Sustainability and Innovation: The Challenge for Highways England

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We are custodians of the Strategic Road Network

- 4,300 Miles of SRN
- 42% Motorways, 58% Major A-roads
- Usage of SRN continues to grow
- 34% all traffic
- 68% freight

- Supporting access to rail and development of HS2
- Delivering smooth access to ports
- Enhancing access to airports
- Complementing local networks and connecting rationally

- 9 in 10 recognise the importance of the SRN to the economy
- 14.3 billion miles light freight
- 10.1 billion miles heavy freight
- £12 billion contributes to the UK economy

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Carbon challenge - context

- UK climate projections show a range of impacts including higher temperatures, increased winter rainfall and sea level rise.
- The UK Climate Change Risk Assessment highlights risks to the UK from climate change.
- The UK signed up to the international Paris Agreement, committing to keeping climate change well below 2°C.
- In 2019 the Climate Change Act (2008) was revised to require the UK to achieve net zero greenhouse gas (GHG) emissions by 2050.
Carbon challenge - context

Transport was the largest emitting sector of UK greenhouse gas emissions in 2017

Road User Carbon – the challenge

Scenarios for very deep emissions reductions from the surface transport sector

Road User Carbon – the challenge

Highways England are responding to this by:

- Increasing the charging infrastructure for electric vehicles
- Integrating cycle routes into highway design
- Running trials with the Transport Research Laboratory and haulage partners to investigate platooning vehicles
- Trialling use of electric vehicles with traffic officers and in projects such as the A14
- Accounting for carbon in appraisal of schemes
Road User Carbon – the future challenge

- Influencing driving behaviour
  - Can we encourage drives to share cars, take public transport, drive more efficiently?

- Support new technologies
  - How will road design respond to more ultra low emission cars and HGVS, autonomous vehicles?

- Leading by example
  - For instance by greater procurement of sustainable fleet vehicles, more efficient logistics in our own road projects

- Working in partnership
  - Can we work with others to help achieve low carbon, for instance how do we engage with local authorities to encourage more sustainable journeys?
Construction Carbon – the challenge

- Carbon in construction comes from a range of sources including:
  - Transportation of materials, plant and workers
  - Use of fuels to provide lighting, power plant, heat materials such as asphalt
  - Embodied carbon in the materials used for construction
  - Waste materials during construction and at the end of life of assets

- In 2018 Highways England Supply Chain used around 295,000 tonnes CO2e
Construction Carbon – the challenge

Examples of missions factors for common construction materials

<table>
<thead>
<tr>
<th>Material</th>
<th>tCO2e/t</th>
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</thead>
<tbody>
<tr>
<td>Composting organic waste</td>
<td>0.01</td>
</tr>
<tr>
<td>Straight run bitumen</td>
<td>0.191</td>
</tr>
<tr>
<td>Organic waste landfilled</td>
<td>0.579</td>
</tr>
<tr>
<td>Timber noise barrier (3m)</td>
<td>0.873</td>
</tr>
<tr>
<td>Portland Cement (UK average)</td>
<td>0.912</td>
</tr>
<tr>
<td>Steel bar and rod</td>
<td>1.99</td>
</tr>
<tr>
<td>Plastic pipework (HDPE) 450mm diameter</td>
<td>2.52</td>
</tr>
<tr>
<td>Steel piles</td>
<td>2.76</td>
</tr>
<tr>
<td>Aluminium traffic sign</td>
<td>6.67</td>
</tr>
</tbody>
</table>

Source: HE Carbon Tool citing Inventory of Carbon and Energy
Construction Carbon – the challenge

- Making materials last longer and repurposing materials – circular economy
- Future automation / modular construction / low carbon materials
- Designing out carbon

HM Treasury, Infrastructure Carbon Review, 2013
Under current legislation projects are designed to minimise impacts on the environment, but can still have negative impacts on biodiversity.

Defra (Department for Environment, Food and Rural Affairs) and industry are moving towards environmental enhancement.

Biodiversity Net Gain - Leaving biodiversity in a measurably better state, quantified using a biodiversity metric.

‘If you can measure it, you can manage it’ (W. Edwards Denning)
Biodiversity Net Gain – what it means for Highways England

- Moving from minimising impacts to delivering an improved environment.
- Supporting projects to have positive impacts inside and outside of project footprints.
- Integrating biodiversity enhancement into project design from inception through to asset management and maintenance.
- Providing transparency around the biodiversity impacts of our projects – calculating and reporting using a biodiversity metric.
Biodiversity Net Gain – Challenges and Opportunities

▪ Balancing environmental outcomes with the financial viability of projects.

▪ Ensuring projects are designed to minimise biodiversity loss before offsetting is considered.

▪ Working with external organisations to secure areas to offset biodiversity impacts outside project boundaries.

▪ Understanding the implications of the ongoing management and maintenance of newly created habitats.
Biodiversity Net Gain – Innovation

- Using aerial imagery and remote sensing to collect habitat information over larger areas.
- Working collaboratively with environmental bodies to use opportunity mapping to identify areas that will benefit most from biodiversity improvements.
- Moving from biodiversity net gain towards environmental net gain - an integrated approach across multiple environmental topics e.g. water, soils, landscape.

CEH Land cover Map 2015 showing different types of habitat
Source: https://www.ceh.ac.uk/services/land-cover-map-2015
Any questions?