The relationship between carbon and cost reduction

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The Infrastructure Carbon Review makes it clear that reducing carbon can reduce cost and that carbon can be used as a proxy for resource efficiency. This underpins the principle that sustainable business is good business. If incorporating carbon reduction into decision-making and construction practices can unlock efficiency and cost savings, the benefits are environmental, social and economic.

In theory this principle is straightforward. The more efficient a vehicle, the less fuel it uses and energy use is directly correlated to carbon emissions. Other things being equal, reducing the amount of materials (e.g. concrete) and energy used in the construction and operation of an infrastructure asset reduces the capital and operational carbon emissions over the lifetime of the asset. In practice, although there may be a strong correlation, it can be difficult to demonstrate if there is a causal link. Are the carbon savings driven by a focus on cost reduction or a focus on carbon reduction? Does it matter?

One reason to focus on reducing carbon to reduce cost, rather than vice-versa, is that focusing on savings through a carbon lens can unlock cost savings that may not have been identified otherwise. It enables a project to be developed differently. For example, a project may use a large volume of carbon intensive concrete. A cost reduction approach may focus on who can supply the concrete at lowest cost while a carbon reduction approach may focus on lower carbon alternatives and reducing the amount of concrete used which can also reduce costs. One approach is to challenge designers to identify cost savings from a baseline design. Then ask them to identify carbon savings from the new design (i.e. look at the design through a carbon lens). This can unlock further savings through innovation, and by challenging the fundamentals of technical specifications and the original functional requirement. Once this principle has demonstrated savings it should become common practice.

Assessing carbon at each stage - concept, design, construction and commissioning, and operation - of infrastructure delivery will help unlock these savings. Measurement is key. Cost savings will always be quantified. So why not carbon savings, particularly if they unlock further cost savings? Measuring carbon will help to increase carbon knowledge. For example, understanding what one tonne of carbon saved in reducing the amount of concrete means in cost savings. It will also enable the identification of carbon hotspots ensuring focus in the right areas. For example, should the focus be on reducing materials or reducing transport miles? What is the trade-off between capital carbon and operational carbon?

It is important to consider whole-life carbon to optimise decisions. Operational carbon over the lifetime of an asset may be greater than the capital carbon involved in construction. Short-term cost and carbon savings may result in long-term cost and carbon increases.
Estimating carbon over the lifetime of an asset will enable a greater understanding of this trade-off and enable decisions to be optimised on a cost and carbon basis. Having the right governance and leadership in place to ensure long-term decision-making is necessary to drive this approach into infrastructure delivery.

Carbon savings can also be calculated over a portfolio of projects. Lower carbon equals lower cost may not be true for every asset – some low carbon innovations may result in higher capital costs. If the outputs from a suite of projects combined results in lower carbon and lower costs then the overall principle is true.

Overall, leadership is required to set objectives for carbon management and establish a framework that allows carbon reduction to be part of infrastructure delivery. Measurement and reporting of carbon allows savings to be quantified and carbon hotspots to be identified – and, most importantly, focusing on reducing carbon reduces costs.