

HOlistic Management of Brownfield REgeneration

Re-use of land: possibilities, decision making and stakeholders

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www.cabernet.org.uk











www.dais.unive.it/~glocom

www.greenland-project.eu

www.zerobrownfields.eu

www.timbre-project.eu





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Focus on "Soft" Re-Use









- "Hard" and "soft" land use
- Collaboration between HOMBRE and Greenland
- Land recycling and value
- Services and value
- Overall value and the investment case
- Improving overall value from soft re-use (BOM)
- The process of design and decision making (as stages)
- Engaging stakeholders in decision-making

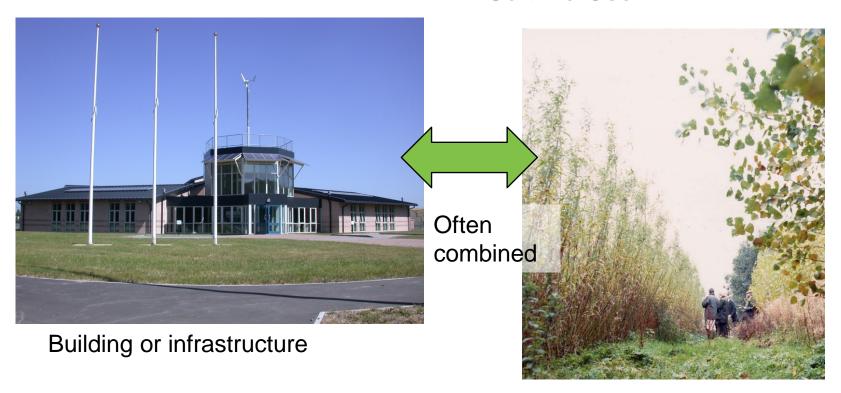




Types of re-use for brownfields

"Hard Re-Use"

"Soft-Re-Use"



Unsealed soil





HOMBRE and Greenland



HOMBRE

- Understanding the land management & use cycles
- Prevention (early warning indicators)
- Brownfield re-use (tools to support transition)
 - WP5 Soft Re-Use
- Case studies and technical information
- Brownfield Navigator linking tools across the land cycle and making them available on line
- www.zerobrownfields.eu

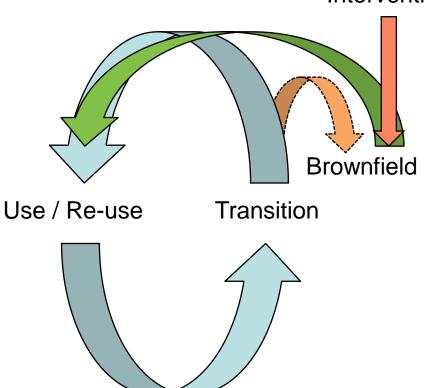
Greenland

- "Gentle remediation" (use of low input techniques) is a natural fit with soft re-use of brownfield sites
- Case studies and technical information from work executed at realistic scales
- Guidance on engaging with stakeholders
- Tools to support decision making for the use of gentle remediation
- www.greenland-project.eu



Land recycling

Intervention



- Interventions have successfully supported BF transition in many cases
- But for many other BF sites:
 - Costs of intervention are prohibitive
 - Returns do not justify investment
 - Interest in making an intervention is insufficient
 - Durability of solutions has been limited
- So BFs remain a problem
 - Especially if we want zero net land take for built development by 2050





The significance of poor durability



Originally restored in the early 1980's here is a view of the Liverpool Garden Festival site after it fell into disuse in the 1990s (credit Euan Hall, Land Trust, UK)

The site has since been re-restored by Land Trust, and is back in use, see:

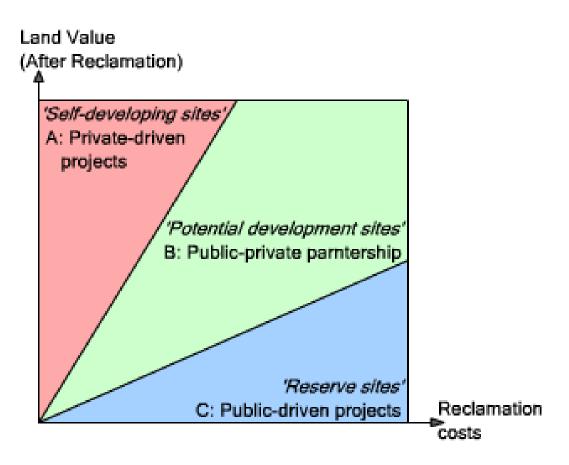
http://liverpoolfestivalgardens.com/about.html

www.thelandtrust.org.uk





CABERNET "ABC" model



Regeneration is value driven...





Services deliver value for beneficiaries

A project service has three main components:



- Some kind of intervention (e.g. development of parkland)
- That has a usable outcome, e.g.
 - The land is safe
 - The land is buildable
 - The view is fantastic
 - It grows biomass energy
- Where "someone" sees enough returned value to justify investment (the beneficiary / beneficiaries)





Soft re-use value derives from services (1)

Traditionally (Private Sector)

- Facilitating building and infrastructure
- Site value uplift

Traditionally (Public Sector)

- Avoided land take
- Job generation / inward investment
- Open space / leisure / access
- Community assets / education
- Reduction of human health, ecological and water resource impacts (from contamination)
- Protection or development of habitat and biodiversity

- But could also be?
- Area value uplift (halo effect)
- Improved health and wellbeing
- Tourism and leisure
- Education
- Framing built developments
- Improved soil function
- Improvement of water resources (e.g. For leisure, navigation etc.)
- Flood and capacity management
- Rehabilitation of water (e.g. Leachate)
- Improving urban soundscapes and air quality
- Limiting visual intrusion by landscaping (buildings, transport links etc.)





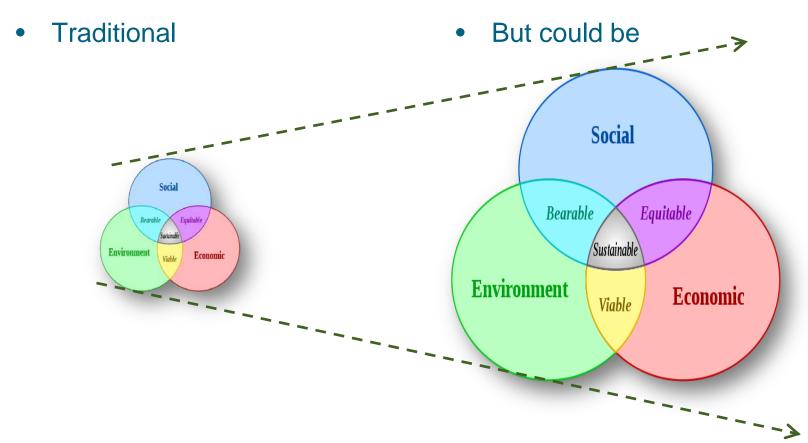
Soft re-use value derives from services (2)

- But could also be?
- Urban climate management (such as mitigation of urban heat island effect)
- Renewable energy generation
 - Biomass based
 - Geothermal
 - Wind
 - Solar
- Renewable material generation
- Facilitation of recycling and resource recovery
- Greenhouse gas mitigation
- = an expanded range of stakeholder interests





But moving to an expanded perspective



As we design in a broader range of services



HOMBRE's hypothesis

Better Services





More Beneficiaries







More Investors

and

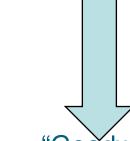
Greater resilience





Forms of value

- **Direct Financial Value** = returns from services such as site value increase, revenues; vs. direct costs
- **Tangible Wider Value** = wider sustainability benefits and impacts, broadly agreed to be monetisable
- Intangible Wider Value = wider sustainability benefits and impacts where monetary value is not easily agreed by stakeholders



- "Goodwill", -different for each stakeholder
 - Monetary value over and above component parts, e.g. brand, reputation, staff know-how etc





Examples of forms of return

Financial

- Appreciation (e.g. of site value)
- Revenue (e.g. from renewable energy)
- Expanded taxation base (from expanded communities and enterprise)
- Reduced costs / liabilities (whether private or public)

Economically tangible

- Enhanced property values in surrounding areas
- Improved connectivity
- Improved health and well being
- Increased employment and skills

Economically intangible

- Enhanced reputation
- Enhanced sense of place
- Social stability and cohesion





Different things interest different investors

- A holistic approach to services may expand the range of beneficiaries, hence also investors
- Take a very simple "thought model"
 - Private Sector / site owner
 - Public Sector
 - Local Community

- Most not interested
- A few say "yes please"
- Most say "yes please"







Potential private sector / site owner interests

WWW.ZEROBROWNFIELDS.EU

- Financial
 - Appreciation (e.g. of site value)
 - Revenue (e.g. from renewable energy)
 - Expanded taxation base (from expanded communities and enterprise)
 - Reduced costs / liabilities (whether private or public)
- Economically tangible
 - Enhanced property values in surrounding areas
 - Improved connectivity
 - Improved health and well being
 - Increased employment and skills
- Economically intangible
 - Enhanced reputation
 - Enhanced sense of place
 - Social stability and cohesion





Public authority / agency interests

Financial

- Appreciation (e.g. of site value)
- Revenue (e.g. from renewable energy)
- Expanded taxation base (from expanded communities and enterprise)
- Reduced costs / liabilities (whether private or public)
- Economically tangible
 - Enhanced property values in surrounding areas
 - Improved connectivity
 - Improved health and well being
 - Increased employment and skills
- Economically intangible
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Local community

Financial

- Appreciation (e.g. of site value)
- Revenue (e.g. from renewable energy)
- Expanded taxation base (from expanded communities and enterprise)
- Reduced costs / liabilities (whether private or public)
- Economically tangible
 - Enhanced peripheral property values
 - Improved connectivity
 - Improved health and well being
 - Increased employment and skills
- Economically intangible
 - Enhanced reputation
 - Enhanced sense of place
 - Social stability and cohesion







Investors (examples)

- Site owner
- Site purchaser / funder
- Service provider (e.g. PV installer)
- Local authority
- Other public agency
- Charity / trust
- Community organisation
- Financial companies
- People:
 - Public involvement has value
 - Safeguarding and security
 - Volunteering / donation of time
 - Avoided costs





Types of returns

- Often money does speak loudest
- Achieving public policy objectives
 - At a lower cost
 - In a more durable way
- Reputational
- Community benefit





The Brownfield Opportunity Matrix: Exploring value for soft re-use of brownfields

Key questions

- How do we know which services add most value for most people and are most sustainable?
- How do we maximise synergy and create opportunity?
- Where do we find the greatest value overall?





What is the Brownfield Opportunity Matrix?

- One of a number of decision support tools developed by HOMBRE
- The Brownfield Opportunity Matrix is a simple MS Excel based screening tool to help decision makers find an expanded overall value for <u>soft end</u> <u>uses</u> in their project
 - What services can they get?
 - How can these add value to a regeneration project?
 - What interventions deliver desirable services?
 - How do different interventions and services interact (synergies/antagonisms)?
 - What previous examples and further information is available?
- It is available for download via the BFN





Broad classes of services and interventions mapped

Services	Interventions							
 Mitigation of Human Induced Climate Change (global warming) Including renewables Provision of Green Infrastructure Risk Mitigation of Contaminated Land and Groundwater Socio-Economic Benefits 	 Water Management Sustainable Land Planning and Development Soil Management Renewables (energy, materials, biomass) Other Remediation Options 							
 Amenity Economic assets Soil Improvement Water Resource Improvement 	 Implementing Green Infrastructure Gentle Remediation Options 							





Describes where and how value is created

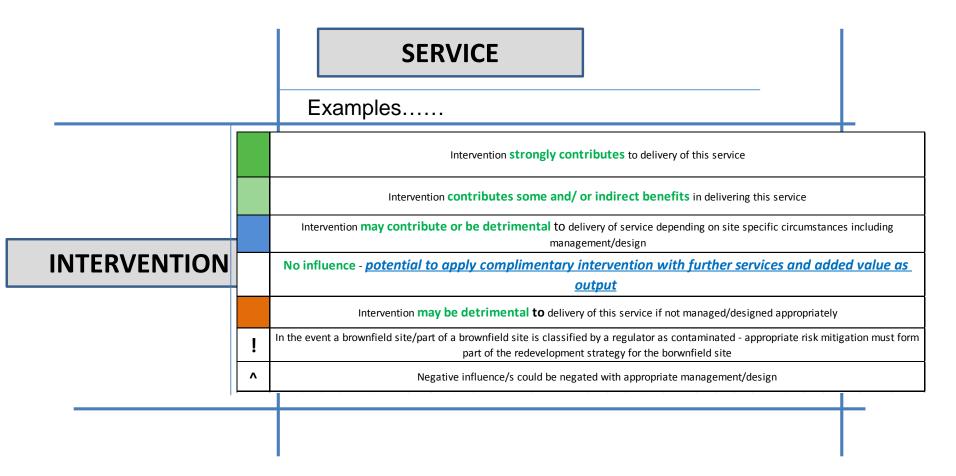
- Financial
 - Revenue generation / capital appreciation
- Tangible economic gains
- Intangible gains
 (goodwill = reputation,
 brand etc)

- Natural Capital
- Cultural Capital
 - May be particularly relevant to noncommercial investors





How it works:







Brownfields		ields	Service level				Services										
Opportunity Matrix		unity	Level 1	Risk Mitigation of Contaminated Land and Groundwater		Soil Improvement		Water Resource Improvement		Provision of Green Infrastructure		Mitigation of Human Induced Climate Change (global warming)		ced Climate ming)	Socio-Economic Benefits		
A high level decision support tool designed to demonstrate the value and opportunities for redevelopment of a brownfield site for a soft re-use		ate the value and evelopment of a	Level 2	Biosphere (Including human health)	Water Resources (hydrosphere)	Featity	Sol Structure	Aber Resource Efficiency and Quality	Rood and Capacity Management	Rehabilitation of water	nhanding Ecosystem Sevices	inhancing Local Environment	Renewable Energy Generation	Renewable moterial generation	Greenhouse Gas Mitigation	Amenity	Economic Assets
Intervention level	Level 1	Level 2	Examples	Human Health Protection Protection of Ecology	Surface Water Treatment (Acid Mine Drainage for e.g.) and protection Groundwater Treatment and Protection	Managing nutrient and micronutrient availability to support vage allon improving sol blobgod of functionality improving sol condition to support desired plant/crop plant/crop	Improve sol realence Providing vegetative cover Miligation measures for sollenction and landstilling	Supply of (reared) water for on-dite uses Provision of Potable Water Basource Improved quality of auritace wore on site or in the vicinity	Resention of runoff / Surface Water Storage Flood militarities (incorporating militarities of severe weather events)	Rain / drainage water (including sustains ble distings) Grey Water (Sink koush water resue) Leachate treatment as and resuse (Landfill, Acid Ming, etc.)	Propertion of habitat and blockwesty (where existing and for probected sites) (a Developing new habitat and increasing blockwesty	Improve urban soundsapes and air quality Limiting visual intrusion by Innocaping (buildings, tramport liviness) Urban Climate Manugement (such as mitigation of urban hear is land effect)	8 8 8	Biofreedstocks (for brokuel/gas/plastics) Re-use of organics	Reduced GHS Emissions Carbon Sequestration	power year or control of control or control	Job Generation Land value recovery over time Area value upilit Interni land management
		Phyto-Remediation	Phyto-extraction Phyto-stabilisation Phyto-containment	!€ ā ©#	!€ ā ©mh	€ ÆD dis (3)	€ 80m/G	ā dh 🚱	#€© ā	€ ā ©ıth(•}	* (*) n(*)*	*(} n(0) &	€ 49#	€ 🚱	⊕ 5©	* # 🚰 🖷	€ i ≌ith (†)
			Phyto-filtration Phyto-degradation/stimulation	6	6			0()		000	ě.	0.11.0	0	(†) ith	itti	C y mo	0.00
	Gentle Remediation Options	Amendment Addition	In situ stabilisation - Char/Biochar In situ stabilisation - slags, compost etc	!€ 5 ©#	!€ ā © #h	€ ã© rth 😚	€ ā ©ım (j	ā illi 😚			* å ith (nth 🍞 🚳	*€ & ©	*€ ढ ©	€ 459	* Æ rth(?)	
		Natural Attenuation	Monitored Natural Attenuation of Groundwater	→	(7) 49€			⊕nth ā			? & 9€		•	•	•		
		of Groundwater	Monitored Natural Attenuation of Groundwater Ex Situ Bioremediation	→ 59€	. 😙 🕪 E			₩ 1111 Ø			⊕ ase						
	Other Remediation Options	<u>Ex Situ</u>	Soil Washing Ex-Situ chemical Treatment Stabilization/Solidification Ex-Situ thermal Treatment Screening	ā (♣)∰ €	ā ? ∰ €	ā 3∕ ? €	& ©'∳€	? ## @ €			∲rtti ā	⊕ ## ®	? €nt© å	? €nh © š	*^(~)	m (†G h	ntil i i i i
		In Situ	Screening (Dual Phase Extraction, Free product recovery) Soil Vapour Extraction (SVE) Air Spanjing 16 Situ Chemical Oxidation Permeable Reactive Barrier In Situ Siturediation	ā (∱ı) ©€	ā ? ∰ €	^* ₫᠑ᠿ€	^* छ 🕎 E	? m@€			♣m ā	⊕ m@	^ ? ne	€ ? ##	*^*	th(∳ Gth	nn® &C◆
		Traditional Remediation Methods	Capping Dig and Dump Source Isolation (sheet piles, cut off walls, pump and treat)	*^ 🕮	*^ &	*^€ 6	*^€ &	^€ ã			*^rth	*^*************************************	*^€ ā ©	*^€ ã ©(♣)	*^	#h & €	€ <mark>a©</mark> ith
	Soil Management Activities	Re-naturalization of soils	Breaking out/removing artificial (concrete, tarmac for e.g.) surfaces and substructures. Cultivation Activities (for example to manage soil	İ*v	į*^								*^			**	
Interventions & Research		Amendment Addition	structure / soil nutrient status) Use of Organic Matter (mushroom compost/sludge/CLO etc) Use of Inorganic Amendments Use of Biochar	!€ ढ ©	!€ & ©(?)	š (₹#19	ă Œn®	*^ (} #£ 6 ()			^* 🚳	⊕nn® ā	€ 5 3 m	€ ā ©ıtt	•	5 9∲#r	€ å (﴾(ii)
	Water Management Activities	Attenuation of Contaminated Surface Waters	Passive Treatment (lagoons, wetlands, aeration weirs etc) Active Treatment (High Density Sludge Process Plant, Chemical Dosing).	∲n® i	∲ri® ā €	⊕ ## 6	⊕ ## 6	⊕ &©#	rttr 🚳	^	Эт 8	*^(*) 🔁	(*) & ©€	^* ⊕ ā	^*(*) & ©	rth (♣ ā©	m®€
		Flood/Orainage Engineering	Flood/Storage Engineering Drainage Design (Sustainable Urban Drainage Systems (SUDS) for e.g.) Maintenance and improvement of water ways onsite	Inth 🏈	á !nth(♣ á	⊕ne ā		5 9 ∂ n€	59 ⊕⊪ €	? m8€			**	*^			€ 49 ## (*)
	Implementing Green Infrastructure	Ecological Engineering	Bioswales, Wetlands Ecoducts and Green Bridges Plants for slope stability	! *© (?) (! *© (*) ā	á 🛞	ā 🏶	å 🐌	š 🏈	ā 🐌	ā 🏈	ō 💮	€ å 🛞	€ å (₹	© (*)	€ ⊕ m	€å ∰m
		Biodiversity and Environmental Management	Creating Parks in Urban Areas Densely populated forests Natural Revegetation Wetland Creation	! *©�∂	! *© (?) 	á 🛞	ā 🏶	å 🏶	š 🛞	å 🏶	ā 💮	ā 💮	€ å 🏇	€ å (₹ ©	© (>	€⊕m	€å∰mh
		Conservation	Developing, enhancing, protecting habitat (e.g. Meadowland)	! ^*©(♣) ₫	! ^*©(*) &	á 🛞	á 🗫	å 🏶	ā 🗫	^* å 🛞	ā 💮	ā 💮			^*© •	€ ⊘ ith	€åæm
	Renewables	Producing renewable feedstock's	Biofeedstock/Biomass Topsoil substitute production	!	1											Λ*	
			On site recycling/valorisation Geothermal/Ground Source														
		Energy Generation	Biomass Energy Creation (e.g. Wood, biofuel, Biogas etc) Photo-voltaic/solar panels for power generation and heating water Wind turbines	! *€ ۞ ā	!^						€ 5 9 m	€ 89 mi 😚	€ å 🛞 #h	€ 4© (→ ##	€ 89 (•) ##	€ ā ©(♣rith	ی9m
	Sustainable Land Planning and Development	Development of Amenities	Landscape planning and development Leisure design, development and management Educational Facilities Facilities, fencing, paths, paving and other small building works Visitor Facilities	ļ.	!						##® ⊕€	€ä©m⊕				©dh € ā	€ 89#1(\$)
		Strategic Planning of land use over time	Promotion Of Green/Soft Reuse Integration of hard and soft developments	!€ & G ©m	!€ å 🏈 #h	ith å 🏵	ő (:	⊕ ĕ	♦ 6	今 ö	⊕m ä	€ 89 m 😚	€ 5 9 m	€ ā © #	€ 6 9 m	©# \%	€ 69 ## 😚





Engaging stakeholders improves the value proposition

- Effective stakeholder involvement has been widely identified as a key requirement for sustainable brownfields regeneration (CABERNET, REVIT, RESCUE)
- There is an enormous literature on stakeholder engagement, recently reviewed for the FP7 Greenland Project:
 - Cundy, Bardos et al. (2013) Developing principles of sustainability and stakeholder engagement. JEM 129 (2013) 283-291, www.sciencedirect.com/science/article/pii/S0301479713005112
- But also we get an expanded value proposition:
 - Expands the range of possible service offers and users
 - Expands the range of potential investors
 - Mitigates project risks





General principles for engagement

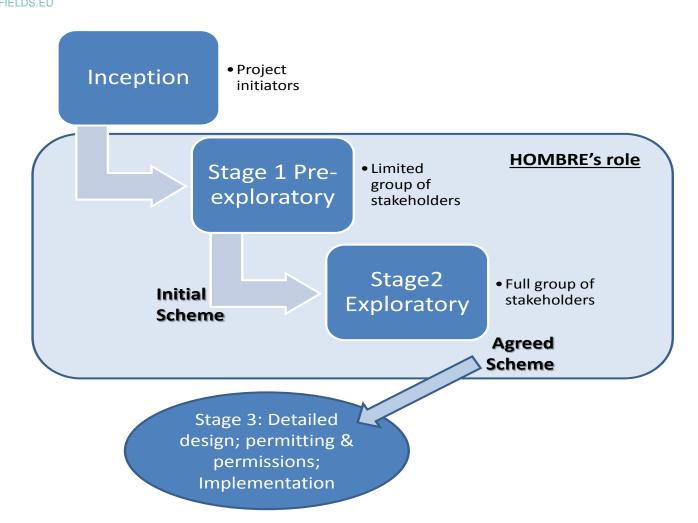
- Identify and engage early in the process
- 2. Be proactive
- Engage stakeholders at all stages of the process
- So plan for long-term stakeholder engagement
- Develop effective communication structures that allow a reciprocal, two-way dialogue

- 6. Ensure engagement is transparent and recorded
- Recognise that criteria for assessing may be subjective OR objective
- Set out all assumptions clearly at the start of each engagement
- 9. Follow a logical, stepwise approach to avoid circular arguments and clearly address subjective issues

From Cundy et al. 2013



When is the Brownfield Opportunity Matrix used?







Who Do We Involve?

Pre-exploratory

- Landowner
- Consultants / contractors
- Regulators
- Planners
- Insurers

Exploratory

- Community bodies
- Public
- Service providers
- Service users
- Investors





BOM applications

- For project initialisation
 - A comprehensive prospectus to find a starting point
- For developing project designs
 - A means to check value is maximised
- For established designs
 - A framework to present ideas to stakeholders such as planners
- For existing projects
 - A framework against which to consider sustainability and outputs (e.g. for communication, verification?)
- For ALL projects
 - Signposting to examples and further information
 - A framework for approaching discussions between different stakeholders





Some general conclusions

- What stops Brownfields transition being routine
 - Lack of interest, lack of value, lack of return, limited durability
- A better value proposition → greater chance of Brownfields re-use
- Value derives from services
- Expanding the range of services under consideration
 - Increases beneficiaries
 - Improves value
 - Improves attractiveness / interest
 - Improves "investability"
- Providing the means of supporting this expansion for soft re-uses has been a major part of the HOMBRE and Greenland effort
- But fits into an integrated package of decision support measures across the land use cycle





HOMBRE tools to support engagement across the land cycle







Thank You

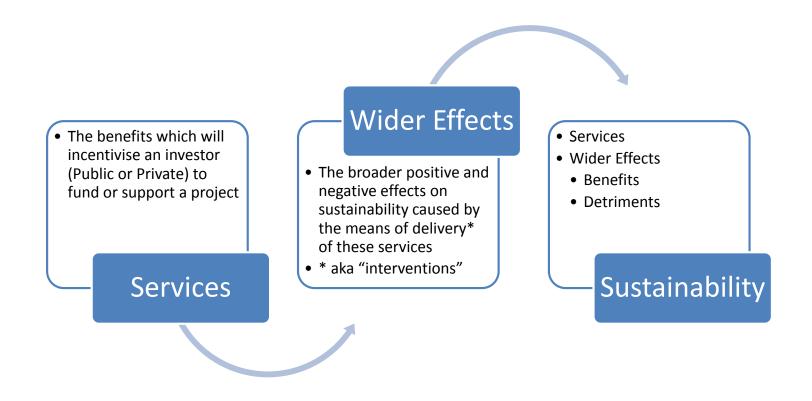
Contacts:

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- Paul Nathanail, <u>Paul.nathanail@nottingham.ac.uk</u>, <u>www.nottingham.ac.uk/geography</u>





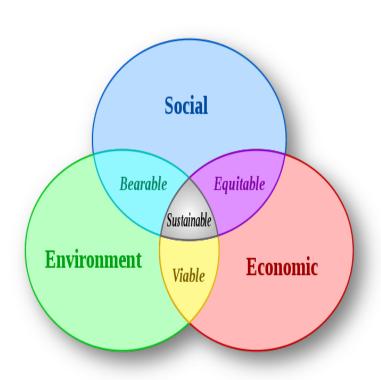
Achieving broader services is also part of improving sustainability

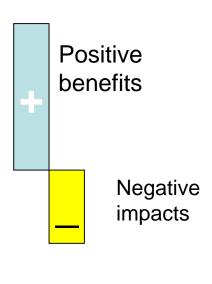






Sustainability has been part of the BF picture for many years





....a net benefit





