



Infrastructure Carbon Review (ICR): Update and Recent Experiences

A summary of presentations and discussions from the ICR seminar hosted by Temple, on behalf of the Building Sustainable Infrastructure Group, at Temple's offices on 17th March 2016.

"How best to drive carbon reduction in infrastructure development?" was the main question explored at this seminar which brought together sustainability and environmental professionals involved in the planning and delivery of sustainable infrastructure. As with many aspects of delivering sustainability, a multi-faceted approach is needed to reduce carbon. Leadership, procurement, collaboration and knowledge sharing all featured throughout the seminar highlighting the critical role each plays.

TfL, National Grid and HS2 all presented on recent experiences of delivering their commitments under the Infrastructure Carbon Review at the seminar which was chaired by Chris Fry, Managing Director at Temple. Mark Edwards, Sustainability Advisor at the Green Building Council gave an introductory presentation.

Matthew Webb, Senior Energy and Carbon Strategy Manager at TfL, described five key elements in TfL's carbon journey:

- Effective leadership, particularly high level commitments e.g. to minimise energy consumption in infrastructure upgrades;
- Metrics and governance, including whole life carbon footprints, plus CapCarb and OpCarb for materials and operation of new infrastructure, see Fig.1;
- Innovation and standards - challenging the norms;
- Commercial solutions – identifying carbon reduction potential, applying a value algorithm, then embedding into procurement; and
- Communication and culture - to build awareness and share best practice.

60 year whole life carbon footprint:
47,180,000 kgCO_{2e}

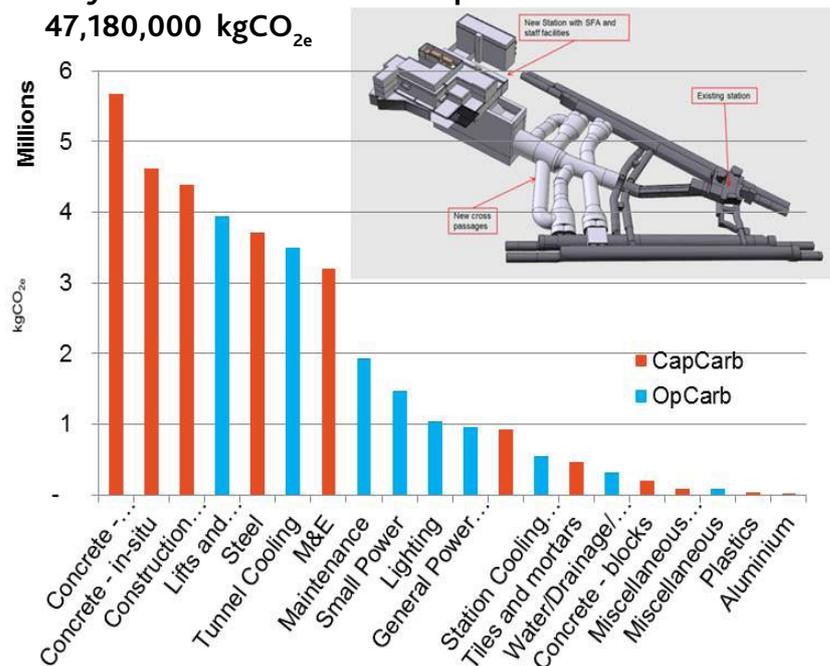


Fig. 1. Whole life carbon footprint for an example station
Source: TfL



Delegates at the ICR seminar



Steven Thompson, Climate Change Manager at National Grid, focused on **National Grid's key carbon reduction activities, learnings and outcomes:**

- Corporate target of 80% reduction to 2050 – aligns with Climate Change Act 2008;
- Embedding carbon reduction in construction with a 5% weighting for carbon in the tender process;
- National Grid is strengthening its organisational carbon knowledge;
- Clear identification of the carbon hotspots of steel, concrete and aluminium;
- Reducing carbon has reduced cost – 20% carbon saving achieved by lowest cost tender for Wimbledon substation redevelopment;
- National Grid has developed an in-house carbon tool that enables it to measure carbon at key stages of the investment process. NG seeks to identify carbon savings at the design stage and has a handbook of design ideas linked to cost savings. The tool is shared with suppliers as part of the tender process; and
- Collaborating with suppliers is key to delivering carbon and cost reductions for National Grid projects.

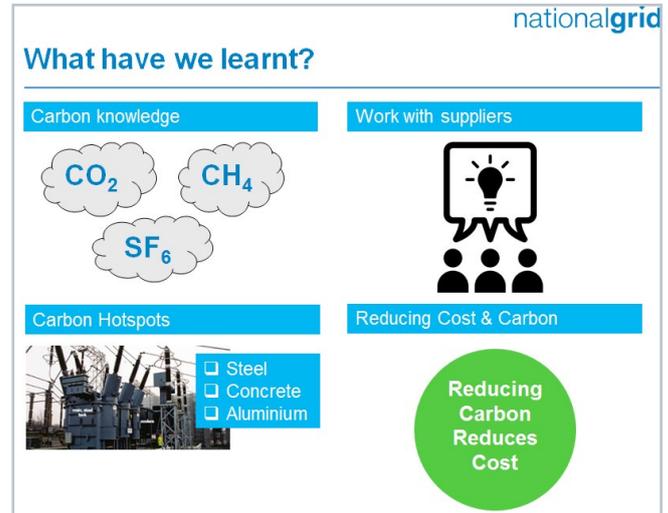


Fig. 2 National Grid Key Carbon Lessons

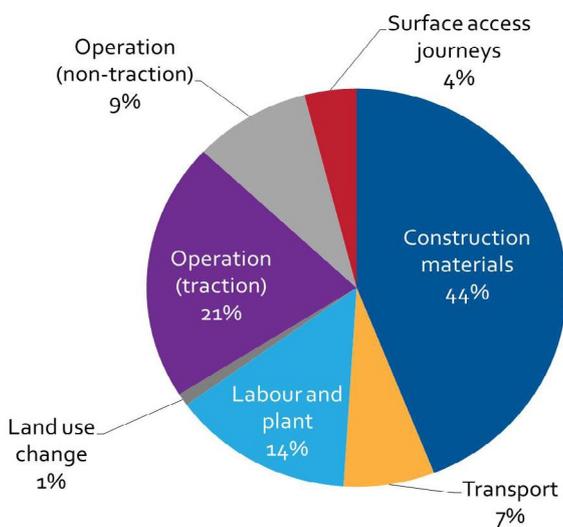


Fig.3 HS2 Phase One Carbon Emissions by Source
Source: HS2 Ltd, 2016

Mark Fenton, Climate Change Specialist at High Speed Two, outlined some of the work to date to **minimise carbon during HS2 construction and operation:**

- Use an 'avoid, reduce, low carbon energy and sequestration' hierarchy, with avoid the most favourable option;
- Involvement in the development of RSSB Rail Carbon Tool freely available to UK rail industry organisations to evaluate low carbon options;
- Communication and culture, both internal and external, with external focusing on supply chain engagement and industry networks;
- Identification of the carbon emission sources during different elements of construction and operation, see Fig.3; and
- Supporting the development of new standards and technologies, including PAS 2080, BREEAM Infrastructure, low carbon concrete and off-site manufacture.



Key themes and panel questions

The presentations were followed by an enthusiastic panel discussion which highlighted three cross cutting themes:

Carbon knowledge

- Strengthened carbon knowledge across a business, including experience that reducing carbon reduces costs, assists carbon reduction progress.
- There is scope for investors and finance teams to be more knowledgeable about carbon to ease carbon reduction progress; sometimes they can drive the process.

Procurement and supply chain

- Experience with requesting low carbon from suppliers varied considerably amongst presenters and participants, from *"if you make the business case then it's a no-brainer"* to experience of designers not being willing to carry the design risk associated with low carbon concrete.
- Collaboration across the supply chain is key to driving carbon reduction. Without this clients may find that low carbon solutions are only available from a few suppliers (with the risk that the market is not sufficiently competitive).
- Procurement processes and staff need to be fully informed about carbon reduction and good practice if the evaluation process is to be sufficiently focused on outcomes.

Incentivising low carbon design

Ways of delivering this generated considerable comment from the panel, see below. Again, experience varied with one participant asking if others had experience of suppliers and questioning the extent to which there is a trade-off between carbon reduction and financial cost.

"Carbon has to be requested – clients need to be informed enough to stipulate it."

Mark Edwards, UK-GBC

"In our experience, working collaboratively with suppliers unlocks both cost and carbon savings. Carbon measurement also has to be followed through into construction - to ensure reductions are delivered and any further savings identified."

Steve Thompson, National Grid

"The designer has to use the carbon tool, not the environmental team."

Mark Fenton, HS2



Collaboration on carbon reduction and key challenges

Finally the workshop invited participants to identify opportunities for collaboration around carbon reduction and also key challenges to delivering this.

Opportunities for collaboration around carbon reduction:

- Opportunity to work together on carbon tools and procurement processes which are non-industry specific - to reduce replicated work, increase shared learning and truly share good practice;
- Collaboration with suppliers pre-procurement;
- Coherent leadership and common voice;
- Early integration of innovation;
- Development of industry benchmarking database and tools, for example on cost savings and procurement; and
- How to use and embed PAS 2080.

Key challenges to delivering carbon reduction in infrastructure organisations:

- The need for clear examples of cost reduction in advance – case studies from other organisations are not sufficient;
- Embedding 'carbon reduction' culture in all parts of the organisation and addressing resistance to change;
- Delivering innovation even though engineering is a risk averse profession. On site the challenge is the divergence between engineers and environmental managers;
- Specifications can limit the innovation of designers;
- Challenge of obtaining a baseline which carbon reduction can be assessed against, especially if incentivising supply chain during delivery;
- Achieving a consistent approach to carbon reduction across different programmes and projects;
- Leadership and management; and
- Engaging with steel suppliers.

Temple would like to thank all the participants at the seminar for their valuable contributions and for generating thought provoking discussions. If you would like to know more about the event or the building sustainable infrastructure group, please contact Jenny Stafford: jenny.stafford@templegroup.co.uk