



CUTTING EMISSIONS WHILE CUTTING COSTS

A sustainable solution to environmental plant improvements

Companies worldwide are working diligently to reduce energy use, water consumption and emissions both for cost cutting reasons and due to local legislation. Like many others, global science company DuPont uses the newest techniques when it comes to emission control, waste management and energy usage. The company views sustainable operations as key to long-term productivity.

“We see sustainable growth as a challenge,” Paul Meyers, Site Manager, DuPont Dordrecht says. “A challenge to use resources intelligently, identify the most effective sustainability projects for our company and make the best decisions for our business and the environment in combination. We do not believe that sustainability, productivity and profitability are mutually exclusive.”

SUSTAINABILITY AT DUPONT DORDRECHT

By 2020, the European emissions trading system expects members who operate factories, power plants and other installations to have reduced emissions by 21 percent on 2005 levels. At the same time, national legislation and other regulations impose caps on the use of chemicals, energy and water consumption. How can manufacturing sites comply with ever more stringent requirements while running a profitable business?

Among the 112 production plants operated by global science company DuPont, its Dordrecht site in the Netherlands is one of the ten largest. Spread over 55 hectares, it is also one of the first in the EMEA region, having been built in 1959. Today, its 880 employees and 150 permanent contractors produce polymers and fluoroproducts, from Teflon® brand products to the plastic Delrin® acetal, the rubber-like DuPont™ Viton® fluoroelastomer and Surlyn® resins and other packaging and industrial polymers. These ingredients are supplied from Dordrecht to customers across Europe, the Middle East, Africa and even beyond. The site has been ISO 14001 certified for over 10 years.

Its environmental credentials go much further though. The European emissions trading system has meant Dordrecht has had to reduce emissions by two percent every year, to bring about a total reduction of 20 percent between 2010 and 2020. As the site's energy champion Erik van Kempen admits: “Finding new ways of reducing emissions gets more difficult every year the further down the road you go.”

Alongside the cap imposed by the European CO₂ trading system, Dordrecht is also subject to a Dutch agreement that encourages companies to produce an energy efficiency plan every three years. Given that production of DuPont™ Delrin® and fluoroproducts is very energy intensive, the site is a large consumer of power.

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THE SUPPORTING STRUCTURE

Developing a plan to continue to meet those national targets, and even improve on them beyond what is expected, is not left up to each DuPont plant in isolation. Each DuPont site is part of a larger team that includes an energy champion for each of the 112 sites, Mr van Kempen in the case of Dordrecht. Between them, the energy champions hold a monthly conference call both at the European and global level to discuss ideas and keep track of overall energy performance via the DuPont Global Energy Plan.

The energy champions provide the business with regular dollar and power forecast savings, as well as progress reports. The target imposed by DuPont on itself is one of reducing energy costs by three percent every year without inhibiting an increase in production.

Eric van Kempen achieves the three percent with the help of the structure DuPont puts in place for every site, ensuring that each production unit, whether it be the chemicals and fluoroproducts business or the packaging and industrial polymers unit, has its own energy team. This is complemented by the site's environmental network, which includes all environmental coordinators. The environment networks meet every month and discuss the sites' environmental performance. The coordinators then feed back to the different production units and Mr van Kempen reports on the environment team's progress during his calls.

MORE THAN TALK

This regular communication has resulted in tangible changes at the Dordrecht plant. DuPont has in fact put in place an integrated set of energy saving, emission reduction and waste management programmes.

Over the last five years, the company has invested more than €15.09 million in environmental improvement projects. The table below (based on data from the CBS) provides an overview since 2007.

DuPont Dordrecht Site Environmental Project Investment	
Year	Total
2007	€ 6,560,000
2008	€ 1,490,000
2009	€ 790,000
2010	€ 770,000
2011	€5,480,000
2012	€5,395,000

REDUCING ENERGY AND CO₂ EMISSIONS

One of the most significant energy savings projects involves collaboration with HVC, an incinerator of community waste that is adjacent to the DuPont plant in Dordrecht. It produces steam, which the incinerator converts to electricity. HVC came to an agreement with DuPont to sell steam to the Dordrecht site on weekends. It is a clear win-win. For DuPont, it has the dual benefit of saving fossil fuels (no need to run its own two co-generators on natural gas) and saving money.

Thanks to this project, Dordrecht's CO₂ emissions will drop by roughly 50,000 tonnes of CO₂ savings per year - roughly similar to the emissions produced by approximately 15,000 medium sized cars driving an average 20,000 km a year. This project alone has helped DuPont significantly towards meeting the European emissions trading systems 2020 goals of CO₂ emission reductions. The entire project with HVC required an €8 million investment to install a pipeline from HVC onto the Dordrecht site as well as the complementing equipment. As a result of this project with HVC, DuPont in Dordrecht helps the city of Dordrecht achieve one third of its own sustainability goals.



“A pipe in the air may not sound very spectacular,” Erik van Kempen says, “but it provides our city with a good deal. And for DuPont, our collaboration with HVC means getting a step closer to achieving one of our internal sustainability objectives: saving 11 percent of energy by 2015.”

These internal sustainability objectives form part of a rigorous set of targets DuPont has communicated to all its employees (see box). The company offers incentives for ideas and projects through its DuPont Production System (DPS), continuous improvement processes and through its internal environmental excellence awards.

Dordrecht won this award in 2008 for a project that increased steam production, reduced the need to cool water and resulted in a significant annual cost saving. Behind this is the simple modification of a distillation column used in the production process of a solution vital for the manufacture of DuPont™ Delrin®, a very impact-resistant plastic used for all kinds of technical parts by the automotive, aerospace and consumer electronics industry. Previously, the column had consumed a lot of steam. By modifying it, Delrin® was able to save 16.7 k tonnes of steam annually and win 25 percent of the total steam needed by the Dordrecht site in other manufacturing processes. The relatively small investment resulted in a big payback, as well as another European environmental excellence award.

Dordrecht has also introduced a real time dashboard signalling system in production operations, which notifies workers when energy usage is excessive. It reminds them to switch off unnecessary pumps, for example. Although it is only a manual interaction tool, dashboards have also contributed considerably to energy conservation at the site. One of the dashboards indicates the status of 25 process values relating to energy consumption. By influencing these values, the operators of the Delrin® unit have been able to save energy worth €1m annually.

As a result of many of these projects, the Dordrecht site used over 14 percent less energy in 2012 to produce the same number of products as in 2005. But, as Erik van Kempen sees it, there is never time to stop and rest on one's laurels. The search is continuously on for further ways to cut energy consumption.

DECREASING WATER CONSUMPTION

Water recycling is another of DuPont Dordrecht's key environmental policies. After the introduction of a number of projects, the water consumption of DuPont Dordrecht has fallen considerably in recent years. Delrin®, for example, has managed to cut fresh water intake by 91,000 m³ by improving efficiency at the site's cooling tower. Dordrecht site manager Paul Meyers explains: "Cooling water systems are essential to our production facilities, and can require a considerable amount of water to run. Through a comprehensive water management assessment, the implementation of a water treatment programme and a sophisticated dosing system, we managed to reduce chloride concentration in the intake cooling water, almost doubling overall system efficiency." The water saving represents the equivalent to the average yearly water usage of 650 Dutch households.

“In addition to supporting our sustainability goals, this technology will allow us to run a more efficient operation”, says Mr Meyers. “It will also help us protect critical assets from corrosion, deposition and biological fouling.”

The project not only reduced water consumption, but also improved safety at the site by reducing acid deliveries by truck from 130 to only 15 per year. This also has a positive impact on reducing CO₂ emissions.

Total water consumption by DuPont Dordrecht since 2006*

Year	Total water consumption (m ³)	Reduction vs. base year 2006 (%)
2006	2,340,810	0%
2007	2,223,152	5%
2008	2,102,108	10%
2009	1,756,380	25%
2010	1,981,571	15%
2011	1,843,626	21%
2012	1,793,490	23%
2013	1,685,606	28%

(* These figures represent de-mineralised & drinking water)

As part of a €10m investment to improve production of polymers, the site has more recently put in place a new water treatment facility which was inaugurated in November 2012. The new tank and clear water pump will enable the fluoropolymer production unit to re-use water from the production process starting this year. The plant expects to save around 25,000 m³ of water a year calculated on average usage of 3m³ per hour.

CUTTING EMISSIONS AND RECYCLING SIMULTANEOUSLY

Air emissions have generally fallen at the site over the last few years. A number of emission reducing projects have focused on hydrofluorocarbons and hydrogen fluoride. Thus, the exhaust gases from the fluoroproducts and the fluoroelastomer Viton® plants have been sent to an incinerator. In this unique furnace, carbon fluorine burns waste gases at high temperatures and converts them into a useful product that is used in the toothpaste industry. A similar process is used in the Delrin® part of the site, where a scrubber washes out all the substances that dissolve in water. Previously, there were minimal residual emissions into the ambient air. Now, the site has put in place a number of lines, which conduct those waste gases into an incinerator.

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The solution sounds simple, but the implementation was complicated from a technical standpoint, site manager Paul Meyers explains:

“We had almost a year to prepare this project. In particular, the control system was a critical factor, due to all of the fluctuations that the stream of waste gases must be able to absorb. The system we have was tested by our colleagues in the United States. In September 2012, we began with the construction of about 650 metres of pipe work, the extension of the operating system and the installation of all other necessary equipment. All in all you're talking about an investment of several millions of euros. We began running the new installation in early October 2012.”

Other efforts, when loading and blending refrigerants, for example, have focused on improving recovery of residues using new vacuum and condensation techniques on containers returned by customers and on the increased use of leak proof connections so that fewer emissions are set free.



SHARING SUSTAINABILITY EXPERIENCE GLOBALLY

DuPont has found the most efficient approach to using resources sustainably requires an integrated environmental support structure for its sites. This structure ensures locations collaborate, sharing expertise and ideas, with the goals of improving productivity and environmental footprint. That in turn allows the company as a whole to benefit, making sustainability a factor in long-term productivity.

See more about how we have done in implementing the DuPont 2015 Sustainability Goals on our website. ●

ABOUT DUPONT

DuPont Sustainable Solutions (DSS) is one of 12 DuPont businesses. Bringing customers the benefits of an integrated global consulting services and process technology enterprise, DSS applies DuPont's real-world experience, history of innovation, problem-solving success, and strong brands to help organisations transform their workplaces and work cultures to become safer, more operationally efficient and more environmentally sustainable.

For more information, visit our website at:
www.sustainablesolutions.dupont.co.uk ●

DuPont (NYSE: DD) has been bringing world-class science and engineering to the global marketplace in the form of innovative products, materials, and services since 1802. The company believes that by collaborating with customers, governments, NGOs, and thought leaders we can help find solutions to such global challenges as providing enough healthy food for people everywhere, decreasing dependence on fossil fuels, and protecting life and the environment.

For more information about DuPont, please visit:
www.dupont.com ●

DuPont Sustainable Solutions

SUSTAINABLE OPERATIONS

http://j.mp/LnD_DU-Drdrcht

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