

Subject: Embodied Carbon in Buildings

Report to: Environment Committee

Report of: Executive Director of Secretariat

Date: 20 September 2018

This report will be considered in public

1. Summary

- 1.1 The Committee will discuss, with expert guests, carbon emissions from parts of the building life cycle including materials production and construction, and potentially demolition and materials disposal.

2. Recommendations

- 2.1 **That the Committee notes the report as background to putting questions to invited guests on life cycle carbon emissions from buildings, and notes the subsequent discussion.**
- 2.2 **That the Committee delegates authority to the Chair, in consultation with party Group Lead Members, to agree any output arising from the discussion.**

3. Background

- 3.1 London's buildings generate significant carbon emissions. Much of these are from heating, lighting and other energy consumption in the operation of the building. There are also carbon emissions in other phases of the building life cycle. These can be as big as or bigger than the operational emissions. Carbon emissions that have been incurred in producing materials, structures or other products are often termed 'embodied carbon'.

4. Issues for Consideration

Phases of carbon emission in the building life cycle

4.1 A building life cycle can be divided into a number of phases, each with its carbon emissions:

- Materials—carbon is likely to be emitted in extracting, processing, forming and transporting the materials that go into a building. For example, for every tonne of steel produced, two tonnes of carbon is emitted; cement is another major emitter. Wood or recycled materials can have lower emissions;
- Construction—the processes of putting materials together to make a building on site also use energy and emit carbon;
- Maintenance—during the operational phase of the building’s life, emissions are mainly from the activities going on as part of the building’s use. There may also be further materials required and energy use involved in maintaining the building fabric, and these can be counted as part of the building’s embodied carbon; and
- Demolition—as with construction, the processes of taking down a building use energy
- Disposal—transporting materials away from the site takes energy. Depending on the destination of these materials, there may be a further carbon cost, but there may also effectively be a reduction in emissions if the materials can be efficiently recycled.

Other opportunities to reduce lifecycle carbon

4.2 Carbon can be reduced at the design phase, for example by designing the building carefully to use smaller quantities of materials, or designing the material elements and the architecture so that it is easy to recycle the materials after the end of life of the building. The proposed new London Plan contains a requirement for major developments to undertake a lifecycle carbon assessment and to seek to reduce lifecycle emissions.

4.3 Lifecycle emissions can also be affected at a higher level of decision-making, when considering whether to replace existing buildings with new ones (likely to be more energy-efficient in operation, but with a cost in embodied carbon), or to refurbish buildings (with different energy efficiency gains and embodied carbon costs), or to continue to operate buildings as is for longer.

4.4 The Committee has invited guests from relevant industry and public bodies to answer questions. Representatives are expected from:

- Sturgis Carbon Profiling;
- Institution of Civil Engineers;
- The Crown Estate;
- WSP;
- Chartered Institute of Building Services Engineers; and
- The Greater London Authority.

5. Legal Implications

5.1 The Committee has the power to do what is recommended in the report.

6. Financial Implications

6.1 There is no financial implication to the Greater London Authority arising from this report.

List of appendices to this report:

None

Local Government (Access to Information) Act 1985
List of Background Papers: None
Contact Officer: Ian Williamson, Scrutiny Manager Telephone: 020 7983 6541 E-mail: scrutiny@london.gov.uk