

Environmentally Sustainable UV LED Curing Technology

LED is the Only Sustainable Choice for UV Curing



See how LED compares to mercury when it comes to the aspects of sustainability for printing applications

Introduction

“UV LED is not only good for the environment, but also has a very positive effect on the finances, sustainability and health and safety of our company.” Eticod Poland

At Phoseon Technology, we are fully committed to the wellbeing of the environment. We continuously work to reduce the environmental impact of the products that we manufacture. Phoseon LED solutions offer consistent and reliable power output, eliminate greenhouse gases and remove mercury from an entire category of industrial processes. Phoseon started the LED revolution for UV curing in 2002 and its products have collectively saved millions of pounds of CO₂ emissions since inception. Allow us to contribute to your corporate sustainability objectives TODAY!

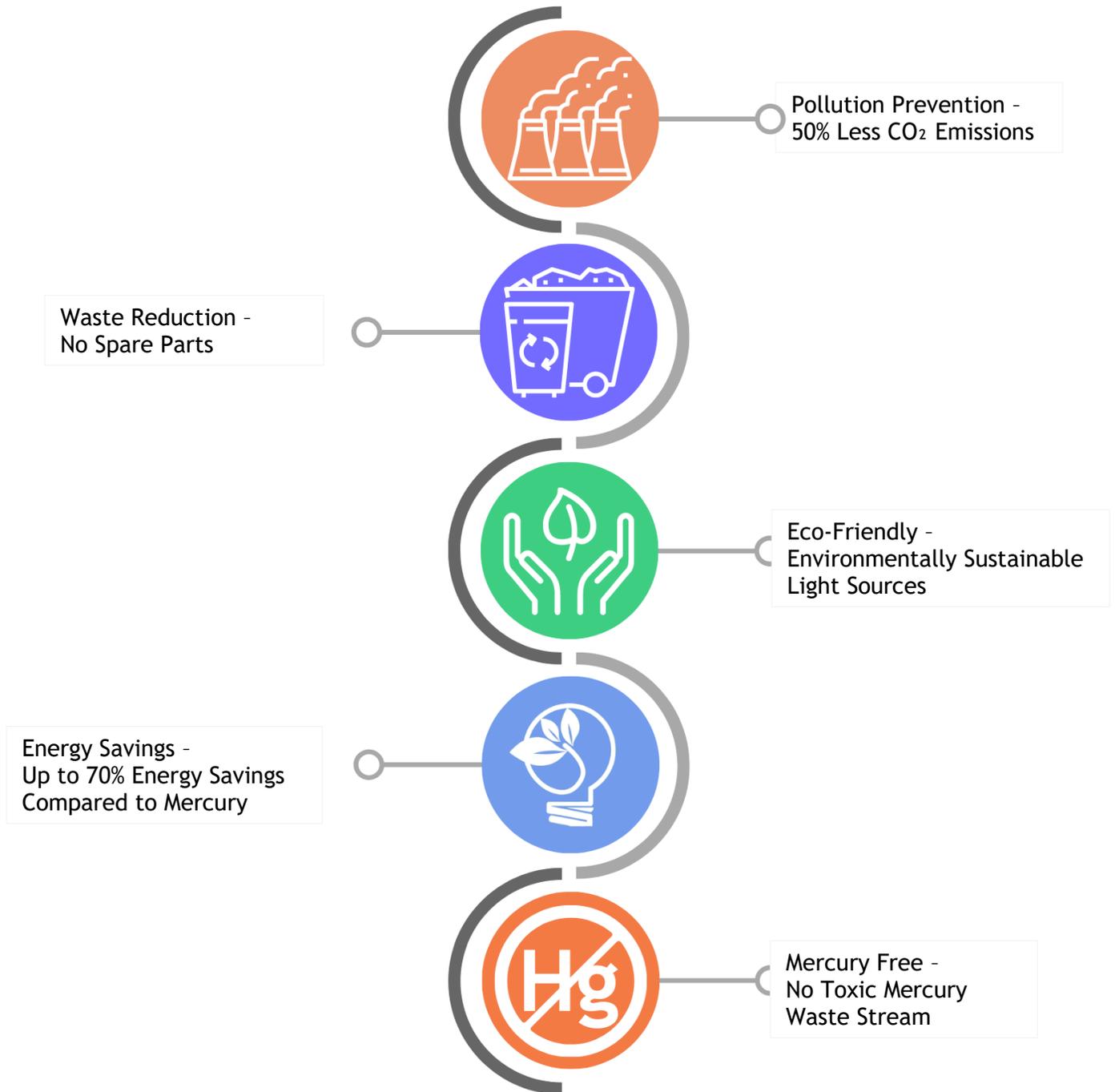
Are LEDs sustainable?

LED is the only sustainable choice for UV curing.

- ✓ No mercury! Mercury ban in manufacturing processes is growing globally.
- ✓ No greenhouse gases or ozone produced or needed to be evacuated from facility.
- ✓ Significantly reduced energy usage versus mercury UV and high-energy IR dryers.

Phoseon pioneered the use of LED technology for UV light curing in industrial applications, offering equipment manufacturers a high-performance curing technology that also saves significant energy while eliminating greenhouse gases and dangerous mercury and ozone from the UV curing process. These UV LED products offer significant environmental improvements to current mercury-based products. See for yourself how LED compares to mercury when it comes to the aspects of sustainability in this paper.

LED Benefits Compared to Mercury



Energy Savings

“The machine consumes approximately 60% less electricity, which corresponds to an annual savings [elimination] of approximately 50 kWh or 200 tons of CO₂.”

With traditional UV curing processes, the tremendous heat associated with mercury UV lamps required a significant amount of electricity to operate. By replacing the mercury UV LED lamps, with UV LED curing systems, Phoseon customers have experienced energy savings of up to 85 percent.

Phoseon UV LED technologies provide energy savings of between 75 and 85 percent compared to prior drying systems. With the Phoseon lamps, there is no need for fume extraction units to remove the gases generated by mercury-vapor UV lamps.
Javier Sequeiros, Technical Director, Impresos Gráficos - Mexico

To reduce CO₂ emissions and to make production more efficient, Eticod decided to invest in UV LED technology. At the beginning of 2021, a Bobst M5 430, 10-color flexo printing press with UV LED curing was successfully installed and put into operation. The machine now consumes approximately 60 percent less electricity, which corresponds to an annual saving of approximately 50 kWh, while eliminating 200 tons of CO₂. UV LED is not only good for the environment, but also has a very positive effect on the finances, sustainability and health and safety of our company.
Eticod - Poland

Phoseon UV LED solutions also help lower energy costs, as traditional UV mercury arc lamps use 70 percent more electrical power to operate than low-heat, low-energy UV LED technologies.
Sopano - France

Phoseon's technology uses significantly less power than its mercury counterparts, the company claims. With its instant on/off capabilities, Phoseon's curing is ideal for South Africa's power fluctuations. The press' electrical consumption is currently 30 percent less than GM Graphix's other flexo presses, Massyn says. The solar panels at GM Graphix generate enough energy to run the press for 5.5 hours each day, which they would never be able to do with mercury UV.
GM Graphics - South Africa

Pollution Prevention

UV LED lamps offer better than 50 percent lower CO₂ emissions. UV LED lamps generate no ozone and offer the promise of eliminating toxic mercury in an entire category of industrial processes. With UV LED lamps, there is no need for fume extraction units to remove the harmful gases and Ozone generated by mercury-vapor UV lamps.

With LED systems, converters can diversify their product lines and enter new markets without having to expand their floor space or expose employees to Volatile organic compounds (VOCs) harmful UV-C ozone. By removing its mercury stations and upgrading them with 13 Phoseon FireJet™ LED lamps (FJ200), Indeco can reduce over 67 Tons of CO₂ annually. They also do not need to re-integrate into the building the 23.5 Million cubic meters of air extracted every year to remove ozone and the heat produced by the mercury lamps.

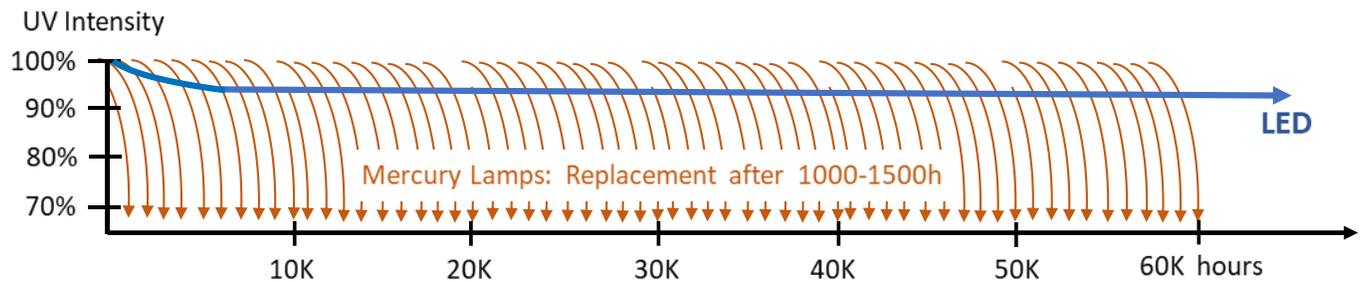
“By removing its mercury stations and upgrading them with 13 Phoseon FireJet™ LED lamps (FJ200), Indeco can reduce over 67 Tons of CO₂ per year.”



Waste Reduction

Conventional mercury lamps have a very short lifetime and need to be replaced every 1000-1500 hours. LED curing lamps extend beyond 60,000 hours if maintained properly. Upgrading to UV LED technology eliminates these replacement costs, offering significant environmental benefits with the elimination of mercury.

Phoseon is the only company in the industry which can say that we have a proven lifetime of more than 60,000 hours. 60,000 hours means, in UV LED terms, that we count only the ON time as turning lamps on and off is instant.



Before switching to Phoseon UV LED curing technology, Central Valley Label was spending close to \$40,000 to \$50,000 per year on spare parts for their old UV mercury presses. When the company switched to the Phoseon UV LED solution, that expense was eliminated. The presses with LED systems were so productive they were able to eliminate their night shift.

Operating expenses for a press with typical mercury vapor curing units, which generate plenty of heat, cost around \$34,000 a year (and the mercury bulbs used eventually end up in a landfill). However, the cost for the same press installed with UV LED curing units adds up to an energy efficient \$658 per year.

Empire Screen Printing - USA



Initial Investment Costs: Mercury Vs. LED

Although the initial costs of mercury may be lower than LED, the long term costs for mercury are much higher. Below shows the initial investment costs to install 8 curing stations on a flexo press, and all additional costs required for mercury that add up over time. The long term costs for LED on the other hand are ZERO.

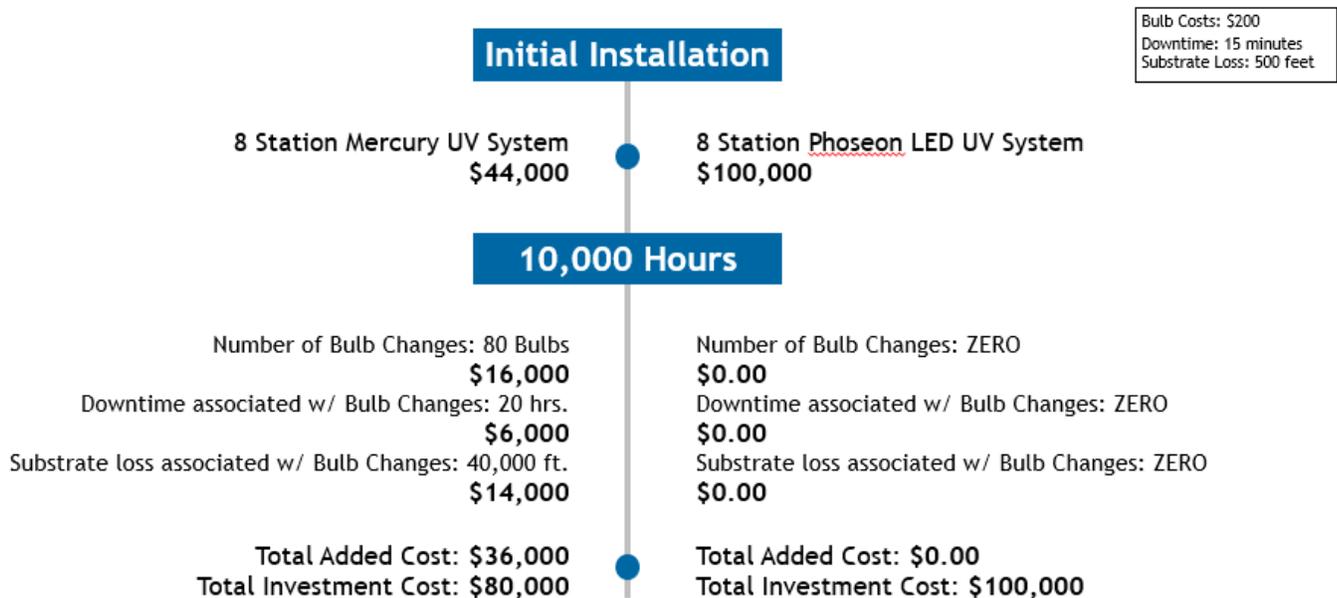
Mercury UV costs continue to mount over the life of the system.

- Consumables (bulbs, reflectors, lenses, shutters, dichroic filters, etc.) are a significant revenue stream for mercury UV manufacturers.
- Lost production, lost substrate and reoccurring consumable expenses erode the profitability of the converter.

UV LED has little maintenance, no consumables and predictable performance.

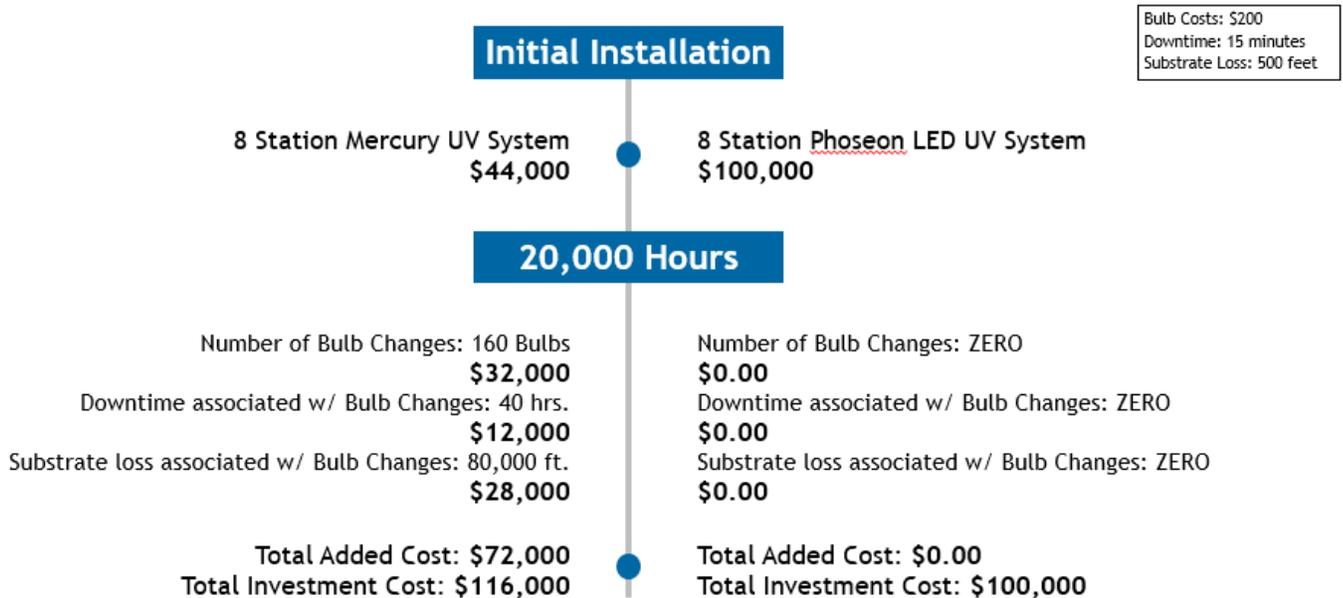
- Phoseon UV LED allows the converter to focus on their work and increase profitability of the converter.
- Constant, Repeatable and Predictable.

Costs: Mercury Vs. LED at 10,000 Hours

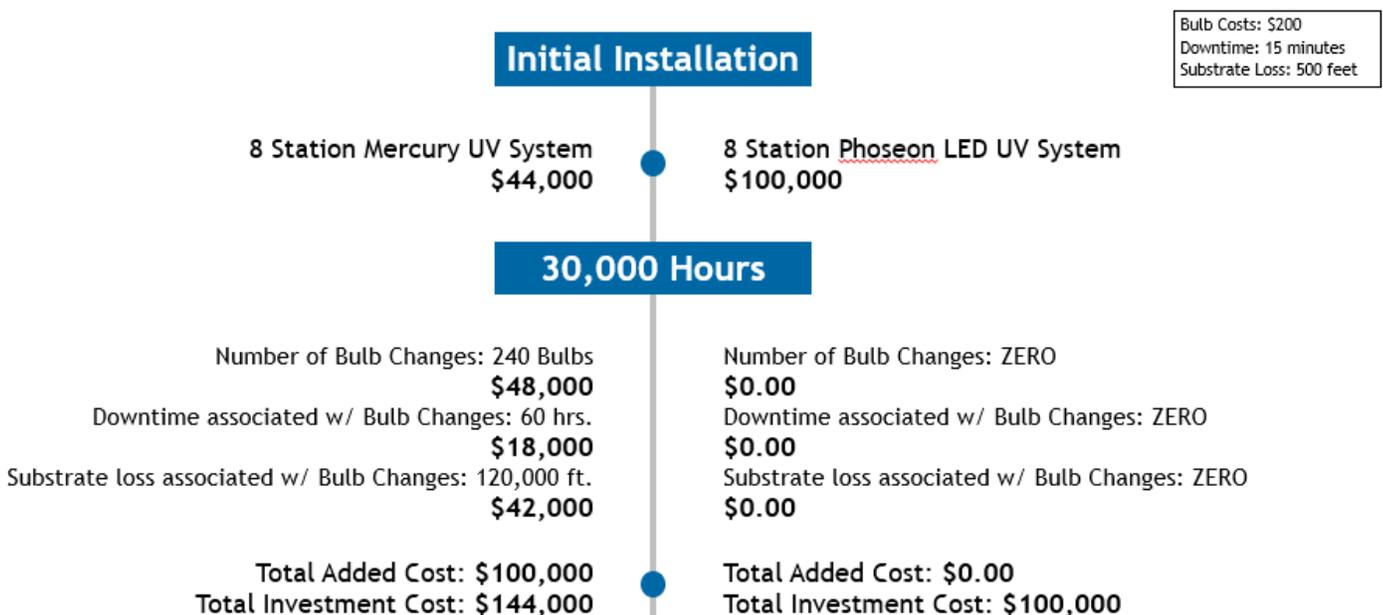




Costs: Mercury Vs. LED at 20,000 Hours



Costs: Mercury Vs. LED at 30,000 Hours



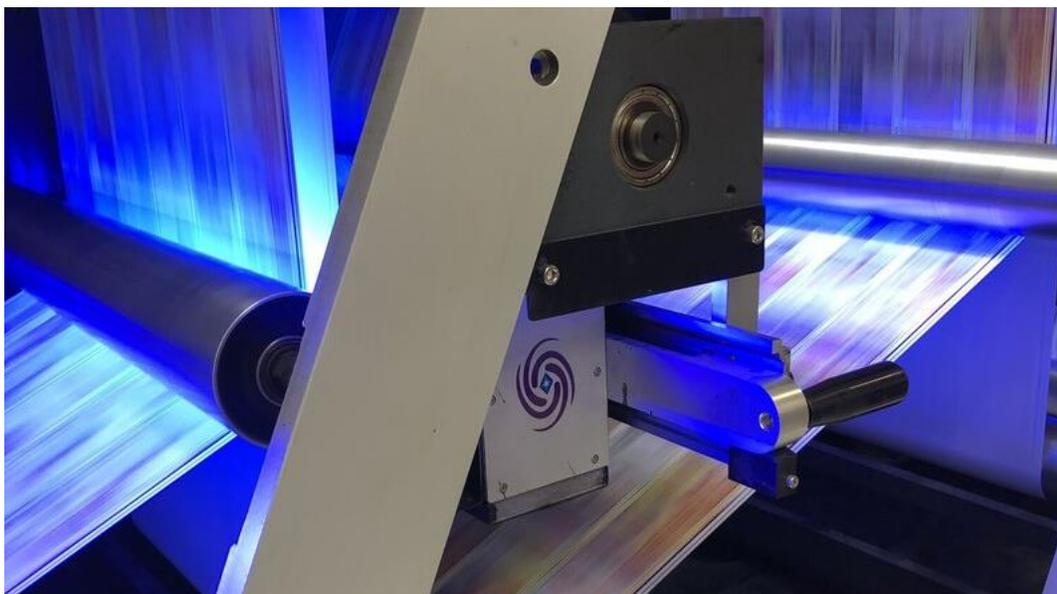
The Cost of Mercury Bulb Replacements

Do not look at just the up-front capital expenditure when considering your next curing system. Mercury UV continues to significantly impact your bottom line for the lifetime of the system.

Presses	1 Shift	2 Shift	3 Shift	Hours per Year
1 Press	16 Bulbs = \$4,000	32 Bulbs = \$8,000	48 Bulbs = \$12,000	2080 hours
5 Presses	80 Bulbs = \$20,000	60 Bulbs = \$40,000	240 Bulbs = \$60,000	4160 hours
10 Presses	160 Bulbs = \$40,000	320 Bulbs = \$80,000	480 Bulbs = \$120,000	6240 hours
100 Presses	1,600 Bulbs = \$400,000	3,200 Bulbs = \$800,000	4,800 Bulbs = \$1,200,000	
250 Presses	4,500 Bulbs = \$1,125,000	9,000 Bulbs = \$2,250,000	13,500 Bulbs = \$3,375,000	

Just 1 year of replacement mercury bulbs!

1 shift: 2080 hours a year
 2 shifts: 4160 hours a year
 3 shifts: 6240 hours a year
 (1000 Hours per mercury bulb)



Legislation

The Minamata Convention on Mercury is a global treaty to protect human health and the environment from the adverse effects of mercury.

Major highlights of the Minamata Convention include a ban on new mercury mines, the phase-out of existing ones, the phase out and phase down of mercury use in a number of products and processes, control measures on emissions to air and on releases to land and water, and the regulation of the informal sector of artisanal and small-scale gold mining. The Convention also addresses interim storage of mercury and its disposal once it becomes waste, sites contaminated by mercury as well as health issues.

- Minamata convention became law in 2017 in the European Union and many other countries. Today, the Minamata convention is currently joined by 127 countries.
- 2020 was a key year for the Minamata Convention as the deadline for mercury-added products.
- Parties shall not allow, by taking appropriate measures, the manufacture, import or export of mercury-added products listed in Part I of Annex A after 2020.
- Some countries have already banned the mining of mercury.
- Use of mercury in some products already banned.

LED is the Only Sustainable Choice

Today, all the major brands are requiring their suppliers to deliver more sustainable printing practices. The environmental benefits of UV LED curing in the printing process are numerous and significant.



Phoseon customers have experienced energy savings up to 85 percent with the implementation of UV LED curing systems. With traditional UV curing processes, the tremendous heat associated with mercury UV lamps required a lot of electricity to operate. The mercury lamps produce ozone, which is dangerous to breathe, especially in a constricted space like a print shop. Air exhaust systems are required to extract the toxic fumes from the presses. These exhaust systems can be eliminated with UV LED curing, making it a far more environmentally-friendly process.

Phoseon is the best choice with the most reliable products available and is the only company that focuses specifically on LED technology.

It's Time to Upgrade

Are you interested in UV LED technology but not sure how to get started? Phoseon offers fully integrated solutions for a wide range of printing applications.

For more information about Phoseon Technology products and services, please contact:
info@phoseon.com

About Phoseon Technology

Since 2002, Phoseon Technology pioneered the use of LED technology for Life Sciences and Industrial Curing. Through our relentless innovation, we deliver high-performance, reliable and patented LED-based solutions. Our strong focus on customer collaboration has resulted in world-wide market leadership position and presence. Phoseon is an ISO9001 certified company manufacturing award winning products that are covered by more than 300 patents worldwide. We uniquely focus 100% on LED technology therefore ensuring superior reliability, business economics, and environmental benefits.

