

Throughout history, the construction sector has been one of the major contributors for the pollution and degradation of the natural environment. The uncontrolled increase on the consumption of natural resources for the creation of building materials, the manner in which they are utilized and the high emissions they produce during the manufacturing process, are an immense challenge in keeping the planet sustainable for the future.

Concrete, the most common building material in construction and the mostly used man-made material on Earth, makes it possible to build “solid” constructs at affordable prices and for the masses. Cement is the main component of concrete used extensively for building and civil engineering construction. It is an essential ingredient for the development of urban spaces, highways, bridges, canals etc, enables development of public transport, industries and utilities; and is also essential in building of infrastructure for water conveyance and purification.

On average approximately 1 ton of cement is produced each year for every person in the world. Also each year, cement production discharges more than 500,000 tons of sulfur dioxide, nitrogen oxide, and carbon monoxide into the atmosphere. Therefore cement is one of the world’s most significant, but polluting, manufactured materials. Because of its abundance in the world market, understanding the environmental impact of cement manufacturing is becoming increasingly important.

For this purpose, the organisation under study is Butra HeidelbergCement, the first and sole producer of cement in Brunei Darussalam and one of the largest investment in the private sector, especially for the non-oil and gas industry. This company is significant because most of the bigger private sector players are in the Oil and Gas sector.

Butra HeidelbergCement or BHC was established in November 1993 when a group of Bruneian entrepreneurs sought to establish the first and only cement manufacturing plant in the country. The first commercial production began in June 1996 and the company manufactures Ordinary Portland Cement (OPC) which is graded and certified by the Ministry of Development of Brunei as a Class 62.5N cement. This grade is one of the highest quality available in the region. BHC currently supplies 73% of the market in Brunei and operates under the brand name ‘Brunei Cement’.

Butra HeidelbergCement is 70% German owned (by the HeidelbergCement Group) and 30% locally owned by P.J. Corporation Sdn Bhd. HeidelbergCement Group has been recognised as a global market leader in aggregates and a prominent player in the fields of cement, concrete and other downstream activities making it one of the world’s largest manufacturers of building materials. The HeidelbergCement Group itself employs some 57,000 people at 2,600 locations in around 40 countries.

As a company under the HeidelbergCement Group, BHC’s strategy for sustainability is guided by two main bodies of statutes: (1) the Group’s ‘Code of Business Conduct’, which

describes the Group's values of ethical and legal standards for all their cement business activities, from strategic planning to day-to-day procedures in all countries they operate and (2) 'The HeidelbergCement Sustainability Commitments 2030', which define the 6 key topics or core principles of its future sustainability approaches at all HeidelbergCement companies.

With the Sustainability Commitments 2030 or SC 2030, BHC has set for itself clear targets that need to be achieved by the year 2030. The Commitments was built to embrace a wide scope of responsibilities in corporate sustainability management, and aligned its business operations with the United Nations (UN) Sustainable Development Goals (SDGs) enacted in 2015 by the UN General Assembly, which were adopted by all 193 member states. The SDGs aim to end extreme poverty, fight injustice and protect our planet by setting 17 goals for 2030.

The SC 2030 has 6 key topics/core principles and are listed and discussed below:

1. Driving Economic Strength and Innovation:

The first core principle implies for BHC to ensure sustainable profitability of its business through the effective management of all its processes and resources and the continuing innovation of its products and services. BHC is to use all resources as efficiently as possible and target to earn a premium on its cost of capital. It also commits to spend 80% of its product R&D budget on the development of more sustainable products and to be active in "Green Building Councils" or similar environmental organisations in order to drive innovation of sustainable cement products together with their customers.

With a production capacity of 500,000 tonnes per year, BHC is more than capable of meeting the demands of the still growing nation of Brunei. Brunei Cement has become an integral player in nation building by providing locally produced cement with better quality and better strength. Also by being the only cement producer in Brunei Darussalam, BHC has solidified (no pun intended) its absolute position in the market.

Even though being the only player in the field, BHC still drives innovation by expanding on their product line under its Brunei Cement brand with the launch of the 52.5 grade of Brunei Cement. The 52.5 Brunei Cement – a combination of clinker, gypsum and slag – is a breakthrough product innovation from the production team of BHC and reinforces the company's strong commitment for sustainable construction in the country. Slag is a byproduct of steel production, and its addition as an ingredient reduces the amount of Carbon Dioxide emitted during cement production. The addition of slag in the 52.5 Brunei Cement also increases the durability of the cement produced, which makes for a more sustainable building by enhancing the

performance of concrete structures and limiting the amount of repairs needed in concrete maintenance.

2. Achieving Excellence in Occupational Health and Safety:

The second principle implies for BHC to be committed to continuously enhancing the occupational health and safety conditions of its employees, contractors, and third parties, by having targets of achieving zero fatalities and zero lost time injuries.

This has been committed successfully by BHC, as the company was first awarded certification of national standards ISO9002:1994 for its quality management system in December 1997 and subsequently upgraded its quality management system to ISO9001:2000. In addition, the company's environmental management system has been certified to ISO14001:2004 and its Health & Safety management system certified to ISO18001:1999. The company has also achieved compliance to the ISPS (International Ship and Port Security) Code, which became effective on 1 July 2004.

3. Reducing our Environmental Footprint:

The third principle implies BHC to be committed to fulfilling their share of the global responsibility to keep temperature rise below 2°C, and to continue to reduce impacts on air, land and water. It also commits BHC to do the following:

(i) Emissions

- To reduce our carbon footprint by 30% compared.
- To increase the alternative fuels rate to 30%.
- To reduce cement production-related SO_x and NO_x emissions by 40% and dust by 80%.
- To permanently reduce all other air emissions below cement industry average.

(ii) Water

- To reduce water consumption at all operational sites as far as economically and technologically feasible.
- To implement water management plans at all sites located in water scarce areas and aggregate them on a country level to form a water reduction master plan. On a Group level, all efforts will be combined in a global strategic water consumption reduction plan.

(iii) Land use

- To operate all extraction sites based on an after-use plan agreed with local authorities and in accordance with the needs of local communities.
- Aim to include biodiversity enhancement recommendations in any new after-use plan.

- To implement a biodiversity management plan at extraction sites within or in direct connection to nature conservation areas.
- To aim to achieve a positive impact on the biodiversity value at extraction sites in cases of nature-oriented after-use plans.

This would be particularly challenging for BHC. Cement manufacture contributes greenhouse gases directly through the production of carbon dioxide when calcium carbonate is heated (producing lime and carbon dioxide) and indirectly through the use of energy, particularly if the energy is sourced from fossil fuels. The cement industry produces about 5% of global man-made CO₂ emissions, of which 50% is from the chemical process, and 40% from burning fuel. The amount of CO₂ emitted by the cement industry is nearly 900 kg of CO₂ for every 1000 kg of cement produced.

The cement industry is an energy intensive industry with energy typically accounting for about 40% of its operational costs, i.e. excluding capital costs but including electricity costs. Traditionally, the primary solid fossil fuel used was coal but a wide range of other solid, liquid or gaseous fossil fuels are now used, such as petroleum coke, lignite, natural gas and oil (heavy, medium or light fuel oil).

The production of cement also involves the extraction and consumption of large quantities of raw materials, energy, and heat. Cement production also results in the release of a significant amount of solid waste materials and gaseous emissions. The manufacturing process is very complex, involving a large number of materials (with varying material properties), and pyroprocessing techniques (e.g., wet and dry kiln, preheating, recirculation).

This results in environmental impacts at all stages of the production process: emissions of airborne pollution in the form of dust and gases; noise and vibration when operating machinery and during blasting in quarries; and limestone quarries are visible from long distances and may permanently disfigure the local environment.

Since the beginning of August up to October of recent years, Brunei frequently hazy conditions which range from slight transient haze episodes to severe haze episodes. Various factors have contributed to these hazy conditions which has also affected other Southeast Asian countries. The factors responsible for the haze include the outbreak of forest and land fires (peat and coal) in the southern part of Borneo and the eastern part of Sumatra, Indonesia.

BHC has also contributed to the severe haze conditions. The company has regularly received public criticism during haze episodes and at times have been asked to reduce their emissions through temporary cessation of their operations, and utilise better production practices or the use of clean technology.

4. Enabling the Circular Economy

The fourth principle implies for BHC to conserve its natural reserves by continuously increasing the use of alternative resources as substitutes for natural raw materials. It also requires BHC to continuously increase the substitution rate of natural raw materials by using by-products or recycled materials

In dealing with solid waste, BHC has given special attention to plastics. In an effort to reduce the use of plastic bags and plastic packaging a campaign has been launched by BHC to raise consumers and retailers awareness on the issue. As part of the campaign for plastic waste reduction, BHC has even switched to paper bags instead of polypropylene sacks to pack their cement.

5. Being a Good Neighbour

For the fifth principle, BHC aims to support the social and economic development of its neighbouring communities and ensure transparent communication to all stakeholders. BHC resolves to maintain open and transparent communication about its activities and performance. They also aim to help improve the level of education and living conditions in neighbouring communities.

BHC actively offers internships for students from local and overseas higher institutions. The programme is designed to develop the skills and capacity of the local youth, to prepare them in their future endeavours. BHC continues to mentor students from the local higher education institutions - Universiti Brunei Darussalam (UBD), Universiti Teknologi Brunei (UTB) and Politeknik Brunei (PB) through internships. In average, the company has 10 to 15 interns being attached at various departments at any time. In addition to the internship programmes, BHC awards top students and academic projects to UBD, UTB and PB respectively as a form of motivation and incentive for academic achievements.

6. Ensuring Compliance and Creating Transparency

For the final principle, BHC would adhere to international human rights, anti-corruption and labour standards and co-operate pro-actively in an open and transparent manner with all its stakeholders. BHC would ensure compliance through internal control and risk management systems, such as internal audits and a whistle-blower hotline where possible. They are also to ensure that their suppliers comply with the Group's Supplier Code of Conduct and to ensure that each of its job position is staffed with the most qualified person, independent from gender, origin, beliefs, and/or orientation.

BHC has developed the thinking of sustainable management, by means of the company to pursue revenue opportunities while never losing sight of its future business health. Unlike traditional forms of business risk, social and environmental risks manifest themselves over a longer term, often affect the business on many dimensions, and are largely outside the organization's control. Managing risks therefore requires making investment decisions today for longer-term capacity building and developing adaptive strategies.

For BHC, investing in sustainability is not only a risk management tool; but it can also drive innovation. Redesigning cement products to meet environmental standards or social needs will lead to new business opportunities. BHC can follow the example of 3M, which integrates sustainability into its innovation pipeline through its "Pollution Prevention Pays" program. The program basically minimises waste and avoids pollution through product reformulation, equipment redesign, process modification, and waste recycling and this leads to lower production costs for the company.

A cement plant like BHC can also be a powerful factor in economic and social development of a country, provided it integrates these sustainable management right from the design stage. The cement industry supports the creation and development of local job-creating companies, just as it does in developed countries. It is also recognized in developed countries that one job in the cement industry creates ten times more indirect jobs in both upstream and downstream economic sectors. This figure may be four to five times higher in developing countries. A cement plant does, therefore, have a real impact on employment in a given region.

For BHC, natural resources would be the basis of concern for its business. Even though the SC 2030 primary objectives are to protect the climate, preserve resources, reduce emissions, and have the lowest possible impact on the environment at its quarry and production facilities, it will always face a challenge in their manufacturing due to resource depletion – particularly water.

Historically, Water has largely been considered a free raw material and therefore used inefficiently, but many big companies are now experiencing the higher costs of using the resource. Coca-Cola, for example, faced a water shortage in India that forced it to shut down one of its plants in 2004. As the 24th biggest industrial consumer of water, Coca Cola has now invested \$2 billion to reduce water use and improve water quality in the communities in which it operates.

Water-related risks also threaten to strand billions of dollars for industries including cement producers. "Stranded assets" are investments that become obsolete due to regulatory, environmental, or market constraints. For example, problems related to disruptions to water supplies in Peru has resulted in the indefinite suspension of \$21.5 billion in industrial projects since 2010. In 2012, the International Union for Conservation of Nature (IUCN) released a Sustainability Report that stated 12% of global cement production operations were in

water-scarce or water-stressed locations, particularly in 'high-risk' basins in Pakistan, India, Algeria, Mexico, Jordan, China, South Africa, Iraq and Uganda.

So, what can BHC do to improve its position but still commit to its sustainable objectives? Below are a few recommendations:

1. Replacing coal. Cement kilns can run on oil or natural gas instead of coal, giving cement producers the opportunity to significantly reduce greenhouse gas emissions, and potentially drive down its energy costs. Alternative fuels such as biomass can also be used, providing further opportunities to conserve natural resources.
2. Adopting more efficient grinding methods. Grinding technologies are very inefficient, with 95% of the energy input in the grinding process lost to waste heat. Some cement producers are now using high-pressure processes to improve grinding efficiency. There are also non-mechanical milling technologies that offer further efficiency gains.
3. Incorporating grinding aids. Liquid grinding aids can improve grinding efficiency and mill output, reducing power needs, as well as pumping costs. This has the potential to vastly reduce the grinding cost per ton of cement for BHC.

Also for BHC to be successful as a company, it has to maintain cordial and cooperative relationships with their various stakeholders who are affected by its business operations on the local, national, and international levels. That is why BHC must place great value on open communication that directly addresses any environmental problems, as well as on maintaining a constructive dialogue with all the relevant stakeholder groups.

The expectations of external and internal stakeholders play a key role in the development of the sustainability strategy. Worldwide, the HeidelbergCement Group is a member of cross-sector as well as industry-specific associations that represent their members' interests through a continual dialogue with governments, businesses, and the general public. BHC can ride on this and set "value creation for stakeholders" as one of its business goals with the understanding that good relationship with all stakeholders would create major benefits such as supporting new innovations and solve certain operational problems, or promote good images for the business and reinforce further its license to operate.

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