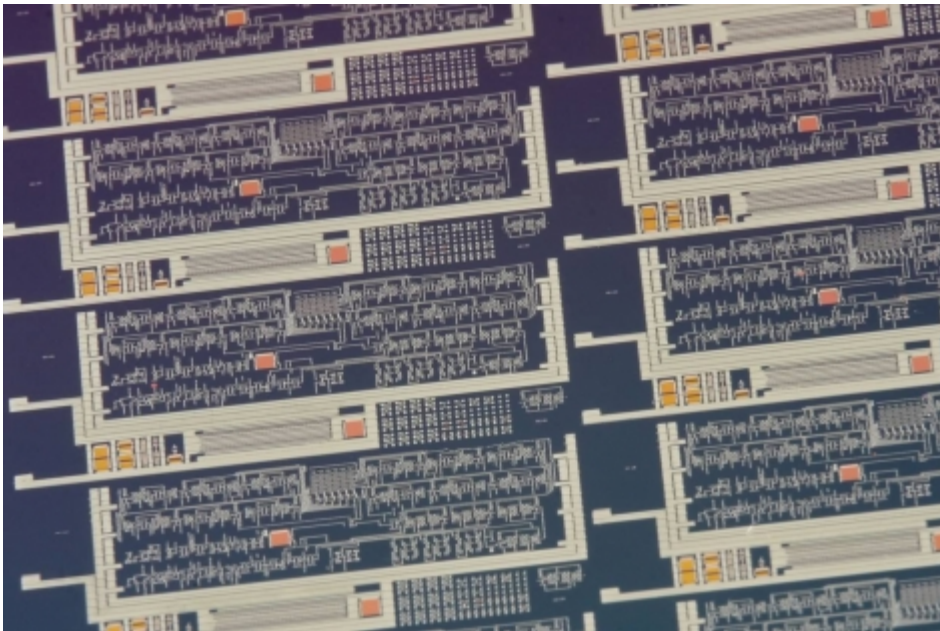




## **Kovio to Print Greener Silicon in the Valley**

Written by [Craig Rubens](#)

While Silicon Valley semiconductor manufacturers have been offshoring their fabrication lines, [Kovio](#), a startup in the silicon circuit *printing* business, has just moved into a 95,000-square-foot facility in Milpitas, Calif., and says it's now set to start printing, with products due to be delivered later this year. Their process uses a mere quarter of the energy traditional semiconductor fabrication requires and eliminates the vast majority of the toxic chemicals needed, Kovio says. Developed at MIT and spun into a company in 2001, Kovio has taken in funding totaling \$34 million.



The money comes from all over the world, including Kleiner Perkins Caufield & Byers, Bessemer Venture Partners, Jerusalem Venture Partners, Flagship Venture Partners, Duff Ackerman and Goodrich, Harris and Harris, DEA Capital, NCD Investors and Pinnacle Ventures. But Kovio has especially piqued the interest of Japanese investors eager to find cheaper and cleaner silicon fab processes for their huge electronics businesses. Across the Pacific, Kovio's investors include Panasonic Ventures, Mitsui Venture, Yasuda Enterprise and Toppan Forms.

Kovio's technology combines silicon ink with inkjet-style fabrication. The process allows the company to print low-cost, albeit low-intelligence, silicon circuits directly onto cheap, and potentially flexible, substrates. This means RFID and item-level intelligence can be built directly into products and labeling. Consumers will be seeing these circuits far more frequently and demanding green processes, Vik Pavate, VP of Business Development, tells Earth2Tech.

There's a reason chip makers wear those full-body Tyvek suits: Silicon semiconductor fabrication is a dirty business. "The dirtiest room in the world is actually the clean room in silicon fab," Pavate says. By his estimates, it takes 62 million liters of chemicals, 17 million liters of hazardous gases and 2 billion kilowatt hours of electricity to make 100 billion RFID tags using traditional fab methods.

Kovio, he claims, can produce the same 100 billion tags using 5 percent of those chemicals, 0.05 percent of those gases and between 10 percent and 25 percent of that electricity. But perhaps the most important efficiency is the saved silicon. In traditional fab, silicon wafers are usually ground down to the needed thinness, wasting precious material. With printing, it's an additive process, depositing only the needed silicon where it needs to be.

Kovio is not the only one working in printed electronics. Thin-film solar companies like [Nanosolar](#) print thin layers of non-silicon photovoltaic materials onto flexible substrates. Also, organic LED fabrication, which [GE recently demonstrated](#), uses printing technology to create illuminating circuits. But Kovio says they're sticking with silicon. "We really like the idea of leveraging silicon as much as we can," Pavate explains.

The company has about 45 employees currently, but will likely ramp up as production begins over the next three years. Pavate says they're going after a market opportunity of "a few billion dollars" as RFID tags could immediately be integrated into access control, toll booths and livestock management. Once tags start rolling off the presses Kovio hopes to be rolling in the money; it isn't currently look for investment.

*Image of printed circuits courtesy of Kovio.*

Source: <http://earth2tech.com/2008/06/02/kovio-to-print-greener-silicon-in-the-valley/>