

PERSONAL PRACTICAL GLOBAL  
**SUN** *Monthly*



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## Community-Based Energy

A RETURN IS LONG OVERDUE

by Mark Sardella

When back-to-back hurricanes struck the heart of U.S. oil and gas infrastructure this fall, many of us became increasingly aware of the dangers of continued reliance on fossil-energy resources. In a span of just 24 days, Katrina and Rita ripped through one of the densest concentrations of energy assets in the world, shutting down at least 21 refineries, dozens of natural gas processing plants, hundreds of offshore production platforms, and more than 100 drilling rigs. Much of the damaged infrastructure will be out of service for months to come, and a number of analysts have begun predicting fuel shortages for the first time since the Arab oil embargo of the 1970s.

Beyond the tragedy of what was destroyed by the storms themselves, there is much concern about the long-term economic impacts of the energy price hikes that followed in the wake of the storms. Energy costs had already begun rising sharply before the hurricanes hit the Gulf, but the loss of critical supply infrastructures sent energy markets reeling. By early October, one-year price increases stood at 31 percent for crude oil, 50 percent for heating oil, 52 percent for gasoline and a staggering 108 percent for natural gas. One analyst put the estimate of increased cost to energy consumers globally at more than a trillion dollars over two years.

In addition to exposing our economic vulnerability, Katrina and Rita demonstrated how a fossil-fuel supply crisis puts the environment at increased risk. The swiftness with which the Environmental Protection Agency waived fuel refinement and emissions standards after Katrina hit — a move deemed essential to ensure that the disaster would not result in serious fuel-supply interruptions around the country — was startling. The total lack of debate provided a clear example of how policymakers, when faced with the choice, will readily succumb to economic needs in favor of environmental ones.

Fossil-fuel supply shocks have geopolitical implications as well, and again the problem is rooted in trying to protect the economy. Our primary geopolitical objective has long been to ensure that the oil our economy needs is available at a price that is low enough to keep us growing. That task continues to become more difficult as global oil supplies become tighter and energy markets become more reactive to world events. Among the recent news stories putting pressure on oil prices are Venezuela (which provides 8 percent of our oil supply) threatening to cut off exports to the United States, and Iran (which does not supply oil to the U.S.) threatening to cut off all oil exports. A number of reports have recently suggested that the aging, giant oil fields of Saudi Arabia (9 percent of our supply) may be heading into steep decline. Stories from Iraq's oil fields have become rare, but military events there continue to have a significant impact on world oil prices.

## **THE PROBLEM IS ECONOMICS**

As the fossil-energy industry tests the limits of our ability to afford its products, broadens its assault on the environment, and necessitates increasingly risky military strategies, there is a growing feeling of urgency for the transition to renewable energy. For many of us who have worked for years trying to foster the transition, the feeling has begun to border on desperation. There is a nagging fear that we have waited too long.

Much of the frustration we experience in trying to transition to renewables stems from our failure to recognize that what is needed is not so much a technological shift, but an economic one. If the problem was as simple as swapping out one technology and replacing it with another, we could have done it long ago. We would have called General Electric for the wind turbines and then ordered the photovoltaic modules from British Petroleum. Weyerhaeuser would have cut the trees

for the Bechtel-designed biomass power plants, and Halliburton would of course have had a no-bid contract to build it all.

But it isn't that simple because the problem isn't technology, it's economics. Renewable energies, for all their virtues, cannot generate and concentrate wealth the same way that fossil-based technologies can. The main reason is that harnessing energy from renewable sources is itself highly energy intensive, sometimes requiring a significant portion of the energy that the finished system will ever produce. It can take years to get back the energy that it took to manufacture, transport, install and maintain a photovoltaic system, for example. This thermodynamic limitation leads directly to the economic one.

Using petroleum and its by-products, we have built an enormously wasteful and inefficient economy that consumes energy and produces income at rates far beyond the capabilities of renewable energy. That doesn't mean that renewables are a bad investment — they are simply less suited for creating obscene wealth. Consider the difference between a soybean farmer growing an oilseed crop for biodiesel and a petroleum prospector drilling a hole that strikes five million barrels of oil. Both might prosper, but clearly on a different scale and time frame.

The ability to generate wealth is what keeps fossil energy, and what's left of the economy built on it, firmly in place. For the beneficiaries of the fossil-fueled orgy of wealth and excess, no amount of environmental damage and no level of geopolitical risk will ever justify changing the system. We are full steam ahead with fossil fuels, and our global economy, like the Titanic, has too small a rudder to avoid the danger that is now clearly in view.

## **FOCUSING LOCALLY**

Regardless of how intimidating the energy problem may seem on the global scale, there are a number of things we can begin doing locally to prepare for the fallout. A good starting point is an assessment of the impact of rising energy prices on Santa Fe, from which we can determine where to begin the job of protecting local residents and businesses. Consider the following:

Residents of the estimated 39,000 homes in Santa Fe heated by natural gas will shell out an additional \$14 million this year keeping the gas turned on. Businesses that use natural gas should be budgeting at least 60 percent more for the fuel this fiscal year than last, and if shortages that energy analysts are howling about actually materialize, these numbers could grow much larger.

The price of gasoline locally is up nearly a buck (97 cents) from a year ago, adding an estimated \$75 million to the annual fuel bill of Santa Fe's drivers. A shortage could drive this figure much higher, and with our hobbled refining industry under increasing pressure to make the switch over to heating oil, that possibility still looms large.

Electricity prices have remained constant for years, thanks to a rate freeze that expires in 2007. Given the across-the-board price increases for other energy sources, the smart money says we'll get walloped in 2008. Reliant Energy in Houston recently warned of the need to raise electricity prices by 24 percent due to rising natural gas costs, and Xcel Energy, Colorado's largest utility, has filed for a 30 percent rate hike. Although PNM only uses natural gas to meet a small portion of its electric generation, small increases in the price of electricity can have major economic impacts.

## **THERMAL ENERGY**

Of the three areas mentioned above — heating, transportation and electricity — the first is by far the easiest to address. The vast majority of homes and commercial buildings in Santa Fe were built when natural gas sold for less than \$2 per million BTU. High efficiency wasn't a priority. When gas rose to \$6, many studies were done to estimate the cost-effectiveness of sealing the leaks. At current prices of \$13 and climbing, the time for study is over. Thermal-efficiency projects are now wildly cost-effective.

Projects that improve efficiency are highly beneficial for a couple of reasons, but foremost is the fact that a one-time expenditure on higher efficiency pays dividends year after year. Insulate your home, and heating bills are reduced for 30 years. From an economic perspective, energy efficiency redirects the flow of energy dollars in the best way possible, reducing the number of dollars leaving the community via the utility and putting more money exactly where it is needed: in the pockets of consumers.

Unfortunately, there is a way to implement energy efficiency such that little or no economic benefit accrues to the community. The "Efficient Use of Energy Act" passed by our legislature last January empowers investor-owned utilities to undertake efficiency projects under the assurance that their revenues will remain unchanged. Since the primary benefit of efficiency projects emanates from less money going to utilities, such terms negate most of the benefits. Paying a utility to not deliver energy furthermore sets a dangerous precedent that must be avoided.

Home-energy assistance programs that direct the bulk of their funding toward bill-pay assistance are similarly ineffective for addressing the economic roots of our energy problem. Giving money to homeowners so that they can hand it over to the utility may provide short-term relief, but it neither corrects the problem of high energy bills nor slows the flow of energy dollars leaving the community. Assistance programs should focus heavily on weatherization, which yields benefits year after year, rather than on bill-pay assistance, wherein dollars merely bounce off the recipient on their way out of town.

While thermal efficiency should be the near-term focus, in the longer term we will need to create systems that help us meet our thermal energy needs with local resources such as solar and biomass, which is nothing more than solar energy stored in the form of trees, grasses and other organic matter. Again, the goal of beneficially redirecting energy dollars should guide the effort. To address the economics, projects should, to the highest degree possible, utilize local resources, employ local residents and be owned locally such that energy dollars tend to stay in the local economy.

## **ELECTRICITY**

Our present system for supplying electrical energy to Santa Fe is terribly inefficient, both thermally and economically. Power plants deliver less than 30 percent of the energy in the fuel they consume, and only about 20 percent of money that customers spend on electricity stays in the local economy, with the remainder going to the institutional owners of the utility.

In the near term, end-use electrical efficiency is again the place to start. Installing more efficient lighting and appliances reduces electricity bills immediately, keeping more money in consumer wallets. Again, however, we must reject utility-funded efficiency programs, since their cost-recovery mechanism under New Mexico law negates the economic benefits.

Longer-term measures to assure that the electricity supply remains affordable and moves toward being sustainable are most easily achieved by creating a municipal utility and exercising the right of condemnation to take the utility grid for public use. While this may seem daunting, the potential it unleashes for capturing the flow of money leaking out of the community via electric bills and redirecting it back into the local community is remarkable. The move furthermore enables the creation of a responsive, intelligent grid powered by small, locally owned generators and systems that actively manage loads. This would greatly reduce total system cost and create economic opportunities for companies seeking to test their energy systems in a networked environment. Santa Fe could then establish a “feed-in tariff” that pays a premium price for locally generated energy — an incentive system that has proved to be the single most successful measure in the world for accelerating the implementation of beneficial energy projects.

## **TRANSPORTATION**

Given the automobile-centered development we have engaged in for so many years, it is difficult to offer much near-term protection against rising gasoline costs. In the longer term, more of our planning processes will emulate that of the Community College District, with villages designed with higher densities and better walk-ability. Until then, we must favor cars with the highest mileage ratings, support public transport systems, build roadways that encourage bicycling, and continue to educate ourselves and our community on the increasing need for efficient transportation.

## **TRANSITIONING GRACEFULLY**

It is all too tempting to wish for a new technology — a fuel cell, a superefficient solar panel or a cold-fusion generator — that swoops down to save Santa Fe from runaway energy prices. But even were they available, unless we implement them under a sustainable economic model, we remain just as vulnerable as we are now.

There is no question that we will eventually transition to renewable energy because for the long term it’s all we have. The issue is only how gracefully we do it, respecting one another and the environment in the process. Since so much of our disrespect seems to originate, on a global level, with the desire to maintain wealth and power, I’m suggesting that we start at the local level with a set of guidelines for distributing resources a bit more equitably.

Creating the 2-trillion-barrel petroleum reserve took about 300 million years of sunlight falling on Earth. Had we never found this buried treasure of stored solar energy, our current problem would be very different. Forced to make do with the daily energy of the sun, the wind and the tides, we would have developed more slowly, more efficiently and perhaps more thoughtfully. Instead we burned through half of the treasure — 150 million years worth of sunlight — in just 150 years, and at our current petroleum burn rate we consume nearly 13,000 years of the sunlight every day.

You might argue with the math, but the premise is sound: we are living on borrowed time — in this case borrowed from an ancient energy reserve. If this odd wrinkle in time somehow inspires a sustainable future built on a sustainable economy, then perhaps the energy hardships we now face will not have been too high a price to pay.