**PIARC Technical Committee 4.5 Working Group 1**

**Decarbonisation in the Planning, Design, Maintenance and Operation of Road Projects Survey**

**Introduction**

This survey is organized by Technical Committee 4.5 of PIARC (World Road Association). PIARC was founded in 1909 its goal is to organize exchange and knowledge, policy and practice on all matters related to roads and road transport, 125 members governments, 1200 experts, 20 + technical committee and task forces

Our knowledge products include reports (one per month on average), online manuals, international seminars and Congresses, etc. [www.piarc.org](http://www.piarc.org)

**Why**

The PIARC Strategic Plan 2024 – 2027 has identified **reducing greenhouse gases** (GHG) from the road sector as a key challenge for the world’s road sector due to climate change.

GHG

It is important we **plan** and **design** roads that reduce their contribution of greenhouse gases when they are built, and also reduce the emissions from their **maintenance** and **operation**.

A previous PIARC special project (2023) “Carbon Neutrality of the Road Sector” identified opportunities and barriers for road administrations to reduce greenhouse gas emissions. This established the need for Technical Committee 4.5.

**Working Group (WG) 1**

This subcommittee WG1 is focusing on the decarbonisation in the Planning, Design, Maintenance and Operation of Road Projects in response to the issue of climate change.

**Aim of the survey and Scope of study**

To gather information to:

* Identify the opportunities for decarbonisation in the planning, design, maintenance and operation of road projects, to include technologies, materials etc.
* Identify the opportunities and potential impact of identified opportunities on decarbonisation.
* Incorporate outputs from other TCs including within ST4.

**Who should contribute to this survey**

We expect input from road authorities, road operators, experts, universities and more.

Contributing to the survey is a great opportunity for you to share your best practice or showcase your national achievements.

**Deadline for input**

Please submit your valuable answers to: **jessica.postance@arup.com** by **30th November 2024**.

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| **SURVEY ON DECARBONISATION IN ROAD INDUSTRY** |
| Name:  |  |
| Phone:  |  | Organisation:  |  |
| Mail: |  | Country/State/Province |  |
| 1. **Carbon Management Process or Framework or System**
 |
| **Questions**  | **Yes** | **No** | **Please add any relevant information, or additional comments, or links to relevant websites you have:** |
| 1A) What is your understanding of “decarbonisation”. Please give a short definition. |  |
| 1B) Does your organisation has a **carbon management process or system or framework** in the planning, design, maintenance and operation of road projects?An illustrative example is provided below:Ref: <https://go-positive.co.uk/How-to-Create-an-Effective-Carbon-Management-Process>Example: <https://www.strategyand.pwc.com/m1/en/strategic-foresight/sector-strategies/energy-chemical-utility-management/the-national-carbon-management-framework.html> |  |  |  |
| 1C) Does your organisation has a **carbon system** in the planning, design, maintenance and operation of road projects?Example provided here: <https://go-positive.co.uk/2024-Carbon-Management-System> |  |  |  |
| 1D) Does your country use any **standards** for carbon management? |  |  |  |
| 1E) Does your organisation use any **standards** for carbon management?Two examples from the UK are provided here:PAS 2080 2016 Managing whole-life ...<https://www.bsigroup.com/siteassets/pdf/en/insights-and-media/insights/brochures/pas_2080.pdf>futuristic roads <https://www.adeptnet.org.uk/sites/default/files/media/2023-10/Carbon%20Calculation%20and%20Reporting%20%28CCAS%29%20Guidance%20for%20Local%20Roads.pdf> |  |  |  |
| 1F) Does your country or organisation use normative and/or contractual tools for managing and reducing the carbon footprint of road projects? |  |  |  |

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| 1. **Decarbonisation strategies and roadmaps**
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| **Questions**  | **Yes** | **No** | **Please add any relevant information, or additional comments, or links to relevant websites you have:** |
| 2A) Does your country have a road **decarbonisation strategy**? If yes, who defined the strategy and when? |  |  |  |
| 2B) Does your organisation have a road **decarbonisation strategy**?If yes, who defined the strategy and when? |  |  |  |
| 2C) Does your country have a road **decarbonisation roadmap**? |  |  |  |
| 2D) Does your organisation have a road **decarbonisation roadmap**?An example is provided below from the UK. |  |  |  |
| Ref: <https://nationalhighways.co.uk/media/eispcjem/net-zero-highways-our-2030-2040-2050-plan.pdf> |
| 2E) Does your country or organisation use **good practice guides** for managing and reducing the carbon footprint of road projects? If yes, please share details of the name and a web link. |  |  |  |
| 2F) Do you have a **carbon reduction hierarchy** for roads projects?An example is provided below from the UK.  |  |  |  |
| **Figure 1 Carbon Hierarchy for Highways** |

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| 1. **Carbon consideration during road project or scheme development**
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| Here are the different stages of developing a road project. We are concentrating on the **planning** and **design** phases (before it goes into construction), as well as the **operation** and **maintenance** of the road once it is built. |
| **Questions**  | **Yes** | **No** | **Please add any relevant information, or additional comments, or links to relevant websites you have:** |
| 3A) Does your country or organisation consider carbon emissions of a project or schemes development – through **planning** stage and as part of the investment appraisal process?Planning: Meaning, Features, Importance ... |  |  |  |
| 3B) Does your country or organisation consider carbon emissions of a project or schemes development – through **design** stage?**Blueprint with solid fillIllustrator with solid fill** |  |  |  |
| 3C) Does your country or organisation consider carbon emissions of a project or schemes development – for **operation** stage?Streetlight with solid fillTraffic light with solid fill |  |  |  |
| 3D) Does your country or organisation consider carbon emissions of a project or schemes development – for **maintenance** stage?**Tools with solid fill**Car with solid fill Garden Tools with solid fill |  |  |  |

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| 1. **Carbon hot spots of road infrastructure**
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| **Questions**  | **Yes** | **No** | **Please add any relevant information, or additional comments, or links to relevant websites you have:** |
| 4A) A **carbon hot spot** is the part of a project producing the most emissions, which should be targeted for carbon reduction measures. Has your organisation identified carbon hot spots in the design and construction of any road projects? |  |  |  |
| 4B) If yes to 4A, in **which aspect/area** of the road project did you identify the **carbon hot spot**, for example, pavement, tunnel, bridge, earthworks? |  |
| 4C) If yes to 4A, what have you identified during the design process as having the biggest carbon footprint in the construction of highways? * Is it a particular material e.g. concrete, steel?
* Is it a particular element of the road e.g. pavements, earthworks?
 |  |
| 4D) What key areas or roads should we prioritise in decarbonising (these may be the same as the carbon hot spots)? If no key areas, why is this? |  |
| 1. **Decarbonisation in maintenance**
 |
| **Questions** | **Yes** | **No** | **Please add any relevant information, or additional comments, or links to relevant websites you have:** |
| 5A) Does your organisation consider carbon management and reduction (decarbonisation) in the **maintenance** of roads? |  |  |  |
| 5B) If yes to 5A, **how** is carbon management and reduction (decarbonisation) undertaken in the **maintenance** of roads? |  |
| 5C) If yes to 5A, please provide **examples** of ways of reducing carbon in the **maintenance** of roads and provide relevant website links if relevant. |  |
| 5D) Is decarbonisation specifically considered for winter maintenance activities?Snow with solid fillSnowflake with solid fill |  |

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| 1. **Decarbonisation in operation**
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| **Questions** | **Yes** | **No** | **Please add any relevant information, or additional comments, or links to relevant websites you have:** |
| 6A) Does your organisation consider carbon management and reduction (decarbonisation) in the **operation** of roads?Streetlight with solid fillTraffic light with solid fillElectric car with solid fill |  |  |  |
| 6B) If yes to 6A, **how** is carbon management and reduction (decarbonisation) undertaken in the **operation** of roads? |  |
| 6C) If yes to 6A, please provide **examples** of ways of reducing carbon in the **operation** of roads. |  |
| 6D) **Renewable energy** – does your organisation buy renewable energy to support the **operation** of the roads?Wind Turbines with solid fill |  |  |  |
| 6E) **Renewable energy** – does your organisation use renewable energy to support the **operation** of the roads?Solar Panels with solid fill |  |  |  |

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| 1. **Decarbonisation standards in design**
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| **Questions** | **Yes** | **No** | **Please add any relevant information, or additional comments, or links to relevant websites you have:** |
| 7A) Is there **guidance** available to support carbon reduction in the planning and design of road projects in your country or organisation? |  |  |  |
| 7B) If yes to 6A, please share details of the **carbon standard** or **guidance** e.g. name, a web link. |  |
| 7C) Do you recommend the of use **environmental product declarations** (EPD) or **certificates**?  |  |  |  |
| 7D) If yes to 7C, how does this influence the engineering design process? |  |  |  |
| 7E) If the **carbon footprint** is calculated for road projects, do you know what carbon savings are made during the planning and design of road projects in your country or organisation? |  |  |  |
| 7F) If yes to 7E, are these quantified? If yes, can you share any numbers? |  |  |  |
| 7G) If yes to 7E, when are the **biggest savings** made – during planning, design or construction? |  |
| 7H) Do you already have **benchmarks** i.e. of greenhouse gas emissions CO2 per m2 bridge area or road surface area to be monitored? If yes, would it be possible for you to share any information in this? |  |  |  |
| 1. **Technology and innovation in roads and highway infrastructure**
 |
| **Questions** | **Yes** | **No** | **Please add any relevant information, or additional comments, or links to relevant websites you have:** |
| *This article provides us with some of the ways in which we can reduce carbon in road construction:* [*https://www.petronaftco.com/reduce-carbon-in-road-construction/*](https://www.petronaftco.com/reduce-carbon-in-road-construction/) |
| 8A) Are there any new low carbon technologies or innovations that your country or organisation is **exploring** or **trialling** on road projects that you can highlight? Please provide details. |  |  |  |
| 8B) Are you able to share any ambitious but practical infrastructure design **ideas** or innovations to drive a radical reduction of carbon emissions? Please provide details. |  |  |  |
| 1. **Carbon and cost**
 |
| **Questions**  | **Yes** | **No** | **Please feel free to add any relevant information or additional comments you have:** |
| *There is a strong relationship between carbon and cost in road projects. Carbon is a proxy for energy, the use of natural resources and quantities of materials; therefore, reducing carbon usually reduces cost.* |
| 9A) Minimising cost and carbon are important engineering challenges.Is the **cost of decarbonisation** considered in the planning, design and construction of road projects in your country or organisation?  |  |  |  |
| 9B) If yes to 8A, how is this considered?How is a **monetary value** placed on one tonne of carbon dioxide equivalent (e.g. $/tCO2e)?For example, shadow pricing - used by analysts and economists to assign a monetary value. |  |  |  |
| 9C) The “**carbon cost tipping point**” represents a critical threshold in road projects, beyond which further carbon reduction leads to disproportionate cost increases. This concept challenges planners and engineers to think creatively about how to balance environmental goals with financial viability.Have you come across this kind of challenge, where to reduce carbon, it costs more? |  |  |  |
| 9D) Does cost still come first, or would your company consider paying more for a **low carbon solution**?  |  |  |  |
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| 1. **Carbon Sequestration/Sinks and Carbon Offsetting**
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| **Questions**  | **Yes** | **No** | **Please feel free to add any relevant information or additional comments you have:** |
| 10A) **Carbon sink or sequestration** is a natural or artificial process that captures and stores atmospheric carbon dioxide and is one of approach being taken to tackle climate change. There are three main types: biological, geological and technological.Tree With Roots with solid fillStacked Rocks with solid fillCloud Computing with solid fillDoes your organisation consider carbon sink or sequestration in the planning, design, maintenance and operation of road projects? |  |  |  |
| 10B) **Road verges** can offer long linear green spaces in some countries, with the potential to provide improved **carbon storage**. Does your organisation consider or calculate the **carbon sequestration/sink potential** of its roadside green spaces? |  |  |  |
| 10C) **Carbon offsetting** is when you pay another organisation to sequester carbon dioxide on your behalf. Normally this is because an activity generated carbon dioxide emissions you couldn't avoid but wanted to.Does your organisation pay for carbon offsetting? |  |  |  |
| 1. **Low Carbon Solutions**
 |
| **Questions**  | **Yes** | **No** | **Please feel free to add any relevant information or additional comments you have:** |
| 11A) Are there any **low carbon solutions** that your country or organisation use to reduce carbon road projects that you can highlight? Please provide details. |  |  |  |
| 11B) Could you provide any **case studies** of successful **low-carbon road project initiatives?** If yes, please could you share details. |  |  |  |
| 11C) Are there any lessons learnt from these **case studies?** |  |  |  |

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| **Follow up** |
| **Questions**  | **Yes** | **No** | **Please feel free to add any relevant information or additional comments you have:** |
| Would you be willing to have a follow up discussion about your answers? |  |  | *If there is someone else in your organisation we should contact, please add their name and contact details here:* |

**Deadline for input:**

Please submit your valuable answers to: **jessica.postance@arup.com**

Due date: **30th November 2024**.

It is possible that answers that arrive after the deadline will be taken into account.

**Contact**

If you need more information about this survey, please contact: **jessica.postance@arup.com**

Thank you for your input.

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