heat and make it easier for walking and other outdoor activities during the daytime. The cost of the materials does not differ from regular materials, while also being just as durable—which encourages a circular economy and support concrete solutions using innovation and technology.

Solving Plastic Waste Problems Through Research and Technology

Dow Thailand Group, along with the Institute of Scientific Research and Technology of Thailand (TISTR), organized the project “Science, Technology, and Innovation Leading to Sustainable Local Plastic Waste” project; promoting the use of research and scientific technology and innovation development to solve the issue of local waste and used plastic. The project will lead to quality improvement and create value for recycled waste, including generating sustainable income for local communities according to the circular economy. The project consists of five main activities over a three-year period as follows:

1. Promote a used plastic separating center to develop junk shops and communities by focusing on used plastic management, which includes technology for processing food and agricultural waste. This activity will start at Wang Wa community, Klang district, Rayong province.
2. Build up the recycled plastic standard by designing methods and tools to investigate and check the quality of plastic within the community, such as density and measurement checking.
3. Improve the course “Set Zero Waste,” focusing on knowledge of waste management according to the circular economy.
4. Develop online tools focusing on application development to promote waste management; connecting with communities and entrepreneurs who are verifiably ready.
5. Create take away lessons on successful waste management from communities to form a guide for further expansion to other communities.





Innovation of Transforming Sludge from the Water Treatment System to Soil Conditioner Instead of Using as Fuel

Dow Thailand Group has improved methods for managing sludge from the water treatment and wastewater treatment systems to be utilized as a soil conditioner. In the past, sludges were sent from both systems to be used as fuel for burning in cement kilns, which was highly costly and emitted greenhouse gases from burning and transportation. The research team has analyzed the composition of sludges and investigated methods for processing them into a soil conditioner in collaboration with academics from the Department of Agriculture, to ensure that sludge from the wastewater treatment system will be unharmed and safe for soil improvement according to the circular economy.



Improving "Greenplas Pallet," an Artificial Wood Manufactured from Used Plastic for Industrial Transportation

Dow Thailand Group, along with Unilever Thailand Co., TPBI Public Co., Ltd., B.M.J. Enterprise Co., Ltd., and King Mongkut's Institute of Technology Ladkrabang, have innovated a pallet for product storage and industrial transportation that is composed of artificial wood and used plastic packaging which is ordinarily difficult to recycle—such as multilayer plastic packaging bags (e.g.,

fabric softener bags, detergent bags, shampoo-conditioner packets), and recyclable colored or opaque packaging bottles that not many stores buy, such as shampoo bottles, dishwashing liquid bottles, etc.

"Greenplas Pallets" are being used in Dow's factories and warehouses, which reduces waste by more than 104 tons per year. In the first phase, Dow plans to use approximately 147,000 artificial wood sheets per year to produce over 59,000 pallets, which can reduce carbon dioxide emissions by approximately 108 tons annually—equivalent to planting 333 rai of trees per year. Dow plans to promote further commercialization of the pallets to other companies.

"Greenplas Pallet" is made from artificial wood consisting of wood powder and used plastic for real wood replacement at a ratio of 10-45%. The pallet is currently one of the few products that allows plastic waste to be reused in massive amounts as it is an equipment used for the storage and transportation of products in almost every industry.



Driving PPP Plastics

Dow collaborated with partners in both governmental and private sectors to establish PPP Plastics in 2018. The purpose of PPP Plastics is to support the governmental sectors in managing used plastic effectively under the circular economy; bringing it back as material for production, including reducing the amount of waste being buried. The activities of PPP Plastics have helped reduce waste by over 1,400 tons. In 2021, the significant achievements of PPP Plastics were as follows:

Developing Used Plastic Management

- Developing the "Recycle Marketplace" application to be a central marketplace for trading recycled products by connecting waste collectors, junk shops, and recycling companies to reuse good-quality plastic as an effective material. This process began in the middle of 2022.

- Expanding the use of plastic management models in Rayong covering 35 governmental organizations; reusing over 700 tons of used plastic. This process expands the model, covering all 68 organizations in Rayong Province.

- "Magic Hands x Loops" project, making used plastic waste management systems. The process began in 2020, bringing more than 25 tons of stretch plastic, which was hard to store, into the recycling system.

Used Plastic Innovations

- PPP Plastics has received research funds to prepare for the expansion of plastic roads in governmental areas and develop an option to build the roads in Thailand with the collaboration of the Department of Highways, Department of Rural Roads, and Chiang Mai University. The study from Chiang Mai University found that plastic

roads had better engineering properties than asphalt concrete in every dimension, especially in their ability to resist disasters caused by water and humidity. Low-value plastic such as handle bags, straws, thin glasses, snack bags, trays, and plastic cutlery can be used for constructing roads. A study in efficiency and environmental effect aspects found that plastic roads did not contain any cracks or contamination of mixed plastic in the processes of mixing, construction, and under load conditions in both water and air aspects compared with roads made of asphalt concrete. Plastic roads not only incorporate the engineering properties of asphalt concrete, but also create additional value for used plastic and reduce the amount of plastic being buried. If plastic roads are constructed in all areas of Thailand, 30,000 tons of plastic will be reused per year expanding the opportunity and promoting a circular economy which is related to the BCG model policies for Thailand's sustainable economic and social development.

Elevating Circular Economic Policies

- The study and development of a certification system for materials and plastic products containing Post-Consumer Recycled (PCR) by the Plastic Institute promotes a circular economy in Thailand, focusing on building confidence in brand owners and consumers through a standard certification system for materials and plastic products; permitting entrepreneurs to compete in a global market that promotes the environment. Measures for trading and production have been implemented, requiring that products from entrepreneurs must contain PCR at a proper rate.

- Development of the Extended Producer Responsibility system in Chonburi province with the collaboration of the Thailand Institute of Packaging and Recycling Management for Sustainable Environment (TIPMSE).

Contributions to Change for the Well-Being of Employees and Communities

Create an Engaging and Happy Work Environment with ERG and eX



Employee Resource Groups (ERG)

Employee Resource Groups (ERG) are Dow employee networking activities in the form of clubs. The purposes of ERG are to promote the acceptance of diversity regarding race, religion, culture, age, belief, and gender as well as encouraging employees to embrace diversity, leading to effective teamwork. Currently, Dow has 10 ERG global groups, with 5 of them originating from Dow Thailand Group as follows:

- **ADN (Asian Diversity Network)** A network for employees who are interested in Asian societies and cultures.
- **DEN (Disability Employee Network)** An employee network to support physical and mental disabilities.
- **GLAD** An employee network for gender diversity.
- **PRIME** A network for senior employees with extensive experience.
- **RISE** A network for new employees.
- **WIN (Women's Inclusion Network)** A network to support female employees.

In 2021, ERG groups at Dow Thailand Group continually organized activities such as the "All IN ERG FUND" contest, the "Photos of Mothers" contest from the WIN group, "How to Advise Friends without Letting Them Down with DEN" by the DEN group, and a lecture on the topic of "Understanding with Heart During WFH" on the occasion of Thailand Inclusion Day 2021.



Employee eXperience

Employee eXperience (EX) creates good experiences among employees and companies across every dimension. In 2021, the EX activities for Dow Thailand Group employees were organized into several formats through online platforms as follows:

- **Wellbeing & Psychological Safety** : to enhance quality of life and mental health, with activities for reducing stress, improving time management, boosting personal finance, and a podcast, as well as online recreational activities such as Zumba dancing, watercolor painting, long-distance buddy matching, and sending gifts to Work-From-Home employees.
- **Recognition & Moments that Matter** : Celebrating important events such as an online New Year's Party and work anniversaries.
- **Tools, Technology, Process** : Resources for friendly working such as a one-stop service by HR and online insurance disbursement.
- **Vision & Strategy** : Understanding organizational visions and strategies, with company strategy updates.
- **Development Opportunities** : Promoting opportunities for self-improvement, through online webinars.

Create Quality and Sustainable Societies Through Various Projects



Dow Chemistry Classroom

Dow Thailand Group, cooperating with the Chemical Society of Thailand and partner agencies, has organized "Dow Chemistry Classroom" since 2013 to improve Thailand's science learning classroom through the Small-Scale Chemistry Laboratory. The Small-Scale Chemistry Laboratory uses 1,000 times fewer chemicals than a regular laboratory, while providing a high level of safety and promoting self-experimentation and self-learning.

The main activities of this project organized every year are small-scale chemistry workshops for secondary-level students, small-scale chemistry experiment contests, and training of role-model teachers. These activities develop potential, prepare instructors to be lecturers, and share techniques for small-scale chemistry practice. From 2013 to the end of 2021, over 2,000 teachers from 1,055 schools have been trained, and over 300,000 students have benefitted.

In 2022, the Office of the Basic Education Commission (OBEC) became a partner in this project for expanded knowledge sharing in secondary-level schools all over the country.



DOW-EF Development for Successful Youth & Rayong Happiness

The "Dow-EF" project aims to promote children's success in the community through knowledge around the development of prefrontal brain skills that help humans with emotional control, restraints, critical thinking, and decision making. These skills affect general habits in thinking, acting, learning, and solving problems. Executive Functions (EF) are the important cognitive skills in controlling a human's IQ and EQ, which are developed effectively between the ages of 0-6 years and are fully developed by age 25.

Achievements of the Dow-EF project "Developing Youths for Success" in Rayong Phasuk in 2021 were as follows:

- Strengthening the working and networking mechanisms by meeting with the board and sub-committees to expand EF knowledge to 300 other sectors.
- Organizing Live Blended Participatory (LB-PL) training via Zoom for 200 primary school teachers from child development centers and educational personnel under the Rayong Primary Educational Service Area Office (Office 1 and Office 2).
- Training the life vaccine team leaders (Change Agents) and EF Facilitators, leading to an increase of over 1,300 team leaders and more than 40 EF Facilitators.
- Expanding activities supporting EF in the community to reach over 10,000 children and their parents.



Scan QR Code for watching Dow-EF video

TRC-Dow Clean Drinking Water for Students

Dow Thailand Group, cooperating with the Relief and Community Health Bureau, Thai Red Cross Society, installed water filters under the project "TRC-Dow Clean Drinking Water for Students" in ten provinces, including Rayong, Chachoengsao, Phra Nakhon Si Ayutthaya, Nakhon Nayok, Nakhon Sawan, Kanchanaburi, Chainart, Nakhon Pathom, and Uttaradit. The project aimed to promote good health for children and prevent illness from germs contaminating unclean water.

In 2021, the water filters were the continual responsibility of the project; collecting data on usage, investigating microbial contamination, and being maintained to ensure that the filters worked effectively and were ready for use after semesters began at schools. Over 8,000 students per year benefited from this project.



V-ChEPC Project

Dow Thailand Group has supported "Vocational Chemical Engineering Practice College" (or V-ChEPC) to improve courses answering industrial needs. Through this project, students have been awarded full scholarships during their studies. Currently, 13 student classes have graduated from V-ChEPC courses and all graduates are guaranteed to get a job offer after graduation.

Dow Thailand Group's support for the V-ChEPC project from 2009- 2021 was:

- Budget support of 10 million baht.
- Hiring intern students for Dow factories.
- Inviting expert employees as guest lecturers to teach students.
- Hiring eighteen graduates from the project to work for Dow.

Community Partnership Association (CPA)

Dow is one of the founding members of the Community Partnership Association (CPA) which is the first collaboration between industrial entrepreneurs in Thailand who are committed to improving and developing industries to be environmentally friendly and support sustainable communities. The activities of the association in 2021 were:



- Developing an eco-industrial city to reach the highest standard (Level 5)
- Enhancing communities' quality of life in the Map Ta Phut Complex area in 3 aspects: 1. Education and Health 2. Environmental Care, including increased green areas 3. Community Economic Development through the Thammasat Model by developing community enterprises in both products and marketing channels which currently have 38 locations.
- Promoting Eco Factory standards by renewing certifications for all factories.
- Providing Nurse Fellowships.
- Providing Public Health Scholarships, cooperating with the Rayong Provincial Administrative Organization.
- Supporting online tutors for university admission' students.
- Providing undergraduate and vocational scholarships.
- Holding a CPA Open House—A Guidance on University Education.
- Organizing CPA VCamp Online to promote and support vocational education.
- Executing community emergency plans and forming proactive environmental surveillance networks.



Dow's Contribution during the COVID-19 Pandemic

In 2021, Dow was committed to supporting work from sectors handling COVID-19 under the project "Dow Cares, Navigating COVID in Thailand" assisting in several ways, which contributed to over 7,000,000 baht.

1. Collaboration with Solvay Company Group, donating 253,000 liters of hydrogen peroxide disinfectant to Rayong Province across many districts, public health agencies, educational institutions, 400 child development centers in the province, and in Bangkok for disinfection in important areas.

2. Providing equipment, alcohol gel, survival bags, food, and water to major sectors all over the country, which contributed up to 400,000 baht.

3. Supporting work from the Department of Public Health, field hospitals, and community isolation facilities in Rayong Province, which contributed to over 5 million baht. The main activities are as follows:

- Procurement of high-flow oxygen machines to the Siriraj Foundation.
- Providing full-face protection masks with Powered Air-Purifying Respirators (PAPRs) to Rayong Hospital.
- Donating two positive swap-test pressure units to Rayong Hospital and the Ban Chang District Public Health.

- Collaborating with Captain Coating Co., Ltd., supporting several types of painting products to Rayong Field Hospital.
- Collaborating with Bangkok Foam Co., Ltd., donating 500 sets of mattress pads made from polyurethane foam covered with PVC to Rayong Field Hospital.
- Collaborating with Bangkok Cable Co., Ltd., donating electric wires, aluminum conductors, and PVC-insulated copper conductors.
- Donating 75 kilograms of Zeolite or sorbent pallets to be used as the materials for oxygen concentrators.
- Collaborating with Eastern Polymer Group (Public) Co., Ltd., or EPG, donating 600 sets of Aeroklases field hospital beds, mattress pads, and bedding sets to Rayong Field Hospital.
- Collaborating with Plastic Institute, the Ministry of Industry, donating 1,000 sets of Thai Kit Spacer inhalers to Thammasat University Hospital.

2021 Dow Awards

In 2021, Dow Thailand Group received three awards for maintaining Dow’s eco-friendly production standards and supporting the environment



1 The Ambassador’s Award for Excellence in Thai-U.S. Partnership

The American Chamber of Commerce in Thailand awarded Dow for the Promotion of Low Carbon Technology with work on presenting sustainable technology to several agencies in Thailand, and raising global warming solutions and reducing plastic waste.

Dow has been driving and demonstrating low-carbon technology in Thailand by presenting sustainable innovations through experts in materials science, and collaborating with all sector partners to prevent global warming. The progress is exhibited in several ways, such as collaboration with customers using the innovations, creating a marketplace for used plastic, and sharing knowledge with Thailand SMEs.

2 The Prime Minister's Industry Award 2021

Siam Polyethylene Co., Ltd., under Dow Thailand Group, received the 2021 best industry award in Circular Economy aspects from Prime Minister Prayut Chan-o-cha. The four principles of Dow’s work to promote the circular economy are 1. material procurement, 2. production process, 3. innovative products, and 4. post-product management while promoting cultural organization.



3 The Green Industry Award (Level 4) from the Ministry of Industry

Four factories of Dow Thailand Group consisting of polystyrene (Siam Polystyrene Co., Ltd.), ethylbenzene and styrene monomer (Siam Styrene Monomer Co., Ltd.), styrene-butadiene (Siam Synthetic Latex Co., Ltd.) and synthetic latex emulsion (Carbide Chemical (Thailand) Co., Ltd.) were certified as Green Industry Level 4: Green Culture. This certification honors entrepreneurs who are committed to operating environmentally-friendly and developing sustainable businesses.



List of Dow Awards

Dow is committed to working with society, the environment, and for the safety and welfare of employees, communities, and all stakeholders. Dow would like to thank every organization for bestowing valuable awards that support our team members, who are always behind our success.

No.	Name	Organization	Year
1	The Ambassador's Award for Excellence in Thai-U.S. Partnership	The American Chamber of Commerce in Thailand (AMCHAM)	2021
2	Best Industries in Circular Economy	Ministry of Industry	2021
3	Green Industry Level 4	Ministry of Industry	Since 2019
4	Plaque of Honor for Organizations that Benefit Children and Youth	Department of Children and Youth, Ministry of Social Development and Human Security	2018
5	Plaque of Honor for Supporting Activities of Prostheses Foundation of Her Royal Highness the Princess Mother	Prostheses Foundation of Her Royal Highness the Princess Mother	2016 - 2020
6	Halal Entrepreneur Award	Rayong Provincial Islamic Committee Office	2015 - 2016
7	Carbon Footprint Certification for Products	Thailand Greenhouse Gas Management Organization (Public Organization)	2015
8	Certificate in "Safe Organizations in Honor of Her Royal Highness Princess Maha Chakri Sirindhorn"	Department of Labor Protection and Welfare, Ministry of Labour	2015
9	Outstanding Standard Award in Social Responsibility of Industrial Entrepreneurs	Department of Industrial Works, Ministry of Industry	2015 - 2016
10	Plaque of Certification in Eco-Industry	Thailand Environment Institute, The Federation of Thai Industries, Ministry of Industry	2015 - 2019
11	Promoting the Use of Waste Project	Department of Industrial Works, Ministry of Industry	2015
12	Asian Social Responsibility Award Winner in Environmental Field	Asian Institute of Management-Ramon V. del Rosario, Sr. Center for Corporate Social Responsibility	2014
13	Best Employee Award	Prompt Professional Resources & Services Co., Ltd.	2013
14	Gold Medal in the Campaign for Reducing the Statistic of Accidents from Work to Zero	Ministry of Labour	2013 - 2014
15	Organizational Award in Social Responsibility (Platinum Class)	The American Chamber of Commerce in Thailand (AMCHAM)	2011 - 2021
16	Certificate for Honor in Reporting Environmental, Health, and Safety Indicators	The Federation of Thai Industries	2010
17	Governance Award for Excellence in Environmental Management and Social Responsibility (Green-Star and Gold-Star White Flag)	Industrial Estate Authority of Thailand	2009 - 2020
18	Green Event Certification	Thailand Business Council for Sustainable Development (TBCSD)	2009 - 2014
19	ISO 9001: 2015 Certificate	Lloyd's Register International (Thailand) Limited	1998 - Present
20	ISO 14001: 2015 Certificate		2001 - Present
21	FSSC22000 Certification		2015 - Present



Dow Thailand Group

Head Office

99/1 BJC 2 Building,
Soi Saengchan-Rubia, Sukhumvit 42 Road,
Prakanong, Klongtoey, Bangkok 10110
Tel: 0 2365 7000
Fax: 0 2381 1249

Manufacturing Sites

Map Ta Phut Industrial Estate
8, I-4 Road, Map Ta Phut Industrial Estate,
Muang District, Rayong 21150
Tel: 0 3867 3000
Fax: 0 3868 3991

Manufacturing Sites

Asia Industrial Estate

10 Moo 2, Asia Industrial Estate
P.O. Box 71, Banchang Sub-District,
Banchang District, Rayong 21130
Tel: 0 3892 5500
Fax: 0 3860 5903

Cover photo credit

"Collared kingfisher"
At Pak Nam Prasae
Klaeng District
Rayong Province
By Sirachai Arunrugstichai

 www.dow.com/thailand
 Dow Thailand
 Dow Thailand Group