

On CO₂ efficiency and tradeoffs between safety and sustainability in the built environment

The construction of transport- and energy infrastructure contributes significantly to global CO₂ emissions through embedded emissions. As a result, policymakers and organizations are currently experimenting with designing and constructing greener infrastructure. Although many of these experiments are making progress, we are navigating in the dark; we do not know how effective our decisions are in creating welfare – a combination of economic growth, life safety and sustainability. Decision-making models used for assessing the societal benefits of infrastructure presently omit the consideration of sustainability, and choices regarding life safety are addressed with no explicit consideration of their implication on sustainability.

The Department of the Built Environment at Aalborg University, experts of sustainability and infrastructure at COWI together with the Department of Civil Engineering at Harbin Institute of Technology in China, have joined forces to provide new knowledge that will substantially enhance the basis for decision making with respect to infrastructure projects in the future. We intend first to establish the relationship between choices regarding infrastructure quality (lifetime/reliability) and quantity (amount/capacity) and their implications on sustainability, life safety and economy. Secondly, we aim to establish fundamental new knowledge regarding the trade-offs between sustainability, life safety and economic developments.

The project will be commenced during 2022 and its results will be reported and discussed at workshops. The results of the project will provide important contributions to the general body of knowledge. However, assuming that we are successful with the project as it is planned, the next step will be to develop tools that help ensure that the new knowledge is brought into impact for the benefit of society. These tools will enable infrastructure planners, engineers, owner organizations and public authorities to optimize the development of new infrastructure with a joint consideration of sustainability, safety, and economy and to document the decisions made in a coherent and transparent manner.