

Co-processing in Cement kilns

The way to treat wastes

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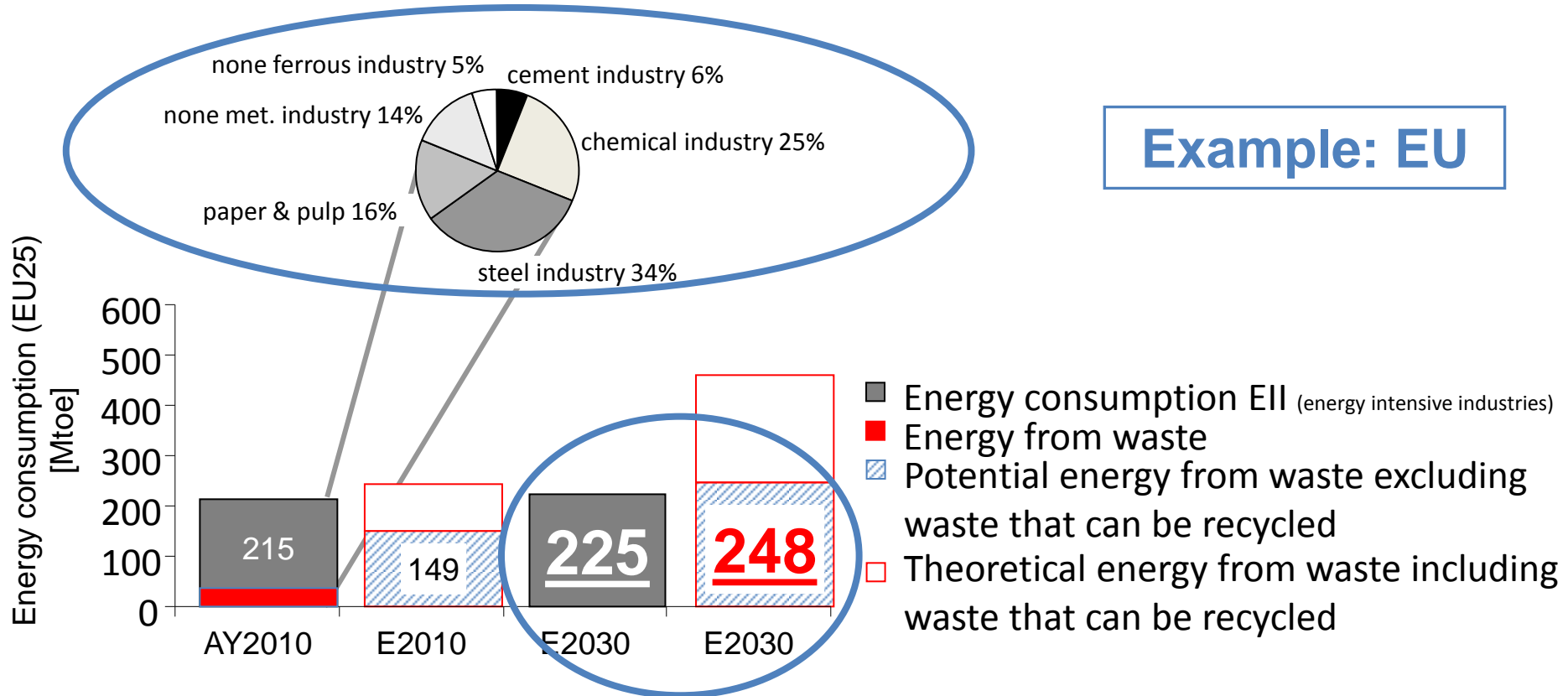


Chemist & Geologist Engineer, 41 years experience with Holcim.

- > September 2011: Partner Cementis... (www.cementis.com)
- 1997 – 2011 : Senior Vice-President – **Head of the Alternatives Resources Division Holcim Group Support**
 - In charge of the worldwide “Wastes to Resources” strategy
 - For Holcim, Co-processing business Implementation in more than 40 countries
 - At the base of the worldwide development and recognition of the co-processing concept: using wastes as Alternatives Resources in Resource’s Intensive Industries
 - Board Chairman for the GIZ-Holcim strategic alliance (2003-2009)
 - Introduction of the “Co-processing” concept at the COP 9 Bali – June 2008 which was driving to the UN/SBC Co-processing guidelines.
- **Expert in the development of low/neutral CO2 cementitious binders production**



Current wastes management practices leave a substantial part of the resource potential of waste unused

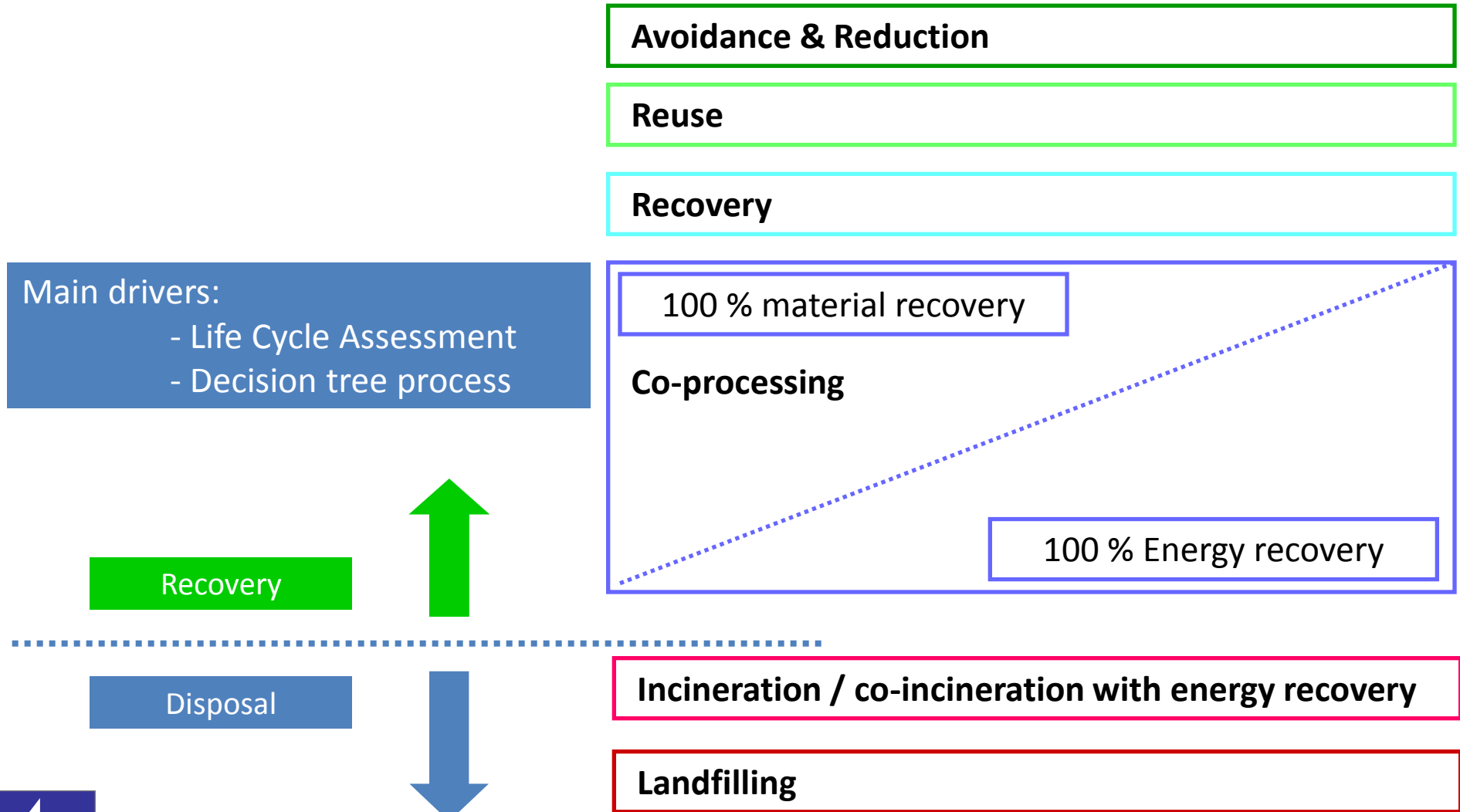


Estimates indicate that world-wide >> 10 billion tons of waste are discarded each year. Despite all the efforts to minimize waste, more than 80% is currently landfilled, dumped or burned illegally...

More clear overview needed for Latam countries

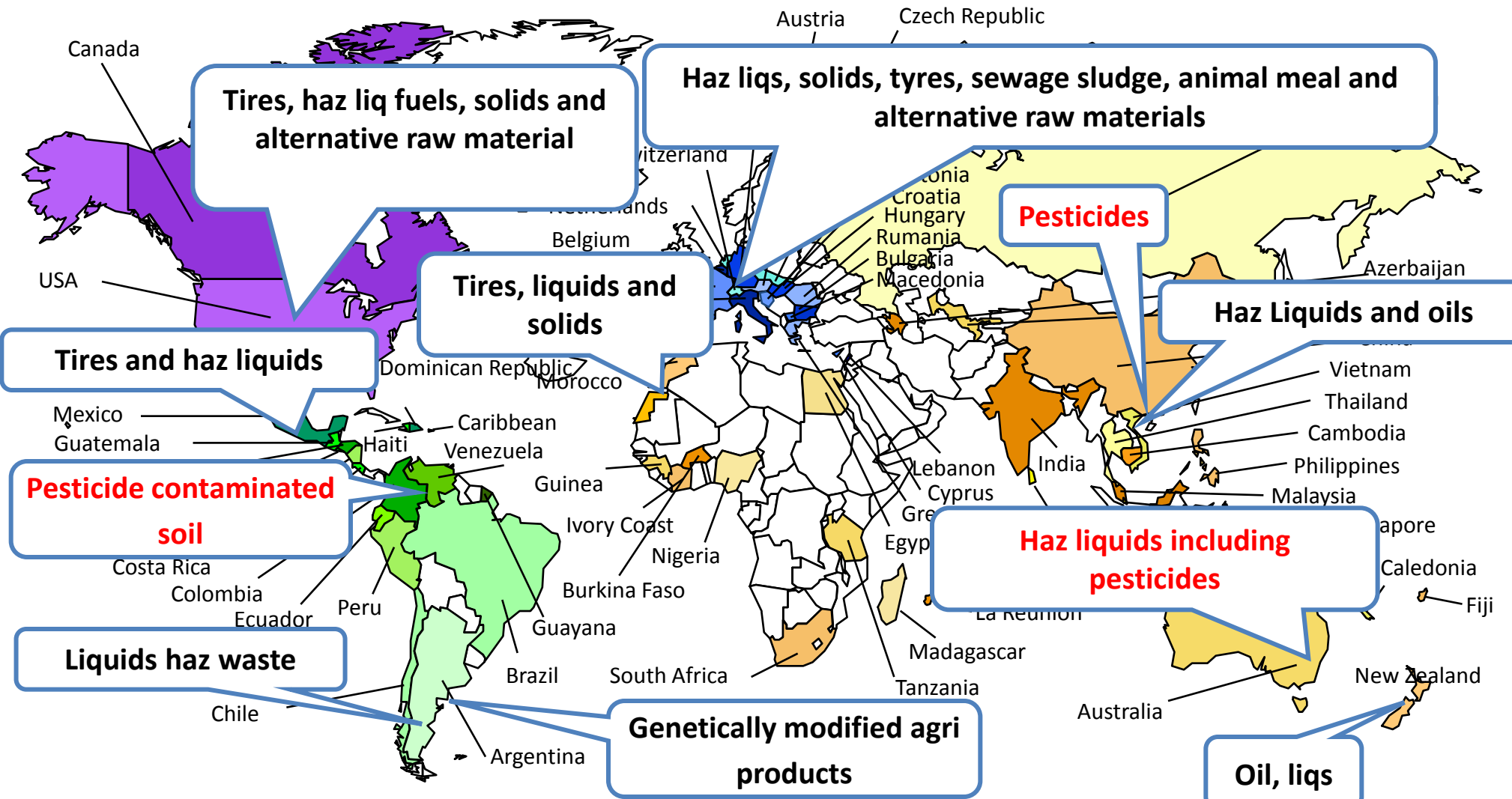


Co-processing to be positioned in the Waste Management Hierarchy as a combined option to recover mineral and organic parts of the wastes



Examples of AFRs and hazardous wastes co-processed

In 2010: more than 20 mio tons in the Cement Industry



Examples of Waste used for Co-processing in Cement kilns

(pop's related wastes in red)

As Alternatives Fuels

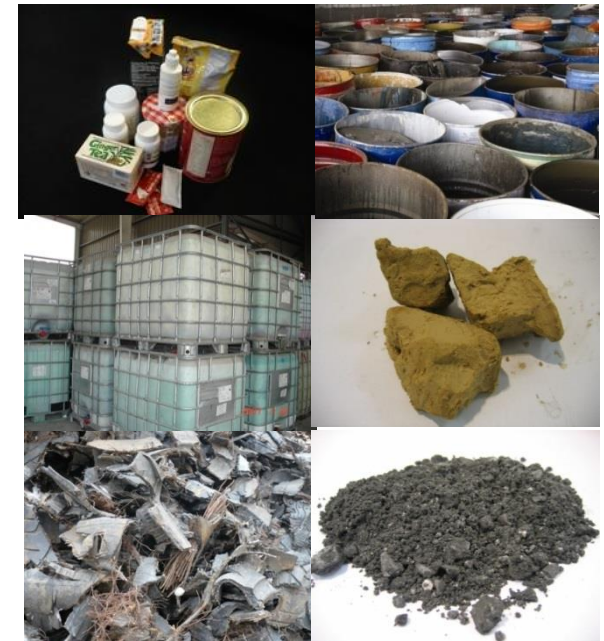
- Diaper trimmings
- Expired & contaminated seeds
- Damaged beans
- Plastics
- Expired products
- Expired food/ health products
- Packaging materials
- Rubber wastes
- Textile waste
- Refinery wastes
- Bleaching earth
- **Herbicides**
- **Insecticides**
- **Pesticides**

As Alternatives Raw materials

- Lime sludge from water treatment
- **Fly ash & bottom ash from power plants**
- Mill scale
- Blasting grit
- Diatomaceous earth
- Aluminum production waste
- Filter cake
- Synthetic gypsum from sulfur scrubbers
- Refinery catalyst
- Calcium fluoride from circuit boards
- Foundry sand
- **Contaminated soils (with pop's or other organic's)**

Non-exhaustive lists

- Paint wastes
- **Used oil & grease**
- Scrap tyres
- Wood chips
- Solvents
- Carbon fines
- Oil filter fluffs
- Coking wastes
- Shipping wastes
- RDF fluff & pellets
- Surfactants
- Pharmaceuticals
- Sorted municipal solid waste
- **Contaminated solids, liquids & sludge's**
- **PCB's**



POP's.....What's the issue?

Googling „obsolete pesticides“ gives the answer

- >500'000 tons of **Obsolete Pesticides (OPs)** are stockpiled throughout many third world countries.
- In 2001, the pop's Stockholm convention was considering Cement kiln as a potential source for D/F emissions if using hazardous wastes as fuels....
- Between 2003 until now, a set of official trial burns has been done and published to prove the full efficiency of the Cement process to treat POP's ...
- So: Cement kilns are now fully recognized by international institutions (Basel Convention, UNEP, UNIDO) as a suitable option for POPs treatment



Success Stories
Stockholm Convention
2001-2011



Sri-Lanka... **pure pyralene oil with 56-62% of PCBs**

- 10,000 liters of mixture co-processed at 2 feed rates under well controlled process conditions
- Accredited 3rd party monitors emissions and samples all materials

Results

- DRE > 99.9999%**
- Emissions unaffected by PCB**
- External report available

Stack measurements	Baseline 2 August		Trial Burn 1 August		Trial Burn 4 August	
	Kiln	By-pass	Kiln	By-pass	Kiln	By-pass
Air flow Nm ³ /h	125040	53500	98750	54120	53060	49800
Oxygen %	14.8	20.6	14.3	20.6	13	20.6
CO mg/Nm ³	13.8	na	na	na	na	na
Stack temperature °C	152.0	89.0	194.0	93.7	192.0	90.7
Sampling time hh:mm	5:02	5:37	5:22	5:23	5:21	4:46
PCDD/PCDF I-TEQ ng/m ³	0.018	0.0094	0.016	0.0057	0.0091	na
PCB I-TEQ ng/Nm ³	0.0046	0.00012	0.0059	0.00031	0.0051	na
HCB ng/Nm ³	<7	<7	<8	<7	<8	na
HCl mg/Nm ³	5	<2	20	<2	2.0	na
Total VOC mg/Nm ³	23	na	14	9.7	na	8.9
Benzene mg/Nm ³	<1	na	<1	<1	na	<1

Holcim
Holcim Group Support Holcim co-processing experience 17.10.2012/LDS

Treatment of pesticides in Australia ...

Geocycle
CEMENT AUSTRALIA

Holcim
Holcim Group Support Holcim co-processing experience 26.05.2009/LDS

Wastes Co-processing:

NO COMPROMISE

LCA and External Audits

Hazardous and Non-hazardous

For pop's: DRE & Certification

On Health and Safety

- Employee Chemical Health and Occupational Safety model to be developed
- External auditing systems requested

On Environment

- EMR: Emission monitoring, compliance and reporting systems
- ERT: Emission reduction target

On product quality

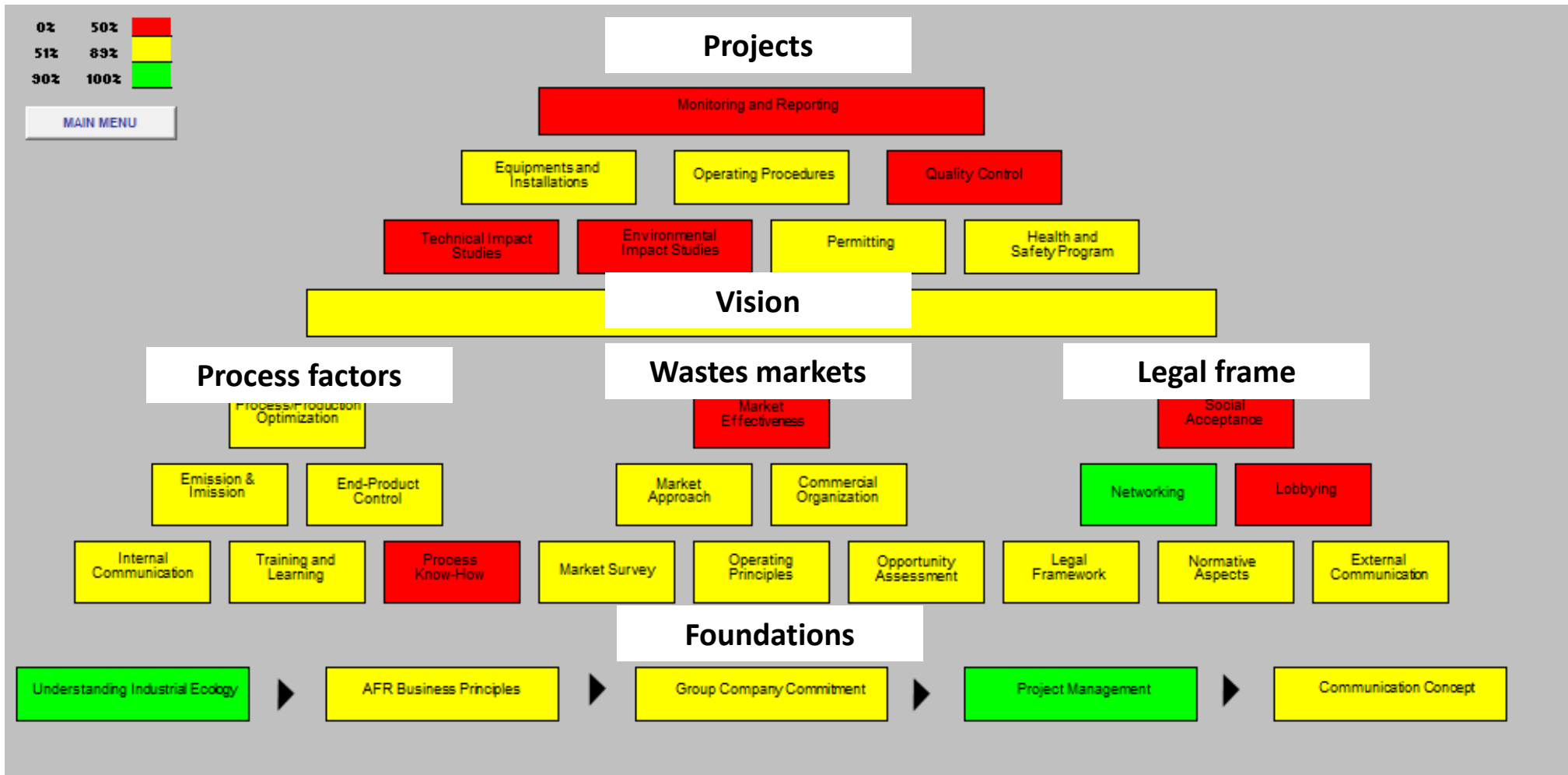
- End-products criteria's (mortar & concrete) fixed to be used in any case for drinking water applications
- End-of life products recyclability

On production process control and efficiency

- Total QC systems on place – wastes-to-AFR & co-processing total traceability
- Pre-processing activities
- Cement production processes improved to handle LGR



Generic Structure of a Co-processing development. Company / plant level



Co-Processing: a WIN – WIN – WIN solution....

For Resources preservation and Environment protection

- Part of the local / National wastes management strategies
- Global reduction of CO2 and other pollutants
- Optimizing the resources management preserving fossils fuels and natural resources

For the RI's and more particularly: the Cement sector

- Keeping and improving competitiveness
- Improving independence, right to operate and business sustainability
- Enlarging the end-product portfolio with the production of Cementitious at low or 0 environment footprint impact

For the local Authorities and Collectivities

- Developing local competences and local solutions including for highly hazardous wastes
- Improve Environment capacity building and understanding

THANK YOU

