

Value Through Carbon Reduction

To recycle or not to recycle?
That is the question.

Stuart Gready OCL Regeneration Ltd



Value Through Carbon Reduction

Running order:

- Short company overview
- To recycle or not recycle?
- Social Value - Climate and the role infrastructure decarbonisation can play
- Circularity to drive value. The methods and products
- The Toolkit – here to help
- Design & Quality
- Case Studies



To recycle or not to recycle?

Recycling in the infrastructure sector, what does it facilitate?:

- Reducing reliance on primary materials
- Circular economy methods – your network is your own virtual quarry
- Innovative treatments – doing more for less, creating value, cost avoidance
- Decarbonisation options – reducing carbon footprint – Social Value

Why wouldn't we?



To recycle or not to recycle?

Infrastructure, an emissions giant – Big ticket sector for moving the decarbonisation needle.

In the UK today the construction, operation and maintenance of infrastructure assets results in approximately **16%** of **total** carbon emissions. This figure rises to **53%** when the use of infrastructure is incorporated, a proportion that is expected to increase to over 90% in the coming decades. These figures are not unique to the UK, they are mirrored internationally.





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Decarbonisation of Infrastructure



- Science Based Targets (Paris Agreement) – Limit Global Warming to 1.5°C above pre-industrial levels
- To achieve this globally we need to achieve an annual decarbonisation rate of 12.9%. **5 times** that of the 2.5% achieved in 2021

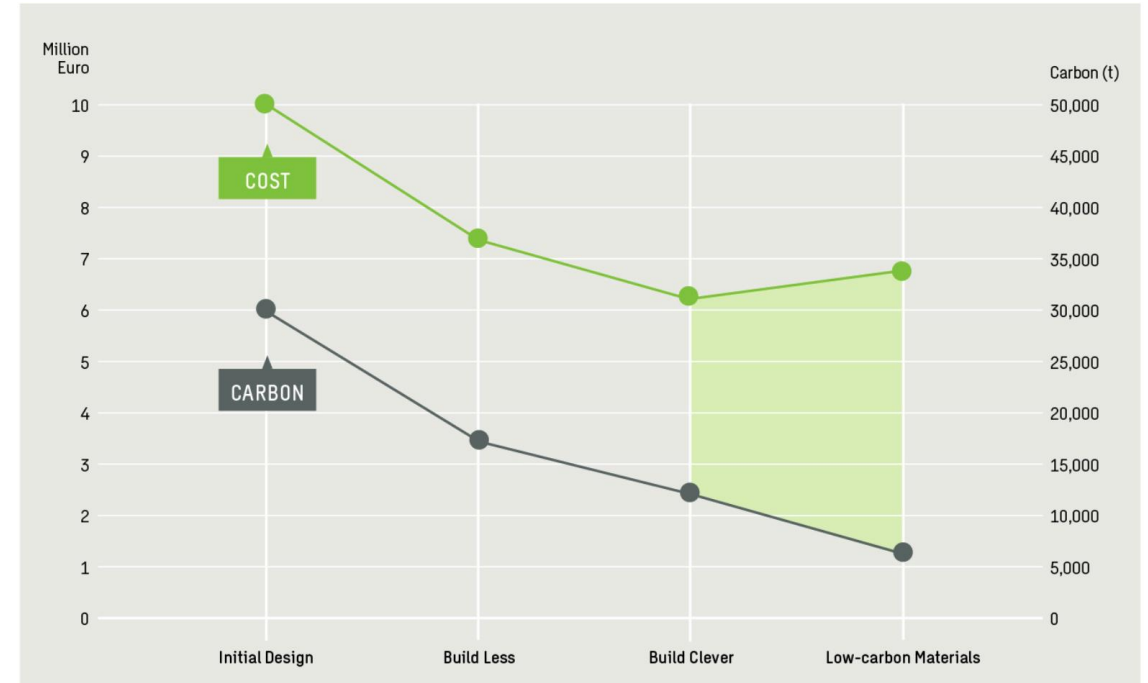


Why Decarbonise? - To “keep 1.5 alive”

How?

- Establishing Baselines to score progress
- Find decarbonisation pathways and react quickly
- Value - Carbon taxation
- Value - Contractual Carbon Reduction
- Urgently accelerating change

The point at which costs start to increase to reduce carbon further can be defined as the ‘carbon cost tipping point’.







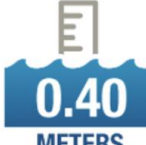

Values are for illustrative purposes.

As the market for low carbon materials and construction techniques evolves, the carbon cost tipping point will shift, with higher carbon solutions becoming more expensive. Until then, it is a financial barrier to net zero carbon.



Social Value Through Carbon Reduction

HALF A DEGREE OF WARMING MAKES A BIG DIFFERENCE: EXPLAINING IPCC'S 1.5°C SPECIAL REPORT

	1.5°C	2°C	2°C IMPACTS
EXTREME HEAT Global population exposed to severe heat at least once every five years	 14%	 37%	2.6x WORSE
SEA-ICE-FREE ARCTIC Number of ice-free summers	 AT LEAST 1 EVERY 100 YEARS	 AT LEAST 1 EVERY 10 YEARS	10x WORSE
SEA LEVEL RISE Amount of sea level rise by 2100	 0.40 METERS	 0.46 METERS	.06M MORE

SPECIES LOSS: VERTEBRATES
 Vertebrates that lose at least half of their range



SPECIES LOSS: PLANTS
 Plants that lose at least half of their range



SPECIES LOSS: INSECTS
 Insects that lose at least half of their range



Population displacement

2x WORSE

ECOSYSTEMS
 Amount of Earth's land area where ecosystems will shift to a new biome



1.86x WORSE

2x WORSE

PERMAFROST
 Amount of Arctic permafrost that will thaw



38% WORSE

3x WORSE

CROP YIELDS
 Reduction in maize harvests in tropics



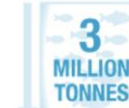
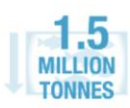
2.3x WORSE

CORAL REEFS
 Further decline in coral reefs



UP TO 29% WORSE

FISHERIES
 Decline in marine fisheries



2x WORSE





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Decarbonisation of Infrastructure

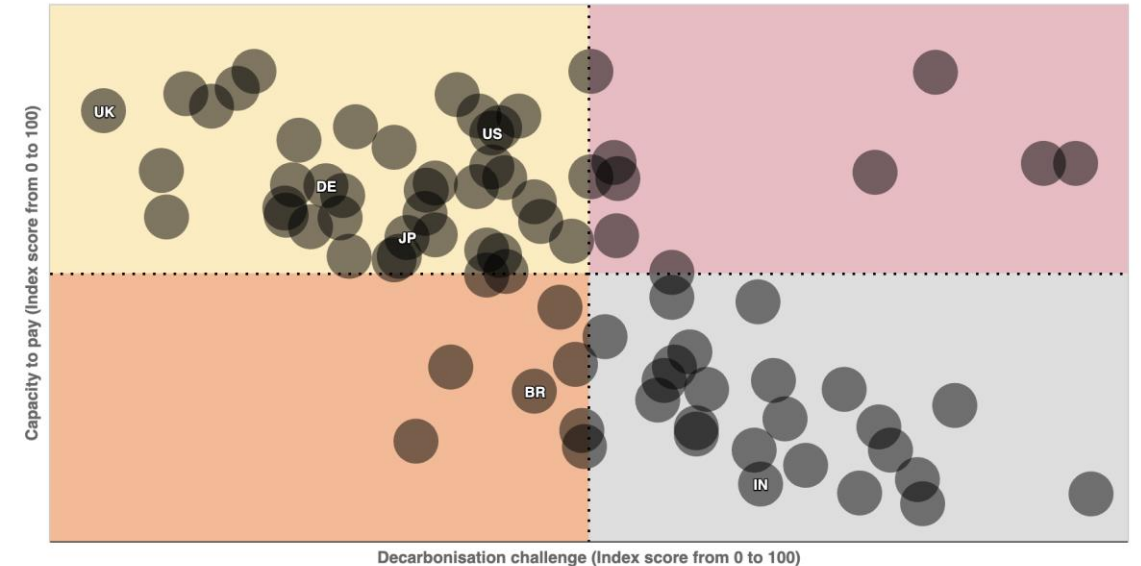
The UK has “higher” (but falling) CO₂ emissions to abate.

Higher levels of existing infrastructure to “green”
Has a greater ability to afford

We must push on and ensure that we are making more carbon-based decisions while embedding behavioral and methodology changes

2 pathways to achieve this in the infrastructure arena are to adopt the circular economy in waste and materials and to use low carbon materials

Green infrastructure transition: Decarbonisation challenge and capacity to pay



Top left	Higher (but falling) CO ₂ emissions to abate Higher levels of existing infrastructure to transition to green Greater ability to afford
Bottom left	Lower (but rising) CO ₂ emissions to abate Higher levels of existing infrastructure to transition to green Lower ability to afford

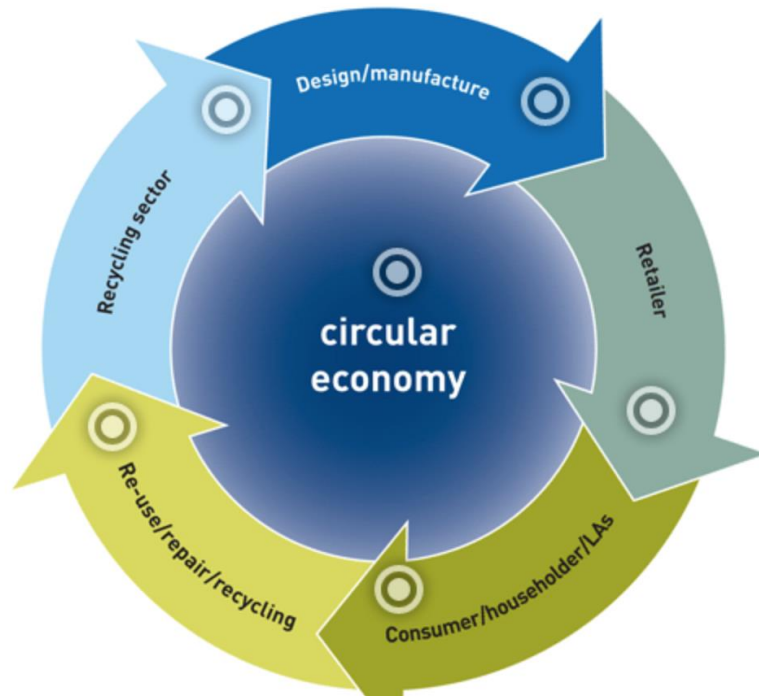
Top right	Higher (but stabilising) CO ₂ emissions to abate Lower levels of existing infrastructure to transition to green Greater ability to afford
Bottom right	Lower (but rising) CO ₂ emissions to abate Lower levels of existing infrastructure to transition to green Lower ability to afford



Circularity in Highways

What is a circular economy?

A circular economy is an alternative to a traditional linear economy (make, use, dispose) in which we keep resources in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life.



Why a circular economy is important

As well as creating new opportunities for growth, a more circular economy will:

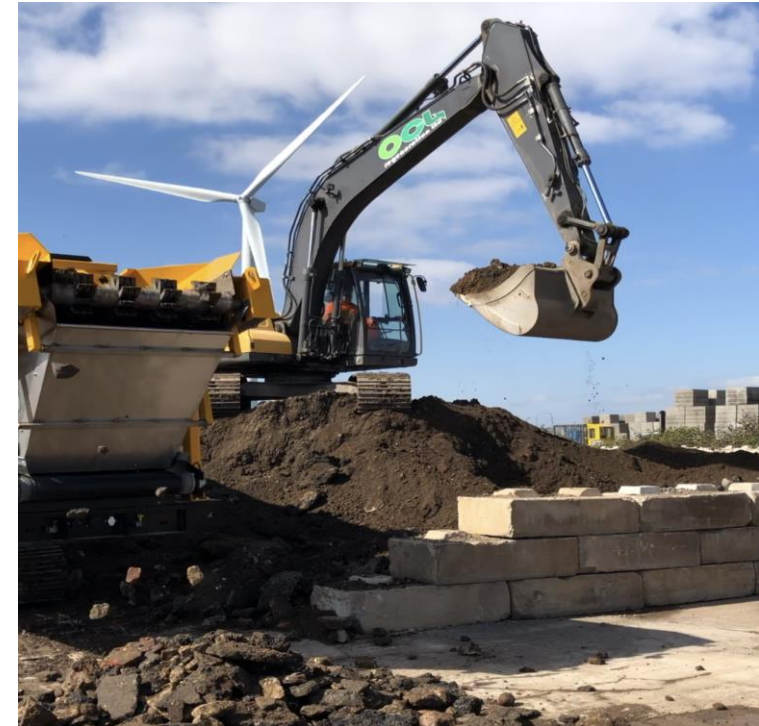
- reduce waste
- drive greater resource productivity
- deliver a more competitive UK economy.
- position the UK to better address emerging resource security/scarcity issues in the future.
- help reduce the environmental impacts of our production and consumption in both the UK and abroad.



Recycling Highways Wastes



Concrete and Mixed C&DW
EWC 17-01-01 and 17-01-07



Soil and Stones (Haz and Non-Haz)
EWC 17-05-03 and 17-05-04





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Recycling Highways Wastes



Asphalt Waste Containing
Coal Tar (AWCCT)
EWC 17-03-01



Non-Haz Asphalt Waste
EWC 17-03-02



The Materials - CRBM

Specifications:

SHW Cl.948 and BS9228

Designs for DMRB and evolved network

Standard Details
TG Notes





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The Materials - CRBM



BS 9228:2021

BSI Standards Publication

Recycling of roads and other paved areas using bitumen emulsion, foamed bitumen or hydraulic material — Materials, production, installation and product type testing — Specification



- CRBM = 50% carbon saving compared to traditional asphalt
- 15% less dense, goes further, 20t worth of work done with 17t – do more with less.
- Licensed to re-use Asphalt Waste Containing Coal Tar (AWCCT)





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The Materials – HBM

Specifications:

SHW 800 Series, BSEN 14227
and BS9227
Designs for DMRB and evolved
road network

Standard Details
TG Notes





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OCL Regeneration Foambase® CRBM CO₂ Savings

Table 1 shows our CO₂e calculations for our Foambase® CRBM Product. This is based on a comparison to traditional hot asphalt where both products have been transported an average of 30km to the site of installation.

Summary:

Hot AC20 contributes 38.5 kgCO₂e per tonne (constituents, manufacture and transport)
Foambase® QVE B4 contributes a mean of 19.58 kgCO₂e per tonne which represents a saving of 18.96 kgCO₂e per tonne or 49.19%
Foambase® MLS contributes a mean of -8.24 kgCO₂e per tonne and is therefore Carbon Negative and represents a saving of 46.76 kgCO₂e per tonne or 121.38%

Table 1

Description	AC20 Base		Foambase QVE		Foambase MLS		Foam MS1 500		Foam MS1 1000	
	kgCO ₂ e per t	%	kgCO ₂ e per t	%	kgCO ₂ e per t	%	kgCO ₂ e per t	%	kgCO ₂ e per t	%
Hot AC20	38.5	100%	19.58	50.8%	-8.24	-21.4%	11.0	28.6%	11.0	28.6%
Foambase QVE B4			19.58	50.8%						
Foambase MLS			-8.24	-21.4%						
Foam MS1 500					11.0	28.6%				
Foam MS1 1000							11.0	28.6%		
Total	38.5	100%	19.58	50.8%	-8.24	-21.4%	11.0	28.6%	11.0	28.6%

Hot AC20 contributes 38.5 kgCO₂e per tonne (constituents, manufacture and transport)

Foambase® QVE B4 contributes a mean of 19.58 kgCO₂e per tonne which represents a saving of 18.96 kgCO₂e per tonne or 49.19%



Foambase® QVE (SHW cl.948 and BS9228) is a suitable replacement for Base and Binder Course. For every 5000t of material used you save 95 tonnes of CO₂ which is equivalent to 117 direct flights from London to New York.

Foambase® MLS (SHW cl.948 and BS9228) is a new product that is suitable for use as a Binder Course in Footways and lightly trafficked roads. If an annual tonnage of an equivalent 5000t was switched to this product it would save 238.8 tonnes of CO₂, hence an extra 138.8 tonnes compared to Foambase® QVE which is the equivalent of 287 direct flights from London to New York.



www.oclregeneration.co.uk



To recycle or not to recycle?

The answer to the question has to be **YES!**
We clearly need to recycle and recycle more



Here to help - The Toolkit



Carbon Savings



Cost Savings



Collaboration Opportunities



The Toolkit

Reducing Carbon



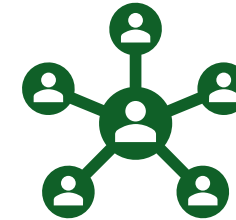
- Low Carbon Materials
- Reduced “caused carbon” through smart working, less disruption
- HVO Fleet
- Green tariff energy usage
- Circular methods

Reducing Cost



- Cost avoidance – Disposal
- Creation of “in authority” or employer facilities
- “More for Less” – Density savings
- Reducing waste
- Cost of Compliance Managing duty of care – best practice

Collaboration



- Innovation Frameworks
- Blueprint / Toolkit
- Targets & Reporting
- Shared Risk
- Regular review structure
- Commercialisation of model – alignment to sold / professional services



Case Study on Collaboration – What have we achieved?



Assessment

How can we use recycled or low carbon products in this scheme?



Design

Work up an equivalencies matrix for the alternative materials.



Planning

Integrate into the Annual Plan and optimise resources.



Programming

Balance the supply & demand, road space and weather constraints.



Delivery

Collaborating with specialist suppliers and supporting sub-contractors,



Case Study on Collaboration

01

Behaviour Change - Driven by a trusted collaborative relationship and driving this approach through the LA and our Supply chain. Moving towards a nurturing and supportive mentality, with contracts that require this approach.



02

Risk Management – Acceptance that we will sometimes fail and using this to learn and improve. Sharing risks, the outcomes and benefits.



03

Driving Innovation – Not just talking about it, organising it via regular contact and review. Pushing for tangible outcomes and lessons learnt.



04

Embedding Change – LA have provided new Technical Guidance notes and county-wide Standard details. Taking this beyond the contract into all other County Council Highway and Developer Projects.





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Peer Reviewed Partnerships

- Innovation Frameworks
- Circularity Workshops
- Best Practice - sharing
- Delivery Partnerships
- Recycling Initiatives
- Decarbonisation targets
- Design Advice
- Specification Guidance
- Risk Analysis



Design and Specification Journey

TRL 611 / 615 – 2004

SHW cl.948



SHW 800

HD25 – Foundations

HD26 – Pavement Design - 2006

HD27 – Maintenance

IAN 73 Rev 1 2009



BS EN 14227 - HBM

CD225 – Foundations

CD226 – Pavement Design - 2020

CD227 – Maintenance

CD225,6 and 7 – LWD & Stiffness Modulus



BS 9227 & BS9228 - 2021

DMRB 2025 – CRBM B4 Design Curve = Permitted in designs to 80 MSA



Quality Outcomes

- OCL have been manufacturing and installing CRBM for over 20 years with no unexplained defects and lots of lessons to share.
- Support for supply chain is built-in, getting more people confident to use the methods and materials is our job.
- Fully accredited quality plans across Local Authority and Major Project experiences.
- National Highways are confident with outcomes.
- OCL over test and test parameters outside of the national standards to provide the full picture to our clients



bsi.



Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:
 OCL Regeneration Ltd
 First Floor, Holm Barn
 Beluncle Hall
 Stoke Road, Hoo
 Rochester
 ME3 9NT
 United Kingdom

Holds Certificate Number: FM 608419
 and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

The manufacture and supply to customer requirements and national specifications of Foambase materials, Hydraulically Bound Materials (HBM's) or processed aggregates using recycled asphalt, primary or recycled aggregates.
 The management of the laying of asphalt mixes - machine laying and hand laying - in accordance with National Highway Sector Scheme 16.

For and on behalf of BSI:
 Matt Page, Managing Director Assurance - UK & Ireland

Original Registration Date: 2014-07-16 Effective Date: 2023-07-16
 Latest Revision Date: 2023-06-26 Expiry Date: 2026-07-15



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...making excellence a habit.™



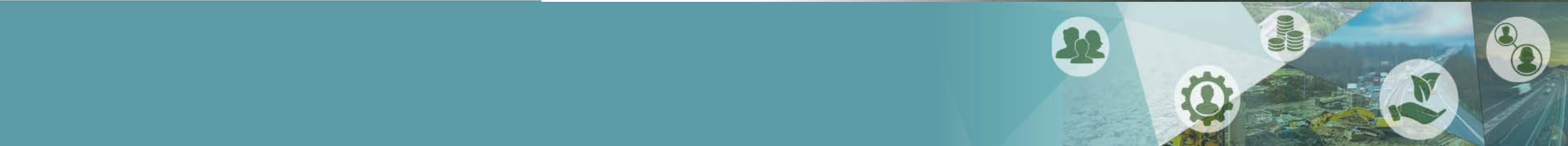


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Summary

Together we have an opportunity to affect change

- Rely on specifications, designs and shared experiences
- Collaborate on risk management and mitigation
- Design and implement with confidence
- Help to develop more opportunities for the methods to increase decarbonisation and recycling in the sector
- Collaborate to ensure supply chain agility, risk management and technical / operational resilience
- Make waste-based decisions and consider the circular opportunities instead of a mental “copy and paste” of the previous methods
- Drive innovation and help to normalise the products, methods and outlets.



Thanks for listening - Q&A?



 OCL Website



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 Stuarts vCard

Paving the way to
greener infrastructure

