

Procurement Requirements for Carbon Reduction in Infrastructure Construction Projects

– AN INTERNATIONAL CASE STUDY

EXECUTIVE SUMMARY JUNE 2019

HOSTED BY VOLVO CONSTRUCTION EQUIPMENT



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About the Project

THIS EXECUTIVE SUMMARY presents the main conclusions from the research project Impres - Implementation of Procurement Requirements for Sustainable Collaboration in Infrastructure Projects. The project was co-funded by Construction Climate Challenge (CCC), hosted by Volvo Construction Equipment, the Swedish Research Council Formas through a grant for the Strong Research Environment ProcSIBE (Procurement for Sustainable Innovation in the Built Environment), and the Mistra Carbon Exit research program. The research activities have been performed in collaboration between the engineering consultancy firm WSP, KTH Royal Institute of Technology in Stockholm, Lund University and the construction company Skanska.

THE FULL PROJECT REPORT (TRITA-ABE-RPT-198 and ISBN 978-91-7873-194-7) is available to download [DiVA Portal](#) and at constructionclimatechallenge.com. The report describes empirical findings and main conclusions from the case studies, while scientific articles are being developed in parallel to analyse and discuss the results more thoroughly in relation to other studies and to theory.

WE EXPECT THAT results from this research project will be useful for decision-makers on the client side that are in charge of developing policies, procurement strategies and procurement requirements to reduce carbon emissions in the construction sector. Further, client and contractor project managers, environmental specialists and procurement staff responsible for implementing policies will be interested in experiences gained in similar initiatives in other countries.

Research team

KTH Royal Institute of Technology, Stockholm, School of Architecture and the Built Environment: Professor Anna Kadefors and Researcher Sofia Lingegård

Lund University, Centre for Environmental and Climate Research: Associate Professor Johanna Alkan Olsson

WSP Sweden: Sustainability Consultants Stefan Uppenberg (project manager), Sofie Absér, Daniel Balian, Mike Hardisty (UK), Elisabeth Hochschorner, James Logie (AU), Sofia Nyholm and Margaret Cederroth (USA)

Skanska Sweden: Sustainability Coordinators Gustav Sandqvist and Joakim Suhr

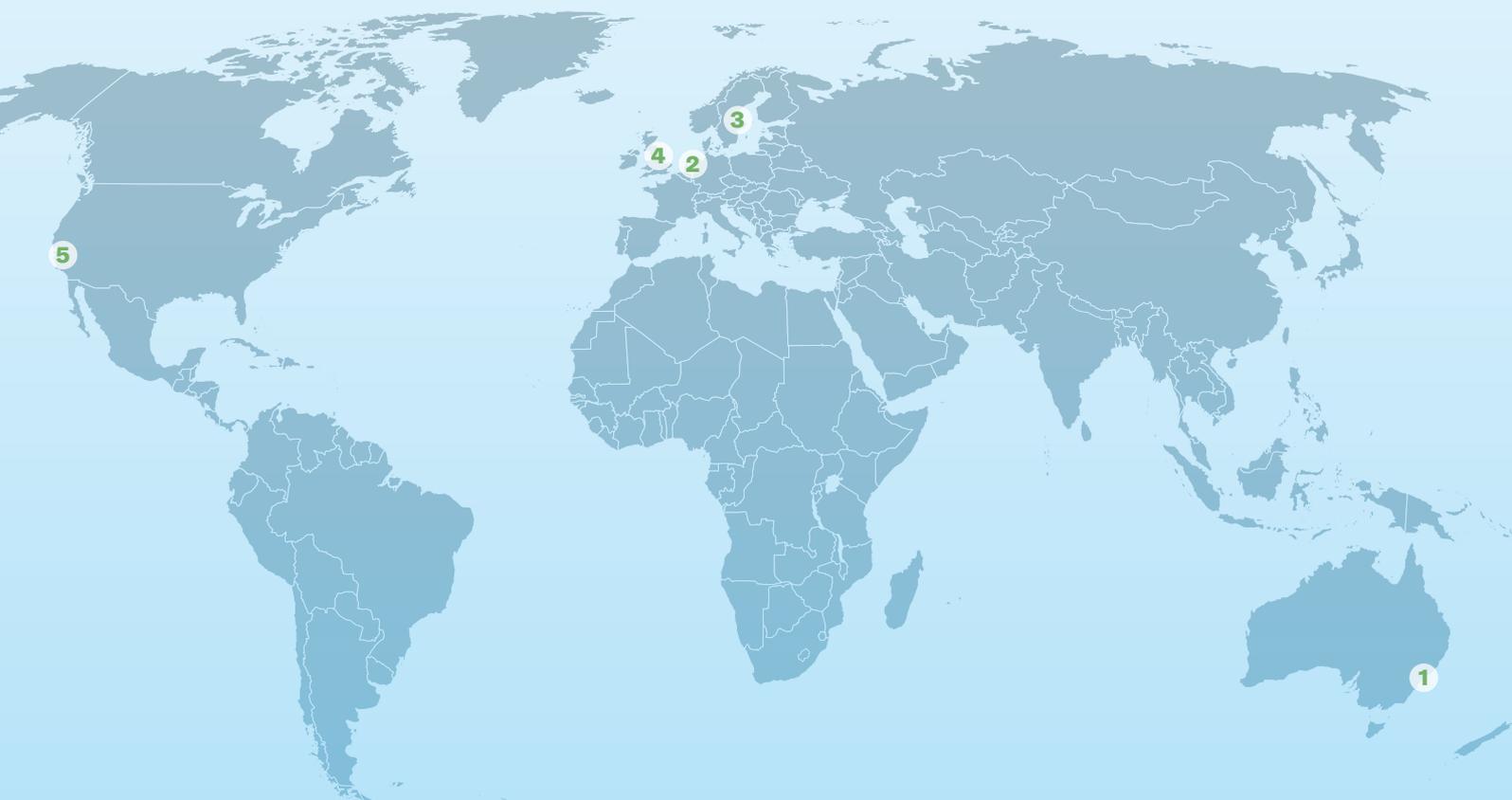
Authors of the report

Anna Kadefors, Stefan Uppenberg, Johanna Alkan Olsson, Daniel Balian and Sofia Lingegård

Case Studies

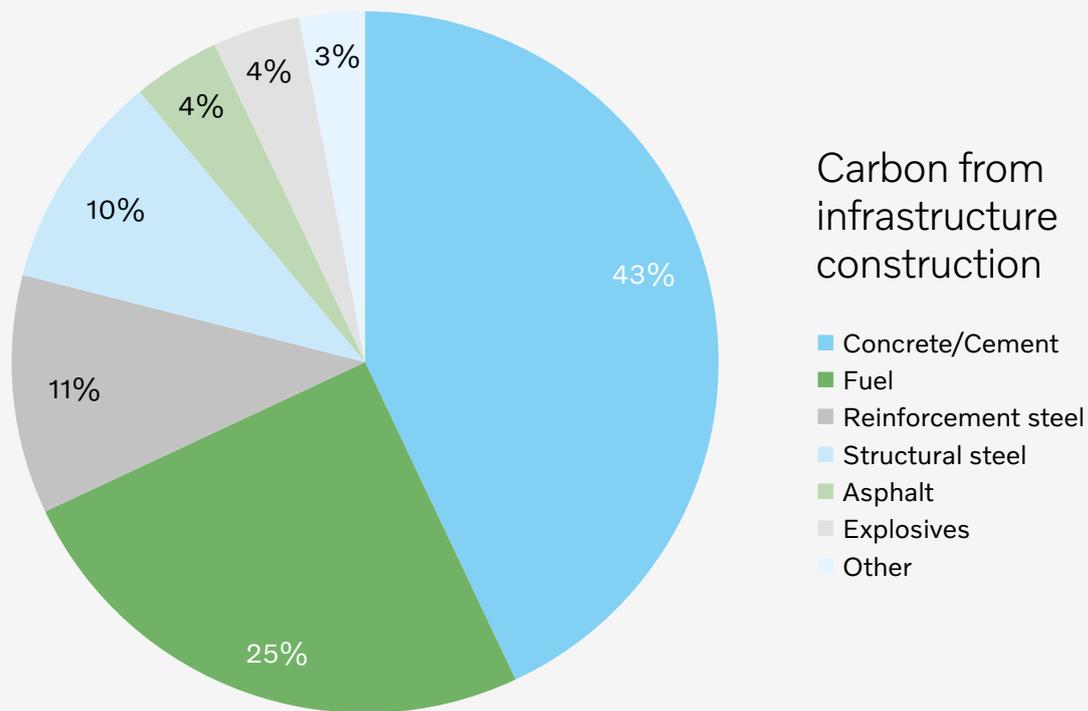
THIS RESEARCH PROJECT has investigated the institutional and organisational contexts, policies, procurement requirements and implementation strategies used to drive greenhouse gas reduction in large infrastructure projects in five countries world-wide: Australia, the Netherlands, Sweden, the UK and the US (see below for an overview of case study projects). The study is based on interviews with key partners on the client side and in the supply chain of each project. To provide a contextual understanding of the strategies used in these projects, we further include descriptions of the policy background that underlies current strategies and ambitions. Thus, the project traces the pathway from political and organisational goals to actual realisation in projects.

Country	Impres case studies
1 Australia	Sydney Metro Northwest Newcastle Light Rail
2 The Netherlands	Motorway A6 Almere
3 Sweden	Results from the Swedish Transport Administration research project Control Station 2018 – an evaluation of carbon procurement requirements in Swedish infrastructure projects.
4 UK	High Speed 2 Anglian Water (Grafham WTW Resilience and Dalton Piercy WTW)
5 USA	California High-Speed Rail SFO AirTrain Extension



Infrastructure Carbon Emissions

FOLLOWING ALARMING REPORTS from the IPCC, climate change has engaged policymakers world-wide to chart policies at different administrative levels to mitigate increasing greenhouse gas emissions. The construction sector causes a substantial part of all greenhouse gas emissions, primarily carbon dioxide. Traditionally in this sector, the focus of carbon reduction measures has been on improving the energy efficiency of buildings. Further, various sustainability assessment schemes (BREEAM, LEED, Green Star, etc.) have been developed to assess sustainability performance. More recently, awareness has increased of the considerable greenhouse gas emissions arising from the manufacturing of construction materials and components, and also from construction processes and transport. Consequently, the infrastructure construction sector is now considered as a major source of greenhouse gases. In the UK, The Infrastructure Carbon Review has estimated that the construction, maintenance and operations of infrastructure assets account for 16% of the nation's total carbon dioxide emissions. It is widely acknowledged that these emissions need to be significantly reduced if the international and national reduction targets are to be met.



Major sources of carbon from infrastructure projects, based on a carbon footprint assessment of all major projects in the Swedish national plan for infrastructure investments for the period 2018–2029 (Trafikverket, 2018).

Conclusions

IN ALL COUNTRIES studied, there is an ongoing process to develop and implement policies for carbon reduction in infrastructure projects, with raised ambitions over time. In some cases, the development has initially been driven by a few dedicated individuals, but today there are frameworks and executive mandates in place that would make it hard to avoid carbon reduction commitments. National and regional reduction policies were found to be important in encouraging clients to develop ambitious carbon requirements that can contribute to setting new industry standards.

CARBON REDUCTION MEASURES such as optimisation of constructions, minimised transport, reuse of excavated material and cement clinker replacement are applied in the studied cases. However, most of these measures are also cost efficient and would – or should – have been undertaken in a normal design and construction optimisation process. The positive side of this is that considerable carbon reductions may be achieved within existing budgets, and in most cases will even reduce cost, and that an increased focus on carbon may contribute to finding more such options. However, it also raises the question of what constitutes a relevant reference case, or baseline. Further, to meet the target levels of the Paris agreement, costly measures will also be needed, and this research identified only a few examples of such policies being implemented.

GOALS FOR CARBON REDUCTION ARE STILL NEW to many in the sector, and both clients and industry partners need time to adjust and develop new competencies. In countries with a longer history of carbon management, procurement strategies and requirements have advanced through continuous interaction between clients and industry actors over longer periods of time. Clients are wary of introducing requirements that may limit competition, and requirements to comply with rating schemes or to supply EPDs have been introduced successively to match the development of industry capacity. Award (MEAT) criteria related to carbon are used, but more often to increase awareness of carbon reduction rather than as a substantive basis for selection. Front-runner contractors and material suppliers were found to play important roles in reducing obstacles to innovation-oriented procurement. Moreover, the development of procurement requirements has been aligned with information and training initiatives, tool kits and



guidelines to support low-carbon design and the calculation of emissions. In general, client environmental specialists have taken an active part in supporting the implementation of requirements in supply chains.

PROCUREMENT REQUIREMENTS ARE CONSIDERED IMPORTANT in driving carbon reductions in all countries, but the preferred style of these requirements vary. This diversity was partly related to general carbon management maturity and partly to general contracting practice and policy culture in the country or region. All countries used some form of contract-level reduction requirements, in most cases set in relation to a carbon emissions baseline. Overall, reduction requirements are perceived to encourage innovation, but our results show that such requirements were often more complex than foreseen and associated with administrative costs. First, to produce change and avoid speculation it is important to set requirements and incentives at the right level, which requires awareness on the client side of both the supplier's competence and of the opportunities for carbon reduction in the specific project. Also, sharp requirements call for equally sharp and transparent performance evaluation. Moreover, much time was spent on calculation and re-calculation of baselines which could detract from measures for actual reduction of carbon emissions. In effect, time constraints in the projects limited the opportunities to involve subcontractors and material suppliers, which meant that all possible reductions were not realised. We conclude that expectations for substantial and innovative carbon reductions through functional reduction requirements may be too high. To influence sub-contractors and suppliers directly, several clients use specific requirements.

COLLABORATIVE CONTRACTING MODELS are a flexible option to encourage innovation and integrate knowledge of different participants. Many interviewees state the importance of breaking silo-thinking and integrating the supply chain in order to reach greater carbon reductions. Also, long-term alliances allow for continuous learning and more transformational innovation, including incentivising contractors to find ways of fulfilling client goals while building less. However, it should be emphasised that strong client leadership and commitment are essential both to legitimise collaborative contracting models and to achieve more fundamental behavioural change within collaborative projects and alliance schemes.

CLIENTS IN MEGA-PROJECTS perceive an obligation to conform to national policy goals and may also have ambitions to be industry-level change agents. Since such projects have vast budgets, last for long periods of time and engage highly competent firms and individuals, they are often expected to show high performance in the area of innovation. However, mega-projects have many goals to fulfil, are technically and organisationally complex and associated with high risks. Therefore, time and willingness to develop new ways of working or implement new technology may be lacking. Further, even large projects may not be long enough to encompass processes to develop, test and approve new solutions. Thus, to support more efficient innovation processes in the industry, a long-term system perspective is needed. Interviewees suggested using smaller pilot projects for quicker testing of new materials, tools and technologies and, once proven, use procurement requirements in large projects to implement these more widely in the market.

“Many interviewees state the importance of breaking silo-thinking and integrating the supply chain in order to reach greater carbon reductions.”

OVERALL, THE STUDY SHOWS that the applicability of procurement requirements for carbon reduction is dependent on how well these requirements are aligned with culture, policies and capabilities in the local context. Inspiration may be sought from cutting-edge examples in other countries and regions, but practices may seldom be directly transferred. Also, it is clear that awareness, competence and capacity on the client side is a key success factor. Such capabilities involve constructive collaboration between procurement functions, environmental specialists and project managers. Further, policy makers need to acknowledge that measures to reduce carbon must align with existing procurement and innovation systems. To reach higher levels of ambition for carbon reduction, such institutional structures may also need to be changed.



Recommendations

Based on the findings, our recommendations to the target group of policy-makers and clients are:



Policy level – national, regional and organisational

- Set high-level goals and policies for carbon reduction in order to sanction ambitious initiatives that contribute to setting new industry standards.
- To reduce barriers for innovation-oriented procurement requirements, engage industry associations and encourage initiatives by supply-side front-runners.
- When developing organisational policies and strategies, address not only ambitions but also what roles the client and other parties should have in implementation.



Project level policies and procurement requirements

- When defining requirements, consider implementation costs for setting and following up requirements. In particular, be careful that focus stays on carbon mitigation measures and that calculation of baselines does not impact negatively on carbon management. Assess and mitigate behavioural risks associated with incentives.
- Ensure that requirements will be effective in influencing all relevant decision-makers in the supply chain (designing engineers, constructors and material suppliers). This implies that time, competence and resources should be available at relevant points in time.
- Apply a long-term learning perspective and acknowledge that different combinations of award and selection criteria, reduction requirements, specific requirements and rating schemes may be preferable over time.
- Align requirements and activities with general contracting models and encourage models that enable integration of knowledge and carbon management in the supply chain.



Innovation and learning

- Develop guidelines, tools and training programs to help build industry capabilities.
- Establish which organisations should drive development, for example commission, host and update guidelines, and provide training and support.
- Communicate plans for raised ambitions well in advance, for example requirements to comply with established carbon management standards and rating schemes.
- Orchestrate long-term innovation by combining small pilot projects to test new solutions with systematic implementation in larger projects to achieve wide market dissemination.
- Establish transparent procedures for updating client standard specifications based on frontrunner initiatives, planned pilots and academic research.
- Innovation should also address contracting and business models: develop institutional capabilities that enable and legitimise long-term, strategic collaborative alliances.

THE CONSTRUCTION CLIMATE CHALLENGE (CCC) is an initiative hosted by Volvo Construction Equipment to promote sustainability throughout the entire construction industry value chain and provide funding for environmental research. The Construction Climate Challenge is a part of the Volvo CE commitment to WWF's Climate Savers Program. Volvo Construction Equipment is a Corporate Advisory Board member of the World Green Building Council.

For more information about the Construction Climate Challenge, please visit www.constructionclimatechallenge.com

For more information about the ProcSIBE project, please visit www.procsibe.se

For more information about Mistra Carbon Exit, please visit [www. https://www.mistracarbonexit.com](https://www.mistracarbonexit.com)

