



2017 European Responsible Care Awards **The winners for 2017**

Environment Responsibility Award

AkzoNobel

Building innovative consortia and creating new value chains to reduce the carbon footprint of mainstream chemicals

Occupational health, process safety and security Award

Total Refining & Chemicals

The NOP bracket

Special Award

Solvay SA

Solvay Care Management System (SCMS)

List of award entries

Chemical Substances Safety category

Azelis

A global distributor of Acrylonitrile through a global safe supply chain

As the global distributor of AnQore's Acrylonitrile, Azelis' challenge is to ensure the safest handling of the highly flammable chemical throughout the supply chain. The AnQore plant in the Netherlands has nominal capacity of 285 kt per year, almost one quarter of European production. From this plant, Azelis delivers Acrylonitrile to 30 customers in over 20 countries in quantities from one drum up to a full container load.

Azelis and its sub-brands are committed to product stewardship and Responsible Care principles. The company has significant supply chain expertise in handling dangerous chemicals, often going beyond what is required by legislation. It implements its internal policy across the organisation and through its logistics services providers and customers. This includes auditing warehouses and evaluating driver and employee safety, drumming, storage and product handling, as well as providing in-depth training. It also includes training local sales representatives in other markets to support customers in the safe handling and use of Acrylonitrile in drums. Customers benchmark – and if necessary, upgrade – their Safety, Health and Environment (SHE) procedures against CEPIC guidelines. As a result safety is improving.

To meet growing demand for Acrylonitrile, Azelis is developing its business in India with a view to making it a hub for Asia-Pacific. Azelis recently audited the Ambica Warehousing Co. in Mumbai and trained workers to help them enhance their local procedures. Through the onboarding and safe operation of the new warehouse Azelis is doing its part to secure the Acrylonitrile supply chain and embed the principles of Responsible Care and product stewardship.

Environment Responsibility category

ANWIL

A sewage sludge drying installation in ANWIL's water and sewage management plant

ANWIL, one of Poland's largest chemical companies, is embedding environmental protection and facilitating "green" waste management in its operations. Like many in the industry, it faces the challenge of treating sewage sludge at its plants. Normally, the multi-stage process ends with mechanical dehydration. Yet, water is still present in dehydrated sludge, which poses an environmental hazard. To fully neutralise the sludge it is necessary to remove the remaining contaminated water, either naturally or through thermal treatment. Yet few factory sewage treatment plants have on-site sludge drying facilities because of the high costs and technical requirements.

In 2013 ANWIL decided to build its own drying facilities at its Wloclawek plant. The biogas generated in the sewage treatment process generates electricity and heat, which in turn dries the sludge. The advanced process produces a form of sludge that can be safely stored. It generates enough energy to meet average demand of 2,500 flats. The new facility reduces the amount of stored waste and enables the sludge to be used as alternative fuel, helping to minimise ANWIL's environmental impact and increase its energy savings.

ARCHROMA IBERIC

Dyestuff made by cotton gin by-product using Earthcolors technology

Archroma's Castellbisbal site near Barcelona specialises in creating textile dyes using agricultural waste and by-products. With its Earth Colors technology it produces dyestuffs from almond shells and rosemary leaves. In 2015 Archroma was asked by Cotton Inc to develop a cotton dye based on cotton waste.

Estimated volume of cotton biomass is up to three million tonnes per year. The usable by-product includes the burs, stems, immature bolls, lint, sticks and leaves of the cotton. The cotton residue has been used for decades in the food and construction industries, but never before in textiles.

Archroma created the new Earth Cotton dye from the cotton gin waste. It also uses the lignin in the cotton stalks to make a paste that is the base of the dye. The result is petroleum-free and bio-eliminable. It is promoted as a cost-effective sustainable alternative to petrochemical-based synthetic dyes.

Traceability is an increasingly important aspect of the textile supply chain so the Earth Cotton dye features a hangtag with a Near Field Communication (NFC) chip. The chip explains the manufacturing process and identifies the source of the raw materials.

Following successful testing and bulk trials, the new Earth Cotton dyes was previewed at the Premiere Vision show in Paris in 2016.

Basell Orlen Polyolefins

BOP Perspectives

Basell Orlen Polyolefins is Poland's largest producer of polyolefins. As part of its approach to sustainability it supports local communities and young scientists. Since 2009 it has been running BOP Perspectives, a public education campaign on environmental aspects of plastics.

The campaign invites students from local schools into a dialogue about plastics in their lives. In previous years the campaign took the form of a public debate. The newest edition was realised as a film competition, co-hosted by the Foundation for Innovation. The aim was two-fold: to promote education about plastics (especially polyolefins) and to encourage creativity and teamwork among young people.

Eleven secondary schools entered the contest by proposing a screenplay for a short film about plastics. Each school also received special training on plastics and polymers as part of their science curriculum. Three screenplays were selected for filming: "Helmet" showed how plastic can save lives; "Anita's Dress" used recycled plastic for fashion and "Great-Grandfather's Portrait" highlighted

the durability and re-usability of plastics. The winning films were uploaded to YouTube where the public could vote. Together they garnered over 100,000 views. The winners and all the participating schools were honoured at a gala screening at the local cinema.

BOREALIS

BorShape flexible packaging ingredient for the circular economy

Recyclability is a major sustainability challenge for the flexible packaging market. Borealis, a leading provider of advanced packaging based in Austria, worked with converters and food/drink manufacturers to develop a new material to address this aspect of sustainability.

Flexible packaging achieves a key objective in the hierarchy of waste management: waste prevention. Compared to glass and metal its low pack weight and high product/pack ratio means it takes up less space in transport and post-use. But its multi-layer construction means it is harder to recycle.

BorShape® uses PE bi-modal technologies to offer a mono-material pack solution that meets technical, aesthetic and environmental needs. It is made from recycled PE laminate that is printed and laminated. The resulting full laminate PE pouch re-uses the recycle into an extruded film application, something which cannot be done today with multi-material solutions like OPET/PE. BorShape® has a positive Life Cycle Assessment performance with a reduced carbon footprint and – most importantly – can be recycled. Borealis expects this innovation to contribute to the circular economy and a more sustainable supply chain.

Clariant

Sugar-based platform

Clariant is one of the world's leading specialty chemical companies. To support sustainability in multiple industries, it seeks to develop innovative products that save time and money and meet strict sustainability requirements.

In 2010, it began developing a new surfactant from renewable, sugar-based raw materials. The company set objectives for resource conservation, environmental protection, product performance and cost. The resulting surfactants and amines have high Renewable Carbon Indexes (RCI), a measure of resource conservation. They have reduced environmental impact: they are readily biodegradable and pose no risk to aquatic organisms. Tests show superior performance compared to synthetic, fossil-fuel based alternatives. The ingredients meet EU and Nordic Ecolabel standards for environmentally friendly and healthy products.

The first generation of Glucamide surfactants was based on glucose of European origin (corn). The next generation was made from oleochemicals based on palm oil (certified RSPO mass balance material) and coconut oil. A subsequent version further improved the product's environmental footprint: GlucoPure SUN is based on European sunflower oil, so that the complete renewable content of the molecule is manufactured from non-tropical, regional resources. Future initiatives will focus on exploring the use of second generation sugars and other, non-food competing oleochemical feedstocks to further improve the sustainability profile.

Dow Chemical Iberica

Demoware

In line with the Dow Chemical 2025 Sustainability Goals, Dow Chemical Iberica is committed to the circular economy and reducing its water footprint. Its manufacturing site in Tarragona is in a high growth, water stressed area. To protect the Ebro River's water supply, the region has encouraged initiatives to boost water reuse for industrial applications nearby.

In 2014, Dow Chemical Iberica collaborated with Nalco Champion to find an alternative water source for the local industrial petrochemical complex. The Dow Tarragona Wastewater Reuse "Demoware" project sought to reduce freshwater intake by 20%. It did this by purifying reclaimed wastewater instead of using pre-treated river water. The Advanced Water Reclamation Plant now blends reused water with river water to provide process water for the Tarragona Chemical Cluster and cooling water for the Tarragona Petrochemical Complex plants.

Dow Reverse Osmosis (RO) permeate and NALCO Trasar® technology allows the Dow cooling tower to run at higher cycles of concentration without affecting corrosion and scaling. It also reduces the cooling tower's blowdown discharge by almost 50% and chemical consumption by 23%. As of 2016 40% of Dow Chemical Iberica's water consumption is from recycled water, freeing up water rights for the local municipality. The final target is 90%.

Dow Polyurethane

V PLUS PERFORM™ Technology: a new level of sandwich panel performance

There is ever greater demand for more energy efficient buildings. This requires the right policy and high performance materials to conserve energy and ensure safety and comfort. Global standards such as Leadership in Energy and Environmental Design (LEED) set a high bar for healthy, highly efficient and cost-saving green buildings. European regulations and national building codes strengthen standards too. Today's construction materials must meet these requirements and solve complex design challenges.

In 2016, Dow's site in Correggio (Italy) launched a project to develop an innovative material that would meet multiple requirements for sustainability, efficiency, fire safety and design flexibility. It sought to combine the features of Polyurethane with stringent combustibility standards for Insulated Metal Panels (IMPs) used in non-residential structures.

The R&D team studied different formulations, exploring polyester polyols, isocyanate index and non-Halogenated flame retardants. The resulting material – V Plus Perform technology – is a Polyisocyanurate (PIR) foam for the insulation cores of sandwich panels. It is thinner and lighter and does not contain any Halogenated flame retardants. It contributes to LEED v4 credits in five categories (Integrative process, Energy and atmosphere, Materials and resources, Indoor environmental quality, Innovation). It also underwent an internal Life Cycle Assessment by the Dow Sustainability department to determine cradle-to-gate environmental impacts. Dow V Plus Perform technology meets fire safety certification (Euroclass B-s1,d0, FM 4880) and helps create more energy efficient buildings.

Move Intermodal

Ultralight 45ft swap body

Transporting chemicals is a specialist job. It requires the highest standards on safety, security and environmental protection and needs to be integrated into customer supply chains. In Europe it also requires maximum flexibility because of a transport policy to limit emissions and manage congestion on the Continent. This has increased demand for intermodal or 'synchromodal' transport: flexibly allocating cargo to different modes and routes to balance time, cost, service and sustainability.

To reduce pollution and fuel consumption in the supply chain, logistics service providers have made major changes to the transport system. They have reduced the weight of the container chassis and optimised the weight of other elements. They have introduced swap bodies – flexible curtain-sided carriers with a rigid frame – as an alternative to ISO freight shipping containers. These new carriers are designed to be transferable between vehicles and transport modes (road, rail and barge). But they still present weight challenges.

Belgium-based Move Intermodal and its partner Wecon developed a lighter tilt swap body by updating the chassis steel frame flanges and side covering. They used advanced computer simulations, lasering and alternative construction materials, like plastics, to produce a reduced weight structure that didn't compromise its strength. The Ultralight tilt swap body is 15% lighter which yields a 4-6% cost saving for shippers. It also claims to save over half a million kilos per year in CO2 emissions.

SABIC

Eco Star Gas Tankers

Shale gas and Liquid Petroleum Gas (LPG) have transformed the energy and petrochemicals industries, driving an expansion of the global ethane trade. Saudi Arabia's Sabic is committed to doing all it reasonably can to reduce the environmental impact of its oil, gas and chemical operations. It recently built a semi-refrigerated storage tank at its UK cracker site and converted the cracker to accept ethane along with other feedstocks.

Working with Hartmann – Gaschem, Sabic designed and built new hydrodynamic ships to transport the ethane from the US to the UK. The Eco Star gas ships feature tri-lobe cargo tanks which fit inside the hull, multi-fuel engines and a “svelte bow” design that improves safety, speed and fuel efficiency. Together these innovations reduce carbon emissions by 30-35% and also exceed MARPOL regulations for preventing marine pollution.

The Gaschem Beluga and its sister ship Gaschem Orca can carry ethane, ethylene, ammonia and LPG. They also run on LPG and ethane. These lower emission engines and the increased capacity help improve transport sustainability for the chemical supply chain.

Solvay Noveware Agro

AgRho N Protect – safe and easy-to-use liquid solutions of Urease and Nitrification inhibitors for fewer Nitrogen losses in agriculture

Solvay has a strategic objective to generate half of its revenues from solutions addressing the challenge of sustainable development by 2025. For several years it has been researching how to improve fertiliser efficiency.

In Europe almost half of agricultural GHG emissions are due to Nitrogen fertilisers which produce nitrous oxide once applied to fields. This is a challenge for the environment (air and water table), the climate and for the farmers who face yield losses and diminished return on fertiliser investment. Use of existing Urease and Nitrification inhibitors was limited because of the risks, lower efficiency or toxicity of solvents. France and Germany even introduced regulations to improve air quality by banning certain types of fertilisers or promoting others. Formulation improvements were needed to ensure safety and efficiency.

Solvay set out to develop a range of safe, easy-to-use liquid solutions based on Urease and Nitrification inhibitors. The AgRho N Protect range of enhanced efficiency fertilisers helps control volatilisation and leaching. It uses proprietary, non-toxic/-ecotoxic and bio-sourced solvent systems. It is said to deliver strong agronomical performance with a reduced unit dose of nitrification inhibitors (NBPT and DCD), at levels that are four times lower than EC regulations. Field tests show an increased yield (up to 15%) and major reductions in ammonia volatilisation (80%), nitrate leaching (50%) and nitrogen dioxide (50%).

Solvay

New circulating fluidised bed boiler

Solvay Sodi in Bulgaria operates one of Europe's largest plants for synthetic soda ash and bicarbonate. In 2016 the plant added a new production line. To meet increased thermal energy demand it installed a circulating fluidised bed boiler (CFBB) in its on-site power station. This helped the company hit its energy efficiency targets and reduce its carbon footprint. Working conditions have improved and the construction boosted local employment.

The new Combined Heat and Power (CHP) boiler optimises consumption of raw materials and energy and reduces emissions and waste. It can run on multiple fuels including biomass and even tires and other waste. Bottom ashes from other boilers can also undergo second-stage incineration, helping lessen waste even more. Waste from the cogeneration plant is registered under REACH and is used as a by-product for road construction. Emissions of nitrogen oxide, sulphur dioxide and dust have all dropped. The low emissions levels go beyond EU requirements and help improve quality of life in the local community.

Solvay Sodi plans to add another CFBB boiler after 2019 and cease operation of the old coal boilers.

Vinavil

Modal transport shift

At its Villadossola site in Northern Italy MAPEI subsidiary Vinavil processes Vinyl Acetate Monomer (VAM) to develop emulsion polymers. Roughly 35,000 tonnes per year of VAM was transported by road from Genoa's port: this entailed an average of six trucks per day each making a 230km journey. In 2016, to reduce its carbon footprint Vinavil negotiated an exclusive contract with a rail freight company. By replacing truck transport with 11 dedicated train cars the company has reduced the emissions in its supply chain and improved wellbeing for the municipalities previously affected by the road congestion's noise and air pollution.

Occupational health, process safety and security category

Ak-Kim Kimya Sanayi ve Tic.A.Ş ROTA

Take no risk, take precaution Project

Ak-Kim Kimya Sanayi is one of Turkey's largest chemical raw material producers. Since 88% of work accidents are behaviour-focused, it launched the "Take no risk, take precaution" (ROTA) project to develop a behaviour-focused occupational health and culture. ROTA was designed to reduce the number of work accidents, to provide a safe, healthy working environment and to ensure its continuity.

ROTA began with an organisational culture survey for Ak-Kim and permanent contractor personnel. After analysis, Ak-Kim Kimya established leadership and operations committees. The Leadership Committee reviewed past work accidents and created a Critical Behaviour Inventory. It also conducted Focus Group Workshops and provided observer training. Over the course of one year, 84 observers identified 1100 observations. The unsafe behaviours were eliminated using the existing Corrective and Preventive Actions System (DÖF) and the identified obstacles causing the unsafe behaviour were reported to the operations committee and removed.

Since then, "Lock out – Tag out" (LOTO), an unsafe actions group, has introduced additional initiatives. These include an awareness campaign throughout the facilities, toolbox safety presentations, an employee competition and an awareness campaign for contractors. Other projects addressed behaviour change with actions to develop better warnings, signage and respiratory protection.

The Leadership Committee continues to meet regularly to analyse incidents and evaluate progress. ROTA has helped reduce the level of risk, increase the level of safety and develop employee safety awareness. In the future, Ak-kim Kimya aims to increase the number of employee and subcontractor observers to maintain safety as the company grows.

ANWIL Educational Programme

Trackers of Myth

As one of the largest employers in the Kujawy and Pomorze region of Poland, ANWIL believes strongly in the development of human capital. Together with the National Centre of Agricultural Education it developed an educational programme to support future farmers. "Trackers of Myth" is designed to help students in secondary agricultural schools better understand non-organic fertilisers.

"Trackers of Myth" uses edutainment principles, humour and social media memes along with the latest scientific knowledge to engage young people. Using a combination of classroom teaching and a field trip, the programme unpacks seven myths associated with mineral fertilisers.

Lessons have already taken place in 132 secondary agricultural schools throughout Poland: over 3300 students and 400 teachers have participated, reaching more than half of young people who see their future in farm work.

Ashland

Custom Safety Awareness “Terminator” video series

To move towards a Zero Incident Culture, Ashland’s EMEA region created a series of short Safety Awareness videos based on an assessment of recent incident and near-miss metrics. The aim was to bring attention to high exposure risks and corrective actions in an engaging framework.

Ashland wanted to increase the impact of the videos and the likelihood for viewing and recalling the content, so they produced their own videos, filmed at their own plants, with their own employees, based on the science fiction film character “The Terminator.” The videos use the cyborg’s signature red-tinted digital vision. They scan and analyse workplace scenes, detect risks and issue warning(s). Each concludes with solutions presented by a hard-hatted human colleague in clear straightforward language. Topics include “terminating” risks associated with heavy lifting, forklift driving and trip hazards, as well as using the right tools for the job. Five of the videos have been uploaded to YouTube.

By using its own employees as actors in recognisable settings along with the Terminator “twist,” Ashland believes it succeeded in making the videos even more engaging and memorable, not only to those who participated, but also to colleagues around the world.

ExxonMobil

Chemical Haulier Safety Initiative

ExxonMobil Chemical’s EMEA Supply Chain division coordinates over 2,000 deliveries per year, distributing over nine million tonnes of product to more than 4,000 locations. Many deliveries are executed by truck. Drivers who visit ExxonMobil Chemical sites are amongst the most vulnerable visitors because they may be visiting for the first time or may not speak the local language.

In keeping with its core value of “nobody gets hurt”, ExxonMobil Chemical developed a Haulier Safety Initiative to help ensure the safety of all haulier drivers visiting its sites and delivering its products. The initiative set standards, recognised positive behaviour, identified areas for improvement and increased safety performance visibility. It also engaged management and promoted learning and progression.

More than 5,000 safety observations have been completed across Europe. Actions included:

- tackling the language barrier by using pictorial cards to highlight safe behaviours
- using a “Drop Trailer Approach”
- setting up advanced slot booking systems
- introducing safety passports for frequent visitors
- colour-coding drivers’ vehicles to focus supervision on those at greater risk of injury
- using behaviour-based safety
- changing loading sequence to reduce risk of working at height
- organising a yearly Overland Transportation Safety day with hauliers.

ExxonMobil Chemical believes the Haulier Safety Initiative has broad applicability across the chemicals sector and beyond. The plan is to further expand the programme globally including refineries and fuels loading terminals.

Soon the company will launch a recognition programme to provide immediate reward for drivers exhibiting the right safety behaviours.

Freeport Cobalt

Process Safety Management Project

Based in Finland, Freeport Cobalt Oy produces cobalt (used in lithium ion batteries) and cobalt-based special chemicals. The company applies sustainable development principles throughout its supply chain. It also aims to identify and control in advance harmful environmental, occupational health and safety risks associated with hazardous chemicals in tanks and pipelines.

In 2015, Freeport Cobalt Oy launched a process safety management programme as part of a new safe production plan. The goal was to develop the most effective and practical process safety control procedures for managing risks and emergencies. The programme was based on legal and

corporate requirements and standards, but also included ambitious new targets set by management. The 14-point programme identified 30 initial projects. These ranged from process safety, process hazard analysis, mechanical integrity and hot work permits to training, employee participation and change management. During the two-year programme the steering group identified 33 additional projects to further improve process safety management.

As a result of implementing these process safety actions, Freeport Cobalt Oy earned its highest ever audit score from Tukes, the Finnish Chemical and Safety Agency. It now ranks among the top 1.3% of Finnish companies. Its performance increased 15% over the previous year. In the areas of compliance and management and employee commitment, it achieved the highest ranking. The company now plans to hire a full-time process safety engineer to continue developing and maintaining safety.

INOVYN

Safety Awareness Programme

UK-based INOVYN is Europe's largest vinyl producer. Safety, health and environmental sustainability (SHE) is the company's top priority. Historically, it had experienced several accidents during the loading and unloading of its products, both at its sites and at customer premises. INOVYN has a zero injuries goal and aims to achieve this through a positive safety culture.

At its sites INOVYN installed devices to ensure safe conditions for everyone involved in the handling of its vinyls, process catalysts, derivatives and chlor-alkali. In 2016, it launched a Safety Awareness Programme to promote safe handling for its products at customers' sites. It focused on safe loading, unloading and storage, including sampling procedures and avoiding leaks and spillage. The programme also included best practice for communications and with hauliers. It has been rolled out across all 19 INOVYN sites and with all its customers. Going forward INOVYN will continue the customer site safety visits and share best practice and training.

Merck KGa

Gas-tight single-use chemical protective suits

As an early signatory of Responsible Care, Merck prioritises integrated occupational safety and process safety. In 2012, Merck adopted new health and safety requirements to reduce statutory workplace exposure limits. Part of this process included a review of its breathing apparatus and reusable chemical protection suits. Merck's specialist unit for breathing apparatus considered time limits, limit values, weight, protection level and cleaning and disinfection of its reusable personal protective equipment (PPE). The team then raised these issues with relevant national and international bodies.

The following year the German Fire Brigade Association launched a project to jointly develop new protective clothing for self-contained breathing apparatus systems. Working together with project partners and users – including Merck – they developed three new gas-tight single-use chemical protective suits. Once ready, these were EC-type tested according to harmonised standards and to ensure resistance to penetration by gases. They were approved for use in potentially explosive environments.

The single-use suits have permanently flange-fitted gloves and footies and may be worn in combination with protective boots. They are 80% lighter, which provides increased comfort and safety, especially at higher summer temperatures. They can be used in a variety of situations from sampling, measuring and transferring hazardous materials to cleaning and flushing activities, as well as emergencies.

Today the single-use gas-tight protective suits along with risk assessment provide an effective alternative to reusable protective suits. They are being used successfully by production departments and company fire brigades alike.

Solvay Italy

Promoting health and work-life balance

Solvay sees its social practices as one of its strengths and the basis of its leadership in Corporate Social Responsibility. In 2014 the Solvay Bollate site near Milan launched a three-year Workplace Health Promotion programme. It began with campaigns and workshops to promote healthy eating in the canteen and vending machines, walking groups and smoking cessation. It then introduced a focus on sustainable mobility and road safety, encouraging employees to use electric vehicles or trains for short business trips. An on-site medical clinic offers blood pressure testing and other services in addition to occupational health services and first aid.

Solvay also renovated the office to improve employee energy and ergonomics. In addition to internal design innovations, the company incorporated new landscaping. It also added complementary health services, flexible working hours, pet therapy and casework help on site. An after-work association offers gym membership deals, well-being services and arrangements with medical and health centres. The Workplace Health Promotion programme met all its initial targets and is now working on continuous improvement and sharing best practice across other sites.

More information about Responsible Care Awards 2017: <http://www.cefic.org/Responsible-Care/Awards>