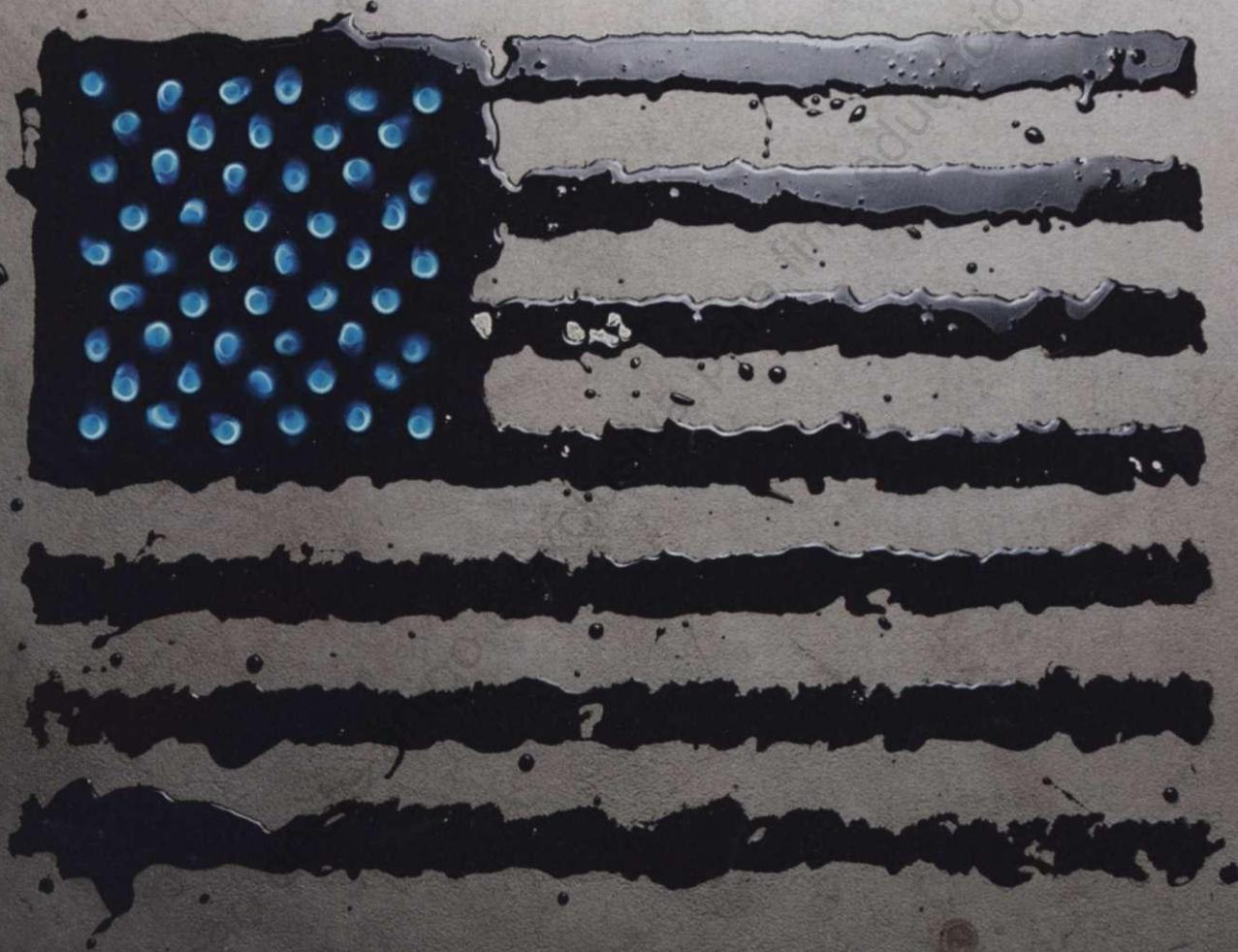


In Gas We'll Trust

America's energy future was supposed to be wind, solar, and nuclear. Abundant natural gas, gains in efficiency, and new sources of oil are putting an end to that.



BY PETER SCHWARTZ

SINCE THE 1950S, the US has had a perverse approach to energy. In effect we have maximized demand by building bigger, hungrier cars, homes, and lifestyles and minimized supply by limiting oil drilling, coal mining, and nuclear development. And how do we make up the difference? We buy oil from the people who hate us most.

But this is changing. We've long been acutely aware of the geopolitical ramifications of relying on Middle Eastern oil. And the threat of climate change—along with high fuel prices—has made us all realize the need for greater energy efficiency. Thankfully, technology is coming to

the rescue. New methods of extracting gas and oil, combined with efficiency gains in nearly every industry, mean that we are now minimizing demand and maximizing supply. And that's a good thing, right? Not so fast.

Flipping the supply-demand relationship is having some unexpected consequences. Chief among them is that, as fossil fuels become more abundant—and we consume less of them—the incentives to develop clean, renewable energy drop dramatically. As a result, we may no longer be looking at an age of increasing solar, wind, and nuclear power. Instead we are likely moving into a new hydrocarbon era. And that's very bad news for climate change.

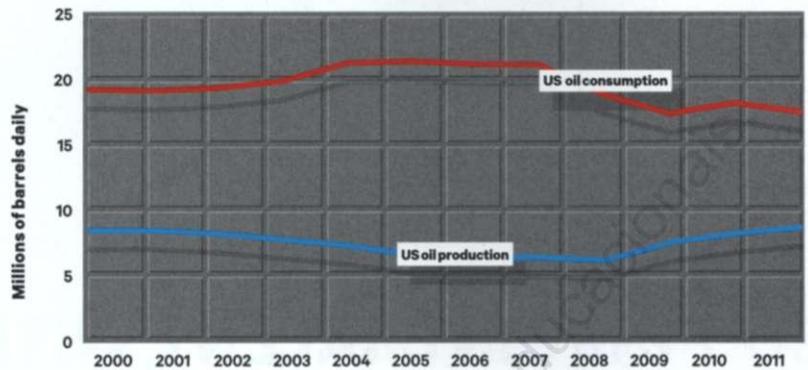
ONE OF THE MAIN FEATURES of America's changing energy landscape is the new abundance of natural gas. Only a few years ago we were desperate to bring in foreign gas. Domestic gas supplies were running out, demand was rising, and prices were skyrocketing. We were struggling to build enough gas import terminals. Fast-forward to today, and we're trying to figure out how to convert those just-finished import terminals into export facilities. What made tens of billions of dollars' worth of brand-new infrastructure almost worthless, seemingly overnight? Shale gas.

The US is endowed with enormous deposits of shale—soft but brittle rock that is dense with hydrocarbons. Sometimes the hydrocarbons take the form of oil, but mostly they exist as natural gas. Over the past 30 years, the technology needed to break up those rocks and get at this gas has steadily advanced. Less than five years ago only specialty gas companies were working on accessing shale gas through hydraulic fracturing, or fracking—using pressurized liquid to break up the rock and release the gas. But as the technique matured and the price of gas rose, major energy companies moved aggressively to exploit these new fields. The result has been an explosion in natural gas production, which has led to a 70 percent fall in gas prices since 2008 and a near collapse of the natural gas import business.

Cheap domestic gas will ultimately have three effects. First it will delay or kill most new competing sources of electricity pro-

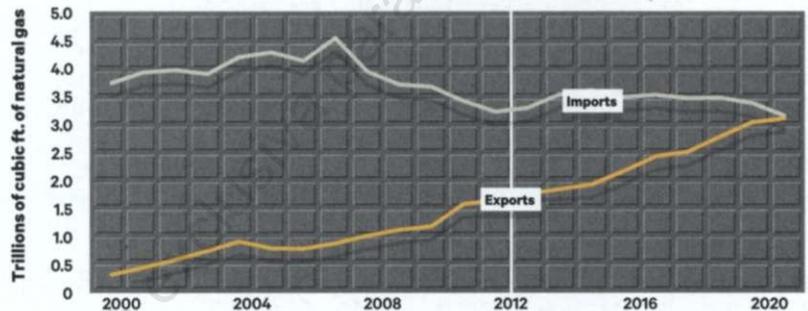
US Oil Consumption Is Down, Production Up

For decades Americans had an almost limitless appetite for oil, most of which was produced overseas. In the past two years, however, the trend has reversed: The US is now making more and consuming less.



Natural Gas Is Becoming a Major US Export

With the widespread adoption of fracking technology, vast production capacity is coming online, reducing imports and transforming the US into a major natural gas exporter.



duction—be they coal, nuclear, solar, or anything else. Gas is now incredibly cheap and easy to acquire, while other energy sources remain expensive or hard to get (or both). Not surprisingly, gas is already winning: Coal is being pushed out, nuclear has stalled, and wind and solar projects are being canceled.

Second, natural gas has become so cheap that it will win over some transportation markets. Trucks, buses, delivery vans, and a variety of commercial and fleet vehicles can all be converted to natural gas. UPS already runs a system of trucks powered by liquefied natural gas and has partnered with other companies to create a refueling infrastructure that runs from Los Angeles to Las Vegas and on to Salt Lake City.

The third impact will be on greenhouse gas emissions. Most new power plants will run on natural gas. While methane is cleaner than coal, it is obviously dirtier than nuclear, wind, and solar. And although some aging coal plants will be replaced, decreasing overall CO₂ output, far more nuclear, solar, and wind plants will be deferred or canceled in favor of gas

operations. All told, moving to a gas-based power grid will almost certainly result in more greenhouse gas emissions over time. This is especially true when you factor in the inevitable gas that leaks in the production, shipping, and distribution process. As an agent of global warming, methane is 25 times more potent than CO₂, so even a little leakage can have a large impact.

And what cheap gas is doing to renewable energy sources, abundant oil will do to hybrid and electric vehicles.

IMPORTED OIL FROM the Middle East has been the bane of American foreign policy since the Arab oil embargo of 1973. The US has tried for decades to find a route to oil self-sufficiency, yet never pulled it off. But this too is changing. For the first time in decades, net US oil imports are falling.

Meanwhile, domestic oil production is on the rise: We're now getting our supply from deep offshore and from shale rock, thanks to the same fracking technology that has given us loads of natural gas. Soon we'll be pulling even more oil out of Alaska. This uptick, plus shrinking

demand thanks to our efforts at efficiency, means that our import needs have greatly diminished and can now largely be met by our neighbors to the north and south. Tar sands in Canada and huge new fields all over Latin and South America, especially in Brazil, are producing enough to keep up with US demand. In the near future the US will finally be able to end its dependency on Middle Eastern oil. (That said, China is likely to see its dependence grow. One day US naval ships may leave the Gulf only to be replaced by Chinese battle groups.)

Now, getting the oil out of Canadian tar sands and operating the deep rigs off the Brazilian coast are challenging and costly affairs. But if you're willing to pay the price, there is a lot of oil out there. Plus, advances in technology mean that even some old oil fields can be revived.

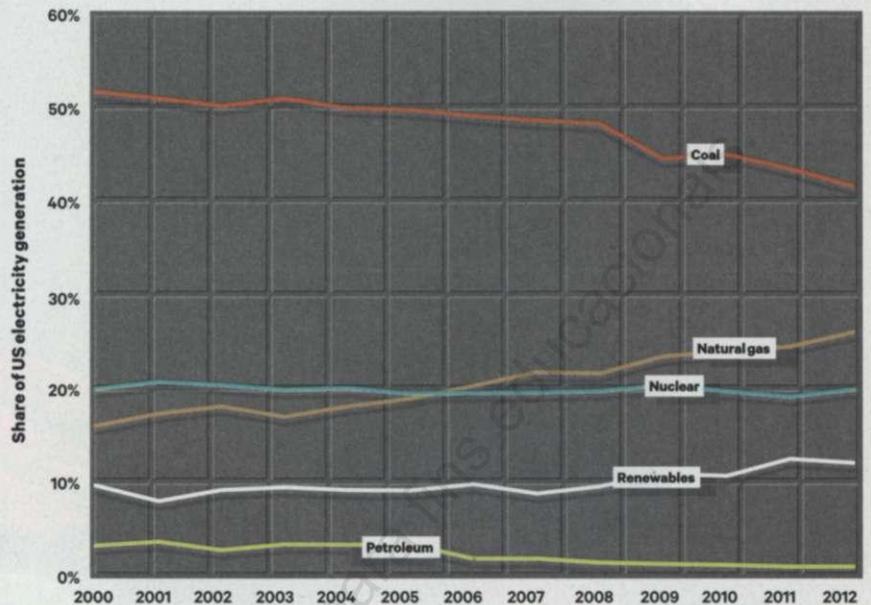
What all this adds up to is abundant if fairly costly oil. But the wave of high prices that began in 2008 has made all of these more expensive options viable. Nearly all the new oil is profitable above about \$80 per barrel, making that the new price floor. If prices drop below \$80, production will once again slow, tightening the market and pushing prices back up.

This doesn't mean a complete end to dramatic price fluctuations, however. The most recent spike in global oil prices has been largely driven by the political turmoil in the Middle East and Africa. Sanctions have reduced Iranian exports; Iraq is just getting back up to capacity; Libya, Syria, Yemen, and Sudan are all pumping less than normal thanks to civil unrest. Saudi Arabia has recently raised production to successfully moderate the price increase, keeping it from hitting \$150 a barrel again. But when the politically shuttered oil comes back, prices will fall, perhaps to less than \$60, overshooting as they did following the 2008 spike. Eventually they'll come back up to somewhere between \$70 and \$120.

Relatively steady oil prices, and the knowledge that we're not about to run out, will have a significant impact on the US automobile fleet. Carmakers will no longer feel the relentless drive for more efficient vehicles. Rising federal mileage standards won't let them reverse course, but there will be far less incentive to keep increasing miles per gallon. This will result in a slowdown of innovation in both electric and

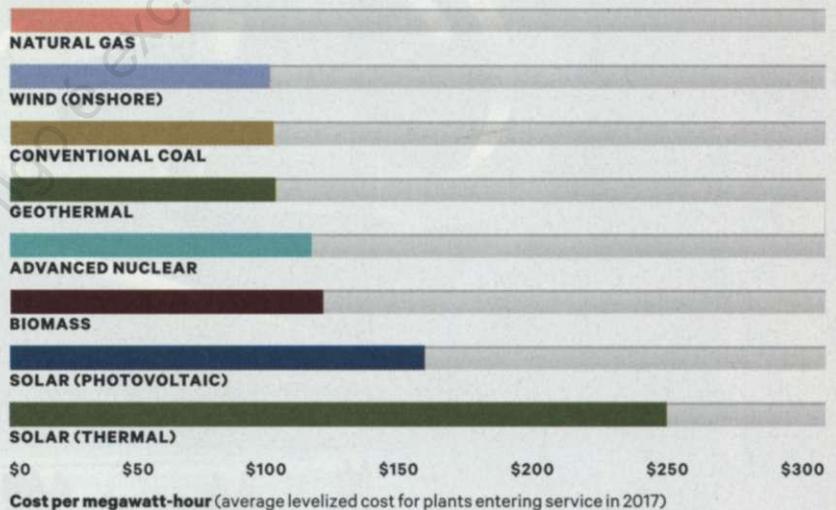
Power Plants Turn to Gas

When it comes to generating power for US homes and businesses, coal has long dominated all other sources. But natural gas has become so cheap and plentiful, it will soon challenge coal as the dominant fuel for producing electricity.



Renewables Can't Compete

The declining cost of solar panels and wind turbines, combined with the rising cost of fossil fuels, was supposed to make renewable sources of electricity generation cost-competitive. But thanks to a 70 percent drop in the cost of natural gas, greener sources like solar and wind aren't catching on.



hybrid cars as well as more fuel-efficient conventional engines. Other industries that rely on oil—airlines, shipping, trucking, and rail—will also feel less urgency to improve efficiency. Supply and demand will find equilibrium.

The result: Energy markets will continue to be dominated by oil and gas. Renewables, coal, nuclear, and efforts to make more efficient cars, planes, and buildings will all be losers. Just as the US auto indus-

try is bringing a new generation of electric vehicles to market, the buyers—and politicians who offer subsidies—will likely start to lose interest in them. And more huge investments in solar and wind power will go bad. The ultimate losers, though, will be all of us. The new age of hydrocarbons—while possibly more stable geopolitically—will be just as damaging to our climate. Unfortunately, the seeds of this cycle have already been sown.