

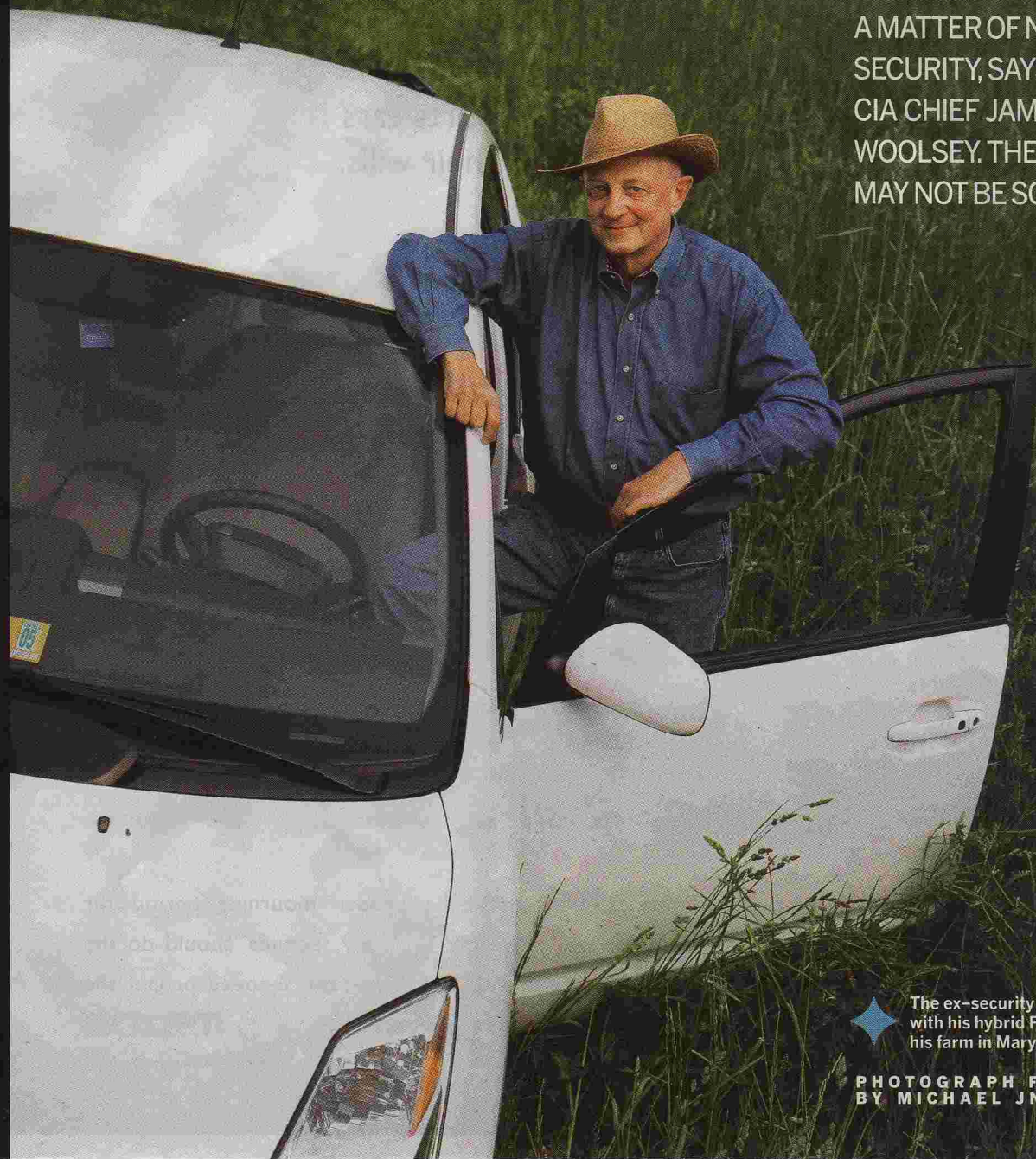
TIME

INSIDE BUSINESS

BONUS SECTION
JULY 2005

Field of Dreams

A 500-M.P.G. CAR? IT'S
A MATTER OF NATIONAL
SECURITY, SAYS FORMER
CIA CHIEF JAMES
WOOLSEY. THE IDEA
MAY NOT BE SO CRAZY



The ex-security czar posing
with his hybrid Prius car on
his farm in Maryland

PHOTOGRAPH FOR TIME
BY MICHAEL JN BOWLES

Breaking That Dirty Oil Habit

AN UNLIKELY ALLIANCE OF HAWKS, DOVES AND GREENS HAS A PLAN TO HELP AMERICA GUZZLE LESS GAS. COULD IT WORK?

◆ BY UNMESH KHER

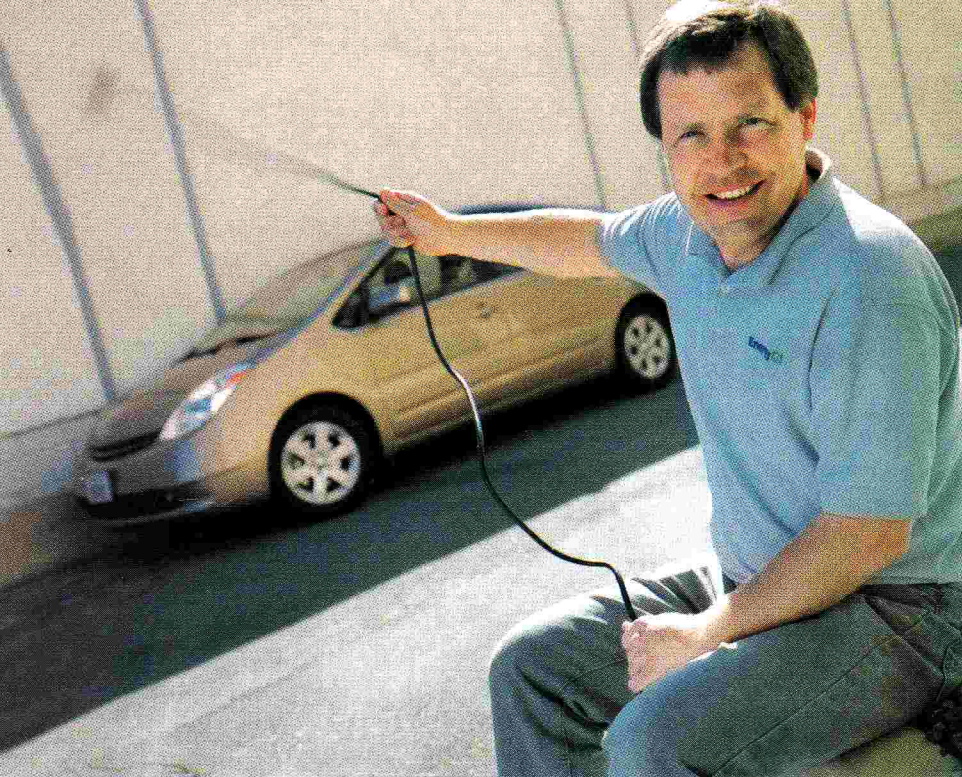
A Republican loyalist and canny political strategist, C. Boyden Gray has been quite busy lately. The former White House counsel to the first President Bush heads up the Committee for Justice, an advocacy group that has worked closely with the White House to push Bush 2's most controversial judicial nominees through the Senate. John Podesta has been busy too. The former chief of staff to President Bill Clinton who today leads the liberal Center for American Progress has worked hard to foil Gray. Yet even as the two party generals square off in a battle that has roiled the Senate, they manage



◀ Joining forces: From left, National Wildlife Federation CEO Larry Schweiger, conservative activist Gray, U.N. Foundation chief Tim Wirth and the U.N.-bashing Gaffney are working together on energy policy

▶ Mick Henderson, left, with Kentucky farmers, is producing the fuel that could help the 500-m.p.g. car become a reality





◆ IN CALIFORNIA, HANSEN'S FIRM WILL SOON SELL A KIT THAT CONVERTS A TOYOTA PRIUS INTO A PLUG-IN

to find common cause: energy policy. "Boyden and I agree on virtually nothing," says Podesta, "but we do agree on this: the security of the country depends on a whole new generation of vehicles and fuels."

What does alternative energy have to do with national security? Gray and Podesta are part of an unlikely alliance of neoconservatives, farmers and union and environmental leaders who want to wean the U.S. of its oil habit—some for purely green reasons (to stave off global warming), but others for the sake of cutting U.S. dependence on the volatile Middle East. And they have some radical ideas about how to do it. "We live in a world in which a terrorist attack in the Middle East could push oil well over \$100 a barrel and send the world economy into a tailspin," says former CIA Director James Woolsey, now a vice president at consulting firm Booz Allen Hamilton. One organization he belongs to, the Energy Future Coalition, shot off a letter last month to Pete Domenici, chairman of the Senate Committee on Energy and Natural Resources, calling for a federal investment in alternative fuels and advanced automobile technology. But it's another arm of this movement, the Set America Free alliance (which also counts Woolsey among its members), that has identified a Holy Grail of sorts. Co-founded by Frank Gaffney, the neoconservative chief of the Center for Security Policy, the group is touting the idea of a car that gets 500 m.p.g. of gasoline.

As oil prices have soared in recent years, there has been increasing attention on renewable-energy sources such as wind and solar power. But even if those sources are expanded, they would not change the U.S.'s fundamental dependence on foreign oil and its derivative, gasoline, to which our car-obsessed culture is addicted. Unless we could plug in our cars and charge them off the electrical grid instead of filling them up at the pump, all those options would leave us as hooked on gas as ever. And while pure electric-car technology has been around for years, it is plagued by a crucial problem: a lack of range.

Gaffney and his cohorts have envisioned a clever solution: a

hybrid car that combines gas-free plug-in technology with the boost of made-in-the-U.S., ethanol-based fuel to give it range. The plug-in hybrid could run for short distances on batteries charged by the same grid that powers our home appliances. On longer drives, it would use a fuel mix of 80% ethanol—alcohol, in the U.S. made mainly from corn—and 20% gas. Given that half the cars on the road travel fewer than 20 miles a day, such hybrids would travel mostly on grid-charged battery power. The rest of the time, those plug-in hybrids would run primarily on alcohol, not imported gas.

A 500-m.p.g.-of-gas car may sound like a pie-in-the-sky dream. But in fact, it is technologically possible. Green-car enthusiasts in California are experimenting with innovative plug-in technology, while DaimlerChrysler will soon be testing its own plug-in van. And ethanol has long been used as a fuel. Indeed, Domenici's committee last month adopted a measure in the energy bill requiring gasoline

refiners to increase the ethanol they use each year to 8 billion gal. by 2012, up from 5 billion gal. mandated by the House.

That's bound to raise hackles. Ethanol has always been controversial (*see box*). Most car companies, meanwhile, have little interest in any electric vehicles beyond the standard hybrid because they consider them too costly and limited in range for American tastes. "I don't think [electric cars] will ever be a significant percentage of the vehicles out there," says Sam Shelton of the Georgia Institute of Technology, citing such obstacles.

It would be too easy, though, to dismiss the 500-m.p.g. movement as all hype and hope. After all, not long ago, hybrids like the Toyota Prius sounded like a laughable idea. These days they are being snapped up by consumers more than willing to pay a premium. So before this pipe dream is summarily cast aside, it's worth exploring. Could it be that the motley coalition of tree huggers and hawks is on to something?

PITCHING PLUG-INS

MEET GREG HANSEN, A PARTNER IN A SMALL BATTERY-prototype testing firm in California called EnergyCS. Hansen was approached last year by Felix Kramer for help in building a dashboard monitor for a Prius that he and CalCars, his group of plug-in advocates, had converted into a crude plug-in. (The original Prius' batteries charge up when the car brakes.) Hansen was inspired. He enlisted the support of another privately held firm, Clean-Tech, to devise a more sophisticated version of the plug-in Prius. Hansen recently showed off his prototype at the 2005 Tour de Sol, a green-car race in Saratoga Springs, N.Y., where it didn't win but did deliver a fuel economy of 102 m.p.g. over a 150-mile course. The cost of charging the batteries? A buck.

EnergyCS and Clean-Tech have launched a start-up called E-Drive Systems, which plans to sell by next year kits to convert the Prius into a plug-in (though the modifications will void the warranty). At speeds below 35 m.p.h., Hansen's Prius sails along on its 18 lithium batteries for up to 30 miles at a go—well within

the range envisioned by Gaffney. The conversion cost isn't cheap: \$15,000, which Hanssen hopes to cut to around \$10,000. "It won't pay for itself in gas savings," Hanssen admits, "but neither does the Prius. People will do this for other, philosophical and environmental reasons."

Toyota isn't exactly jumping on the bandwagon. "Customers," says Ed LaRocque, Toyota's national manager of advanced technology, "are not telling us plug-in hybrids are something they'd like to see at no cost, let alone what we estimate would be an additional \$15,000." Other car companies, including Ford and General Motors, seem to feel the same way. But DaimlerChrysler sees the field differently. It has spent millions to modify a handful of gas and diesel-powered Mercedes Sprinter vans into plug-ins, which will be tested as early as this fall by commercial partners in the U.S., such as utilities. Chrysler says the vans can run 20 miles on batteries charged both via the socket and, like the Prius, by braking. Cost will matter, says Rolf Bartke, head of the Mercedes-Benz van division. "In the end it should be viable and economic for our customers." Bartke says the aim is to bring the battery cost down below \$10,000 within four years.

Several U.S. utilities are supporting the technology. Plug-in cars would open a new market for electricity at night, when utilities have excess capacity. In fact, the Electric Power Research Institute in Palo Alto, Calif., helped build the plug-in Sprinter. Ed Kjaer, director of electric transportation at Southern California Edison, argues that plug-ins represent a natural evolution of hybrid technology, which today essentially burns gas to generate electricity. "The more hybrids are sold," he says, "the stronger the business case will become for the electric vehicle."

ETHANOL DREAMS

DAVID WIMPY, 49, CULTIVATES 800 ACRES OF CORN AND OTHER crops in Kentucky's hilly Amish country. As a member of the 2,300-strong Hopkinsville Elevator Cooperative, he is also part owner of the hottest new thing to hit town, Commonwealth Agri-Energy, an ethanol plant that started up a year ago in a stream-fed rock quarry a mile south of his land. The cooperative has a 94% stake in the \$32 million plant, which has made an estimated \$40 million in sales over the past year from ethanol and its by-products. Plant manager Mick Henderson says he expects that investors will get returns better than 13%. "Ethanol is a win-win for consumers, farmers and for the country," says Wimpy.

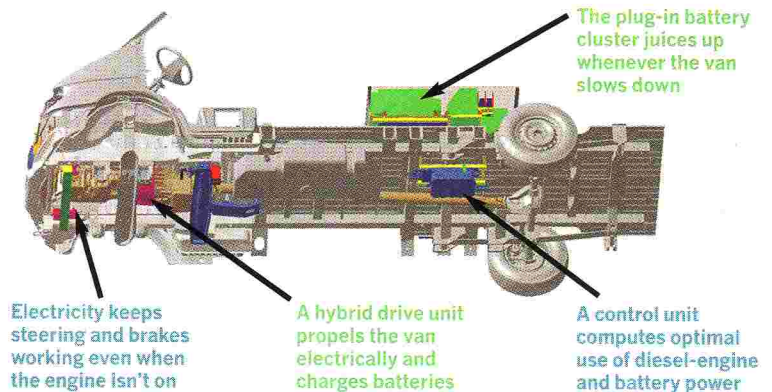
If electricity provides half of the 500-m.p.g. dream, ethanol provides the other: an alternative to gas. Hopkinsville's ethanol experience is hardly unique. Since 2001, 26 plants have been built in the U.S., bringing the total to 87, as political support for the fuel has grown. Roughly 40% of the plants are owned by farmers, although a single corporation, Archer Daniels Midland, retains a 25% share of the market.



A Plug-In Play

This prototype Mercedes Sprinter runs on diesel fuel—and on socket-rechargeable batteries

◀ DaimlerChrysler has converted some Sprinter vans into plug-in hybrids



Today's ethanol boom has nothing to do with Gaffney & Co.'s extreme solution, but if ethanol use were to evolve into the mainstream, it would multiply the plug-in's gas savings. Gaffney's group calculates that if by 2025 all cars are hybrids, half of them plug-ins and all of them running on an 80% ethanol blend, U.S. gas imports could drop from the projected 20 million bbl. a day to 8 million bbl. But today it is not national security that drives ethanol demand so much as environmental regulation. Refiners buy ethanol because it helps gasoline burn more cleanly—and it is one of two additives the government requires polluted cities to use to cut down on certain tailpipe emissions. Because the traditional additive, a toxic substance called MTBE, tends to pollute groundwater, many states are opting for ethanol.

But there are huge debates about ethanol's economic via-

Weighing the Benefits

THE DEBATE STILL RAGES OVER ETHANOL FUEL

- **PRO** Wholesale ethanol, at \$1.24/gal. in Los Angeles, is cheaper than gas at around \$1.55
- **CON** Gas-ethanol blends can't be piped to terminals because the alcohol separates out. Transport adds to costs
- **PRO** Cars can be built to run on an 85% ethanol blend at marginal extra cost
- **CON** Only 600 U.S. gas stations sell the fuel. There are 167,000 retail gas stations in the U.S.

- **PRO** Ethanol boosted the price of a bushel of corn by 25¢ to 50¢ last year
- **CON** Taxpayers support ethanol via state subsidies and a 51¢/gal. federal tax exemption
- **PRO** Ethanol helps reduce tailpipe emissions from cars
- **CON** Badly blended ethanol makes gas more vaporous on hot days, promoting ozone pollution. Corn farming and alcohol production are also very polluting

bility. The Federal Government provides a 51¢ tax exemption to gasoline refiners for every gallon of ethanol used, to keep the product competitive. (Conservative activist Gray points out that the oil industry has long enjoyed far larger tax breaks.) And now, Senate mandate aside, Illinois Senator Barack Obama has slipped an amendment into the energy bill providing a \$30,000 tax credit to encourage gas stations to pump "E85," an 85% blend of ethanol and gas used by so-called flexible-fuel vehicles. There are already 4 million such cars on U.S. roads. The Set America Free plan calls for just such incentives.

Debate has long raged over whether ethanol takes more energy to make than it delivers—something called the energy balance. Most experts now agree that from cornfield to factory vat, the amount of energy expended in making the fuel accounts for about 80% of the energy in it. But refiners say ethanol is still an inefficient option. Because it tends to separate from gas in pipelines, it has to be trucked to terminals and blended there by specially modified machines. That increases costs. "There is a question about the real cost of this product," says Robert Slaughter, president of the National Petrochemical & Refiners Association. "How many federal-assistance programs do you need to make it work?"

In fact, the real answer to such cost issues is bioethanol, which is the same stuff as ethanol but is made from wood or plant wastes like cornstalks. One of the few oil companies to back bioethanol

is Shell. It invested in a pilot plant run by a small Canadian biotechnology firm named Iogen, which put itself on the map by shipping the first commercial batch of ethanol made from straw last year. Iogen CEO Brian Foody says he expects to break ground on a 50 million-gal.-a-year plant next year. The hawk-and-dove coalitions want bioethanol to fuel future cars. It's loved as much by fiscal conservatives for turning waste into treasure as it is by environmentalists for its overwhelmingly positive energy balance. A bioethanol industry would even help deplete the global-warming gas carbon dioxide from the atmosphere, notes Woolsey. And corn ethanol can't be produced in sufficient quantities to dent oil imports: roughly 4 billion gal. will be made this year. Vehicles in the U.S. consume that much gas in just 11 days.

Whatever the future of the electric car and bioethanol, the notion that America must end its oil habit is gaining currency in Washington. George W. Bush, the former Texan oilman, has begun talking up corn ethanol and clean diesel and has endorsed a \$4,000 tax credit for purchases of hybrid cars. That has not gone unnoticed by energy's new coalition of convenience, even if the President hasn't yet mentioned plug-in hybrids or bioethanol. "We drive to high-tech jobs today in cars built with 100-year-old technology, using 100 million-year-old fuel," says Podesta. "We can do better than that." Maybe 500 m.p.g. isn't so crazy after all. —*With reporting by Marc Hequet/St. Paul, Kristin Kloberdanz/Hopkinsville and Jeffrey Ressler/Los Angeles*



Riisgaard has a vision to use biotechnology to create a cleaner world

Turning Waste into Fuel

A DANISH BIOTECH FIRM WORKS ON ANSWERS

When the hawks and greens of Washington's new anti-oil coalitions talk about ethanol fueling the future car, they aren't talking about the brew distilled from cornstarch. What they are referring to is a more fiscally and environmentally defensible alcohol, brewed from prairie grasses or agricultural waste, like straw. Trouble is, the technology required to commercialize bioethanol is in its infancy.

People like CEO Steen Riisgaard, a passionate environmentalist who went into business because he thought he could do good, are helping the technology mature. Novozymes, the \$1 billion, Copenhagen-based company he leads, sells microbes and enzymes made from genetically engineered bugs that improve consumer products and make dirty industrial processes more environmentally friendly. But as the volume of ethanol brewed in the U.S. has doubled since 2001, to 3.4 billion gal., the farm-fuel business has become Novozymes' fastest-growing source of revenue.

Enzymes that help transform

cornstarch into ethanol are fairly run-of-the-mill in biotech terms. The same can't be said of those needed to brew bioethanol from indigestible plant fibers. Making enzymes efficient and cheap enough for that has long been an obstacle to a viable bioethanol industry. Canada's Iogen is the only biotech firm to have shipped a batch of commercial bioethanol (see *main story*). But Novozymes is making waves as well. It announced in March that with \$17 million in U.S. Department of Energy (DOE) funding, it had reduced the cost of enzymes for making booze from corn stover from \$5 per gal. of ethanol in 2001 to a mere 10¢ to 18¢.

"We are involved in this because we believe there is a market," says Riisgaard, though he thinks a large bioethanol industry is still years away. With more funds from the DOE, Novozymes will supply enzymes for a bioethanol plant to be built in Nebraska next year by a subsidiary of the Spanish firm Abengoa. More than a few people in Washington will be watching. —*By Umesh Kher. Reported by Ulla Plon/Copenhagen*