Sustainability, as an environmental concept, is an evolving approach to the protection of our planet. Corporate response to environmental issues has changed over the years and is having to continue changing today. Over the past two decades, global science-based products and services company DuPont has undertaken its own efforts in sustainable growth. The company had set very clear sustainability goals for its entire organization to achieve by 2015 (see box 1). With 60,000 employees of 80 nationalities operating in around 90 countries and manufacturing in excess of 500,000 products, this was an ambitious step.

**IMPLEMENTING SUSTAINABILITY GOALS**

These goals apply to all DuPont sites across the world. DuPont Luxembourg, founded in 1962, is no exception. It is one of the DuPont's largest investments in Europe and today employs more than 1,150 people. On the 104 hectare site, DuPont runs four major production units for polyester films, spunbonds and elastomers. Here, DuPont produces building products, geosynthetics, spunbonded polyethylene such as DuPont™ Tyvek® used in personal protection industrial and medical packaging and much more. The site also has its own power plant and waste water treatment station with a population equivalent capacity of more than 50,000. Two big office buildings host a business centre for DuPont and its joint venture DuPont Teijin Films, the world’s leading producer of PET and PEN polyester films.
DuPont Luxembourg had already begun focusing on improving energy efficiency, emissions and water usage, as well as biodiversity around its site in 2000. The site has been ISO 14,001 certified since 1997 and is also Wildlife Habitat certified. However, the corporate 2015 sustainability goals for water and energy consumption go beyond what is required for this certification and also exceed national regulatory requirements.

PUTTING IN PLACE A STRUCTURE
Spurred on by the 2015 sustainability goals, the site set up three networks to tackle specific areas. The energy, pollution prevention and waste committees meet regularly to identify new ideas and develop projects using internal assessment documents as the starting point. Every production unit on the site sends a representative to these networks, so they are peopled by a good mix of product experts, engineers and managers. The site also has a responsible care committee composed of the site director, operations manager and SHE professionals.

Furthermore, DuPont Luxembourg is part of several other wide-reaching DuPont projects that focus on lean production - increasing production while decreasing waste. “Waste reduction has the additional benefit of decreasing exposure to risk in manual handling terms alone,” Alan Turner of the DuPont Energy Centre of Competency points out.

ENERGY PROJECTS
In 2010 and 2011, DuPont Luxembourg’s energy network set up a total of 29 energy reduction programmes resulting in yearly estimated savings of more than 40,000 MWh of primary energy and annual CO₂ reductions of more than 8,000 tonnes.

One of the big contributors to these savings was a project conducted on two of the casting lines of DuPont Teijin Films. By reducing the heating and ventilating air flow by half in one year from 210,000 m³/h to 105,000 m³/h, the Luxembourg site was able to save almost a thousand MWh in electricity, and cut down on low pressure steam to such an extent that CO₂ emissions were reduced by more than 1,000 tonnes. Carbon dioxide emissions were also cut by re-circulating hot exhaust air from H&V in the Typar® production area, achieving savings of about 2,400 tonnes. The natural gas consumption needed to produce one tonne of 12 barg steam is reduced from 71 to 65.4 Nm³/t by preheating the boiler feed-water with a heat exchanger in the exhaust gas stack.

“Although many of these programmes seem minor in themselves, combined they added up to an overall 28% reduction on energy use by the end of 2011 compared to 2004,” Alan Turner says.

For 2012, the site has set its sights on achieving even further savings through similar projects: returning more steam condensate to the boiler feed-water tanks, recovering heat from a casting oven, installing more efficient steam jets, using variable speed drives on compressors and pumps, to name but a few.

REDUCTION OF AIR EMISSIONS
Since 1990, the site has reduced its Volatile Organic Compound emissions by 90%, sulphurous gas emissions by 99% and nitrous gas emissions by more than 80%.

BOX 1: DUPONT SUSTAINABILITY GOALS

1. To reduce greenhouse gas emissions by at least 15% from base year 2004.
2. To reduce water use at sites where renewable fresh water is scarce or stressed by 30% on 2004. To hold total water use flat at all other locations.
3. To ensure the entire fleet of company off-site vehicles is fuel efficient.
4. From the current 92% reduction in global air carcinogens achieved since 1990, DuPont plans an additional 50% reduction of remaining emissions by 2015. This will result in a total reduction of 96% since 1990.
5. By 2015, DuPont will have 100% of its environmental efforts validated by independent third parties.
6. Reduce energy intensity by 10% by 2020 compared to 2010. Intensity defined as non-renewable energy normalized by revenue.
FOCUS ON WATER REDUCTION
Alongside the work on energy efficiency, the Luxembourg site has also made significant efforts to reduce its water consumption. By the end of 2011, the site had achieved a 35% reduction on 2004 levels and a 53% reduction compared to 2000. The joint venture DuPont Teijin Films was able to reduce its water consumption on 2010 levels by more than 40,000 m³ due to the implementation of three major projects:

1. **Optimizing the VOC (Volatile Organic Compound) scrubbing system**: This project improved the cooling capacity of the cooling tower system and therefore reduced the amount of process water which was injected for cooling purposes during the polymer production.

2. **Modification of the DuPont Teijin Films process water feeding arrangement**: Due to a modification and relocation of the process water feeding point, it was possible to achieve a more consistent temperature distribution for the various different production lines. As a result of this, the overall amount of process water, which was fed for cooling purposes could be reduced significantly.

3. **Polymer press process water replacement**: Process water was used in a polymer press for cooling purposes. By modifying the press to connect it to the cooled water system, which runs in a closed circuit, water usage by the press was eliminated.

In addition to these projects, the Luxembourg production unit for the polyester elastomer, Hytrel®, optimized the treatment control of the cooling tower water, which reduced process water supply to two cooling towers by more than 30,000 m³/year.

The site continues to reduce water usage and is aiming for another 50,000 m³ savings in 2012 through two additional projects in the Hytrel® production process: the first project will consist of recuperating condensate water, which formerly was lost. The second is based on the possibility to pelletise the Hytrel® polymer at a higher water temperature, which will reduce the amount of process water needed to regulate temperatures.

WASTE TREATMENT
For 2010, DuPont Luxembourg had set itself the goal to recycle at least 90% of its materials rather than allow them to go to waste. That goal has been achieved through improving waste segregation in the offices and production units by ensuring waste went into the correct recycling containers.

Luxembourg has also managed to reduce its overall waste output between 2008 and 2010 by almost half.

The use of landfills has been discontinued since mid-2010.
BIODIVERSITY

The DuPont Luxembourg site is surrounded by woods and is located close to two communities, 1km and 2.5km away respectively. The woods are maintained in a close to natural state and therefore present remarkable biodiversity. This green belt is one of the rare remaining areas close to Luxembourg town that are neither urbanized nor agricultural land. As a member of the Wildlife Habitat Council (WHC) since 2002, DuPont decided to enhance this land under a “Wildlife at Work” programme by creating wetlands that are now well established. Two ponds provide an important habitat for amphibians, dragonflies and many other insects. The site also gave four acres of land back to wildlife in 2003, and repopulated an old landfill for inert rubble area with natural pioneer vegetation in 1999. These areas have now turned into richly flowered meadows which offer a refuge to wild bees, butterflies and other pollinating insects from the intensely farmed agricultural areas that are nearby. DuPont was particularly pleased to see rare butterflies and orchids return to the area.

Henri Werner, Global Product Stewardship and regulatory communications manager for DuPont, explains: “To make access for visitors easier, volunteers from our site have created a nature trail which DuPont opened to the general public in 2002. The nature trail includes tablets on plant species in several different languages. The trail has a recreational and an educational side and thus benefits the local community.”

Though recent sustainability efforts in Luxembourg focused on safe operations, reducing water, energy and waste consumption, reducing gas emissions as well as on supporting biodiversity, the site has demonstrated its commitment to its core values.

DuPont Luxembourg is one of 39 DuPont sites operating along sustainable principles in Europe. DuPont shares its experience in sustainable operations through its consulting services and technology arm DuPont Sustainable Solutions providing advice on improving energy efficiency, asset productivity and reliability, as well as capital effectiveness.