



APSE

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USE OF ECO-FRIENDLY MATERIALS FOR A NEW CONCEPT
OF ASPHALT PAVEMENTS FOR A SUSTAINABLE
ENVIRONMENT

Industrial Symbiosis and Circular Economy

FINAL WORKSHOP
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CWare

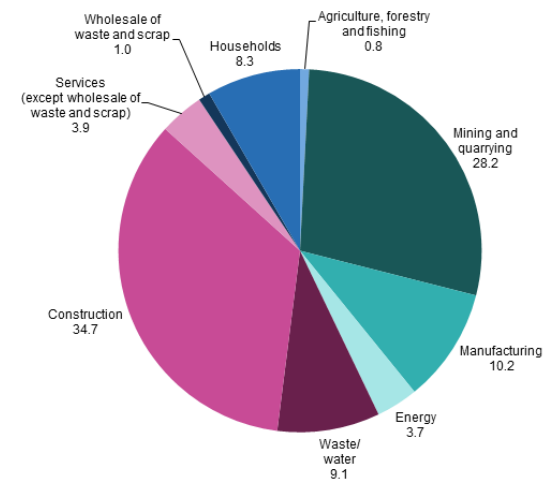
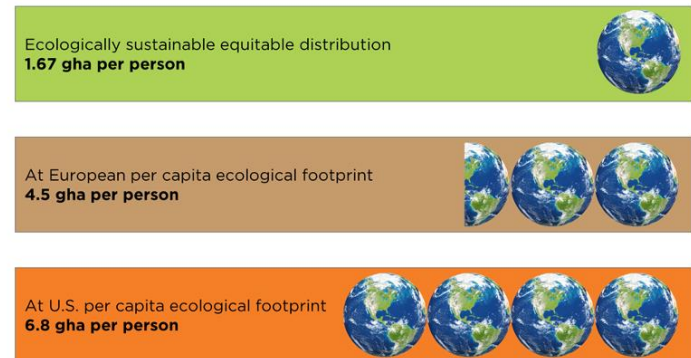
KEY MESSAGES

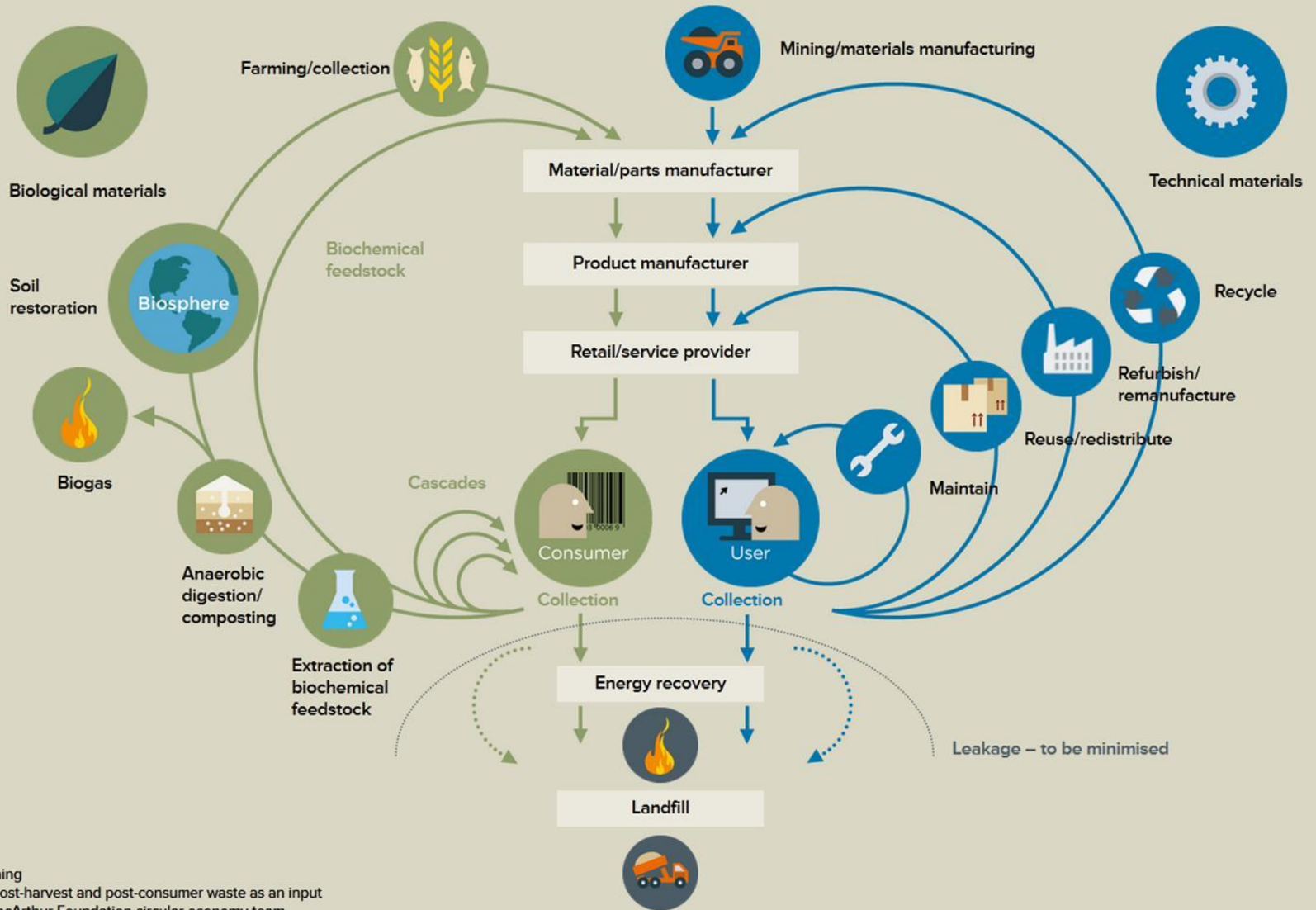


- Why circular economy is important
- What do we mean by industrial symbiosis
- Value chain in the road construction
- APSE's contribution to the understanding of circular economy
- Pricing-in externalities, APSE results
- Barriers and challenges in going circular
- Questions to the audience

WHY WE NEED TO GO CIRCULAR

- WE HAVE OVER-CONSUMED
- IN EU28 WE GENERATE 2500 MILLION TONNES OF WASTE EQUAL TO 5 TONNES PER PERSON A YEAR
- CONSTRUCTION ACCOUNTS FOR 35%
- THAT IS WHY WE NEED TO GO CIRCULAR!!





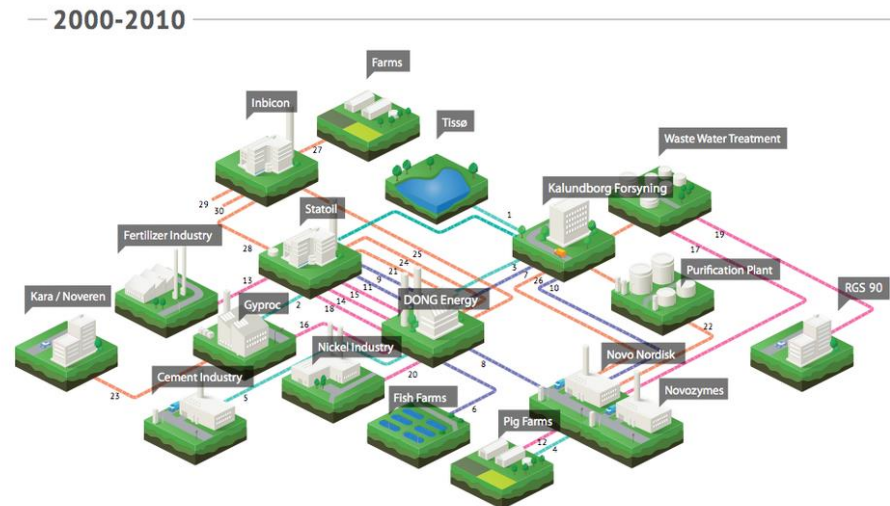
1 Hunting and fishing
 2 Can take both post-harvest and post-consumer waste as an input
 SOURCE: Ellen MacArthur Foundation circular economy team

WHAT DO WE MEAN BY INDUSTRIAL SYMBIOSIS?

Kalundborg Symbiosis is the world's first well-functioning example of industrial symbiosis and, within the academic discipline of industrial ecology, has become a textbook example of effective resource saving and cycling of materials in industrial production.

Industrial symbiosis can be defined as the exchange of materials or waste streams between companies, so that one company's waste becomes another company's raw materials.

At Kalundborg Symbiosis, public and private companies buy and sell waste from each other in a closed cycle of industrial production. A variety of by products are traded, such as steam, ash, gas, heat, sludge, and others that can be physically transported from one company to another.



THE KALUNDBORG CASE

ROAD CONSTRUCTION VALUE CHAIN

LINEAR ECONOMY



TAKE



MAKE



USE



DISPOSAL

Benefits:

- Waste reduction
- Reduce dependence on raw materials imports
- Innovation
- Creation of job position

CIRCULAR ECONOMY



APSE's SOLUTION: WIN-WIN



1km of new road construction requires 300.000 of aggregates



APSE has proved that aggregates in the base layer can be 100% substituted by C&D wastes

De-route C&D waste from construction to road construction



Each year we consume 12 million tonnes of bitumen in EU28

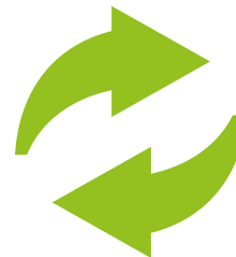


APSE can reduce this by 10% by substituting with lignin

GHG reduction
Price reduction



Each year we send 10 million tonnes of RAP to landfill (only 80% are re-used or re-cycled)



APSE will re-use all RAP

GHG reduction
Price reduction
Landfill avoidance

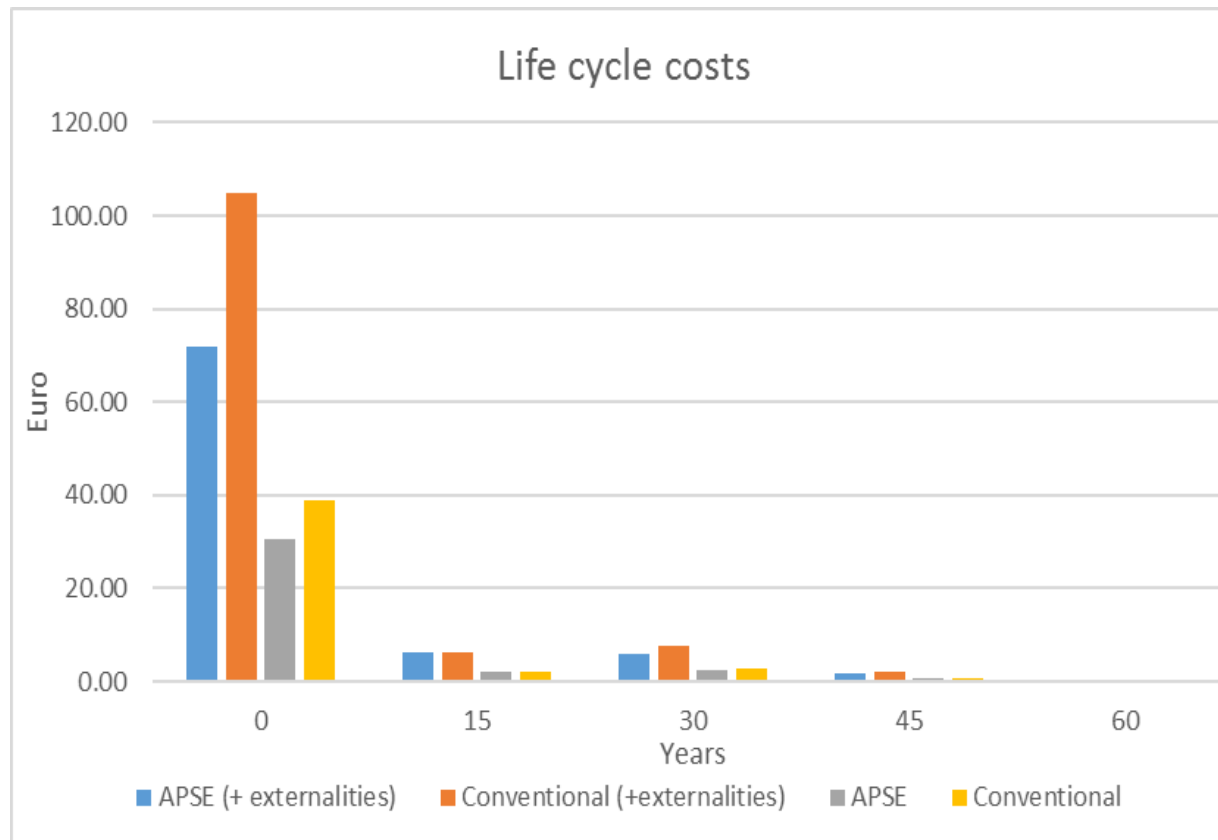


PRICING-IN EXTERNALITIES



THE TRUE COSTS VERSUS THE MARKET COSTS

Life cycle costs per 1m² of flexible conventional and APSE pavements, UK



The environmental costs constitute approx. 60% of the total costs of conventional and APSE pavements.

LCCA results indicate that cost-effectiveness of APSE pavement improves by 8% and achieves 29% in case environmental costs are taken into account.

HINDRANCES AND BARRIERS FOR GOING CIRCULAR – APSE EXPERIENCE

- APSE OFFERS A SOLUTION – HOW TO IMPLEMENT?
- INDUSTRY?
 - GREEN COMPETITIVENESS?
 - CONSERVATIVE INDUSTRIES?
- PUBLIC ROAD AUTHORITIES?
 - CHANGING LEGISLATION/STANDARDS?
 - GREEN PUBLIC PROCUREMENT?
- DOES THE CITIZEN HAVE A SAY?
 - AWARENESS ?
 - USING THEIR VOTE?