WASTE AND LIFE CYCLE THINKING

INTRODUCTION

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3 KEY QUESTIONS

- WHAT IS A « WASTE MANAGEMENT PRIORITY ORDER » ?
- WHAT IS « LIFE CYCLE THINKING » ?
- DOES LCT CAN HELP FOR THE RANKING OF SOME « COMBINED »WASTE TREATMENT ?

WHAT IS A « WASTE MANAGEMENT PRIORITY ORDER » ?

ARTICLE 4 OF THE DIRECTIVE 2008/98/EC:

1. *The following waste hierarchy shall apply as a **priority order*** in waste prevention and management **legislation and policy**:
   - *(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***

WHAT IS A « WASTE MANAGEMENT PRIORITY ORDER » ?

➔ **new legal requirement (“legally binding” order)**

➔ **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 subsidies

➔ except for some specific waste streams …if departing from the hierarchy… **is justified by LCT**

==> derogation from the priority order should be an exemption for some waste streams

==> burden of proof on the « deviator »

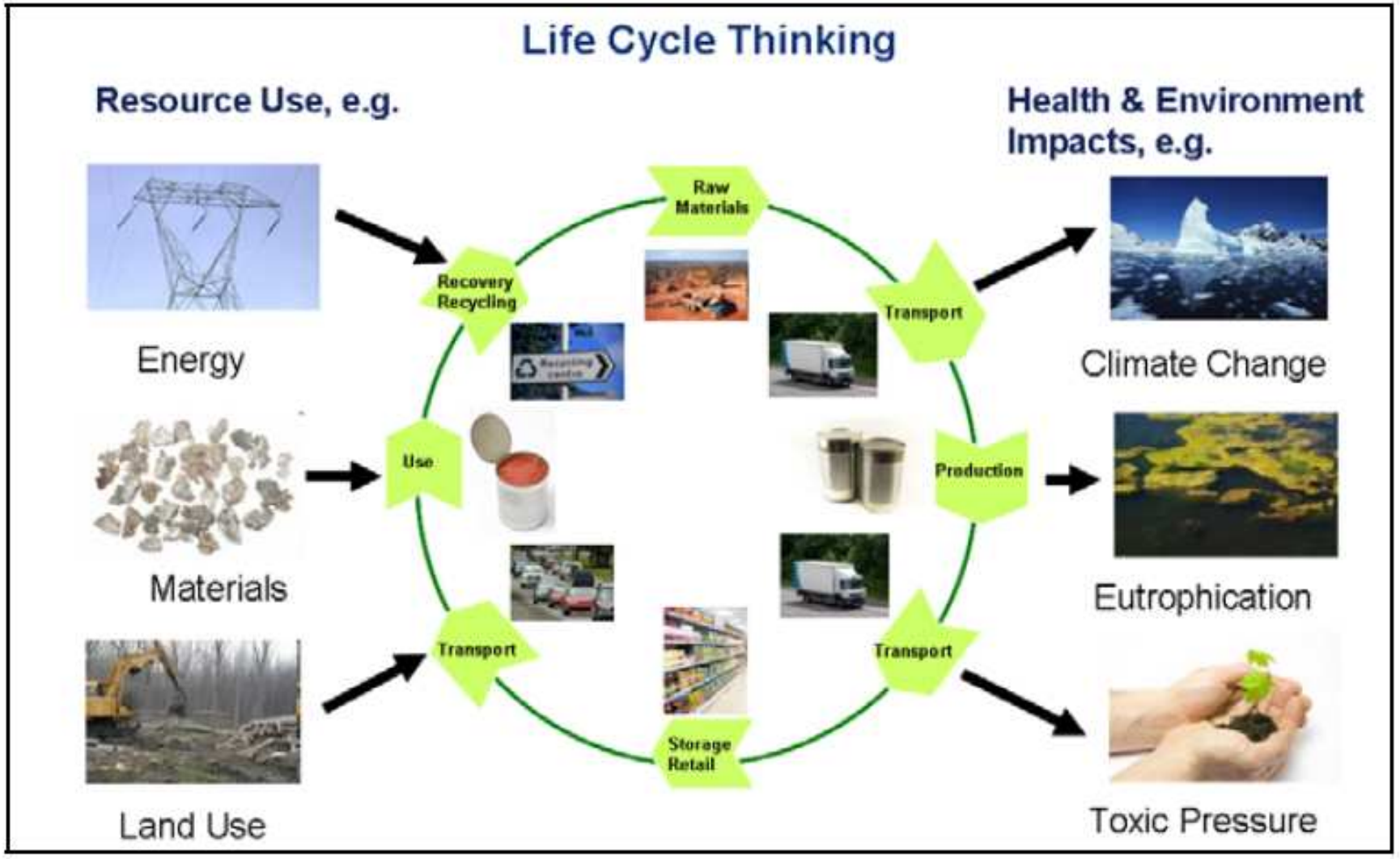
==> method mandatorily to be used: LCT

WHAT IS « LIFE CYCLE THINKING » ?

"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**" (EC)

WHAT IS « LIFE CYCLE THINKING » ?

Figure 3-2: Elements within Life Cycle Thinking



« 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 ecological and human health impacts

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 ⇔ LCA and …?

LCT ⇔ ? C02 Balance

? Energy Balance

? Ecological Footprint

??? Cost-Benefit Analysis CBA),

??? Life Cycle Costing (LCC)

??? Social LCA (S-LCA)

YES :LCT can include« Cost-Benefit Analysis »

« Evaluating the impact and costs of products and processes from cradle to cradle… is the concept of life cycle thinking »

(EC « LIFE FOCUS »)

« Member States shall take into account…the general environmental protection principles of precaution and sustainability, technical feasibility and economic viability… »

(art.4 .2 – Directive 2008/98/EC)

"…departing from such hierarchy may be necessary for specific waste streams when justified for reasons of, inter alia, technical feasibility, economic viability and environmental protection."

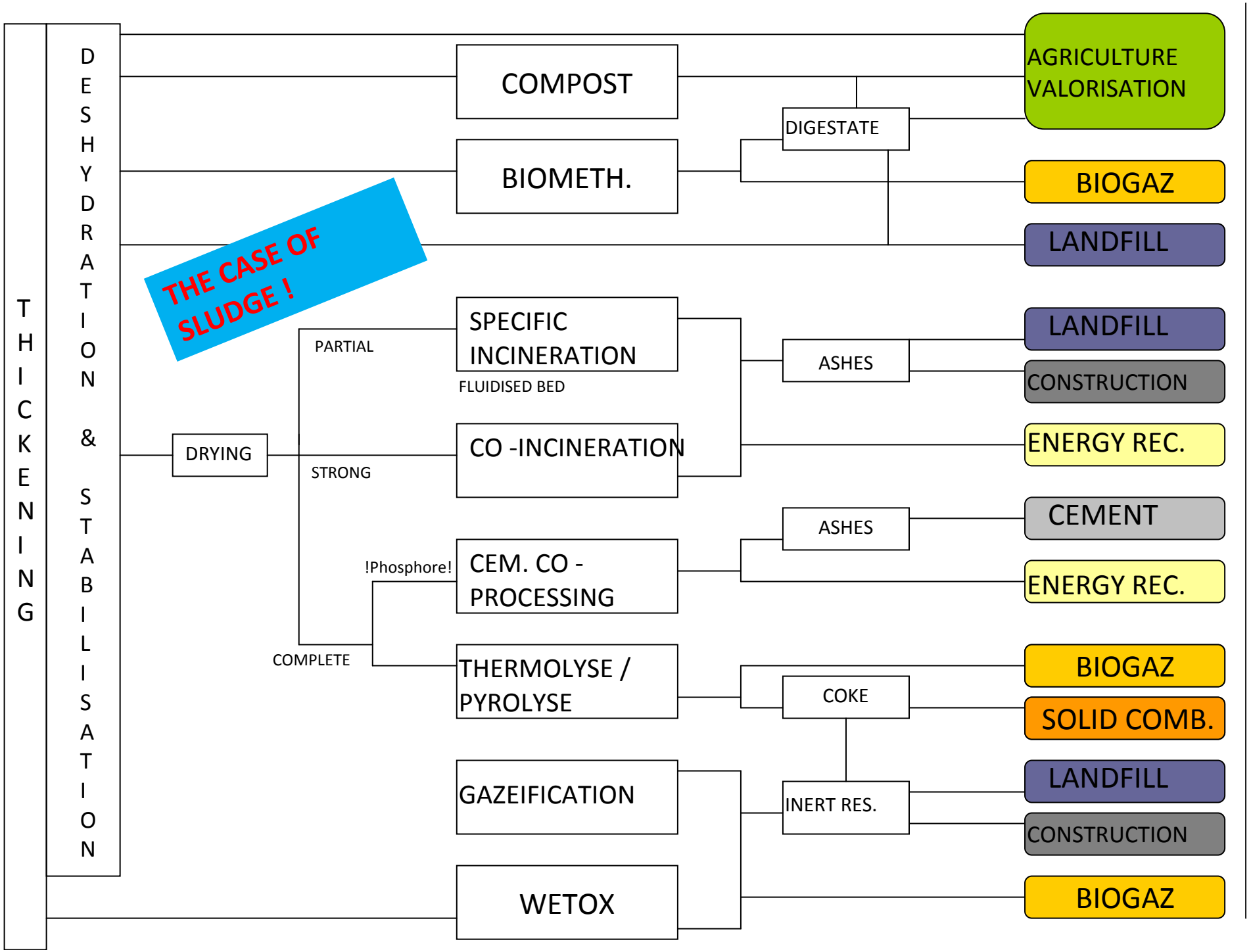
(whereas 31 – Directive 2008/98/EC)

« Under the conceptual framework defined by LCT, a number of quantitative decision support methods exist, such as LCA, Cost-Benefit Analysis (CBA), Life Cycle Costing (LCC) and Social LCA (S-LCA) »
(DRAFT GUIDANCE ON INTERPRETATION)

DOES LCT CAN HELP FOR THE RANKING OF SOME « COMBINED » WASTE TREATMENT ?

« In some cases, a number of alternatives exist at a given level of the waste hierarchy (eg different recycling alternatives for a given waste stream). These alternatives may not be equivalent from an environmental perspective…A scientifically sound approach to ensure that the best outcome for the environment can be identified is provided by Life Cycle Thinking »

(DRAFT GUIDANCE ON INTERPRETATION)


THICKENING
DESHYDRATION & STABILISATION
THE CASE OF SLUDGE !
COMPOST
BIOMETH.
DIGESTATE
AGRICULTURE VALORISATION
BIOGAZ
LANDFILL
DRYING
PARTIAL
STRONG
COMPLETE
SPECIFIC INCINERATION
FLUIDISED BED
CO -INCINERATION
ASHES
LANDFILL
CONSTRUCTION
ENERGY REC.
!Phosphore!
CEM. CO - PROCESSING
ASHES
CEMENT
ENERGY REC.
THERMOLYSE / PYROLYSE
COKE
BIOGAZ
SOLID COMB.
GAZEIFICATION
INERT RES.
LANDFILL
CONSTRUCTION
WETOX
BIOGAZ

RANKING OF SLUDGE TREATMENT OPTION… **BY 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

BUT LCAs does not properly take into account toxicity aspects and omits some agronomics benefits of sludge !

RANKING of **BIO- WASTE** TREAMENTS… **BY DEFRA (UK)**

« The ranking of the various waste management options are based on current **scientific research** on the impact on the environment in terms of **climate change, air quality, water quality and resource depletion » :…**

ANAEROBIC DIGESTION = « OTHER RECOVERY »
FOR FOOD: « ANAEROBIC DIGESTION IS BETTER THAN COMPOSTING »
FOR GARDEN WASTE: « DRY ANAEROBIC DIGESTION FOLLOWED BY COMPOSTING IS BETTER THAN COMPOSTING ALONE »
FOR LOWER GRADE WOOD: « ENERGY RECOVERY IS BETTER THAN RECYCLING »

RANKING OF **TYRES** WASTE MANAGEMENT OPTIONS… **BY DEFRA**

- 1. PREVENTION
- 2. RE-TREADING
- 3. RECOVERY USE IN ROAD SURFACE
- 4. ENERGY RECOVERY IN CEMENT KILNS
- 5. ENERGY RECOVERY THROUGH PYROLYSIS
- 6. OTHER RECOVERY (eg drainage fill and sea defences)
- 7. GASIFICATION/INCINERATION WITH EfW

in conclusion…

- LCT is the legal basis of the binding waste hierarchy and of derogations to this hierarchy
- LCT can be developed by a lot of quantitative tools but no one is binding
- LCT can help for the ranking of some specific or combined waste treatment but …

LCT is not yet established as true harmonized methodological instrument