Paul Minett, CEO
Strategic Lift Ltd
17/130 Great South Road, Epsom
Auckland 1051
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The Productivity Commission
By email to info@productivity.govt.nz

Dear Sir or Madam

Low-Emissions Economy Inquiry: Response to the Issues Paper
Thank you for the opportunity to make this submission to the Issues Paper. The focus of this submission is the built environment.

As a business strategy consultant, I have had the opportunity to support clients in the building industry, and have recently been involved in proposing for a research project focused on decarbonising the built environment.

The analysis in the issues paper touches on the key issues associated with decarbonising the built environment

There are four types of emissions perspectives for the built environment:

1. Operational emissions from existing buildings,
2. Embodied emissions in construction of new buildings,
3. Embodied emissions in renovation of existing buildings, and
4. Operational emissions from new and renovated buildings

Each of these perspectives has a residential building and commercial building component.

The Commission rightfully points out that there is 'little data available to estimate potential mitigation from buildings, or the costs and priorities'. I think this is a priority for analysis.

The World Green Building Council is proposing 'Net Zero by 2030' for operational emissions from new buildings, and 'Net Zero by 2050' for operational emissions from existing buildings. See:
http://www.worldgbc.org/sites/default/files/From%20Thousands%20To%20Billions%20WorldGBC%20report_FINAL%20issue%20310517.compressed.pdf.

This perspective ignores embodied emissions in construction of new buildings.

From a US-based Carbon Leadership Forum at:
http://www.carbonleadershipforum.org/why/ we find the following comments:

The built environment is a critical source of savings. As an end user of fossil fuels, ***the built environment accounts for more emissions than any other sector****, producing nearly half of total global greenhouse gas (GHG) emissions. The current gold standard for reducing emissions from buildings is to build new, zero net energy (ZNE) buildings – super efficient buildings powered by renewable energy sources. This is an important step to realize a carbon neutral built environment, but there is a problem with this strategy: building new, ZNE buildings will generate substantial emissions.*

Two other sources of emissions may be even more important to address in the short term: embodied emissions from building materials, products and construction processes, and operating emissions from existing buildings.

From this paper: http://carbonleadershipforum.org/no-access/download-id/1135/ construction and operation of buildings is claimed to be responsible for almost half of US GHG emissions, a much greater share than in New Zealand. The paper goes on to make the following important point:

When a building is constructed - before it starts operating and generating operating emissions - it is already responsible for tons of GHG emissions. And even though the majority of embodied emissions happen once -- when the building is constructed -- and operating emissions happen over time and are cumulative, the majority of GHG emissions for the first 15 – 20 years of a building's life will be the embodied emissions from materials and construction.

This is especially important in the context of a drive to reduce emissions in the coming 10 – 30 years, and even more important when it is considered that we are in the middle of an unprecedented urban building boom.

The name of the paper is: TIME VALUE OF CARBON when you save matters what you build matters what you don't build matters more LARRY STRAIN, FAIA | lstrain@siegelstrain.com, May 2017

The paper goes on to make several relevant points, including that embodied emissions can be reduced by changing the materials used, and by renovating rather than replacing existing buildings.

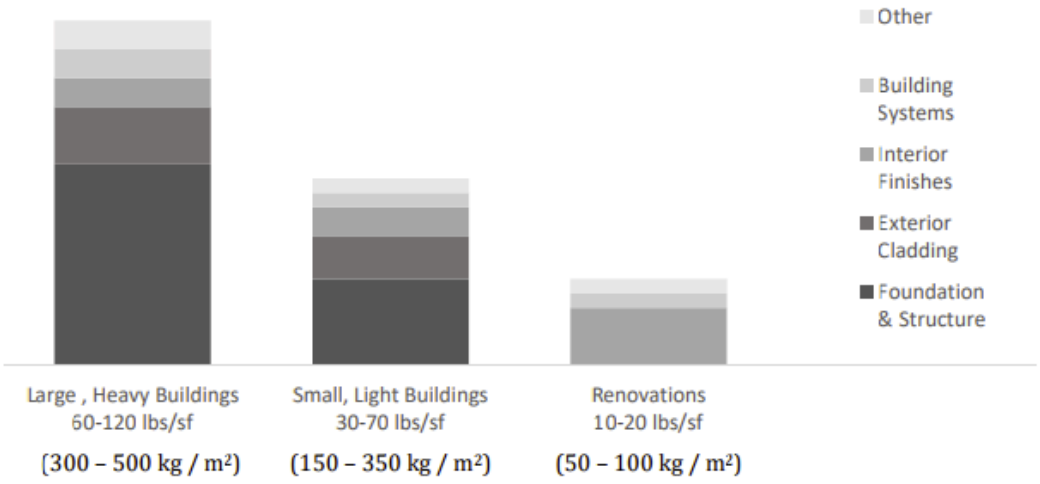

Figure 5. Carbon Emissions by Building Type and Building Element
Source: Embodied Carbon Benchmark Project, Carbon Leadership Forum, and review of multiple embodied energy and carbon studies

This is especially important in the context of New Zealand's wood resource that could be used for structural purposes (CLT for example) to a greater degree as a replacement for steel and concrete, producing lighter, more carbon friendly buildings.

Considering the foregoing, I offer the following as an answer to question 16: What policies and initiatives would best promote the design and use of buildings that produce low greenhouse gas emissions?

1. Bring a separate and urgent focus on embodied emissions and seek to reduce these as quickly as possible, especially given the current building boom. Find a carrot to reward specifiers and owners with, that makes this happen in one year rather than five. As an idea to explore, give any developer 5X the emissions (in credits) they succeed in reducing on a site compared with the current average, on the first site they develop under a 'challenge' environment. This could kick-start development of new capability by developers. Note that embodied emissions include ALL emissions associated with the site, including emissions embodied in materials brought to site, emissions caused by transportation to and from the site, and waste generated at the site during construction.
2. Encourage faster development and evaluation of demonstration projects that use mass timber for structural purposes in New Zealand (note the significant resources and effort being expended world-wide for structural timber to replace steel and concrete, and note that concrete and steel cause significant emissions while timber is a carbon sink). Consider establishment of a well-resourced Centre of Excellence for Structural Wood Buildings in Auckland. Note that for soft sites and in seismically active zones, structural timber is lighter and more resilient. This enables a greater built-space yield for soft sites, a co-benefit from this strategy. (Note that an example of a structural timber tower is described in this link: http://www.archdaily.com/879625/inside-vancouvers-brock-commons-the-worlds-tallest-timber-structured-building?utm_medium=email&utm_source=ArchDaily%20List.
3. Require Housing New Zealand to take an active interest in mass timber as a core technology for their future housing developments, including building some demonstration projects, and require other government departments to specify mass timber as an option for their building requirements.
4. Require that analysis be performed to understand the mix of embodied and operational emissions in New Zealand commercial and residential buildings, new and existing, so that stronger policy can be developed for this space.
5. Require that the building code be much more stringent, especially considering insulation to avoid heat infiltration in summer (to reduce use of cooling energy) as well as avoiding heat loss in winder (to reduce use of heating energy). To this end note that the insulation code for Sydney is much more stringent than for Auckland. See picture from www.designnavigator.co.nz/crc.php.

Current NZS4218:2009 Schedule Method minimum R-value Targets (non-solid contruction)

	Zone 1	Zone 2	Zone 3
Roof	R-2.9	R-2.9	R-3.3
Wall	R-1.9	R-1.9	R-2.0
Floor	R-1.3	R-1.3	R-1.3
Glazing (vertical)	R-0.26	R-0.26	R-0.26
Glazing (skylights)	R-0.26	R-0.26	R-0.31

Australian Building Code Targets:

	All Zones except NSW	NSW
Roof	R-4.1	R-6.3
Wall	R-2.9	R-3.8

6. Note that it is already known how to build buildings with ultra-low operating emissions, so there is little to be gained by delaying until 2030 before this is made a requirement. It could be started by 2018.
7. Require that all advertisements of buildings for sale or rent include information about the operating emissions associated with the building on an annual basis under a standardised set of usage conditions, or using a standardised rating tool such as Green Star and Home Star. This would provide an almost 'cost-free' nudge to owners to improve the rating of their buildings. This is already happening in overseas markets, for example see: https://houseea.co.uk/landlords/energy-performance-certificates-epc/.

Thanks you again for the opportunity to comment.

Yours faithfully

Paul Minett, CEO
Strategic Lift Ltd