Low carbon infrastructure requires lower carbon construction materials. This means that many of the businesses supplying these materials are putting increasing levels of effort into understanding the environmental impact of their products in order to meet ever stricter procurement criteria and communicate credible environmental information. This process helps suppliers to achieve competitive differentiation in a crowded marketplace, especially where price, quality and availability are comparable.

There are a broad range of opportunities to reduce the carbon emissions associated with products, from improving production efficiency in the manufacturing process through to design changes that promote the reuse of materials at end-of-life. Some approaches to reducing carbon emission to products are generally applicable and others are relatively unique to industry subsectors. However, typically the first step in successfully reducing emissions is measurement, which involves undertaking a life cycle analysis of a product’s carbon footprint.

Understanding at a granular level the upstream impact of a product presents an opportunity for construction product suppliers to save money or protect margins. This is because it can often highlight inefficiencies in the upstream supply chain, influencing the future selection of raw materials and identifying opportunities for cost savings.

Marshalls, a stone and concrete product manufacturer, has been able to use life cycle analysis to navigate the complexities of whether to choose virgin or recycled inputs for its products. The company found that in some cases the use of virgin materials had lower carbon emissions than recycled aggregates, once the energy required to process the outputs of demolition (from crushing and grading through to transport) had been taken into consideration.

This insight is central to how Marshalls can communicate the wider value of its products, helping its customers to make informed choices. The value of collecting this information is realised by integrating it into a holistic marketing and communications strategy, allowing buyers to make easy and meaningful like-for-like comparisons between products based on their environmental impact. This has given Marshalls an advantage in acquiring market share and growing revenues in a competitive market, while also improving the company’s reputation.

Similarly, FM Conway uses life cycle analysis to support the development of its Enviro range of asphalt products. This involves using a proportion of recycled aggregates, known as Reclaimed Asphalt Pavement (RAP), with the aim of having a significantly lower carbon footprint than traditional asphalt.
Using modelling the company can identify the cases where, depending on the desired outcome, using virgin raw materials could occasionally be less carbon intensive than recycled materials. This is largely due to the extra energy required to superheat the virgin aggregate when blending in cold RAP. The model shows that due to the weight of raw materials, transportation by sea freight can significantly reduce overall emissions.

The model is currently used by FM Conway in guiding procurement decisions, providing both a carbon and cost perspective for operations and products. FM Conway is now able to ascertain real-time comparisons and calculations of different building mixtures, understanding both financial and environmental impacts. This knowledge can be used to select the lowest carbon solutions based on the location of a project and customer needs.

Carbon footprinting can also be used to underpin product innovation. The conventional road material, commonly used across the UK, is made by bonding aggregates and bitumen into asphalt by heating them to temperatures of 180°C – 190°C. Lafarge Tarmac recognised that one of the most significant areas of environmental impact from asphalt was from the energy used to heat it. This project successfully trialed the use of a Low Temperature Asphalt (LTA) material, which allows mixing and working at lower temperatures. It bonds road materials as effectively as the conventional method, but using much lower temperatures and less energy.

The project has lifted market barriers for the use of lower temperature asphalt used in road construction, which reduces energy costs, as well as cutting carbon emissions by between 7% and 39% per tonne, depending on the layer of application.

Having a better view of upstream and downstream impacts can encourage collaboration between different actors within the value chain, leading to wider transformative change within the industry. This can help to identify and overcome some of the commercial barriers that can hold back emissions reduction, where parties can share in the benefits from greater efficiencies or recovering materials.