

**global**  
**cemfuels**  
**CONFERENCE & EXHIBITION**

*“How to identify the right waste markets  
for AF(&R) – now and in future”*

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Alternate Resource Partners (ARP)*

*22 - 23 February 2016, Prague, Czech Republic*



# Topics of Presentation

- Introduction Alternate Resource Partners
- Objectives presentation & Tour de Horizon 2030
- Future, trends and developments cement manufacturing
- Future, trends and developments waste management
- What & why circular economy
  - From linear to circular economy
- AF(&R) potential future markets 2020 - 2030
- Take home messages

- Company established in 2009
- Group of consultants, engineers, trainers, coaches & field operators for resource management
- Worldwide experience in mature and emerging countries replacing all type of fossil fuel by waste (transformed to) AFR
- ARP & partners have > 150 years experience in all aspects of resource management and cement manufacturing when it comes to AFR



## Main activities ARP:

- ✓ Resource management business development in cement, lime & electric power industry,
- ✓ Waste – to – AFR market research, feasibility studies, etc.,
- ✓ Pre- & Co-processing Marketing & Sales training & coaching,
- ✓ Consulting, reviews & audits on health, safety & environment behaviour,
- ✓ Development of specialized recycling machines for waste to AFR activities, example: oil - filter recycling machine for emerging countries



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## Objectives of presentation:

1) Identify AF(&R) markets by reviewing (at a high level) following topics

- ❖ General environmental development,
  - ❖ Circular economy, Climate change COP21
- ❖ Cement manufacturing
- ❖ Present AF used
- ❖ Waste & resource management
- ❖ How to find new markets for AF & AR

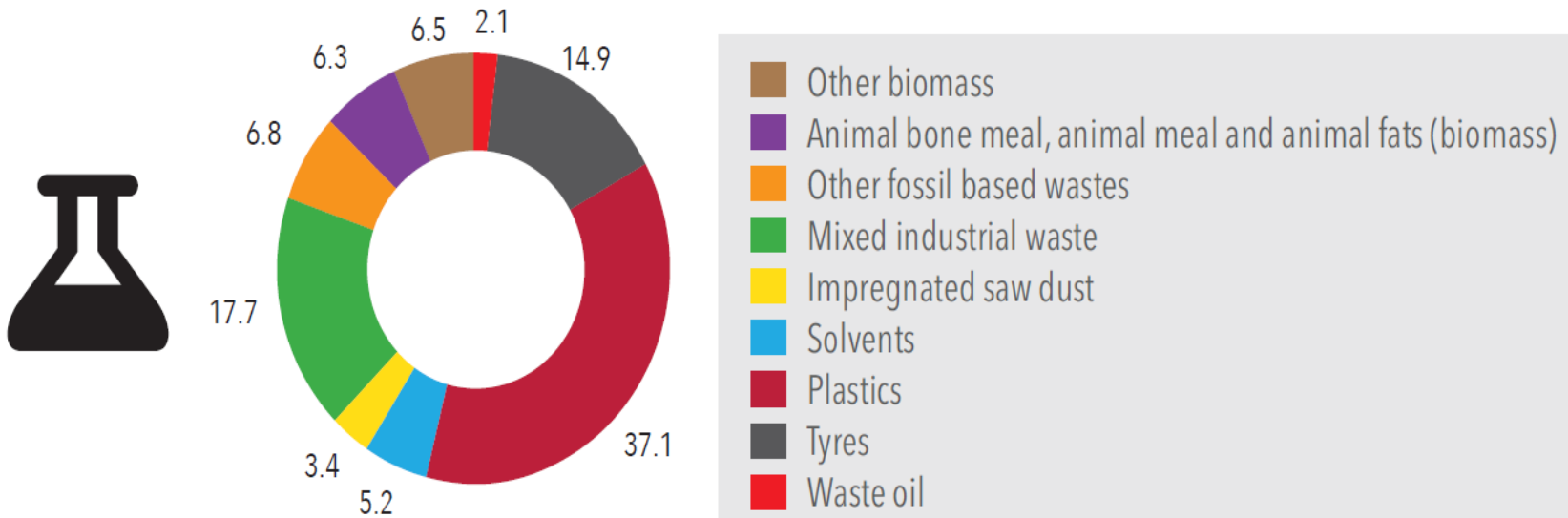
2) At the end have a list of potential AF(&R) based on this high level tour de horizon



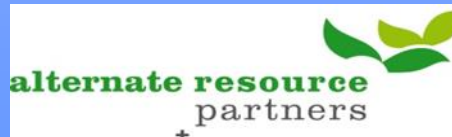
# Objectives presentation & tour de horizon

## Present alternative fuels use in Europe

BREAKDOWN OF ALTERNATIVE FOSSIL FUELS, EU28



Source: Getting the Numbers Right (GNR) 2012



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- CO<sub>2</sub> / ton clinker/cement will become one of the key performance indicators of the future
- Alternative fuels – use of less carbon-intensive fossil fuels and more alternative (fossil) fuels and biomass fuels in cement production process.
- Alternative fuels include wastes otherwise burned in incinerators, landfilled or improperly destroyed
- Clinker substitution – substituting carbon intensive clinker with other, lower carbon, materials with cementitious properties.
- Carbon capture and storage (CCS) – capturing CO<sub>2</sub> before it is released into atmosphere and storing it securely so it is not released in future.

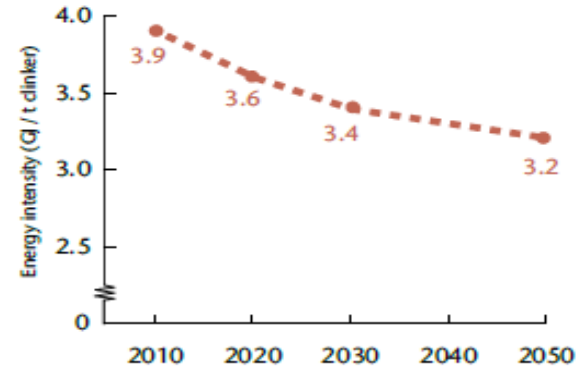


## WBCSD

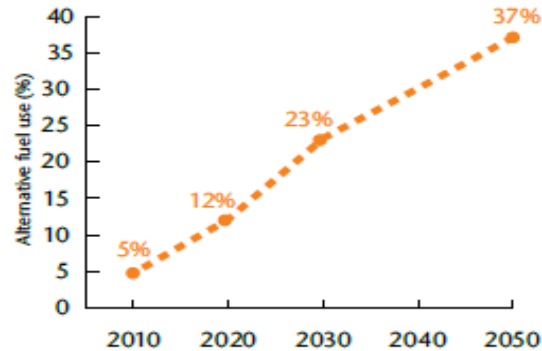
### Cement roadmap targets:

- Energy intensity
- Alternative fuels use
- Cement to clinker ratio

Targets for decrease in energy intensity, 2010-2050

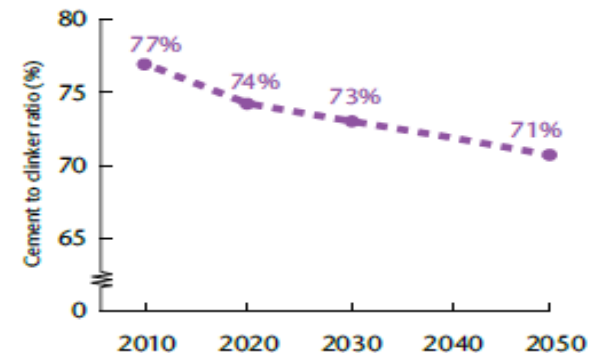


Targets for alternative fuel use, 2010-2050



Note: excludes CCS energy use and electricity

Targets for decrease in cement to clinker ratio, 2010-2050



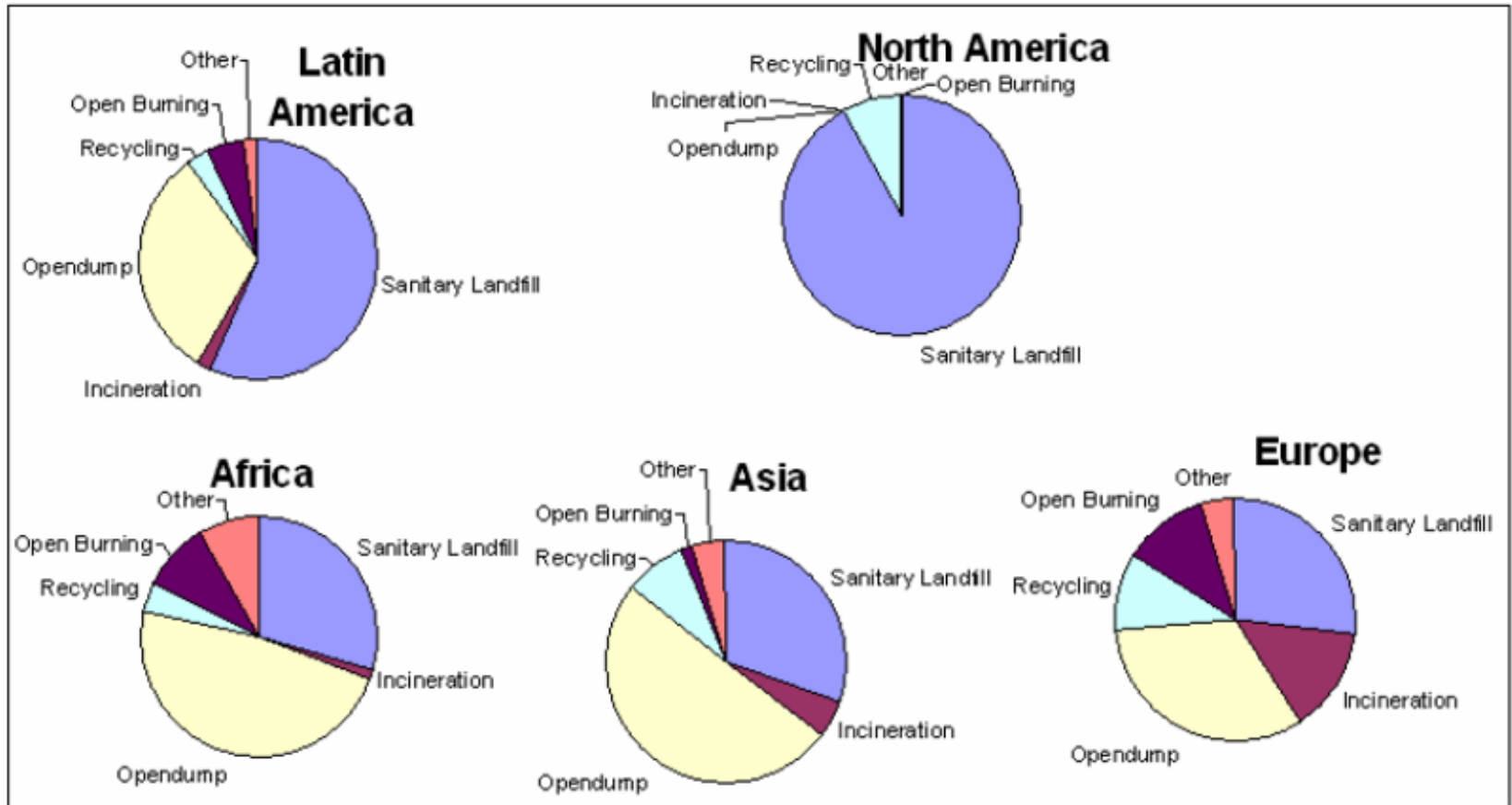
Note: all figures show global average

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In different parts of the world big differences:

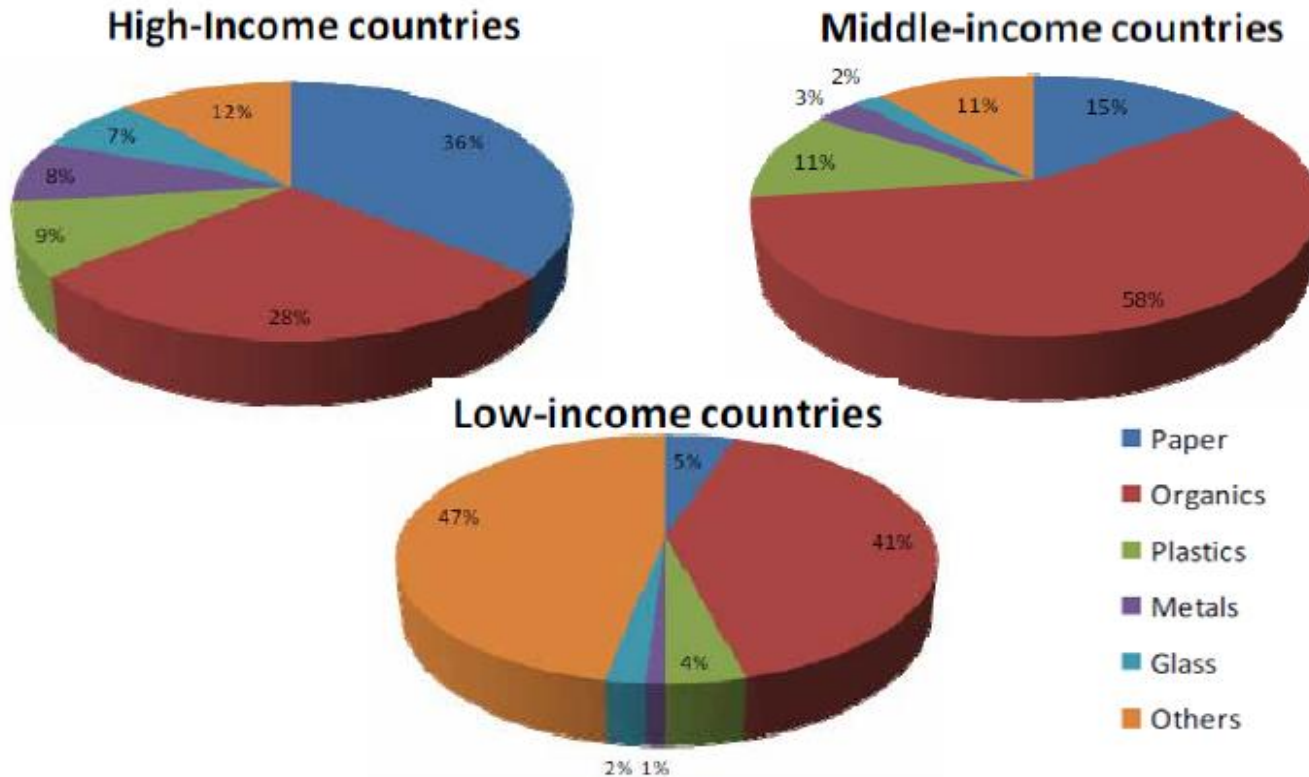
- treatment/disposal



Source: UNEP

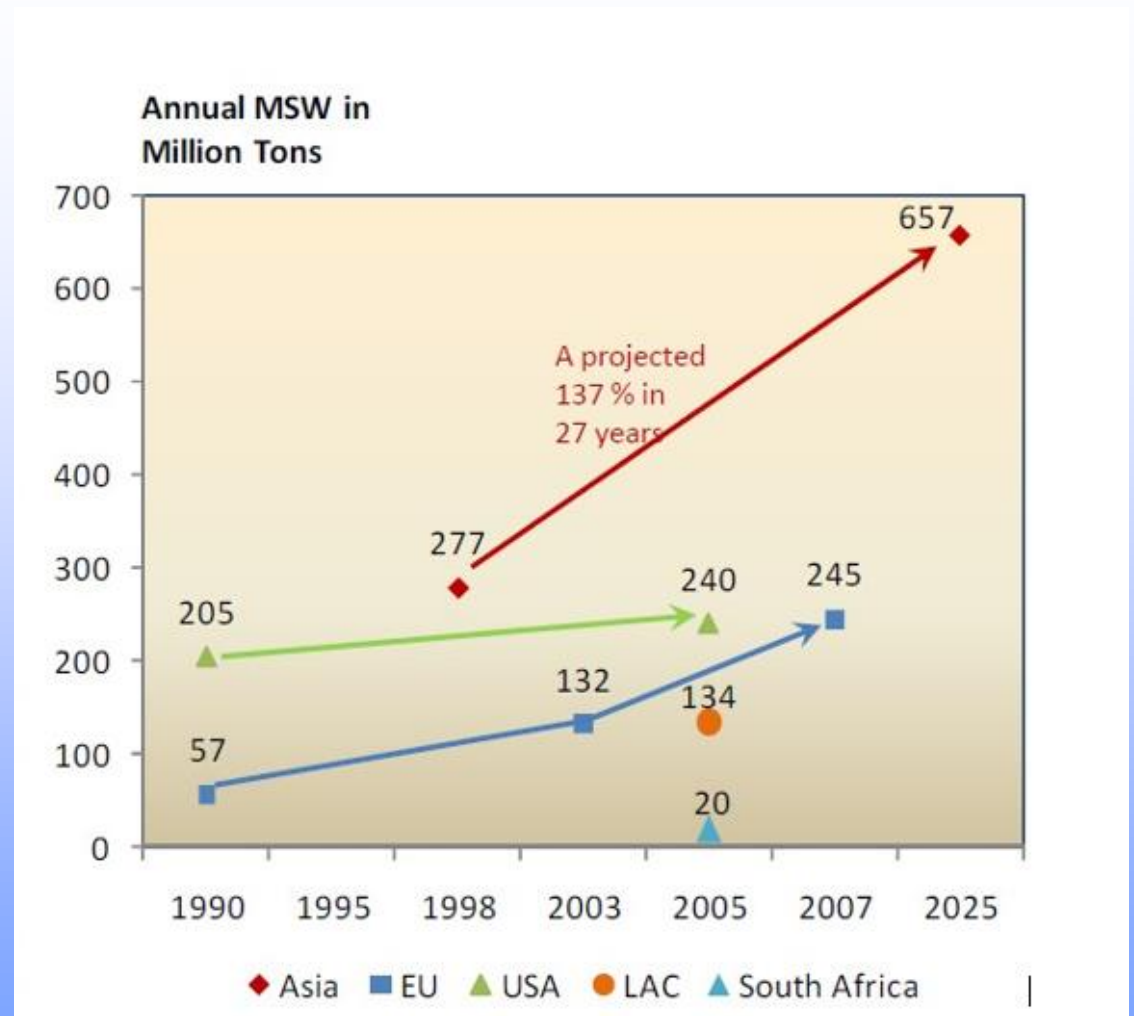
# Future, trends, developments waste management

Shift from high organics to higher plastics and paper corresponding with increase of relative standard of living



Source: Arunprasad, Swati. (2009) "Waste Management as a Sector of Green Economy," Presentation at International Forum on Green Economy, Beijing, China, November 2009.

In different parts  
of the world  
big differences in  
developments of  
volume of waste, e.g.  
MSW



Source: Arunprasad, Swati. (2009) "Waste Management as a Sector of Green Economy," Presentation at International Forum on Green Economy, Beijing, China, November 2009.



# Future, trends, developments waste management

Main issue – change of perspective

## 20th CENTURY

### WASTE MANAGEMENT

“How do we get rid of our waste efficiently with minimum damage to public health and the environment?”

## 20th CENTURY

### RESOURCE MANAGEMENT

“How do we handle our discarded resources in ways which do not deprive future generations of some, if not all, of the value?”



## Future, trends, developments waste management

### Waste management chain changes:

- Source segregation, collection
  - Will increase quality of waste for recycling and co-processing
- Treatment and disposal
  - Sector will look for new treatment/recycling options which will compete with co-processing
- Resource generation
  - Waste will more be used to create value, disposal fees will become lower or even have a positive value





# Effects of source segregation, collection



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# WHAT & WHY CIRCULAR ECONOMY ?

- Best way to explain a *circular* economy is to compare it to our current *linear* economy. In our current economic system, we extract resources from our planet at an ever-increasing pace, turn them into products we often dispose after use. From the perspective of an individual or organization, that seems efficient. Zooming out to a global level shows how unsustainable this approach is.
- We need an economic system operating within our planetary boundaries  
A circular economy is waste-free and resilient by design.  
Designing economy in a way that is restorative of ecosystems, ambitious with innovation, and impactful for society
- All economic actors across the product value chains  
(resource extraction / mining sector, product designers, manufacturers, distributors, retailers, consumers, repair / reuse businesses, waste management sector)
- All these actors will also be affected as producers of waste.



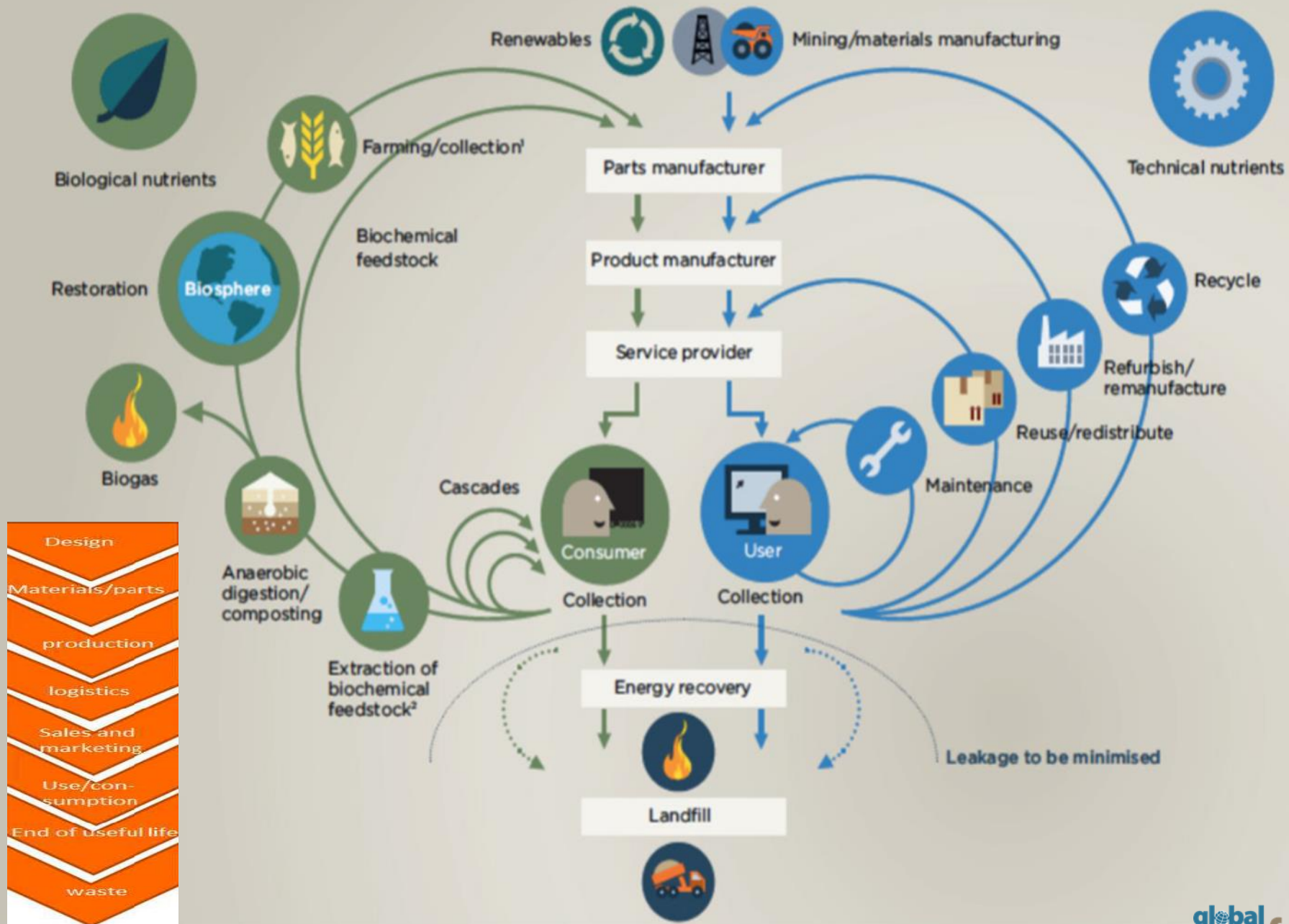


Figure 1: The 'butterfly diagram' of the circular economy. Courtesy Ellen MacArthur Foundation.

# Topics, effects circular economy



## MATERIALS

All materials are cycled  
**infinitely**



## ENERGY

All energy is derived from  
renewable or otherwise  
sustainable sources



## ECOSYSTEM

Human activities support  
ecosystems and the  
rebuilding of natural  
capital



## VALUE

Resources are used to  
**generate value (financial  
and other forms)**



## HEALTH

Human activities support  
human health and happi-  
ness



## SOCIETY

Human activities support  
a healthy and cohesive  
society and culture

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# AF & AR potential future markets

- Examples - AF
  - ❖ Improved quality RDF/SRF by segregated collections of MSW & Industrial/commercial waste and improved pre-processing
  - ❖ Water treatment sludge of “Grondstoffenfabriek”  
“Commodity (resource) factory”  
waste water treatment initiative in Netherlands
  - ❖ By-products of bio based industry
  - ❖ Circular economy initiatives in packaging, textile and carpet will offer opportunities

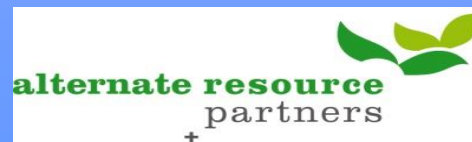


# AF & AR potential future markets

## ○ Examples - AR

- ❖ Construction & demolition waste
- ❖ Metakaolin containing waste – sludge from wastepaper water treatment facilities (CEDEM)
- ❖ Bleaching earth from food and oil preparation facilities (DOBE & ePP, EcoOils)
- ❖ Drilling muds of drilling operations

**Note:** Cement companies will have to partner with companies in the circular economy learning curve like food, agriculture, bio-based industries, (bio)-chemicals, packaging, carpet, etc.





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# Take home messages I

- ✓ CO<sub>2</sub> / ton clinker/cement will become one of the key performance indicators of the future – will be taken in account when reviewing value of (future) AFR
- ✓ Short term similar AFR will be sourced and co-processing will continue to grow as part of resource management especially in MSW arena  
Both in more mature and emerging markets
- ✓ Waste industry will change to a resource management industry - “Waste doesn’t exist” credo will increase quality
- ✓ Circular economy will change business models and partnerships e.g. buy & own versus lease, materials are longer re-used (aiming for indefinitely)

# Take home messages II

- ✓ Source segregation and collection will improve quality of resources opening alternatives to co-processing,
- ✓ Partnering with manufacturers and “waste” management becomes vital for AFR market knowledge and success
- ✓ Identifying new AFR markets will need full understanding of waste to resource developments
- ✓ Cement manufacturing and AFR activities will have to join circular economy learning curve at early stage to identify future AFR markets





***“How to identify the right waste markets  
for AF(&R) – now and in future”***

*Thank You for Your attention*

*Questions?? – Remarks!!*





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# BACK UP SLIDES

# Cement manufacturing objectives

**Sustainability** and environmental concerns have been key considerations for the cement industry in recent years.

WBCSD sees following targets for reducing CO<sub>2</sub> :

- recycling other industry waste while conserving natural materials
- managing utilized waste to end of its life-cycle reducing emissions from cement-manufacturing, including greenhouse gases, landfill, dust and NOx
- increasing efficiency in manufacturing - requiring less power and fuel
- creating superior construction materials for wider range of uses improving durability of concrete through cement quality.

**How does this fit with circular economy ?**