WOW! CLOSING EVENT – PART 2
FRIDAY SEPTEMBER 8TH – DUBLIN

Interreg North-West Europe WOW!
EUROPEAN UNION
European Regional Development Fund

Circularity of PHA Production

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Overview

Introduction of Case Study

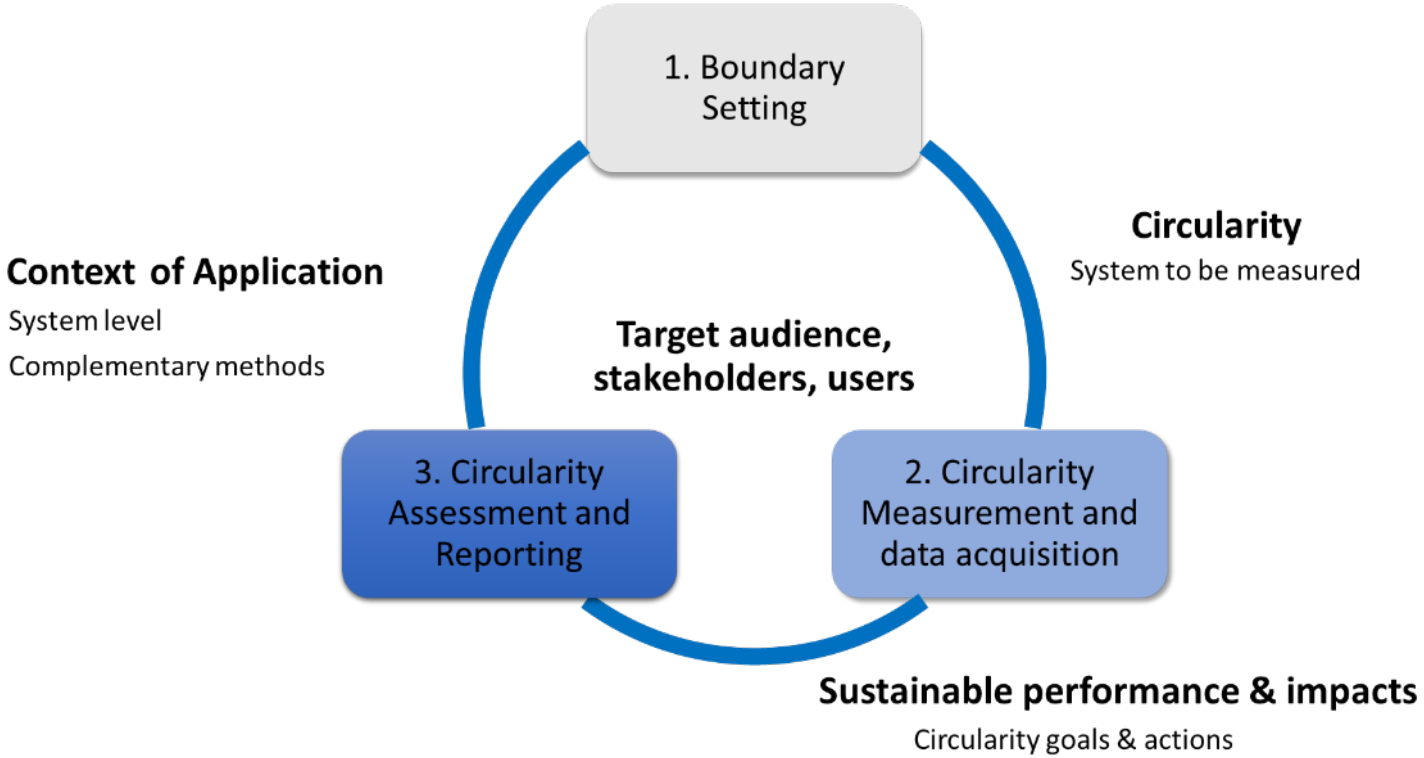
Applying Circular Economy Standards

Circularity Measurement & Assessment Process

Circularity Results

Conclusions

Applying Circularity Economy Standards



COMPLETENTARY METHODS

Life Cycle Assessment

ReCiPe impact assessment method to evaluate impacts on human health, ecosystems and resource availability.

Sustainable Development Goals

SDG	Target
#7	Affordable and clean energy
#8	Decent work and economic growth
#9	Industry, innovation and infrastructure
#10	Reduce inequalities
#12	Responsible consumption and production

Circularity Measurement & Assessment

Valorise PHA as a by-product from primary sludge

Producing PHA cake as a resource to replace traditional polymers

Sludge no longer used for biogas production (or incineration or fertiliser)

e.g.	**Energy**		**Lifespan**
PHA	+ + +	PHA	+
Biogas	- - -	Polymer	+ + +

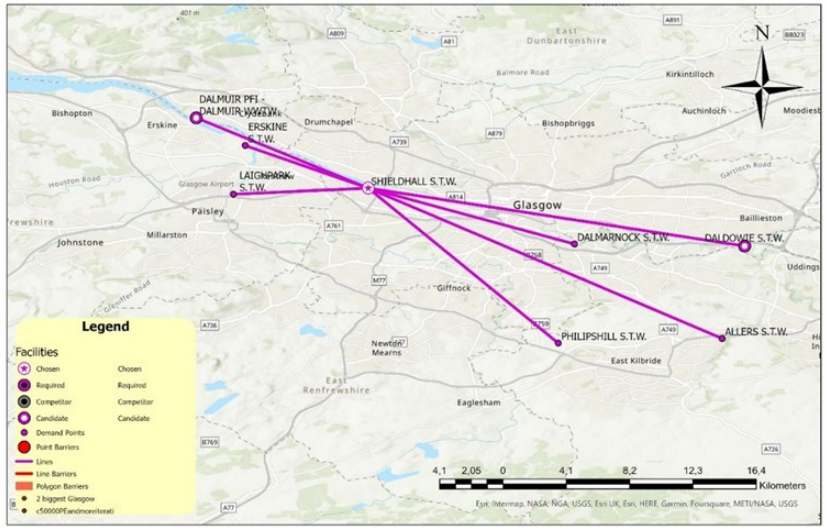
Introduction of Case study

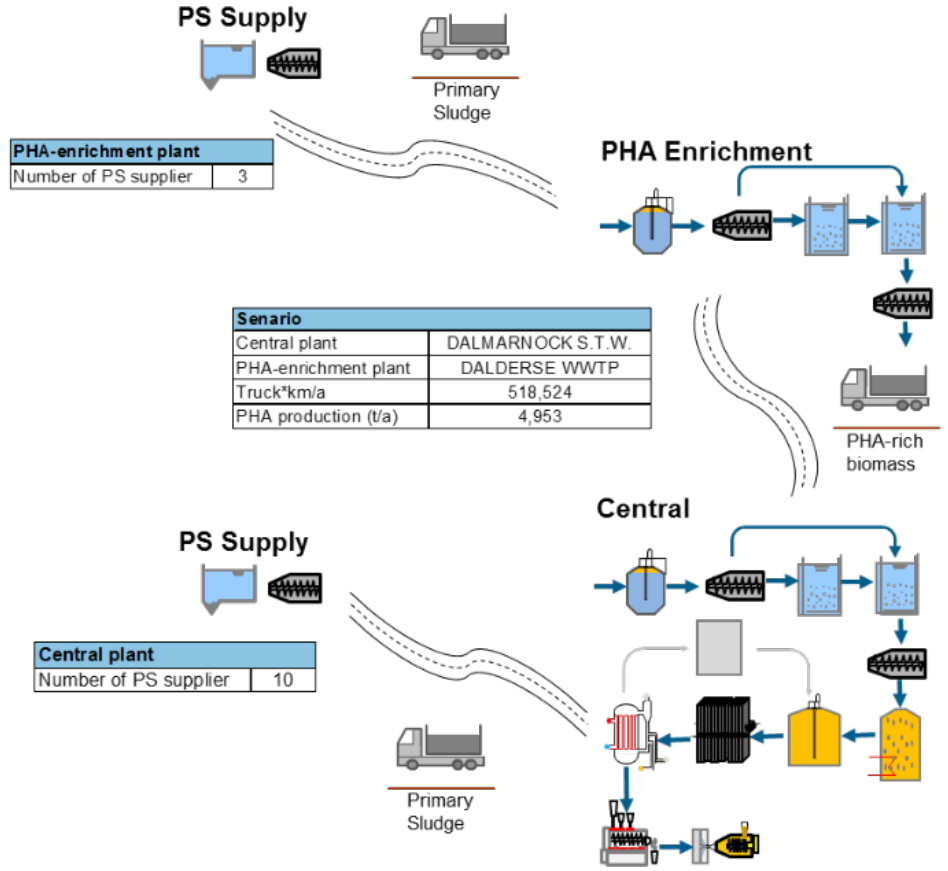
#4 Scenarios considered for 2 million p.e. in Scotland

1 centralised

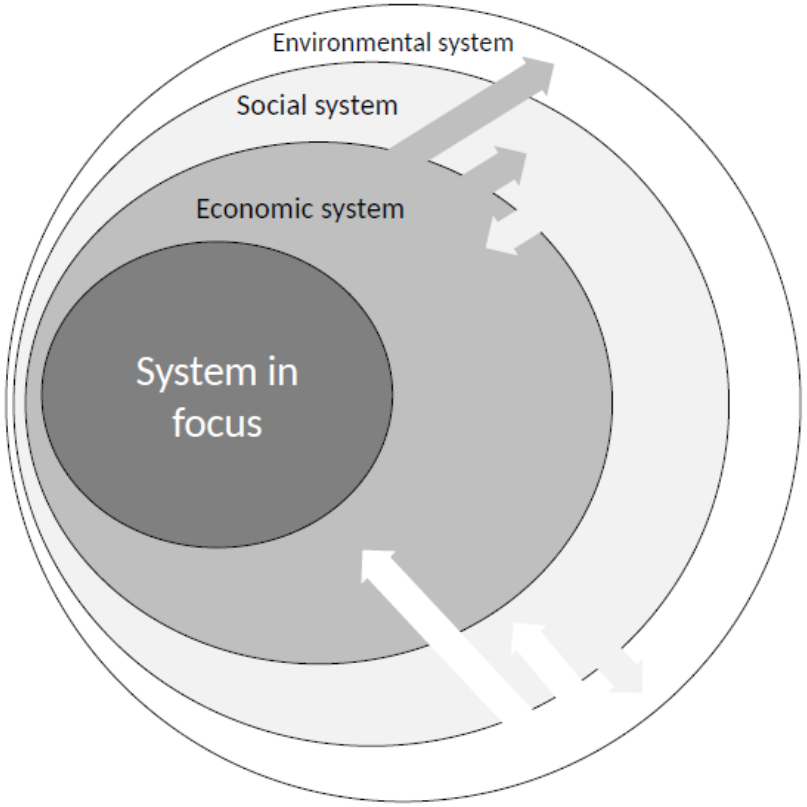
2 decentralised

1 stand-alone





Circularity Indicators



Category	Indicator
Outflow	Average lifetime of product or material relative to industry average
Energy	Average % of consumed energy from renewable source
	Percent energy recovered from residual, non-renewable resource outflows
Economic	Value per mass
Cost	Investments
	Production costs
Social	Labour

Percent (by mass) circular content of inflow(X)
- Average % reused content
  - includes renewable and non-renewable sources
- Average % recycled content
  - includes renewable and non-renewable sources
- Average % virgin, renewable content

+

% virgin, non-renewable content

=

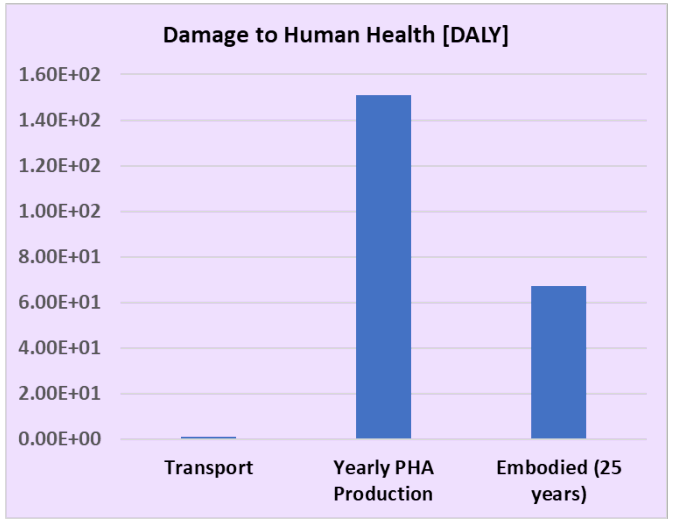
100 % of resource inflow

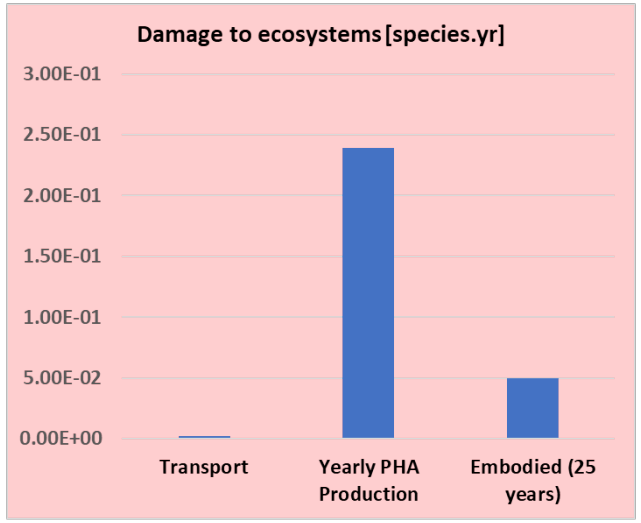
Circularity Results

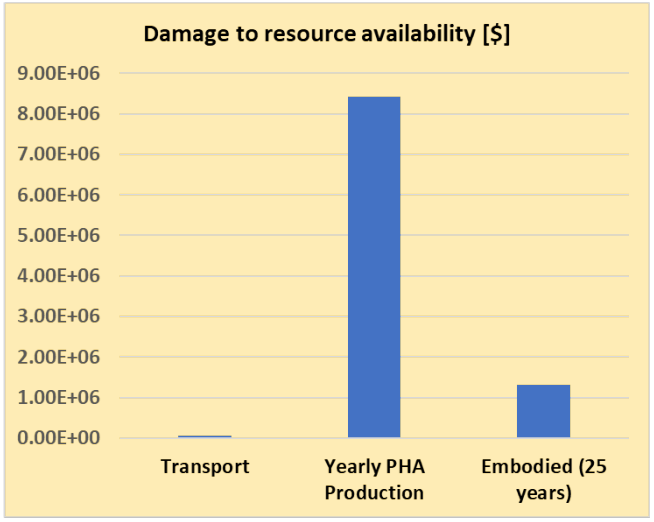
RESOURCE:	The lifespan of PHA can compete with traditional polymers, but do we want this bioplastic to have a similar lifespan?
ECONOMIC:	Estimated costs of ~€3,000-3,600 for PHA depending on Scenario, versus ~€900 for PE (or even ~€1,700 for recycled plastic.
SOCIAL:	Ensuring living wage was provided to employees in the PHA value chain would impact product costs by less than 1%.
ENVIRONMENTAL:	LCA of embodied and operational impacts

Complementary Results

ENVIRONMENTAL: LCA of embodied and operational impacts







Reducing impacts of energy as part of production process key to more sustainable PHA.

Credits from biogas currently outweigh benefits of PHA production or incineration of sludge.

Conclusions

Scotland case study offered a unique set of scenario that account for centralised, decentralised and stand-alone PHA production.

Circular economy standards are new and can be applied to bioproducts in support of forthcoming circularity product declaration sheets.

The circularity measurement & assessment process incorporates resource flows, and economic, social and environmental considerations.

The circularity results show opportunities and barriers to PHA as a sustainable product, and provides outputs of value to different stakeholders.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