

This case study is one in a series co-sponsored by Washington Department of Ecology, the Oregon Sustainability Board, and the Oregon Department of Environmental Quality to help companies in the Pacific Northwest understand the challenges and benefits of product environmental footprinting.

# HP finds life cycle assessment lends credibility to the environmental benefits of small batch digital printing

Small batch digital printing enables consumer packaged goods brands to respond to rapid market changes and stand out on the retail shelf. HP's use of life cycle assessment demonstrates that small batch digital printing offers environmental benefits as well.

## THE ISSUE

In the world of consumer flexible packaging for everything from dried peanuts to moist tofu, the text, images and logos had always been printed with analog technologies, which require either engraved cylinders or plates for each color separation of print images. Such technologies make good sense for large print jobs that don't require frequent changes—ones in which economies of scale really pay off.

But what about smaller print batches, or ones where many customized designs are needed? Consumer packaged goods (CPG) brands and retailers are under the pressure of dynamic change in consumer trends and are redesigning their processes to allow more flexibility and customization to meet the demands of shoppers. The CPG industry demands more agile, flexible printing technologies to bring down printing costs for small print batches and also seeks new ways to interact with consumers through their packaging.

HP seized this opportunity and in 2014 introduced a new technology to the

flexible packaging market—the Indigo 20000 Digital Press. This press proved financially beneficial for not only smaller print jobs with quick turnaround but also enabled variable data printing for creating new flexible packaging applications that had not existed before, complementing analog technologies, which remain preferable for large print jobs.

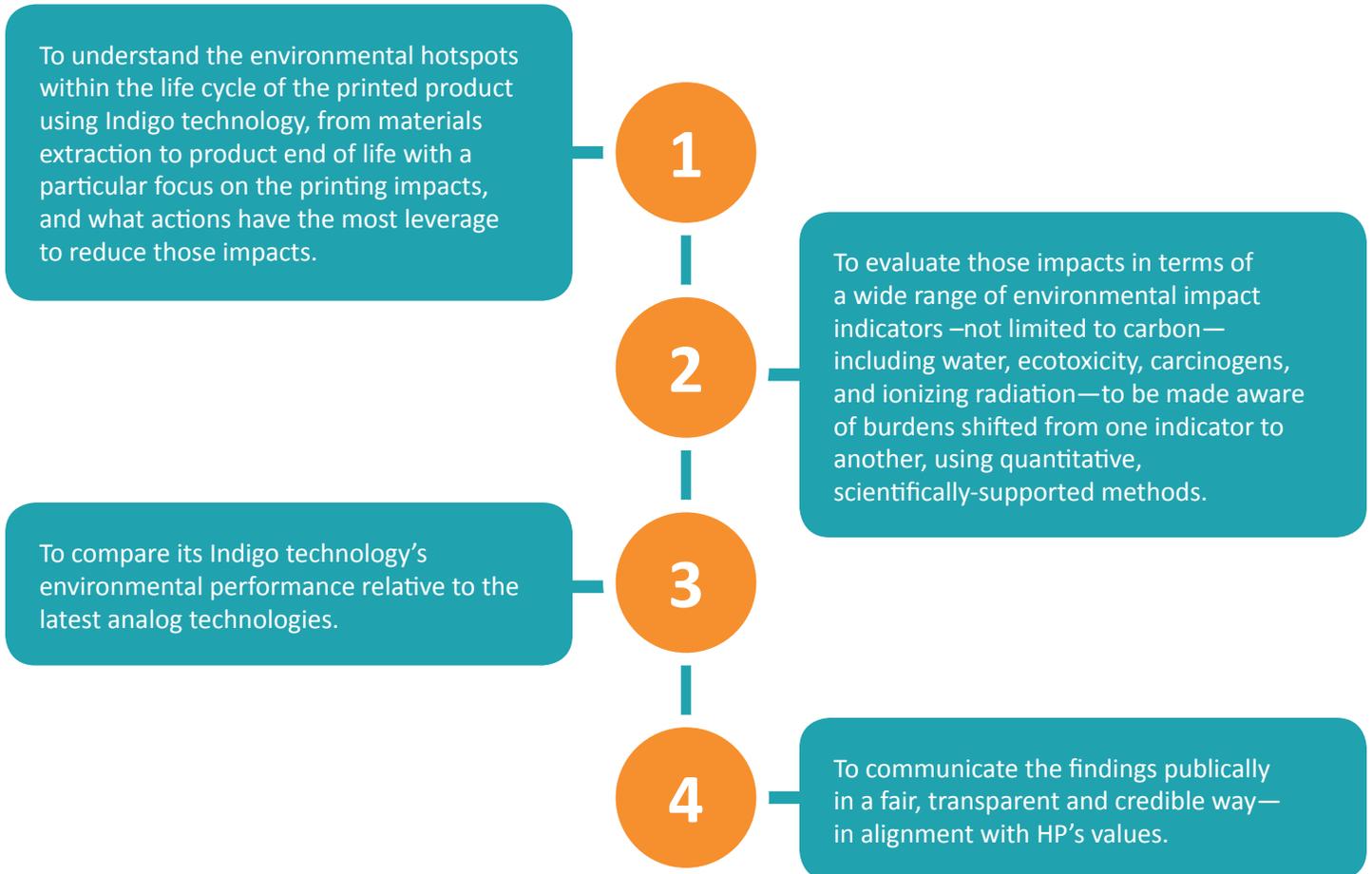
HP's marketing team could easily substantiate the financial benefits to its customers for using this small-batch technology. But what about the environmental performance benefits? The marketing team had a strong inclination that there were environmental benefits to be communicated, but it wanted a sound, credible, thorough message—a powerful, positive marketing message to deliver to that audience.



Examples of printed flexible packaging (aka pouches)

# GOALS

In deciding to conduct a life cycle assessment (LCA), HP had its sights set on the following goals:



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# THE SOLUTION

The vision amounted to a comparative assertion LCA, which was carried out in alignment with ISO-14040/14044 standards. The criteria include review by a third-party panel and stringent guidelines to help ensure fairness in the comparison. Carrying out this type of project allows the findings to be communicated to the public in a credible way.

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# THE CHALLENGES



## COST

Carrying out a comparative assertion LCA can be expensive in terms of money and time—a lot of data needs to be collected, familiarity with life cycle inventories and methods is needed, and a peer review must be supported—so HP decided to start small to gain more certainty about their technology’s environmental performance.

HP did some in-house calculations using information from its manufacturing team and some publicly available information for the competing technologies and came up with some positive preliminary results.

HP recognized that working with detailed environmental data and analysis was outside their core competency and hence engaged a qualified consultant early to guide the process.

With specialized help engaged, HP was able to validate the likely outcomes and then implement a complete LCA that would conform to the ISO 14040/14044 standards.



## DATA

One of the biggest challenges of the study lay in finding reliable data, particularly for energy use, for the alternative technologies. HP overcame that challenge by seeking the advice of an expert specialized in those technologies to provide the most current information available. By including such an expert in analog printing technology in the review panel, they were able to further ensure that all systems were fairly represented in the assessment.



## ANALYSIS

HP found it challenging to summarize all of the interesting findings from the LCA—from ozone depletion to water consumption, which results do you communicate without obfuscating any information? HP addressed this by focusing on the key drivers of impact and putting the results into the context of its customers—which environmental indicators are important and relevant to them? HP polled its customers and reviewed general industry information to determine the subset of the information which had the most meaning to its key audience.



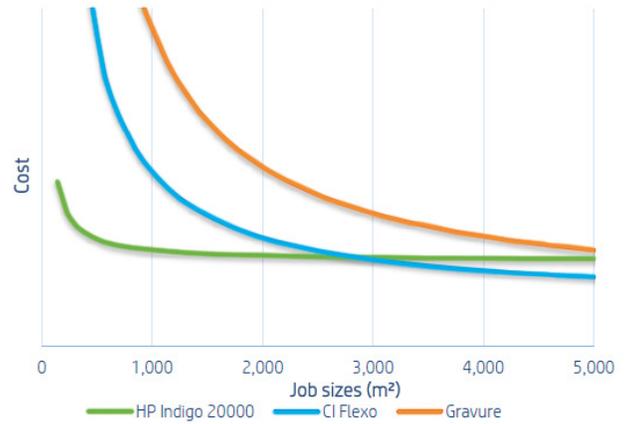
## INTERPRETATION

HP recognized the importance of doing the LCA right. HP wanted a fair comparison that accurately reflected the technologies and the best available science. Careful interpretation and communication of the results was key to aligning the messaging with HP’s leadership in transparent sustainability disclosure. To this end, HP found it very important to develop and provide long-term knowledge and support to respond to ongoing customer and public inquiries about the work.

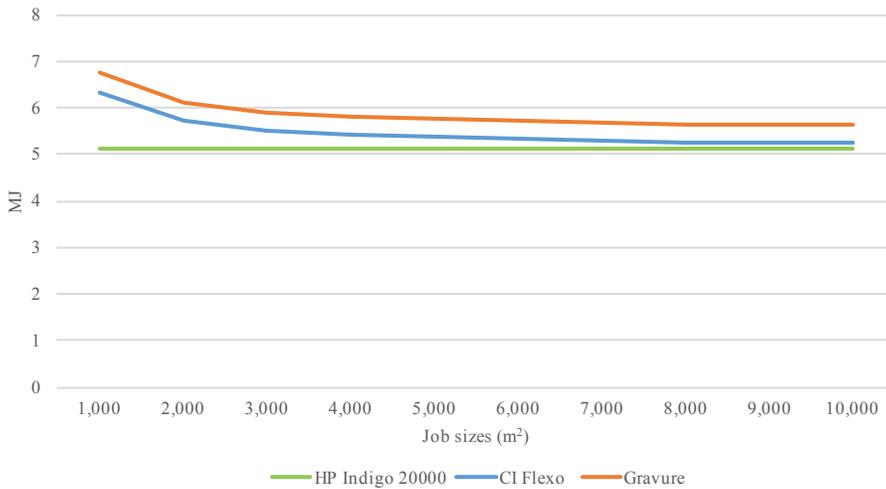
# RESULTS

The LCA results confirmed what HP had speculated: as print job sizes increase, the setup impacts per print job decrease, and at job sizes smaller than 10,000 m<sup>2</sup>, digital technology provides lower potential impacts for many of the indicators evaluated including global warming potential, water depletion and energy demand.

For very large print jobs, analog prints make sense both financially and environmentally. Therefore, the right solution depends on the printing goals. HP was able to quantify this “cross-over point” at which analog becomes preferable to digital. HP was happy to conclude that there was enough room in the market for both analog and digital printing technologies.



## Cumulative Energy Demand per pouch varying print job size (Europe)



*Coffee pouch's cost (top) and cumulative energy demand (left) performance using HP Indigo 20000 Digital Press and analog printing (Reproduced from HP's Press White Paper 2016). As print size grows, analog print costs and environmental performance together make it competitive with digital prints.*

# THE BENEFITS

Although financial benefits cannot yet be tracked to this project directly, the learnings from the LCA have helped inform the way HP designs the printing press, which help its customers reduce environmental impacts during the printer's use stage. These actions have given HP a competitive advantage. HP is able to market this superior environmental performance as part of its branding as a sustainability leader.

HP was also able to leverage the work to engage in direct conversations with customers, strengthening those relationships for the long term. This work is just one more brick in the foundation of HP's sustainability reporting, environmental transparency and brand image.