



Valorisation of polluted soils and mineral waste in the Flemish region of Belgium

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BIOTERRA NV



- Founded in 1996
- 48 FTE
- 100% part of **Group De Cloedt** → Dredging, Aggregates, Environment
- Main office = Genk, Belgium
- Belgium : approx. 1 million tons of polluted soils and mineral waste per year
- Site Genk = epicenter of treatment of Group De Cloedt, BIOTERRA
 - 9 (13,5) ha
 - Waterbound (3500 tons waterway)
 - State-of-art wet separation plant, in-house developed
 - + 500.000 tons yearly processed



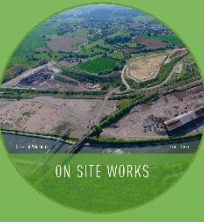
Site Genk (B)

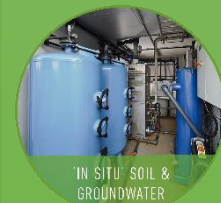
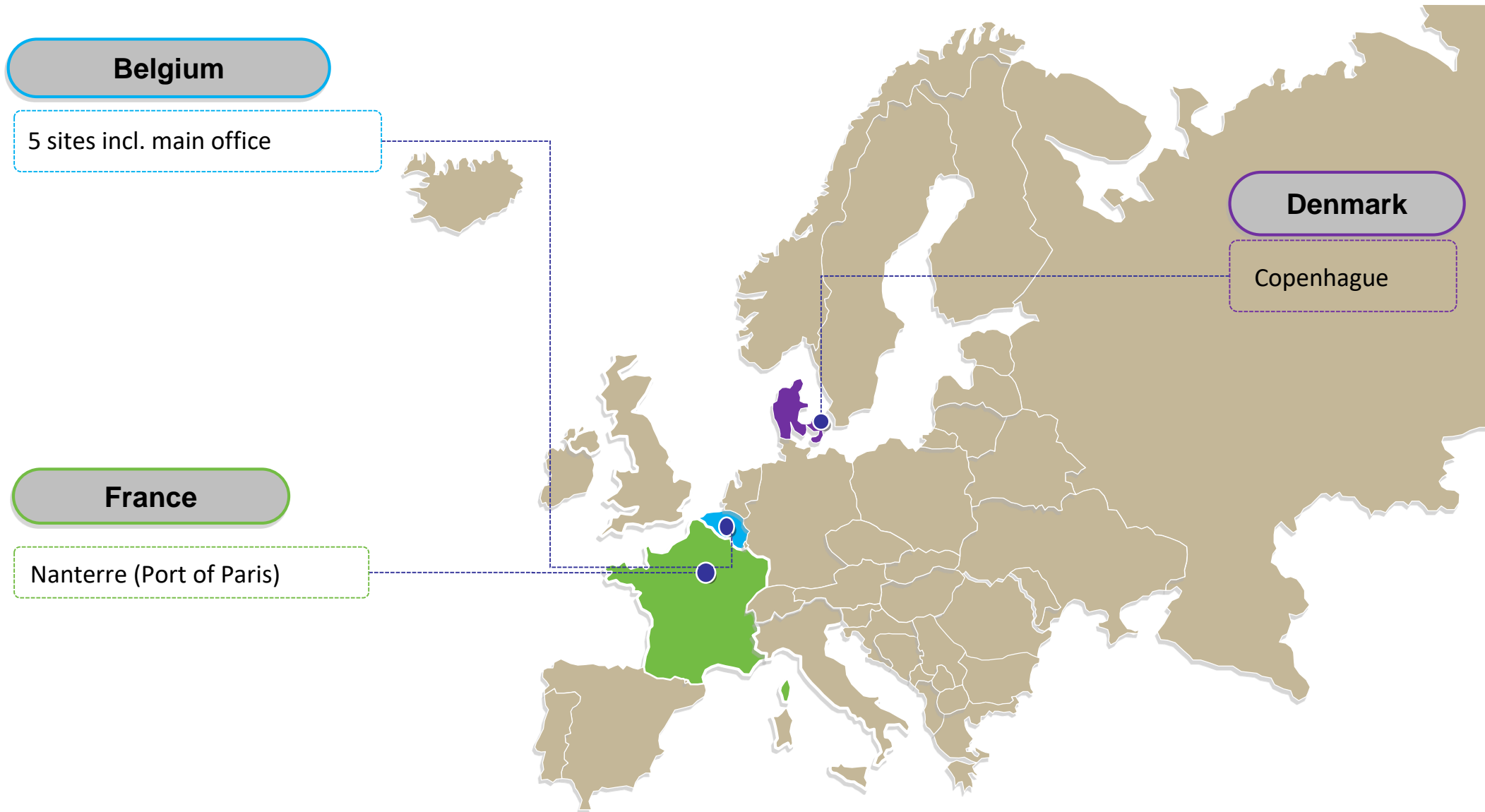
9 ha (13,5ha)

Innovative washing plant ; 100t/h

3.500 ton waterway

Main treatment site Europe





GROUP DE CLOEDT

Circular driven economy

Sustainability

Scarcity of primary aggregates

Awareness

Secondary aggregates

Tools in legislation / political will

Innovation

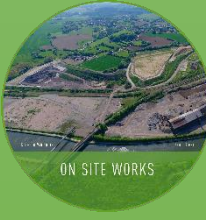
Quality

End-of-Waste

Landfill mining?

Every little bit counts!

From Waste to new Resources !!!

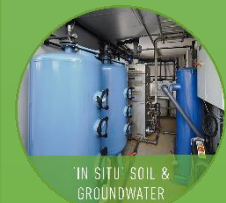


Brief overview of legislation on soils and waste – Flanders

Responsible authority : OVAM (www.ovam.be)

“VLAREBO” → SOILS since 1996!

- **Threshold values** on :
 - Remediation level regarding usage of site (nature vs residential vs industrial)
 - Re-use as backfilling material (free use = unpolluted material!)
 - Re-use regarding “**standstill**” principle (re-use as soil)
 - Re-use in or as building materials
- **Traceability**
 - Preventing diffuse spreading of pollution
 - Ensuring quality of soils at receptor site
- **Quality**
 - Chemical parameters : heavy metals, HAP, mineral oil, BTEX, PCB, cyanides, asbestos
 - Stones (artificial) < 5% w/w, and all stones < 50mm
 - Physical contamination < 0,5% w/w (plastics, wood,...)
- **Control**
 - Independant “soil bank” follow-up of traceability (“soil banks” certified by authorities)
 - Certified and by the Minister of Environment accredited **Soil Recycling Centers** (= BIOTERRA)



Brief overview of legislation on soils and waste – Flanders

Responsible authority : OVAM (www.ovam.be)

“VLAREMA” → **WASTE** → **Materials Decree** → *creates framework for reuse as materials!!!*

- **Threshold values** on :
 - Re-use as soil improving material (very low contamination ; moreover organic wastes)
 - Re-use in or as building material (mineral fractions)
- **Traceability**
 - For each waste code a producer has to pass the authorities (OVAM) to get an approval for re-use
 - Re-use is defined (strict) and chemical quality of product is proven (even for third life!)
 - Ensuring quality of materials at receptor site
- **Quality**
 - Chemical parameters (heavy metals, HAP, mineral oil, PCB, BTEX, pesticides)
 - Physical parameters : asbestos (100 ppm), glass (2%), light materials (5cm³/kg)



Brief overview of legislation on soils and waste – Flanders

Responsible authority : OVAM (www.ovam.be)

RE-USE AS BUILDING MATERIALS

- Limitative list produced by the Minister of Environment → **specific applications**
- Form-shaped building materials vs non-form-shaped building materials
 - **Form-shaped** : bricks, concrete blocks and tiles, readymix concrete,...
 - **Non-form-shaped** : sound barriers, dykes, bridgeheads, sub-foundations, stabilised sand, drainage material/sand bed, ...



2019

Sand and Sustainability: Finding new solutions for environmental governance of global sand resources

UN 
environment

United Nations
Environment Programme



GROUP
DC
GROUP DE CLOEDT

Scarcity of primary aggregates – awareness on political level – sustainable society



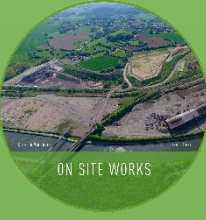
Potential for recyclable mineral waste that is landfilled or disappear in the gray zone of legislation



20 years of experience in physico-chemical treatment of contaminated soils, combined with 4 years of research on treatment of mineral



Design&Build of *state-of-art* wet processing plant





ON SITE WORKS



IN SITU SOIL & GROUNDWATER



BIOREMEDIATION



WASTE TO NEW RESOURCES



TEMPORARY STORAGE



GROUP DE CLOEDT



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TEMPORARY STORAGE

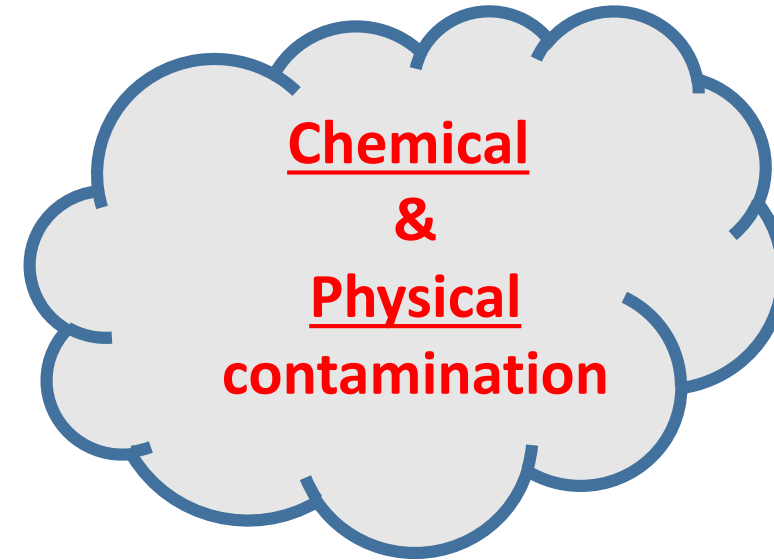


GROUP DE CLOEDT

Facts & figures

- Capacity : 100 TPH (250kT/yr)
- Built-in separation techniques based on:
 - Grain size
 - Density
 - Magnetic affinity
 - Shape
 - Optical properties
- 15 outputs of which the most important are :
 - filtercakes (fraction < 0,063 mm)
 - Organic matter incl. light density materials
 - Ferrous
 - Non-ferrous
 - Washed sand 0-2mm
 - Washed coarser aggregates 2-8mm, 8-32mm en > 32mm
 - Glass
 - ...
- Closed circuit of processwater, 500 m³/h, alimented with processed wastewater from own activities

Wet processing plant Genk (B)





From Waste to New Resources...

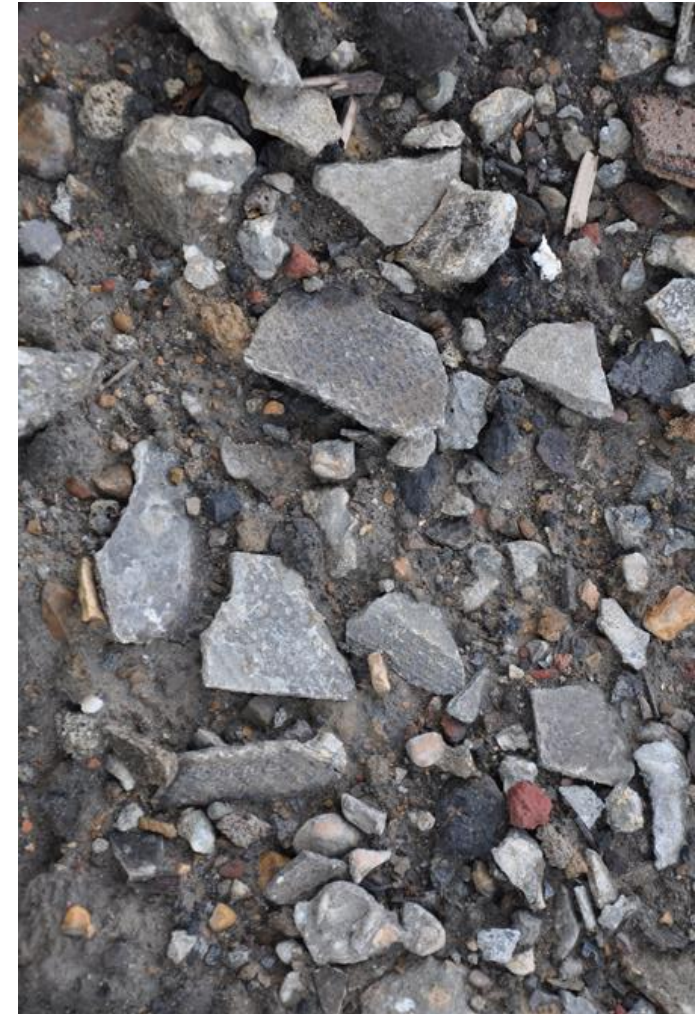
Recycled products (waste)



Fines of recycling household bin waste



Bottom ashes



*Asbestos contaminated
soils & construction waste*



From Waste to New Resources...

Recycled products (waste)



Polluted dredged materials

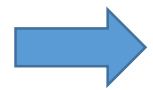


Road sweepings & Sewer sludge

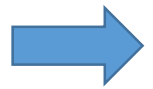


Fines of sorting out C&D waste

And.....foundry sands (phenolated), sand blasting waste, sandtrap waste,.....polluted soils.



Polluted (chemical and/or physical) mineral waste/soil with a recoverable fraction of at least 50% dry mass



Screening industrial processes on the feasibility to further recycle internal waste streams (diversification)



Keeping recyclable waste off the landfills (**TAX-regulated environmental legislation**)



From Waste to New Resources = Production of secondary aggregates



Washed sand 0/2mm

< 1% organic matter

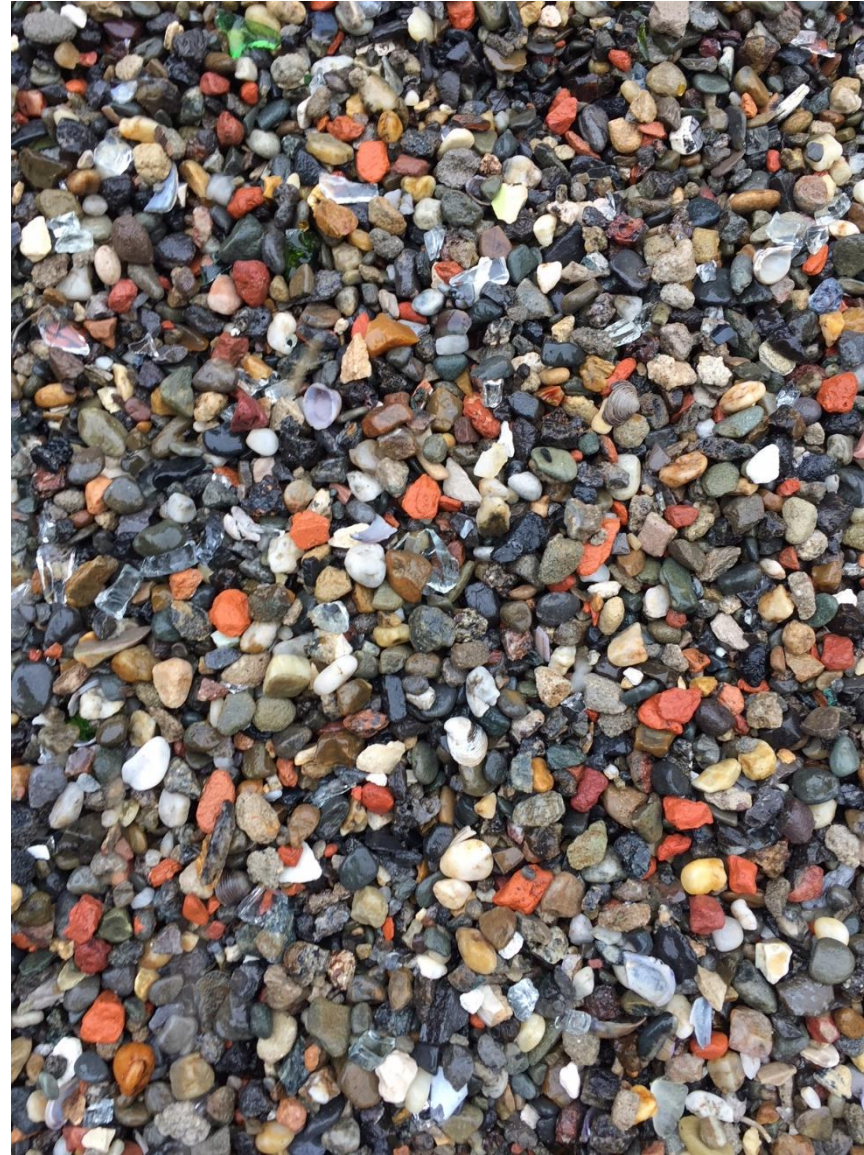
Re-usable in building materials such as drainage layers, sand bed for conducts, stabilised sands and concrete structures.



From Waste to New Resources = Production of secondary aggregates



2/8 mm



8/20 mm





Fe

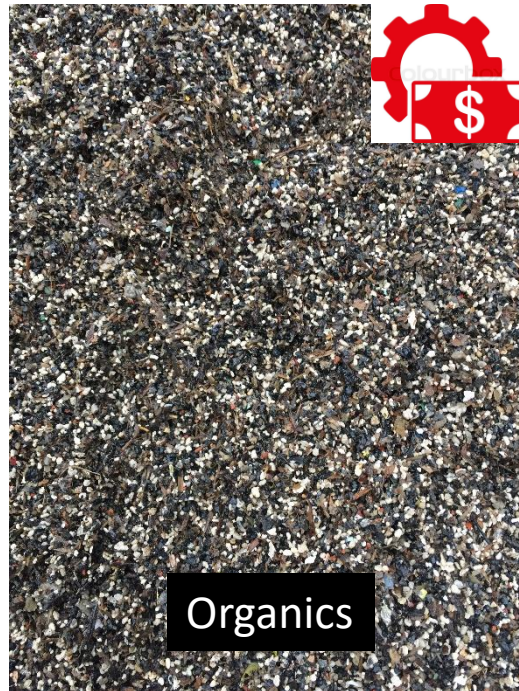


Non-Fe

More end-products...



Floating (lights)



Organics



Filtercakes (fines)



ON SITE WORKS



IN SITU SOIL & GROUNDWATER



BIOREMEDIATION



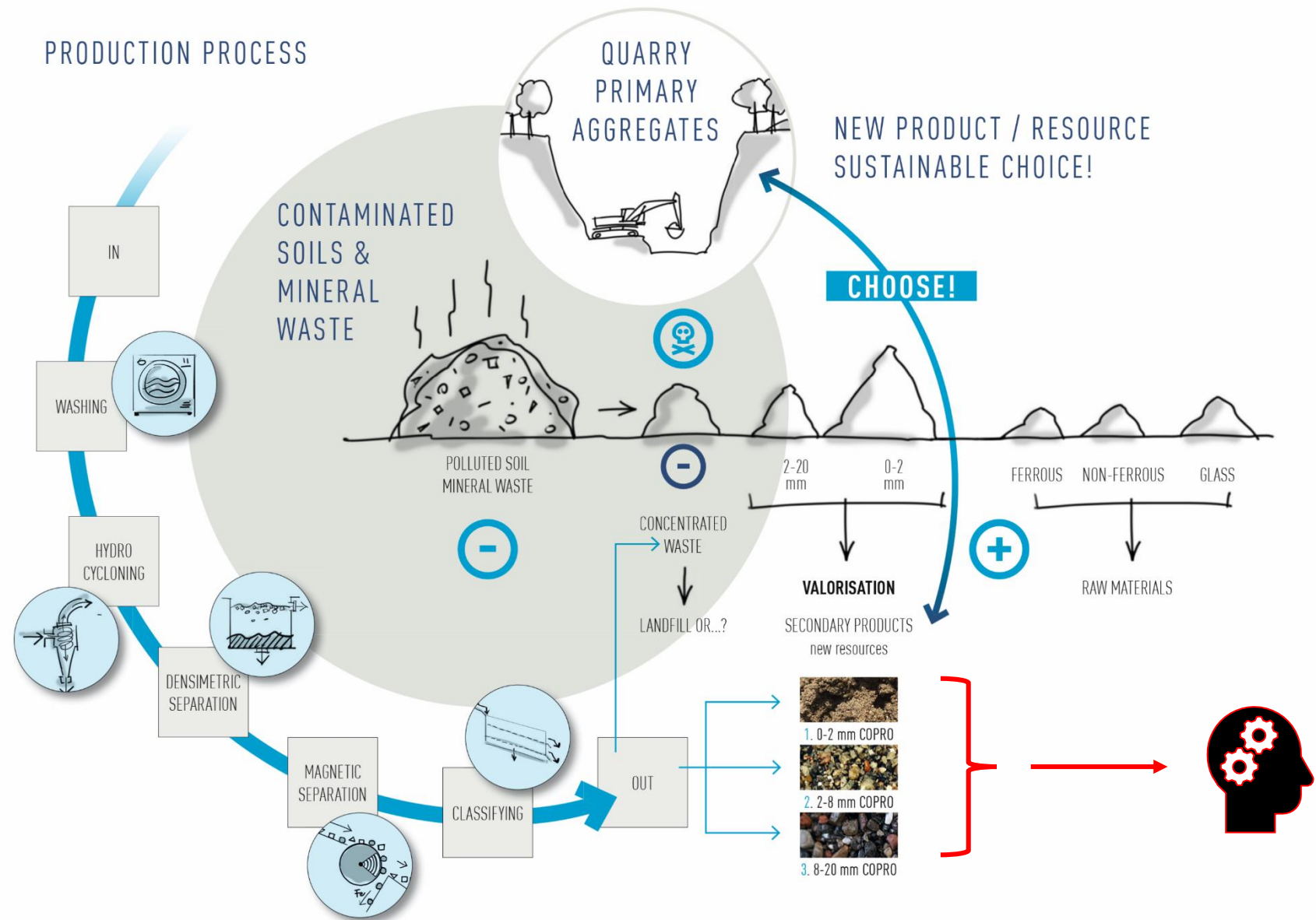
WASTE TO NEW RESOURCES



TEMPORARY STORAGE



GROUP DE CLOEDT



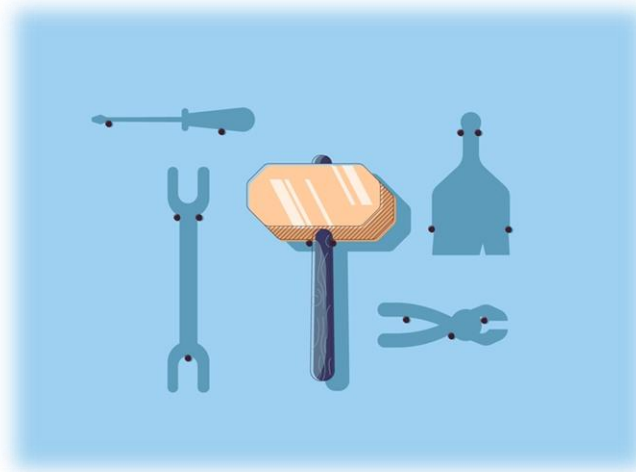
Legislative framework and processing potential is there. Now let's look at the question:
"Which products do we make with which raw materials?"



RECYCLING



(POLITICAL) TOOLS



Minimal % of recycled content

- Concrete (depending on strength)
- Asphalt
- Concrete based products
- (sub)Foundations
- ...

DEFINING A FRAMEWORK WHEREBY PRODUCTS ARE DEFINED REGARDING
THE % OF SECONDARY/TERTIARY MATERIALS TO BE PRESENT INCL. THEIR QUALITY NEEDS



ON SITE WORKS



IN SITU SOIL & GROUNDWATER



BIOREMEDIATION



WASTE TO NEW RESOURCES



TEMPORARY STORAGE



R&D concrete mixtures/recipes 50MPa

→ 80% of sandmixture is secondarygoing for 100%



DEMO-PROJECT CIRCULAR CONCRETE : 40.000 m² of ROAD CONCRETE

