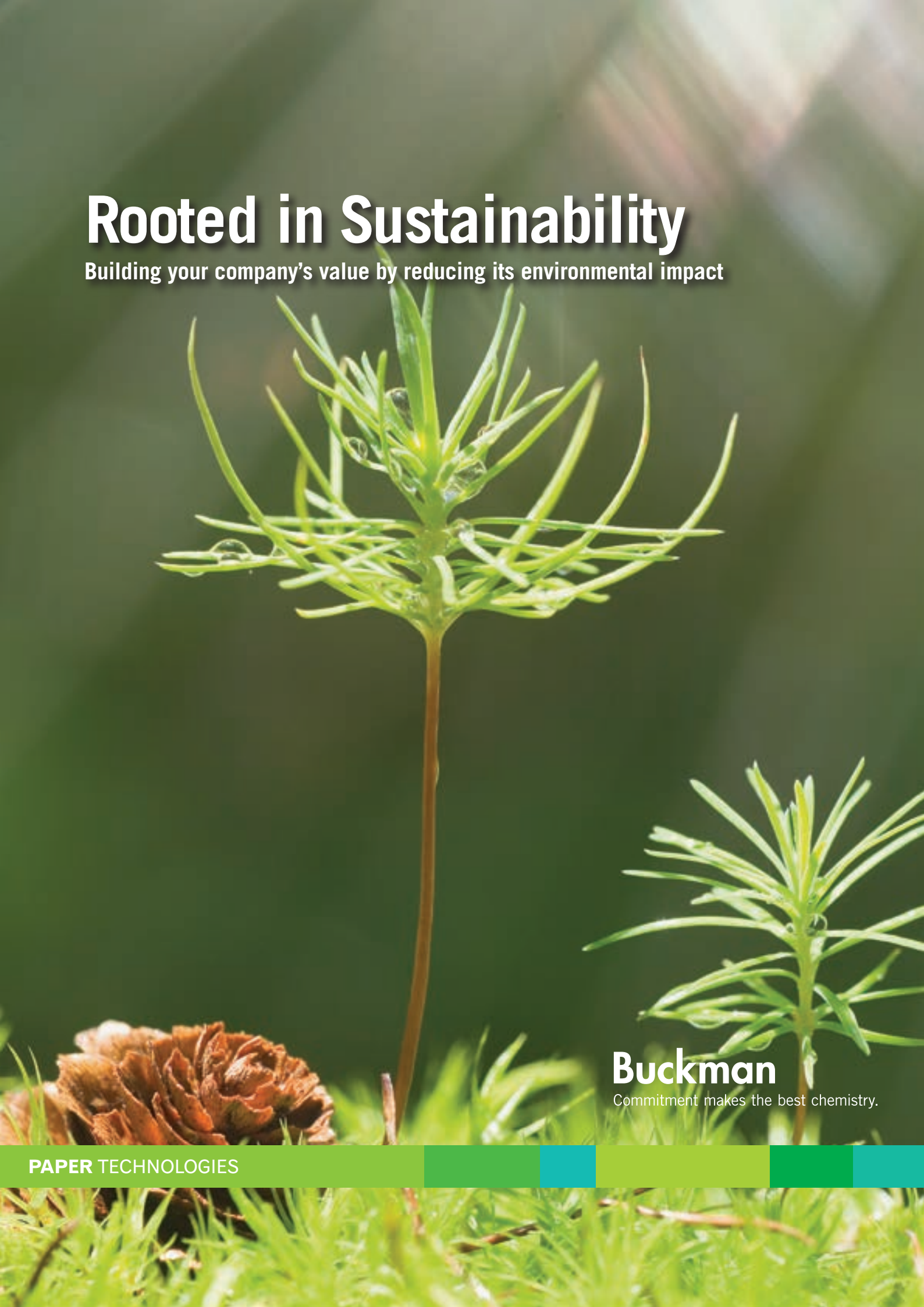


Rooted in Sustainability

Building your company's value by reducing its environmental impact

Buckman

Commitment makes the best chemistry.

PAPER TECHNOLOGIES

Good for the planet. Good for business.

Dear Valued Customer,

The idea of sustainability has taken hold all over the world. You'll find it in just about every company annual report. It takes a prominent position in marketing and advertising. And, for forward-thinking companies, it is having a profound effect on business strategy. After all, the future will be one of carbon taxes and credits, water shortages and increasingly stringent regulations. Greenhouse gas management, alone, is predicted to account for four percent of global economic output. It will pay to be prepared.

Buckman has had a longstanding commitment to sustainable practices. You see it in our intimate customer approach and our steadfast adherence to proven business and ethical fundamentals. We believe being green is the key to being economically viable in the decades to come. So it only stands to reason that we would want to help our customers become sustainable, too.

There's no better place to start than with our largest market, pulp and paper, a truly sustainable industry when done right. That's why our paper technologies division is working to bring new levels of sustainability to our clients, finding ways to improve not only their environmental profile, but also their social and economic vitality. We would like nothing better than to do the same for you.

Steve Buckman
CEO and President

Going green and growing your company

are not mutually exclusive. You can do both. In fact, growing green is really the only way forward. That's because a strong commitment to a sustainable future is also a commitment to saving money, to increasing productivity, to attracting customers and to enhancing the quality of life for your employees and your community.

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

This guide will show you how our trained sales associates can use specialized processes and tools to strengthen your sustainability efforts and reduce your environmental footprint in the areas of raw material utilization, water, energy, emissions and waste discharge.

Together we can assess:

- Where you are.
- Where you would like to be.
- How we will get there together.
- How we will know we have reached our goals.

Not only will Buckman assist you in achieving your productivity goals, we will focus on your overall sustainability goals, and we will also strive to do it in such a way that you reap the maximum benefits, ones that are measurable.

Why Buckman?

We practice what we preach. We've invested in new equipment, new technologies, and quantitative metrics to measure and significantly reduce our own environmental footprint. In 2010, we set ambitious five-year goals, and by 2012 we had already met many of them, including a 15% reduction in direct energy consumption, water usage and CFC emissions. We are continuing to make reductions in these areas while improving our emissions to the air, land and water. Buckman has particularly focused on eliminating emissions to landfills, with special emphasis on hazardous waste.

Of course, for Buckman, one of the best ways to minimize our impact on the planet—and to reduce your company's carbon footprint—is to improve the chemistries we create. We have dedicated ourselves to developing biodegradable, nontoxic and naturally derived products to replace less sustainable options.

Recent breakthroughs

Buckman is committed to providing the pulp and paper industry with highly effective products that offer the lowest possible environmental impact. We do not accept that being green means sacrificing performance, and this thinking is what drives our researchers. Here are a few areas where Buckman is leading the way.

Stickies Control

Our Optimyze® and Optimyze Plus enzymatic solutions address multiple components that comprise complex stickies deposits that can foul recycling, pulp, and paper operations and result in lost production. These programs take contaminants right out of the system, so they stay out of the sheet. Best of all they are eco-friendly to reduce the mill's impact on the environment.

Fiber Modification

Buckman's Maximyze® enzymatic technology enables mills to reduce pulp refining and drying times, which reduces electricity and steam consumption. Carbon emissions are also lowered. And the integrity and strength of the fiber is maintained, so mills can use less fiber, choose less expensive fiber or upgrade quality, depending on their needs.

Deposit Control

Buzyme® deposit and boilout programs from Buckman use highly effective natural enzymatic products and other low-risk ingredients to keep paper machines clean and running at their optimum level. Compared to conventional chemistries, these low-VOC, low-toxicity alternatives provide effective results with a lower environmental impact.

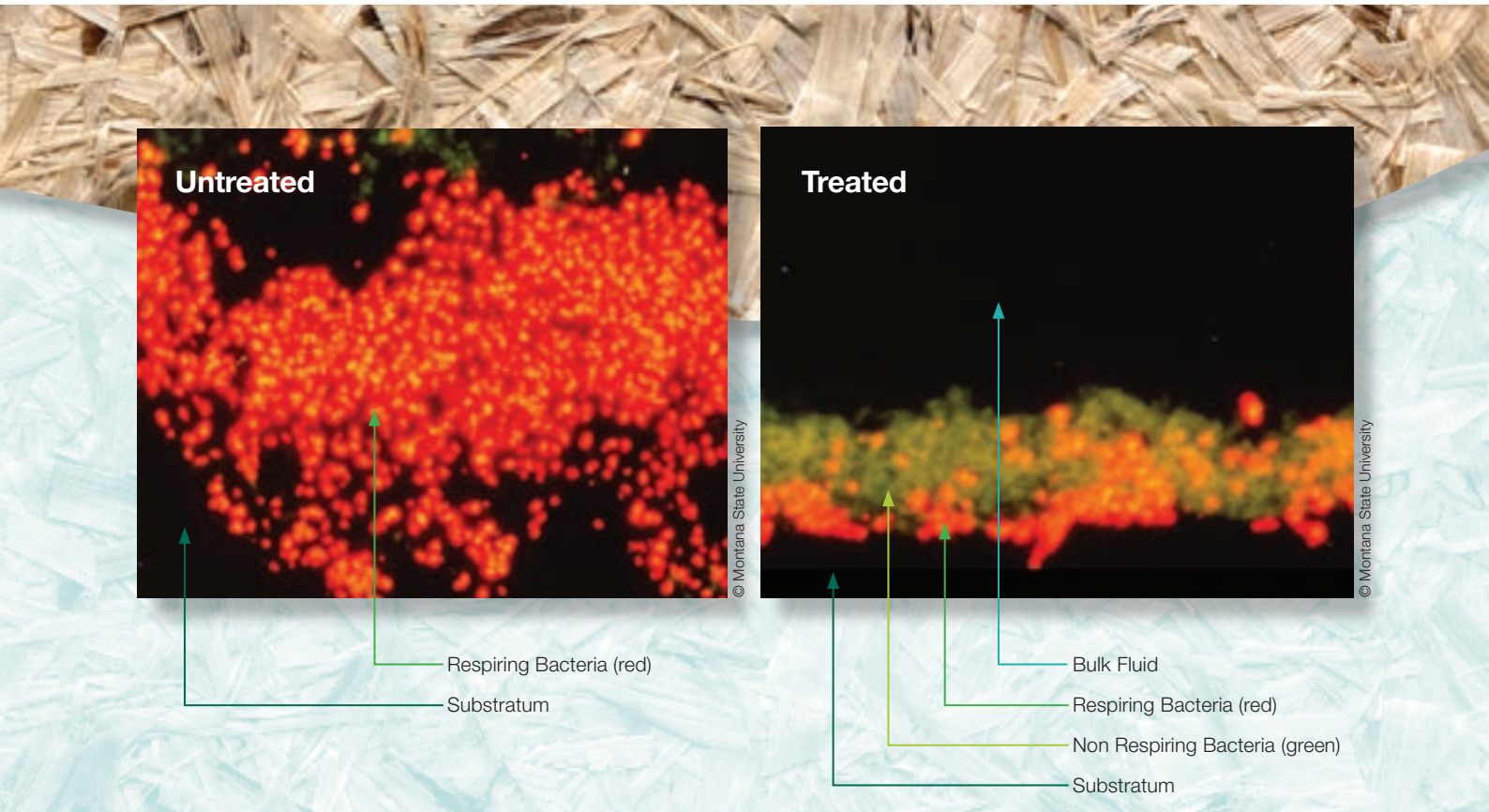
Clarification

The improvement of your highest-volume raw material entering the mill has numerous beneficial impacts down the line, from chemical usage to machine operating efficiency. Buckman offers new plant-derived coagulants, such as Bufloc® 5828, for improved clarification of incoming water.

For example, we have successfully replaced traditional hydrocarbon-based products with those made from renewable resources such as trees, citrus, corn and soya. We also have developed oil-free defoamers, organic coagulants and phosphate-free scale and corrosion control products.

For our innovative enzymatic technologies, Buckman has been awarded two Presidential Green Chemistry Challenge Awards from the U.S. Environmental Protection Agency—one for Optimyze® in 2004 and the other for Maximyze® in 2012. Our research and development continues.

Just as important as the chemicals themselves is the search for ways to improve the sustainable credentials of the existing processes within our customers' facilities. Improving yield of forest resources. Using scale and deposit inhibitors to save energy. Reusing effluent waters. Recycling and identifying alternative water sources. We do all of this and more for our customers everyday, providing not only a Return On Investment (ROI), but a measurable Return On Environment (ROE) too.



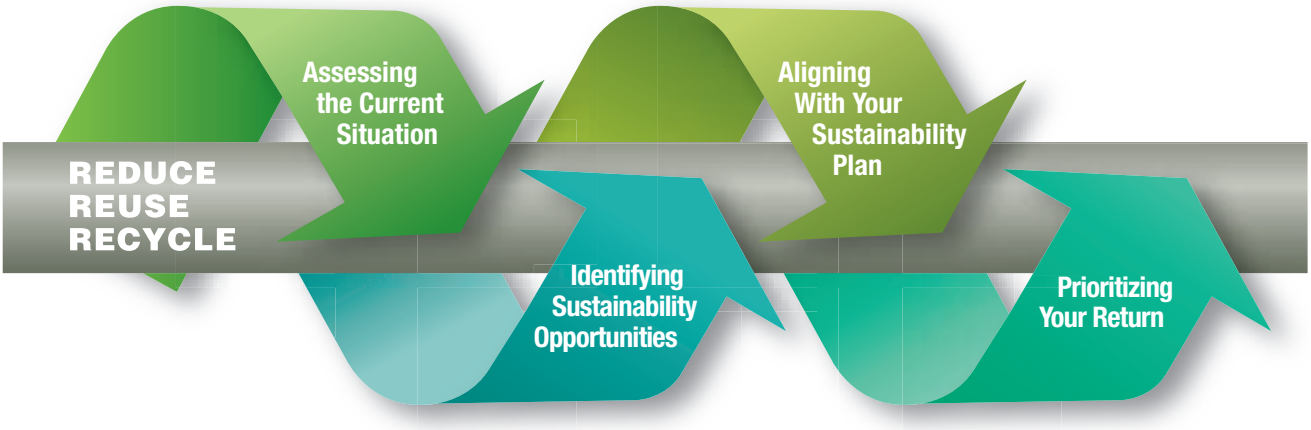
Greener Microbicide Technologies

Oxidizing biocides offer excellent microbial control but come with inherent limitations. Their effectiveness is compromised by high organic demand, and they lead to the formation of chlorinated organic compounds. Buckman offers breakthrough alternatives that excel in high demand systems, are not affected by pH levels, and are highly specific in targeting microbiological material.

Our products can keep equipment cleaner, longer, while saving money in chemicals, maintenance, and manpower. And because they reduce chemical use and emissions and degrade into nontoxic minerals, they will help you take significant steps toward a more sustainable operation.

The water, fiber and energy reduction process.

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



Step 1 Assessing the Current Situation

In Step 1, we assess where we are as a team—Buckman's current role in your facility, the knowledge we have regarding your systems and what drives your sustainability program. During this step, the Buckman representative will ask a number of "now" questions to better understand:

- Your current levels of water and energy consumption, discharges and emissions.
- What drives your company's sustainability and reuse program.
- What you consider to be the ideal situation for your company.
- What the cost is of current practices within your facility.

This will help establish a baseline for your facility and provide insight regarding:

- Environmental pressures under which your company operates.
- Current limitations on your company to increase capacity and sustain current practices.
- The costs of maintaining current practices and protocols.
- The roles and responsibilities of specific facility positions and personnel in your facility.
- The drivers of your green and sustainability initiatives.
- Your short-, middle- and long-term strategic sustainability plans.
- Reuse initiatives you currently have in place.

Your Buckman representative will conduct a number of surveys of your systems to understand and quantify the water, energy and raw material usage in specific operations.

A Close Look at Costs

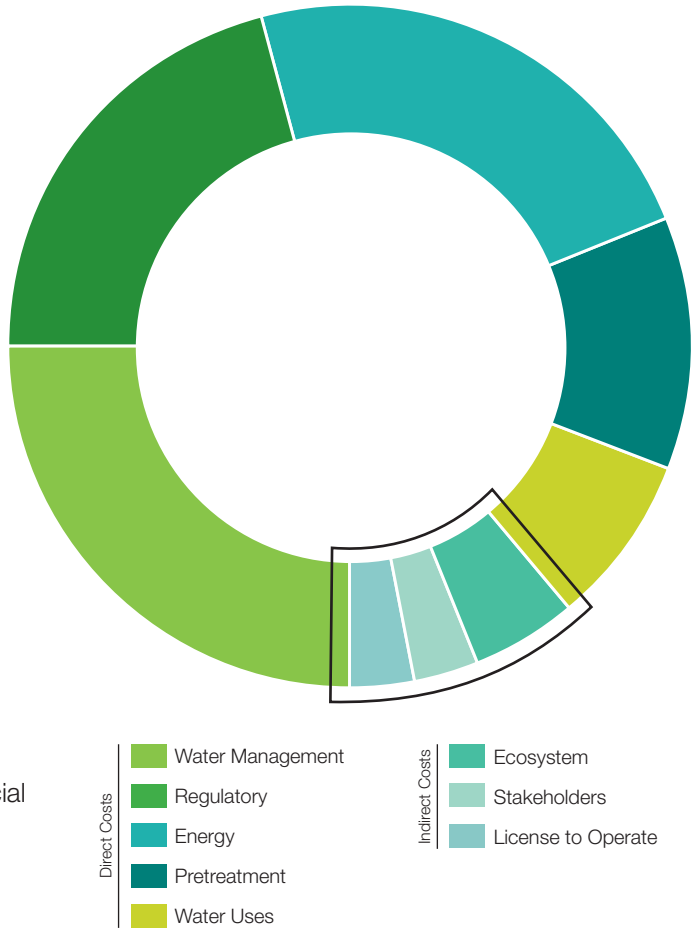
In addition to assessing flow capacities, the Buckman representative will work with your team to collect all related cost information. Your cost basis can be viewed as follows:

Direct Costs

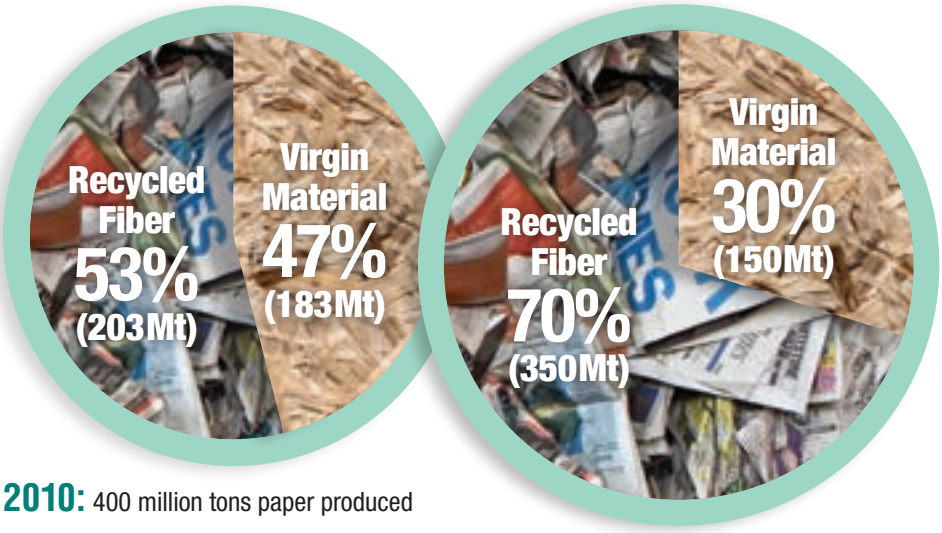
- Raw material utilization and yield
- Water use expressed as $/volume x volume per period (minute/day/year). Volume units are typically gallons or m^3
- Wastewater and solid waste discharge fees
- Costs of reuse practices and treatment technologies in use
- Energy costs at current utilization rate
- Regulatory costs (permits, compliance assessment, fines, etc.)
- Costs for water management measures (staff time and resources, technology, equipment and materials)

Indirect Costs

- License to operate or grow (marginal cost for capacity expansion)
- Relationships with stakeholders (suppliers, financial institutions, employees, regulators, customers, shareholders, neighbors and local communities)
- Environmental impact (loss or damage to the environment)



Producing More Paper With Less Virgin Material



2010: 400 million tons paper produced

2020 Scenario: 500 million tons paper produced with 70% recycled fiber

Increased paper recycling and improved papermaking technologies could reduce the demand for virgin material by 2020.

Source: WWF's Living Forests Report, 2012

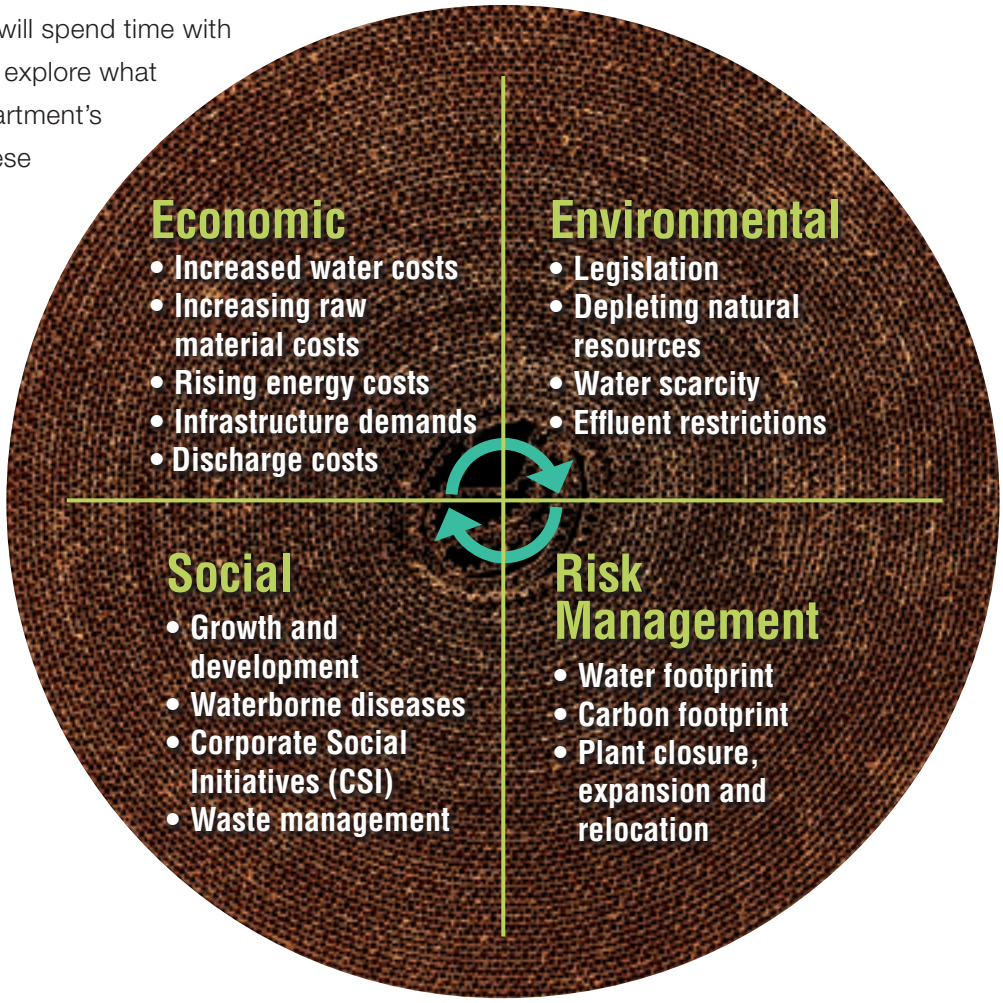
Step 2 Identifying Sustainability Opportunities

Armed with the knowledge gained in the first step, we can now see the gap between where you are and where you would like to be. In Step 2 of the process we will begin to identify opportunities to grow green.

Your Buckman representative will spend time with you and other stakeholders to explore what drives your company's or department's sustainability plan and why these drivers are of value to you.

Categories of Sustainability Drivers

Now we can look for ways to Reduce, Reuse and Recycle and generate a list of possible opportunities to grow greener.



Getting Your Workforce Involved

With all of the debates and discussion in the media over climate change, emissions, conservation and energy, awareness of sustainability issues among your workforce is high. You can demonstrate your company's or department's commitment to sustainability and, at the same time, elicit innovative ideas on how everyone can contribute.

A Buckman initiative in South America involving a "sustainability tree" proved this point. Employees hung "suggestion leaves" on the tree. There were numerous innovative ideas. And they came with a high level of pride and willingness to contribute.

After initiatives are implemented, feedback and progress reports are important to keep staff involved and committed.

Step 3 Aligning with Your Sustainability Plan

After generating a list of potential opportunities for improving sustainability we are now in a position to evaluate each one.

Projects will be drafted based on their return on environment (ROE), cost, risk involved and external influences such as regulation. Although ROE includes a monetary value associated with a reduction in water or energy costs, it goes beyond that.

The return from a sustainability project also takes into account risk and the positive net effect that a reduction in risk can have on your company's reputation and brand. High profile environmental incidents which have found their way into mainstream media illustrate the negative impact an environmental incident may have on the reputation of a company.

Your company may also see other gains from the successful implementation of green projects. These may include a reduction in your carbon and water footprint and the social benefit of reduced emissions.

Step 4 Prioritizing Your Return

Finally, proposed sustainability projects are prioritized based on the ROE criteria for your mill. By determining the value of each project beforehand, we can decide which will bring your organization most efficiently toward its goals.

How it works.

Here are some case studies that document sustainable solutions we have provided for our clients and the benefits realized. Buckman can bring similar success to your company or department.

Case Study

Tissue

The Challenge: A tissue mill wanted to improve sheet softness and runnability for its biodegradable, food contact-approved 3-ply tissue.

The Solution: Buckman applied Buckman® 691, which improved softness and production efficiency. Hood temperatures were reduced, reducing emissions. And blade life was extended.

Return on Investment (ROI)

- Blade life extension saved $18,750 per year.
- Production increase valued at $300,000 per year.
- Hood temperature reduced 30 degrees C.
- Total ROI (after treatment costs) $102,000 per year.

Return on Environment (ROE)

Reducing gas at dryer hoods saved 172.8 tons of CO_2 equivalent emissions per year.

Case Study

Packaging

The Challenge: A large, modern machine making two-ply linerboard from recycled fiber was losing productivity due to drainage limitations with recycled fiber. Excessive water loads in the wire section led to drive system overloads, reduced speed, and high steam usage.

The Solution: Buckman introduced our new Maximyze formulation to the stock storage chest two hours before the paper machine.

Return on Investment (ROI)

- As Maximyze began to cycle up in this closed system, drainage began to improve.
- Paper machine speed records were set.
- Wire section drive loading was reduced 5%.
- Production rates increased.

Return on Environment (ROE)

- The mill added incremental tons while reducing the energy usage per ton and the operation's overall carbon footprint.

Case Study

Graphics Paper

The Challenge: A fine paper mill needed to increase tensile strength so it could reduce the amount of pulp fiber and increase filler. It also wanted to reduce energy use and emissions.

The Solution: Buckman applied Maximyze® enzymatic technology, which increased tensile MD and CD 5–12% and 5–16% and reduced local pulp use. It also significantly reduced refining energy use, allowing the mill to turn off one conical refiner.

Return on Investment (ROI)

- Savings in steam, electricity and pulp added up to approximately $5.65/t.

Return on Environment (ROE)

- Maximyze® reduced electricity consumption 3.4% and steam 12.6%, translating to a 608 kg reduction in CO_2 equivalent emissions per month.

Case Study

Pulp

The Challenge: A mill producing softwood kraft bleached grade pulp suffered from high washing aid usage and cost and poor flow through the evaporators, causing a production bottleneck.

The Solution: Buckman applied a new washing aid program that reduced shower flow by 240 gallons per ton and increased black liquor solids to the evaporator.

Return On Investment (ROI)

- Because less water was needed per ton, the mill could reduce energy use by $2 per ton for a savings of $840,000 per year.
- The bottleneck at the evaporators was eliminated, allowing the mill to make more tons per day.

Return on Environment (ROE)

- The mill could save up to 240,000 U.S. gallons of water per day.
- Less water means significantly less energy required for evaporation, reducing the operation's carbon footprint.

Want to know more?

Just tell your Buckman representative you want to grow green. He or she can provide you with additional examples and case studies pertinent to your industry and answer any questions you may have. With Buckman you'll have a real partner in sustainability.

When you look to the future, look to us.

Buckman

Commitment makes the best chemistry.

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