



# Tackling climate change from the ground up

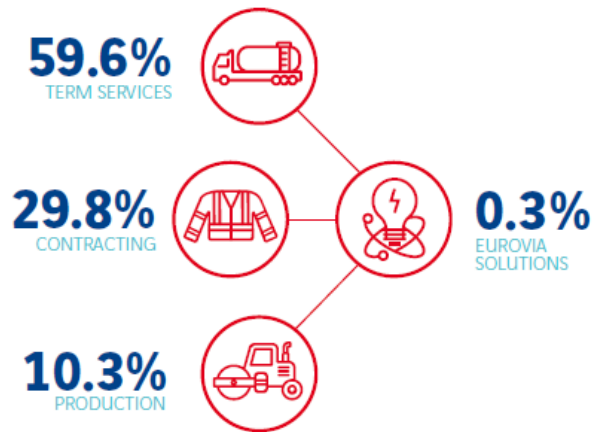
...understanding the potential impacts and  
opportunities for our highways

A world of expertise, **applied locally**

# We are...

...highways specialists, with a key role to play in driving change, unlocking economic growth, and strengthening social cohesion, whilst embracing new, sustainable ways of working.

An integrated organisation



# Tackling climate change – from the ground up??

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The local road network is your most valuable asset worth around £400B.

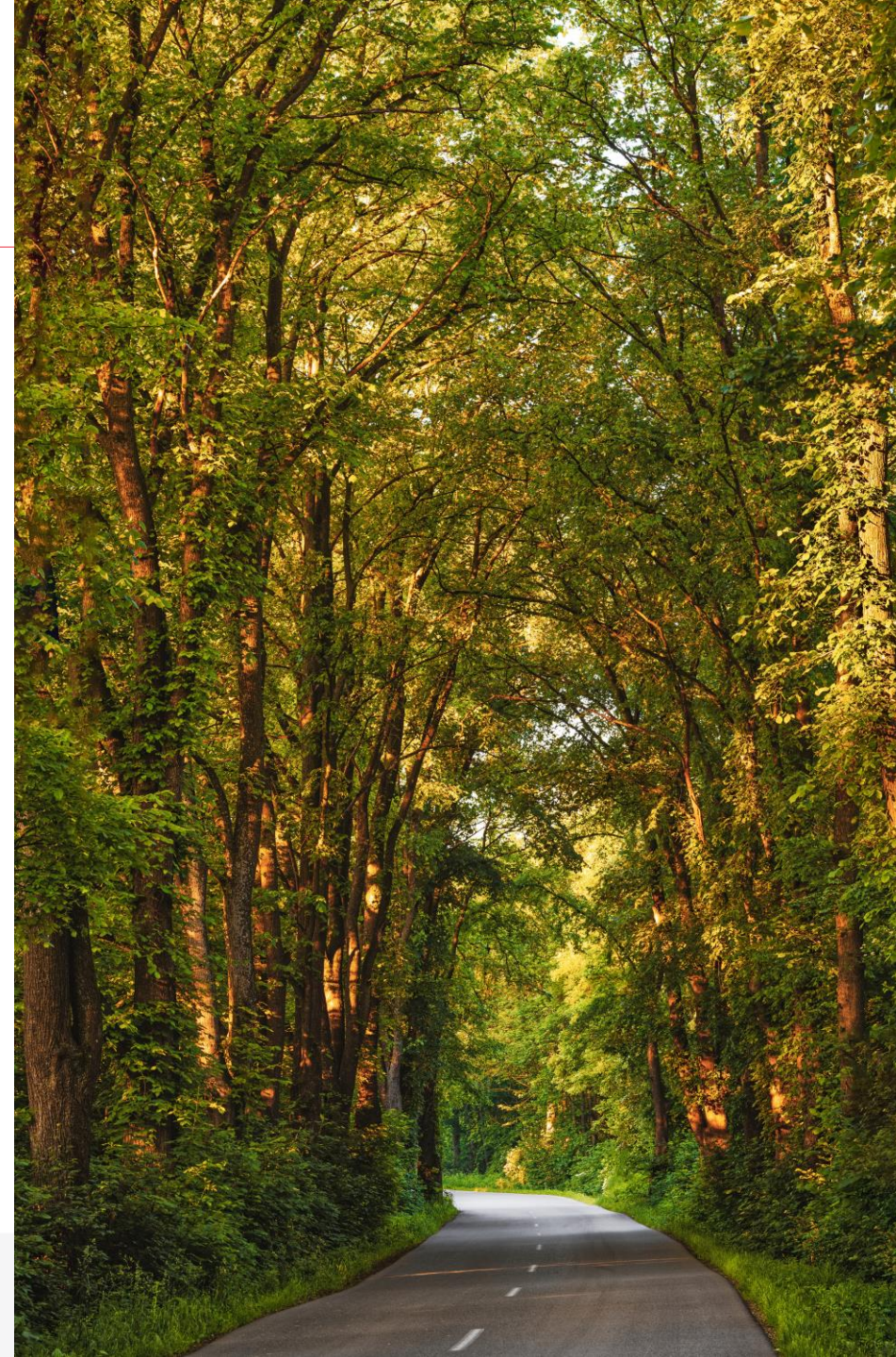
In 2020, there are 215,700 miles of local roads.

Funding provided for local road maintenance in 2020/21 was around 0.3% of its total asset value.

It is 20 times more expensive to carry out reactive maintenance than planned, preventative maintenance.

Today, we are tackling a climate emergency, with many Highway Authorities signed up to net zero, and varying deadlines to hit this by 2030 – 2050.

...so, how do we get there?

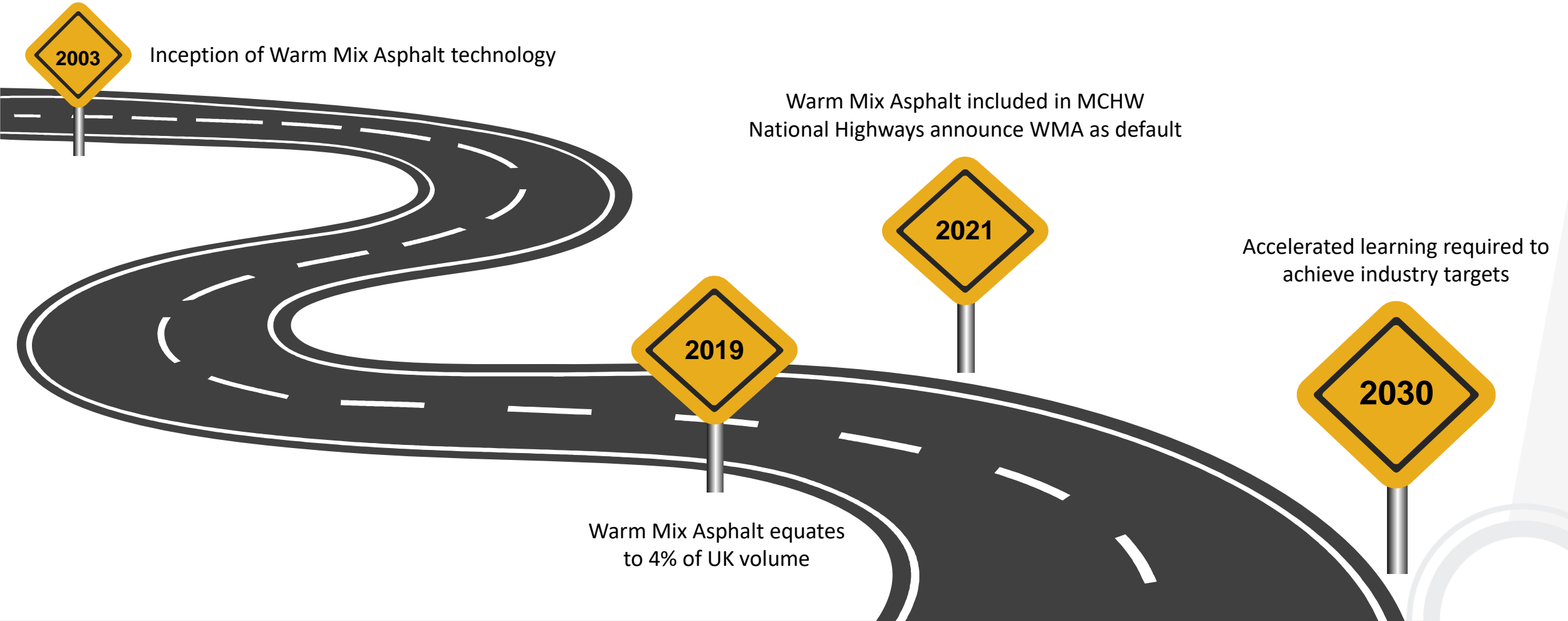




# Tackling climate change - what are the options?



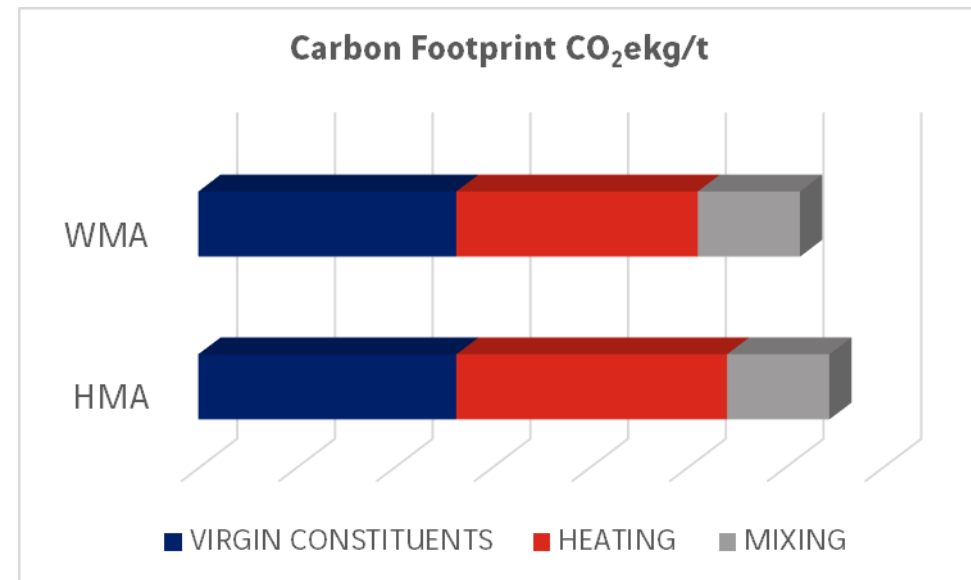
# Tackling climate change - what are you waiting for?



# Warm mix – is it the solution?



The challenge: Warm mix delivers around 10% carbon reduction on hot mix....does it help us reach our low carbon vision?



# Biomass binders – an organic solution

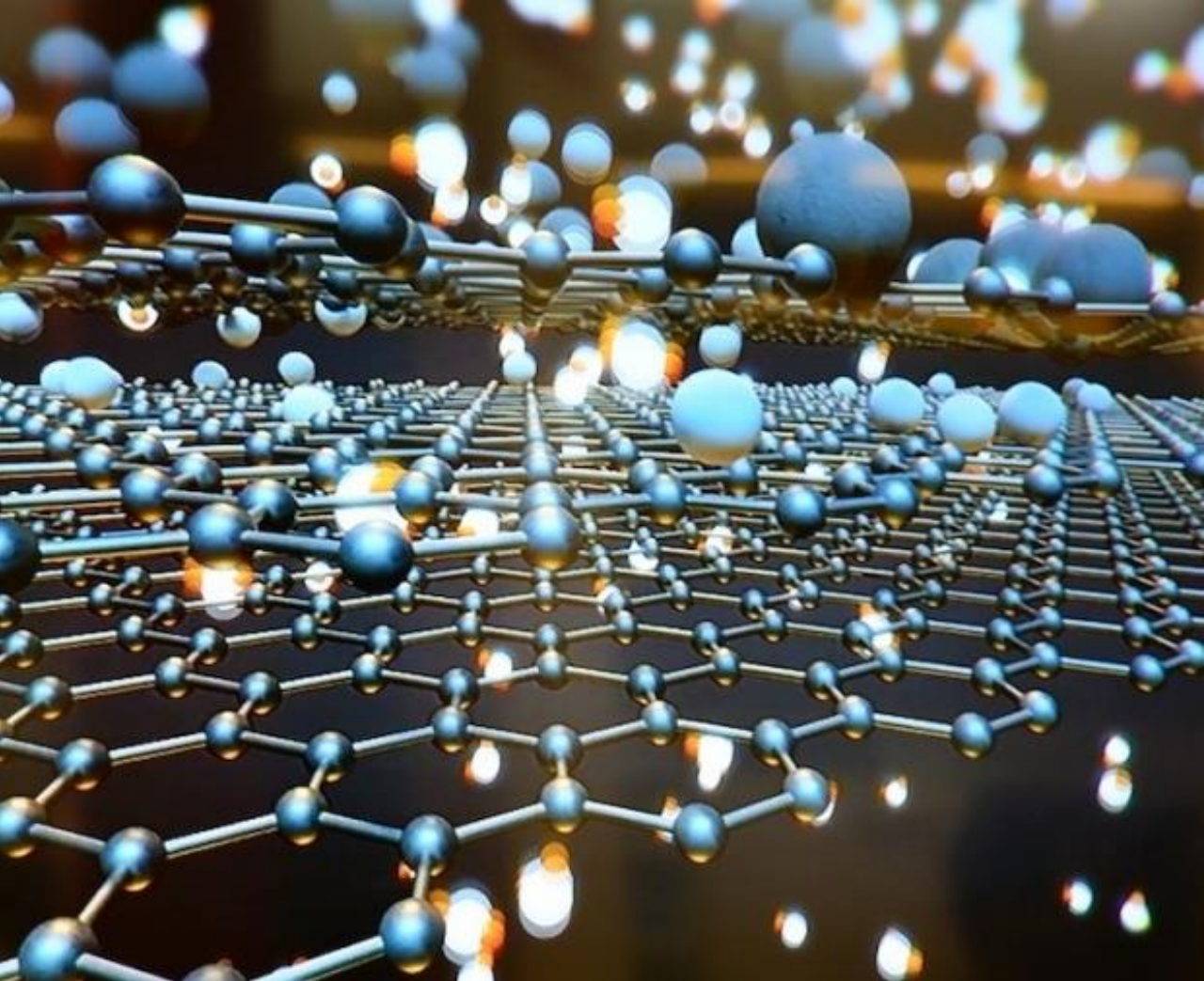


**The challenge: Bitumen equates to 15% of asphalt's carbon footprint – how can we reduce this?**

- Reduce our reliance on fossil fuel derived constituents
- Warm mix capability
- Can improve resistance to UV aging
  
- A 50:50 bitumen/biomass binder = 18-27% reduction in CO<sub>2</sub>e
- Our target = 100% biomass binder by 2040



# Nanotechnology – science-based solutions



**The challenge: Do low carbon alternatives deliver the same performance benefits?**

- Graphene nanoplatelets & Carbon nanotubes
- Performance benefits
- Neat graphene trialled in 2021 by National Highways in in-situ recycling.
- Plastic/graphene additive for asphalt
  - ➔ Extends the life cycle of the asphalt layer
  - ➔ 20t of recycled plastic per km
  - ➔ Circa 180t CO<sub>2</sub>e reduction per km

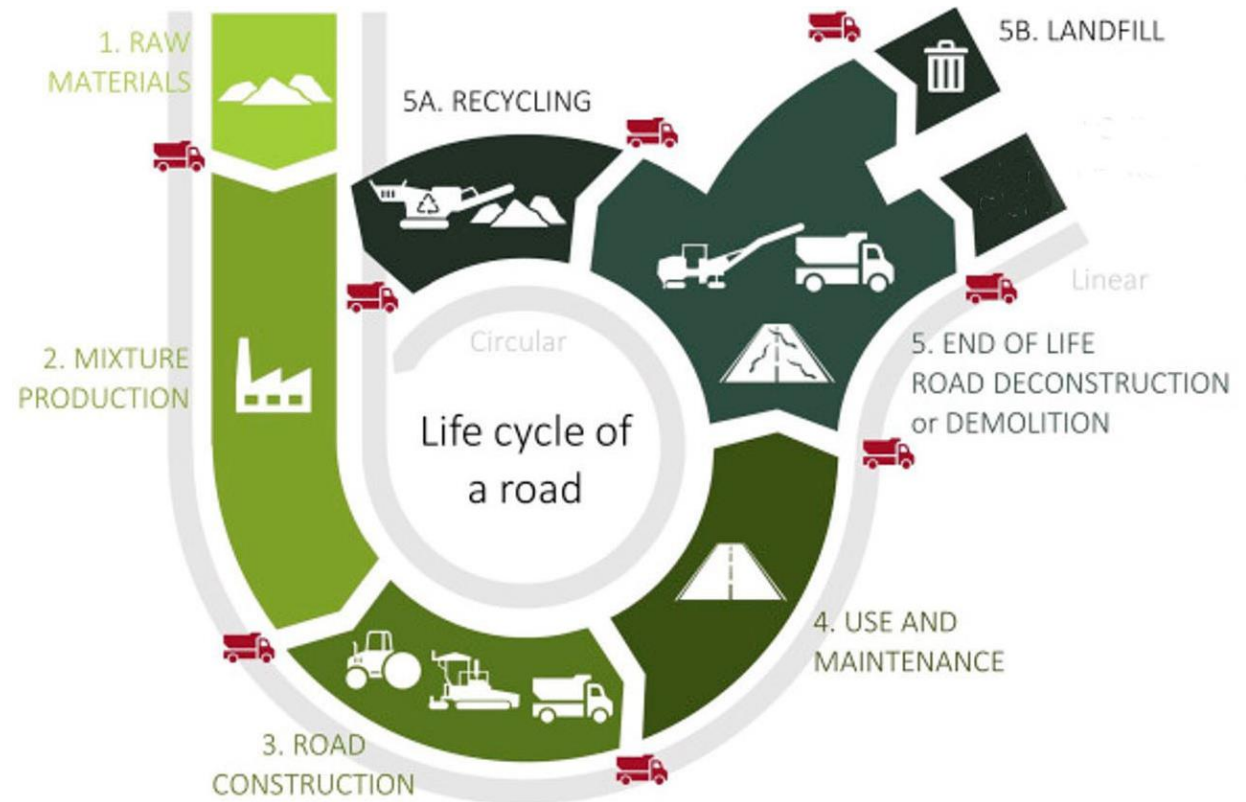
# Cold applied treatments – leading carbon results



## The challenge: why aren't we using more of it?!

- CRBM provide between 40-50% reduction in CO<sub>2</sub>e
- Technical advancements are providing improved performance levels
- Surface dressing: 1.00 kgCO<sub>2</sub>e/m<sup>2</sup>
  - ➔ Service life: 0.10 – 0.14 kgCO<sub>2</sub>e/m<sup>2</sup>
- Micro surfacing: 2.87 kgCO<sub>2</sub>e/m<sup>2</sup>
  - ➔ Service life: 0.29 – 0.41 kgCO<sub>2</sub>e/m<sup>2</sup>

# Whole life.....



# Reusing highway assets

## What are the barriers?

- Understand the asset
- Perception – reliance on ‘virgin’ materials
- Perception - performance
- Value – is environment considered?
- Actual performance?
- Budget

...change isn't easy

## So how do we overcome them?

- Investing in facilities
- Rethinking circular economy

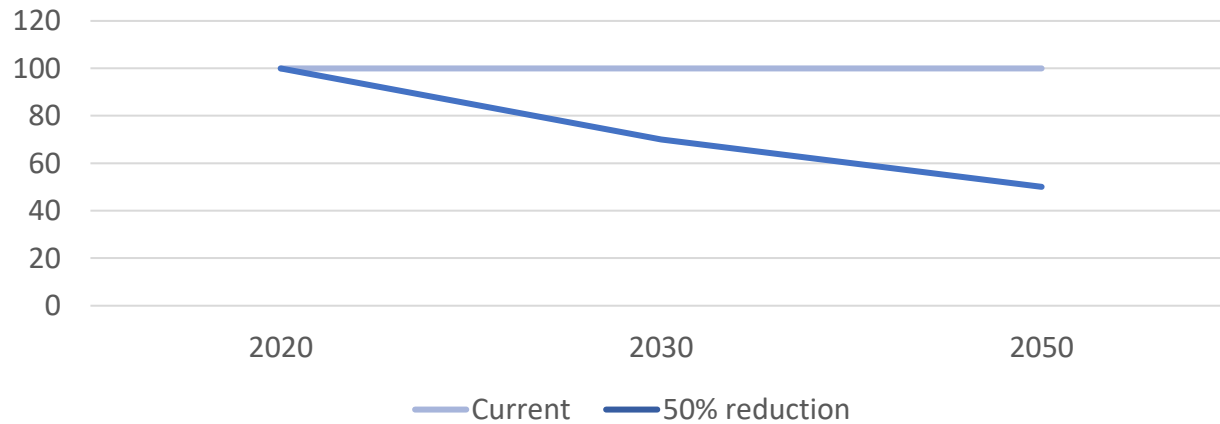
...increased customer demand!



# Investing in facilities

- 275 – number of asphalt plants in the UK today
- £2B – substantial investment to enhance sustainability
- Energy demand – Gas Oil / Recycled Oils.....need to switch
- Most facilities operate at 100kwh per tonne

Energy Use at Asphalt Plants kwh per tonne



# Rethinking Circular Economy

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## A pipe dream?

- Rationalising standards and specifications
- Higher volumes of RAP
- Change in energy used in haulage
- Partnership with industry – modifying fleet and plant
- Moving from warm mix to Low Carbon Asphalt.....



...over to you – what is stopping us?

