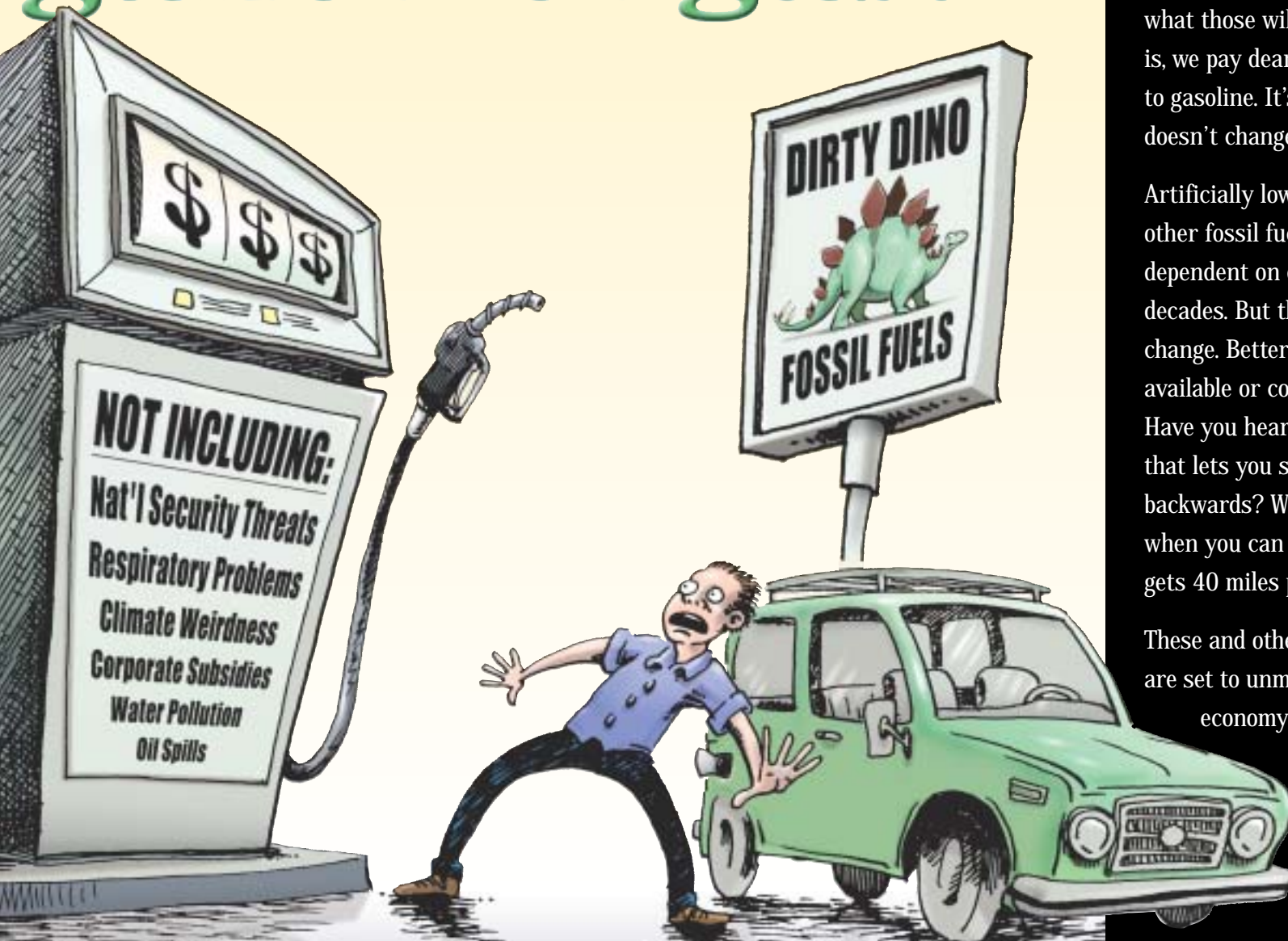


What's the real price of a gallon of gas?



Bottom line:
clean energy
is cheaper.

We can rattle off gas prices to the nearest nickel, but those figures hide as much as they reveal. Studies show that if you include all the hidden costs, the price of gas could double. And that doesn't include the worldwide effects of climate change — no one knows what those will amount to. Truth is, we pay dearly for our addiction to gasoline. It's just that the money doesn't change hands at the pump.

Artificially low prices for oil and other fossil fuels have kept us dependent on dirty energy for decades. But that's starting to change. Better options are already available or coming to market soon. Have you heard about the system that lets you spin your power meter backwards? Why buy a gas-guzzler when you can have an SUV that gets 40 miles per gallon?

These and other energy innovations are set to unmask our fossil fuel economy for the dinosaur that it is. Together we can flip the switch on a clean energy future.

In this issue of SectionZ:

**CLEAN ENERGY:
Alternatives to
the Dinosaur**



ecotrust

Think clean energy is decades away? Think again.

At the dawn of the 21st century, clean energy breakthroughs are everywhere. Investing in their development is like getting in on Texas oil fields in the 1880s — someone's going to strike it rich. And some of the key innovators are based right here on the West Coast.

In the last two years, venture capitalists have doubled the share of their investments that they're steering to clean energy, and big firms like General Electric, General Motors, British Petroleum, and Shell are joining the scene too. Worldwide, the clean energy market is projected to reach \$180 billion a year by 2020. Two crucial bills now in Congress would increase that figure dramatically. One would set a national standard for renewable electricity, as thirteen states have already done. The other would force fossil fuel prices to better reflect their true costs, as is already the case in Europe. (See backpage for details.)

Meanwhile, studies around the country show that clean energy creates more jobs and generates more local income than fossil fuel-based energy production. The New York State Energy Office concluded that, for each unit of electricity generated, wind power creates 27% more jobs than coal and 66% more than natural gas.

These pages profile some of the ideas and technologies that are headed our way. The sooner we embrace them, the healthier and the richer we'll be. There's a clean energy economy just waiting to be unleashed.

CLEAN ENERGY: Alternatives to the Dinosaur

HYBRIDS

Power-to-burn. Cheap on gas. Proven technology. Gasoline-electric hybrids are winners, and now virtually all the major U.S. and Japanese automakers are scrambling to get on board. Is the model you want available as a hybrid? Ask your dealer. It might be soon.

You've probably heard about the fantastic mileage that hybrids are getting. Well, the same tricks that help a small car get 68 miles per gallon can also help a sports car accelerate 0-60 in three seconds. The only reason you never hear about hybrids winning Formula One races is that the sanctioning body banned them as having an unfair advantage on the track.

Hybrid power can be rugged too. The Army plans to purchase 30,000 hybrid trucks by the end of the decade. And Dodge will introduce a hybrid Ram pick-up that doubles as an electrical generator for running camping equipment or power tools at a remote job site. In case of a blackout, it could even power your home.



Honda's souped-up prototype, the hybrid Dualnote, packs 400 horsepower and still gets 42 miles per gallon.



Ford's four-cylinder Escape hybrid SUV matches the performance of the current V6 but delivers 40 miles per gallon.



GM's hybrid military Silverado comes equipped with a fuel cell for silent auxiliary power.

HYDROGEN FUEL CELLS

Fuel cells seem almost too good to be true. They capture the energy of the most plentiful stuff in the universe and their only by-product is water — clean enough to drink. But there's a catch. Hydrogen isn't really a fuel so much as a carrier of energy — it's only as clean as the source of power it carries. That makes it a great medium for converting the intermittent flow of wind and solar into reliable power that's on tap when we need it. On the other hand, making hydrogen from coal or nuclear power just puts a green face on dirty energy.

While fuel cell cars are still several years away from the showrooms, some of the bumps on the road to a hydrogen economy have been overplayed in the media. *The Economist* says that hydrogen's reputation as dangerous is "undeserved," and that estimates of \$100 billion for a nation-wide distribution system are "outlandish."

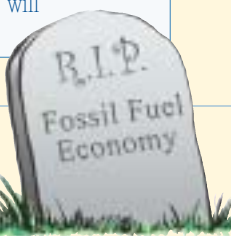
STATUS CHECK: Hydrogen buses from Ballard have been on the streets of Chicago and Vancouver since 1998. Hundreds of fuel cells have already been installed in buildings that value their clean, silent and dependable operation as well as their capacity for "dual-generation" of both heat and electricity.

BIODIESEL

"Smells like French fries," was the most frequently heard comment when the city of Berkeley converted its recycling trucks to run on biodiesel. That's because their fuel is made from waste vegetable oils — the stuff restaurants use to deep fry foods. Just one-fifth of the used restaurant grease in New York City would be enough to power its transit system.

Releasing far less CO2 and a fraction of the air pollutants of regular diesel fuel, biodiesel is a great solution for the thousands of soot-spewing trucks and buses on the road today. Converting them to run on biodiesel would require few or no modifications. In fact, the diesel engine was invented to run on peanut oil!

STATUS CHECK: There are lots of diesel vehicles available these days, and all of them can run on biodiesel: VW and Mercedes cars, and Ford and GM pick-ups. Every major city on the West Coast has at least one filling station that offers biodiesel, and if one is not nearby, switching between regular diesel and biodiesel is no problem.



GOOD NEWS ABOUT SOME OLD FRIENDS:

GEOTHERMAL: Energy from the heat of the Earth already accounts for 6% of the electricity generated in California. Now technological developments are allowing companies like ORMAT to offer smaller facilities that tap geothermal resources at lower temperatures, in the 200-250°F range.

SOLAR: Photovoltaic (PV) cells — which convert sunlight into electricity with no moving parts — have dropped tenfold in price in the last 25 years, and materials researchers in several areas are all hoping to find the next breakthrough. One promising development at Lawrence Berkeley National Laboratory would utilize the full spectrum of sunlight to nearly double the efficiency of the conversion process.

WIND: "The fastest growing game in the power business," according to *Business Week* magazine, wind energy is now price competitive with both coal and natural gas. Vast potential for wind development exists in many states — Oregon could generate more electricity from wind than it currently consumes.

STATUS CHECK: With the help of rebates from the Emerging Renewables Program in California and the Energy Trust of Oregon, the solar-net metering combination is a great choice for home owners and businesses in both states.

BIOMASS GASIFICATION

It may sound like something you should see a doctor about, but biomass gasification is actually a promising energy source. It works by taking wood waste, or other plant matter, and heating it in chamber that's short of oxygen. The result is a flammable gas that burns cleanly and efficiently. Other sources of biogas include sewage plants, landfills and dairy farms. Studies at the Oak Ridge National Laboratory also indicate that "power crops" for gasification, such as switchgrass, could be produced cost-competitively without eroding soils or competing with food crops.

STATUS CHECK: Burlington, Vermont is home to the largest biomass gasification plant in the country, a facility with the capacity to power 6,000 homes. A village in the Philippines uses the stand-alone BioMax gasifier to power a hundred homes on coconut shells.

The Benefits of Clean Energy

+ Dollars in Your Pocket Investing in energy efficiency pays off big time. With bonds or money market accounts, the best you can hope for is about a 5% return. Putting that same money into the purchase of an Energy Star refrigerator could pay you back five times that much. In fact, the typical home energy efficiency upgrade pays better than the Dow Jones Industrials did during the 1990s. And with mortgage rates low, there is no better time to look into home energy financing.

+ A Breath of Fresh Air One thing about the new cars profiled here — hybrid, biodiesel and fuel cell — is that they all emit either reduced or zero pollution. Cleaner air for our cities benefits not only our health but our pocketbooks as well. One study for the Los Angeles area published in *Science* estimates its annual air pollution-related health costs to be almost \$10 billion.

+ Real Energy Security Pretty much everyone agrees that importing 55% of our oil puts our nation in a tough position. But relying on oil or gas that's piped clear across the country holds dangers as well. Real security comes from plugging into sources closer to home and not likely to run out anytime soon. It might sound like the same promises you've heard for years, but the fact is that for every federal tax dollar of ours spent on research into clean energy, four dollars have been spent on oil, gas, coal and nuclear. It's time to put our money where our priorities are.

+ A More Stable Climate Our use of fossil fuels is affecting the planet's climate system. Yet "there are policy options that would slow climate change without harming American living standards," says a joint statement endorsed by over 2,500 economists. Such policies are on the table in Congress right now. Let's level the playing field for clean energy. Just turn the page to learn how to join in.

TIDAL POWER

Trading free-flowing rivers for energy-producing dams has come at a steep price in lost fish and habitat. Similar problems have plagued an older generation of tidal power systems — they block fish passage and are expensive to build and maintain.

But new types of hydropower are aiming to tap the rivers and tides, and a range of companies are competing for demonstration projects to show that their technologies are cost-efficient as well as environmentally benign. Some designs feature revolving door-like or double helix-shaped turbines that allow easy fish passage. The HydroVenturi system considered by San Francisco's Department of the Environment has no underwater moving parts at all, but creates suction that runs turbines on the nearby shore.

STATUS CHECK: The first of the new generation of tidal power stations went online in Norway at the end of 2002. The four hundred million gallons entering and exiting through the Golden Gate twice daily make it one of the best tidal power locations in the world, and according to the S.F. Department of the Environment, HydroVenturi has pledged \$4 million to the launch of a demo project.

NET METERING

Put some solar panels on your roof, feed any excess electricity that you generate into the grid, and run your power meter backwards — that's net metering in a nutshell. Already in use in thirty-six states, net metering is one strand in a growing "energy web" that's beginning to revolutionize the electricity market. By supplementing large electric plants with power from smaller and more diverse sources, our electricity supply will be cleaner, more reliable, more secure, and more efficient as well.

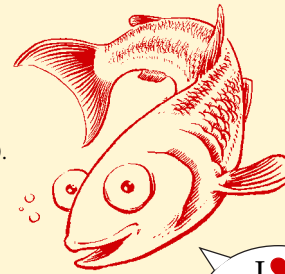
The U.S. Department of Energy says that policy changes should aim to remove barriers to such distributed energy generation nationwide. Many European countries, for example, require utilities to purchase solar or wind energy from customers at near-retail rates. In the U.S. we sorely need a similar national law. Each rooftop and backyard is a switch waiting to be flipped.



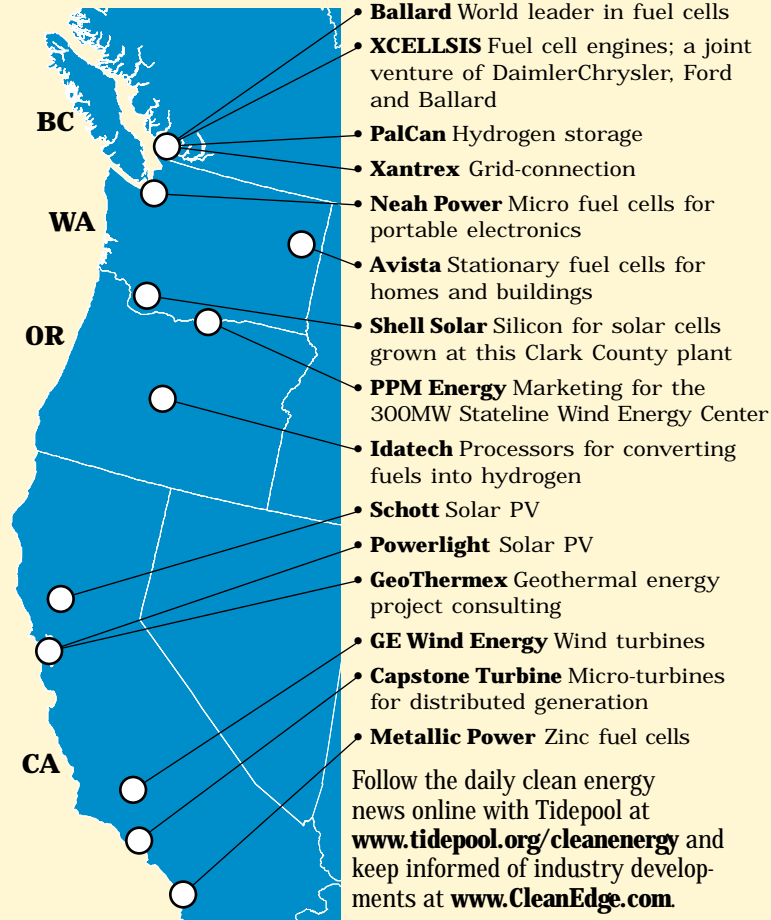
Build a Market for Clean Energy

A powerful bill in Congress would require utilities to generate 20 percent of their electricity from clean energy sources by 2020. This idea is called a **Renewable Electricity Standard** and it has already been adopted in some form by 13 states, including California. A national law would create jobs, improve energy security, and actually reduce our nation's total energy bill.

➔ Take action with the Union of Concerned Scientists to support a National Renewable Electricity Standard at www.ucsaction.org



Companies in Our Region Are Leading the Charge



● Become an Energy Producer

A private rooftop solar power plant provides great annual returns on your investment — far better than today's money market funds — thanks to the rebate from California's Emerging Renewables Program.

- ➔ Calculate the costs and savings of a solar system with this simple online tool: www.bpsolar.com/homesolutions/solarsavingsestimator.cfm
- ➔ Get the details at a workshop or training near you. See the Classes and Events listed by the Northern California Solar Energy Association at www.noricalsolar.org

● Cut Your Home Energy Bills

Details about potential savings through efficient insulation, Energy Star appliances, and more are all available quickly online.

- ➔ Just enter your zip code in the Home Energy Saver tool at www.homeenergysaver.lbl.gov.

● Fix the Market for Fossil Fuels

"Many scientists consider [global warming] the greatest economic threat of this century," says *Business Week* magazine. But the power of the market can help us to reduce the risk. If polluters have to buy permits to burn coal, oil and gas, the pricetags on their products will better reflect the true costs of climate change.

- ➔ Take action with the Union of Concerned Scientists to cut global warming pollution at www.ucsaction.org

● Support Energy Alternatives in California

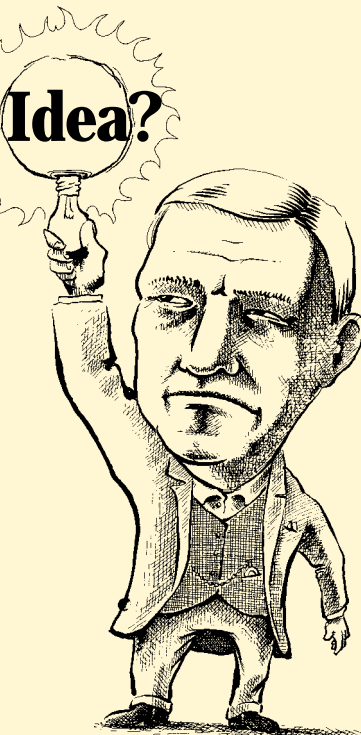
Adding a \$1 fee to each barrel of crude oil refined in California would provide a major source of new revenue for pollution cleanup as well as transit, bicycle, pedestrian, and clean vehicle projects. A bill in the California Legislature would generate about \$700 million annually for such projects.

- ➔ Take action with the Bluewater Network to help cut oil dependence and support transportation alternatives, at www.bluewaternet.org

What's the Big Idea?

We can trade up to an affordable clean energy future.

Click on [What's the Big Idea?](http://www.SectionZ.info) at www.SectionZ.info.



"I'd put my money on solar energy... I hope we don't have to wait til oil and coal run out before we tackle that."
—Thomas Edison, in conversation with Henry Ford and Harvey Firestone, March 1931

And the Real Price of a Gallon of Gas?



Tabulating hidden costs such as tanker and pipeline protection, increased health risks, and gas-guzzler subsidies, many economists have searched for the true price of gasoline. Join us online for a quick survey of their numbers. Part of [Clean Energy Facts & Footnotes](http://www.CleanEnergyFacts.com) at www.SectionZ.info.

FEEDBACK MATTERS

Please let us know what you think of SectionZ. Write comments@SectionZ.info.

Making our economy safe for people and nature

The blessings of the free market have won endless praise. But wait a second. If Adam Smith's "invisible hand" is so deft, why are problems like climate disruptions and ever-widening wealth gaps so clearly visible?

We can change all that by rethinking some of our basic assumptions. Let's start by recognizing that the "economy" is but a part of the larger "ecology." The result will be more prosperous lives for all of us.

The science is there, the economics is there, and we need you there, too.

Learn more: www.SectionZ.info

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