

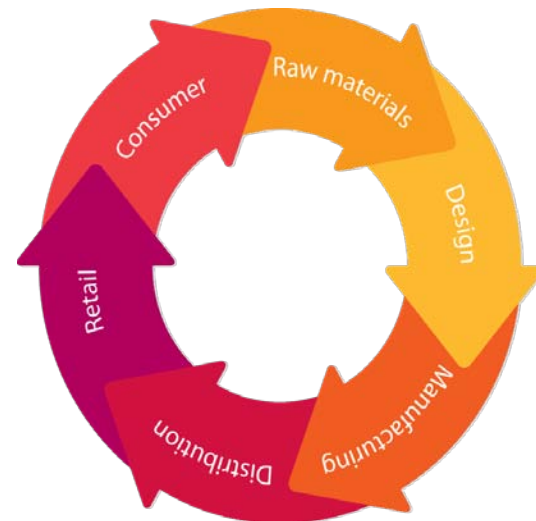
Dow Sostenibilidad plan 2025

La Economía Circular puesta en práctica

Transfiere 2016

Malaga, 10 de febrero 2016

Stéphane Laloyau.



About The Dow Chemical Company

Who we are:

- Science & technology company
- Annual sales of \$58 Billion
- Founded 1897 by Herbert Dow
- Supply more than 6,000 products in 180 countries



Footprint (Huella ecológica)

Rendimiento de las operaciones líderes
a nivel mundial

Handprint (Oferta sostenible)

Soluciones de productos para
los desafíos mundiales

Blueprint (Plan estratégico)

El liderazgo intelectual y
las acciones de Dow

Dando soluciones a los desafíos globales



Alimentos



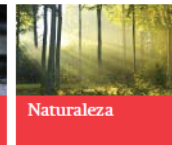
Energía



Agua



Cambio climático



Naturaleza



Problemas
sociales

Entre nuestros indicadores clave de rendimiento*

CERO

eventos no planificados de seguridad
de procesos ni de seguridad
personal grave

10

colaboraciones "Blueprint"
de gran impacto

6 veces más

impacto positivo neto en las medidas
de desarrollo sostenible

100%

de apoyo de los grupos de interés y de
la cadena de valor en el uso seguro de la
tecnología de productos químicos

20%

de reducción en intensidad de residuos
e intensidad de consumo de agua

400 MW

de su demanda de energía procedente
de fuentes renovables para 2025

**1000 millones
de USD**

en proyectos para mejorar
la naturaleza

1000 millones

de personas impactadas por
los empleados de Dow

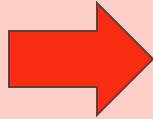
* Los indicadores clave de rendimiento no son detallados, sino más bien una descripción general.

What we do:

- Combine the power of chemistry with the Human Element to address needs
- Focus on maintaining exemplary standards of social, ethical and environmental performance

Economía Circular

Dow Offer



1. Termoplasticos
2. Embalaje flexible
3. Tratamiento del agua



Advancing a Circular Economy
Dow advances a Circular Economy by delivering solutions to close the resource loops in key markets.

2025 Sustainability Goals



Advancing a Circular Economy
Dow advances a Circular Economy by delivering solutions to close the resource loops in key markets.



Engaging Employees for Impact
Dow people worldwide directly apply their passion and expertise to advance the well being of people and the planet.



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.



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.



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



Delivering Breakthrough Innovations
Dow delivers breakthrough sustainable chemistry innovations that advance the well being of humanity.



Increasing Confidence in Chemical Technology
Dow increases confidence in the safe use of chemical technology through transparency, dialogue, unprecedented collaboration, research, and our own actions.



1- Case study : Recyclable exhibition carpets

Issue : 100 million m² (= 30000 mt) per year of exhibition carpet in EU

Solution : Redesign the chemical product composition to make it 100%recyclable



Former system

Polypropylene fiber + thermostable binder (usually SBR latex)

- Use of durable carpets, tiles (price, storage, versatility)
- Incineration (pollution, energy, price)
- Landfill (pollution, waste management cost)
- Re-usage (short cycle)



New system



Polypropylene fiber + **thermoplastic binder (PP water dispersion)**

- Recyclable exhibition carpets produced with conventional equipment .
- Elimination of waste management cost
- Reduction of waste/energy/raw material
- Transformation of waste into valuable material (PP pellets) that can be sold and used to produce again carpets or other PP objects



recyclable



Beneficios :

- The system **is** recyclable to thermoplastic material. Instead of expending on waste management, used carpet can be converted to valuable PP pellets to be re-processed



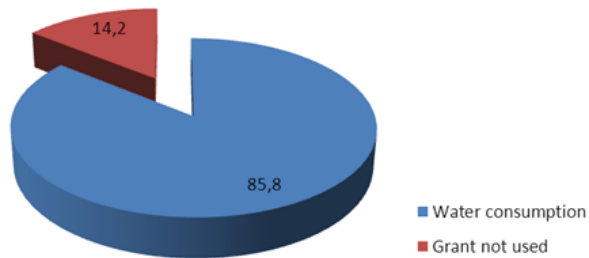
- DOW chemical produces polyolefin waterborne dispersions by its proprietary **Bluewave™** technology. **Hypod™** polyolefin dispersions are commercially available to carpet manufacturers to produce recyclable exhibition carpets, among other applications.

2- Municipal waste water reuse for industrial applications in Tarragona petrochemical complex :

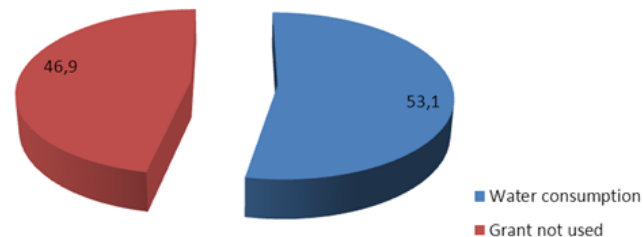


- CAMP DE TARRAGONA IS A SEASONAL WATER STRESSED REGION THAT USES EBRO RIVER WATER FOR MUNICIPAL AND INDUSTRIAL APPLICATIONS
- INDUSTRIAL WATER RIGHTS ARE MAINLY USED IN COOLING TOWERS INSIDE PETROCHEMICAL COMPLEX
- REUSED WATER IS BLENDED WITH EBRO RIVER WATER IN ORDER TO PROVIDE WATER NEED FOR THE TARRAGONA PETROCHEMICAL COMPLEX PLANTS

Municipal Water Rights (%)



Industrial Water Rights (%)



Advanced Water reclamation plant



- PRETREATMENT CONSIST OF VEOLIA ACTIFLO™ TECHNOLOGY
- FIRST PASS USES DOW FILMTEC™ BW30X **EXTRA FOULING RESISTANT** MEMBRANES
- SECOND PASS USES DOW FILMTEC™ LE-440I **LOW ENERGY** MEMBRANES



Camp de Tarragona
Advanced
Water Reclamation Plant



Tarragona
Petrochemical
Complex

- **Current blending ratio**
 - 40% reclaimed water
 - 60% Ebro Water



- **New blending ratio**
 - 90% reclaimed water
 - **10%** Ebro Water



DW&PS GWTC
Global Water Technology
Center



Beneficios :



- RECLAIMED WATER CAN BE USED IN THE INDUSTRY INSTEAD OF PRE-TREATED RIVER WATER WITH A POSITIVE IMPACT IN THE ENVIRONMENT AS IT DOES NOT HYDRAULICALLY AND ECOLOGICALLY STRESSING RIVERS
- STABLE OPERATION OF THE COOLING TOWER IS ACHIEVED SINCE STARTING BLENDING RECLAIMED WATER AS MAKE-UP WATER IN THE DOW TARRAGONA ETHYLENE CRACKER COOLING TOWER
- RECLAIMED WATER IS USED UP TO 160 M³/H (40%). DEPENDING ON THE SEASON THIS FREES UP MORE THAN 200 M³/H OF WATER RIGHTS FOR THE MUNICIPALITY. COOLING TOWER BLOWDOWN DISCHARGE IS REDUCED BY 76 M³/H (49%)
- USING RECLAIMED WATER FROM A WASTEWATER TREATMENT PLANT THAT HAS UNDERGO A RO MEMBRANES STEP PRESENT NO HEALTH CONCERNS WHEN COMPARED WITH CONVENTIONAL PRE-TREATED RIVER WATER



3 - SUSTAINABILITY -DOW PACKAGING & SPECIALTY PLASTICS



Cost-environmental benefit balance for recycling plastic packaging shows potential to increase from current 36% to max 53%*

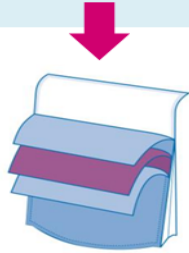
CLOSING THE LOOP: A FULLY RECYCLABLE WASTE STREAM



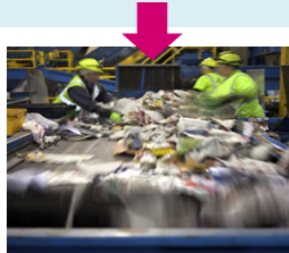
RECYCLING MANY PLASTICS IS CHALLENGING



Consumer behavior:
Plastics has lower recycling rate than paper or metal



Technical: The use of multiple plastics in very thin layers makes flexible plastic packaging more difficult to recycle than most other types of packaging



Infrastructure: The lifecycle benefit of being lightweight makes flexible packaging more difficult and less valuable to collect, and less important to weight-based metrics used by cities, states, and MRFs when setting goals

HOW CAN DOW CONTRIBUTE

- Leading material supplier to the global plastics packaging industry
- World-class technologies delivering market driven innovation
- Broad product portfolio covering a wide range of packaging requirements

Recycling compatibilizers



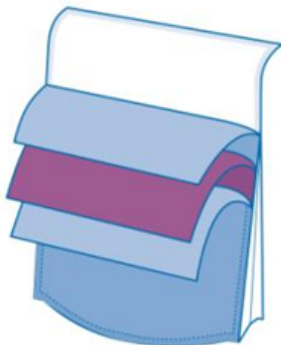
Affinity Retain INTUNE
VERISIFY ENGAGE AMPLIFY



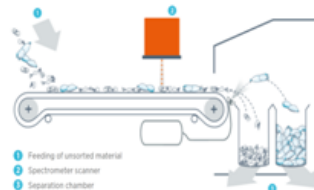
Materials science
Modeling
Prototyping

PROJECT REFLEX (UK)

- **Practical and cost-effective** flexible packaging design
- **Removable inks**



- **Novel marking and sorting techniques** to aid accurate separation of recyclable packaging



- Identifiable at more than 2m/s
- Survives lifetime of packaging
- No interference with branding
- Few sorting steps

- A **collaborative** effort



- **Practical and cost-effective design guidelines for recyclability** for all brand owners and retailers
- Marking licenced to brand owners who comply with guidelines

REFLEX – Design for Recyclability of Flexible Packaging



Project objectives



Divert > **50%** of waste from landfill and incineration
60% yield when recycling

Social benefit



Generate **€140 MM** new economic activity

End goal



Create a **circular economy** for flexible packaging

¡Gracias por su Atención!

slaloyau@dow.com

