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# European Waste Policy and the issues of material and energy recovery

## THE CASE OF BIOWASTE AND SEWAGE SLUDGE

**Jean-Pierre HANNEQUART**  
Valencia, 16 Jun 2011

## **1. GLOBAL VIEW of WASTE MATERIAL RECOVERY versus ENERGY RECOVERY**

- Evolution of the hierarchisation
- Legal prescriptions of the new WFD

## **2. SPECIFIC CONSIDERATIONS about BIOWASTE and SEWAGE SLUDGE**

- Legal Distinctions
- Hierarchy applicable to biowaste
- Hierarchy applicable to sludge

## **3. CONCLUSIONS**



# EVOLUTION OF THE HIERARCHISATION

## 1975-1995: NO EU POLITICAL HIERARCHISATION

1975 (Directive)	Recovery > Disposal
1977 (Env. Action Plan)	1. Prevention > 2. Recovery > 3. Safe Disposal
1989 (Waste Strategy)	1. Prevention > 2. Recovery > 3. Optimal Disposal
1991 (Rev. Directive)	1. (firstly) Prevention > 2. (secondly) Material and Energy Recovery



# EVOLUTION OF THE HIERARCHISATION

## 1995-2000: SOME EU POLITICAL HIERARCHISATION

1994 (Packaging Dir.)	<ul style="list-style-type: none"><li>• Legal obligation of prevention</li><li>• Reuse as optional second level</li><li>• Legal % of recycling (within % of recovery)</li></ul>
1996 (Waste Strategy Rev.)	<i>« Reuse and Material Recovery should in general be considered preferable, in terms of environmental impact, to other forms of recovery »</i>



# EVOLUTION OF THE HIERARCHISATION

## 2000-2010 : EU HIERARCHISATION VIA TARGETS

2000 (ELV Dir.)	85% of reuse-recycling for vehicles
2002 (WEE Dir.)	50-80% reuse-recycling for WEEE
2004 (Rev.Packaging Dir.)	60% for glass and paper packaging; 50% for metal; 22,5% for plastic; 5% for wood
2006 (Batteries Dir.)	50-65% of recycling for some batteries



# EVOLUTION OF THE HIERARCHISATION

DIRECTIVE 2008/98:

TRUE LEGAL  
HIERARCHISATION

# ART.4 / DIRECTIVE 2008/98

1. *The following waste hierarchy shall apply as a **priority order***
  - (a) *prevention;*
  - (b) *preparing for re-use;*
  - (c) *recycling;*
  - (d) *other recovery, e.g. energy recovery; and*
  - (e) *disposal.*
  
2. *...the best overall environmental outcome... may require specific waste streams departing from the hierarchy where this is justified by **life-cycle thinking***



# LEGAL“PRIORITY ORDER”

➔ true legal new requirement

➔ step 1 before 2 before 3 before 4 before 5

➔ “ in legislation and in policy”

==>binding hierarchy for waste treatment investments

==>binding hierarchy for waste subventions

➔ not applicable ...only if justified by LCT

==> burden of proof on the « deviator »





# LEGAL PRIORITY ORDER

## WITH LEGAL DEFINITIONS

**Recycling** = *any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does **not include energy** recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.*

**Recovery** = *any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.*



# LEGAL“PRIORITY ORDER”

## • CONFIRMED BY NEW RECYCLING TARGETS

« *By 2020, the preparing for re-use and recycling of:*

- ▶ ***50%** by weight of at least paper, metal, plastic and glass from household and possibly other origins as far as these **waste streams are similar to waste from households;***
- ▶ *70% by weight of non-hazardous construction & demolition waste*

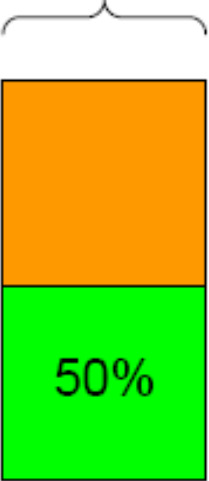
*... can include transition periods for Member States which, in 2008, recycled less than 5 % of either categories of waste ”*



# CAN WE INVOLVE ALL MUNICIPAL ORGANIC WASTE ?



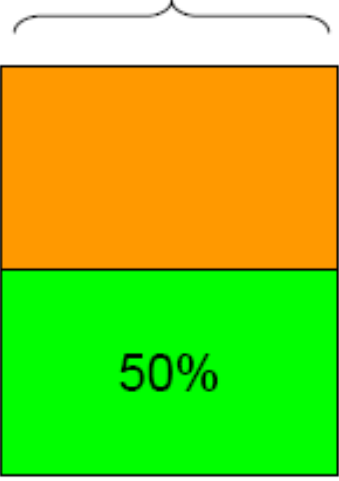
minimum of overall



50%

paper, glass, metal, plastic

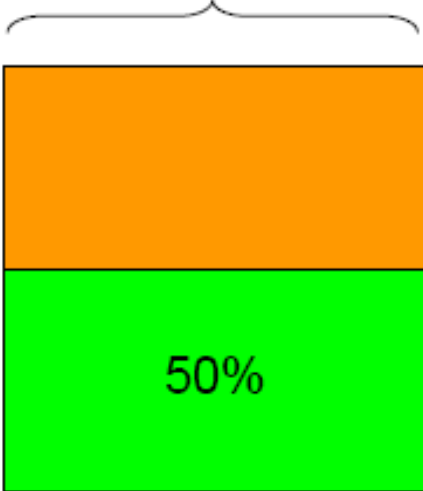
minimum of overall



50%

paper, glass, metal, plastic + other household or similar waste streams

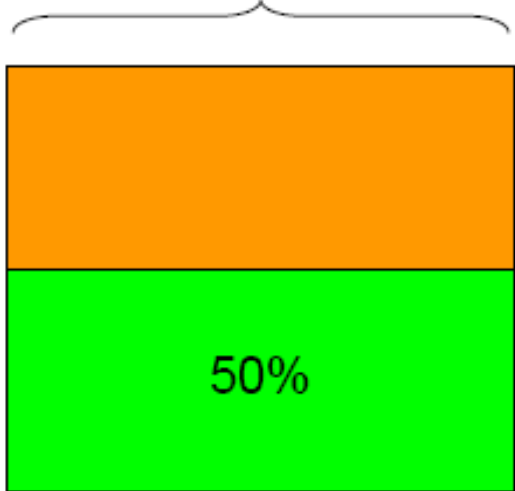
minimum of overall



50%

all household waste

minimum of overall



50%

All waste from households + all similar waste streams = all municipal waste



# « LIFE CYCLE THINKING » (FOR WASTE?)

- “LCT can and should be applied to waste management
- as an essential complement to the waste hierarchy,
- in view of its ability to integrate all the variables
- that influence the environmental performance”



# « LIFE CYCLE THINKING »

= « The process of taking into account in decision making both the resources consumed and the environmental and health pressures associated with the full life cycle of a product »



# LCT ↔ LCA

LCA is a tool used to evaluate the potential environmental impacts of a product, process or activity throughout its entire life cycle by quantifying the use of resources and environmental emissions

## LCA LIMITS

- Time
- Biogenic carbon
- Electric mix
- Loss of biodiversity
- ...

**« LCA is one tool – standardised in ISO14040/44 – that quantitatively supports life-cycle thinking »  
(EC REPORT ON WASTE THEMATIC STRATEGY)**



# LCT = ????

LCT ↔ ? (LCA / Carbon Balance/ Ecological Footprint/...)

↔ ? Cost-Benefit Analysis

« Evaluating the impact and costs of products and processes from cradle to cradle...is the concept of lifecycle thinking »

(EC « LIFE FOCUS »)

« ...the best environmental outcome.

...the general environmental protection principles of precaution and sustainability, technical feasibility and economic viability... »

( art.4 .2 – Directive 2008/98)



# LCT =

- THE BASIC JUSTIFICATION OF THE HIERARCHISATION PRINCIPLE
- THE KEY-REFERENCE TO APPRECIATE THE HIERARCHY TO APPLY TO...

**BIOWASTE AND SLUDGE**



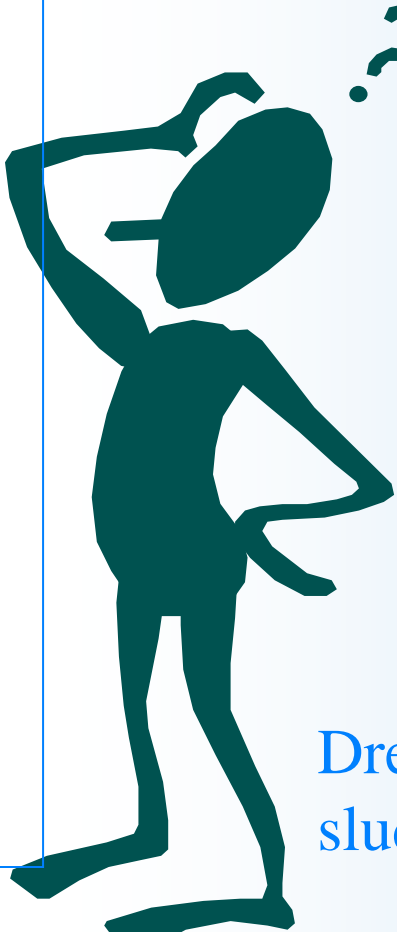


# SLUDGE = ?

# BIOWASTE = ?

**BIOWASTE =**  
(Art.3.4 Directive 2008/98):  
*biodegradable garden and park waste, food and kitchen waste from households, restaurants, caterers and retail premises and comparable waste from food*

*processing plants*  
**OTHERS ORGANIC OR BIODEGRADABLE WASTE???**



**SEWAGE SLUDGE = (Directive 86/278) :**  
*(i) residual sludge from sewage plants treating domestic or urban waste waters and from other sewage plants treating waste waters of a composition similar to domestic and urban waste waters;*  
*(ii) residual sludge from septic tanks and other similar installations for the treatment of sewage;*  
*(iii) residual sludge from sewage plants other than those referred to in (i) and (ii);*

Dredging sludge?

Clearing sludge?

Industrial sludge?



# EC APPROACH OF BIOWASTE HIERARCHY

- **FOR PREVENTION**

- cfr - → Waste Prevention Programme (WFD) /
  - ? Specific Guidance For Biowaste Prevention

- **FOR RECYCLING**

- cfr → *MS should take measures...to encourage the separate collection of bio-waste with a view to the composting and digestion? (art.22 WFD)*
  - ? Specific Revision of the Municipal Waste Target of 50% (2014)
  - cfr Consultation process (target of 36.5%...)



# EC APPROACH OF SLUDGE HIERARCHY

COM (2010)235:

« *Bio-waste Management option should be determined by Member States using life-cycle thinking* »

*Choice between composting and energy recovery will depend on local conditions.*

- D.86/278 : *to prevent harmful effects...thereby encouraging the use in agriculture*
- D. 1999/31 : *to reduce the landfill at less 35% by 2016*
- D.2009/28 : *to promote « renewable » energy*

→ ??? Common Standards for compost and digestats ( End of Waste Procedure WFD)

→ ??? New Minimum Legal Standards for Sludge and Biowaste to agricultural soils ( EC Working Paper)

→ ???

# SLUDGE PREVENTION PRIORITY ?

*Sludge Prevention : can be quantitative & qualitative*

- *upstream measures to decrease total amount of waste water (rational water use, separation of sewage system, ...)*
- *upstream measures to decrease water toxicity (epuration of firms effluents, no phosphate detergents, ...)*



# SLUDGE RECYCLING PRIORITY ?

Cfr LCA (RDC / HOUILLON ET AL 2005)

→ **CO2 BALANCE CRITERIA:**

- Landfill is the worst option
- Incineration in cement kiln is the best

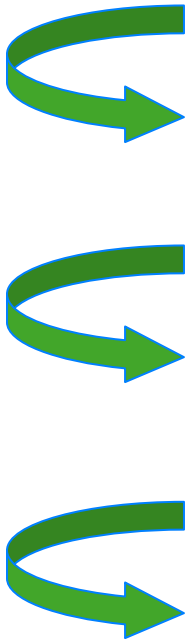
→ **ENERGY BALANCE CRITERIA :**

- Wet oxydation is the worst option
- Agricultural spreading and incineration are the best

LCA s - does not properly take into account toxicity aspects  
-omits some agronomics benefits of sludge

# SLUDGE RECYCLING PRIORITY ?

A LOT OF (MIX) TREATMENT  
(MATERIAL AND ENERGY  
RECOVERY)



## Recycling

Biomethanisation

Co-processing

Wetox

## Energy recovery

(Co)-incineration with ER

Thermolysis

## Elimination

(Co)-incineration without ER

Landfilling



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BIOMETH

DIGESTATE

AGRICULTURE  
VALORISATION

BIOGAZ

LANDFILL

SPECIFIC  
INCINERATION  
FLUIDISED BED

PARTIAL

CO -  
INCINERATION

STRONG

ASHES

LANDFIL

CONSTRUCTION

ENERGY REC.

CEM. CO -  
PROCESSING

!Phosphore!

ASHES

CEMENT

ENERGY REC.

THERMOLYSE /  
PYROLYSE

COMPLETE

COKE

BIOGAZ

SOLID COMB.

GAZEIFICATION

INERT RES.

LANDFIL

CONSTRUCTION

WETOX

BIOGAZ

SOURCE: Céline SCHAAR (IBGE)



## **CONCLUSIONS : a lot of uncertainty**

- **LCT =?**
- **THE « MUNICIPAL WASTE GLOBAL TARGET » OF 50% =?**
- **BIODEGRADABLE WASTE ↔ BIOWASTE ↔ SLUDGES**
- **EU PREVENTION POLICY FOR BIOWASTE AND SLUDGE =?**
- **EU RECYCLING POLICY FOR BIOWASTE AND SLUDGE=?**

**WHY NOT A SPECIFIC DIRECTIVE FOR BIOWASTE?**

**( EP Resolution 6-7-2010)**

**WHY NOT A SPECIFIC DIRECTIVE FOR SLUDGE?**



# THANK YOU !

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