

SEEDS OF CHANGE

Bush's Proposed Remedy for Oil Addiction Is a Fuel Made of Farm Waste

BY JOHN J. FIALKA
AND JEFFREY BALL

Staff Reporters of The Wall Street Journal

If the first step in treating an addiction is admitting that you have one, then maybe America is making progress.

"We have a serious problem," President Bush declared in this year's State of the Union address, in which he outlined an ambitious new energy strategy. "America is addicted to oil, which is often imported from unstable parts of the world.

"The best way to break this addiction is through technology," he added.

Of course, presidents have been saying much the same thing for decades, with little effect. And this president's announced goal—reducing U.S. oil imports from the Mideast 75% by 2025 through the development of alternative fuels like ethanol—still faces some big hurdles.

For one, the budget-constrained White House is offering little money to back up its rhetoric: just \$150 million next year, hardly enough to revolutionize a multibillion-dollar energy market. The fuel also faces distribution problems and a lack of properly equipped vehicles and filling stations. And an unpopular gas tax might well be needed to make ethanol a competitively priced product at the pump.

The notion that the U.S. can significantly reduce its dependence on foreign oil anytime soon by shifting to alternative energy sources is highly controversial. This isn't the first State of the Union address in which President Bush has touted the idea. He touted the potential of hydrogen-powered fuel-cell cars in his 2003 speech. Hydrogen has since lost some buzz, partly because the most realistic way to produce it today is by using a fossil fuel—natural gas—and partly because cars that run on hydrogen aren't ready for prime time.

The administration has also said in the past that the route to energy independence lay in encouraging domestic oil and gas drilling, including opening the Arctic National Wildlife Refuge in Alaska. Such proposals, which have repeatedly died in Congress amid bitter political battles, were notably absent in this year's speech.

STALK MARKET

The key to President Bush's latest initiative is the development of "cellulosic ethanol," or fuel made from agricultural waste such as plant stalks and wheat straw, which is now viewed as more promising than standard U.S. ethanol, which is made from corn. Because the raw materials for cellulosic ethanol are cheap and plentiful, proponents tout it as a

Holy Grail for energy independence—and a true alternative to foreign oil.

The only other way to significantly cut imports in the near term is to damp demand by raising taxes on gasoline and perhaps tightening fuel-economy standards, which the administration isn't inclined to do. Nor is Mr. Bush talking about increasing production of standard ethanol, which is competitive with fossil fuel only with a heavy government subsidy.

Unlike other fossil fuels and conventional ethanol, cellulosic ethanol can draw support from a surprisingly diverse political coalition. Scientists, investors and policy makers say it is increasingly feasible to make fuel from farm waste, also known as "biomass." Private-sector investors—including **Virgin Group** mogul Richard Branson and tech pioneer Vinod Khosla—are putting money into the concept in hopes of seeing an ethanol boom in the U.S. similar to one in Brazil.

Environmentalists like the idea because burning the fuel doesn't pollute as much as conventional gasoline. Defense hawks promote it as a way to boost national security. Struggling U.S. auto companies like it because they currently have a competitive advantage over the Japanese on so-called flexible-fuel vehicles that can switch between gasoline and alternatives.

And because the fuel can be made from a wide range of agricultural products, it draws backing from a geographically diverse range of politicians, from New York's Republican Gov. George Pataki to a bipartisan group of elected officials in California. The fuel is even popular in farm states such as Iowa that tout conventional corn-based ethanol, since it can make heavy use of corn stalks.

Beyond ethanol, Mr. Bush's new "Advanced Energy Initiative" includes spending for research on hydrogen cars and hybrid-car batteries that can be recharged overnight, as well as money for solar and wind energy. His grand goal, as he stated in his national address, is "to replace more than 75% of our oil imports from the Middle East by 2025."

That would mark a significant departure from the future the government now predicts. The Energy Information Administration says the U.S. will import more crude oil and finished petroleum products, not less—more than 70% of projected oil use in 2025, compared with 62% last year. Mideast imports are expected to become more important, rising to 30% of U.S. crude-oil and refined-product imports in 2025 from 21% last year.

'NO REAL SILVER BULLET'

John Felmy, chief economist at the American Petroleum Institute, the oil industry's main trade group, says Mr. Bush's goal is "achievable," but not without big changes. He says it would likely require a boost in domestic drilling, a major conservation effort or an increase in U.S. oil imports

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from other parts of the world, none of which is under way.

About five million vehicles that can use gas and ethanol are on the road now, but many of those drivers don't know their vehicles are capable of using ethanol. Only 600 filling stations offer E85, a blend of 85% ethanol and 15% gasoline, and they are concentrated in the Midwest. That number could quadruple this year, but it still would be a fraction of the 170,000 fueling stations in the country.

Some auto companies—notably the Japanese, who haven't invested much in the technology—remain cautious. **Toyota Motor** sells flex-fuel vehicles in Brazil, but not in the U.S. Bill Reinert, national manager of Toyota's U.S. advanced-technologies group, is skeptical of corn-based ethanol because of the huge amounts of land and water required to grow the corn. Made in large quantities, he says, cellulosic ethanol holds more promise.

Still, he has questions: How does it perform in the car? What might future production look like? What are the environmental issues associated with that production? "There's no real silver bullet out there," Mr. Reinert says. "Each fuel has its own particular problems."

Bush officials are optimistic their efforts can push the technology over the hump. The \$150 million they are seeking for the year starting Sept. 30—up from \$90 million this fiscal year—would go to research on enzymes and yeast that can break down materials including wood chips and "switch grass," a grass that grows quickly without much fertilizer. The process is similar to making bootleg whiskey.

SUGAR BREAKTHROUGH

According to Doug Faulkner, acting assistant energy secretary for energy efficiency, the Department of Energy's researchers had a breakthrough in 2004 when they figured out how to drastically cut the cost of producing sugar from corn stalks. Now, he says, they can produce ethanol from corn waste for \$2.30 a gallon, although that doesn't include distribution or marketing costs. The average U.S. retail price of regular unleaded gasoline is \$2.35 a gallon, according to AAA, the motoring group.

The Energy Department has received unverified reports from outside researchers that the cost of producing cellulosic ethanol could be as low as \$1.30 a gallon. The president's goal is, by 2012, to bring the retail price of cellulosic ethanol below the retail price of gasoline.

Even if ethanol costs come down, distribution remains tricky. Besides the shortage of filling stations, ethanol can be transported along existing pipelines as long as it is blended with petroleum products in concentrations of less than 10%, says Pierpaolo Cazzola, an analyst at the International Energy Agency. Any more than that and ethanol can corrode pipelines. How to manage the distribution of ethanol is "a bit of debate," he says.

Officials say once production costs fall, other hurdles should disappear. "The marketplace will take care of that," Allan Hubbard, head of the White House National Economic Council, says. "Once the product is available, the distribution system will respond quickly."

John D. McKinnon and Christopher Cooper contributed to this article.