Skip the Slip, Environmental & Human Health Impacts of Paper Receipts

2019, 2nd Edition

RECEIPT

SKIP THE SLIP

Green America®

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WHY RECEIPTS?

Paper receipts may seem insignificant, but they have unnecessary environmental impacts and expose workers and customers to toxins. Every year in the United States, receipt use consumes over 3 million trees, 9 billion gallons of water, and generates over 4 billion pounds of CO_2 and 302 million pounds of solid waste during production[1]. Extraction and use of these resources take a toll on the climate, a reminder that we need to continue replacing outdated, wasteful items with innovative solutions.

Receipts also pose health risks to people who are regularly in contact with them. An estimated 93 percent of paper receipts are coated with Bisphenol-A (BPA) or Bisphenol-S (BPS), endocrine-disruptors which serve as color-developers to make the text appear on receipts[2]. When we touch receipts, the chemical coating is absorbed into our bodies through our hands. Researchers at the New York State Department of Health documented connections between BPA exposures and developmental and neurological problems[3].
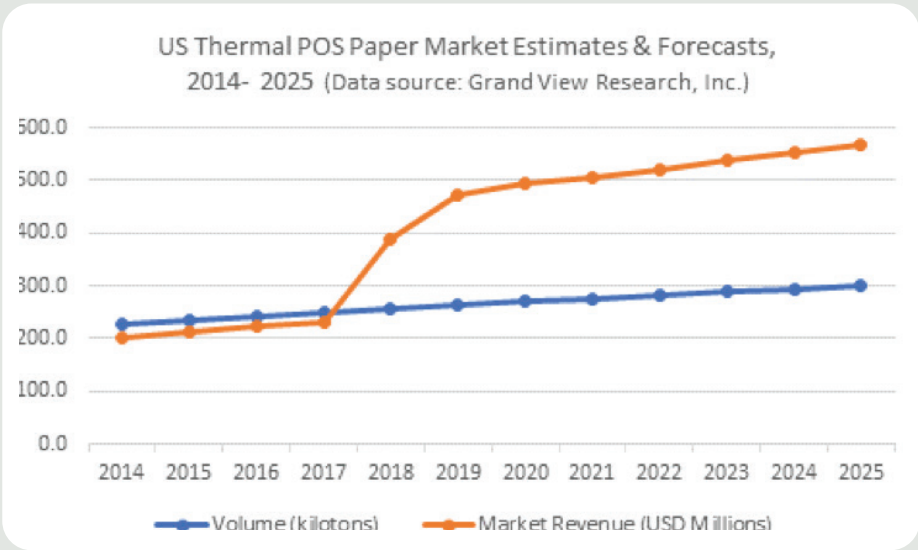
BPA impacts fetal development and is linked to reproductive impairment, type 2 diabetes, thyroid conditions, and other health concerns. Companies have sought out "non-BPA" paper, but the replacement is commonly BPS, a similar chemical which research indicates has similarly detrimental effects as BPA[4].

Retail employees are at the greatest risk, as studies show workers who have regular contact with receipts have over 30 percent more BPA or BPS found in their bodies, and many employees may exceed the European Union's limit for the safe amount of BPA to absorb in a day (4 micrograms per kilogram of body weight per day)[5]. While it is uncertain precisely how much of this BPA and BPS in workers' bodies is directly influenced by contact with thermal paper receipts, retailers are exploring options for moving away from using these papers in stores.

Reducing paper receipts and other disposable items can also be good for business. Analysis from Grand View Research shows that the consumption of thermal paper for receipts is increasing in the United States and worldwide. Additionally, this research shows that the cost of thermal paper is going up each year, a trend that is projected to continue into 2025[6]. This is due to a critical shortage of leuco dye, essential for producing thermal paper.

In 2017, Chinese manufacturer Connect Chemicals, a major supplier of leuco dye, was shut down due to exceeding limits of hazardous fine particulate matter in its emissions. This cut leuco dye production by an estimated 80%, which led to drastically higher prices. Connect Chemicals reopened in late 2018, but only at 50% capacity while many other suppliers remain closed[7]. This cost increase is one reason why reducing the automatic printing of unwanted paper receipts can save a business money over the long-term.

US Thermal POS Paper Market Estimates & Forecasts, 2014- 2025 (Data source: Grand View Research, Inc.)

Graph 1. Thermal Paper Point-of-Sale Market Estimates, Grand View Research, Inc.

SOLUTIONS

There are many existing solutions which eliminate the need for phenol-coated paper and can reduce paper waste.

- Dynamic receipts are digital receipts that can contain coupons, surveys, or other add-ons for the customer to offer feedback to a company in the single receipt.

- Card readers for smartphones and tablets offer paperless transactions that are seamless and secure.

- Digital receipt software is available that works with the various point of sale hardware, meaning companies do not need to make changes to their registers.

- For customers who desire a printed copy of their receipt, phenol-free paper should be offered by companies.

In this report, we discuss these different solutions and costs, some suppliers of these alternatives, and retailers successfully using them.

Despite a decline in some paper products use due to the rise of digital technologies, we are still producing mountains of the material. Paper use is going up globally, exceeding 400 million metric tonnes per year. China, the U.S., Japan, and Europe are the largest consumers[8]. In North America, we consume on average 215 kg per person (four times the global average). By comparison, Africa accounts for only 2 percent of global use and a mere 7 kg/person[9].

Individuals and institutions are going paperless in some ways, but when we decrease our paper use in one area, the consumption can shift to another product. For example, we are using less office paper, but online shopping and delivery packaging has increased. Paper production, from deforestation to manufacturing processes, can pose consequences to the environment and communities.

Pulp and paper companies acting irresponsibly have even violated lands rights of indigenous peoples and communities in some cases[10]. Worldwide impacts on communities from production can include environmental degradation, pollution, destruction of sacred lands[11] and negative impacts on local economic sectors like fishing and tourism[12].

The worldwide paper recycling rate hovers around 58 percent, and while the U.S. recycling rate is above the global average at 64 percent, it trails Australia (85 percent), Japan (80 percent), Europe (72 percent), and Canada (70 percent)[13]. Recycling rates can be challenging metrics, since different definitions and methods of measuring may be employed. However, these numbers offer some insight into the ways that paper recycling has improved and how much more progress is needed.

ENVIRONMENTAL IMPACTS

Take those ubiquitous slips of paper nestled at the bottoms of shopping bags, coat pockets, or wallets and multiply them times the millions of transactions that occur daily. The slim size of paper receipts doesn't convey the unnecessary environmental and health risks they carry.

In the May 2018 version of this report, we based environmental impacts on the widely used statistic that the US consumes 640,000 tons of receipt paper each year. The original source of this number, AllEtronic, has since closed but we estimate the data came from around 2009[14]. Green America has since commissioned newer, reliable data from Grand View Research that analyzes global thermal paper by region and application. This 2018 data shows that the U.S. consumes 256,300 metric tonnes of point of sale (POS) thermal paper each year. The research shows that receipt paper use has been increasing since before 2014 and is projected to continue increasing at a rate of 2.3 percent every year[15].

Using this data and the Environmental Paper Calculator[16]*, Green America estimates the annual impacts of receipt paper consumption in the United States are over:

- **3.32 million trees,**

- **9.08 billion gallons of water,**

- **4.68 billion pounds of greenhouse gas emissions,**

- **302 million pounds of solid waste (from paper production and disposal).**

Per the advice of industry experts, our analysis included a 20 percent average of recycled content in thermal paper. We also used the supercalendered grade in the Paper Calculator, which is a category of printing & writing paper, which only sees 8 percent recycled fiber use globally[17]. For this reason, it was determined that 20 percent would be an estimate favorable to the industry.

The annual estimate of thermal paper for receipts represents less than 1 percent of the 71 million tonnes of paper used in the US. But consider that receipt paper use in the U.S. alone has the same greenhouse gas emissions impact as driving over 450,000 cars each year for receipts that many customers don't need. The short-term aim of Green America's Skip the Slip campaign is to address the wasteful impacts and health risks associated with paper receipts. A larger goal is to raise awareness of the complex impacts of commonplace materials we engage with every day, and the varied ways individual actions and corporate responsibility influence our waste streams.

Waste reduction includes identifying processes or items that can be replaced with environmentally preferable alternatives. By making changes to curb waste, we can reduce consumption at the source and institute a longer-lasting replacement. These changes can pave the way for reducing waste by addressing a variety of items. Reducing unnecessary waste can save more than the material itself. Resources are used to produce even the smallest of items and when those are produced in the billions, there is ample reason to explore their usefulness.

FORESTS

Forest ecosystems are essential to a healthy, functioning planet. Forests produce fresh oxygen and are also powerful agents of carbon sequestration. By absorbing roughly 40 percent[18] of global fossil fuel emissions every year forests contribute greatly to battling climate change. At the same time, deforestation accounts for 25 percent of global carbon emissions caused from human activities[19]. In short, deforestation is slicing away at forests' potential to sequester much more carbon.

When we log forests to produce paper and wood products or to clear land for agriculture, these carbon sinks become carbon emitters. As Dogwood Alliance reports, logging is diminishing the net forest carbon sink in the US by at least 35 percent, and if soil emissions from logging were included, this number would be "significantly higher"[20]. Globally, forests are pulling enough carbon from the atmosphere to equate to 25 percent of

anthropogenic emissions, but in the United States, forests are only removing 13 percent of our country's annual emissions[21]. Dogwood Alliance also reports our nation's forests are still operating at a carbon deficit, since new growth has not absorbed past emissions from forest loss.

To satisfy paper and wood demands, tens of millions of acres of biologically diverse forests have been destroyed and converted to monoculture tree plantations made up of one species[22]. A wider range of tree species, as we see in natural forests, sequesters more carbon than single-species forest[23]. Planting trees is a noble effort that yields positive results and is a valuable tool in addressing climate issues, but it is still a mitigation strategy. Proposals to plant trees to counteract emissions from removal ignore the fact that we'd have to use unsustainable volumes of water and land to maintain these carbon sequestering tree plantations[24]. To address the root of the problem we must cut overall emissions, which means reducing pressure on forests by curbing production of wasteful materials and leaving diverse, natural ecosystems intact.

WATER

Water sustains ecosystem functions, such as nourishing the plants which produce oxygen. We need fresh water for our food production and to maintain sanitary conditions in communities. Every living thing on the planet needs water to survive.

Until we experience heavy contamination or drought, it's easy for people in the developed world to take for granted what seems to be endless water flowing from a tap. But, less than one percent of fresh water on the entire planet is suitable for human use and consumption[25]. Water insecurity is already impacting communities worldwide. As our population escalates, so does the need for this critical resource, but 783 million people currently do not have access to clean water[26]. If our current trends of population growth and usage continue, the UN estimates by 2030, our need for water will surpass the steady supply by 40 percent[27]. In order to meet these growing pressures for fresh water, and to address the additional pressures on supply that result from climate change, we will need to greatly reduce water waste.

We could save over 9 billion gallons of water every year by reducing paper receipts. That's the equivalent to more than 6.5 million clothes washers operated per year.

GREENHOUSE GAS EMISSIONS

Greenhouse gases are released through each phase of extracting new resources used to produce thermal paper receipts, including the emissions to transport and distribute. Producing 256,300 tons of paper for receipts every year emits an estimated 4.68 billion pounds of greenhouse gases, the equivalent of 450,000 cars on the road[28]. From harvesting and processing the wood pulp to producing the millions of gallons of oil used in their production,

paper receipts have unnecessary climate impacts. Emissions also result from the waste generated by paper production and the disposal of the paper itself. Production of receipt paper generates 302 million pounds of waste each year[29].

Regarding the end of life, municipalities advise putting receipts into the trash as they are considered a contaminate in recycling streams. The Minnesota Pollution Control Agency reports that the chemicals used in thermal paper are water-soluble, so the majority leach out into wastewater during the recycling process. While much of the BPA is removed during treatment, wildlife could still be endangered by waste water discharges, and the paper industry has been observed to be a "major BPA contributor to the influent of the waste water treatment plant"[30].

The remaining 10 percent of BPA that does not leach out in wastewater remains in fiber used for new recycled products[31], and the bisphenol levels found in new paper products varies greatly between paper grades. Some research shows that BPA levels are highest in recycled containerboard and carton board[32]. Seventh Generation, which sells a wide range of recycled paper products, has addressed this issue on its website. It periodically tests household paper products for BPA and it reports the testing has uncovered a small amount of the substance was found in those products. The company states, "our research shows that the likely source of this BPA is the thermal papers used for cash register, ATM, and other receipts, which are often made with BPA[33]."

As for landfill disposal, it's observed that over time BPA contaminates landfill leachate at a wide-range of concentrations. However, there is limited data available to assess concentrations from US landfills and research shows that BPA can be effectively removed through treatment of leachate from landfills. Based on this information, it is recommended to dispose of thermal paper receipts in the trash[34].

HUMAN HEALTH IMPACTS

Paper receipts are not only wasteful, they can also negatively impact human health. Thermal paper requires heat and a coating to display purchase information on the receipt. Ecology Center estimates that 93 percent of receipts in the U.S. are coated with phenol chemicals, Bisphenol-A and Bisphenol-S (BPA and BPS), which serve as color developers of the paper[35]. These substances are easily transferred to anything that touches the paper, including our hands and into our bodies, where they act as endocrine disruptors. Researchers at the New York State Department of Health documented connections between BPA exposures and developmental and neurological problems[36]. BPA impacts fetal development and is linked to reproductive impairment, type 2 diabetes, thyroid conditions, and other health concerns. A 2010 study conducted by the University of Missouri, commissioned by Environmental Working Group, reported that the total mass of BPA on a receipt is up to 250 to 1,000 times greater than the amount of BPA found in a can of food or in plastic bottles[37].

Ecology Center's 2018 report found that 75 percent of tested receipts were coated with BPS, and 18 percent were coated with BPA[38]. In response to public concerns of BPA, companies began printing receipts with BPS-coated thermal paper, a similar chemical. A 2018 study found that BPS is as significant of an endocrine-disruptor as BPA, even though there is less awareness surrounding its potential harms amongst the public[39]. As of 2014, nearly 81 percent of Americans were shown to have detectable levels of BPS in their urine[40], and nearly 90% of human exposure to BPS is from thermal paper receipts coated with the substance[41]. Workers regularly touching receipts have over 30 percent more BPA in their bodies than other adults, based on urine tests[42]. Many employees may be regularly exceeding European BPA exposure limits due to their frequent contact with thermal paper receipts[43]. The "tolerable daily intake" (TDI) represents the maximum amount of a substance that humans can safely absorb. In 2015, the European Food Safety Authority declared previous TDI limits for BPA (50 micrograms per kilogram of body weight per day) were set too high and lowered the limit to 4 micrograms[44]. In early 2018, the European Commission issued a ban on BPA in thermal paper to begin in 2020 and has asked the European Chemicals Agency to study the effects of BPS[45].

U.S. POLICY ACTION

In 2008, the U.S. Food and Drug Administration (FDA) set the daily limit for BPA at 50 micrograms per kilogram of body weight[46]. The National Toxicology Program released part of a long-term, multi-year study meant to assess the safety of BPA. Based on this partial and incomplete data, in early 2018 the FDA declared BPA exposure had "minimal effects," but did so without adequate scientific evidence to back up the claim[47]. The study data was not peer reviewed, and the methodology of the study was not designed to detect endocrine disruption. There has been no announced U.S. national initiative to tackle phenols in thermal paper, such as the EU ban.

On the state level, Connecticut was the first in the U.S. to ban BPA in receipt paper on the grounds of health concerns in 2011[48]. Other states have banned BPA in baby bottles and similar containers, and the FDA banned the use of BPA in baby bottles nationwide in 2012[49]. But no federal policy initiatives exist to end phenols in thermal paper, and no other states have enacted bans except Connecticut. A 2010 study conducted by the University of Missouri, commissioned by the Environmental Working Group, revealed that the total mass of BPA on a receipt is 250 to 1,000 times greater than the amount of BPA found in a can of food or baby formula, or in plastic baby bottles[50].

THE SOLUTIONS

In January 2019, California Assemblymember Phil Ting introduced a new bill with the aim of reducing paper receipt waste. Inspired by Green America's Skip the Slip campaign, AB 161 would require businesses to offer a digital receipt option and provide a paper receipt upon customer request. The bill exempts cash-only businesses, small businesses as defined by the state[51], and businesses using short-form receipts on paper free of BPA and BPS[52]. AB 161 has been approved by the assembly and is currently under discussion in the state senate.

Based on the health impacts of phenol-coated thermal paper and the environmental impacts of generating paper receipts, Green America has prepared the following solutions. Implementing phenol-free paper is an essential immediate step to ensure worker and customer health, however it is our conclusion that the long-term solution is to reduce overall production of paper receipts. By promoting the use of digital receipts, we can conserve resources and make transactions more secure and efficient.

Innovative companies are moving to digital receipt options or allowing customers to skip receipts altogether. The most common drivers for switching include customer convenience, corporate goals to reduce paper use, consumer protection (digital receipts are easier to trace and result in less identity theft), and other cost-saving needs. But, this still leaves a large number of retailers only offering paper receipts, most of which are made using BPA or BPS, and other companies offering both paper and digital, but not digital alone.

Toast, Inc., a company offering all-in-one restaurant technology, released survey results in 2017 showing the shifting attitudes towards digital processes in restaurants. Compiling responses from 450 restaurant owners, the survey included owners and patrons of diners, fast food, cafes, bars, and fine dining. The results showed 49 percent of millennials aged 18-39 prefer email or text receipts. For customers in the 40-59 age group 37 percent preferred digital, and of those in the 60+ age group, 26 percent preferred digital[53]. The survey results support making digital receipts available to all customers while continuing to offer phenol-free paper receipts by customer request.

Awareness on the issue is increasing around the world, along with new research. Flux, a UK tech company and creator of the "Beat the Receipt" campaign, released survey results in 2019 showing that an estimated two out of every three paper receipts go straight into the trash bin[54]. Flux's research estimates of the 11 billion receipts printed across the UK every year, nearly 9.9 billion are thrown out. The results also showed that 74% of British consumers would prefer to receive all receipts digitally and are confused why paper receipts are still used[55]. Retailers can take steps to improve receipt practices and ensure transactions are efficient, secure, and better for workers and the environment. This is an overview and not an exhaustive list of all retailers and software providers offering these solutions.

OFFER A "NO RECEIPT" OPTION

For some transactions, particularly at convenience stores, cafes, or fast-food restaurants, where there is little potential for customer returns, offering an option for no receipt has the lowest environmental impact. At the beginning of each transactions, customers can be asked, "Will you need a receipt?" Then retailers would only print (or email) a receipt to customers that answer affirmatively. Green America wants to see paper receipts as an opt-in, so the default will be no receipt, or digital where a receipt is needed.

Digital receipts still have an environmental impact, as an average email (including one for a digital receipt) is estimated to have a footprint of 4 grams of carbon dioxide[56]. Since a mature tree can absorb roughly 21,772 grams of carbon dioxide every year, by keeping trees in forests rather than using them for unwanted paper receipts, Green America estimates that one tree can accommodate the emissions of over 70 individuals emailing every year.

Additionally, if individuals reduce the reliance on fossil fuels to power their devices — and urge companies to power networks and data centers on clean energy — the impacts of digital receipts will be even smaller. While the environmental impacts of a paper receipt vary depending on length of receipt and other factors, in general paper receipts have a higher environmental footprint than digital. Retailers can contact their print-of-sale (POS) system supplier to disengage the auto-print option.

DIGITAL RECEIPTS

Green America recommends offering digital receipts as the default option when a receipt is needed to curb environmental impacts and offering phenol-free paper by request. Customers can choose to have a copy of their receipt emailed to them, which eliminates the need for paper receipts and improves the security and efficiency of transactions. By offering this service as the primary alternative to "no-receipt", customers are encouraged to take a simple, convenient step that can go a long way in reducing waste.

Digital receipts also provide benefits to consumers and protect merchants. With an electronic receipt system, it's much easier for the customer to retain their receipts. It improves customer convenience and reduces fraudulent activities. Digital receipts are easier to track as they are directly linked to the point of sale system. Paper receipts can fall out of bags or pockets, which opens the door to fraud if a receipt falls into the wrong hands.

Digital receipts can be used to enhance record-keeping, especially since the IRS has allowed digital receipts to be provided in response to audits since 1997[57]. For business owners as well customers, record-keeping can easily become a digitized process. Digital systems allow individuals to total up expenses for the past year and search for receipts easily when filing taxes or responding to an audit. For businesses, digital systems help maximize tax deductions and protect them if they are audited. Available software for digital record-keeping includes Shoeboxed, with costs ranging from $15 to $125 per month to cover subscription fees, depending on the number of receipts submitted.

It is important to promote digital receipts to customers and make it easy to participate. If a digital program is designed as an opt-in with multiple steps or is not promoted, companies might not see a large percentage of customers participating in the program. CVS has developed a reputation for its lengthy paper receipts, but many customers may be surprised to learn it offers a digital option. Customers have to know about the digital program and request it in-store or download an app to begin use. CVS's 2017 annual report stated 4.5 million customers use the digital receipt program, and this resulted in saving the company $200,000 in paper and other expenses[58]. But, this represents only 7 percent of their 62 million Extracare members[59], and CVS could take steps to increase participation beginning with making it the default option.

Digital receipts are also price-competitive with paper–based receipts. Digital receipts require machinery that many businesses already own, such as registers, point of sale equipment, computers, tablets or smartphones. Some digital receipt options require the purchase of card readers or special plug and play products, yet such products remain price competitive and many involve a one-time investment. In the following sections, we provide sample price points for digital and non-toxic paper options. All prices listed below are from companies that have made this information publicly available.

There are different types of digital receipts depending on the uses a company needs to fill or the distribution it prefers using (sending the e-receipt to email, an app, etc.).

A) Dynamic Digital Receipts

Companies can provide either a simple e-mail, with no additional marketing information, or provide a dynamic email receipt. Dynamic receipts are used to provide future promotions and offers to the customer, gather relevant feedback, and develop digital marketing strategies.

They can provide another stream of communication between the customer and the retailer but is most beneficial for all involved when customers are explicitly asked to opt into further messages from the company. Green America supports receipt practices that are centered on customer preference and needs.

Transaction Tree, a company specializing in digital receipts, requires that customers opt in for marketing features. It warns retailers of the repercussions from using "intrusive marketing efforts.[60]" A quick way to lose the respect of a customer is by bombarding them with unsolicited messages. A customer opting in for digital receipt is not automatically opting for additional marketing or further messages. A single digital receipt can include any marketing, coupons, or survey opportunities.

Retailer Users: Apple, Best Buy, CVS, The Container Store, Macy's, Nordstrom.

Software Vendors: FlexReceipts, NeatReceipts (annual subscription costs ranging from $79.99-$249.99), Square, Inc. (hardware costs range from $49-$999), Transaction Tree.

B) Card Readers (with e-receipts) for Smartphones and Tablets

Another digital solution is using a card reader for mobile devices. Vendors can accept credit cards and provide customers with receipts instantly, making transactions seamless and speedy. Such card readers are compatible with any mobile device, like smartphones and tablets. The readers send e-receipts and ensure secure transactions. As the customer's card is swiped or inserted, the information is securely sent to a merchant bank, which obtains the charged amount from the customer's bank or credit card account. Services like Apple Pay utilize contactless payments which don't require customer information to be given to the retailers when the smartphone is held over the reader to begin the transaction.

In 2018, MasterCard, Visa, American Express, and Discover stopped requiring merchants to obtain signatures for credit card purchases. Merchants using chip technology have seen fraudulent charges drop 70 percent from 2015 and 2017[61].

Card readers allow for businesses of all sizes to benefit from using digital receipts. Green America's Green Business Network, comprised of 3,000 small-to-mid-size businesses, often demonstrates that small businesses are sustainability innovators in their fields. Green America helps all small businesses go green, and we are encouraging our business members to adopt Square or Apple Pay as an easy way to lower their environmental impacts.

Retailer Users: Coffee Foundry, Cork N' Bottle, K. Hall Studios, Souvla, Wright Bros. Brew & Brew.

Contactless Software Vendors: Apple Pay, Android Pay
Mobile card reader vendors: Square, Inc. (charges 2.75% of transaction amount per swipe and 3.5% for each manual transaction), Clover Go, PayPal Here (2.7% per swipe and 3.5% for manual transactions), Spark Pay.

C) Integrations with Existing Registers

One of the easiest ways for a company to move from paper receipts to digital is to use a product that can integrate with the company's existing registers. Point of Sale (POS) systems provide the software and hardware that allows both e-receipts or paper receipts to be generated. The POS hardware includes a screen and keyboard at the check-out register, a barcode scanner, credit card reader, and a printer for receipts. The software is what distributes the receipt, and it can "live" on-site through a business' computer system or can be cloud-based and operate through the internet. A cloud-based system avoids the extra cost of upgrading software or paying for licensing fees. The system relies on the internet, but sales are still tracked when a connection falters and will sync up once it reconnects. POS systems differ from credit card terminals, which are the machines with a keypad for pin numbers and a pen for signatures, since terminals only function is to process payments whereas POS provides a wider range of services.

A POS software system records and tracks when goods or services are sold and can track inventory and manage personnel information. The software obtains data from the register's printers, so all the receipts being sent to the printer can instead be configured into a PDF and then the receipts are sent as emails to customers. The hardware will be the same whether a company uses software that processes receipts through an on-site computer system or the cloud. POS digital receipt systems work for companies using compatible print drivers.

Another option utilizes a "plug and play" system that provides both software and hardware to retailers. Retailers unplug receipt printers and then plug the printer into a device where the digital receipt appears on the screen. Once plugged in, the receipt goes into the cloud and no app needs to be downloaded by the customer because they receive the receipt via email. This technology can capture receipts before they're printed and digitizes them. These systems provide analytics to retailers that track customers' spending patterns.

An additional method is "tap and go", similar to contactless payments which have become extremely common throughout Europe. Mastercard reported in 2018 that Europe saw a 97% increase in contactless transactions from the previous year[62]. By contrast, only 3% of U.S. cards are contactless[63]. Contactless allows customers to pay by tapping their cards onto the store's checkout terminal. Similarly, "tap and go" transactions connect directly to POS terminals and does not require customers to give their email addresses for a digital receipt. The customer can tap their NFC enabled card or phone (Near Field Communication, which is a short-range wireless connectivity standard that allows communication between two devices once touched together) and have the receipts sent to cloud-based storage tied to the ID of their NFC card of phone. The digital receipts are securely stored, and customers can then retrieve their receipts at any time directly through an app on their iPhone or Android-based smartphone if that is their preference.

- Retailer Users: ALDO, Dr. Martens, GNC Live Well, In-N-Out Burger, Jared Jewelers, Kay Jewelers, Nixon, Ripcurl, Oakely, Shoe Carnivals.

- Software & Hardware Vendors: FlexReceipts, FuturePRNT POS Receipt Printer (hardware cost is $189.85), Receet, TillBilly.

NON-TOXIC PAPER

The Pew Research Center notes that in 2017, 77 percent of Americans owned a smartphone, which was a large jump from only 35 percent in 2010[64]. While smartphone usage is becoming the norm, there are still millions of customers who do not have smartphones, and many Americans do not have computers are home or lack access to the internet. In addition, even customers who have the latest technology may still prefer paper receipts. If consumers request a paper receipt, companies should opt for non-toxic papers that don't contain BPA or BPS. There are a range of available alternatives to toxic paper receipts and a growing number of phenol-free paper receipts on the market. Generally, they use polymeric or Vitamin-C based coatings, which are safer for human health but also better for the environment, as they are recyclable and compostable in most areas.

Phenol-Free Vendors

- Appvion – POS Alpha Free – This paper uses a vitamin C mixture for its coating, which gives a subtle shade of yellow to receipts (costs range from $29.90- $74.90 depending on the size of the roll). The yellow tint does not affect the visibility of the text.

- BASF - Pergafast 201 – This color developer is an alternative to using phenols as developers and was the first commercial alternative to BPA when it was released in 2011. Pergafast could potentially present some developmental hazards, but is not easily absorbed through the skin, in contrast to BPA and BPS[65].

- Iconex 2ST™ – This new dual-printing process allows printing on both sides, which decreases the amount of paper rolls needed by 50 percent and reduces the cost of buying paper rolls. It is also BPA-free, BPS-free.

- Koehler– BLUE 4EST – Phenol free and uses polymeric coating that doesn't come off the paper like BPA/BPS. This paper uses a physical reaction to make text appear. When printing, heat applied to this paper activates the carbon black paper underneath which results in print appearing. Unlike phenol thermal paper, there is no chemical reaction involved. Koehler states this is the first thermal paper to be approved for direct contact with food.

- Koehler KT 48PF – Phenol-free paper that can be used with most thermal printers and provides receipts that last up to 10 years.

RETAILERS USING PHENOL-FREE PAPER

Best Buy: Receipts contain the Pergafast 201 color developer. Best Buy also offers e-receipts, which customers can request in store by joining their loyalty program.

Lidl Grocery: This German grocery company (which is opening stores across the U.S.) began using phenol-free receipt paper in June 2017 in this country. Lidl proudly states that it offered phenol-free papers worldwide throughout the company's existence.

MOM's Organic Market: MOM's (a supermarket chain in the Washington DC area) uses receipt paper coating made from Vitamin C, free of phenols (BPA and BPS-free). Customers regularly thank MOM's for using non-toxic receipts.

Trader Joe's: In 2018, Trader Joe's made the commitment to switch to phenol-free receipt paper and has since rolled out this change in all of its stores.

SELECT RETAILERS RECEIPT PRACTICES

A OFFERS DIGITAL AND
PHENOL-FREE PAPER RECEIPTS

Best Buy	Ben & Jerry's	Apple

B OFFERS PHENOL-FREE PAPER;
NO DIGITAL PROGRAM

Whole Foods Market*	Trader Joe's	MOM's Organic Market
Costco	Lidl Grocer	

C HAS OPTIONAL DIGITAL PROGRAM;
USES BPA OR BPS PAPER

Lowe's	Banana Republic	Nordstrom*
Kmart	GAP	Starbucks
Macy's	In-N-Out Burger	Target*
CVS	Aldo*	

D NO DIGITAL PROGRAM;
USES BPA OR BPS PAPER

Walgreens	7-Eleven	Panda Express
Burger King	Safeway	Taco Bell
Petco	Subway	Rite Aid
Family Dollar	Claire's	Aldi
Chipotle	McDonald's	Wendy's
Walmart	TJX Companies	

This is a selection of retailers, and not an exhaustive list. Companies are rated on in-store transactions. Online purchases are not included.

This denotes a company that offers a no receipt option or is exploring other changes to receipt practices.

Ben & Jerry's uses digital receipts as the default and less than 1% of transactions result in a paper receipt, which at present is not phenol-free.

Costco uses phenol-free paper at many stores and is in the process of implementing at all locations.

Walmart & TJX only offer e-receipts along with a printed copy, which is not environmentally preferable.

Data for the scorecard was gathered from: direct contact with company, publicly-available information, or research published by The Ecology Center or the Center for Environmental Health[66].

HOW TO TAKE ACTION

Green America's "Skip the Slip" campaign is one of the first initiatives in the United States to analyze environmental and human health impacts of receipt usage and waste, propose solutions for businesses, and engage consumer action. Our goal is to reduce the unnecessary use of paper, energy, and water for receipts by urging major companies to offer paperless receipt options. For customers that do request paper receipts, it is necessary that non-toxic paper options be provided to them. Below are concrete steps you can take to address paper receipts:

If you're a consumer:

- At the start of a transaction, let the cashier know you don't want a paper receipt, and feel free to remind them towards the end.

- Request digital receipts when possible. You could also create a special folder for emailed receipts or even use a separate email address for digital receipts.

- Urge companies you patronize to adopt paperless options and non-toxic receipt paper. You can advocate in person or ask via social media or email.

- Fold receipt with the printed side in if you need to take a paper copy. This will lessen BPA/BPS exposure, since the back of thermal paper is often not coated.

- Be mindful of the products you purchase since everything we buy has an impact on the planet. And the fewer purchases we make, the fewer receipts to reject.

- If you get a long receipt, you can tweet a photo of it and tag the company to urge them to #skiptheslip.

If you're an employee:

- Ask customers if they'd like a receipt rather than automatically printing it.

- Confirm with your employer if the paper in your workplace has BPA or BPS coating or contact the paper supplier. Encourage your company to explore phenol-free options.

- Encourage the store manager to disable automatic printing and to make digital receipts optional.

- Share information on environmental and health impacts of paper receipts with other employees.

- Wear nitrile gloves to decrease BPA/BPS exposure to thermal paper receipts.

- Wash your hands after touching receipts using soap and water instead of alcohol-based hand sanitizers or lotion (which increase BPA/BPS absorption).

If you're a business owner:

● Look into digital receipt and non-BPA/BPS paper options. Green America is glad to assist in strategizing the best receipt practices for your company, free of charge. Please contact us to learn more.

● Review the examples above to learn about the available technologies and solutions.

● If you offer digital receipts, you can promote them to your customers. Make it a part of cashier training to ask if the customer wants a receipt, and then ask if they'd like paper or digital. Promote the paperless option on company website, app, and in-store signage at check-out.

ENDNOTES

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