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Quantifying the contribution of the chemical supplier in papermaking sustainability

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Papermaking in its simplest form is a sustainable process. It uses wood, a renewable resource, and produces a product that is 100% recyclable and biodegradable. Indeed, the paper industry has become significantly better at communicating and promoting the sustainable nature of its product.

The sustainable qualities of paper, a key differentiator when compared to the available alternatives (e.g. plastics, non-wovens and electronics), have been a driver for increased demand. A good example is the packaging industry where, although linked to the global economy, sales continue to increase because the well-informed consumer balances the factors of cost and the best ecological alternative in the retail environment.

Sustainability is not a new requirement to the industry. It is, and always has been, good business practice to ensure the continuing source of raw materials, to maintain positive media relations and to avoid regulatory fines by adhering to local environmental legislation. But sustainability is much more; it is a commitment, a noble goal that encompasses all of these factors and more under one umbrella term.

Despite significant advancement in manufacturing practices, the paper industry itself is still under increasing pressure to improve its profile in terms of sustainable metrics. The scope of measurements has increased to include things like Life Cycle Analysis (LCA), and corporations can be held accountable for the practice and ethics of the suppliers selected by the business. The result is that provenance and transparency throughout the entire supply chain is now high on the agenda.

Sustainable reporting and accreditations through non-profit organisations like the Global Reporting Initiative (GRI), UN Global Compact and indices like the WWF and world stock markets sustainability index (to name but a few), although voluntary, have seen a very high level of adoption by papermaking organisations, and there are many other sector specific accreditations which address different areas of the business, such as forestry management, carbon emissions, waste management and supply chain management.

Sustainability is not only a differentiator in the global marketplace, it is also a business driver and a fundamental requirement which must be measured, reported, assessed and improved upon. Corporations that do not embrace the continuous drive for more sustainable practices are not only targets for NGOs and poor media publicity, but according to widely held opinion, they are unlikely to be in business long term.

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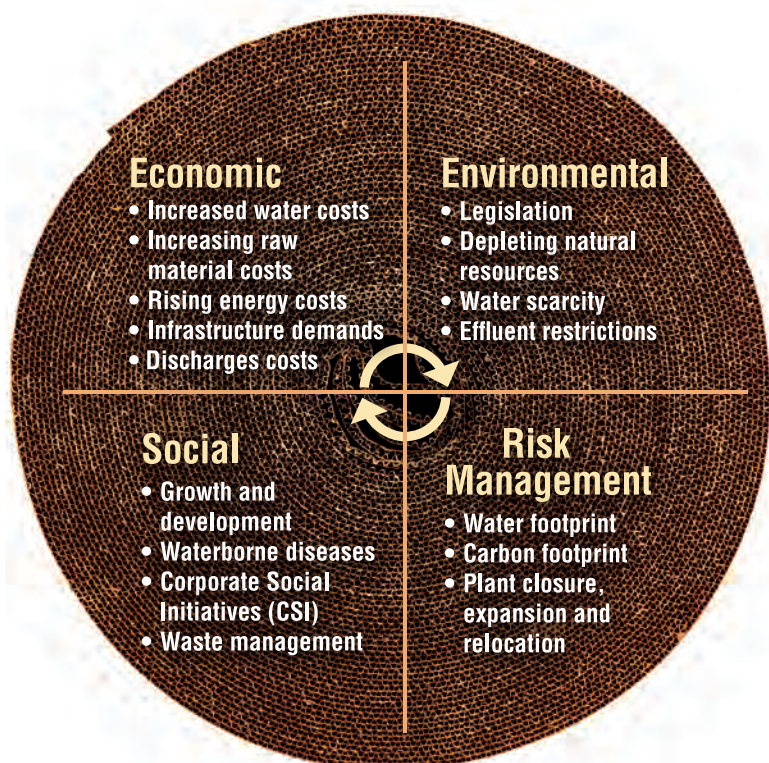


Figure 1. Drivers of sustainability

There is a strong financial case for sustainability as the cost of energy increases and, in some parts of the world, water resources are scarce. Similarly, the financial penalties for emissions (e.g. Carbon tax / land fill costs, etc.) indicate a more sustainable business should enjoy lower operational costs. Market share is key as retailers bow to the pressure of consumer choice and take the most recognised or highly accredited sustainable option.

As a chemical supplier to the paper industry, Buckman have always held sustainable values at their core. The company was founded in 1945 based on the development of an organic biocide which gave the industry a much needed alternative to existing mercury-based technology.

Today Buckman continues in their commitment to creating more environmentally friendly products from renewable sources. With a full catalogue of products for the pulp and paper industry we endeavour to design treatment programs for our customers that yield a greater financial return with lower environmental impact whilst keeping safety at the forefront. Some examples include:

- Market leading position in the development and application of enzyme technology
- 2 EPA Presidential Green Chemistry Challenge Awards for enzyme technologies, the most recent awarded in June 2012
- Development of naturally-based products from soy, cellulose, and citrus sources
- Organic coagulants
- Phosphate-free scale inhibitors
- Process application equipment for water reuse

Buckman are a customer-intimate organisation, and like the pulp and paper industry, we were faced with the similar challenge of getting the message out to our customers and aligning our approach to sustainability with the approaches our customers had already developed independently.

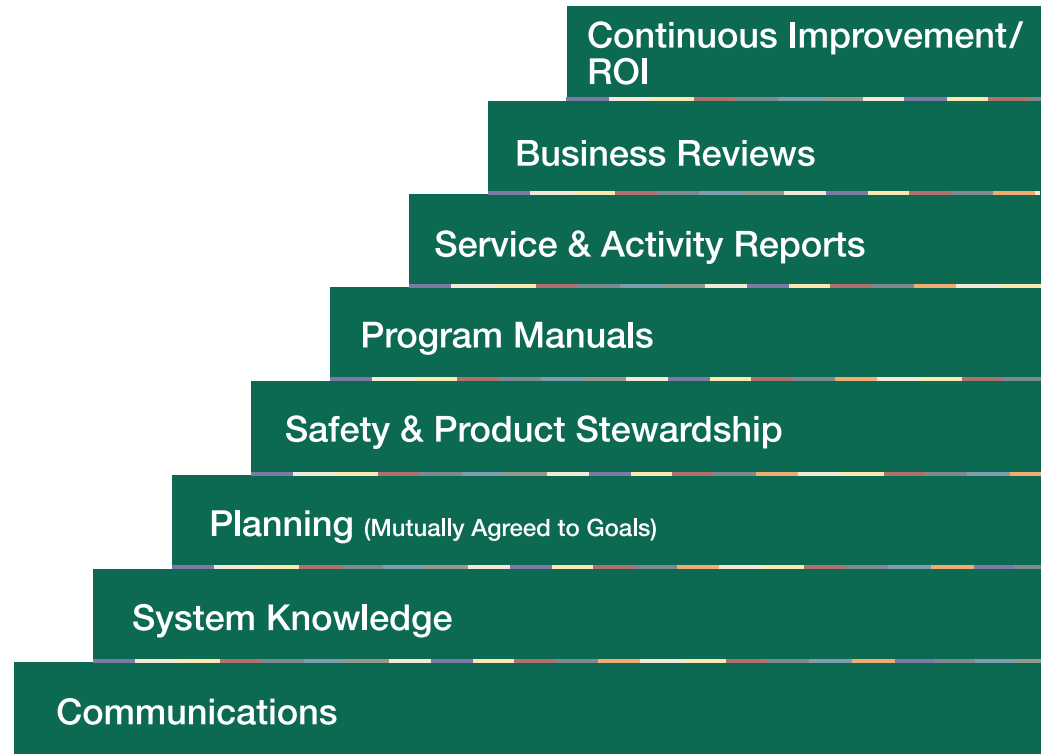


Figure 2. Globally Buckman employ a set of 8 Business Management Standards at our larger customer sites as part of our Account Management Programs

ACCOUNT MANAGEMENT PROGRAMS

The purpose of these 8 Business Management Standards is to maintain customer satisfaction by delivering agreed-upon, measurable improvements in efficiency, safety, and performance.

The chemistries used in pulp and papermaking operations are predominately valued for problem solving, improving efficiencies and reducing operational costs. But these treatments often deliver a measurable sustainable benefit such as reduced energy consumption, reduced water use, decreased emissions, or higher yields. Buckman are able to define and record the sustainable contribution – some examples of which include:

Maximize® - Enzymes for strength development

- Allow for higher usage of recycled waste paper content (lower usage of natural resource - virgin fibre)
- Reduce energy in refining (reduction

- in greenhouse gas emissions)
- Improve productivity (reduction in sustainable metrics per tonne of production)
- Improve bleaching response (reduced contribution to AOX levels in waste water)
- Reduce cationic additives that can affect aquatic species
- Natural products with very low carbon footprints

Bufloc®/Bubond® - Polymers for retention/drainage/dry strength

- Improve raw material utilisation rates (yield/lower basis weight for strength requirements)
- Improve discharge water quality (chemical oxygen demand/total suspended solids)
- Decrease energy needs and demands through drainage and moisture improvements (reduction in greenhouse gas emissions)
- Improve productivity of existing facilities (reduction in sustainable metrics per tonne of production)

There is a strong financial case for sustainability as the cost of energy increases and in some parts of the world water resources are scarce

Busperse® - Cleaners

- Enzymatic or biodiesel cleaners that pose no environmental impact (replacing solvents, caustics and acid based cleaners)
- Improve efficiency and lower environmental footprint
- Lower Volatile Organic Compounds (VOCs) to discharge

These are just a few examples, but there are many more which illustrate how chemicals can impact sustainability. The value definition can be varied for different industry sectors. Tissue mills, for example, may place greater value on lower drying temperatures and reduced refining energy which impact CO₂ emissions. And packaging mills may value strength properties at lower basis weight to achieve lower raw material usage and reduced CO₂ emissions throughout the supply chain to the retailer.

Buckman believes so strongly in the value of sustainability that we have invested in our people, with sustainability training for every field associate around the world. This means our associates can discuss the desired goals of a corporation specifically with each customer on-site, and how Buckman can contribute to achieving:

- Reductions in water, energy or raw material usage
- Reductions in emissions to air, land or water
- Improvements in process efficiency which lead to lower sustainable metrics per tonne of paper produced.

The 7th Business Management Standard, holding regular business reviews with our pulp and paper customers, gives us the format to actively determine and record the customer's continuous improvement objectives.

Once projects are identified, they are prioritised through consultation according to the financial Return on Investment (ROI) and the sustainable Return on Environment (ROE).

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Other factors will affect the prioritisation including risk involved and external influences such as regulation.

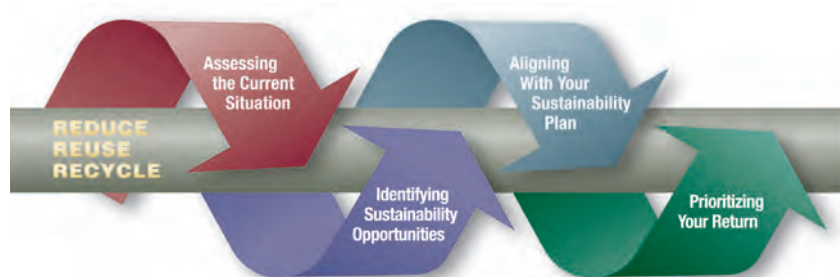


Figure 3. Buckman have established a way to assess process and water systems and implement improvements that will help make the operation greener. The process consists of four distinct steps that revolve around the concepts of Reduce, Reuse and Recycle.

One of the key differentiators of this approach by Buckman is that we have also developed tools to identify, monitor and report the sustainable benefits in terms of Return on Environment (ROE).

Buckman's sustainability guide is an interactive reference manual which helps our associates to identify and develop programs for sustainable benefits. This means that before we start a chemical trial on a machine, we have identified a number of potential financial and environmental benefits of the program. These can be baseline monitored pre-trial so that improvements in sustainable metrics can be recorded and quantified.

One of the key issues for translating trial information is to convert the data into a meaningful sustainability number. Energy converted to CO₂ emissions, for example, will vary considerably and is entirely dependent on the source of energy and the type of fuel. Buckman have developed a proprietary sustainability calculator which allows us to input the variables and make accurate conversions of trial information.

The sustainability calculator converts all of the data collected to meaningful sustainability metrics in five key categories;

- Carbon emissions (CO₂e)
- Water savings
- Environmental water quality (e.g., COD / AOX)
- Reduction of waste material
- Reduction in the use of natural resources

The sustainability calculator tracks data over the short and long term and generates a monthly report of sustainable values which our applications have delivered in the pulp and papermaking process.

At Buckman, Green is our colour, and our commitment. Buckman's global sustainability initiative is a comprehensive approach to environmental stewardship, social leadership and financial responsibility. Our goal is to find the sustainable path, not only for ourselves but also for our customers. Through Buckman Green we are committed to helping our customers make the most of greener technologies and solutions.