







Sustainable **Growth** 



**DOW THAILAND GROUP** 











We invite you to give children an opportunity to drink clean water every day by supporting water filter replacement and maintenance costs under the "Thai Red Cross – Dow Clean Drinking Water for Remote Schools" project, where we will install and maintain water filtration systems at 50 remote schools nationwide.

Thanks to your generous contribution, the children will have good health and quality for unlimited learning. You can help take care of drinking water for children by donate to The Thai Red Cross Society at

Account Name: Foundation Sapharkachardthai

Siam Commercial Bank PCL., Thai Red Cross branch, savings account number 045-2-88000-6.

Please fax or email your transfer slip together with your name, address and phone number to 0-2250-0120 or finance@redcross.or.th specifying the "Thai Red Cross – Dow Clean Drinking Water for Remote Schools" project (Relief and Community Health Bureau). For further information, please contact Tel. 0-2256-4000 ext. 92174 or 92175

Remark: To avoid repetition, please choose only one channel to submit your transfer slip.



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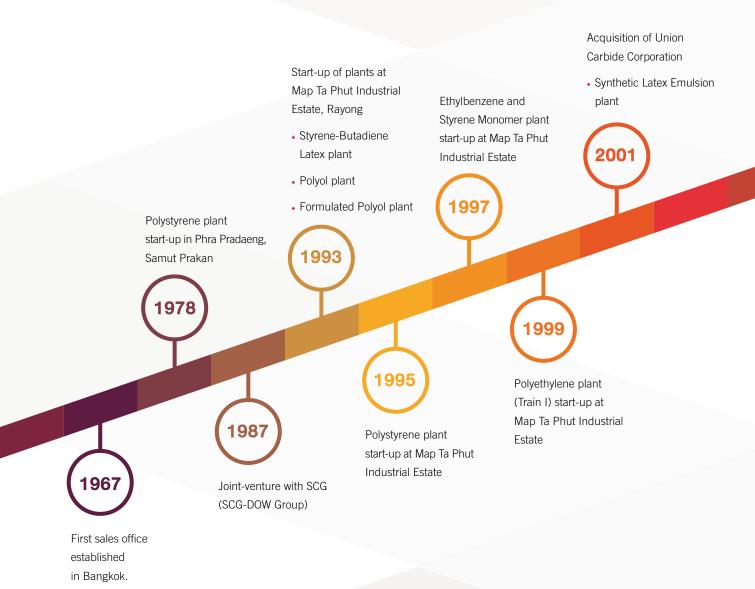


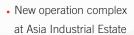
# Celebrating 50<sup>th</sup> Anniversary of DOW Thailand and 30<sup>th</sup> Anniversary of SCG-DOW Group

### Testament of Strong Collaboration and Sustainable Growth

Starting from our first step in Thailand in 1970, we are proud to be a part of Thailand's development in various dimensions ranging from driving economic growth, responding to industrial needs, making innovative products and solutions, developing technology of tomorrow, enhancing life quality and safeguarding the Planet Earth. We are committed to continue to adhere to these efforts to bring values to the entire society.

2017 is an auspicious moment for Dow Thailand Group. We are celebrating our 50<sup>th</sup> anniversary as well as honoring our close collaboration with SCG that results in the SCG-DOW Group, which is also celebrating its 30<sup>th</sup> anniversary this year. With commitment and dedication that passed on from generations to generations of management and employees and with great camaraderie developed among us throughout our journey, Dow Thailand Group including the SCG-DOW Group are confident to build a sustainable growth in parallel with a growing Thai society.





- Start-up of plants at Asia Industrial Estate
- Specialty Elastomers plant
- Hydrogen Peroxide plant
- Propylene Oxide plant

Polyether Polyol plant start-up at Asia Industrial

2015

Estate

Dow Thailand Group's 50th Anniversary and SCG-DOW Group's 30th Anniversary

2017

 Acrylic Emulsion plant Poly-Acrylic Acid plant

Acquisition of Rohm and Haas Company

2009

2011

2012

2016

Acquisition of Dow Corning Company

2007

Dow and Solvay's joint-venture announcement for a Hydrogen Peroxide plant project at Asia Industrial Estate, Rayong

2010

Polyethylene plant (Train II) start-up at Map Ta Phut Industrial Estate

 Polyolefin Encapsulant Films plant start-up at Map Ta Phut Industrial Estate (Sold to First Material Science (Thailand) Co., Ltd. in 2016)

- Propylene Glycol plant start-up at Asia Industrial Estate
- Map Ta Phut Non-routine Analysis Laboratory established at Hemaraj Eastern Industrial Estate (Map Ta Phut), Rayong

# Awards/Recognitions in 2016





### Halal New Entrepreneur Prize 2016 (3 consecutive years)

The Central Islamic Committee of Rayong

- Propylene Oxide Plant
- Propylene Glycol Plant



# Carbon Footprint Certificate Thailand Greenhouse Gas Management Organization (TGO)

- Product: Styrene Monomer (Siam Styrene Monomer Co., Ltd.)
- Product: Latex DL 930PA (Siam Synthetic Latex Co., Ltd.)
- Product: Polystyrene GPPS 685D (Siam Polystyrene Co., Ltd.)

#### 2016 Good Governance Awards

Industrial Estate Authority of Thailand (I-EA-T)



#### "Gold Star" awards: 10 plants

- Ethylbenzene and Styrene Monomer Plant (Siam Styrene Monomer Co., Ltd.)
- Polystyrene Plant (Siam Polystyrene Co., Ltd.)
- Polyethylene Plants Train I & II (Siam Polyethylene Co., Ltd.)
- Polyol Plant and Formulated Polyol Plant (Dow Chemical Thailand Ltd.)
- Styrene-Butadiene Latex Plant (Siam Synthetic Latex Co., Ltd.)
- Synthetic Latex Emulsion Plant (Carbide Chemical (Thailand) Ltd.)
- Acrylic Emulsion Plant and Poly-Acrylic Acid Plant (Rohm and Haas Chemical (Thailand) Ltd.)



#### "Green Star" awards: 14 plants

- Ethylbenzene and Styrene Monomer Plant (Siam Styrene Monomer Co., Ltd.)
- Polystyrene Plant (Siam Polystyrene Co., Ltd.)
- Polyethylene Plants Train I & II (Siam Polyethylene Co., Ltd.)
- Polyol Plant and Formulated Polyol Plant (Dow Chemical Thailand Ltd.)
- Styrene-Butadiene Latex Plant (Siam Synthetic Latex Co., Ltd.)
- Specialty Elastomers Plant (Siam Synthetic Latex Co., Ltd.)
- Synthetic Latex Emulsion Plant (Carbide Chemical (Thailand) Ltd.)
- Acrylic Emulsion Plant and Poly-Acrylic Acid Plant (Rohm and Haas Chemical (Thailand) Ltd.)
- Propylene Oxide Plant (MTP HPPO Manufacturing Co., Ltd.)
- Propylene Glycol Plant (Dow Chemical Thailand Ltd.)
- Polyether Polyol Plant (Dow Chemical Thailand Ltd.)



# Outstanding Organization in Promoting Science Education in Thailand Award 2016

The Professor Dr. Tab Nilanidhi Foundation

• Dow Thailand Group



#### 2016 AMCHAM Corporate Social Responsibility Excellence Recognition Award in Gold Level and Creative Partnership

The American Chamber of Commerce

• Dow Thailand Group



Dow Thailand Group



#### **Eco Factory Certificate**

The Industrial Environmental Institute, The Federation of Thai Industries

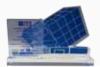
- Ethylbenzene and Styrene Monomer Plant
  - (Siam Styrene Monomer Co., Ltd.)
- Styrene-Butadiene Latex Plant (Siam Synthetic Latex Co., Ltd.)
- Polystyrene Plant (Siam Polystyrene Co., Ltd.)



#### Corporate Social Responsibility, Department of Industrial Works (CSR-DIW) Award 2016

Department of Industrial Work, Ministry of Industry

- Ethylbenzene and Styrene Monomer Plant
- Styrene-Butadiene Latex Plant
- Polystyrene Plant



### National Science Museum Recognition Award 2016

National Science Museum

• Dow Thailand Group



### Certificate of Enterprise Architecture Excellence 2016

Friendly Design for All Foundation

Dow Thailand Group

### **Message from Managing Director**



Dow Thailand Group had a great success in 2016. With our strong teamwork and business collaborations, we achieved our goals which greatly contributed to our favorable business performance.

In 2016, Dow Thailand started building Dow's first Analytical Technology Center in Asia Pacific at the Asia Industrial Estate, Rayong Province. The center will bring together world-class technologies with highly-skilled professionals from network all over the world to deliver new innovations and solutions for our clients. Once commencing in full operations in 2017, the center will enable us to better respond to our clients' needs and deliver highly efficient production which will contribute to high value added manufacturing and Thai industry. This will help support Thai economy to move forward.

In remembrance of His Majesty King Bhumibol Adulyadej, we initiated a series of good deed activities including corporate social responsibility and sustainability programs in order to encourage our employees and stakeholders to perform good deeds as a tribute to His Majesty King Bhumibol Adulyadej. All of those activities are also a platform for our employees to turn their capacity into talents to positively impact both economy and society. With our commitment to building the workforce of tomorrow and global solutions, we wish to bring sustainable growth to Thailand.

At Dow, we have nearly 7,000 researchers in research and development centers all over the world to develop new technologies and innovations to support various industries. As a solution provider, we work closely with our customers to deliver products that address the modern societal needs and positively impact the world we live in. We will be a partner of choice to propel Thai industry to a new level of innovation and enter the Industry 4.0 era.

Our great success would not be achieved without the support of our stakeholders. I'd like to express my heartfelt appreciation to our employees, customers, business partners, government, and communities for your thorough support. We truly hope to earn the same trust and support from you in the years to come.

Jirasak Singmaneechai

Managing Director

Dow Thailand Group







#### Name of reporting organization



Dow Thailand Group comprises the companies of Dow Chemical Thailand and SCG-DOW Group.









#### Primary brands, products, and/or services



Dow Thailand Group consists of a total of 15 wholly-owned subsidiaries and joint venture companies (5 wholly-owned subsidiaries and 7 SCG-DOW joint venture group of companies managed by Dow, 3 SCG-DOW joint venture group of companies managed by SCG) and 1 Solvay and Dow Chemical joint venture company managed by Solvay.

Dow Thailand Group has 14 world-class plants equipped with state-of-the-art technology and combined annual production capacity of more than two million tons of products for local and regional distribution. The group's total investment (gross initial investment in plants during start up which is not accounted for any accumulated depreciation) is approximately 135 billion baht (US\$ 4 billion) and its total assets as of December 31, 2016, was approximately 94,171 million baht or US\$ 2.629 billion.

Dow Thailand Group has more than 1,000 lists of product families sold in Thailand. Either produced locally or imported for sales, these high-quality products are classified as follows.

- 1. Products produced in Thailand: Being Dow's largest production base in Asia Pacific, every plant of Dow Thailand Group is equipped with world-class, sophisticated technology as well as high-standard environmental and safety management systems. A variety of products are produced in Thailand and can be separated into five major groups as follows.
  - Polyethylene The success of Dow's first polyethylene factory in Asia Pacific that effectively responded to the needs of local and international markets especially those in the Asia Pacific region has led to an opening of the second plant that is highly integrated with the first one. The new plant uses state-of-the-art process automation system, containing software developed by Dow that allows us to provide broader product coverage and faster responses to customer needs. High-quality products under this group become materials for food and consumables packaging to guarantee freshness and safety before reaching consumer's hands. Not only polyethylene is a material for packaging of dry and liquid foods, meat and cheese but also medical supplies and animal feeds. In addition, this substance can be turned into stretch cling film, durable furniture, artificial grass and outdoor furniture.
  - **Elastomers** As a result of the world's most sophisticated elastomers manufacturing technology to meet rapidly-growing demands within the region, highly-flexible but durable plastic pellets are mostly used in the automotive industry especially for interior work. Elastomers can be turned into console covering, interior door panels and instrument panel components. Elastomers is also applied to exterior vehicle surface of, for example, front and back bumpers thanks to its lightness and durability that improves vehicle energy efficient and durable. Moreover, this substance can be used as a raw material for lightweight, highly flexible and high-resistant shoes. Elastomers also involves in a construction materials industry where it is used as part of roof and water-resistant materials.















• Polyurethanes – Being the world's leader in polyurethanes, Dow runs factories in the entire chain from upstream to downstream including propylene oxide, propylene glycol, polyol and formulated polyol as well as polyether polyol. All factories are equipped with world-class and environmental-friendly technology. Dow Thailand Group's polyurethanes business consists of the Polyurethanes Foam and the Propylene Glycol group. Flexible and rigid polyurethanes foam are used in the bedding and furniture industry where it's turned into mattresses & pillows, bath sponges as well as couch and sofa cushions. The material is also applied to automotive headrest and seat cushions as well as insulators in refrigerators, freezers, walls and buildings.

Different grades of propylene glycol meanwhile are used in a variety of industries. Food-graded materials are used as chemicals in pharmaceutical industry. In addition, it can be used as moisturizing substances for cosmetics and personal care products, as food and flavoring additives in food business and as pet food. Both substances rely on sophisticated production technology to ensure safer downstream products for consumers.

- Coatings The coating business aims to design innovative products that answer to customer needs through Dow's global leadership in product research and development. The business consists of factories producing synthetic latex, acrylic emulsion and poly-acrylic acid solutions. Coating materials are used as binder for both interior and exterior water-based emulsion paint. Its resistance to pollution enables the production of paint with faint odor by reducing formaldehyde level. This unique properties help reduce costs of production while making a product more users and environmental friendly.
- Polystyrene Being Dow Thailand Group's first factory built in Phra Pradaeng in 1978 before being relocated to Map Ta Phut in 1995, the polystyrene plant got raw materials from one of the Group's subsidiaries Siam Styrene Monomer Co., Ltd., to produce multi-purpose high-quality plastic products found in a wide range of every day's item. This refers to hard, clear, high-quality plastic pellets for use in making packaging, TVs, and refrigerators, and toys as a result of its durability and safety for consumption.

Dow and SCG have jointly invested in two ethylene cracker factories and storage and port facilities service provider in Rayong province. We have also jointly invested with Solvay, the world's leading manufacturer of chemicals and special materials, to produce hydrogen peroxide, a raw material for propylene oxide. In addition, we own and operate a top-notch analytical laboratory that can analyze highly complex data and solve production-related problems to enhance our production process's capability.

Dow's products imported and distributed in Thailand are classified into five categories as follows.









- Agricultural Sciences Chemicals for agriculture and pest management products
  are under this category. The product will enhance farming productivity and can
  be easily dissolved. Users' safety is also our main priority. We have teams to
  regularly educate farmers to use agrichemical products safely. In addition, Dow
  Thailand Group also runs a regular health check-up program for farmers.
- Consumer Solutions This refers to moisturizing substances in skincare
  products, thickening agents to prevent backflow, child-friendly formula
  shampoos and flavoring additives. Our products are safe for consumption as
  they are extracted or synthesized from natural raw materials such as cotton and
  plant fibers.
- Infrastructure Solutions Products under this group are diverse. Majority of
  them are used in constructions or infrastructure. They will add strength and
  durability while remains energy-efficiency. They can be used as one of the
  ingredients in cement, paint, flooring solutions and building insulator using in
  various industries (including energy industry). In addition, our high efficiency
  reverse osmosis water filtration system is counted under this group. This
  filtration system not only helps reduce energy usage but also less wastewater
  emission.
- Performance materials & Chemicals Solvents, Amines, Surfactants and other
  industrial chemicals are high-quality products under this group geared for
  industrial use. The business supports industrial manufacturers associated with
  virtually all end markets, notably electronics, agricultural chemicals, engine/heavy
  equipment, coatings, adhesives and inks, and detergents and cleaners.
- Performance Plastics Products under this group include Elastomers and Performance Packaging, e.g. Polyethylene, Plastic adhesive, which are not produced in Thailand.

### Location of organization's headquarters

Bangkok, Thailand



#### **Countries of operation**



Dow Thailand Group operates 14 plants in Map Ta Phut Industrial Estate, Asia Industrial Estate; and Hemeraj Eastern Industrial Estate (Map Ta Phut) in Rayong province, Thailand.

### Nature of ownership and legal form



Dow Thailand Group is considered the largest manufacturing base of Dow Chemical in the Asia-Pacific region, which consists of 16 companies under two main organization structures:

#### 1. Group of Dow Chemical Thailand

Group of Dow Chemical Thailand is a group of Dow wholly owned subsidiaries held by Dow Group in US at 99.99 percent of the shares, consisting of five companies as follows:

- 1.1 Dow Chemical Thailand Ltd.
- 1.2 Carbide Chemical (Thailand) Ltd.
- 1.3 Rohm and Haas Chemical (Thailand) Ltd.
- 1.4 Dow AgroSciences (Thailand) Ltd.
- 1.5 Dow Corning (Thailand) Ltd.

#### 2. Group of Joint ventures

#### 2.1 SCG-DOW Group

SCG-DOW Group is a joint venture of equal equity between SCG Chemicals Co., Ltd. and Dow Chemical of 49.99 percent each, which forms a close-knit collaboration in five core businesses under operations by five companies and two holding companies. These seven companies under SCG-DOW Group are operated and managed by Dow Chemical as follows:

- 1) Siam Polyethylene Co., Ltd.
- 2) Siam Styrene Monomer Co., Ltd.
- 3) Siam Polystyrene Co., Ltd.
- 4) Siam Synthetic Latex Co., Ltd.
- 5) MTP HPPO Manufacturing Co., Ltd.
- 6) SD Group Service Co., Ltd.
- 7) Banchang HPPO Co., Ltd.

#### 2.2 Joint-Ventures between Dow and SCG (operated by SCG)

Dow Chemical and SCG established a joint venture in a cracker business under the operation and management of SCG, in the form of two limited companies: Rayong Olefins Co., Ltd. and Map Ta Phut Olefins Co., Ltd., and jointly operate a storage and export facility service business under Rayong Terminal Co., Ltd.

#### 2.3 Joint-Venture between Dow and Solvay S.A. (operated by Solvay S.A.)

MTP HP JV (Thailand) Ltd. is a joint venture of equal equity between Solvay and Dow Chemical, which forms a close-knit collaboration under the operation and management of Solvay.

#### Markets served



Foreseeing market trends of our products on the basis of demographic information, today's lifestyle and the world's existing natural resources, we anticipate more needs from consumers for comfort and convenience as well as faster and convergent communications. At the other end, increasing population also means higher demands for food and water resources. With this picture in mind, we focus our business in research and development that will result in innovation and technology to answer to these demands. Our products are a variety of items featuring in people's daily life to make their livelihood better, which include those that allow more people to get access to food and clean drinking water through higher agricultural productivity and more sophisticated water filtration technology.

Being Dow's largest production base in Asia Pacific, Dow Thailand Group is able to accommodate eclectic demands of local and international customers. Of our production, 42 percent are sold in Thailand while the remaining 58 percent are exported in Asia Pacific region.

Customers that are most important are those eyeing for high-quality, high-tech and innovative products as well as those looking for business partners to enhance product development. We can find them in various industries ranging from consumer products to electronic devices and from large industries such as infrastructure, construction to energy.

#### Scale of reporting organization

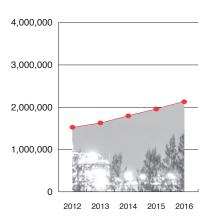


Number of Dow Thailand employees as of December 31, 2016 is 953 people.

Currently, there are a total of 14 manufacturing facilities in Map Ta Phut Industrial Estate, Asia Industrial Estate and Hemaraj Eastern Industrial Estate (Map Ta Phut) in Rayong province. Thailand is the largest manufacturing base of Dow in Asia Pacific. Thailand has around 4 percent of Dow's asset base worldwide.

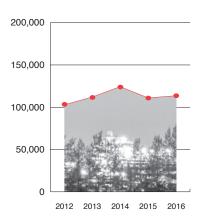
### **Total production of Dow Thailand Group** in past 5 years





### Net sales of Dow Thailand Group in past 5 years

#### (millon baht)



Remarks: Net Sale of Thailand entities is unaudited.

#### **Total workforce**



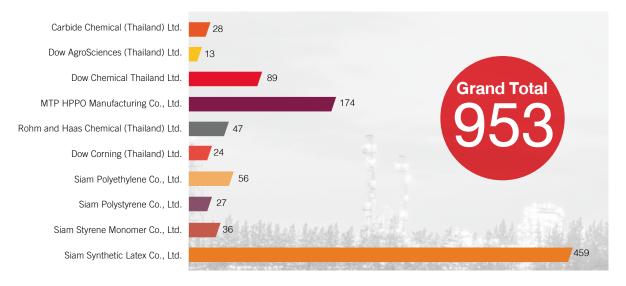
#### Total number of employees by gender and location

Location/Gender	Female		Male		Number of employees	
	Persons	%	Persons	%	Persons	%
Bangkok	133	13.96	71	7.45	204	21.41
Rayong	191	20.04	558	58.55	749	78.59
Grand Total	324	34.00	629	66.00	953	100.00

#### Total number of employees by age and gender

Age/Gender	Female		Ma	ale	Number of employees	
	Persons	%	Persons	%	Persons	%
Below 30	59	6.19	116	12.17	175	18.36
30 - 40	167	17.52	329	34.52	496	52.05
41 - 50	86	9.02	160	16.79	246	25.81
Above 50	12	1.26	24	2.52	36	3.78
Grand Total	324	34.00	629	66.00	953	100.00

#### Total number of employees by company



#### Percentage of total employees covered by collective bargaining agreements

Dow Thailand Group does not have employees under collective bargaining agreements.



### Dow Thailand Group's supply chain







Dow Thailand Group operates in an integrated manufacturing environment. Basic raw materials are processed through many stages to produce a number of products that are sold as finished goods at various points in those processes. The two major raw material streams that feed the integrated production of the Company's finished goods are ethylene-based and propylene-based raw materials.

These raw materials were fully intergraded back to crackers which we also have shared in them. Connection is via pipeline. Dow Thailand has annual non-hydrocarbon procurement. The Group purchases co-monomer raw materials including Octene, Hexene and Butene on both short and long-term contracts.

Our diverse, industry-leading portfolio of businesses offers a broad range of technology-based products and solutions and distributed to customers in Thailand and across Asia Pacific region. Products are distributed to domestic customers via pipeline, bulk truck, container truck, and to export customers via bulk marine vessel, dry cargo container, and ISO tank.

Thailand Purchasing supports the value and growth initiatives of Dow Thailand Group through purchases of goods and services that deliver competitive advantage and value enhancement. Purchasing accomplishes this by working closely with the Dow Sourcing Organization to ensure the effective leverage and implementation of global sourcing strategies and agreements and developing local strategies and suppliers to meet client needs. The Purchasing function follows Dow Global Purchasing Policy and Procedures as guiding principles, and defining Thailand specific procedures as required.

Procurement Services below are in scope if sourced from third party supplier:

- Raw materials and packaging including external manufacturing
- Maintenance/Repair/Operation (MRO) and Capital projects procurement
- Logistics
- Corporate services

#### **Supplier Management Process**

Supplier Qualification is multi-functional coordination in various activities in order to qualify new material or new supplier and ensure that each responsible function approved and documented supplier's details in Approved Vendor List (AVL). We monitor and evaluate Supplier Performance Evaluation via the tool called Quality Message (QM) where each of the stakeholders is able to address issues and concerns about supplier performance related to quality, product, service and performance in order for us to work closely with supplier on Root Cause Investigation (RCI) and define Corrective Action and Preventive Action (CAPA) to solve the issue. We manage approximately 1,400 suppliers in all procurement services.



#### **Supplier's Code of Conduct**

Both new and existing suppliers are selected and evaluated not only on the basis of economic criteria, but also with respect to environmental, social and corporate governance standards. Our Supplier's Code of Conduct is Dow's global guidelines, such as the principles of Human Rights & Labor including Child Labor Law, Environment, Occupational Health & Safety as well as Ethics & Legal requirements including anti-corruption policies under US Foreign Corruption Practices Act (FCPA), UK Bribery Act and Local national anti-corruption legislation.

Thailand Purchasing aims to:

- Deliver competitive advantage
- Collaborate with supplier to help our business meet their objectives for profitability, growth, innovation, diversity and sustainability
- Work with local supplier where it is possible in order to reduce lead time, inventory and transportation cost
- Maximize cash flow by improving payment terms and working closely with user to minimize material inventory

### Significant changes during the reporting period





In 2016, Dow Thailand Group started to build the Dow's first Center of Advanced Analytical Technology in Asia Pacific at Asia Industrial Estate, Rayong province. The development is expected to increase manufacturing effectiveness, deliver new products and solutions to customers and business partners through our advanced measurement in science and analytics, and to advance Thailand towards being a hub of high skill, high technology, and analytical laboratories.

This Center will deliver the development of new technology, new product and manufacturing process as well as optimization of existing plant processes and support Dow's operations in Asia-Pacific region. The center brings together the advanced world-class technology with highly-skilled professionals from the center network all over the world to pass on technology and knowledge to Thai personnel, helping to reduce the time needed to analyze information and solve complex problems from weeks or months long to hours. A number of the developed technologies have obtained a patent of the company.

The construction of the Center of Advanced Analytical Technology is set to be completed by 2017. Around 5,000 research samples are expected to be analyzed on a yearly basis when the center begins operations.

Whether and how the precautionary approach or principle is addressed by the organization



Dow Thailand Group regularly reviews its strategy to manage risk exposures while monitoring markets developments. Various hedging instruments have been utilized to mitigate the adverse effects of market risks, pursuant to established guidelines, policies and strategies.

Externally developed economic, environmental, and social charters, principles, or other initiatives to which the organization subscribes or endorses

Dow Thailand Group has taken part in projects, standards or activities initiated by government agencies or non-governmental organizations to reflect our commitment in sustainability. Here is a list of some activities or projects we have joined.



Project/Criteria	Description	Certifying Institute
Eco Factory	Business focusing at improving production process and environmental management on the basis of social responsibility internally and externally through the entire supply chain in a continuous and sustainable manner	The Industrial Environment Institute, Federation of Thai Industries
Green Industry	Business with environmentally-friendly operation that strives to be a green industry in five levels as follows.  Level 1: Green Commitment, which refers to having an intention to reduce environmental impacts and the commitment has been communicated internally.  Level 2: Green Activity, which means activities designed to reduce environmental impacts are implemented.  Level 3: Green System where systematic environmental management has been put in place and constantly reviewed for improvement. Corporate may be recognized, at this point, by receiving environmental awards and accreditation.  Level 4: Green Culture where environmentally-friendly operation becomes a corporate DNA for everyone working at the organization.  Level 5: Green Network, referring to the expansion of this attempt to cover the entire green supply chain where suppliers and partners are encouraged to be part of the green industry accreditation process.	Ministry of Industry and network institutes

Project/Criteria	Description	Certifying Institute
Good Governance for Excellent Environmental Management and Social Responsibility Awards (Gold Star/Green Star Awards)	Commitment to enhance environmental management capacity, safety and CSR activities of factories within an industrial estate. The working team consisting of I-EA-T, community representatives, local authorities and local media will jointly evaluate factory through participation by the civil society.	Industrial Estate Authority of Thailand
Corporate Social Responsibility, Department of Industrial Works (CSR-DIW)	This refers to business under the CSR-DIW requirements which have been improved/developed from ISO 26000 accreditation. CSR-DIW criteria cover seven major topics of Corporate Governance, human rights, labor practices, environmental consciousness, fair operating practices, consumer issues, and community involvement and development.	Department of Industrial Works, Ministry of Industry
Green Meeting	Business applying green meeting practices in a constructive way. This means maximizing resources and minimizing environmental impacts when organizing corporate meetings, seminars and training.	Thailand Business Council for Sustainable Development (TBCSD)
Zero Accident Campaign	Businesses with workplace safety practices in accordance with the Ministerial Regulation on Safety Management, Occupational Health and Workplace Environment, B.E. 2549 (2006) and B.E. 2553 (2010) (No. 2)	Ministry of Labor

### Memberships in associations and/or advocacy organizations



Dow Thailand Group takes an active role in many trade, business and industry associations in Thailand. Engagement with trade and business associations, whose purpose is to promote common business interests, assists us in managing priorities relevant to Dow Thailand and the chemical industry. Working through industry associations enables us to improve its own Environment, Health and Safety (EH&S) programs, as well as share its knowledge and expertise to improve the EH&S programs of other manufacturers. Dow has also developed partnerships with civic leagues and social welfare organizations that play an important role in public policy debates. These nongovernmental organizations sometimes engage in advocacy related activities, as well.

All proposed memberships in trade associations and civic organizations are reviewed by Public Affairs Department and Government Affairs Department. Examples of trade, business associations and alliances where Dow Thailand Group is an active member are shown below.

- The American Chamber of Commerce in Thailand: Member of Energy and Environmental Committee
- Thailand Business Council For Sustainable Development: Council Member, Associates Member and Public Relation Member
- The Federation of Thai Industries: Vice Chairman of Petrochemical Industry Club, Member of Board Director of Industrial Environment Institute, Member of Board Director of Chemical Industry Club, Director of Free Trade Committee and Director of Town-plan & Industrial Estate Committee

- Petroleum Institute of Thailand: Member of Council of Trustees and Chairman of the Standing Committee on Petrochemical and Refining
- Community Partnership Association: Founder Member, Steering Committee Member, Representatives in Operation Taskforce, CSR Taskforce and Communications Taskforce
- US-ASEAN Business Council: Vice Chairman of Thailand Committee
- The Strategy Committee on the Management of Dow Chemical for Sustainable Industry assigned by Ministry of Industry's Department of Industrial Promotion
- Community Advisory Panel (CAP) at the Asia Industrial Estate and the Map Ta Phut Industrial Estate

# Entities included in the organization's consolidated financial statements



Entities	Businesses
Dow Chemical Thailand Ltd.	Manufacturing and selling of Polyol, Polyether Polyol, and importing and distributing Dow's products, for example, Consumer Solutions, Infrastructure Solutions, Performance Materials & Chemicals, and Performance Plastics.
Carbide Chemical (Thailand) Ltd.	Manufacturing and selling of Synthetic Latex
Rohm and Haas (Thailand) Ltd.	Manufacturing and selling of Acrylic Emulsion, Poly-Acrylic Acid Solution
Dow AgroScience Company Ltd.	Trading of agriculture and pest management products
Dow Corning (Thailand) Ltd.	Trading of silicones
Siam Synthetic Latex Co., Ltd.	Manufacturing and selling of Styrene-Butadiene latex and Specialty Elastomers
Siam Polyethylene Co., Ltd.	Manufacturing and selling of Polyethylene
Siam Styrene Monomer Co., Ltd.	Manufacturing and selling of Styrene Monomer
Siam Polystyrene Co., Ltd.	Manufacturing and selling of Polystyrene
MTP HPPO Manufacturing Co., Ltd.	Manufacturing and selling of Propylene Oxide

### Process for determining report content



Material aspects identified by Dow Thailand Group to present in this report reflect our impacts to economic, environmental and social conditions and expectations from various groups of stakeholders that affect corporate sustainability. The report contents are determined by the following.

#### 1. Dow's Sustainability Goals

#### Redefining the Role of Business in Society

Firmly committed to our pledge to sustainability, Dow applies the principle of sustainable development to every undertaking by using resources more efficiently, providing value to our customers and stakeholders, delivering solutions for human needs, and enhancing the quality of life of current and future generations.

#### **Dow's Sustainability Pillars**

As a world leader in science, Dow is positioned to drive changes by delivering sustainable and innovative solutions that contribute to human progress and the growth of our business. Dow organizes its sustainability focus around four key pillars.



#### **Smart Solutions for Today**

Our technologies enable our customers, and their customers, to develop products and services for a more sustainable future.



#### **Innovations for Tomorrow**

We contribute to the sustainability of society and our planet by developing innovative technologies for current and future markets.



#### **Responsible Operations**

Our infrastructure has a positive impact on our company, our communities, and ourselves, making our operations a model for others, wherever we operate.



#### **Partners for Change**

We are the leader in advancing all aspects of sustainability, openly collaborating with customers, suppliers, communities, civil society, and governments.

Dow's 2025 Goals (Blueprint), the Company's third set of sustainability-related goals since 1995, build upon its previous decade-long commitments. Dow's 2005 Environment, Health & Safety Goals (Footprint) resulted in US\$ 5 billion in safety, waste water reduction, water and energy savings after a US\$ 1 billion investment. Dow's 2015 Sustainability Goals (Handprint) provided more sustainable products and solutions addressing global challenges in food, energy, sustainable water supplies and improved personal health.

### Dow's seven 2025 Sustainability Goals are as follows:



#### Goal 1:

#### Leading the Blueprint

Dow leads in developing a societal blueprint that integrates public policy solutions, science and technology and value chain innovation to facilitate the transition to a sustainable planet and society.



#### Goal 2:

#### Delivering Breakthrough Innovations

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



#### Goal 3:

### Advancing a Circular Economy

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



#### Goal 4:

#### Valuing Nature

Dow applies a business decision process that values nature, which will deliver business value and natural capital value through projects that are good for the Company and good for ecosystems.



#### Goal 5:

### Increasing Confidence in Chemical Technology

Dow increases confidence in the safe use of chemical technology through transparency, dialogue, unprecedented collaboration, research and the Company's actions.



#### Goal 6:

### Engaging Employees for Impact

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

By 2025, Dow employees worldwide will apply their talents to positively impact the lives of 1 billion people.



#### Goal 7:

### World-Leading Operations Performance

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

For more information about Dow's sustainability commitments, please go to www.dow.com/sustainability.



Community Advisory Panel meetings at Asia Industrial Estate



Dow opens house to welcome visitors



"Thai SMEs Spring Up to Industry 4.0" Seminar

#### 2. Activities with groups of major stakeholders held through the following channels:

- Community Advisory Panel (CAP) meetings providing an important outside-in
  perspective on the environment, health and safety issues, as well as
  sustainability, for the company are organized through two committees, each of
  which at Asia Industrial Estate and Map Ta Phut Industrial Estate, respectively.
  In 2016, 8 meetings were convened.
- A community meeting (San Sum Phan) provides a forum for communities to discuss the Dow Thailand Group's operations and for us to listen to their concerns and suggestions; in 2016, 2 meetings were convened and cover 43 Communities around the operation locations.
- Conducting Global Employee Opinion Action Survey (GEOAS) to measure
  employee's participation, commitments and satisfaction, as well as the Leadership
  Effectiveness Survey (LES) to assess what and how leadership could be improved
  as well as to create a plan to fulfill such improvement, both of which aimed to
  make Dow a happy workplace. Besides, an employee listening session was
  organized for staff to voice their concerns and propose solutions, which led
  to a better understanding and precise resolutions by the company that
  subsequently reduced stress among employees and made the workplace
  a happier one.

#### 3. Sharing the best practices

- Dow Thailand Group is a key member of the Responsible Care Club in Thailand and the Federation of Thai Industry to share its best practices on sustainable operation.
- During the past several years, we welcomed a huge number of visitors from
  private sector to those in manufacturing factories and industrial partners who
  visited our factories and met our executives. Visitors learnt the best practices
  in Environmental, Health, and Safety (EH&S) management and community
  success programs delivered by Dow.
- We collaborated with leading industries under the "Community Partnership
  Association (CPA)" to share the best industrial practices with other peers in the
  industry for their benefit and for the benefit of communities.
- A seminar on the topic "Thai SMEs Spring Up to Industry 4.0" was conducted by Dow Thailand Group together with public and international organizations to update about the supporting tools and programs for SMEs including Thai enterprises that have succeeded in the global market.

#### **Materiality map**

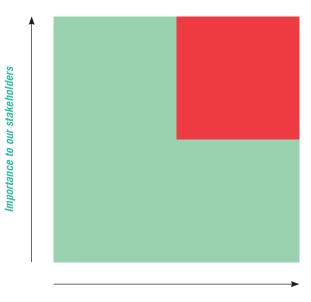


Aspect Boundary within the organization



Aspect boundary outside the organization





Importance to the organization

Having conducted the materiality assessment using GRI G4's guidelines, the assessment considered 2 factors which are importance to the organization and to our stakeholders. The aspects identified as very important to both Dow Thailand Group and our stakeholders were identified as Material Aspects and then disclosed in the sustainability report on the basis of In Accordance – Core option, which means at least one indicator related to each material aspect is reported. As for significant issues to be reported under Dow Thailand Group's sustainable development framework, four areas of Contribution to Thai Economy, Responsible Operations, A Great Place to Work and Global Citizenship have been identified. Details are as follows:

Areas	Category	Material Aspect	
Contribution to Thai Economy	Economy	Indirect Economic Impacts	
Responsible Operations	Environment	Effluents and Waste	
	Social – labor practices and work of value aspect	Occupational Health and Safety	
A Great Place to Work	Social – Labor Practices and Decent Work	Employment	
Global Citizenship	Social – Society	Local communities	

#### **Aspect Boundary**

This report features results of sustainable operations carried out by businesses under Dow Thailand Group; namely, companies under Dow Chemical Thailand and SCG-DOW Group. All contents disclosed in this report cover both internal and external stakeholders especially employees, communities in Rayong province and the society.

# Explanation of any re-statements of information provided in earlier reports

None identified.



### Significant changes from previous reporting

None identified. Review G4-13 for more information on significant changes during the reporting period.



List of stakeholder groups engaged by the organization

Our groups of major stakeholders are:



Basis for identification and selection of stakeholders with whom to engage



Approaches to stakeholder engagement



Key topics and concerns raised through stakeholder engagement and how the organization has responded to those key topics and concerns





Throughout 2016, Dow Thailand Group established various channels to enable participation from different stakeholder groups. The idea is to listen to concerns and provide a forum for those wishing to express their ideas and recommendations to us for further adjustment in our planning and operation so that we better respond to their needs while pursuing a corporate sustainable development path. Examples of channels where Dow Thailand Group depend upon to listen to ideas and opinions are under Topic G4-18.

This following table presents ideas and issues expressed by different groups of stakeholders:

Groups of Stakeholders	Topics	Engagements
Employees	<ul> <li>Performance-based remunerations</li> <li>Work-related concerns</li> <li>Safety workplace</li> </ul>	<ul> <li>Developing a remuneration system to stay competitive with the companies we compete for talents</li> <li>Conducting a survey and organize the employee listening session</li> <li>Committed to Environment, Health and Safety (EH&amp;S) policy &amp; best practices</li> <li>Personal consultation session with guaranteed confidentiality</li> </ul>
Community	<ul> <li>EH&amp;S issues especially preventive measures against impacts from waste and water quality</li> <li>Community engagement</li> </ul>	<ul> <li>Organizing Community Advisory Panel (CAP) meetings an important outside-in perspective on the environment, health and safety issues, as well as sustainability, for the company through two committees, each of which at Asia Industrial Estate and at Map Ta Phut Industrial Estate.</li> <li>Organizing an informal community meeting (San Sum Phan) to strengthen the company's relationship with communities by providing a forum for communities to discuss the company's operations and for Dow to listen to their concerns and suggestions.</li> <li>Strengthening community's success with a focus at community engagement.</li> <li>Corporate reputation survey</li> </ul>
Business partners	<ul> <li>Fair returns from investment for both parties</li> <li>Strict compliance to contractual obligations</li> </ul>	<ul> <li>Holding Board of Directors' meetings at subsidiaries and affiliated companies where business partners can express their views and exercise their rights.</li> </ul>

Groups of Stakeholders	Topics	Engagements
Customers	On-time delivery of required quantity and quality	<ul> <li>Conducting customer satisfaction survey</li> <li>Setting up a process that allows customers to file complaint on quality, volume, safety and services</li> <li>Visiting customers and organizing activities to strengthen customer relationship</li> <li>Offering technical supports</li> <li>Responding to requests for information disclosure</li> <li>Collaborating on initiations relating to environment and social responsibility</li> </ul>
Government Agencies	<ul> <li>Compliance with regulations</li> <li>Environment awareness</li> <li>Hiring of local labor</li> <li>Stability and appropriate timeframe to issue regulations</li> <li>Fairness in implemented policies</li> </ul>	<ul> <li>Strict legal compliance and reporting</li> <li>Paying taxes and other expenses required by the government's regulations</li> <li>Conducting government visits</li> <li>Pursuing social projects with participation from the company, community leaders and public sector</li> </ul>
Contractors	<ul> <li>Equal and fair opportunity in a selection process</li> <li>Appropriate returns in relation to economic and social conditions</li> <li>Safety work environment</li> <li>Fair business agreement for both parties</li> </ul>	<ul> <li>Setting up a transparent and accountable selection and evaluation process of contractors</li> <li>Organizing internal meetings between Dow Thailand and contractors for monitoring, enhancing productivity and taking care of safety and environmental issues</li> </ul>
Suppliers	<ul> <li>Equal and fair opportunity in a procurement process</li> <li>Fair returns</li> <li>Fair agreement for both parties</li> <li>Strict compliance with contractual obligations</li> </ul>	<ul> <li>Setting up a transparent and accountable procurement process</li> <li>Implementing an on-time payment policy</li> </ul>
Creditors	<ul><li>Returns from loans and fees</li><li>Ability of debt payment and punctuality</li><li>Strict compliance with contractual commitment</li></ul>	Organizing meetings when appropriate
Media	<ul> <li>More business information of Dow Thailand Group</li> <li>Press conference on Dow's annual performance</li> <li>More press meetings with Dow's executives</li> <li>Invitation to attend corporate activities when appropriate</li> </ul>	<ul> <li>Conducting poll to survey media's attitude towards Dow Thailand Group</li> <li>Organizing media activities, e.g., exclusive interview, press conference</li> <li>Media participation in corporate CSR activities</li> </ul>
NPO/NGO	<ul> <li>Interest in Dow's natural resource and environmental management</li> </ul>	<ul> <li>Organizing plant visit</li> <li>Providing environmental management information whenever appropriate</li> <li>Partnering with NPOs to conduct CSR projects</li> </ul>

#### **Reporting Period**



Based on 2016 corporate data for the year ended December 31, 2016.

### Date of most recent previous report



The previous report is Dow Thailand Group Sustainability Report 2015 which can be found on our http://www.dow.com/thailand/publications/.

#### **Reporting cycle**



Annual

### Contact for questions regarding the report or its content



Public Affairs Department

Tel. +66 2365 7000

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# Table identifying the location of the Standard Disclosures in the report



Dow Thailand Group uses the GRI 4 Guidelines for report development. For ease of navigation, see the Content Index available at the end of this report. We are determined to continually improve the quality of the report by enhancing information disclosure and its credibility by having an assessment from the third party in the future.

### Policy and practice with regard to external assurance for the report



### Governance Structure of the organization



Dow Thailand Group carries on businesses with transparency under the principles of good corporate governance. The board of directors of each company is appointed and subject to the authorities prescribed by the general meeting of shareholders. The board of directors of Dow Chemical Thailand consists of all senior executives nominated by the parent company. The boards of directors of the joint ventures consist of senior executives nominated by Dow Chemical and the joint-venture partners in an equal proportion based on shareholding.

Dow adheres to the principles of good corporate governance, as well as honesty and the maximum ethical standards. The company's directors and officers represent a good example for compliance with the maximum ethical standards. Our long-term sustainable development depends on these ideologies. Our shareholders, board of directors, officers, customers, and community also expect high standards from us.

Describe the organization's values, principles, standards, and norms of behavior such as codes of conduct and codes of ethics



Taken together, Dow's essential elements of mission, vision, values, and strategy describe why the company exists, who we are, what we intend to do, and how we intend to do it. These essential elements provide insight, offer motivation, and point the way forward as we seek to grow and achieve our goals.

#### Mission:

To passionately create innovation for our stakeholders at the intersection of chemistry, biology and physics

#### Vision:

Maximize long-term value per share by being the most valuable and respected science company in the world

#### Values:



#### Dow Chemical's code of business conduct

The Diamond Standard – Living Our Values Every Day

At Dow, we are passionate about chemistry. We believe in the potential of chemistry to change the face of humanity for the better. The great promise of our industry is to deliver solutions that will make the world a better place – directly through our products, and indirectly by our conduct, by providing jobs, and by fueling the economy and improving the standard of living. We are fiercely focused on these goals. And we are equally focused on "how" we accomplish them. Our Values of Integrity, Respect for People and Protecting Our Planet are evident in our corporate culture and connect each of us around the world.

The Diamond Standard, Dow's Code of Business
Conduct, puts a framework around these Values that is
multifaceted and clear, setting expectations and guiding our
behavior. Our intent, of course, is to enable ethical, lawful decision-making
and to create an environment of respect, but that's not all. We
believe it is also our responsibility as a corporate citizen
to extend these Values well beyond our Company
walls. The Diamond Standard applies to all
employees, our subsidiaries, and group
companies of Dow Chemical,
including joint ventures that
adopt this code of
conduct.

Dow cultivates the Diamond Standard in every officer and employee in the organization from the first day they join the company, and continuously provides training on principles and compliance with the Diamond Standard.

Dow's Values set the foundation for everything we do. They drive us to conduct business fairly and with appropriate sense of responsibility to each other and the broader community. The Code of Business Conduct provides a framework to make good choices: to abide by the law and be highly principled and socially responsible in all of our business practices.





#### **Economy Summary**



#### **Economic impacts**

Thanks to Thailand's market strength, competent human resources and supporting government agencies, Dow Thailand Group has operated our business in this country for half a century. With our long presence in the market, we have witnessed and well understood market situations and its mechanisms. We also see opportunities to respond to market needs through our evolving innovations and solutions.

#### Major milestones in 2016

With our well plan, implementation flexibility and dedication from our staff, Dow Thailand Group's performance was outstanding in several areas including financial results that were better than estimated and higher than the previous year.

In terms of production, Dow Thailand Group was able to meet its target without much difficulty. We achieved an outstanding rate of product supply reliability, which, at 96 percent in 2016, was as good as we performed a year ago. Our operational hub is one of the global top quartile performers on site reliability rate. In addition, more than half of our plants managed to break their annual production records in 2016.



In 2016, Dow Thailand Group started to build the Dow's first Center of Advanced Analytical Technology in Asia Pacific at Asia Industrial Estate, Rayong province. The development is expected to support the manufacturing sector toward succeed through world-class measurement in science and analytics, in order to deliver technology and solutions to customers, and to advance Thailand towards being a hub of high skill, high technology, and analytical laboratories.

This center will deliver the development of new technology, method development for new product launches and plant startups, optimization of existing plant processes and support Asia-Pacific and other regions. The center brings together the advanced world-class technology with highly-skilled professionals from the center network all over the world, helping to reduce the time needed to solve complex problems, analyze information, and develop technology used in manufacturing processes. A number of developed technologies have obtained a patent of the company.

The construction of the Center of Advanced Analytical Technology is set to be completed by 2017. An estimated 5,000 research samples will be analyzed on a yearly basis when the center begins operations.

#### Sustainability - Meaningful power to drive the business

Dow has been able to make things better through our R&D activities and innovations to resolve challenges with a goal to advance our wellbeing in a sustainable manner while simultaneously growing our business. By tying our business strategy and corporate management with the sustainability goal, Dow Thailand Group manages to effectively use our resources, increase our productivity and expand our business in a sustainable way.

#### **Direct economic impacts**

#### Creating jobs and developing skills and expertise for Thai people

Dow Thailand Group gives priority to human resource development and skill enhancement as well as job creation. From only 700 employees in 2009, the number of our workforce increased to more than 953 in 2016 to support our plant expansion.

To enhance the capacity of our human resources, we dispatch staff in key positions to overseas training in Canada, Belgium and the US. Employees are exposed to sophisticated technology, career advancement and an opportunity to work at the international level. We also provide training to our subcontractors.





#### Supporting community economy

For nearly five decades of our presence in Thailand, Dow Thailand Group has actively supported economic and social activities of local communities, e.g., local tax payment, financial support to Energy and Power Funds, and funds for community and social development projects.

Dow Thailand Group has purchased products and services from neighboring communities, which is aligned to our policy to support communities. In 2016, we spent more than 30 million baht buying products and services from communities in Map Ta Phut district and Ban Chang district. These activities helped stimulating cash flow within the local economy. We also spent more than 20 million baht to support several community and social development projects in Thailand.

#### **Indirect economic impacts**

Dow Thailand Group underlines the importance of growth of both our business and surrounding communities. The growth of our business especially through our plant expansion not only creates job directly within the local community but also has indirect impacts to technology and know-how transfer, labor skill development and related job expansion in the local economy.

# Significant indirect economic impacts, including the extent of impacts



Dow Thailand Group's indirect economic impacts are as follows.

#### Adding values to the Thai industries

Dow's innovative products and technology are proven beneficial to end consumers as well as various industries in Thailand such as paint, food & food processing, home appliances and electronics, packaging and pharmaceutical industry. By adding values to both the goods and the business through our products which effectively answer to eclectic needs of enthusiastic consumers, we are able to contribute to the advancement of Thailand's industries.

#### Technology and know-how transfer











Installed CCTV in truck

#### **Knowledge Sharing**

During the past six years, Dow Thailand Group has established the "Dow Chemical for Sustainable Industry" project by developing the lean management for environment method to help small and medium entrepreneurs and manufacturers to improve their environmental and safety standards in their operations. The project doesn't only improve industrial standards of small- and medium-sized manufacturers but also contribute to the great economic and social impacts to their companies, employees and society as a whole. For more information of the project, please go to "Global Citizenship" pages.

#### **Promoting local economy**

Dow Thailand Group's success helps expanding other local business especially those in Rayong province where we base our production. Our business has created countless business opportunities for suppliers of goods and raw materials, contractual parties and residents in nearby communities.

#### Boosting the car-rental business

Every vehicle used by Dow Thailand Group for its operations in Rayong is registered in Rayong province.

#### **Enlarging the logistic industry**

Our plant expansion during the past several years has resulted in positive impacts to the logistics business in Rayong and Chon Buri provinces. Our business expansion has led to the growth of the general and food-grade ISO tank businesses, the transportation business, and the drumming business for the food-grade and non food-grade industry, and subsequently increased local employments. In addition, by renting warehouse in Laem Chabang as our new depot, we effectively manage the transportation between Map Ta Phut and Laem Chabang, which helps reduce heavy traffic flows between the two areas. Apart from that, Dow Thailand Group has not only trained external logistic personnel in the fields of logistics management, safety standards, and quality management specifically for food industry but also collaborated with cargo carriers to develop the Truck Management System (TMS). These knowledge transfers help improve efficiency and competitiveness of the Thai logistics industry.

According to significant increase in export volume via Laem Chabang, Dow Thailand Group has collaborated with a working committee under the Federation of Thai Industries (FTI) to advise the port authorities as well as Ministry of Transportation to improve port congestion. This is to increase the competitiveness of Thailand's export industry.

We also underline the importance of maintaining high standard of cargo transportation and logistics. In doing so, we have organized trainings on safety and occupational health management for logistics businesses, measured truck speed, installed the GPS system to monitor the routing and conducted a regular system check-up. Recently, we started a trial period by installing CCTV inside our trucks to reduce accident and minimize transportation risk.





## **Environment, Occupational Health and Safety summary**



Responsible Care<sup>®</sup> is Dow's commitment in our manufacturing and management of chemical products worldwide. Since inception, we believe that environment, health and safety (EH&S) is our way of life. By declaring Responsible Care, Dow assures that our operations regardless where they are will be beneficial not only to us but also to neighboring communities and that it becomes a model for other businesses.

## Environmental, Health, and Safety Policy



At Dow, protecting people and the environment will be a part of everything we do and every decision we make. Each employee has a responsibility in ensuring that our products and operations meet applicable government or Dow standards, whichever is more stringent. Our goal is to eliminate all injuries, prevent adverse environmental and health impacts, reduce wastes and emissions, and promote resource conservation at every stage of the life cycle of our products. We will report our progress and be responsive to the public.

Dow has implemented the most effective technology and operating discipline practices both internally and externally. EH&S requirements are among the most important drivers to continue improving reliability, productivity and quality of our process. It also induces collaboration between experts from Dow's operations and business functions, a move that should enhance Dow's operation efficiency and sustainable growth.

We are committed to the elimination of injuries, prevention of adverse environmental and health impacts, reduction of waste and emissions, and promotion of resource conservation throughout our manufacturing-specific safety processes and emergency response procedures to environmental practice programs such as Waste Reduction Always Pays (WRAP) and safety performance campaign such as Safe a Life Program.







#### **Health and Safety Operations**

Dow Thailand Group is confident that its safety efforts are second to none across Dow's operations worldwide and ensure that safety is the responsibility of all employees. We believe in zero accidents, and each employee must therefore strictly and continuously observe Dow's safety policies and the Vision of Zero.

#### **Environmental Stewardship**

Since one of our core values recognized by Dow worldwide each time we do our business anywhere is "protecting our planet," we underline the importance of care and attention given to the environment especially at places we have our business. Dow intends to reduce waste at every production process, maximize the use of resources and minimize impacts to the environment and communities.

#### Reduce, Reuse and Recycle

Dow Thailand Group closely monitors and controls waste discharge throughout processing cycles using high technology to ensure minimized impact to both the environment and surrounding communities on the principles of 3Rs of reduce, reuse and recycle. Simultaneously, we also encourage maximized use of waste to reduce the landfilling. In addition, Dow implements strict measures to surveillance waste treatment service providers by requiring them to install a Global Positioning System (GPS) in their transporting trucks to ensure that the vehicles handle the waste in a proper and safe manner. We periodically conduct random sampling by following trucks carrying waste from companies within our group to waste treatment service providers to make sure that the carriers strictly comply with the regulations.

Dow strives to reduce waste, wastewater and discharge by monitoring water quality and by putting in place a surveillance system so that water discharge will not cause environment impact. Through our care of the environment at every production stage, Dow Thailand Group has achieved ISO 14001 standard, received green industry certificates, awarded Good Governance for Excellent Environmental Management and Eco Factory Certification.

#### **Continuous Emissions Monitoring System (CEMS)**

Dow Thailand Group has adopted the Continuous Emissions Monitoring System (CEMS), a 24-hour online data analysis system, to monitor air quality emitted from the combustion stack from our plants in Rayong province. The system's close inspection ensures that the emitted compounds are within the government's standards limits and do not harm the environment and surrounding communities. The CEMS is directly linked with Industrial Estate Authority of Thailand (I-EA-T)'s system for effective monitoring and proactive prevention as well as for transparently real-time reporting to the government agency.



#### Volatile Organic Compounds Controlling System

From the design stage, Dow Thailand Group has chosen the best technology to control Volatile Organic Compound (VOC) emissions in every process and to meet all applicable government or Dow standards, whichever is more stringent. Dow Thailand Group has applied a closed system technology to our chemical loading and unloading (vapor return line, dry-break coupling connection, etc.), seal-less or double mechanical seal pumps and a closed sampling system for hydrocarbon, and Continuous Emission Monitoring System (CEMS). We also install a monitoring system to detect minor leakages from pumps, valves and seals within our plants so that a quick fix can be done following the detection. We also encourage employees and contractors to be aware of this issue and report us for fast, safe and right action.

#### Efficiency in energy consumption and conservation

To achieve our goal of sustainable growth, Dow Thailand Group has committed to efficiency in energy consumption and conservation. Each plant has pursued activities to steadily reduce the use of energy per production unit. This includes, for example, enhancing the efficiency of our production process to reduce the use of fuel and electricity where the Variable Frequency Drive (VFD) is installed to reduce the motor's velocity, which subsequently lowers the electricity when demand for electricity is low. In addition, there are attempts to readjust production formulas, reduce the use of natural gas in the production process and the absorption process of contaminants in monomer and install efficient technology and devices at our offices and plants for energy-saving purpose.

In 2016, Dow Thailand Group's energy efficiency rate was shown in the table below.

#### Dow Thailand Group's manufacturing energy intensity

(Production Unit: BTU per Pound of Product)

Year	2012	2013	2014	2015	2016
Dow's Manufacturing Energy Intensity at Map Ta Phut Industrial Estate	2,537	2,497	2,473	2,605	2,643
Dow's Manufacturing Energy Intensity at Asia Industrial Estate	6,116	4,893	4,270	3,831	3,486
Total	3,719	3,448	3,225	3,146	3,022

#### Remarks:

- In 2012, Dow Thailand Group's manufacturing energy intensity at the Map Ta Phut Industrial Estate
  included the energy consumption of the Polyethylene plant (Train II), which came on stream in 2010.
   Each plant continues to trim its energy consumption.
- Dow Thailand Group's manufacturing energy intensity at the Asia Industrial Estate consists of data on commissioning and operations (including the energy consumption by the Specialty Elastomers plant, the Propylene Oxide plant, and the Power, Utilities & Infrastructure unit).
- The Propylene Glycol plant came on stream in November 2012.
- The Polyether Polyol plant came on stream in April 2015.
- The Polystyrene and the Ethylbenzene and Styrene Monomer plants' turnarounds in 2015.
- The Polyethylene plant (Train II)'s turnaround in 2016.



Waste Water Treatment Plant (WWTP) at the Asia Industrial Estate

#### **Environmentally friendly technologies**

Regarded as crucial for Dow Thailand Group, plant design and the planning of each production process are based on the best available technologies to ensure the best environmental management possible. Our major achievements include the following.

- The construction of a world-scale Propylene Oxide plant at the Asia Industrial Estate (AIE) in Rayong affirms Dow's commitment to breakthrough environmental technologies. The facility's innovative technology was jointly developed by Dow and BASF to extract propylene oxide from hydrogen peroxide (HPPO). The innovative HPPO technology won a Presidential Green Chemistry Challenge Award from the US Environmental Protection Agency in 2010 and an Innovation and Excellence Award in Core Engineering from the Institution of Chemical Engineers in the UK in 2009. This innovation enables the following achievements:
  - » Reduction of waste water by 70 80 percent compared to the existing technology;
  - » Reduction of energy consumption by 35 percent compared to the existing technology;
  - » Reduction of infrastructure and physical footprint with simpler raw-material integration and avoidance of co-products, resulting in optimized use of resources and environmental friendliness.
- The Specialty Elastomers plant at the Asia Industrial Estate has adopted the most advanced technology to produce polyolefin plastomers and polyolefin elastomers in a more environmentally friendly manner than other conventional technologies.
   Our technologies feature the following:
  - » A closed system in which production process-derived vapor is accumulated for elimination at the flare
  - » No involvement of carcinogens and VOCs in the production processes, as required by the National Environment Board's announcement in 2007
  - » No sulfur oxide emission
  - » Utilization of Ultra-Low NOx technology for burners and water heaters to lower the release of nitrogen oxide from production processes.
- Similarly, the new Polyether Polyol plant, which started production in 2015 with world-class technology, manages to reduce energy consumption and wastewater by 50 - 70 percent. The plant is able to completely reduce 100 percent of solid waste from its production.
- Leveraging the best available technology, our operations at the Asia Industrial Estate feature an advanced biological treatment at the Waste Water Treatment Plant (WWTP) to ensure that the effluent's quality meets regulations. An Odor Treatment Plant (OTP), involving OTP blowers and activated carbon filter units, minimizes odor in the WWTP, while all odorous areas, including the equalization tank, diversion tank, and bio-reactor basins, are covered. Air released from these processes is used as alternative air in the biological treatment unit, and excess air is treated by the activated carbon filter unit. Since the first start-up of the OTP, the WWTP has never faced any odor issue. In addition, the WWTP's online analysis system at the discharge point monitors the COD. Data from the system are continually sent to the responsible unit at Industrial Estate Authority of Thailand.





#### **Advanced Analytical Laboratory**

In mid-2012, Dow Thailand Group set up an advanced analytical laboratory called the Map Ta Phut Non-Routine and Reactive Chemical Testing Laboratory, located at the Hemaraj Eastern Industrial Estate (Map Ta Phut). Going beyond normal quality control, the laboratory supports the company's growth in Asia Pacific. The setup of the new laboratory focuses on using state-of-the-art technologies for the following objectives:

- To identify and analyze the proportions of chemical components in samples, a task beyond the current techniques' ability;
- To develop new analytical techniques for more effectiveness and for tests on substances that can disrupt production processes;
- To solve production problems, improve performance, and handle emergencies such as leaks and substance identification during emergencies. For the past several years, the laboratory has played a critical role in enhancing production processes, which include the following:
  - » A method for analyzing glycol ether acid in waste water for a redesigned discharge system;
  - » A method for testing residual monomers in products for legal compliance;
  - » An analytical method for inspecting chemical components in production processes for the improvement of waste and energy management.

In 2016, Dow Thailand Group start building the Center of Advanced Analytical Technology in Asia Pacific at Asia Industrial Estate. This center will deliver the development of new technology, method development for new product launches and plant startups, optimization of existing plant processes and support Asia-Pacific and other regions.

#### Strengthening environmental, health, and safety standards

Dow Thailand Group puts tremendous efforts into the improvement of our environmental, health, and safety standards. This year, the company conducted the following programs:

#### Environmental, health, and safety standards

- Effective environmental, health, and safety management systems are strictly and continuously applied at all plants.
- Life Critical Standards are designed to improve safety awareness and behavior in a global effort to further boost our safety performance.
- The Return to Operation policy ensures our proper commissioning of process equipment returning to service to prevent Process Safety and Containment Event (PSCE).

- Management of Change ensures review by experts and proper communication together with training for all changes to ensure that changes have been effectively and smoothly implemented.
- The Injury and Process Safety and Containment Prevention Workshop provides
   Dow Thailand Group's employees with an opportunity to review lessons and
   knowledge of EH&S experienced during year-round operations. At this workshop,
   employees brainstorm and share ideas on risks and measures to prevent incidents.
- Dow Thailand Group applies similar EH&S standards of Dow Chemical Company in the US to contractor management, with a stringent screening process designed to ensure effective training and the use of effective safety programs. All contractors are also subjected to our annual performance assessment.

#### Environmental, health, and safety training

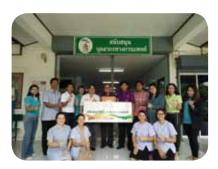
- We provide intensive EH&S training to our employees and contractors to ensure their competence and sound safety awareness to safely and effectively perform their jobs.
- We build a strong culture of intervention for unsafe behavior or conditions (or both)
  through the Behavior-Based Performance (BBP) program, which introduces correct
  and safe operations, as well as site inspections (plant safety walkthroughs). This leads
  to a safe work culture.

#### Promoting environmental, health, and safety awareness

- Dow Thailand Group organized the 2016 Safety and Green Day under the theme of "Drive Through Innovation" at our plants in Rayong province to create awareness in safety and to underline that safety is and remains the first priority. The event was also hammering our commitment to "Drive to Zero" program. Main activities during the event were declaring our commitment to Responsible Care, sharing safety experiences, running a creativity contest and awarding those with outstanding EH&S performances. More than 800 employees and contractors attended the event now held annually.
- "End Strong Start Stronger Safety Hunger Game" activity was held to underline Dow's expectation of safety from employees and contractors. It's also an occasion to enhance understanding in risks, assessing safety situations at worksites and planting awareness in work-related threats. The activity format is a competitive game to increase employees and contractors participation.



2016 Safety and Green Day



Community Partnership Association (CPA)



Dow volunteers trained students of Wat Prachum Mit Bamrung School about safety at school.

#### Sharing best practices

Responsible operations at Dow Thailand Group not only mean setting good examples, but also sharing our best practices with neighboring communities, partners, and society at large. Here are some of our major activities organized in 2016.

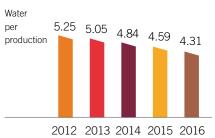
- Dow Thailand Group is a key member of the Responsible Care Club in Thailand and the Federation of Thai Industry. The memberships serve as a channel through which we publicize our good practices for sustainable development. Over the years, Dow Thailand Group has hosted many visits from private companies, manufacturers, and industrial allies by allowing them to tour our sites, meet with our EH&S management team, and learn about EH&S practices at Dow.
- Dow Thailand Group collaborated with other leading industrial companies in
  establishing the Community Partnership Association (CPA). As a founding member
  of CPA, we have had opportunities to share good practices for the benefit of the
  industry and the community.
- The company led a group of Dow Volunteers to teach students in grade 5 and grade 6
  at Wat Prachum Mit Bamrung School in Rayong about everyday safety while raising
  their awareness of safety at home and school. The activity was part of the annual
  Safety School project, the project has been implemented at 21 schools.

## Total water discharge by quality and destination

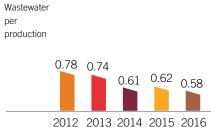


In 2016, water intensity (the ratio of cubic meter per metric ton of production) was down 6 percent from the previous year and wastewater intensity (the ratio of cubic meter per metric ton of production) was also down 6 percent from the previous year. Besides, Dow Thailand Group has strictly complied with the laws and regulations on waste treatment. Of the total waste, 44 percent was recycled by sorting and re-using; 33 percent was combusted; 23 percent became alternative energy or raw material for cement furnace. Through our policy, we continue to minimize waste destined for landfill. In 2016 only 0.02 percent went to landfill, reduced by 88 percent from the previous year.

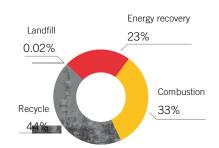
#### **Water intensity**



#### Wastewater intensity



#### Waste treatment by catagory



Percentage of total workforce represented in formal joint management-worker health and safety committees that help monitor and advise on occupational health and safety programs





As part of the Vision of Zero, the Drive to Zero safety program was introduced in Thailand in 2006 to enhance the awareness of local employees and contractors of the importance of the Drive to Zero goal, which strive to see everyone return home safely every day. The program reflects our emphasis on safe behavior among our employees, contractors, and members of nearby communities. We expect our employees and contractors not only to act safely, but also to look out for the safety of their colleagues.

The Drive to Zero concept is applied to every activity. Its importance is reinforced in the mind of Dow employees and contractors through internal communications and safety promotion activities such as incident prevention workshops and pre-project risk assessments. All these efforts are designed to achieve its ultimate goal of getting everyone to return home safely every day.

Thanks to shared commitment and joint effort from all our employees and contractors, the Drive to Zero program in Thailand has continuously thrived. We have been highly successful in our safety operations.

#### **Health and Safety Performance**



#### **Recordable Personal Safety Rate**

In 2016, the annual recordable personal safety rate per 200,000 working hours was at 0.04, which was better than the target anticipated at 0.12. Moreover, company also created a new record of no accidents at work over 16 million working hours.





#### **Great Place to Work summary**



At Dow, we are staffed with competent people. Together with our strength in corporate values of integrity, respect for people and protecting our planet, Dow's employees worldwide relentlessly strive to turn competency and compassion into benefits for people around the world and our planet. One of the Dow's 2025 sustainability goals set for achievement that underlines the importance of staff boldly declares that within 2025, Dow employees worldwide will apply their talents to positively impact the lives of 1 billion people.

At Dow, we believe in diversity and inclusion, which are two distinctive qualities in our workplace. We respect in diversity since it brings us valuable innovation and creativity. We believe that differences among more than 50,000 employees worldwide and energy generated from their collaboration will allow Dow to resolve problems and bring new solutions to the world.

The same belief applies to Dow Thailand Group. Throughout 50 years since our inception in this land, staff is the most important resource and the most valuable drive behind our growth. We give priority to employees and teamwork. We commit to regularly take care of and enhance capacity of our staff while making the workplace something close to their heart. These factors have helped the organization prosper in a sustainable way.

#### **Employer of Choice**

Dow Thailand Group commits to "Employer of Choice" workplace. We focus at creating a happy workplace environment, offering attractive remunerations, awarding employees for their achievements and allowing them to prosper in their career paths. We wish and encourage everyone to express his leadership quality since we believe that each has potential and can reach his career apex. At the same time, we inspire staff to take pride in our organization as a good corporate citizen who significantly helps making community and the society a better place to live. Employees are encouraged to participate in social contribution activities as Dow volunteers by committing their time to share what they have to the less fortunate and the society. Several activities our volunteers initiate are what they are most good at thanks to their expertise. As a professional, they share the knowledge, advise solutions or improve the quality of life of the less privileged.

# Happiness @ Dow



Realizing that when employees are happy, they will become more efficient and the organization will strive in a sustainable manner. That's why Dow Thailand Group is searching for activities that allow employees to participate and feel connected with the organization to cultivate happiness in the workplace. Besides, we conduct the Global Employee Opinion Action Survey (GEOAS) on an annual basis to measure staff's participation, their commitments and satisfactions to the organization. The survey allows employees to express their views towards supervisors as well as suggest ways and means to improve workflows. In addition, the Leadership Effectiveness Survey is organized to assess supervisor's leadership, areas of improvement and action plans to transform a plan into success. We also operate the Employee Listening Session to allow employees to express problems and difficulties they are facing at and to propose solutions. These channels not only allow us to increasingly understand our employees but also enable us to effectively solve problems while reducing work stress and nurturing workplace happiness.





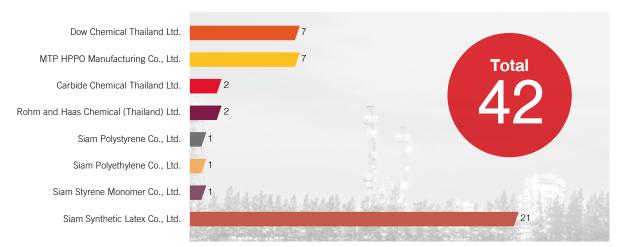
#### **Employee success development**

Dow Thailand Group underlines staff's career path and their professional advancement. Aimed to retain quality personnel as well as to attract high-potential co-workers as part of our growing organization, we use the talent profile as a tool to allow every employee to present himself. The talent profile offers an opportunity for each employee to directly tell what his strengths are, starting from skills to work experiences and career goals. The information in the profile will not only be used for applying for internal vacancy but also functions as a database for supervisors and the Human Resources Department to select staff with right qualifications for a new job position or a new project. The information is also a basis for us to understand the potential of our staff and thereby effectively identifies professional development they may need. At Dow worldwide, we have the learning and development center offering diverse services ranging from online classroom learning to official and unofficial consulting services, workshop classroom and a strong network of enthusiastic employees. These allow our employees to grow along the career path specifically designed with their career advancement, strengths and personal interest in mind.

Total number and rate of new employee hires and employee turnover by age, group, gender, and region



#### New hires by company



Location/Gender	Female		Male		Number of employees	
	Persons	%	Persons	%	Persons	%
Bangkok	10	23.81	1	2.38	11	26.20
Rayong	4	9.52	27	64.29	31	73.80
Total	14	33.33	28	66.67	42	100.00

Age/Gender	Female		Male		Number of employees	
	Persons	%	Persons	%	Persons	%
not over 30	7	16.67	17	40.48	24	57.14
30 - 40 years old	6	14.29	9	21.43	15	35.71
41 - 50 years old	1	2.38	2	4.76	3	7.14
Total	14	33.33	28	66.67	42	100.00

#### **Employee attrition**

In 2016, Thailand voluntary attrition rate was 4.28 percent. This includes retirements as well as employees separating for other reasons.

Year of service/ Gender	Female		Male		Number of employees	
	Persons	%	Persons	%	Persons	%
Fewer than five years	6	12.24	14	28.57	20	40.82
5 - 10 years	4	8.16	16	32.65	20	40.82
11 - 15 years	1	2.04	3	6.12	4	8.16
More than 15 years	0	0.00	5	10.20	5	10.20
Total	11	22.45	38	77.55	49	100.00

Location/Gender	Female		Male		Number of employees	
	Persons	%	Persons	%	Persons	%
Bangkok	7	14.29	7	14.29	14	28.57
Rayong	4	8.16	31	63.27	35	71.43
Total	11	22.45	38	77.56	49	100.00

Benefits provided to full-time employees that are not provided to temporary or part time employees, by major operations







Dow Thailand Group believes it is important to care for our employees' wellbeing. That is why we offer various benefits to employees both traditional benefits and flexible benefits to enable them the convenience and flexibility to pick and choose a benefits package that suits their lifestyle.

- Competitive welfare and remuneration packages: They are offered to the employees based on their performance and contributions. The packages include several additional benefits and follow these principles:
  - » Competitive compensation programs benchmarked against the companies we compete for talents. This allows Dow Thailand Group to attract and retain the best talents.
  - » A superior remuneration policy compared to market standards when the employees and the company itself exceed goals and objectives.
- Flexible benefits Starting in 2011, employees can choose from several flexible benefit
  options to suit their diverse needs, which they may change each year, while continuing
  to receive main welfare and benefits from the company. In 2016, 930 employees or
  99 percent of our staff took part in this flexible benefit scheme.
- Accelerate Great @ Dow: At Dow, we believe in showing appreciation to our employees who meet the job requirements, celebrate those who exceed expectations and go beyond what is required of them, and express gratitude towards those who support the company's activities or help out their colleagues in different ways. Both supervisors and employees can nominate and reward their co-workers for their outstanding efforts. The recognition ranges from a simple congratulations card to cash rewards of different values. To make it easy for the employees to say "Thank You" or show their appreciation for one another, Dow has established an internal web-based tool called Accelerate Great @ Dow.

#### Other key benefits include.



Retirement saving plans – Provident Fund



Medical plans –
including In-patient,
Out-patient, maternity
and dental



Life insurance



Paid vacation, holiday and leave programs



Disability protection



Business travel accident insurance



Accident insurance

Return to work and retention rates after parental leave, by gender

SR G4-LA3 Dow Thailand Group offers employees, both male and female, the opportunity to take maternity and paternity leaves. In 2016, 36 employees took the leave and all of them returned to work after their leaves period.





#### **Global Citizenship summary**



Throughout our 50 years of business in Thailand, Dow Thailand Group, the leading science company and global citizen, strives to building the workforce of tomorrow as well as innovating for global solutions. We do this by leveraging the potentials of employees to create economic and social values that will lead to better changes and sustainable well-being of the communities and society.

In 2016, Dow Thailand Group conducted the following social contribution activities based on Dow's path of being the world's good global citizen:

#### **Building the Workforce of Tomorrow**

Dow commits to nurture the workforce of the next generation by enhancing skills and expertise of teachers, inspiring a new generation of students to study science, technology, engineering and mathematics (STEM), offering opportunities and expanding capacity of students from diverse education backgrounds to be the country's competent future.

#### 1. Educator Empowerment

At Dow, we value skills and expertise enhancement especially to science and chemistry teachers. We believe that as soon as they are skillful and committed, they are empowered to transfer knowledge to students either in or outside classrooms. The curriculum will be adapted to reflect the real world. The bottom line is that the students will gain more benefits from their studies and will grow up to be an important force for the development of the country and the world.

#### 1.1 Dow Chemistry Classroom

Dow Thailand Group in collaboration with Chemical Society of Thailand under the patronage of Professor Dr. HRH Princess Chulaborn Walailak has set up the "Dow Chemistry Classroom" project for more than four years to focus on science teaching and learning through small-scale chemistry laboratory. The technique is considered not only highly efficient and safe, but also recognized by UNESCO. It is the first time that the technique has been applied by a private company in the Thai education system. Started as a pilot project in Rayong province during 2013 - 2014, the project expanded to provinces in the East in 2015 before going national in 2016. From its inception, 400 teachers from 176 schools attended the project and more than 30,000 students have been benefited from the project.

Main activities of the project include training small-scale chemistry laboratory techniques to science teachers, monitoring and evaluating their teaching, organizing the DOW-CST Award science project competition at the national level and training model teachers of the Dow Chemistry Classroom. The main purpose is to develop trainers' and teachers' capabilities so that they can extensively promote the teaching technique.







#### 2. Classroom to Career

Dow Thailand believes that inspiring and promoting interest of science, technology, engineering and mathematics (STEM) among the youths will not only be a foundation for their professional success but also benefit the country's education development. That is why we continually organize various activities that promote science education to children including other education-related activities.

#### 2.1 Science & Technology Initiatives and Sustainability Awards (STISA)

Dow Thailand Group, SCG Chemicals, the Thai Institute of Chemical Engineering and Applied Chemistry (TIChE), the Thailand Research Fund and the National Innovation Agency have operated the Science & Tech Initiatives and Sustainability Award (STISA) Project since 2009. It encourages students to research for innovations using science and technology while being aware of social responsibility. Into its ninth year in 2016, the STISA received a total of 386 innovative projects submitted by university students nationwide.

#### 2.2 Vocational Chemical Engineering Practice College Project (V-ChEPC)

This is a collaboration between Petroleum Institute of Thailand and the Petrochemical Club of the Federation of Thai Industries (FTI) in which technical students are taught through the "Learn How to Learn" and "Learning by Doing" concepts in a 2-year curriculum. Since 2009, Dow Thailand Group has donated 6.5 million baht to the project. At present, eight classes of technical students have already been graduated and 15 of them are enrolled as our employees. Dow Thailand Group's employees also volunteered as guest lecturers for factory operation.

#### 2.3 Safety Schools

As safety is Dow's top priority, Dow volunteers organize the project to raise safety awareness for school students and to improve school safety in neighboring communities so that students can study in safe and secured school environment. Each year, Dow volunteers organize an activity to give basic safety instruction and to repair basic infrastructure to improve students' safety. Since 2008, more than 100 Dow volunteers, 21 schools and 1,210 students have participated in the project.

#### 2.4 Adopt-A-School

Dow Thailand Group has joined hands with the American Chamber of Commerce in Thailand to adopt schools in Rayong province to improve their basic infrastructure, the environment as well as to provide support to students. Since 2008, 11 schools have been renovated under this project to benefit more than 6,500 students.







#### **Innovating for Global Solutions**

Dow strives to transform technological expertise, innovation and employee's competency into solutions that answer to today's challenge and that respond to people's needs, either in the area of food distribution to consumers, clean water for consumption, access to appropriate habitat and sources of energy. This helps creating positive impacts to the world, making the community sustainable and bringing success to the business.

#### 1. Increase food productivity and prevent waste

Dow worldwide underlines the importance of increasing food productivity while preventing waste before reaching consumers so that the food can indeed respond to increasing needs. In Thailand, the Dow Chemical Project for Sustainable Industry is an answer to this priority. The project focuses not only at the food industry but also diverse businesses of local SMEs in order to increase food productivity and reduce waste from the production process.

#### 1.1 Dow Chemical for Sustainable Industry

#### The 2014 Asian CSR Award\*

Since 2011, Dow Thailand Group, Thailand Environment Institute Foundation, Ministry of Industry, Department of Industrial Promotion, and Thai-US Creative Partnership have initiated a long-term project called the "Dow Chemical for Sustainable Industry" in which the principle of lean management for environment is applied to enhance the industrial sector's capacity and to improve environmental and safety standards, resulting in an increase of management and production efficiency as well as profitability.

Remark: \*The Dow Chemical for Sustainable Industry project won the 2014 Asian CSR Award in Environmental Excellence, presented by the Asian Institute of Management-Ramon V. del Rosario, Sr., Center for Corporate Social Responsibility (AIM-RVR CSR Center), marking the first time Thailand won this environmental award.





#### Major milestones:

#### 2012

- Developing a curriculum and producing a training manual for Thailand's six major industries of pharmaceutical, textile, beverages, metal, ceramic and general industry
- Organizing a training on "Sustainable environmental management and pollution prevention" for the six industries

#### 2013

Organizing three more training curriculums, namely, (1) Integrated
Organizational Management Based on Lean Management for the
Environment; (2) Development of Green Products for Environmental
Sustainability; and (3) Green-Business Operations for Sustainable
Development.

#### 2014

 Offering in-depth coaching to 20 small and medium enterprises (SMEs) and non-governmental agencies on the principle of lean management for environment.

#### 2015

 Setting up a learning organization on the principle of lean management for environment in order to develop environmental consultants through a comprehensive and intensive trainings.

#### 2016

- Organizing the "Thai SMEs Springing Up for Industry 4.0" seminar attended by 496 participants from the media, public and private sectors and the general public
- Organizing a training on "Preparing a new generation for corporate development through the principle of lean management for environment" and the training on "Lean management for environment and innovative technology."

Success from the Dow Chemical for Sustainable Industry project includes the following:

- More than 5,600 people enjoyed direct benefits from the project either in the form of seminar, training or comprehensive consulting service.
- A network of lean management for environment consisting of more than 1,000 people was created and is now extended to other sectors. Knowledge has now been transformed into good practice and the network functions as a platform for information exchange in the long term.
- About 20 organizations getting in-depth coaching see
  their productivity increase on average by 30 percent,
  which is translated into more than 57 million baht of
  production costs and energy being saved, 10 percent
  of pollution being reduced, a better quality of life
  to more than 8,000 employees and extensive reduction
  of environmental impacts to various communities.
  (Source: Information from Thailand Environment
  Institute Foundation.)
- Three learning organizations were created from winners of the Lean Management for Environment Award;
  - 1. The Prostheses Foundation of H.R.H. the Princess Mother
  - 2. Cotco Metal Works Co., Ltd.
  - 3. Bangkok Eagle Wings Co., Ltd.



#### 2. Water access and reuse

Thailand's water challenges include the problem of draught and flood which lead to drinking water contamination and water-borne diseases. Rapid urbanization, increasing population and expansion of the industrial and agricultural sectors means groundwater are increasingly pumped out, resulting in worsening water pollution and adverse effects to quality of water resources and water supply. All of these are major factors forcing the public and private sectors to collaborate to resolve problems through wastewater treatment, recycling and reuse processes.

During the past decade, Dow Thailand donated two mobile reverse osmosis water filtration units worth more than 6 million baht to the Thai Red Cross to tackle the shortage of potable water in Thailand especially in areas suffering from draught and flood. Dow Thailand and our volunteers also supported communities in Rayong province by installing water purifiers with maintenance advice to ensure that communities get access to enough clean water for every day's use.

In 2016 Dow Thailand Group, in collaboration with the Relief and Community Health Bureau, Thai Red Cross Society, installed 2 water filtration machines to Center of the Non-Formal and Informal Education - Ban Mae Ramit Luang, Omkoi district, Chiang Mai province and Center of the Non-Formal and Informal Education - Mae Fah Luang Ban Huai Put, Chaloem Phra Kiat district, Nan province to provide clean drinking water to students and neighboring communities. In 2017 Dow Thailand Group will work with the Relief and Community Health Bureau - Thai Red Cross Society to install water filtration machines to 50 remote schools nationwide. Suitable specification of filtration machine and filter will be carefully selected for each school to match with each own different water condition and quantity required. Dow will also provide maintenance training to responsible persons and an effective maintenance system throughout the machine's lifespan. The project aims to provide access to clean drinking water, reduce health risk from drinking unclean water and reduce student's absenteeism from their health-related issues.

Percentage of operations with implemented local community engagement, impact assessments, and development programs





#### **Support for Community Success & Community Engagement**

With our commitment to be a good corporate citizen, Dow Thailand Group has a mission to promote quality and sustainable wellbeing to communities especially those in Rayong province where we have factories through various Corporate Social Responsibility (CSR) activities focusing on promote community wellbeing and community participation.

#### 1. Support for community success

#### 1.1 Dow-EF Development for Successful Youth & Rayong Happiness

Dow Thailand launched the Dow-EF Development for Successful Youth & Rayong Happiness Project in 2016 with a goal to turn Rayong into a model of happy town where communities and strong families live happily. The project, which has been fully supported by all sectors in the province and Thailand EF Partnership, aims to develop Executive Functions (EF) of the brain to young kids in families all the way to schools and communities in the province. The EF will also be a part of the mechanisms to build a strong community while preventing social problems such as drug addiction, gambling, premature pregnancy, game addiction or family violence. The project also equips parents with an ability to cope with potential problems. In brief, this project marks the first time for Thailand to implement such a large-scale citywide initiative with collaboration from all sectors.

## **Executive Functions (EF)**

Executive Functions (EF) are a set of cognitive process located in the prefrontal cortex of our brain. This brain section works similarly to a CEO of a corporation where it controls thoughts, decision-making, emotion, expression and action. EF skills help us plan, concentrate, memorize orders and manage tasks. It also helps us prioritize our work, set up goals and achieve them. Besides, it controls our desires and impulses so that they remain in a proper manner, in a way very much similar to air traffic control who manage a large number of aircrafts' landing and taking off from a busy airport at the same time. This EF skill is critical in controlling human being's IQ and EQ. The EF skills consist of three groups of skills, namely,

#### 1. Basic skills

which is extremely important because it is the "basis" for other external EF skills. The basic EF skills include working memory, inhibitory control and shifting / cognitive flexibility.

#### 2. Organization skills

which consist of initiation, planning and organizing and goal-directed / persistence.

#### 3. Regulation skills

which include focus attention, emotion control and self-monitoring.

Normally, all human beings use EF skills for a life span. Nurturing a child since his/her early childhood days with these skills on a regular basis is important and results effective utilization of these skills. This can be done through various practices starting from creating trust and bond to ensuring that body and brain is physically strong, creating a right environment and exposing a child to a variety set of experiences.



Executive Functions (EF) Seminar with Change Agents

During the past year, Dow Thailand, network partners and Change Agents conducted various activities to expand EF knowledge and promote EF skills in this Dow-EF Development for Successful Youth & Rayong Happiness project. Details are as follows.

- Organizing a workshop on "building skills for a happy life for kids through Executive Functions" to 120 EF Change Agents, with Ban Chang district and Map Ta Phut district as pilot areas.
- Co-planning activities with EF Change Agents working in various areas, providing tools and promotional materials before actually implement actions.
- Promoting EF regularly in communities mainly through EF Change Agents who bring in knowledge to each area. Over 2,500 people received benefits from the project through the following activities:
  - » Introducing EFs to parents and kids at the "3rd Dow-National Science Museum Science Caravan" activity held at Central Plaza, Rayong province and attended by around 800 participants.





EF Change Agents passing on knowledge to communities

EF SYMPOSIUM 2016 ปลุกพิจทักษะสมอง บับเพาะเด็กโกยยุก 4.0

"EF Inspire: Experiences in Driving EF" dialogue in EF SYMPOSIUM

- » Integrating EFs with mobile reading activities held twice by Map Ta Phut Municipality Library and six childcare centers. 275 people attended the event.
- » Organizing eight EFs enhancement events at the EF Activity Square, Banchang Municipality Stadium. The event attracted 625 participants.
- » EF Change Agents from Banchang Hospital and Banchang public health volunteers organized a workshop on EF skills during monthly meeting date of public health volunteers to promote EF skills to public health volunteers. The event was attended by 256 public health officers of the Banchang Municipality.
- » Three parent-classroom activities were held and attracted 330 participants as follows.
  - Public health volunteer leaders of Ban Chang district together with teachers from the Ban Chang Municipality childcare center organized the EF activity to 150 parents and students on the center's orientation day.
  - Childcare Center of Mapkha Sub-District Municipality, Nikhom Pattana district and EF Change Agents from Banchang Hospital educated 60 parents on child development, children's healthcare and EF skill enhancement.
  - EF Change Agents, public health officers and public health volunteers working in villages under Samnak Thon sub-district together with teachers of Wat Samnak Thon School organized the EFs enhancement activity to 120 parents and early childhood students.
- » Expanding the EF knowledge to 60 teachers in 9 childcare centers within Ban Chang district and Wat Khao Huaymahad School.
- » EF Change Agents of the Health Promotion Hospital of Ban Payoon sub-district, Ban Chang Sub-District Municipality, organized an activity entitled Body Vaccination, Life Immunity to discuss EF knowledge to public health volunteers and parents with kids between 2 - 4 years old at the Health Promotion Hospital of Ban Payoon sub-district. About 40 participants attended the event.
- Wat Pala School Childcare Center organized an activity on beautiful teeth, bright smile where the EF knowledge was integrated in the dental health promotion plan. About 30 people benefited from this activity.
- » EF knowledge was integrated in the activity to promote breastfeeding at Ban Pala Sub-District Health Promotion Hospital where 20 people attended the event.
- » EF Change Agents, public health officials of the Health Promotion Hospital of Ban Sakaew together with teachers from Sakaew School organized the event entitled Home and School Surrounding with Love to parents and their children to get familiar with EF skills. 60 people benefited from the event.
- » The "EF Inspire: Experiences in Driving EF" dialogue was held during the EF SYMPOSIUM at Impact Forum, Muang Thong Thani, Nonthaburi province to expand EF knowledge to EF Change Agents and to act as an information sharing platform on EF and their experiences in promoting the mechanism within Rayong province. The dialogue was attended by 19 participants.

The lesson learnt activity was held for 60 area facilitators to share their experiences in promoting EF in their respective areas and to discuss and plan for the way forward in the following year.

#### 1.2 Ban Chang Development Plan

Dow Thailand Group has supported Ban Chang district to formulate the "Ban Chang Development Plan" where residents in 22 villages of 3 sub-districts in Ban Chang district, Rayong province, took part in drafting the plan aimed to support sustainable empowerment of their communities. The plan identifies major projects critical to sustainable development. It also singles out details of projects the community may pursue by itself or need collaboration from the public or private sector and allows them to access to various resources. In 2013, Dow and communities in Ban Chang district completed the development plan, which was later submitted to community leaders and the district in June 2013.

In 2016, Dow Thailand Group managed to do the following based on the Ban Chang Development Plan.

- The "Dow Science Caravan" activity was organized with the National Science Museum to promote science education. More than 10,000 students from various schools in Rayong attended the caravan activity.
- The "English Kids Fun" project offering the kids between 9 12 years old English classes on weekends with an aim to develop their English language skills. The project, which has been up and running since 2014, is a true reflection of the community's real need. About 1,000 kids have been passing through this activity.
- Collaborating with a reputable English language institute to train English language skills to 120 local teachers.

#### 1.3 Neighbor Care Project

Starting in 2014, Dow Thailand Group has established the socio-environmental project under the name of "Neighbor Care Project", which offer an opportunity for Dow's staff to propose projects that will improve community wellbeing and nourishing a relationship with communities in Rayong. Almost 600 Dow volunteers have participated in the project and 15 activities has been commenced. In 2016 alone, five activities were held under the project as follows.

- "Safe Use of Chemicals and Traffic to the Youth" Traffic signs installation
  and traffic areas & footpath renovation are a part of landscape refurbishment
  to improve safety at the Wat Krok Yai Cha School, Rayong province.
  A training on traffic sign reading and basic use of chemical substances
  was also held to enhance safety knowledge to more than 60 teachers and
  students in the school.
- "Easy Science for Kids" Outstanding model science teachers from the
  Dow Chemical Classroom project and a team of Dow volunteers shared
  knowledge on small-scale chemical laboratory with Wat Ta Kuan School's
  students. The equipment was also given to the school for teaching purpose.



Dow Science Caravan



English Kids Fun



Safe Use of Chemicals and Traffic to the Youth



Easy Science for Kids



**Vetiver Grass Planting** 



Organic Farming



Clean Drinking Water for Community

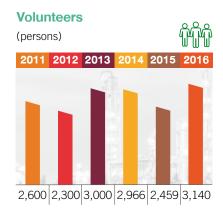
- "Vetiver Grass Planting" 400,000 saplings of vetiver grass were planted along four kilometers of public waterways in Pala sub-district, Ban Chang district, and within Ban Chang Municipality area to prevent soil erosion resulted from flash flood and to increase green area to the community.
- "Organic Farming" The project is developed based on last year's lemon
  tree planting project where students in Wat Kiri Pawanaram School were
  taught to prepare organic soil from sludge, grass and leaves as well as to
  make organic fertilizer and bio extract to nourish the lemon trees. The
  project strives to increase incomes for the school and students and to
  enhance vocational skills of the students.
- "Clean Drinking Water for Community" Dow Thailand helped improve the drinking water manufacturing plant of Map Chalood Community in Rayong province by building shelves for drinking water tanks. The company also organized a training on the 5S cleaning system and donated the company's Ultratex BW-4040 filter membrane to be used in the water purification system. The membrane is durable and able to filter solutions found in water, enabling the community to produce clean water and reduce the use of energy in an environmental-friendly manner.

#### 1.4 International Coastal Cleanup

Dow Thailand Group, Industrial Estate Authority of Thailand (I-EA-T), Tourism Authority of Thailand, surrounding communities and local businesses have joined hands to organize a beach cleanup on the International Coastal Cleanup day in Map Ta Phut area for 14 consecutive years. The activity not only helps save marine animals but also raises environmental awareness among community members to protect beaches and local coastline.



#### Statistics of International Coastal Cleanup program (2011 - 2016)





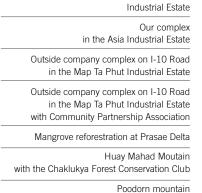




#### 1.5 Tree planting and protection strips

Dow Thailand Group has actively supported tree-planting activities in the community and around the neighborhood in order to improve their living quality by increasing green strips and green area. The activities also raise environmental awareness among Dow's employees and local residents. During the past eight years, Dow has planted more than 150,000 trees. The tree-planting activity is usually organized on auspicious occasions such as on H.M. the King's and H.M. the Queen's birthdays and on the World Environment Day.

#### Tree planting statistics between 2009 - 2016:

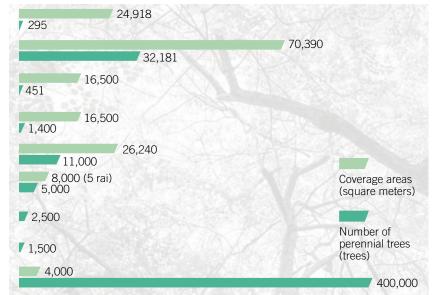


Our complex in the Map Ta Phut

Namrin Beach with the Ban Chang Municipality on the World Environment Day

with the Ban Chang Municipality

Planting vetiver grass with the Ban Chang Municipality as part of the "Sustainable, Safe and Care for Community project."



#### 1.6 Supporting community enterprises

Dow Thailand Group supports community goods and services provided by community or community enterprises since this means supporting the local economy. Community products such as fruits, vegetables, foods and snacks were usually on sales at our plants when we organized corporate event in order to generate income to the communities. The company supported 15 communities in Ban Chang and Map Ta Phut and was able to generated more than 200,000 baht.

In addition, the company supports community enterprises to broaden and develop their products in order to better respond to market needs. With our help, community enterprises were able to generate more than 1,600,000 baht.

### 1.7 Community Partnership Association (CPA)



Mobile Clinic



Awarding Scholarship to nursing students



Promoting Community enterprises using the Thammasat Model

Dow Thailand is one of the founding members of the "Community Partnership Association" group, which is Thailand's first collaboration among five industrial companies in the Map Ta Phut area since 2010; namely, Dow Thailand Group, PTT, SCG, BLCP and Glow, who commit to develop and enhance a green industrial business while developing a sustainable environmental management network with an ultimate goal of turning Rayong province into a Eco Industrial Town.

CPA's major activities during 2016 were as follows:

- Organizing the Friend-Helps-Friend project to upgrade safety and environmental management standards of the companies within the Map Ta Phut complex by sharing factory management knowledge with them.
- Initiating the Eco Factory project by applying the Eco Factory principles adopted by the Industrial Estate Authority of Thailand (I-EA-T) and Department of Industrial Works among its members. 38 factories participated in this eco factory project.
- Training and reviewing an emergency evacuation plan to 38 communities and 11 schools in Map Ta Phut area to effectively handle potential disasters.
- Dispatching a mobile clinic to Map
   Ta Phut and Ban Chang communities
   on 17 occasions which attracted
   more than 1,800 people seeking
   medical services.

- Awarding 38 scholarships to undergraduated students of Rayong province for sixth consecutive year.
   From 2011 - 2015 the CPA has granted 97 scholarships.
- Awarding 27 scholarships to nursing students for sixth consecutive year.
   Total 376 scholarships have already been granted between 2011 and 2015.
- Promoting community enterprises
  in the Map Ta Phut complex using
  the Thammasat Model to manage
  the businesses and improve quality
  of goods and services in order to
  enhance their competitiveness.
  Initiated as a pilot project, the project
  was conducted in eight community
  enterprises covering seven
  sub-districts.
- Collaborating with the prototype community model project organizing traditional Thai Health Promotion activities focusing on prevention of non-communicable diseases (NCD) at the Koh Kok community, making the village to win an award in 2016 that recognized its success in changing lifestyle behaviors among villages under Health Region 6 covering eight provinces in the east.
- Introducing the 3Rs concept of Reduce, Reuse and Recycle to manage waste and environment at the Krok Yai Cha School as a pilot project to turn the school into an ecological role model school.

#### 2. Community Engagement

Dow Thailand Group underlines a strong relationship with the communities by maintaining communications between the company and communities throughout the year. We join community events on major occasions such as National Children's Day, Thai New Year Day, Buddhist Lent Day and in Kathin ceremony.



**Community Advisory Panel** 



Dow Thailand Group welcoming plant visitors





#### 2.1 Community Advisory Panel (CAP)

Dow Thailand Group's Community Advisory Panel (CAP) provides an important outside-in perspective on the environment, health and safety issue, as well as sustainability, for the company. CAP members include local government officials, community leaders, the media, and other community representatives. Currently, Dow Thailand Group has two CAPs. The first one, formed in 2010, is at the Asia Industrial Estate, and the other, formed in 2011, is at the Map Ta Phut Industrial estate. Since their inception, 48 meetings were convened. In 2016 alone, there were eight meetings.

#### 2.2 San Sum Phan (Community Meetings)

This activity is an informal meeting held to strengthen relationship between Dow and the community and as a forum to discuss Dow's business operation as well as listen to community advice. The activity was held with communities in Ban Chang Sub-district Municipality, Muang Ban Chang Municipality, Pala Sub-district Municipality and Muang Map Ta Phut Municipality.

#### 2.3 Other activities

We open our house to welcome visitors from government agencies, community representatives, local schools, university students and the media to look at our products, safety and environmental management systems, our social activities and community engagement. Other visits are by accredited measurement agencies to monitor the measuring of the environmental quality.

#### **Energy Efficiency and Affordable Housing**

#### **Habitat for Humanity**

Executives and staff of Dow Thailand Group have built houses with the US-based Habitat for Humanity International Foundation for residents in need of housing in Ban Chang, Map Ta Phut and Map Chalood communities, Rayong province. In 2016, Dow built two homes for poor families in Pala Sub-District Municipality and Sam Nak Thon Sub-District Administration Organization. Since 2006, Dow has built 29 homes to people in need of shelter and drew participation from more than 1,000 volunteers.

#### Other contribution activity

Aside from empowering communities, in 2016, Dow Thailand Group provided social contribution activity in other area as follows.

#### Supporting the Prostheses Foundation for H.R.H. Princess Mother

Dow Thailand Group has donated a polyurethanes product to produce prostheses to the Prostheses Foundation of H.R.H. the Princess Mother since 1996, which can be translated into more than 30,000 prosthetic legs. Besides, Dow has organized trainings on how to safely use chemicals and personal protective equipment (PPE) and how to safely store chemicals and has helped drafting safety plans for the foundation's management and staff. In 2014, a fund for safety, occupational health and environment was established for the foundation. In 2016, Dow, business partners and employees donated money and products worth 1 million baht to the foundation to develop a new style of prosthetic leg that could reduce impact from walking and thereby making the wearer less painful.



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