Wide Format Printer
Selector Guide

Introduction

Margins in traditional commercial printing applications continue to contract. At the same time, the large format sign and display graphics market continues to grow as a signifigant part of today's marketing mix. From the world's largest brands to small businesses, non-profits, schools and even consumers, the demand for short run, wide format graphics for special events, promotions, point-of-purchase displays and other alternative advertising has never been greater. In fact, according to InfoTrends, the retail value of large format graphics is projected to increase at a 7.9% CAGR from 2010 to 2015*.

Many in the industry agree that out of all the value-added services that commercial and quick print shops should be adding to their mix, wide format printing holds the largest potential for major revenue growth through new offerings and new, higher-margin revenue streams. This guide will help you navigate through the complex world of wide format printing to select the most appropriate solution for your business needs, and those of your customers, today and as your business grows in the future.

*Printing Impressions Group, The Emerging Markets Webinar Series, "Wide Format: Big Reasons to Invest" webinar, May 7, 2013.

Opportunities Abound

Wide format graphics are not hard to spot. Just take a look around next time you're in the car, or at a shopping mall, grocery store or sporting event. Chances are you won't have to look long and hard to spot large format, branding graphics on buildings, banners, vehicles, bus stops, store windows and retail displays.

The application possibilities are endless and, perhaps, may seem a bit overwhelming. The first step in determining which wide format printer is right for your business is to understand the applications you could be producing today and the margin structure it would add to your business. Take a close look at and make a list of the type of work you are currently outsourcing or even turning away. You'll not only protect your customers from a potential competitor and better your revenue potential, but also tighten your overall relationship with your customer with the addition of wide format printing.

Ask Yourself

- Which high-margin, short-run jobs or one-offs can we bring in-house?
    - ◊ What's our margin loss in outsourcing?
- Are we turning away large or wide format just-in-time jobs?
- Which wide format applications can we offer customers to protect our share of wallet?
- Could we also offer specialty-printing applications, such proofing, nameplates, promotional items, fine art reproductions or customized/personalized items to gain even more wallet share with customers?

Case in Point

Evron Graphics farmed out digital work to partner companies, but with market changes over the past few years, it was time to rethink their strategy. "First people stopped ordering by the thousands and wanted only small quantities," Chris Root of Evron, explains. "Then work picked up even more, and eventually there were enough jobs to justify my own digital wide format printer."

Case in Point

FireHouse Signs had a strong reputation for vehicle wraps but wanted to expand the business. With the acquisition of an entry-level flatbed UV-curable wide format printer, FireHouse Signs was able to offer customers new substrate options such as glass, acrylic, ceramic tiles and doors, up to 2" in thickness. Much of the company's business growth was from new applications being produced for existing customers. FireHouse Signs even gained the prestigious job of providing interior door graphics for "Extreme Makeover: Home Edition."

Take a look at the different types of commercial graphic applications:

Outdoor Graphics
Building coverings and wraps
Flexface billboards
Backlit signage: day and night
Banners
Fleet graphics
Vehicle wraps
Transit and informational signage

Point-of-Purchase (POP) Displays
Rigid POP displays
3D POP displays
Open-box packages and displays
In-store promotions
Short-run packaging for prototyping

Short-run packaging for seasonal promotions and one-off events

Indoor Graphics
Branding Promotions
Popup displays
Posters
Backlit signage: day and night
Exhibition and event graphics
Floor and window graphics
Backdrops for theater or TV
Photographic reproductions

Package sample for production and marketing

With the ability to print direct to substrate on materials such as wood, metal, plastic, glass and fabric, the application possibilities are endless. Here are some "non" traditional applications being produced on wide format inkjet printers:

Thermo-formed displays
Flooring and rubber mats
Ceramic tiles
Table top and seating decorations
Wall coverings
Home furnishings, such as pillows and drapes

Understanding Wide Format Inkjet Technology

Wide format inkjet printers range in size and price and are used to produce a range of indoor and outdoor graphic, and specialty applications. Inkjet printers use piezoelectric print heads to deposit tiny droplets of ink directly onto a substrate. The ink is bonded or cured to the substrate using a thermal or light source, such as a heater or UV lamp system, depending on the type of ink used.

Ink Formulations

There are a number of ink formulations used in wide format inkjet printers, including solvent, UV-curable, aqueous (water-based) and latex inks. Let's briefly explore each of these formulations:

Aqueous inks use a mixture of water, glycol and dyes or pigments. They are difficult to control on the surface of the media and are not waterproof, therefore require a special overcoat or lamination if the finished graphic will be installed outdoors.

Latex inks fall into the aqueous ink category, with their composition being 70% water and 30% additives. Manufacturers of latex inks claim that graphics produced with the ink on wide format printers can be as durable as images created using solvent inks and are more environmentally friendly, eliminating the need for ventilation. What they don't say is that for proper substrate adhesion, the graphic must be heated to an extremely high temperature. This will drive up energy use and costs. Also, latex inks often require specially treated or coated substrates that can drive up your base costs.

Solvent inks are mainly comprised of petroleum-based chemicals. Solvent inks produce rich vibrant colors and are:

- Comparatively less expensive
- Waterproof, durable and fade resistant, eliminating the need for special over-coatings
- Very flexible, making them ideal for printing on uncoated, flexible substrates, such as vinyl and films, to produce vehicle graphics, banners, billboards and more

Also, graphics produced on a solvent printer are not immediately dry and may require special drying equipment. If running hard solvents, special ventilation is required to protect printer operators from harmful volatile organic compounds (VOCs).

UV-curable inks consist primarily of acrylic monomers with a photo initiator. After printing, the ink is cured by exposure to a strong ultraviolet (UV) light, traditionally a shuttered mercury arc lamp, causing a chemical reaction that results in the ink components cross-linking into a solid. Unlike solvent- or water-based inks, UV-curable inks do not evaporate. They quickly cure, or set, as a result of the chemical reaction, and are immediately dry and ready to move to the next step in the production process. This makes them durable and ideal for printing on the widest range of flexible materials as well as direct to rigid substrates. UV-curable inks offer many environmental advantages, too.

Case in Point

Vector Printing has offered both digital and screen printing since its inception, but the digital side of the business accounts for the majority of output. Vector had a mix of printers, including solvent, but transitioned all digital print to UV-curing devices to provide faster production times, more flexibility in the types of applications and substrates that can be utilized, and a safer work environment for employees.

Choosing a Wide Format Printing Platform

Now that you have a basic understanding of wide format inkjet technology and a list of wide format applications that you want to offer, we can start to narrow your search by matching your application range to a printer platform. So, let's review the available platforms.

Types of Inkjet Printers: Flatbed, Roll-to-Roll and Hybrid

Wide format inkjet printers are available in a variety of platforms. The right one depends on the applications that will be produced and substrates that will be used.

True flatbed printers can print on sheets of flexible or rigid materials, or on any relatively flat item, generally up to two inches (5.08cm) thick. Materials are placed on a flatbed or table (thus the name) and held down through printing. A vacuum platform holds down the materials so they are secure throughout the printing

process as the printer's gantry passes over the substrate. This process allows an extremely precise printing process, allowing the operator to place drops in exact locations, even on existing images. Substrates printed on a flatbed include plastics, wood, metal, glass, lenticular lenses, foam boards, plastic based boards and sheets, and, of course, paper-based materials.

Roll-to-roll printers are just as the name implies: a roll of flexible material is fed into the printer and an uptake reel rewinds the graphics.. They are ideal for commercial printers that want to

capture signage applications, such as posters, banners, transit and way finding signs, and much more.

Hybrid printers are capable of printing both roll-to-roll, flexible sheets and rigid substrates. Hybrid roll-to-roll/flatbed printers offer the ultimate in flexibility, allowing fast changeover from flexible to rigid materials and enabling cost-effective production of the widest possible array of applications. They are the perfect selection for shops that want to provide a wide variety of printed applications/offerings to their customers.

Other Considerations

Yes, there's more, but you are getting closer. Be sure to look for a solution and supplier that can provide the right combination of print capabilities and productivity, service and support, and value.

Print Quality

The industry tends to measure print quality in dots per inch (dpi), but that is only a relevant measure of single/binary droplets and one factor in determining the quality of the output. So, here are some other measures and capabilities to consider as you are evaluating a system's print quality.

Color capability coupled with higher resolutions. Look for a printer that produces consistent and accurate colors on a range of substrates (flexible and rigid), from print to print and job to job, along with resolutions for distance- and closely-viewed applications.

Compare speeds to print quality. It's typical for printer manufacturers and suppliers to quote "up to" print production speeds in their marketing materials. These modes are sometime express or draft modes that may not be used very often. Determine the image quality your customer's expect and match it up to the printer's production sweet spot.

Binary variable drop and variable drop grayscale print heads. Binary variable drop print heads can produce different size drops, but only one size per image. Variable drop grayscale print heads, on the other hand, produce different size drops dynamically, on a drop-by-drop basis within the same print.
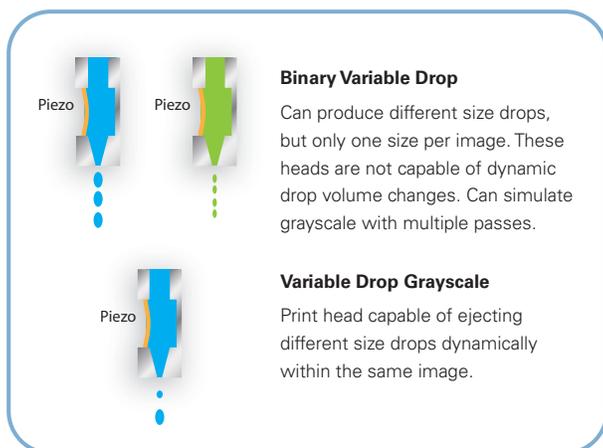
The use of variable dot sizes within the same print (variable drop grayscale printing) can be a marked improvement in the imaging technology. As the dot size gets smaller, the eye perceives the dots to disappear, becoming continuous tone, like a photograph. This is referred to as apparent resolution. The use of dynamic variable drops also uses dramatically less ink when compared to binary or variable binary heads.

Although the levels of grayscale (the number of variable droplet sizes available) differ by printer, the overall result of variable drop grayscale printing is near photographic image quality that exceeds the image quality when printing with a binary drop or using light colors.

Case in Point

Palm Printing began as a quick print shop but recognized an increasing demand for high-quality, wide-format printing. The company selected an entry-level wide-format UV hybrid printer because it delivers near photographic image quality with saturated color, using four-color plus white and 8-level grayscale technology. The wide format printer not only delivers the ability to print high quality images on rigid and flexible materials, giving them a competitive edge in their area, but also the ability to grow their business over the next several years.

Binary Variable Drop

Piezo

Piezo

Can produce different size drops, but only one size per image. These heads are not capable of dynamic drop volume changes. Can simulate grayscale with multiple passes.

Variable Drop Grayscale

Piezo

Print head capable of ejecting different size drops dynamically within the same image.

White Ink

The ability to use white ink expands both the range and quality of applications that can be produced. Here's what to look for in a white ink solution:

Ink stability. Some white ink has a greater tendency to clog inkjet heads. Be sure to ask about the performance characteristics of the supplier's white ink.

Print speed. Ask if the white ink is applied in a single pass, without slowing down the machine, or in multiple passes. If the machine does slow down to print white, find out by how much. Slowing down the printer to print white will affect total throughput—and, ultimately, profitability.

With some systems, it's necessary to change over to white ink, while other printers have a dedicated channel for white. Time spent on ink changeovers also can affect both quality and throughput.

How white is the white. Some "white" ink has a distinct yellowish cast, which produces a lower quality product. Be sure to ask for samples to make direct comparisons on the brightness and opacity of the white ink.

Ask Yourself

- What are the performance characteristics of the supplier's white ink?
- Can white ink be applied in a single pass, without slowing down the machine?
- How fast does the white print?
- Does white come standard or is it a chargeable option?

Matching Anticipated Print Volume with Productivity

It is important to consider the print volumes you will need your wide format printer to generate. Low-end wide format printers are designed to print high quality images, but can't handle large volumes. Others are built as production level printers that don't compromise quality for speed, and are still affordable.

Match it Up

Use the chart below to see if your print volumes or square feet/square meters of outsourced jobs per day justify a jump to wide format.

Type of Work	Ft²/M² per Day	Printer Platform
Roll and direct print to rigid	160/15	Hybrid
Precision and specialty printing	205/20	True flatbed
POP and high value graphics	280/26	Dedicated roll-to-roll

Next, don't just compare print speed; compare the time required to set-up the printer, and the time to switch over materials or changeover from job to job. Look for a printer that is easy to use, allows for quick set up, and features other process efficiencies so you can focus on production, not preparation.

Ask Yourself

- Does the printer support the anticipated print volumes?
- Do I need it to run multiple shifts?
- How many square feet/square meters or boards per hour does it print?
- What's the burst capacity?
- Does it handle sheet or continuous feed or both?
- How fast is the changeover between materials and between jobs?

Space and Environmental Considerations

Wide format printers vary widely in terms of the amount of space they consume, and this should be taken into consideration when deciding which printer to purchase. You will also need to consider the additional space requirements for materials, finishing equipment and storage.

Ask Yourself

- How much square footage do you have available for the production of wide format applications?
- How much square footage is available for the printer itself?
- Does the printer need special ventilation?
- Can we meet the electrical requirements?
- Are there special delivery requirements for the printer?

Reliability, Service and Support, and Training

A printer that isn't running isn't profitable. Choose a system from a proven, reputable provider with quality products that can perform in your environment. You also want to choose a manufacturer that provides a full array of services and support programs designed to keep printers up and running, and making the most of your investment.

Inquire about training programs. Introductory and refresher courses for new users to advanced operators will help users understand everything from file prep to troubleshooting to repair.

Ask The Supplier

- Is it built for reliable, multi-shift operation?
- How much downtime can I expect?
- What kind of warranty is available with the printer? What is included in the warranty?
- What kind of service and support is available with the printer?
- Can we service the printer ourselves?
- If the printer is down, how fast is service response time?
- Is training offered with the cost of the printer?
- What training courses are available?

Workflow

Increasingly, service providers must seek ways to take time and cost out of production processes, and the type of business and production solutions chosen can make a big difference. Your discussions around workflow may vary by supplier—for some, workflow only consists of the processes from the RIP to printing system to finishing equipment; for others, it also means integrating business processes, from job acquisition, cost capture and reporting tools, with your print production processes.

Ask Yourself

- Do you have your output devices integrated with your MIS/quoting system?
- Do you have existing workflow/planning software in your shop with which a new product must integrate?
- Do you have or plan on acquiring web-based quoting or ordering?

Financial Investment and Operational Costs

There is no way around it: wide format inkjet printers can be a big investment. So, before purchasing one, carefully analyze the real costs of the printer. Your return on investment is based on more than just initial cost. The least expensive model doesn't necessarily translate to the greatest value. Ink, maintenance, media, uptime, process improvements, and training all factor into the equation. It's a lot, but if you choose the right printer, you're assured the best overall value.

Understanding the total cost of the printer. Before you invest in a wide format printer, it's important to look at and understand the "total" cost, including energy consumption, ink, print heads and special maintenance requirements above and beyond that of the printer's purchase price. Flexibility plays an important role here, because the more flexible the solution, the greater the value to your business. You need to recoup your capital investment costs quickly by either transferring current jobs that are more cost-effective and/or efficient on your new wide format printer, or you can expand your services to increase your profits with more short-run printing and/or high-margin applications.

Consider This

Costs to consider before purchasing:
- Inks (cost and usage)
- Media
- Finishing
- Storage
- Service and support
- Maintenance
- Print heads, lamps and parts
- Power consumption
- Uptime
- Labor
- Training

Consumables play a big role in the overall cost of the solution. It is wise to find versatile inks that are manufactured to work optimally with the printer on your full range of substrates.

Also take into consideration other consumables, such as the new types of media that you will need to purchase and store for your wide format printer. Determine material costs and how they will be stored, if you'll need additional finishing equipment, and the level of quality and support the media vendors offer.

Then, there is the cost of maintenance, print heads, uptime and training to consider. Daunting, yes, but not insurmountable, which is why it is so important for these costs to be analyzed properly and thoroughly.

Once you have considered the "total" cost of the wide format printer, review all the financial data to ensure that the printer you choose is the best, most cost-effective solution for your specific needs.

Take a Test Drive

Since purchasing a wide format printer is a major commitment not only in terms of technology, but also in terms of dollars, it is not unreasonable to ask a manufacturer or distributor to take a printer on a "test drive." After all, seeing what a piece of equipment can do in reality, not just in a contrived setting, is the best way to judge both the equipment and supplier.

Why Wide Format – In Conclusion

With today's roll-to-roll, flatbed and hybrid UV-curable wide format solutions, service providers can:

- Gain more share of customer wallet by offering an increased array of applications, thereby promoting tighter, more profitable relationships
- Gain share by taking on smaller runs and high margin one-offs
- Produce and sell a wide variety of specialty printing applications

Today's wide format printers are becoming more affordable than ever before and provide a relatively fast return on investment. An investment in an entry-level wide format printer allows printers to produce more work in house, eliminating the need to outsource while retaining control over both the process and the costumer. Many of these wide format printers can deliver a positive ROI with a run-time requirement of less than two hours per day.

For more information on EFI's Wide Format printing solutions, please visit wideformat.efi.com or call 1-800-875-7117.