Komori America Corporation Executive White Paper

HOW SUSTAINABLE PACKAGING IS SHAPING THE FUTURE FOR BUSINESS

Environmental issues are changing the way every business and industry operates, and the print industry is no exception. This White Paper, prepared by Komori America, offers insights into steps influential companies are taking to require more sustainable packaging from their suppliers.

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Kando: Beyond Expectations

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WHY READ THIS PAPER?

Environmental issues are changing the way every business and industry operates, and the print industry is no exception. With global concerns increasing over climate change, the depletion of natural resources, waste disposal, and greenhouse gases, it is clear that the environmental impact of business practices will only gain more scrutiny.

As an integral part of nearly every product sold, packaging takes center stage in the effort to adopt eco-friendly business practices.

According to a recent study by Pike Research, sustainable packaging will grow to 32% of the global packaging market by 2014.[4] Influential corporations like Walmart are already taking steps to require more sustainable packaging from their suppliers. Through groups like the Sustainable Packaging Coalition, many other major companies have joined suit in working toward eco-friendly packaging solutions. These companies recognize that being eco-friendly with packaging is not at cross purposes with being efficient or profitable.

This White Paper will offer analysis and insights about this important trend toward sustainable packaging, as well as specific suggestions for printers interested in incorporating green initiatives into their business practices.

Businesses have many of goals to consider when it comes to packaging, including: safety, convenience, efficiency, identification, and marketing concerns. Now, sustainability is being added to that already complicated mix. Even slight changes to packaging methods can substantially impact the amount of materials, manufacturing, shipping containers, trucks, storage, waste, and energy used in connection with a product.

In Europe, efforts to regulate packaging waste date back to the early 1980s. In 1994, the European Union issued its Packaging Directive. The central requirements of the EU Directive are aimed at fostering the prevention of packaging waste, the reuse of packaging, and the recovery and recycling of packaging materials post-use.

Here are some facts to consider:

- Currently, the packaging industry worldwide is an estimated $429 billion business, and is forecasted to exceed $500 billion in 5 years.[1]
- Americans produced 254 million tons of trash in 2007, while recycling only 63.3 million tons.[2]
- One-third of all consumer trash in the U.S. comes from packaging.[3]

To date, efforts to promote sustainable packaging in the U.S. have come from industry initiatives rather than comprehensive Federal legislation. For example, Walmart has taken a notable leadership role in corporate green initiatives, having set a 2013 target of decreasing by 5 percent the amount of packaging for products carried by Walmart and Sam's Club. The ultimate goal for the world's largest retailer is to be supplied 100 percent by renewable energy, create zero waste, and sell only environmentally-friendly products. Walmart plans to be "packaging neutral" by 2025, meaning packaging recovered or recycled from its stores and clubs will be equal to the amount of packaging on the shelves.[5]

To help reach its objectives, Walmart has developed an online sustainable packaging scorecard. The scorecard assesses Walmart and Sam's Club suppliers on their progress toward developing sustainable packaging. The measurement tool allows buyers to show preference to suppliers who are committed to green packaging.

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In addition to Walmart's efforts, a collaborative industry group, the Sustainable Packaging Coalition, is also working towards what it calls "a more robust environmental vision for packaging" through "informed design practice, supply chain collaboration, education, and innovation."[6] Members of the group represent all facets of the packaging supply chain. The Sustainable Packaging Coalition has developed tools similar to Walmart's scorecard to aid in the evaluation of packaging.

With these significant industry initiatives afoot, incorporating sustainability into business objectives is becoming a growing necessity. Printers working with the packaging industry will find it increasingly important to evaluate whether their practices and capabilities are in keeping with these eco-friendly initiatives.

2 THE BUSINESS CASE FOR SUSTAINABLE PACKAGING

Legal and industry initiatives are not the only drivers for sustainable packaging; market considerations play an important role as well. Despite a prevalent misconception that sustainable packaging efforts necessarily have a higher price tag, most companies are able to achieve a cost savings and positive impact on the bottom line.[7] Manufacturers are realizing that less packaging can result in greater efficiencies in the supply chain and the manufacturing process itself. Less or lighter packaging results in products that are less expensive and easier to move from one location to another. Additionally, less energy is expended to produce the packaging, and less waste is produced.

Simplifying packaging design so that it incorporates fewer pieces translates into lower labor cost as well. Not as much space in the warehouse is needed, further lowering costs. This ripple effect continues with reconfigured pallet designs that enable the shipment of more product per pallet.

Sustainability involves adopting a holistic perspective that encompasses the entire life cycle of a product, from manufacturing and packaging to delivery and recycling.

According to Industry Week, a global leader in computer hardware and software saved more than $500,000 in packaging with this approach, and eliminated 99,813 pounds of packaging on 4.3 million products shipped.[8]

2.1 Reduced cost and increased revenue

Reducing costs through sustainable packaging may not be the only positive contribution to a company's bottom line – revenue may increase as well. Walmart has indicated that it is willing to pay more for products produced and packaged with sustainability in mind because the savings in the supply chain costs it receives will more than offset the incremental cost it is paying for a more sustainable item.[9] In addition, consumer and media interest in eco-friendly measures continues to swell. Recent studies show a shift in consumer awareness as a result of more media coverage and attention paid to sustainability by businesses. An April 2009 study by Datamonitor revealed that not only is sustainable packaging a growing concern for consumers, it is becoming a consumer expectation.[10]

As a result, companies that incorporate sustainable packaging into their business can gain a competitive edge through promoting their sustainability efforts and meeting consumer expectations. A rising

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number of stakeholders—customers, investors, employees, advocacy groups, the media and competitors—are seeking greater disclosure and transparency about how products are manufactured.

All in all, it appears that sustainable packaging is becoming an increasingly important business consideration. Businesses will face a growing expectation that they have evaluated sustainability as a component of packaging-design decisions. Nearly nine out of 10 respondents in a survey by Packaging Digest and the Sustainable Packaging Coalition say their companies are already doing this.[11] When analyzing sustainable packaging, 59 percent of the survey respondents say their companies look at the use of recycled materials as the top consideration. More than half also say that in order to achieve their company's goals, new materials and improved education and training are needed.

As a result, it can be expected that companies and package designers will increasingly look to work with printers that incorporate sustainability practices in all aspects of their print operation, and choose those that have the capability to work with the latest eco-friendly package design techniques.

3 SPECIFIC INITIATIVES

Two important initiatives are leading the way toward sustainable packaging standards in the U.S. The first is the initiative instituted by Walmart, which has broad implications for all the businesses, large and small, in its extensive supply chain. The second is an industry working group, the Sustainable Packaging Coalition, which includes members from the entire spectrum of the packaging supply chain, including a number of Global 500 companies.

3.1 What is driving Walmart

When Walmart launched its green initiative a few years ago, the corporate giant was being criticized for the large carbon footprint generated by its Walmart and Sam's Club stores. By implementing eco-friendly business practices and requiring its suppliers to do the same, Walmart has improved its image. Walmart also believed its efforts would appeal to younger generations, who are more likely to hold big corporations accountable for their actions, and who will constitute a growing percentage of its customer base.

According to Walmart, today's customers look for products that are more efficient, last longer and perform better, and these customers want to know about the entire life cycle of a product so they can "feel good" about buying it.[13]

WALMART'S HISTORY OF PACKAGING INITIATIVES INCLUDE:[12]

- In 2005 Walmart pledged to stop using PVC packaging on all private brand items whenever possible. While it has yet to reach this goal, by December 2008 it had redesigned 75 items without PVC as a packaging material.
- In 2005 Walmart's packaging team worked with select private label brand suppliers to improve packaging on almost 300 items in its Kid Connection toy line. By shrinking the packaging just a bit, Walmart used 497 fewer shipping containers and generated freight savings of more than $2.4 million per year.
- In 2006 Sam's Club reduced the amount of packing in its digital media department by half. As part of this transition, Walmart worked with Apple to convert iPod packaging to 100 percent renewable, recyclable and more sustainable materials. The packaging also is reusable and greatly smaller in size.
- In 2008 Walmart switched to only offering concentrated liquid laundry detergent at its U.S. and Canadian stores, which vastly reduced the amount of water, plastics and cardboard used by the company. Now most retailers carry concentrated detergent.

3 SPECIFIC INITIATIVES

GLOSSARY OF TERMS

ASTM International: An international standards organization with a committee whose focus is developing criteria for ranking sustainable packaging.

Carbon footprint: The total set of greenhouse gas emissions caused by an organization, event, or product, measured in units of carbon dioxide.

Cube utilization: A method of measuring the ratio of occupied space to available space in a storage area, trailer or container.

Greenhouse gases: Atmospheric gases that absorb and emit radiation within the thermal infrared range and greatly affect a planet's temperature. The main greenhouse gases in Earth's atmosphere are carbon dioxide, nitrous oxide, ozone, methane and water vapor.

ISO: The International Organization for Standardization (ISO) has developed standards for the control of environmental aspects of business and the improvement of environmental performance.

Life cycle analysis: The investigation and evaluation of the environmental effects of a product or service caused or required by its existence. Also known as life cycle assessment, eco-balance, and cradle-to-grave analysis.

Post-consumer waste: Waste or paper that has served its intended purpose and was separated from solid waste for recycling.

Sustainability: Actions, policies, and procedures that are capable of meeting the needs of the present without compromising the needs of the future by destroying or depleting natural resources or polluting the environment.

3.2 Walmart's definition of sustainable packaging

To help educate its suppliers, Walmart identified what it calls its "7 R's" of sustainable packaging:

- **Remove:** Eliminate unnecessary packaging, boxes or layers and harmful materials.
- **Reduce:** "Right-size" packages, optimize material strength and design packages appropriately for contents and merchandising requirements.
- **Reuse:** Walmart has a goal that all transport packaging will be reused or recycled by 2011 through improved pallets and reusable plastic containers.
- **Renew:** Use materials made of renewable resources and select biodegradable materials that meet certain ASTM International standards.
- **Recycle:** Use materials made of the highest recycled content without compromising quality, including post-consumer recycled material where appropriate. Components should be chosen based on recyclability post-use, with a goal of increasing the municipal recycling rate to 35 percent by 2011.
- **Revenue:** Achieve all principles at cost parity or cost savings, which requires a supply chain approach.
- **Read:** Get educated on sustainability and how suppliers play a part.

3.3 A scorecard changes the game

In 2008, Walmart introduced an on-line scorecard that measures the extent to which suppliers are demonstrating a commitment to sustainable packaging. The scorecard is intended to help suppliers determine whether their packaging is helping Walmart achieve the goal of being supplied 100 percent by renewable energy, creating zero waste and selling only sustainable products. According to the company, the scorecard also gives Walmart's buyers a tool for making more informed purchasing decisions, including showing a preference to those suppliers who demonstrate a commitment to producing more sustainable packaging.

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Nine weighted metrics form the foundation of the scorecard:

1. **Greenhouse gas emissions created during package production, with a weight of 15 percent**
2. **The packaging material's sustainability, weighted 15 percent**
3. **Average distance the material is transported, 10 percent**
4. **Package-to-product ratio, 15 percent**
5. **Cube utilization, 15 percent**
6. **Recycled content, 10 percent**
7. **Recovery value, 10 percent**
8. **Renewable energy use, 5 percent**
9. **Innovation, 5 percent**

The Scorecard currently contains information for approximately 90 percent of items carried in Sam's Club and 300,000 items carried in Walmart stores.[14]

Walmart's scorecard is only one facet of a larger, three-stage plan for the development of a worldwide sustainable product index. The first stage of this effort includes a survey studying suppliers' sustainability in four areas: energy and climate; material efficiency; natural resources; and people and community. The second stage involves creating a global database of information on product life cycles, from raw materials to disposal. In the final stage, the data will be converted into simple ratings so consumers can easily determine a product's sustainability. The rating system will give shoppers transparency into the quality and history of products—facts that are not readily available today.

The questions on Walmart's scoreboard are relatively simple. What are the packaging materials used? How much of each material is being used? How are they designed for sustainability? How far has the packaging been transported?

3.4 The Sustainable Packaging Coalition

The Sustainable Packaging Coalition (SPC) was formed with nine founding members who shared the mission of encouraging a strong environmental vision for packaging. According to the SPC, it "envisions a world where all packaging is sourced responsibly, designed to be effective and safe throughout its life cycle, meets market criteria for performance and cost, is made entirely using renewable energy, and, once used, is recycled efficiently to provide a valuable resource for subsequent generations."[15]

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THE SPC HELPS COMPANIES MEET THEIR CORPORATE SUSTAINABILITY GOALS FOR PACKAGING BY:

- Providing opportunities to network with professionals from across the supply chain
- Sharing information on best practices, case studies, new materials, and technologies
- Informing members about critical issues
- Presenting informed technical and global perspectives on packaging and environmental issues
- Developing tools and resources as part of the SPC's projects and activities
- Developing strategic partnerships to advance the SPC mission
- Sharing sustainability expertise
- Introducing perspectives on global trends

Because the SPC places such a significant emphasis on supply chain collaboration, which it considers vital to affecting the changes needed for sustainable packaging, external outreach is a primary focus. The SPC's membership consists of nearly 200 organizations ranging from large global corporations to small businesses involved in all aspects of the supply chain.

3.5 The SPC defines sustainable packaging

In its criteria for sustainable packaging, the SPC balances business considerations and strategies with broad sustainability goals that address the environmental issues surrounding the life cycle of packaging. The SPC hopes that its efforts will turn packaging into a closed loop flow of packaging materials. In its words, the SPC seeks to create a "sustainable packaging system" that "is economically robust and provides benefit throughout its life cycle."[16]

According to the SPC, sustainable packaging:

- **Is beneficial, safe and healthy for individuals and communities through its life cycle**
- **Meets market criteria for performance and cost**
- **Is sourced, manufactured, transported and recycled using renewable energy**
- **Optimizes the use of renewable or recyclable source materials**
- **Is manufactured using clean production technologies and best practices**
- **Is made from materials healthy in all probable end-of-life scenarios**
- **Is physically designed to optimize materials and energy**
- **Is effectively recovered and utilized in a biological and/or industrial closed loop cycle**

3 SPECIFIC INITIATIVES

3.6 Taking an active role

With education as one of its top priorities, the SPC concentrates on a number of short-term, result-oriented projects meant to help its members take an active role in moving toward sustainable packaging.

Sustainable packaging practices entail more than just shrinking the package size and making the packaging out of materials recognized as having eco-friendly properties. Designing packaging and supply chain processes for sustainability is a complex process.

Specific SPC projects include:

COMPASS (Comparative Packaging Assessment). The online software program helps packaging professionals determine which packaging designs have the least detrimental effect on the environment using a life-cycle approach. The application generates the profiles of each design option based on data from the SPC.

Sustainable Performance Indicators and Metrics Project. The project's primary purpose is to develop guidelines for measuring the sustainability of packaging and packaging systems. The guidelines help members of a packaging supply track and measure their performance against the SPC's definition of sustainable packaging. The SPC plans to publish a final set of metrics as its recommended criteria for evaluating sustainable packaging.

Design Guidelines For Sustainable Packaging Project. The SPC has developed a comprehensive design resource for packaging designers that incorporates sustainable packaging considerations as design objectives in addition to traditional criteria.

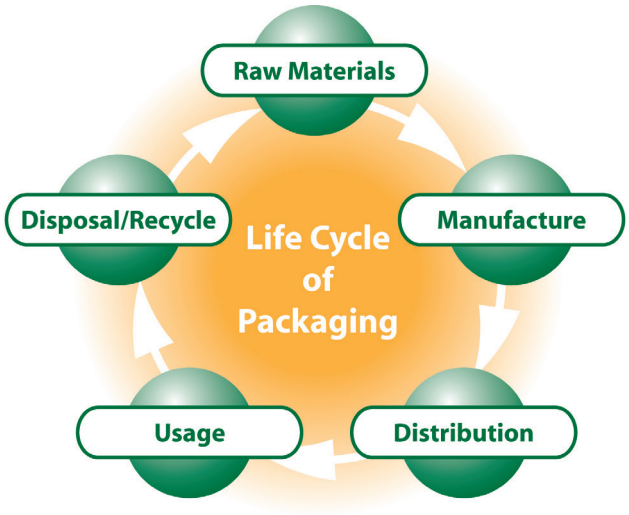
Environmental Technical Briefs For Common Packaging Materials. The SPC has compiled briefs with information on the environmental and human health effects associated with packaging materials. Aimed at nontechnical audiences, the profiles cover a variety of topics, including fiber-based materials, glass and aluminum. The complete collection will be available for purchase in early 2010.

4 THE BOX AND BEYOND

A LIFE CYCLE APPROACH TO ACHIEVING SUSTAINABILITY

4.1 Where to begin

According to the SPC, the majority of a package's environmental impact is determined in the design phase, where factors such as the choice of package material can have far-reaching environmental implications when that design is implemented. For this reason, packaging material choices cannot be made in a vacuum. That said, there are some packaging materials that are generally recognized as preferable components from an eco-friendly standpoint. These include low and high density polyethylene, polypropylene, and polylactic acid films; virgin and recycled paper and paperboard that are renewable, recoverable, recyclable, and compostable; and inks and coatings formulated with low VOC (volatile organic compound) vegetable-based or UV components.



Optimally, businesses should evaluate everything from the energy expended to extract and produce the packaging materials, to the downstream implications for the environment of incorporating those materials in the packaging, including the implications for optimizing package design, shipping, storage, recycling, reuse, and ultimately disposal—the entire life cycle.

This life-cycle approach to packaging sustainability looks at both the inputs (resources) required to produce the packaging and the outputs (emissions to air, water and soil) related to that packaging choice throughout its life cycle. In this way, a life cycle analysis highlights the environmental trade-offs tied to different aspects of the packaging design.

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4.2 Putting it all together

In addition to scrutinizing the impact of materials used in, and the design of, primary consumer packaging, companies interested in eco-friendly packaging must examine secondary and transport packaging as well. Secondary packaging is used to distribute quantities of packaged goods to stores, and potential material choices are constrained by the need to minimize product damage during distribution. The bulk containers, cardboard and plastic wrapping, and pallets used to transport goods also have a big impact on the environment. How much influence secondary and transport packaging has on the environment depends on many of the same factors for primary packaging: use of renewable or recycled source materials; clean and energy-efficient production; optimized design, transportation considerations, and effective post-use recovery.

Dell Inc. plans to remove 20 million pounds of packaging materials over the next four years. The computer company intends to cut desktop and laptop packaging materials by about 10 percent globally, raise sustainable content in cushioning and corrugate packaging by about 40 percent and make sure 75 percent of packaging components is recyclable by 2012. Dell has recently introduced bamboo product cushions as part of the packaging for some laptops and netbooks. The bamboo cushions are an eco-friendly alternative to the foam, molded paper pulp, or corrugated material that is traditionally used for product cushioning in computer packaging.[17]

Walmart's packaging modeling software gives its suppliers the tools to find out how changes in materials and processes can raise their scorecard rating and reduce their packaging's effect on the environment. Similarly, the Sustainable Packaging Coalition's online COMPASS software determines which packaging designs will have the least detrimental effect on the environment.

5 SUSTAINABILITY AND THE PRINTING INDUSTRY

5.1 The print provider's scorecard

Printed material is an essential part of virtually all packaging. The AIGA, a professional association for design, suggests designers consider a number of criteria in selecting an environmentally responsible printer, including:

- Management commitment to environmental stewardship that extends beyond legal compliance
- All major suppliers and subcontractors are informed of the company's environmental policy and encouraged to adopt similar standards
- A dedicated manager for environmental health and safety
- Standards-based environmental and quality management systems, and
- Evidence of life cycle thinking and continuous improvement applied to key products, service offerings and business practices[18]

5.2 There are a number of ways printers can adopt sustainable practices

#1: Recycling

Recycling is an important eco-friendly practice for print facilities. All of the following print by-products can be recycled:

- *Paper*
- *Water*
- *Fluorescent Bulbs*
- *Metal Machine Parts*
- *Waste Inks and Solvents*
- *Empty Chemical Drums*
- *Aluminum Printing Plates*
- *Rubber Press Blankets*
- *Batteries*
- *Toner and Print Cartridges*
- *Empty Ink Cans*
- *Electrical Equipment*
- *Cardboard*
- *Broken Pallets*
- *Polythene Packaging*
- *Aluminum Cans & Plastic Bottles*
- *Glass* [19]

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#2: Energy and water conservation

Examining electricity, gas, and water use, installing energy efficient lighting systems and light bulbs, using equipment and techniques that reduce energy and water consumption, and reviewing transportation-related practices are all ways to improve energy conservation and reduce costs.

#3: Eco-friendly substrates

There are a number of considerations to make when it comes to sourcing paper. Printers should make sure that paper comes from a third-party certified resource that ensures sustainable and well-managed forests, such as the Forest Stewardship Council (FSC). In addition to setting strict standards for responsible forest management, the FSC also offers certification for printers who have procedures in place that meet FSC standards for paper usage and job tracking. In order to use the FSC logo as an environmental claim on paper, the product must have flowed through the FSC "chain-of-custody" from the FSC-certified forest, to a paper manufacturer, merchant, and finally printer who all have FSC chain-of-custody certification.[20]

Another step in sourcing paper responsibly is considering the bleaching methods used in paper production. Totally Chlorine Free (TCF) processes can be used with 100% virgin fibers, Processed Chlorine Free (PCF) is a sustainable method for recycled paper with 30% or more PCW, and Elemental Chlorine Free (ECF) is a designation for virgin or recycled paper made using chlorine dioxide or a chlorine derivative, which reduces but does not eliminate hazardous dioxins.

Printers should also look to papers with a high post-consumer waste content, which can range up to 100 percent. In addition to saving trees, the use of paper with high PCW content decreases paper waste ending up in landfills.

Finally, there are many types of alternative "tree free" fibers which can be used as printing substrates, including hemp, eucalyptus, cotton, and agricultural by-products such as cereal straws and corn stalks.

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#4: Sustainable ink, varnishes and coatings

The use of vegetable-based or UV inks can reduce volatile organic compound (VOC) emissions and possibly reduce the energy required for print production. Soy inks and other vegetable inks are renewable and clean, making them an excellent choice for eco-friendly printing. Soy inks are very bright and yield more impressions, reducing the amount of ink needed for a job, and are also easier on the printing press. UV inks contain little or no solvents and therefore do not emit VOCs. Unlike conventional inks, UV inks can be left in the ink fountain overnight without skinning, which reduces cleaning time and wasted ink. Having an ink recycling program in place is also an important consideration.

Water-based and UV varnishes and coatings are also eco-friendly options that reduce or eliminate VOC emissions. As with all parts of the printing process, consideration should be given to handling waste and recycling.

#5: Printing press equipment

In choosing print equipment, look for a manufacturer that has ISO 14001 certification for its responsible environmental practices.

The following are some features available in state-of-the-art press equipment that can help a printer run an environmentally responsible operation:

- High speed inking systems with self-learning capabilities enable faster makeready and job changeover times, reduces operator stress and manual operations, and can dramatically reduce waste
- Advanced dampening systems can significantly reduce the use of alcohol, improving air quality and eco-management
- Fully automatic plate changing technology reduces ink volumes and waste
- Technology reducing noise emissions improves the pressroom environment
- Look for press equipment that has been awarded a BG Emission Test Certificate

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5.3 Key certifications

The ISO 14001 and the Forest Stewardship Council are two certification programs that can establish a printer's commitment to environmentally responsible practices. In addition, the Sustainable Green Printing Partnership (SGP) offers certification specifically for the printing industry.

The SGP is a group whose mission is to encourage and promote participation in the worldwide movement to reduce environmental impact and increase social responsibility of the print and graphic communications industry. The SGP recognizes the following sustainable business practices as guiding principles to ensure continued viability and growth:

- Employ, whenever and wherever possible, materials derived from renewable resources or with low environmental impact, maximizing recycling and recovery efforts with efficient utilization of renewable energy.
- Encourage the adoption of changes within the supply chain by strongly recommending the use of raw materials that do not threaten or harm future generations.
- Educate the consumer and ultimate consumer regarding the benefits of a restorative economy.

Printers certified through SGP have met specific eco-friendly requirements, including the establishment of a sustainability team; the implementation of a management system; the use of SGP program metrics; taking specific steps to reduce the facility's environmental footprint; implementing pollution prevention activities; and committing to fundamental social and ethical norms. Additionally, SGP printers commit to annual reporting and a biennial certification audit requirement.

6 CONCLUSION

Sustainable packaging strategies are intended to safeguard the planet's natural resources for future generations, but a greener approach to packaging also offers companies a number of competitive business advantages that translate into lower costs and higher revenue. Good environmental stewardship and smart business practice can coexist, which is why some of the world's leading corporations are helping to institute meaningful sustainable packaging practices across industries. These trends are influencing the future for the print industry, and proactive printers will take steps to evaluate the sustainability of their practices in order to benefit by being recognized as both a socially-responsible business and a company that meets the eco-friendly criteria of potential customers.

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