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PROCEEDR
OPTIMISING RESOURCE USE FOR ROADSIDE INFRASTRUCTURES

Practical recommendations for National Road Authorities (NRAs) on how to implement sustainability policies by using the PROCEEDR software tool

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D4.3 - Practical recommendations for National Road Authorities (NRAs) on how to implement sustainability policies by using the PROCEEDR software tool

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1 Introduction

In 2020, road transportation accounted for 24% of the total carbon dioxide emissions in the European Union. Most of the carbon emissions within the transportation sector are associated with vehicle operations, followed by infrastructure construction and maintenance. Roadside equipment, like noise and safety barriers, has a limited impact. Nonetheless, road infrastructure construction necessitates significant use of natural resources and leads to huge waste production. The PROCEEDR project, financed by the CEDR Transnational Road Research Programme Call 2020 Resource Efficiency and Circular Economy, has developed a software tool to assist National Road Administrations (NRAs) and manufacturers of roadside equipment in discovering innovative and sustainable solutions, thereby facilitating the shift from a linear to a circular economy in the realm of roadside infrastructure.

This report provides recommendations on how the developed PROCEEDR tool can support the sustainability work of NRAs. The report is divided into four parts. After the introduction, a summary of the sustainability efforts of the NRAs is presented. In the third chapter, concrete recommendations are discussed. Finally, some conclusions are provided.

2 State of the art on sustainability efforts by NRAs

The National Road Authorities (NRAs) are committed to advancing sustainability across environmental, social, and economic dimensions. Continuous efforts are made to integrate innovative practices and international standards, ensuring a holistic and responsible approach to road infrastructure development. This summary provides an overview of key initiatives undertaken by NRAs.

2.1 Environmental Sustainability

2.1.1 Green Infrastructure Development

NRAs prioritize the development of green infrastructure, incorporating eco-friendly materials, and promoting sustainable construction practices [Reference 1].

2.1.2 Biodiversity Conservation

Several NRAs have adopted measures to mitigate the impact of road construction on biodiversity, including wildlife crossings, habitat restoration, and ecological monitoring [Reference 2].

For example, in the UK, National Highways (NH) have recently published their Environmental Sustainability Strategy (2023) which sets out priorities and actions for carbon, communities and nature from 2023 to 2050, laying out plans for achieving net zero, being positive for nature and reducing their environmental impacts on communities. This document states that “Our vision for 2050, is to provide a road network that supports the country’s transport needs and also protects and strengthens the natural environment and community wellbeing.” They commit to updating this strategy every road investment period (RIS) which is every 3 years, and it will be complemented by a robust implementation plan, including assigned ownership and a set of actions with associated deadlines and metrics to monitor progress. The document includes case studies highlighting projects where interconnected pollinator habitats have been created on existing grass verges (via changes to cutting and maintenance regimes, seeding and planting), and landscape scale measures have been implemented to improve the quality and connectivity of landscape and habitats. This has been achieved by various methods including tree planting, natural flood management measures and wetland restoration as well as orchard creation.

2.1.3 Climate Change Mitigation

NRAs are actively working to reduce the carbon footprint of road infrastructure through measures such as energy-efficient lighting, sustainable drainage systems, and incorporating climate-resilient design principles [Reference 3].

In the UK, in 2022, National Highways published their Net Zero Roadmap for Concrete, Steel and Asphalt (2022) and now publish an annual Net Zero Annual Report with the latest version published in September 2023. Both documents highlight the steps that National Highways are taking to work closely with industry to work towards net zero. They also support a Carbon Hub, containing a digital library of net zero knowledge, news and resources which is accessible to their supply chain, along with the Low Carbon Opportunities Register where internal project teams can share their innovations with others.

2.2 Social Sustainability

2.2.1 Community Engagement

NRAs emphasize community engagement in road development projects, ensuring that local communities are consulted, and their concerns are addressed [Reference 4].

2.2.2 Inclusivity and Accessibility

Accessibility for all, including pedestrians and cyclists, is a key focus for NRAs, with the development of sidewalks, cycling lanes, and accessible public transportation facilities [Reference 5].

2.3 Economic Sustainability

2.3.1 Life Cycle Cost Analysis

NRAs conduct life cycle cost analyses to assess the economic sustainability of road projects, considering long-term maintenance, environmental impact, and societal benefits [Reference 6].

2.3.2 Public-Private Partnerships (PPPs)

Several NRAs engage in PPPs to fund and manage road projects, promoting private sector involvement in a sustainable and socially responsible manner [Reference 7].

3 Recommendations on how to benefit from the PROCEEDR tool in the sustainability work of NRAs

National Road Authorities play a crucial role in implementing sustainability measures to address environmental, social, and economic challenges. To promote environmental sustainability, they can adopt policies that encourage the use of renewable energy sources, promote energy, and resource efficiency, and regulate emissions into water, soil, and air. Public transportation infrastructure and green urban planning can be prioritized to reduce carbon footprints.

Social sustainability can be achieved by fostering inclusivity, supporting education and healthcare, and implementing fair labour practices. NRAs have a considerable influence on how infrastructure projects might affect humans, e.g. regarding noise levels along highways.

Economic sustainability can be promoted through policies that encourage responsible business practices, fair trade, and investments in green technologies. Public authorities can also facilitate community engagement and awareness programs to involve citizens in sustainable planning and construction practices. By enforcing and incentivizing sustainable practices through legislation, regulations, and public initiatives, authorities can contribute significantly to building a more sustainable and resilient future.

The developed PROCEEDR tool allows NRAs and manufacturers to assess the environmental impacts, costs and the circularity potential of noise and safety barriers over the entire life cycle. The PROCEEDR tool itself and how it functions technically is described in detail in Deliverable D4.1. The following paragraphs describe possible fields of application for the PROCEEDR tool to support the sustainability work of NRAs. The examples provided might differ from country to country and we hope that it might spark further ideas.

3.1 Tendering processes

The tendering process for NRAs typically involves several stages to ensure fair competition and transparency in the selection of contractors for road construction or maintenance projects. The following is a general overview of the tendering processes commonly followed by road authorities, which might differ significantly among the member states:

3.1.1 Project Identification and Planning

Road authorities identify the need for a construction or maintenance project based on factors such as traffic volume, road conditions, and development plans. Detailed project plans and specifications are developed, outlining the scope of work, technical requirements, and project timeline.

3.1.2 Preparation of Tender Documents

Tender documents are created, including the project description, scope of work, technical specifications, terms and conditions, and evaluation criteria. These documents also include details about the submission process, deadlines, and any specific qualifications or certifications required from bidders.

3.1.3 Advertisement and Invitation to Tender

The road authority publishes a notice inviting interested contractors to bid on the project. This may be done through public advertisements, government procurement portals, or other

designated channels. Interested contractors request the tender documents from the road authority.

3.1.4 Pre-Bid Meetings and Site Visits

Road authorities may organize pre-bid meetings to clarify any queries from potential bidders and provide additional information about the project. Site visits may be arranged to allow contractors to assess the conditions on the ground and gather necessary information for their bids.

3.1.5 Submission of Bids

Contractors submit their bids by the specified deadline. Bids typically include technical proposals, cost estimates, and any required documentation proving the contractor's qualifications and financial capability.

3.1.6 Bid Opening and Evaluation

Bids are opened publicly, and the information is recorded. A tender evaluation committee assesses the bids based on predetermined criteria such as cost, technical competence, experience, and compliance with specifications.

3.1.7 Contract Award

The road authority selects the winning bid based on the evaluation results.

We see clear benefits of using the PROCEEDR tool for the NRAs in tendering processes, especially in step 3.1.6 Bid Opening and Evaluation. Here NRAs could make the PROCEEDR tool mandatory and potential contractors must submit their bids in line with the requested assessment scheme. Explicit life cycle stages could be defined as well as Impact Assessment categories that would be considered in the evaluation process. Furthermore, it would be possible for the NRAs to request the use of the default data provided by the PROCEEDR database to allow better comparison of the different bids. Considering that carbon reduction already is or will become a contractual obligation soon, a fair and transparent evaluation of different bids will be assured using the PROCEEDR tool.

The European regulation on construction products is evolving toward the inclusion of environmental sustainability within performances declared by manufacturers when placing the product on the market. This will require a common and robust system for the assessment and certification of environmental sustainability. In the meantime, the use of PROCEEDR tool by NRAs in tendering processes is recommended to stimulate noise and safety barrier manufactures (most of them are SMEs) to implement sustainability policies and use LCA techniques to assess achieved results.

3.2 Benchmarking

The PROCEEDR tool could be used for benchmarking. This is not restricted to the evaluation of noise and safety barriers in tendering processes (see Chapter 3.1) but it could also be used

within the NRAs, e.g. to assess types of barrier solutions even before the tendering process and limit the barriers to a few types of barrier solutions.

This is especially valid for noise barriers; for this product, the use of new materials is often proposed by manufacturers claiming for high score is sustainability ranking.

Furthermore, it would be possible to identify the most environmental post-structures for barriers. The PROCEEDR tool offers a unique feature with the Circularity Index that no other software tool in the market offers today (see D1.1). Hence, benchmarking of distinct types of barrier solutions, the importance of the different life cycle stages, even for different life cycle impact categories as well as the circularity potential of distinct types of construction and types of barriers could significantly support the sustainability activities of NRAs.

3.3 Communication

The PROCEEDR tool offers a comprehensive presentation of the results of the environmental and economic assessment of noise and safety barriers. As described in Chapter 3.1 and Chapter 3.2, the PROCEEDR tool could be used for tendering or benchmarking purposes. Since the tool follows the relevant standards for environmental life cycle assessment, the calculation steps are understandable, reliable, and transparent. Therefore, the PROCEEDR tool offers several opportunities to support communication processes.

4 Conclusions

It is widely acknowledged that the NRAs have a long tradition of reducing environmental impacts throughout all their fields of responsibility which entered strategic sustainability work in the last decade. This report provides recommendations on how the developed PROCEEDR tool can support these sustainability activities of the NRAs.

We have identified three areas, where we could reckon immediate benefits, which are “Tendering,” “Benchmarking” and “Communication”. Obviously, the possible benefits are not restricted to these areas, and it would be beneficial to discuss this further with different representatives from the NRAs.

5 References

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