Submission Form

Summary of questions from "Process Heat in New Zealand" Technical Paper

To: ECCA

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Background Information

The Golden Bay Cement's Portland Manufacturing Plant is the largest and only fully integrated cement manufacturing plant remaining in New Zealand. The Plant, located on the southern shore of the Whangarei Harbour in Northland, is a contemporary world class cement production facility, with a very long successful innovative history. The Portland Plant recently celebrated a century of cement production at the present site.

Golden Bay Cement works 'smart and hard' to supply and retain our valued NZ customers from Northland through Southland plus a range of export customers in the Pacific Islands. All of our

customers have a choice of supply/supplier product which could also be sourced from competitors in Asia. For us to remain competitive in such an environment we are forced to manage our input costs; and the foremost of these is our energy spend.

The cement manufacturing plant has and continues to be a centre of engineering innovation and manufacturing excellence coupled with the significant economic, employment and business contribution it brings to the wider Whangarei district. It has also established and continues to cultivate a zone of supporting industry growth in a region that needs encouragement for further growth.

Golden Bay Cement has been a consistent and constructive participant in initiatives to improve energy efficiency and ghg emissions reduction. In the 1990's GBC partnered with CCANZ, EECA, Ecologic Foundation and MNZL to form the Cement Industry Energy Management Association (CIEMA) with the Mission Statement; "To continually improve efficiencies in the cement industry by 'best practice' and demonstrate commitment to New Zealand's international climate change obligations.' The NZ cement industry via the CIEMA grouping was one of 24 Voluntary Agreements with Government and committed to and achieved a significant emissions efficiency improvement from base year 1990 (BYE) in target year 2000. GBC continued to engage with Government (MfE -- Climate Change Office et al) during the early 2000's first with NGA options and subsequently as an active participant in the NZ ETS (cement activity).

Opportunities and barriers to lowering emissions from process heat

Q1: To what extent has the NZ ETS influenced process heat investments in your business?
The impacts of the ETS are considered as one of the major influencing factors for all capital projects business case applications/decisions. However, each project proposal is only constrained by the business case economics and meeting necessary ROI hurdle rates.

Q2: To what extent do you agree that businesses are accounting for the price (and future price) of emissions, but face other barriers to reducing process heat related emissions?
GBC includes the possible emissions liabilities in all business cases for projects in their sensitivity analyses. The leading barrier to reducing GBC's exposure to future price increases is the considerable cost of these projects with available industrial scale proven technology solutions.

Q3: To what extent do you agree that businesses are accounting for emissions prices but are unresponsive to changes in the emissions price?
It is difficult to be completely responsive to changes in the emissions prices when there is so much uncertainty over possible legislative changes and/or the future cost of emissions. Whilst operational expenditure can be accounted for in the current trading conditions it is difficult to take a pre-emptive approach for future operational and capital expenditure with a high degree of uncertainty over potential liabilities from changes in the emissions costs.

Q4: Does the NZ ETS provide an incentive to significantly reduce emissions beyond current levels for business who receive industrial allocation?
The current NZ ETS industrial allocation to EITE businesses such as GBC, supports ongoing domestic manufacture of cement against the imported product of all the other cement supply companies in NZ that possibly don't account for emissions in their country of origin. Without this support GBC would not be able to compete with imported product from jurisdictions that do not have an ETS in place.

Barriers to improving energy efficiency and the uptake of renewables in process heat systems

Q5: To what extent does your business ring-fence capital for energy related projects?
All capital projects (including energy related projects) within Fletcher Building (FB) and therefore GBC, are ring-fenced with formal approval, accounting and review protocols. However, projects are prioritised based upon the quantum return on the investment against scheduled hurdles rates of return.

Q6: To what extent are objectives such as sustainability incorporated into your organisations investments, i.e. is sustainability included in your KPIs?
GBC has included energy use (thermal and electricity) use in its KPI's for more than 30 years. Sustainability improvements are included as commercial sensitivities in evaluations for all project investments. Carbon is accounted for and reported on as required by the current ETS scheme.

Q7: Are these objectives considered secondary to risk and return?
GBC project investments are only constrained by the business case economics and achieving the projected economic outcomes. Risk and sensitivity analysis are considered as part of the overall assessment of whether a given project has merit and should receive FB funding approval.

Q8: Do you agree that energy efficiency or renewable projects are often not implemented as they are not core business investments?
Investment in energy reduction related projects in GBC (and FB) is constrained only by the business case economics. Projects that do not meet ROI hurdles are not progressed.

Q9: Is your business limited by access to capital for energy related investments? Is this due to lender appetite or are these limits self-imposed?
Access to capital for energy efficiency projects is - constrained by the economics of the venture(s) and the total amount of capital made available to the business in any one financial year

Q10: To what extent do hidden costs or co-benefits (as described above) hinder or progress process heat investments?
GBC project business case evaluations include all costs and benefits (direct, indirect and any foreseeable costs or benefits) in the sensitivity and risk analysis that is applied to all projects. However, hidden or intangible costs such as community improvement or social well-being are not currently financially accounted for in current business case evaluation

Q11: Does your organisation actively monitor its energy use and/or its emissions?
GBC has included energy use (thermal and electricity) use in its KPI's for more than 30 years. GBC also reports its annual emissions data to Ministry of Economic Development to meet ETS reporting requirements.

Q12: Do you think that there would be benefits from publishing individual emissions data reported by NZ ETS participants and/or large process heat users?
GBC is the sole manufacturer of cement with full processing capability in NZ. There is a risk that publishing this information would disadvantage GBC against the importers in the competitive marketplace. If the individual emissions data included the importers and also considered their emissions at source, including the nature of their electricity generation (coal-fired), and the shipping component, GBC would be comfortable with this reporting.

Q13: Do any of the informational barriers described above have an impact on your organisation's decision to invest in process heat technologies, and if so, to what extent?
The considerable uncertainty of future legislation and/or emissions costs is not helpful to provide accurate scenario analysis for capital applications. Certainty over future possible costs adds merit to the scenario analyses for the sensitivities and the risk register for projects that are explored as part of the capital application process. The Government needs to assist by taking a pre-emptive approach where there is uncertainty over possible outcomes of ETS changes that encourages GBC to bring forward investment in energy reduction projects.

Q14: Could you please rank the three informational barriers as listed directly above this box in order of impact on your organisation?

1. ***Barrier F: Inadequate information on the emissions profiles of products or firms*** *– Most consumers, construction project specifiers and Government agents are not making informed choices to choose lower environmental impact cement options. GBC are assessing projects that will lower the specific energy required to produce cement. This will require that the end users, customers, or specifying consultants change their biases and adopt the usage of lower emission cements.*
2. ***Barrier H: Lack of information or aversion to new technologies*** *– However, contrary to the comments in Paragraph 66, GBC makes considerable effort to acquaint itself with new or emerging technologies. Customers and end user specifiers (engineering consultants) have a bias toward trends that they are familiar with and not with cement products (with a lower environmental impact) that have wide acceptance and proven performance in developed jurisdictions.*
3. ***Barrier G: Some firms have poor information on their own energy use*** *– Of all operating costs at GBC, energy usage (thermal and electrical energy) is the highest operating cost and is monitored very closely. In this respect GBC does not have poor information on its energy use.*

Barriers to the electrification of production

Q15: Has your organisation considered electrifying part or all of a given site's heating process?
Electrification of cement clinker kilns to electric-arc furnaces is not technically possible.

Q16: If so, to what extent do you agree with the barriers I to K listed on the following pages?
Barrier I *– The very nature of cement manufacture requires large machinery that can only be driven by electricity (aside of the thermal energy requirement for the kiln) and therefore other alternatives are not practicable.*
Barrier J *– Given that electricity is the only practicable means to drive the large machinery, GBC manages its electricity demand and cooperates with the network supplier(s) to minimise demand during supply events. Additionally GBC hedges its electricity supply costs for approximately 75% of its peak demand which allows it to run only critical process equipment for short to medium durations during high demand events.*
Barrier J1 *– GBC owns all the incoming electricity supply system from the national transmission network to the plant (25km) and has done so since the 1920's.*
The TPM would impact disproportionally on GBC as Northland is remote in terms of the primary generating capacity in NZ.
Barrier J2 *– NA*
Barrier J3 *– GBC suffers process disruptions from incoming electricity supply fluctuations, whether that be electricity voltage brown-outs or complete black-outs. The nature of the cement manufacturing process means that even a single short duration event can result in costs of over $100k to re-establish production to pre-event levels.*
Barrier J4 *– NA*
Barrier K *– The nature of cement manufacture prevents substituting fuel technologies for electricity (electric arc furnaces) to generate the heat required for the kiln thermal energy.*

Q17: What does your organisation consider are the largest barriers to the electrification of its production?
Electrification of cement clinker kilns to electric-arc furnaces is not technically possible.

Q18: Are there any costs or co-benefits of electrification that we have not included that your organisation has identified?
NA

Barriers to the use of woody biomass

Q19: Has your organisation considered biomass as a fuel source? If so, what did you conclude and why?
For over 15 years GBC has substituted increasing amounts of its thermal fuel (coal) requirement using biomass with wood-waste (chipped demolition timber from Auckland), sawdust and shavings from wood processors.

Substitution rates have been maximised and are limited in the first instance by process issues related to the moisture content of the biomass. Seasonal variations in moisture content of the "as received" biomass also pose process restrictions. However, of more recent years; say last 5 years, widespread interest in the use of woody biomass by other industries has resulted in a scarcity of supply and a compounding market effect that is driving the cost of supply of woody biomass up creating an increasingly less attractively priced source of energy.

Q20: To what extent do you agree with the barriers L to M listed on the following pages?
Barrier L *– Biomass substitution of fossil fuels at GBC is also limited by supply given the strong competition for what has become a commodity from consumers within Northland and beyond the regional boundary.*
To increase GBC's biomass substitution, beneficiation of the "as received" biomass product is needed to achieve the extreme combustion temperatures (~2,300°C) in the GBC kiln. This equipment whilst technologically proven comes at a very high capital cost.
Barrier M *– For over 15 years GBC has had established several supply chains to source biomass. However, with other thermal energy consumers converting their processes to utilise biomass, this fuel has become a commodity which we must now compete for. Security of supply or the cost variability of the biofuel is a considerable risk factor when assessing whether a biomass project has merit and that it will meet the financial outcomes of the venture.*

Q21: What does your organisation consider to be the largest barrier(s) to the use of biomass for supplying heat?
To further increase substitution of the above biomass, the wood-waste products need to be dried to remove much of the moisture (typically 35% as delivered). High moisture creates process issues and poor combustion characteristics in the cement manufacturing process. The barrier to achieving further increases is the capital cost of the equipment for drying, and the safety and dosing systems to needed to introduce it into the kiln combustion system.

Q22: Has your organisation identified any costs or co-benefits of using biomass that we have not included above?
Drying biomass before combustion in the GBC process would have considerable benefits. GBC estimate the cost of drying equipment and the dosing system to be between NZ$7M & NZ$10M. Given competition by other users for this fuel and the modest ROI it has been parked for the immediate future.

Self-generation from renewable sources - wind or solar

Q23: Has your organisation considered building onsite generation? If so, why did the project go ahead or not go ahead?
GBC has considered co-generation of electricity utilising waste process heat. However, the modest energy recovered, technical barriers and the high equipment capital costs have not encouraged GBC to progress this option.
GBC has done preliminary work on wind generation of electricity and found that it is constrained by the business case economics; essentially such investments require many years of operation in order to return any noticeable savings. To date, such investments do not meet FB financial hurdle rates for capital investment

Q24: Are there any barriers to, or co-benefits from, the use of onsite generation that we have not included that your organisation has encountered?
No

The use of direct heat from geothermal

Q25: Does your organisation have the potential to use direct heat from geothermal?
GBC does not have the potential to use heat from geothermal sources.

Q26: If so, what are the key barriers that hinder your organisation from using direct heat from geothermal?
Aside of lack of local geothermal resources, the low quality heat from geothermal sources would not be beneficial to cement manufacture.

Q27: Has your organisation identified any other barriers to, or co-benefits from, the direct use of geothermal heat that we have not included above?

No