



**APPROACH OF TECHNOLOGICAL SOLUTIONS
FOR LIMITING LIABILITIES
RELATED TO CONTAMINATED SITES**

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CONTENT

- **ENVIRONMENTAL CHALLENGE**
- **HOW TO LIMIT LIABILITIES?**

Unlocking the barriers to the recovery of soil and the rehabilitation of contaminated sites:

From Owner's point of view

- **Technological barriers**

- To get access to technologies which can reduce the environmental risk and limit the environmental liabilities

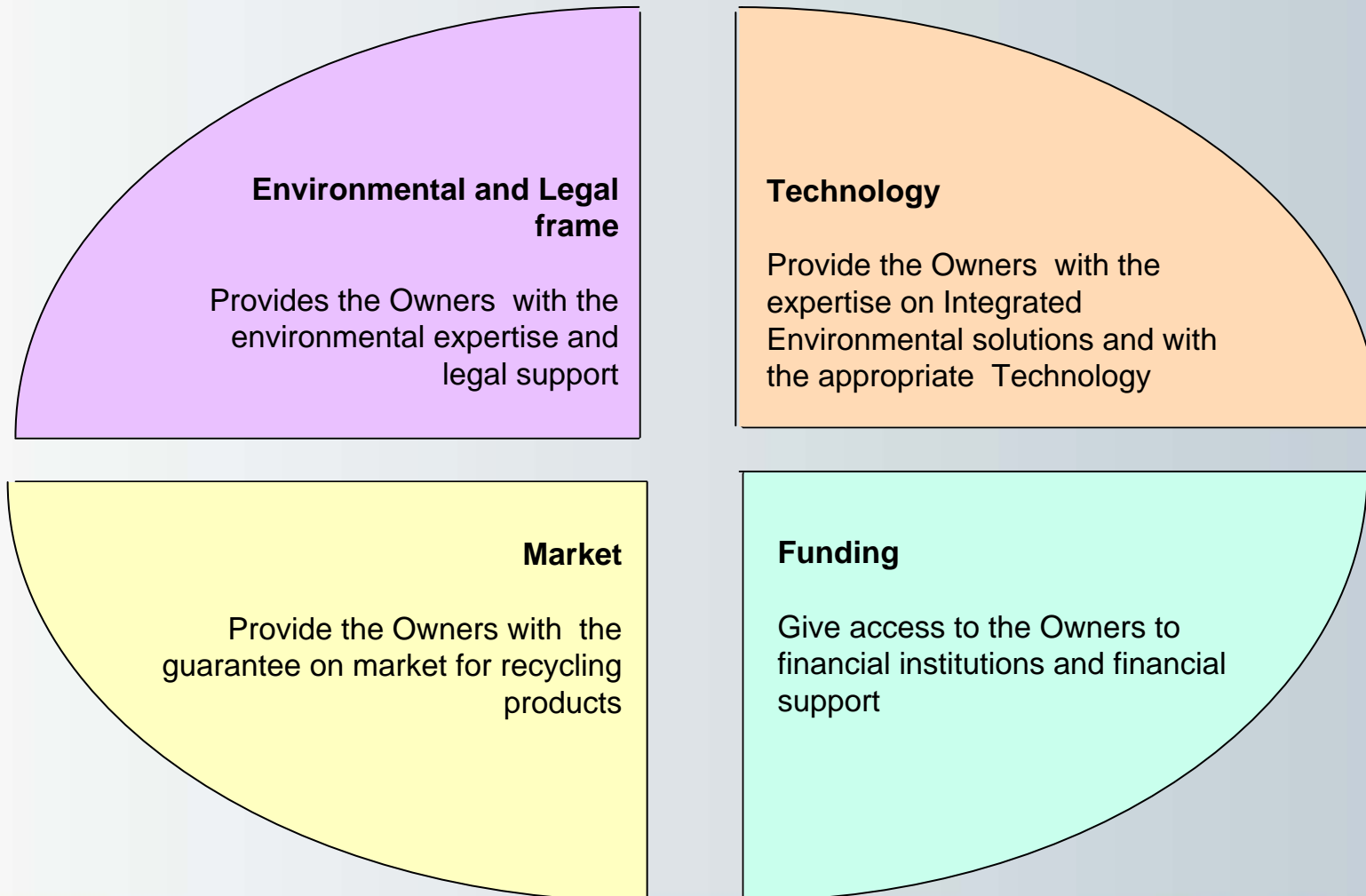
- **Financing barriers**

- To get access to subsidiaries and financing support development of technological solutions and studies
- To get access to financial support for necessary investment

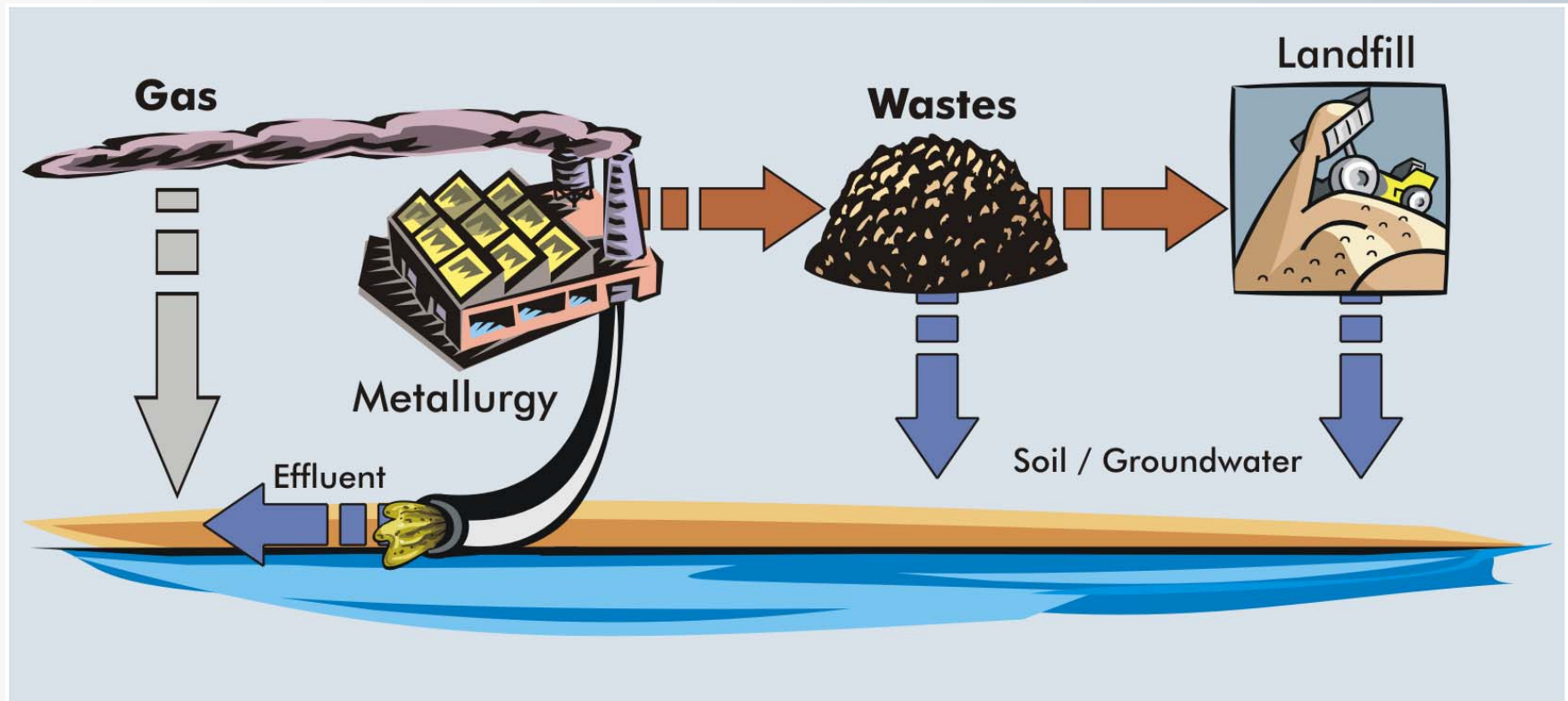
- **Market barriers**

- To get access to recyclers of wastes

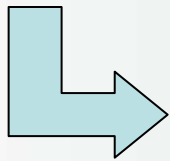
Combining stakes with efficiency



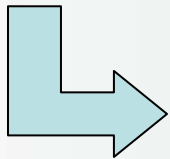
Taking care of all the pollution sources



... Alternatives to landfilling - “Zero waste” approach



Preventive approach - extraction and recycling from the flows



Remedial approach - extraction and recycling from the soils and storages

- **Preventive approach**

- Minimize the use of water
- Minimize the generation of wastes
- Minimize the volume and/or hazardness of discharged liquid effluent and solid wastes
- Maximize the recycling/reuse of wastes
- Get flexible treatment facilities adapted to the market
- Secure treatment facilities adapted for safe disposal
- Optimize the construction and the management of waste storage

- **Preventive solutions**

- To reengineer technological solutions in order to get an integrated environmental approach, in terms of :
 1. Management of gas, water and wastes ... before treatment and landfilling
 2. Global solutions addressing gas, water and wastes
 3. Process and technology adapted to the market
 4. Get value out of the waste products
 5. “Zero waste” flow-sheet, only recyclable products

- **Preventive approach – Extraction and recycling**

- **Barriers**

- High level of investment
- Technology not always available
- Market not always existing / accessible
- Restrictions on transport of waste products
- Administration procedures

- **Drivers**

- Access to subsidies for technology development and studies
- Trading approach during technology definition
- Access to support from banks for investment
- Negotiation with recyclers
- Proven benefit from products
- Proven legal frame for waste transport and treatment

- **Preventive approach – Successful case**

- Recycling of various industrial wastes (dust and sludge) stored by several metallurgical sites, at GD of Luxemburg: PRIMOREC

Residues containing mainly Iron & Zinc

- Incentive: market and environment
- Technologies not available
- Development financed by Arcelor, public authorities and development banks
- Market research and consolidation through traders
- Support from local authorities
- Valorisation of the residue through extraction
 - Production of a Zinc concentrate
 - Production of DRI and Pig Iron
- “Zero waste” technology

- Remedial approach

- Decrease the volume and/or hazardness of stored liquid effluent and solid wastes
- Maximize the recycling/reuse of wastes
- Get flexible treatment facilities adapted to the market
- Secure treatment facilities adapted for safe disposal
- Optimize the construction and the management of waste storage
- Secure the long time evolution of the remediated areas

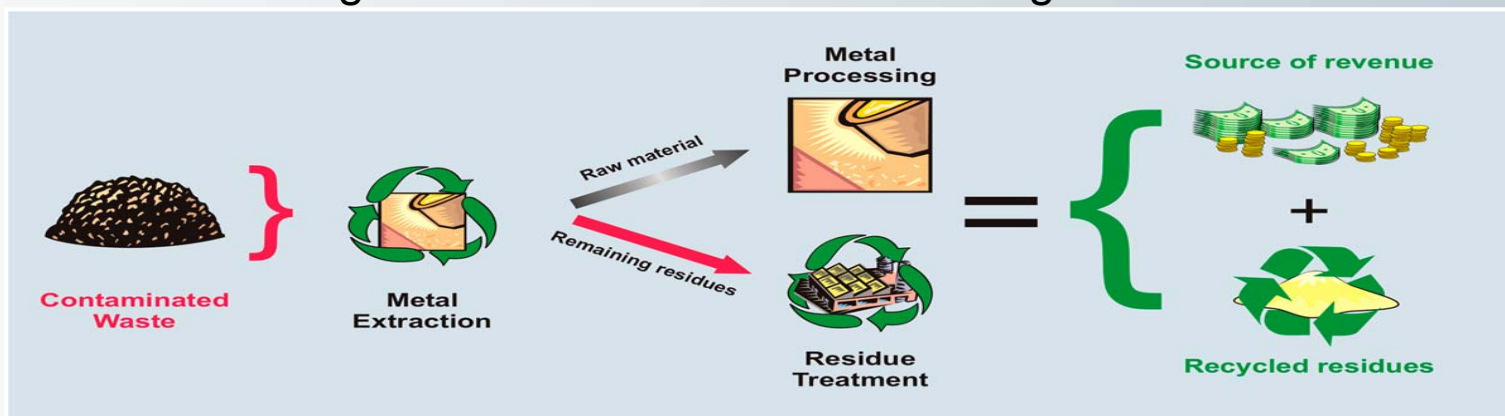
- **Remedial solutions**

- To reengineer technological solutions for rehabilitation of contaminated sites and recovery of soils, in terms of :
 1. Global solutions addressing gas, water and wastes
 2. Process and technology adapted to the market
 3. Get value out the waste products
 4. Get “inert” material if not recyclable

• Remedial approach – Extraction and recycling

➤ How ?

- Decrease the contamination through extraction technologies
- Processing and concentration of metal part according to market (opportunities, trading value)
- Treatment of residue according to market
- Recycling of residual products
- Water Management
- Waste/ground water treatment according to market



- Remedial approach – Extraction and recycling

- Barriers

- High level of investment
- Technology not always available
- Market not always existing / accessible
- Restrictions on transport of waste products
- Administration procedures
- Access to contaminated material (evaluation, excavation, ...)
- Large volume with low content of valuable material
- Historical understanding

- Remedial approach – Extraction and recycling

- Drivers

- Access to subsidies for technology development and studies
- Support from banks for investment
- Trading approach during technology definition
- Negotiation with recyclers
- Proven benefit from products
- Legal frame for waste transport and treatment

- Remedial approach – Successful case

- Management and recycling of waste water from various industrial activities in Russia and in Bulgaria: water quality protection

- Context

- ✓ Sites in priority areas
- ✓ Client: cluster or municipality
- ✓ Pressure: market and environment
- ✓ Technology and expertise available, but each operation making its own choice

- Adapted approach

- ✓ Global management (various parties involved)
- ✓ Integrated treatment
- ✓ Studies financed by European Institutions and Development Banks
- ✓ Support from local authorities
- ✓ Water management and treatment
 - Separation of water streams according to market
 - Water management to limit infiltration and leachates
- ✓ Recycling of wastes
 - Market research and consolidation through traders

An integrative approach

