

## THE PROBLEM SOLAR POWER IS A NO-BRAINER, BUT SOLAR PANELS ARE A MAJOR HASSLE.

**THE SOLUTION: MAKE THE WHOLE PROCESS LEANER, MEANER AND MORE EFFICIENT.**

### 1. BRING THE HEAT

Though touted as a font of clean energy, solar cells actually take a lot of power to produce, particularly because the process requires that silicon, an essential ingredient, be heated to upward of 1,830 degrees F. That's why researchers at the National Renewable Energy Laboratory have developed a light-based optical furnace that uses about half the energy of a conventional furnace while also being easier to control. As a bonus, it's more effective at removing impurities from the silicon—increasing the energy efficiency of not only the manufacturing process, but the finished product as well.



### 2. ROAD TESTING

Apparently not content with cycling's current level of eco-friendliness, Dutch company TNO is using bike paths in the town of Krommenie in northern Holland to test glass-covered, solar cell-embedded concrete panels—a.k.a. SolaRoad—which generate 50 kilowatt-hours of electricity per square meter. But that's just the beginning: Ultimately, TNO has designs on all of Holland's 85,000 miles of road.



### 3. BRUSH JOB

Forget Jackson Pollock—researchers at the University of Notre Dame have come up with a way to make paint *really* energetic. When mixed into a paste and spread onto a conductive material, semiconducting nanoparticles—dubbed “quantum dots”—produce



electricity, which could be used to, say, power home appliances. While the resulting solar paint, called “Sun-Believable,” isn't nearly as efficient as a solar panel, it's not a bad start. (Besides, some artists don't get discovered until later in their careers.)

### 4. FLOWER POWER

Researchers at MIT and Germany's RWTH Aachen University have shown they can boost the efficiency of the field of mirrors that surrounds and directs heat to the 300-foot-plus central tower at concentrated solar plants, or CSPs, by arranging the mirrors in the same spiral pattern as the florets in the head of a sunflower. Compared with the standard concentric-circle arrangement, this pattern not only reduces the amount of real estate needed for each CSP, but also increases the plant's heat-collecting efficiency—which is a beautiful thing indeed.



### 5. STRAIGHT TO THE TOP

If you're going to cover your roof with solar panels, why bother with shingles *and* cumbersome arrays of photovoltaic cells? Dow Solar, a division of Dow Chemical, made its Powerhouse solar shingles available in very limited quantities in 2010, but recently expanded its Michigan plant to bring them to the mass market. What promises to make solar power significantly more accessible to homeowners—since a Powerhouse shingle can be installed about as easily as a regular one—began covering roofs in Colorado at the end of last year. —SAM POLCER



their environmentalist adversaries can finally agree on. “I see this as a win,” he says. The technology hasn't been licensed for sale yet, but governments in the U.S. and the U.K. are considering it. —JOE KEOHANE

PRISM uses liquid sodium as a coolant instead of water, which allows the neutrons that drive fission to achieve higher levels of energy, in turn allowing the reactor to run on heavier fuels, like nuclear waste

