

Innovation Forum in Pharmaceutical Process



### **Circular economy and Ecological Intelligence:**

# life cycle and carbon footprint within the pharma sector

#### Dr. Pere Fullana i Palmer, Barcelona, 28th October 2015

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Organización • Cátedra UNESCO de las Naciones Unidas para la Educación, • y Cambio Climático la Ciencia y la Cultura







# LIFE CYCLE THINKING

- Responds to the problem but avoids creating a new problem
- **Ex. Biofuels and tortitas**
- Addresses the challenge of the exponential growth of environmental impact because of both C and P
- Ex. Increasing number of products (12% yearly)



# **UNEP/SETAC** Life Cycle Initiative





la Ciencia y la Cultura



Phase 3: 2012-2016

**Vision:** A world where life cycle approaches are mainstreamed

**Mission:** Enable the global use of credible life cycle knowledge for product sustainability. Why is it necessary to change towards an environmental policy for products (production and consumption)?

This policy has been insuficient for companies and industries Pipe policy  $\rightarrow$  end-of-pipe policy  $\rightarrow$  Minimization at origen  $\rightarrow$  best available technologies  $\rightarrow$  voluntary systems (ISO 14001)  $\rightarrow$  ????

The amount of products in the market increases every year  $(12-15\%) \rightarrow$  The environmental impact per unit of product, needs to decrease at least in the same proportion (Population growth + increase of new markets) x increase of the consumption per

person → at a 3% growth we double every 20 years, at 7% every 10 years (China)

# A 12% annual improvement at the production plants is not feasible/possible

# Integrated Product → Policy

- Life Cycle Perspective
- Stakeholder communication
- Instruments: LCA, Ecodesign, Ecolabelling

# Sustainable Consumption and Production Policy

- Follow-up of IPP
- Importance of Consumption
- Production chains work together
- From LCA to LCM

# Life Cycle Management: Life Cycle Thinking into Practice

- Life Cycle Perspective part of the Mainstreaming
- Life Cycle Management principles
- From environmental to sustainability issues
- Methodologies, instruments and actors at the same level

- The "3/3" principle
- The "Good enough is best" principle
- The "Consensus beats reality" principle
- The "Trust beats certainty" principle

MOST SIGNIFICANT SCIENTIFIC CONTRIBUTION AWARD Life Cycle Management World Congress, Cape Town 2009



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#### REMEMBER!!!!



# Life Cycle and Sustainability

# Practicity!!!

The overal goal of the SAT research call is to develop and test in real case studies a framework methodology operational methods and tools for the assessment of the sustainability of existing and future technologies. A conditio sine qua non identified by DG RTD is that both the framework methodology and its derived methods and tools shall be based of a Life Cycle Thinking approach that takes into adequate consideration all the three pillars of sustainability (economic, environmental, social)

Participation is a cornerstone both for the development of the approaches and for the application in the case studies, closely interacting with relevant business and government and society stakeholders groups. This will be supported by working along an agreed set of criteria and indicators.

Sustainability is understood as a combination of social and environmental goals. Three column models, which distinguish between ecological, social and economic dimensions of sustainability, are dominating the international discussion. The assessment of the degree of sustainability of future technologies is complicated by a number of issues and insecurities of the decision situation.

Reflecting values and needs, assessment of sustainability cannot be done as a purely scientific task because values and needs cannot be defined in the scientific system but only in interaction between science and society. Participative procedures are an appropriate way to involve stakeholders and actors to yield accepted solutions.

# **Product Panels**

# LIFE CYCLE PERSPECTIVE

# Life cycle perspective implies adopting an integrated vision on the correlations between products and the environment

- Understanding a product as a system
- Different life cycle stages
- Different types of environmental impacts



& production a reality.

# Life cycle perspective helps decision making for real environmental improvement

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# LIFE CYCLE SYSTEM

#### Integrated assessment of environmental problems (Point to Plane)



# LIFE CYCLE METHODOLOGY





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# LIFE CYCLE STANDARD UNIVERSE



# Is not all that glitters in gold and. Half the story has never been told. But now you see the light... Bob Marley (Get up, stand up)

Function and Functional Unit and not Material or Product





-Limiting factor: weigth or volume -Other functions: rubbish -Number of uses

-Rebound effects: biobags



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# Life Cycle in practice

#### Ejemplo: Aislamiento viviendas con poliestireno



tecnalia) Inspiring



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# GHG Footprint of B&J's European ice cream business



## Energy is not CO2 but it is very near

ALMIRALL, PIONERA EN ESPAÑA EN OBTENER EL CERTIFICADO SISTEMA DE GESTIÓN DE LA ENERGÍA ISO 50001:2011

# Almirall consigue la certificación ISO 50001:2011



#### reconocimiento internacional.

Con el sistema de gestión de la energía implantado de acuerdo a ISO 50001:2011, Almirall dispone de una herramienta que contribuirá a mejorar la eficiencia energética de forma sistemática, a incrementar el aprovechamiento de energías renovables; así como al ahorro de energía, y a la disminución de las emisiones de gases de efecto invernadero.

20/06/2013 09:24:22 Almirall ha superado con éxito la auditoría inicial de certificación ISO 50001:2011 que ha realizado la entidad TÜV Rheinland sobre sus centros de trabajo en

España. Se convierte así en uno de los primeros laboratorios farmacéuticos

en obtener esta certificación de

In addition, application of life cycle assessment to packging choices

Cheese

Example!

### **Circular Economy at Grupo Uriach**

PACKAGING TECHNOLOGY AND SCIENCE *Packag. Technol. Sci.* 2009; **22**: 443–450 Published online 23 June 2009 in Wiley InterScience (www.interscience.wiley.com). **DOI**: 10.1002/pts.865

# A Comparative Life Cycle Assessment of Single-Use Fibre Drums Versus Reusable Steel Drums

By Marco Raugei,<sup>1</sup>\* Pere Fullana-i-Palmer,<sup>1</sup> Rita Puig<sup>2</sup> and Alejo Torres<sup>3</sup>





An LCA study within an LCA study (DISGREN)

Figure 5. Life cycle impact assessment results in terms of GWP, AP, GRE and waste generation.

## After these Spanish exemples...

- JRC 2015: EC is starting a PEF pre-pilot for pharmaceuticals
- Up to now "use and waste stages", from now on "production chain"!
- Main impact due to APIs!
- Within APIs: long chains, energy, solvents...
- Long unknown chains  $\rightarrow$  complexity  $\rightarrow$  new data
- Ineficiencies are kept because we want to start selling NOW!
- Changes are very difficult once we start production → Design phase!!!
- Not many providers where to chose
- Optimization means profit and less impact
- Carbon footprint: mainly scope 1-2.
- Scope 3: mainly business travel, and other minors (not APIs)
- Fundación Empresa y Clima: Almirall, Uriach and Ferrer

# LCA AND CARBON FOOTPRINT POSITIONING



# LCA part of the mainstreaming?



TIME magazine "10 ideas changing the World right now" Una 100% Organic cotton T-shirt  $\rightarrow$  10.000 litres of water, ink Industrial ecologists  $\rightarrow$  LCA

After his best sellers Emotional Intelligence and Social Intelligence, **Daniel Goleman** introduces the concept of *Ecological Inelligence*, based on life cycle thinking.







**Gregory Norris** gives a one hour lecture to his Holiness, the **Dalai Lama**, about the importance of LCA to change consumption and production patterns to help for a better future of our planet .

# ¿BEER O JUICE?

#### (From Prof. Dr. Matthias Finkbeiner)





栽培办。

CO2 LABEL

CO2 161g

Beer Sapporo better than juice Innocent

1 juice is equivalent to 735 ml of beer

1 g CO2 (Japan) = 2 g CO2 (RU)

Beer is better than juice! (Wine is better than beer!!!)

# **THANK YOU!!**

# **UNESCO** Chair in

Life Cycle and Climate Change



Life Cycle

Initiative

Spanish partner



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# THANKS A LOT FOR YOUR ATTENTION!!!

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