GLOBAL CHEMICAL INDUSTRY CONTRIBUTIONS TO THE SUSTAINABLE DEVELOPMENT GOALS
In 2015, world leaders adopted the Sustainable Development Goals (SDGs), setting the global development agenda for the next 15 years. The aim is to address the daunting challenges that the world is facing, including meeting the needs of a growing population, promoting a path toward more sustainable environmental practices, mitigating climate change, and boosting economic growth and global development.

The International Council of Chemical Associations (ICCA) is committed to supporting the implementation of the SDGs. The chemical industry plays a unique role in meeting these challenges through research and development of innovative, life-enhancing products, technologies, and applications that could turn today’s societal challenges into opportunities. Furthermore, through its two flagship initiatives, Responsible Care® and the Global Product Strategy, ICCA has made a commitment to improve the responsible handling and use of chemicals in the industry and throughout the value chain. Responsible Care and the Global Product Strategy are key drivers of the chemical industry’s environmental, health, safety, security, and sustainability practices. We are committed to continuing to grow and advance these programs.

Implementing the 2030 agenda for sustainable development will be challenging for all stakeholders. It will require extensive engagement from both the public and private sectors. The SDGs provide an opportunity to amplify the role chemical manufacturers have long played as innovators, solution providers, and drivers of economic growth.

The purpose of this brochure is to highlight the contributions of the global chemical industry to the 2030 agenda for sustainable development.
THE UNITED NATIONS DEVELOPMENT GOALS

1. NO POVERTY
2. ZERO HUNGER
3. GOOD HEALTH AND WELL-BEING
4. QUALITY EDUCATION
5. GENDER EQUALITY
6. CLEAN WATER AND SANITATION
7. AFFORDABLE AND CLEAN ENERGY
8. DECENT WORK AND ECONOMIC GROWTH
9. INDUSTRY, INNOVATION AND INFRASTRUCTURE
10. REDUCED INEQUALITIES
11. SUSTAINABLE CITIES AND COMMUNITIES
12. RESPONSIBLE CONSUMPTION AND PRODUCTION
13. CLIMATE ACTION
14. LIFE BELOW WATER
15. LIFE ON LAND
16. PEACE AND JUSTICE STRONG INSTITUTIONS
17. PARTNERSHIPS FOR THE GOALS
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Advances in chemistry are instrumental in increasing agricultural production to meet the basic nutritional needs of a growing world population. Chemical products protect plants from pest infestation, increase crop production through the use of high-yield seeds and fertilizers, and slow soil erosion. Chemistry is also essential to safe drinking water and sanitation. Advances in chemistry include disinfectants that kill germs and prevent disease; polymer membrane filters that remove impurities; materials for desalination, turning salt water into fresh water that is suitable for human consumption; and materials for pipes that protect water from its source to the tap. Chlorine-based water disinfectants, used for over a century to help protect consumers from diseases that once decimated populations, remain in wide use for maintaining drinking water quality during storage and distribution. Finally, medical breakthroughs and innovative technologies made possible by chemistry provide deeper understanding of the causes of—and better treatments for—medical diseases and ailments, enabling people to live longer and healthier lives.
BASF: Improving Nutrition Through Food Fortification

Today, around two billion people suffer from micronutrient deficiencies, or so-called “hidden hunger.” Women of reproductive age and children less than two years old disproportionately lack iron, folic acid, vitamin A and zinc, which are essential for the cognitive and physical development, and a robust immune system. Improving nutrition has demonstrably resulted in better performance among schoolchildren and boosts productivity among the population. Thus, it contributes to the overall development process.

Fortifying staple foods is an effective and sustainable method to improve the nutritional status among low-income population groups. By adding essential micronutrients during the production process the nutritional value of staple foods, such as oil and flour, increase. BASF’s Food Fortification Initiative offers product solutions, technical assistance and scientific capacities to support local food producers in fortifying foods. Furthermore, BASF has developed a semi-quantitative test kit that enables both food producers and public authorities to assess the fortification level of the products. Using the test kits does not require a special training and can be done within the production process. The test kits are very cost effective because no laboratory equipment is needed.

Sumitomo Chemical: Fighting Malaria, Empowering Communities

According to the UN, malaria kills a child in the world every minute. And nearly 90 percent of malaria deaths occur in Africa, where the disease accounts for one-fifth of all childhood deaths. One essential strategy to fight this disease is the production, distribution and use of long-lasting insecticide-treated mosquito nets (LLINs).

Sumitomo Chemical developed an insecticide-treated mosquito net that contributes to malaria prevention. In one dramatic example: in Sauri village in Kenya, the number of people with malaria parasites is reported to have decreased from around half of the total population in 2005 to 8 percent by 2008, by using the Sumitomo Chemical mosquito net.

Sumitomo Chemical did more than just develop these life-saving nets. It also aided in their manufacture and distribution by providing the technology free of licensing fees to a local Tanzanian company and by establishing a joint venture, creating jobs for about 7,000 people. According to a 2011 report by the University of London, Sumitomo Chemical’s manufacturing operation accounts for 20 percent of all manufacturing jobs in the region. These jobs are enabling workers to enhance their financial stability, plan for the future, and ensure an education for their children.
Dow: Clean Water, Better Health

Clean, safe drinking water is essential to human health. Unsafe drinking water is a vicious and pervasive killer worldwide—UNICEF reports that 1.5 million children die every year from a lack of clean water and sanitation.

To address this challenge, stakeholders must work together to kill waterborne bacteria and viruses, build water treatment facilities, and transport safe water to those who need it most. Advances from Dow are contributing to all these areas.

Dow provides the plastic resin for lightweight water purification devices that remove parasites, bacteria and viruses from contaminated water. One device can provide water to a household for 10 to 15 years at an annual cost of $1 per person. On a larger scale, Dow’s reverse osmosis technologies provide safe drinking water through desalination in coastal areas with limited fresh water resources. Another innovation enabled by Dow is lightweight, durable “bricks” that can transport food and water and then be reused to create homes, schools or medical facilities. Dow’s resins reduce the weights of these containers, which can be air-dropped to remote regions during disasters or when road access is compromised.

To supply clean water to more than 11 million people in rural India and Africa, Dow has provided a $30 million loan guarantee to WaterHealth International (WHI) to help finance 2,000 water treatment systems.

Like many other ICCA members, Dow’s commitment to clean, safe drinking water around the world recognizes the complexity of the challenge and the responsibility of companies to respond.

Toray: Supporting Goals 6 Through Ensuring Clean Water and Sanitation For All

Seawater desalination and wastewater reclamation technologies have shown their effectiveness in helping to solve water security and water shortage challenges around the world. Toray provides a variety of membranes that are necessary in water production and wastewater reclamation processes. Membranes separate suspended particles and salts in water solution, and the type of membrane applied varies with the size of separation materials and the intended purpose. Toray will continuously contribute to pursuing Goal 6 through membrane separation technologies.
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<td>High molecular weight polymer</td>
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<td>RO (Reverse Osmosis)</td>
<td>NF (Nanofiltration)</td>
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**Treaty's membrane product**

- **ROMEMRA™**
  - RO Membrane
  - Ultrapure Water
  - Seawater Desalination
  - Wastewater Reclamation

- **TORAYFIL™**
  - UF Membrane
  - Softening
  - Removal of Toxic Substance
  - Municipal Drinking Water
  - Reuse of Wastewater
  - Pretreatment for Seawater Desalination

- **MEMBRAY™**
  - MF Membrane (MBR)
The global chemical industry has a unique role in innovating and producing a wide range of products, articles, and services that are essential to everyday life and that promote sustainable development and environmentally sound outcomes. Today’s technologies enable energy and resource-use efficiency, greenhouse gas (GHG) emissions reduction, reusability of waste, and the development of sustainable materials and business practices. Through Responsible Care and the Global Product Strategy, the chemical industry is committed to advancing sustainable management of materials in all its phases, and achieving greater transparency in environmental, health, and safety performance. Responsible Care is the centerpiece of this global commitment.
Braskem: Sustainable Methods, Sustainable Products

Braskem, the largest biopolymer producer in the world, is committed to a comprehensive strategy to: use more sustainable processes; provide a more sustainable product portfolio; and offer solutions for a more sustainable life.

Braskem has embraced the Responsible Care® model and implemented a program to reduce waste, conserve water, save energy and improve worker safety throughout its facilities in Brazil and abroad.

The results have been dramatic. Between 2002 and 2011, accident rates decreased more than 80 percent, to a level on par with the best performing chemical companies in the world. The company reduced its liquid and solid waste by more than 60 percent through innovative programs that capture rainwater and recycle inorganic effluent. And its emissions are now less than one quarter of the Brazilian chemical industry average.

On the product side, Braskem developed a new process for polyethylene production based on renewable raw materials by investing more than $250 million in a facility to produce polyethylene from sugar cane-based ethanol. Sugar cane, a renewable material, has the capacity to capture 2.5 tons of CO2 equivalents per ton of polyethylene produced, because it takes carbon from the atmosphere during the natural photosynthesis process.

Another benefit: the plastics industry, which uses Braskem’s bio-polyethylene, does not need to change its equipment or processes because the performance characteristics of the material are the same. The product is being widely embraced, and Braskem has announced plans to develop a renewable based Polypropylene, the second most consumed polymer in the world.

BASF: Advancing Efficient Manufacturing

The Verbund principle enables BASF to add value as one company through the efficient use of its resources. With the company’s six Verbund sites and 338 additional production sites, BASF supports customers and partners in almost every country in the world. Verbund is all about intelligent interlinking of production plants, energy flows, and infrastructure. Also, know-how and customers are intelligently connected to each other.

The Verbund system creates efficient value chains that extend from basic chemicals right through to high-value-added products such as coatings and crop protection agents. In addition, by-products of one plant can be used as the starting materials of another. In this system, chemical processes consume less energy, produce higher product yields and conserve resources. BASF saves on raw materials and energy, minimizes emissions, cuts logistics costs and exploits synergies. Through the Verbund system, waste heat from one plant’s production process is used as energy in others, saving BASF around 17.6 million megawatt hours (MWh) in 2015, which corresponds to a savings of 3.5 million metric tons’ worth of carbon emissions.
A smart and diversified energy future underpins sustainable growth. It includes making better use of finite resources and raw materials; extending a product lifecycle perspective to production, consumption and use patterns; and developing innovative technologies that vastly improve energy efficiency around the world. The chemical industry is continuously improving energy efficiency in its facilities, and its companies manufacture products that help to reduce energy consumption throughout their life cycle. As one example, lightweight materials used in the building and automotive sectors are transforming how we use, consume, and save energy on a daily basis. Furthermore, nearly all renewable energy sources and technologies—wind, solar, natural gas and new battery technologies—depend on innovations in chemistry to become more efficient, affordable and scalable. Chemical innovations also enable breakthrough technologies in energy generation, storage, recovery and alternative fuels, providing end-user products for a low-carbon society.
DuPont: Innovation Driving Energy Diversity and Efficiency

Around the world, innovations in chemistry drive major improvements to the clean energy sector. Industries depend on chemistry to make the solar panels, wind turbines, fuel cells, and advanced fuels and vehicle technologies that will diversify our energy supply and make our global economy more efficient and green.

DuPont is a major provider of materials that make solar panels, including specialty films, electronic pastes and specialty plastics. The company sold $1.4 billion worth of U.S.-made products into the global solar market last year that helped increase the power output and lifetime of solar panels and reduce overall costs of PV systems. In addition, DuPont’s fire-resistant fibers, traditionally used to make protective clothing for first responders, also are being used, in a new form, to insulate the electrical components of wind turbine motors.

In the transportation sector, DuPont’s products make strong, lightweight specialty plastics for vehicles, improving their fuel efficiency. And a new nano-fiber sheet material is used to make lithium-ion batteries for hybrid and electric cars more energy rich, longer lasting and safer at high operating temperatures. DuPont is also commercializing two advanced, low-carbon biofuels—cellulosic ethanol and biobutanol.

While enabling a cleaner, more efficient and diverse energy future, these advances are creating and preserving jobs as well. DuPont expanded production of materials for solar panels in the midst of the recent recession, spending hundreds of millions of dollars on capital improvements and adding several hundred jobs. These are just a few of the many examples—from just one company—of how the chemical industry enables innovation in a changing global economy.

Momentive: Wind Energy Innovation

Forty percent of global GHG emissions are produced by the power sector. Renewable energy technologies, such as wind turbines, are increasingly becoming important components of a holistic energy portfolio. Through advancements in technology, industry continues to increase wind turbine energy yields while decreasing cost per kilowatt hour. Energy efficiency can be further improved by using larger, longer and lighter rotor blades. However, as blade sizes increase, so do the inertial forces that cause cracking and other forms of structural degradation. Momentive Specialty Chemicals’ broad range of epoxy resins, curing agents, and bond pastes enable designers and manufacturers to produce longer blades with greatly improved composite strength, while at the same time minimizing added weight. Rotor blades using Momentive’s systems can realize both cost and energy efficiency savings through decreased raw material resources and better durability of the blades.
Solvay: Optalys® Products in Road Transport Emissions Control

According to the latest figures from the International Energy Agency (IEA Statistics 2015), transport accounted for 23 percent of global CO2 emissions, of which road transport represents three quarters. In order to meet regulatory emission limits and air quality standards, the auto sector uses exhaust after-treatment devices to optimize the efficiency of combustion engines and reduce engine-out emissions. Solvay has more than 30 years of experience in supplying advanced raw materials for the development of such devices, thus enabling the automotive industry to cost-effectively conform to worldwide emissions regulations. In particular, Solvay OPtalys® products have enabled the automotive sector to introduce advanced, highly fuel-efficient internal combustion engines, such as direct injection gasoline and diesel. Solvay OPtalys® technologies have the added benefit of contributing to the reduction of emissions of toxic substances, such as carbon monoxide, unburnt hydrocarbons, nitrogen oxides, and particulate matter.

FMC: Powering the Future

FMC’s Stabilize Lithium Metal Powder (SLAMP®) significantly extends lithium-ion battery capacity, output, life, and application flexibility. This pioneering technology is used in a wide range of applications, from powering electric and hybrid vehicles, to increasing efficiency of absorption air conditioning systems, which support Green Building initiatives. For consumers, this means that their energy consumption is reduced in a range of daily activities, from driving to air treatment in buildings.
Dow: Cool Roof Reflective Coating

Urban environments around the world are working to reduce greenhouse gas (GHG) emissions, increase energy efficiency and improve the quality of life in urban settings by combating the urban heat island effect. The annual mean air temperature of a city with one million people or more can be 1.8–5.4°F (1–3°C) warmer than its surroundings. In the evening, the difference can be as high as 22°F (12°C). Heat islands can affect communities by increasing summer time peak energy demand, air conditioning costs, air pollution and GHG emissions, heat-related illness and mortality, and water quality.

Dow’s elastomeric coatings technology meets the growing demand for energy-efficient cool reflective roof coatings, or “cool roofs,” while extending the life of the existing roof. The energy-saving white roofs reflect the sun’s heat, helping prevent it from being absorbed into the roof and building. This can reduce the cost of cooling by as much as 20 percent and help combat urban heat island effect.

Durable Cool Reflective Roof Coatings can also protect the roof from environmental degradation and help reduce the effect of peak temperatures and resulting mechanical stress, leading to an expanded lifetime for the roof reducing re-roofing costs and waste. As an added benefit, applying cool reflective roof coatings can also help buildings achieve Leadership in Energy and Environmental Design (LEED) accreditation, thanks to their energy-saving capabilities.
The global chemical industry is a USD $4 trillion business affecting virtually every sector of the economy. Worldwide, it directly employs more than seven million people and, indirectly, more than 20 million. Chemical manufacturers are driving innovation in virtually every country. More than 95 percent of manufactured goods are touched by chemistry. That is why the safe production and management of chemicals is crucial to economic growth and enhancing quality of life for people globally. Innovation provides business opportunities and a sustainable foundation for new growth in developing regions. By helping to enhance product stewardship activities around the world, the industry continues to create capacity for innovation and economic growth in the countries that need them most.
DuPont Science: Economic Growth in Africa – The Continental Shift

Today, African nations face unique and daunting challenges. Africa is the second largest continent in the world, but it is also the world’s most underdeveloped. It has one of the largest reserves of precious metals on earth, and yet is the poorest continent on the planet. A quarter of its people are malnourished, but its population is likely to double by 2050.

Many economic challenges that African nations face demand the problem-solving might of the world’s top scientists and engineers. DuPont, working with the local government, academics, leaders and influencers in a variety of industries, is helping to catapult many of the continent’s 54 nations from small-scale, independent workforces to modern, industrialized economies. DuPont science will help build African roads and connect nations, bring vital nutrition to Africa’s young and elderly, increase crop production for growers, and raise workplace safety standards everywhere. Half of Africa’s population is under 25, which means there is a great future on the horizon – and DuPont is helping lead the way through life-changing, science-based solutions.

Air Products: Sustainable Growth in China

As a leading global supplier of gases and performance materials, Air Products thrives on helping people solve tough challenges. Since 1940, the company has grown from a single U.S. location to a Fortune 300 company operating in more than 50 countries. With headquarters in Shanghai, Air Products is now a leading global gases and performance materials company in China, serving a wide range of industries. The company has established strong positions in Southern, Eastern, and Northern China, and is expanding into new regions. In Western China, for example, the company is building several large air separation units, including the largest, single on-site contract awarded to any industrial gases company in the world. With its leading edge technologies, local knowledge, and a deeper understanding of its employees, Air Products is set to play an important role in China’s sustainable growth story for years to come.
Quality education brings numerous benefits to communities: greater economic growth, improved public health, and more stable societies. The global chemical industry supports equitable quality education and education for sustainable development, in addition to promoting lifelong learning opportunities for people all over the world. The global chemical industry has a long history of promoting sustainable development in communities in which they operate around the world. In particular, ICCA members actively collaborate with government and non-government organizations to advance educational programs that are socially, culturally and economically relevant, and that lead to greater empowerment of community members.
Sasol: Osizweni Education & Development Centre in South Africa

Sasol believes that education is the foundation of a prosperous future, and is continually investing in projects to ensure that youth have access to quality education, and are well-equipped for the future.

Sasol established the Osizweni Education & Development Centre in Secunda, Mpumalanga, South Africa in 1991. The Centre helps thousands of young people get better access to the world of science, improve their marks, and eventually become trained, working adults. In addition, Sasol has donated science laboratories to under-resourced schools in Mpumalanga to help improve mathematics and science matriculation. In 2011, the Osizweni Centre hosted more than 50 science and technology activities during National Science Week. The program brought together exhibitors from academic institutions, technology-based companies and government based departments including Eskom, South African Police Services, South African Qualifications Authority and Honeywell.

Celanese: International Impact Program – Volunteerism at Its Best

The Celanese Foundation’ International Impact Program is an employee-driven initiative dedicated to improving the quality of life for people around the world. Under this initiative, Celanese employees work side-by-side with individuals and non-government organizations to design projects that address local social, economic, environmental and sustainability challenges. Examples include workshops on creating a sustainable marketing model for a community garden; enhancing volunteer retention for an organization that supports domestic violence victims; and offering management tools for a home that provides free housing for females undergoing medical treatment. Celanese employees recently traveled to Uberlândia, Brazil, where they assisted three organizations that provide social services to their local communities.
ICCA partnerships and capacity building programs promote awareness of chemicals management and support community services. To advance pressing issues related to chemicals management, ICCA has collaborated with a range of stakeholders -- from small and mid-sized chemical companies in emerging and developing economies, to non-government and inter-governmental organizations. Since 2006, ICCA has worked with partners to host over 195 chemicals management capacity building projects in over 46 countries.
ICCA & UNEP: Safe Handling and Transport of Chemicals Workshops

ICCA and the United Nations Environment Programme (UNEP) partnered on a large-scale, 24-month initiative to promote chemicals safety management in east and western Africa. ICCA and UNEP hosted workshops that brought together chemical safety experts and key representatives from Burkina Faso, Burundi, Kenya, Mali, Niger, Rwanda, Tanzania, and Uganda. The workshops focused on basic training in dangerous goods handling and capacity building for emergency preparedness and emergency response. ICCA and UNEP used the results of these projects to identify major transportation-related hazards. The findings were shared cross-regionally to enhance chemicals safety management in the region.

BASF: Soy Doctor Program is helping Indonesian farmers to increase farm productivity and competitiveness

BASF introduced the Soy Doctor program in Bima, West Nusa Tenggara with the aim of improving the productivity of soybean farmers. 15 farmers were selected as soy doctors and trained on good soy cultivation techniques. The soy doctors would then share the information and knowledge with their fellow farmers, with each soy doctor reaching out to about 50 to 100 farmers.

BASF developed the Soy Doctor program with the Australia-Indonesia Partnership for Promoting Rural Income through Support for Markets in Agriculture (PRISMA). Through this partnership with PRISMA, we are helping farmers to increase their competitiveness by improving productivity, fostering innovation and applying Good Agriculture Practice in crop cultivation. At the harvest day, farmers shared some of the positive results from the program – a 20 percent higher yield, and soybean plants that were more vigorous, with more root mass and pod filling.

AkzoNobel: Human Cities initiative

Launched in 2014, AkzoNobel’s Human Cities Initiative is intended to support efforts to make urban living more inspiring. Around 50 percent of the world’s population currently lives in cities. This is expected to increase to nearly 70 percent by 2020. With this growth come many challenges, and the Human Cities initiative is intended to improve, re-energize, and regenerate urban communities through large-scale partnerships aimed at revitalizing cultural and recreational spaces to support sustainable community development.
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ICCA is the worldwide voice of the chemical industry, an industry with a 2012 turnover of more than €3,600 billion. More than 20 million people around the globe are employed directly or indirectly by the chemical industry. ICCA members account for more than 90 percent of global chemical sales. ICCA focuses on key issues for the chemical industry such as the promotion and coordination of Responsible Care and other voluntary initiatives.

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