

From old-school Fortune 500 companies to start-ups barely out of first-round financing, businesses are committing big bucks to the green revolution. And while it seems like everyone's doing it these days, we think these 20 companies are the ones pushing the ecological envelope. Whether it's because of their reach, their potential, their influence, or the sheer genius of their innovations, we predict that each one will have a hand in changing the world in one way or another—sooner rather than later. Introducing the inaugural edition of...



The Plenty 20

BY DANIELLE WOOD

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1 NANOSOLAR

PALO ALTO, CALIFORNIA

Solar power has been around since the '70s, but until recently, people were about as likely to use it as they were to live in geodesic domes and grow all their own food. The reason? No company has been able to make solar power as affordable as electricity produced by coal and natural gas.

That's where Nanosolar comes in: Its thin film technology involves "printing" a microscopic layer of solar cells onto metal sheets as thin as aluminum foil. The resulting panels are lighter, cheaper, and as efficient as traditional solar panels, but they require no silicon, short supplies of which have caused many solar companies to stumble. Others are pursuing thin film, too, but Nanosolar is poised to produce enough to generate 430 megawatts of electricity a year—four times the amount produced by all solar plants in the U.S. combined.

Perhaps more importantly, Nanosolar is the first company to figure out how to produce these cells cheaply. How cheaply? Less than \$1 per watt, or one-tenth of the cost of traditional cells. In other words, solar power will finally be able to compete with gas and fossil fuels.

This year, the company will begin building the world's largest solar-cell factory, which will triple U.S. capacity and make us second only to Japan in output. Investments from Silicon Valley heavyweights like Larry Page and Sergey

Brin, the founders of Google, are bolstering the company, and a new deal with Conergy, the nation's largest solar electric systems integrator, gives Nanosolar a huge jump on its competitors.

2 ECD OVONICS

ROCHESTER HILLS, MICHIGAN

When inventor Stanford Ovshinsky first opened ECD Ovonic in 1960, he had a lofty goal—to use science to change the world completely. Over the past four decades, he's done just that, inventing everything from the flexible solar cell to the nickel-metal hydride batteries that power every hybrid car on the market.

The spry octogenarian's latest obsession is that clean-fuel sticky wicket: hydrogen. Though often touted as a replacement for gasoline in cars, hydrogen is extremely flammable in its gaseous state. But Ovshinsky has solved that problem by pioneering a method for storing hydrogen in solid form, rather than as a high-pressure gas. The process involves

GE expects to earn at least \$20 billion in revenue from green technologies by 2010.

a proprietary formula made up of non-polluting metals that are ground into a fine powder. When added to a tank of hydrogen, the powder acts as a sort of sponge to encapsulate the gas. When the hydrogen is needed for fuel, a small amount of heat is added to the tank, which releases the element.

Those who say a hydrogen car is impossible need only look at Ovshinsky's modified Prius, which has an internal combustion engine powered entirely by solid-state hydrogen. George W. Bush has even shown interest. An unlikely ally? Maybe, but stranger things have happened. A few years ago, Chevron came calling, hoping to sniff out the threat. Instead, they invested \$67.3 million for a 20 percent stake in the company.

3 GREENFUEL TECHNOLOGIES

CAMBRIDGE, MASSACHUSETTS

Former International Space Station researcher Isaac Berzin, along with his team of scientists from Harvard, Columbia, and MIT, have found a truly bizarre secret weapon in the fight against carbon dioxide emissions: algae. Yes, algae. Not only does it "eat" CO₂, it can also be used as a clean, renewable biofuel. The researchers at GreenFuel Technologies have developed an emissions scrubbing system that takes advantage of this happy coincidence.

Power plants that use Berzin's system not only reduce their carbon footprints and gain valuable emissions credits, but they

can also use the algae-based fuel themselves or sell it on the open market. If it sounds like a pipe dream, it's not. The company has already launched small projects in Arizona, Massachusetts, and New York. A large U.S. utility company and a major U.S. power generator are poised to begin partnerships with GreenFuel to build 1,000-megawatt plants, which will each generate over 100 million gallons of biofuel a year; the owners of a 2,200-megawatt coal plant are also ready to try out the technology. With \$20 million in venture capital investment in the bag, GreenFuel is one to watch.

4 ENVIROFIT INTERNATIONAL

FORT COLLINS, COLORADO

In the U.S., two-stroke engines are mostly used for chain saws and go-karts, but in the developing world, they are the motor of choice. There are more than 100 million two-stroke vehicles in Asia alone, from Thailand's tuk-tuks to India's auto rickshaws. They ply the streets leaving swirls of brown smog in their wake; the toxic clouds of ash, soot, and other particles spewed from the exhaust cause hundreds of thousands of people to die each year from respiratory disease.

Those days may be drawing to a close, thanks to a retrofit kit originally developed for snowmobiles. Envirofit has retooled the technology to convert two-stroke engines into cleaner-burn-



ing, more efficient engines, testing them first in the Philippine cities of Vigan and Puerto Princesa. By this fall, Vigan's government is requiring all 3,000 of its city taxis to switch to the new technology, and if all goes well, Puerto Princesa and other Asian cities will adopt it, too. Though the retrofit is relatively cheap—just \$300 a pop—it's still a lot of money for most taxi drivers. Luckily, government grants can help offset the cost, and the increase in fuel efficiency means that the payback period is less than a year.

Envirofit expects to sell retrofits for 100,000 engines by the end of 2007, and two million by 2011. Best of all, every retrofit the company sells eliminates more than a ton of pollution a year.

5 GENERAL ELECTRIC FAIRFIELD, CONNECTICUT

Two years ago, GE hopped onto the sustainability bandwagon with its Ecomagination initiative, promising to attack some of the world's biggest problems with an army of some of the world's biggest brains. Oil and gas reserves being depleted? Greenhouse gases out of control? Over one billion people lacking clean water? GE's on it—and with 25,000 technologists and 2,500 scientists on staff in their research facilities alone, it certainly has enough brainpower to make it happen.

The company's green awakening isn't about altruism—it's big business. GE expects to generate at least \$20 billion in revenue from green technologies by 2010.

So far, there are more than 40 products in development, from water-stingy washing machines and fuel-efficient airplane engines to hybrid locomotives and mammoth desalination plants.

In the first full year of the program, revenues from Ecomagination products topped \$10 billion. With numbers like that, GE has been leading by example, showing corporate America that doing good and doing well don't have to be mutually exclusive.

6 ORGANIC VALLEY LA FARGE, WISCONSIN

In the U.S., today's food production is dominated by just a handful of mammoth industrial farms—the sheer sizes of which cause massive erosion and pol-

lute our air, water, and soil with hazardous gases, toxic chemicals, and harmful pathogens. Big farms have given consumers cheap prices—but they come with a price, too. For years, large farms have squeezed out smaller competitors, who can't charge the same low prices.

Recognizing that there's power in numbers, in 1988, Organic Valley, a member-owned co-op, recruited seven organic dairy farms to unite against Big Agriculture. Today, the label is made up of 900 independent farms whose combined size makes them able to compete against the giants. Organic Valley cheese sits right next to Kraft on grocery shelves, and the co-op boasts 90,000 acres under its umbrella. Its farms produce juice, milk,

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eggs, meats—more than 200 products in total. And they offer a lifeline to struggling family farms, paying them up to 40 percent more than what they'd get for conventionally-grown fare.

7 TESLA MOTORS SAN CARLOS, CALIFORNIA

The old knock on electric cars was that they performed more like golf carts than sports cars (or even sedans). Tesla Motors wants to change that. The company's electric Roadster, which sells for a cool \$100,000, has the look and pick-up of a world-class sports car—and it's just as reliable as many of the high-end gas-guzzlers on the market. Plans are also in the works for more affordable models, according to CEO Martin Eberhard: Tesla is aiming to produce a \$50,000 electric sedan by 2009.

To date, Tesla has already sold more than 200 Roadsters, mostly sight unseen. This year the company will launch customer centers, where consumers can kick the tires on the Roadster, then squeal off down the street for a test drive—no gas required.

8 SOUTHWEST WINDPOWER FLAGSTAFF, ARIZONA

These days, you don't have to be an engineer to convert your home to run on alternative energy. After years of research and development (and cash infusion from investors), last summer Southwest Windpow-

er introduced the Skystream—the first small wind turbine designed to easily hook into a home utility system. With a price tag of \$10,000 to \$13,000 (including installation), the Skystream costs half of what its predecessors did. And the resulting power is not only clean, it's cheap: only 10 cents per kilowatt hour, as opposed to the 15 to 35 cents that local utilities typically charge.

Granted, you'll need at least a half-acre property and a breeze of ten miles an hour or more to make it work. And depending on local zoning rules, you may need to get a permit for the 35- to 100-foot Skystream rising from your backyard. But assuming that conditions are right, Skystream can enable homeowners to make their houses greener and cleaner.

9 DOMINI NEW YORK CITY

Do you support deforestation? Child labor? Companies that pollute? Maybe not consciously, but your investments in mutual funds may sustain these very activi-

ties without your knowledge. At Domini, analysts don't just look at the financial performance of the companies they invest in, they take social and environmental factors into account as well. Armed with \$1.8 billion in assets, Domini has filed more than 140 shareholder resolutions with more than 60 corporations, actively engaging high-level management on issues ranging from product safety and sweatshop labor to climate change. The company has talked to Coca-Cola about human rights; coached the computer giant Dell on energy conservation; and convinced J.P. Morgan Chase, a \$1.1 trillion bank, to adopt a comprehensive environmental policy.

10 TOYOTA TORRANCE, CALIFORNIA

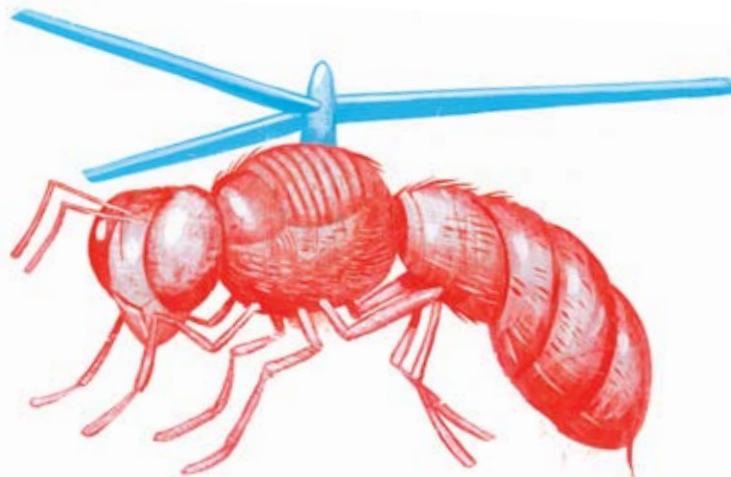
When greenies hear "Toyota," they think of the company's popular Prius hybrid. But Toyota has more to boast about than this: Both its other hybrids (the Highlander, the Camry, and the Lexus RX400h) and its wider eco initiatives.

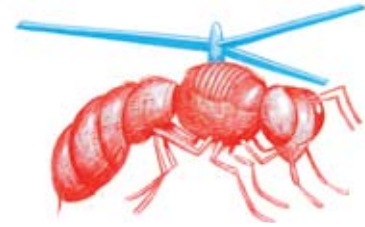
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The auto-maker made environmental stewardship a key component of its business when it established its first Earth Charter, a statement of environmental responsibility, back in 1992. In 2006, Toyota put nearly nine million fuel-efficient vehicles on American roads and recycled 500,000 pounds of materials, including plastic wrap, solvents, and even engine blocks. From steel and urethane foam to plastic bumpers, 85 percent of a Toyota vehicle needs never hit the landfill—any dealer trade-in that's not resold is recycled by the company. The new parts are also delivered to dealerships in returnable packaging, eliminating the need for the wood pallets and cardboard boxes they usually arrive in. And despite the company's growth over the past several years, its overall disposal of waste has declined by 86 percent. Rumor also has it that Toyota may have an all-electric Prius on dealer floors by late 2008.

11 WHOLE FOODS AUSTIN, TEXAS

Whole Foods opened its first store in 1980, when "natural foods" were barely a blip on the culinary radar. It's now the





largest natural and organic food superpower in the world, with 189 stores and revenue of \$5.6 billion in its last fiscal year.

Not content to ride on this reputation, in 2006 the company made the largest renewable-energy credit purchase in U.S. history, becoming the only Fortune 500 business to offset all of its electricity usage. For every light flicked on in the produce department and every oven fired up to bake organic-grain breads, Whole Foods will invest in wind technology. That's 458,000 megawatt-hours of clean power every year—the equivalent of planting 90,000 acres of trees, or yanking 60,000 cars off the road.

Some Whole Foods stores are making even more direct commitments to renewable energy. The Northwest locations are already run entirely by wind power, while the Berkeley, California, store powers its lights primarily with solar energy. In 2006, the EPA recognized the company as a "Green Power Partner" for all its investments in clean energy.

12 GREEN MOUNTAIN ENERGY AUSTIN, TEXAS

Since 1997, Green Mountain Energy has allowed consumers to purchase cleaner electricity and help reduce the amount of carbon dioxide released into the air each

year. In the past decade, its customers have created a demand for 13 new wind and solar facilities across the country, and it has sold six billion kilowatt-hours worth of renewable energy generated by a variety of sources, including wind, solar, hydropower, geothermal, and biomass. That's the CO₂ equivalent of not driving 4.6 billion miles. And Green Mountain's eMission Solutions program is a relatively painless way for businesses to offset their carbon footprints. With electricity generation still the leading cause of industrial air pollution in the U.S., every step counts.

13 KONARKA LOWELL, MASSACHUSETTS

In the heat of battle, soldiers in the field need reliable energy sources. That's why the U.S. Army recently awarded \$1.6 million to this small company. Konarka's solar-powered plastic, a nano-material that's deposited like ink onto a surface or material, can be embedded into clothing, implanted into consumer electronics, or woven into textiles. It can help power objects as small as a cell phone or as large as a Hummer. For the military, Konarka has begun developing tents capable of

generating their own power and foldout solar panels that would reduce the number of batteries soldiers must carry, as well as wearable communication systems powered by sunlight. These technologies aren't expected to hit the consumer market for a few more years, but with more than 200 global patents or patent applications and two Nobel Laureates on its payroll, the company has the mental muscle to reinvent solar power as we know it.

14 GOLDMAN SACHS NEW YORK CITY

This blueblood investment bank rocked Wall Street when it called on the U.S. government to address climate change. Rather than pressure Washington to shield big business from environmental obligations, the financial powerhouse rolled out an eight-page environmental policy, stating that "voluntary action alone cannot solve the climate change problem."

Next, the company pledged to use its influence to move markets and investors. In the past year it's done just that, pumping close to \$1 billion into renewable energy. Goldman Sachs has also committed to helping to develop a U.S. market for emissions trading and has spoken out in favor of government incentives for technologies that lead to a less carbon-dependent society. The bank's new public policy arm will churn out independent research

with assistance from the academic and non-profit communities.

15 ORMAT TECHNOLOGIES RENO, NEVADA

In a sense, the people behind Ormat Technologies are miners, but they're not after gold or diamonds—they're looking for heat. Deep in the earth's crust is a supply of mostly untapped energy: hot water just itching to get to the surface in the form of steam. The hardest part is getting to it. Here in the U.S., that's only feasible along the "ring of fire"—California, Hawaii, and other western locations known for their tectonic activity. But with just six U.S. power plants and four more overseas, Ormat produces enough geothermal energy to power about 360,000 homes.

Last July, the company put in a bid to help develop what will be the world's biggest geothermal project ever—a \$600 million mega-plant in northern Sumatra set to generate another 340 megawatts. Ormat's still investigating other opportunities, too. It has put significant research toward creating a market to capture waste heat from manufacturing processes, and last fall, the company announced a \$63.5 million investment into biodiesel.

16 ICE ENERGY WINDSOR, COLORADO

Year after year, air conditioning is the top contributor to peak

**Green Mountain Coffee ships
25 million pounds of Fair
Trade coffee beans each year.**

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electricity problems: Last summer alone, heat waves across the nation left many cities with blackouts, and high electricity demand forced the dirtiest of generators to kick in. But this company says that a better solution lies in something laughably low-tech: ice.

Ice Energy's Ice Bear cooling unit plugs into an off-the-shelf air conditioner. At night, when electricity is cheapest and most abundant, it makes ice. But during the day, when demand for air conditioning soars, the Ice Bear uses the ice—instead of electricity—to cool down the coolant in the air conditioner, reducing electricity consumption for air conditioning by up to 30 percent. Right now, the company sells the Ice Bear only for commercial buildings, but a residential version is being tested now. And many utilities are already offering huge incentives for companies to buy them. Now that's cool.

17 GREEN SANDWICH TECHNOLOGIES

NORTH HOLLYWOOD, CALIFORNIA

Most people don't think much about the wood or metal framing that holds up their houses—but what if that framing could save them 60 percent on energy bills? Green Sandwich Technologies has developed insulated concrete panels that can be used to build homes and commercial structures. The panels provide nearly four times the insulation of wood- or metal-framed struc-

tures, and they're made from at least 40 percent recycled content, including an eco-friendly foam made by chemical giant BASF. They can be fabricated from locally harvested biomass (like rice straw, mowings, or even roadside weeds) and then coated with Earthskin, a concrete replacement made almost entirely of dirt. Naturally fire-resistant, the panels are also strong enough to rebuff hurricanes and withstand earthquakes, and they can be used in roofs, floors, walls, and even countertops and pools. But more importantly to builders, Green Sandwich structures can be built in half the time of conventional construction—an enticement that might just make green buildings more popular.

18 GREEN MOUNTAIN COFFEE

WATERBURY, VERMONT

Yuppies have been sipping organic, Fair Trade coffee for years now, but the masses have yet to follow suit. Enter Green Mountain Coffee, which ships 25 million pounds of beans a year and is the sole coffee supplier for the popular Newman's Own Organics line. Last year, through a partnership with McDonalds, Green Mountain brought its product to the mainstream, allowing customers to order a cup of its Fair Trade joe with their hotcakes at more than 650 franchises throughout New England. And this past summer, in collaboration with



International Paper, Green Mountain unveiled the first all-natural, renewably resourced, compostable hot beverage cup. Unlike conventional cups, which are lined with petroleum-based plastic to prevent leaks, these biodegradable sippers are lined with a bioplastic made from corn. With more than 2.5 million cups of Green Mountain coffee consumed daily, all that avoided trash adds up.

19 FIBERSTARS

SOLON, OHIO

Can fiber optics replace light-bulbs? This company thinks so—its technology already lights the Declaration of Independence and the Magna Carta. (The U.S. government funded the research to develop the technology with about \$16 million worth of grants.) Fiberstars uses a special fixture called a metal halide lamp



to send light through a series of large plastic fibers that look something like plexiglass cables. The lights don't create heat or ultraviolet rays, both of which degrade fragile papers, so they're suited for use in museums and other archival areas. A single 70-watt metal halide lamp connected to the company's fiber optic system can replace the output of eight normal 50-watt bulbs; better yet, the lights

consume one-third the amount of energy of even the most miserly fluorescent bulbs. To date, most of Fiberstars's customers have been hotels, casinos, and retailers—but if all goes well, consumers could be next.

20 NATURALAWN FREDERICK, MARYLAND

At least 78 million American households blanket their yards

with pesticides in search of the suburban emerald dream lawn—and we've got the polluted groundwater to prove it. Pesticides have been linked to birth defects, neurotoxicity, and liver and kidney damage, and exposure to pesticides increases the likelihood of childhood leukemia by sevenfold. After nine years in the field as a manager for Chemlawn, where he was surrounded by co-workers who were frequently sick,

Philip Catron decided he'd had enough and launched a lawn-care franchise that eschewed the use of pesticides altogether. Today, the Frederick, Maryland company is the country's largest organic-based lawn care business, with over 50,000 clients in 24 states. NaturaLawn's customers have collectively prevented millions of pounds of pesticide usage—and lawns look so lush that you'd never know the difference.