

APRIL 2010

SUSTAINABLE CARDS, LLC

SUSTAINABILITY ASSESSMENT



EXECUTIVE SUMMARY

Sustainable Cards, LLC (SC) and its subsidiaries market the company's patent-pending wood veneers designed for the card and retail point-of-sale signage industries, including gift cards, hotel key cards, membership and loyalty cards. Additionally in selected European markets, the company markets its own finished printed cards and signage also made from the company's patent-pending wood veneers. The company's primary brand promise is that forest products are significantly more sustainable than the current predominant card and signage industry substrates: virgin PVC (Polyvinyl Chloride), recycled PVC (pre and post consumer content), BioPVC (biodegradable PVC), PETG (Polyethylene Terephthalate Glycol) and bio-plastic (plant-based plastic).

Natural Capitalism Solutions (NCS) has reviewed SC's European operations to examine the relative sustainability of their core "ProSum™" veneer sheet, unaltered natural birch veneer with a cellulose overlay. (ProSum translates to "Do Good" in Latin.) The company's ProSum™ sheets may be directly surface-printed or laminated with thin overlays made of virgin PVC, BioPVC, and PETG for added durability and to meet certain printing requirements. See www.sustainablecards.com for more information about the company and its product line.

More Sustainable Than Current Industry Alternatives

Based on this review, NCS supports SC's claim that their products are more sustainable than or comparable to the listed alternatives. SC's forest products use less water and synthetic inputs, produce less pollution, and sequester more carbon than the alternatives researched.

NCS, an internationally recognized leader in sustainability, reviewed SC's value chain and sourcing. This review included interviewing key vendors, analyzing existing documentation (such as MSDS), researching industry standards, and interviewing relevant NGO and card industry professionals. NCS has concluded that card and wood products made with SC's veneers are more sustainable than the studied alternatives. Furthermore, in the case of laminated wood cards, the company's preferred PETG laminate is more sustainable than the alternative oil-based options.

Made From a Renewable Resource

The main contributor to the increased relative sustainability is based on the fact that the main product input is wood. This wood is renewably sourced from certified forests and presents sustainability advantages compared to petroleum-based cards made entirely from virgin, recycled, or biodegradable PVC, and PETG. Additionally NCS identified sustainability benefits, across SC's manufacturing and supply chain, including high renewable energy use, low waste, low toxic profiles, and low water use.

Renewably sourced wood is the main component of their ProSum™ veneer. Unaltered plant material comprises 68 percent (laminated) to 75 percent (surface-printed) of the wood cards made with SC's ProSum™ veneer substrate, depending on the application and type of laminate applied if applicable. Renewable resources provide a source material that can be replenished in a timely manner, unlike oil. Based on the high percentage of plant material, there are low amounts of synthetic inputs and only trace amounts of chemicals in the card products.

Sourced From Certified Forests

To further their sustainability, SC sources their wood materials from certified forests. The cellulose backer used by SC is created using FSC certified fibers. Also, SC is able to source specifically from FSC forests for their veneer when necessary, but unless requested, their wood is sourced from PEFC forests. Wood sourced from PEFC forests is more economical than FSC. The higher price on FSC certified wood and wood products is due to increased costs associated with FSC monitoring and the certification process. While the PEFC certification is not as stringent as FSC, purchasing PEFC wood is more beneficial than purchasing wood from forests that have no certification, which are likely degrading the land to a larger extent.

Less Water and Fewer Synthetic Inputs Used

Cards made entirely with virgin PVC, recycled PVC, BioPVC, and PETG are produced primarily from petroleum. Sourcing petroleum products involves

oil extraction and refining, processes that release sub-surface carbon, and pollute the world's waterways and landmasses. Furthermore, it takes 24 gallons of water to produce one pound of plastic. Bio-plastic is generally sourced from industrial agricultural farmlands that use large quantities of synthetic petroleum inputs, are often excessively irrigated for the given landscape, and contribute to run-off and the pollution of waterways. Sustainable forestry does not rely on irrigation or synthetic inputs for productivity.

Eco-Friendly European Manufacturing Facility

In addition to the benefits of using forest products, SC and their key European vendors have manufacturing processes that are environmentally preferable. Many of the facilities are International Organization for Standardization (ISO) 14001 and 9001 certified. SC maintains its own facility in Hede, Sweden where ongoing R&D is conducted and short run card production is undertaken principally for local Scandinavian clients. In this facility, about 50 percent of the electricity comes from renewable resources and high percentage of the energy used in other stages of the manufacturing process also come from renewable energy sources. One facility even has a solar array that produces about 30 percent of their electricity.

Trace Amounts of Chemicals

The card components used by SC-- adhesives, inks, varnish, various laminate overlays, and an optional magnetic strip--are nearly ubiquitous

across the industry, thus the use of these materials makes SC's card features neither significantly more nor less sustainable than their competition. NCS did not find anything that presented itself as particularly hazardous in these materials, though SC should pursue further verification in regards to the inks. Furthermore, these card features make up a small percentage of the total volume of each card and, as mentioned above, are used consistently throughout the card industry.

Certified Card Manufacturers

As noted, SC supplies its patent-pending cellulose-coated veneers to card and signage manufacturers around the world who may apply a variety of laminate overlays depending on their clients' needs. Environmentally conscious card customers are advised to ask their card suppliers to provide information on the overlays applied and their relative sustainability.

Around the world, Sustainable Cards is developing its own network of "certified wood card manufacturers" that will produce cards and wood products made with the company's ProSum™ veneers. These certified manufacturers must meet a rigorous certification developed by SC to ensure product quality standards are met. The company also strives to work with manufacturers that pursue best practices in environmental stewardship.

More Details in Full Report

NCS prepared a more comprehensive sustainability assessment, dated April 2010, which details the sustainability-related strengths and weaknesses of SC's products and key vendors, background information on the aforementioned alternative substrate types, and a comparison of those alternatives to SC's products. An appendix with a product claim verification by NCS and glossary of terms follows this executive summary. A copy of this report may be obtained directly from Sustainable Cards.

April 9, 2010

Sustainable Cards, LLC
 Attn: Peo Akesson
 2229 Broadway
 Boulder, CO 80302



Dear Sustainable Cards, LLC,

This letter verifies that the product claims listed below have been researched and validated by Natural Capitalism Solutions (NCS) as accurate and complete. Contracted by Sustainable Cards, LLC, Natural Capitalism Solutions conducted a sustainability-oriented review of the sourcing, manufacturing, use, disposal, and marketing of the ProSum™ cards and wood products. NCS certifies that the product claims are correct, based on the data provided by Sustainable Cards, LLC, its vendors, and independent research conducted by NCS.

Product Verification:

Sustainable Cards' ProSum™ veneer is:

- Made out of forest products, a renewable resource.
- Free of vinyl chloride.
- Manufactured with 50 percent renewable energy.
- High in organic content. Plant material makes up at minimum 68 percent of the ProSum™ card.
- Biodegradable, except when there is a plastic coating such as PETG.
- More sustainable based on sourcing, manufacturing, and toxic profile, as compared to other card alternatives: PVC, recycled PVC, BioPVC, and PETG.

Analysis of Card Type		Material Sourcing	Manufacturing	Toxics	Disposal	Total
Sustainable Cards, LLC.	ProSum™ *	●	●	●	◐	3.5
	ProSum™ + PETG**	◐	●	◐	○	2
	ProSum™ + PVC**	◐	◐	○	○	1
	ProSum™ + BioPVC**	◐	◐	○	○	1
Alternative	PETG	○	◐	◐	◐	1.5
	Bio-Plastic	◐	◐	◐	◐	2
	BioPVC	○	◐	○	○	0.5
	Recycled PVC	○	◐	○	○	0.5
	PVC	○	○	○	○	0

* Plant-based surface-printed card.
 ** PETG, PVC and BioPVC are some of the possible overlays that companies may place on the ProSum™ Veneer base.
 *** Relative overall sustainability rating according to NCS's assessment.

For further analysis of Sustainable Cards' sustainability, as well as competitor, and industry analysis, please see "Sustainability Assessment, Sustainable Cards".

Sincerely,
 Natural Capitalism Solutions



GLOSSARY OF TERMS

PLASTICS

Bio-plastic is plastic that is made from plant-based materials, rather than fossil petroleum. Bio-based plastics can be made out of products obtained from raw materials produced by natural, biological, living or growing systems, such as starch and cellulose.ⁱ Bio-plastics can currently be made from corn, wheat, potatoes, tapioca, soy, sugarcane, wood, and, in the near future, switch grass.

BioPVC, or biodegradable PVC, is made from conventional PVC resin, with additional additives to make the plastic biodegrade.ⁱⁱ Researchers think that this additive acts like bait to microorganisms that will consume the carbon in the product, decomposing it into carbon dioxide, water, and a mild salt, leaving no toxic vinyl chloride.ⁱⁱⁱ

PETG (Polyethylene Terephthalate Glycol) is a petroleum based plastic with similar properties to PVC. However, PETG can be recycled without creating harmful gases or polluting the environment.^{iv}

PVC (Polyvinyl Chloride) is the most widely used plastic available. Although it is popular in the card industry, it contains large amounts of chlorine and toxic additives. PVC also releases dioxin, an extremely toxic chemical, as well as other persistent organic pollutants during its manufacture and disposal. Though PVC is recyclable through combination with additional virgin material, it cannot be recycled at a municipal facility. Therefore, most PVC ends up in landfills where it can leach dioxin and other toxic chemicals into the surrounding water and soil.^v Finally, vinyl chloride used in producing and recycling PVC is a known human carcinogen.

FOREST CERTIFICATIONS

Forest Stewardship Council (FSC) is an independent, non-governmental, non-profit organization that was established to promote the responsible management of the world's forests. FSC certified paper and wood products ensure that the forests logged from which wood was obtained were logged in a sustainably managed process and that no old growth forests were cut down for their production.^{vi}

Programme for the Endorsement of Forest Certification (PEFC) is an international non-profit, non-governmental organization dedicated to promoting sustainable forest management through independent third party certification.^{vii}

Swedish Forestry Agency^{viii} is the Swedish government's expert authority on Sweden's forests. The Swedish Forestry Agency ensures that Sweden's forests are managed in such a way as to yield an abundant, versatile, and sustainable harvest, while at the same time exercising due consideration for the environment and other valuable features.

DISPOSAL DEFINITIONS^{ix}

Compostable plastic is "capable of undergoing biological decomposition in a compost site as part of an available program, such that the plastic is not visually distinguishable and breaks down to carbon dioxide, water, inorganic compounds, and biomass, at a rate consistent with known compostable materials (e.g. cellulose) and leaves no toxic residue." - (ASTM)

Biodegradable materials will degrade from the action of naturally occurring microorganisms, such as bacteria, fungi etc. over a period of time. Note, that there is no requirement for leaving "no toxic residue", and as well as no requirement for the time it needs to take to biodegrade.

Degradable Plastic is plastic that will undergo a significant change in its chemical structure under specific environmental conditions resulting in a loss of some properties. Please note that there is no requirement that the plastic has to degrade from the action of "naturally occurring microorganism" or any of the other criteria required for compostable plastics.

COMPOSTING AND BIODEGRADABLE STANDARDS

The ASTM, CEN and DIN standards specify the criteria for biodegradation, disintegration, and eco-toxicity for a plastic to be called compostable.^x

American Society for Testing and Materials (ASTM) 6400-99 is a standard Specification for Compostable Plastics. This specification covers plastics and products made from plastics designed to be composted in municipal and industrial aerobic composting facilities. The purpose of this specification is to establish standards for identifying products and materials that will compost satisfactorily in commercial and municipal composting facilities.^{xi}

European Standardization Committee (CEN) EN13432 provides a standard of testing to prove compostability.^{xii} This testing organization sets specific standards including a requirement that the product reaches 90 percent biodegradation within 180 days.

German Institute for Standardization (DIN) V49000 provides testing standards for compostability of plastics requiring 60 percent biodegradation within 180 days.^{xiii}

International Organization of Standardization (ISO) 14855 sets standards concerning the determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions.^{xiv}

ENVIRONMENTAL CERTIFICATIONS

ISO 14000^{xv} addresses various aspects of environmental management, including environment, management, and safety guidelines, as well as specific environmental aspects, including: labeling, performance evaluation, life cycle analysis, communication, and auditing.

ISO 9000^{xvi} represents an international consensus on good quality management practices. It consists of standards and guidelines relating to quality management systems and related supporting standards.

OTHER

MSDS is a Materials Safety Data Sheet. An MSDS is designed to provide both workers and emergency personnel with the proper procedures for handling or working with the substance outlined in the MSDS.

Magnetic strip is applied to the back of a card, and data can be encoded onto it. These are typically found on credit cards and hotel key cards. When forming magnetic strips, several steps are involved. First, iron oxide is combined with a binder and turned into a foil strip. In a printing process, the foil is coated with glue that, when heated, will cause the magnetic strip to stick to the card. A polyester coating is put on the other side of the foil strip. To attach the metallic strip to the card, the strip is heated; the glue attaches the metallic strip to the card; and the polyester is peeled off once it is dry.

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