



Digital Paper for Sustainability



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Sponsored by: E Ink Corporation®

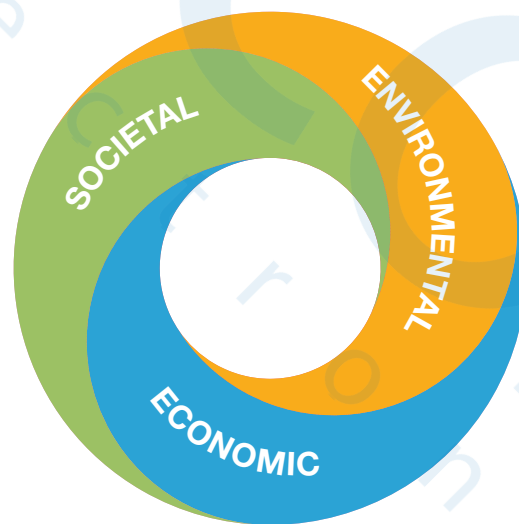
Eink®



While there's widespread agreement that sustainability is important, there's a general lack of understanding of what exactly it means. To many, sustainability may seem like the buzzword du jour — a lot easier to talk about than actually put into practice.

The real-time bus arrival schedule on the right is solar-powered and made with E Ink digital paper.

The most accurate and contemporary view of sustainability today is that it's multifaceted, comprised of three core pillars that are interconnected and synergistic:



This represents a shift in thinking from prior eras, when sustainability was narrowly defined as environmental. In fact, the concept of sustainability can be traced back to Hans Carl von Carlowitz (1645 –1714), and was applied exclusively to forestry.¹ While the industrial revolution saw relentless economic growth occurring at the expense of the environment, current thought leaders see modern technology as driving new solutions that support growth in ways that protect the environment while improving our world in numerous ways. Andrew McAfee, a professor at the MIT Sloan School of Management, details the positive

trajectory of this trend is his book, “More from Less: The Surprising Story of How We Learned to Prosper Using Fewer Resources — and What Happens Next.” McAfee points out that in the 1970s, environmentalists warned we were in danger of running out of key resources such as timber. And yet today America is 30 percent below its past usage of timber, and 20 percent below its peak usage of paper despite decades of economic growth. The reason? Advances in new technologies and the products they enable.²

It's perhaps ironic that one of these technologies, digital paper, relates directly to the timber-specific origins of sustainability. Pioneered by E Ink,[®] digital paper (often referred to as ePaper) hit the mainstream as the paper-like screens in popular eReaders like the Kindle. Today, digital paper is enabling sustainability that brings together all three of its core pillars — sometimes all in the same product — with innovation that spans multiple industries.

Digital paper defined: Sustainable by nature.

Digital paper provides the comfortable, sunlight-readable look of paper with all the advantages of digital media, yet without the waste and pollution associated with paper. Lumbering, transporting logs, processing wood into paper, and even recycling are all carbon-intensive processes. And despite recycling efforts, 25 percent of the nearly 268 million tons of solid landfill waste each year in the United States is comprised of paper and paperboard.³

Digital paper technology is comprised of particles within microcapsules or microcups that are coated onto a thin film layer and act as a form of ink. Instead of ink being pressed permanently upon paper, the ink particles in digital paper are automatically recycled to form new letters and images when the display image is updated. The film essentially acts as a closed system that responds to electrical charges, with no waste produced over the life of the product.

Digital paper screens require very little power to operate. In fact, an E Ink display uses about 99 percent less power than the liquid crystal displays (LCD) used in television screens and many types of mobile devices. One key reason for this is that power is only used when the screens refresh with new text and images. In other words, zero power is required to show a static image indefinitely, completely upending what it means for a screen to be “ON.”

The combination of ultralow power consumption, waste-free reusability and product design flexibility is driving the use of E Ink's digital paper as a sustainability ingredient brand. The technology is becoming widely adopted in industries ranging from smart packaging and logistics to healthcare, transportation and publishing to name a few.

Smart packaging: Replacing cardboard shipping boxes with a whole new paradigm.



THE BOX, from LivingPackets, is a reusable shipping box made with an E Ink shipping label.

LivingPackets, a European company with headquarters in France, is launching THE BOX — soon to be the world’s first mass-produced reusable shipping box. It can be used for 1,000 trips, then reconditioned for another 1,000 trips (and on, and on). THE BOX doesn’t require the avalanche of packing peanuts or gobs of plastic common with our Amazon Prime orders.

Instead of making shoppers print out return shipping labels, the hard-plastic containers feature E Ink screens that can be instantly updated with return addresses using an app. Over 100 billion cardboard boxes are shipped every year for e-commerce, and LivingPackets believes THE BOX will make a serious dent in that figure. But the sustainability of their innovation goes beyond environmental benefits. Through what the company calls its “Sharing Angel” program, for a limited time LivingPackets is allocating 50 percent of its profits to benefit customers who make a contribution toward the production of THE BOX, guaranteeing five times their initial contribution. This new model allows for broader participation in wealth creation across all levels of society, while simultaneously catalyzing economic growth and protecting the environment.

“We think of it as serenity augmented,” says Emmanuel Lemor, Living Packets’ head of Customer Experience, “It’s financial serenity, customer experience serenity, and serenity for the planet.”

Smart transportation and community engagement: Staying informed through the power of the sun.



Solar-powered E Ink signs provide real-time updates on train or bus arrival times.

One of the major challenges in cities striving to become smarter is the need for citizens to be connected and well-informed while avoiding excessive energy use that can add to carbon footprints. E Ink is helping to solve this problem by enabling a range of connected signage solutions, all with ultralow power consumption requirements.

E Ink bus and light rail signage can be solar-powered, requiring no costly connections to the electrical grid. Instead of leaving riders guessing about when their train or bus will arrive, the signs will provide real-time updates down to the minute. And because the signs mimic the look of paper, they're easy to read even in bright sunshine.

E Ink solar-powered community bulletin boards allow city managers to broadcast messages out to neighborhoods so everyone can stay informed. During the COVID-19 crisis, vital updates on school closures, and information on the availability of civic services like libraries and transit, was disseminated instantly.

In addition to the obvious environmental benefits of the signage, it's equally important that vital information is available to neighborhoods at every socioeconomic level (for example, in poorer communities where not everyone has a smartphone). And due to the technical nature of E Ink, the signs can continue to display emergency management messages even in the event of prolonged power outages.

Smart retail: Making competition sustainable.



Photos courtesy of Displaydata

Electronic Shelf Labels (ESLs) made with E Ink replace paper labels and help stores compete with their online counterparts.

In the retail sector, E Ink is helping drive sustainability by enabling the digitalization of the in-store shopping experience. With competition intense and consumers increasingly using their phones to compare prices while in physical stores, retailers are switching from price labels made from paper to Electronic Shelf Labels (ESLs) made with E Ink. Prices on thousands of shelves can be updated in minutes versus days, with zero paper waste. Leading Belgian retailer Colruyt estimates that switching to ESLs means they no longer have to print 75 million price labels every year, helping them save approximately 90 tons of paper yearly. ESLs are being widely adopted by North American retailers including Best Buy and Home Depot, creating a positive cumulative impact on the environment as well as store efficiency.

Smart healthcare: Making workloads sustainable while improving the patient experience.



Digital signage for hospitals made with E Ink reduces the workloads of busy nurses while improving the patient experience.

Paper signage is one of the last holdouts in the age of hospital digitalization, wasting not only tons of paper but also the precious time of caregivers tasked with updating signs by hand.

E Ink screens are now available in a range of formats, from about 5 inches to up to 42 inches, for applications ranging from medical admission forms and patient door signs to bedhead and bedside patient care signs. All information on the signs is linked to a hospital's central database, allowing for rapid and accurate updates that free staff to focus on what matters: care for patients. At a time when hospital systems may be overburdened, taking grunt work off the shoulders of busy nurses may be the most sustainable solution of all.



reMarkable's digital paper tablet lets users write and sketch with a stylus, improving office efficiency and helping to eliminate paper waste.

Bringing handwriting and sketching back to the office, without paper waste.

Corporations and educational institutions share the goal of improving efficiency while supporting important sustainability initiatives. To check all the boxes at once, many organizations are turning to tablets and books made with E Ink. One example is reMarkable, inventors of a digital paper tablet that lets users write and sketch just as they would on paper, without the

latency issues common with digital tablets of prior eras. Another major innovator in the sector is Onyx, maker of the Boox line of eReaders and digital paper tablets. Not only does Boox avoid the use of wasteful paper for writing and book publishing (including textbooks), their Android-based operating system paired with a cloud architecture is democratizing digital publishing so that more companies can easily disseminate knowledge.

E Ink's 2020 sustainability vision.

Recognizing the unique role that the company's technology can play in supporting sustainable growth, E Ink is an active participant in the UN Global Compact. The Compact is the world's largest sustainability initiative, aligning strategies and operations with universal principles on human rights, labor, environment and anticorruption. "One of the guiding beliefs of the UN Global Compact," states Adam Roy Gordon, USA engagement director, "is that when it comes to sustainability, companies should not wait for countries to take action on issues like climate change."

E Ink isn't waiting. The company's senior leadership has engaged with the Global Compact through the Young Innovators Program, establishing a unique curriculum to empower young professionals to create breakthrough innovation.

"Being the leading reflective screen technology," says Paul Apen, E Ink director of strategy, "we're helping companies create products not previously possible — and underscoring all of this is sustainability."

Conclusion.

While E Ink is being engineered into more and more products, the digital paper revolution has just begun and will accelerate as more companies realize the full sustainability potential of the technology as an ingredient brand. Achieving economic growth while preserving the environment and making life better for everyone is not only possible, it's imperative. In this fast-evolving landscape, E Ink will be everywhere we look.

About the Sponsor

E Ink is the originator, pioneer and commercial leader in digital paper technology. The company delivers its advanced display products to the world's most influential brands and manufacturers, enabling them to install extremely durable, low-power displays in previously impossible or unimaginable applications and environments.

E Ink encompasses the combined E Ink Corporation, which was spun out of the MIT Media Lab in 1997 to commercialize electronic ink and EPD technology, and Prime View International, which was established in 1992 as the first TFT LCD company in Taiwan, focusing on high-quality small-to-medium sized TFT LCDs. In 2009, Prime View acquired E Ink Corporation to further integrate and expand the EPD supply chain and the new combined companies were branded as E Ink.

E Ink's corporate philosophy centers around delivering revolutionary products, excellent user experiences, and environmental benefits through advanced technology development.



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