

PHOTONICS spectra

WHITE PAPERS & APPLICATION NOTES



LIGHTENING THE LOAD: How Photonics is Reducing our Environmental Impact

Darren W. Dink, PhD, Technology Program Manager, NextCorps Luminate



Any species that cannot live sustainably within its environment eventually runs out of resources and dies. It's not abstract theories. It's real. Learning to live more sustainably is the biggest challenge of the 21st Century. Advances in optics, photonics, and imaging (OPI) technologies are playing an enormous part in making our lifestyles and industries more sustainable. Often in unexpected ways. The Luminate startup accelerator in Rochester, NY, exclusively fosters companies developing OPI-based technologies, and four of those companies are making major contributions to sustainability initiatives.

Increasing Efficiency

SunDensity, from Luminate's third seed cohort, is using nano-technology to make existing solar cells more efficient.

Solar cells convert light into electricity, but they are not particularly efficient. In general, a solar panel converts only 20% of the solar energy into useful electrical power, and the rest is lost as heat. This inefficiency exists because of semiconductor bandgaps. Photons with energy below the bandgap cannot excite electrons, and photons with energy above the bandgap excite electrons, but the excess energy of the photon is converted to heat. The energy of a photon depends on its color, with violet photons (with a wavelength around 400 nm) having more energy than red photons (with a wavelength around 700 nm). Most solar cells use silicon semiconductors that are most efficient for harvesting "near infrared" photons (with a wavelength around 1000 nm). Because photons of visible light have much more energy than the silicon semiconductor bandgap, the extra energy is turned into heat. Not only is the energy wasted, but the heat generated actually interferes with conduction, reducing the energy output of the solar cell.

Lightening the Load

NextCorps Luminate

LIGHTENING THE LOAD: How Photonics is Reducing our Environmental Impact

Four companies from the Luminate startup accelerator in Rochester, N.Y. are making major contributions to sustainability initiatives with emerging optics, photonics, and imaging (OPI) technologies. Their work is driving energy savings and better monitoring of our impact on the environment — specifically by increasing the efficiency of solar panels, improving data input for hydropower production, revolutionizing device displays, and enabling eco-friendly underwater data communication.

[DOWNLOAD WHITE PAPER](#)



More White Papers from This Sponsor

- [Saving Vision With Light: Five Startup Technologies That Are Revolutionizing Eye Care](#)
- [Making Innovation Faster: 7 Lessons from Luminate on Building Effective Accelerators for Optics Entrepreneurs](#)

Visit [Photonics Media](#) to download other white papers and learn more about the latest developments in lasers, imaging, optics, biophotonics, machine vision, spectroscopy, microscopy, photovoltaics and more.

www.photonics.com/WhitePapers.aspx

We respect your time and privacy. You are receiving this email because you are a Photonics Spectra magazine subscriber. You may use the links below to manage your subscriptions or contact us.

Questions: info@photonics.com

[Unsubscribe](#) | [Subscribe](#) | [Subscriptions](#) | [Privacy Policy](#) | [Terms and Conditions of Use](#)

Photonics Media, 100 West St., PO Box 4949, Pittsfield, MA 01202-4949

© 1996 - 2020 Laurin Publishing. All rights reserved. Photonics.com is Registered with the U.S. Patent & Trademark Office. Reproduction in whole or in part without permission is prohibited.



Laurin Publishing

PHOTONICS MEDIA