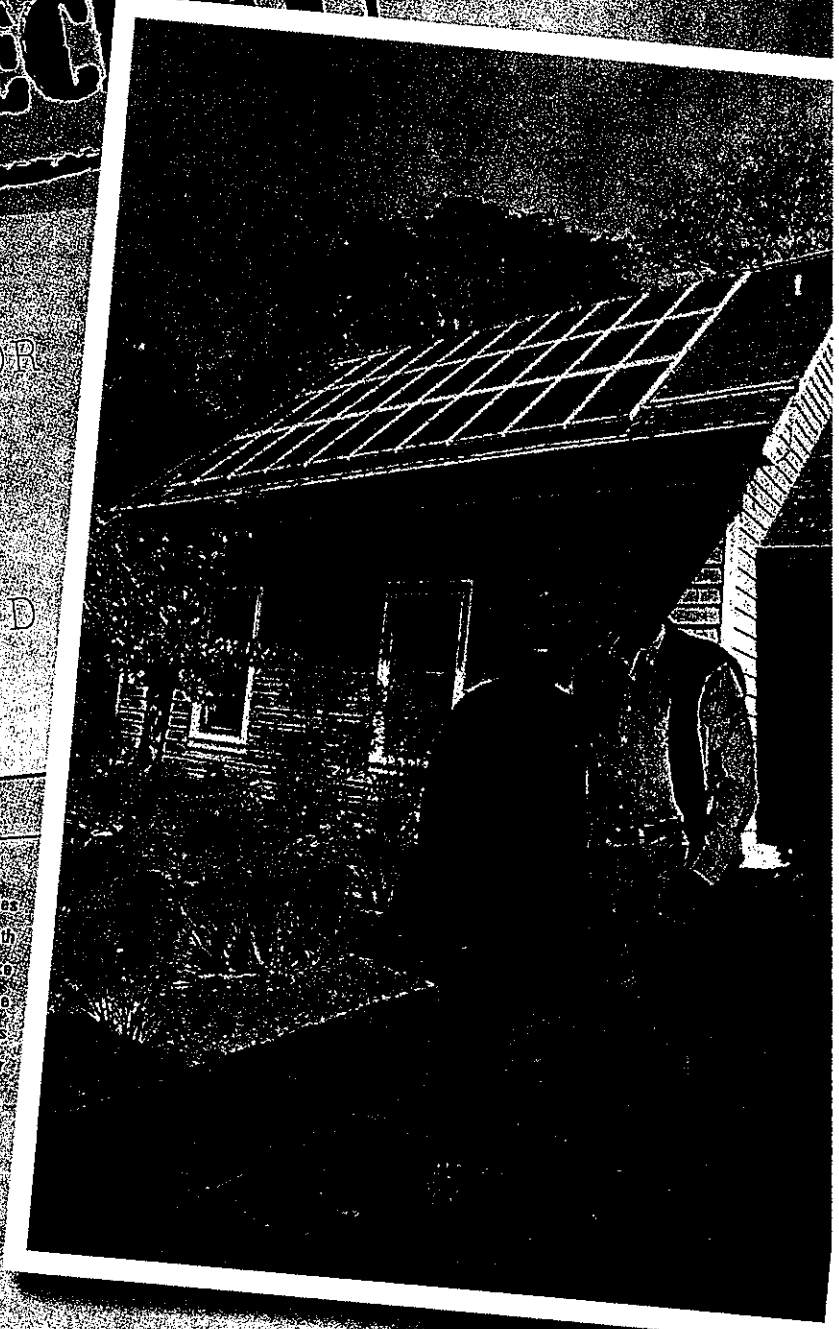
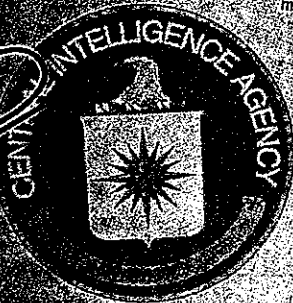


# SOLAR SECURITY

## TOP SECRET

FORMER CIA DIRECTOR  
JAMES WOOLSEY  
HAS A RECIPE FOR  
US SECURITY:  
FEED-IN TARIFFS AND  
LOTS MORE PV

Walking the talk: James Woolsey, shown here with wife Sue, doesn't just make pronouncements about the need for more solar. He has had a rooftop PV system for more than 5 years.



R. James Woolsey is impossible to stereotype. The nation's top spy during the first term of President Bill Clinton, a Democrat, Woolsey actively campaigned for Republican John McCain in 2008 and is backing Republican Mitt Romney for president this year. But the one-time CIA chief departs dramatically from most Republicans on energy and environmental issues, largely for national security reasons, Woolsey is a big supporter of renewable energy, especially small-scale solar financed through feed-in tariffs.

If one were to conjure up the image of an aging hippie manor, it might look startlingly like the home of R. James Woolsey and his wife, Sue. Located in Harwood, Maryland, just south of Annapolis, the Woolsey home – which is like some English estate in that it has a name, Waterfields – has an intimate connection with both history and nature. Located on 35 acres, the converted farmhouse turned upscale residence has sweeping views down to the West River, where during colonial times boats loaded with lumber used to pass en route to England. From the home's back porch, it's possible to see Tulip Hill, a brick plantation house

Tools of the trade: Former CIA chief James Woolsey received these Russian dolls while negotiating arms control agreements with the Soviets.

that is considered one of the nation's best examples of Georgian architecture and a place where George Washington spent a couple of nights.

It's not just the location and the legacy of Waterfields that would make it the dream retirement spot for, say, a Berkeley history professor. In the garage are a Chevy Volt and a Toyota Prius, the automobiles of choice for environmentalists, and the white pickup truck used around the farm runs exclusively on biodiesel. To make it even more enviable to the green-inclined, the roof of the garage is covered with 30 polycrystalline solar panels, which the Woolseys had installed 6 or 7 years ago (neither can remember exactly when or what kind of panels they own). Teamed with the lead acid batteries housed in the basement, the solar comes in handy keeping the lights on during power outages, a not rare occurrence in a spot so rural. His surroundings and his early embrace of photovoltaics (PV) notwithstanding, James Woolsey is by no means a stereotypical 1960s throwback.

Best known for his time as director of the Central Intelligence Agency (CIA) from 1993 to 1995, Woolsey doesn't fit neatly into any narrow political slot. Over the course of a high-level, multi-decade career in government, Woolsey

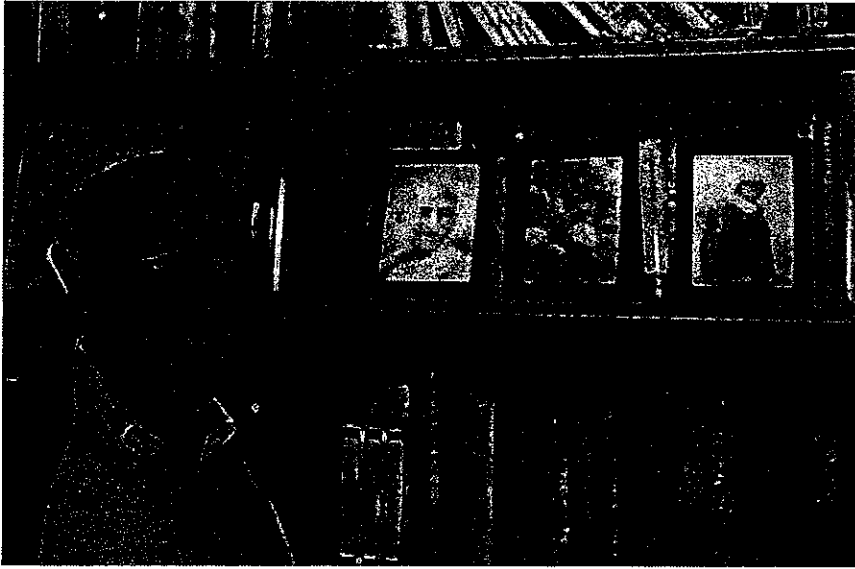
received presidential appointments from two Democrats and two Republicans, including a stint as Under Secretary of the Navy and as a negotiator in the US-Soviet Strategic Arms Reduction Talks. A self-described Scoop Jackson Democrat – a reference to Henry Jackson, the late, long-serving senator from Washington state – Woolsey calls himself a hawk on national security matters and a dove on domestic policy. Deemed a neo-conservative by some observers of foreign affairs, Woolsey advocated the overthrow of Iraqi dictator Saddam Hussein in the 1990s and, more recently, has been vocal in his warnings about the danger of Iran obtaining nuclear weapons.

#### Not green: red, white and blue

But it's in his attitudes towards energy and its impact on all manners of national security that Woolsey's hawkish and dovish philosophies seamlessly meld. Indeed, his environmentally friendly house is the embodiment of the direction Woolsey hopes to see the US move in order to become both safer at home and more respected throughout the world. While Woolsey believes in the importance of addressing global warming – he has testified to Congress urging action – it's largely as a way of enhancing US security that



Matthew Nightwelder / Photon Pictures.com (2)



A man and his muses: James Woolsey, shown here in his study, channels Gandhi, John Muir and George Patton when he thinks about energy issues.

he trumpets the idea of getting millions more Americans to follow his lead and install solar panels on their homes.

To get a full grasp of the former CIA chief's energy philosophy, all one has to do is step into his study. There, amongst crammed bookcases and memorabilia from his days as a top government official, are photos of the environmentalist John Muir, General George Patton and Gandhi. Think of the trio as his muses. Indeed, when he thinks and writes about energy issues, he tries to find solutions where Muir's environmental concerns could agree with Patton's obsession with security and Gandhi's push to improve the lives of the poor. »You end up heading towards distributed generation for each of those reasons,« he says. »For example, before Fukushima, Muir was getting more and more enthusiastic about nuclear because of the lack of carbon dioxide and the one who was really opposed to nuclear was Patton, because he was really worried about proliferation.«

For someone like Woolsey, inclined to favor Patton's emphasis on security, the reasons to emphasize small-scale solar are innumerable. For example, Woolsey sees plentiful distributed generation as the antidote to attacks on the electrical grid. »If anyone wished to launch a

national blackout, they could coordinate attacks in a few rural grassy fields, where major transformers are located. If enemies didn't want to bother with the travel, our grid is laughably open to cyber attack,« Woolsey wrote in an article for the journal *World Affairs*. This would be catastrophic, he noted, because it would mean basic economic functions would cease rapidly along with essentials such as water, sewage, communications and groceries. »The military won't bring it to you because they are on the grid, too.«

Along these lines, Woolsey has been adamant that not enough discussion of smart grids has considered national security. »As they redo the grid, they ought not to just add features that make it possible for you and me to turn down our air conditioning (AC) on hot summer days from our cell phones,« says Woolsey, who these days is a venture partner at Lux Capital Management and chair of the Foundation for the Defense of Democracies. »We could make it possible for a teenager in Shanghai to turn down our AC and more. People have to think about that.«

From his perspective, a poorly done smart grid will be vulnerable to attack from terrorists or anyone intent on creating mischief. In fact, he says that it would be simple for tech-savvy eighth graders to

take down the grid using nothing more sophisticated than off the shelf software.

How does PV help? What Woolsey would like to see is the establishment of so-called micro-grids that can operate autonomously in the event that the transmission grid is attacked. For that to work well, Woolsey believes there needs to be independently functioning portions of the distribution grid, or what he calls islands, that would continue to operate because they would be powered primarily by small-scale PV systems. But in both the development of the smart grid and in the evolution of the US solar market generally, Woolsey says this potential is being largely ignored. Channeling his three energy muses – Muir, Patton and Gandhi – Woolsey says the focus on large-scale solar is misguided, especially from the perspective of Patton, the tempestuous World War II general.

»We have gone pretty much solely for large utility-scale stuff. And that does not solve any of the Patton problems. It only makes them worse,« he says, noting the big solar parks still need to feed their energy through long transmission lines and are themselves vulnerable to attack. »It's a wash for Muir and Gandhi hates big stuff. It's not going to help the villages.«

### The one proven approach

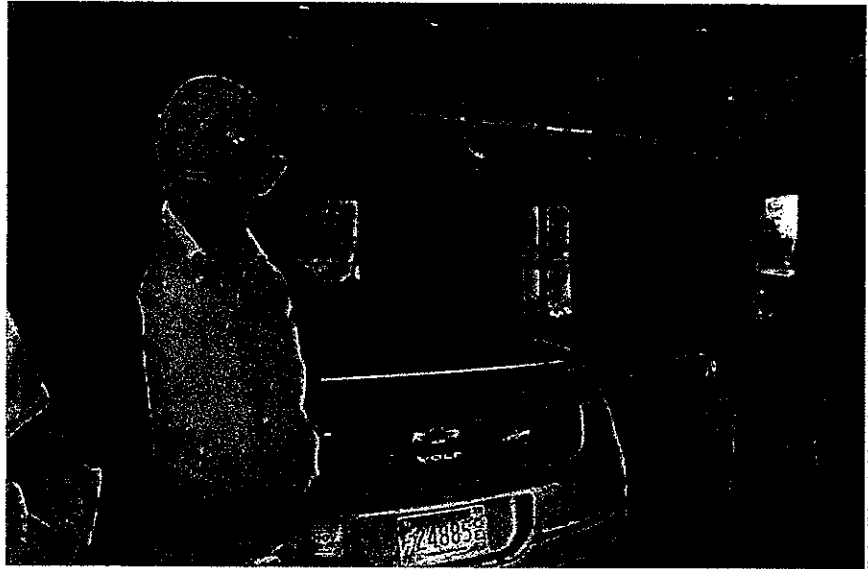
As a long time supporter of solar, Woolsey is accustomed to getting teased by colleagues and friends about it being an impractical source of affordable electricity. These days, though, he has a quick rejoinder, one that gets stronger and stronger as prices for PV continue to plummet. »What I tell people who come at me with solar is so expensive is you might not be as up to date as you think you are,« he says. »And tell me, were you one of the folks who in the beginning of the 1990s said you'd never be interested in cell phones because they're always going to weigh seven pounds and need their own separate suitcase?«

While the dropping price of solar energy is vital and has helped spur real growth in the US, Woolsey says his vision for improved security via small-scale solar

is missing one important ingredient: the availability of feed-in tariffs. »It's the only proven way to finance distributed generation,« he says. Woolsey is dismissive of the wide range of rebates and solar renewable energy credit (SREC) markets currently in place as being far too complicated and confusing. When he hears others joke about what many Americans consider to be overly burdensome bureaucracy in Germany, home to the world's most successful feed-in tariff, he tells them about a presentation Craig Lewis gives.

Lewis is executive director of the CLEAN Coalition, which promotes the implementation of feed-in tariffs in the US. He shows two slides: one pictures a sea of documents thumb tacked onto a wall, while the other has exactly two sheets of paper. The slide with all the paper represents the documentation required to install a photovoltaic system in the US; the image with just two pages shows what it takes to put up a PV system using the feed-in tariff in Germany. »We are the joke,« he says. »The Germans get to laugh about our bureaucracy and they are absolutely right.«

It's not just the simplicity of the feed-in tariff that appeals to Woolsey, who is a board member of the CLEAN Coalition. It's also about tapping into self-interest,



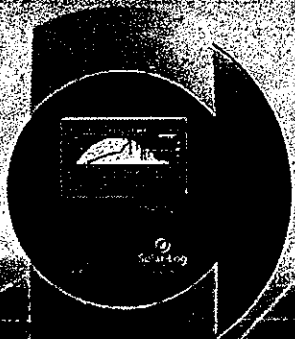
Electric cars are coming: Shown with his Chevy Volt and Toyota Prius, Woolsey believes natural gas needs to be used increasingly for transportation before electric cars are widely available.

because well-designed feed-in tariffs allow homeowners to make money by installing solar. »The feed-in tariff financially is the heart of the matter. What you want is people to take literal and figurative ownership,« he says. He also believes that having people regard solar as an investment along the lines of a certificate of deposit (CD) or money market account is much better for the long-term sustainability of the industry

than developing huge solar parks. »The trick here is for solar not to be, on the whole, some giant installation that cost hundreds of millions or billions of dollars and requires giant loans and loan guarantees,« he says. »But something that your neighbor says, »Hey, you're doing well with that thing and you had your lights on when the power went out last week. How much would it be to put up a couple of kW on the roof?«

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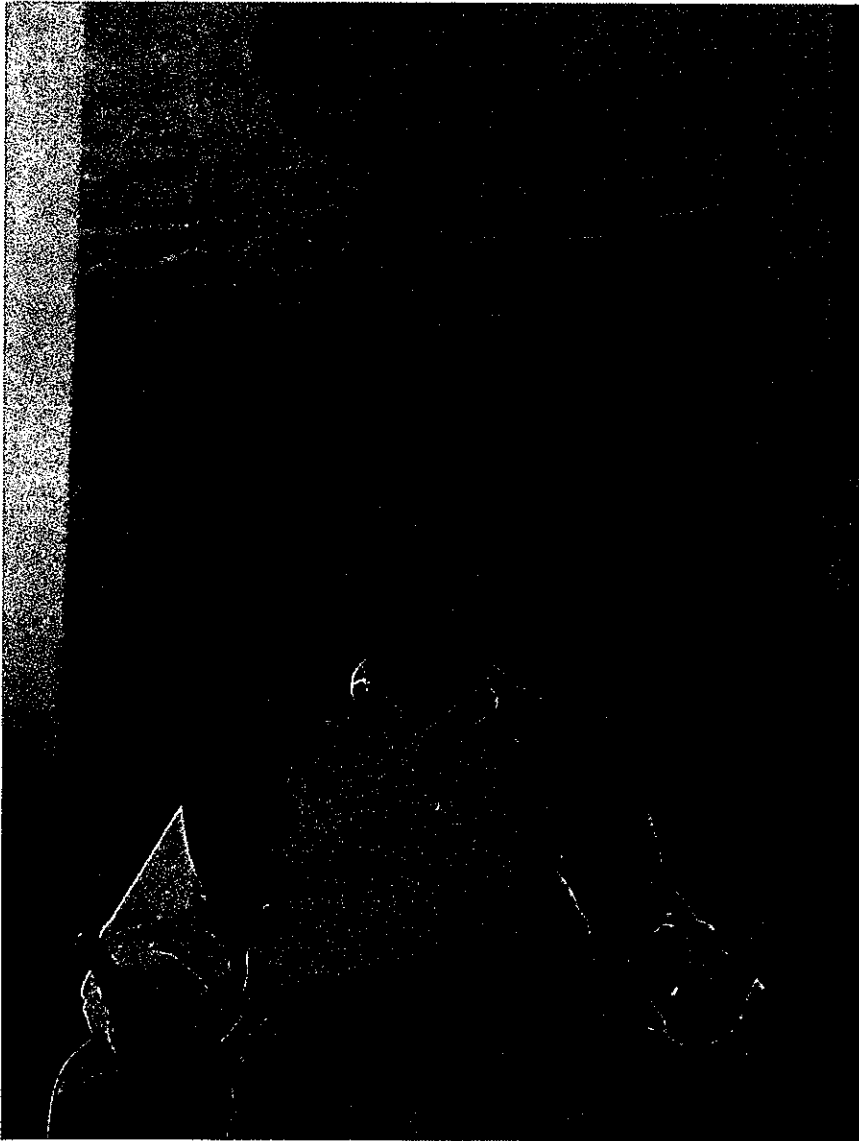
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Both sides are wrong: Woolsey faults both Democrats and Republicans for the simplistic public debate about energy.

As someone who has been in and around the political world most of his life, Woolsey understands the near impossibility of implementing a national feed-in tariff – the fact that we live in a federal republic means that states more or less control electricity markets. Woolsey says that just means feed-in tariffs need to be enacted state by state, with a large one taking the lead. »If we got on large state, Colorado or someplace, to implement a feed-in tariff then people could see what its effect was. What that does is make it plausible for the local banks to finance what's going up on your roof,«

he says. »And now with solar so cheap, it shouldn't cost very much.«

#### Part of a bigger picture

Obviously, solar and distributed generation is only part of any energy and national security equation. In fact, Woolsey's emphasis on solar is relatively new. For almost four decades he has been convinced that truly enhanced national security will only come as the result of moving away from imported oil – a position he still strongly holds. Woolsey remembers when he began to get passionate about the issue. Appropriately

enough, it was while waiting for hours in a line for gasoline, a delay that was making him late for a hearing he had organized as the general counsel of the Senate Armed Services Committee. »I realized the reason I was sitting there was because the Saudis had cut off our oil because we were shipping ammunition to Israel to keep it from being overrun by its neighbors, who had attacked it,« he recalls. »And the more I thought about it, the madder I got and I've basically stayed ticked off one way or another since October of 1973.«

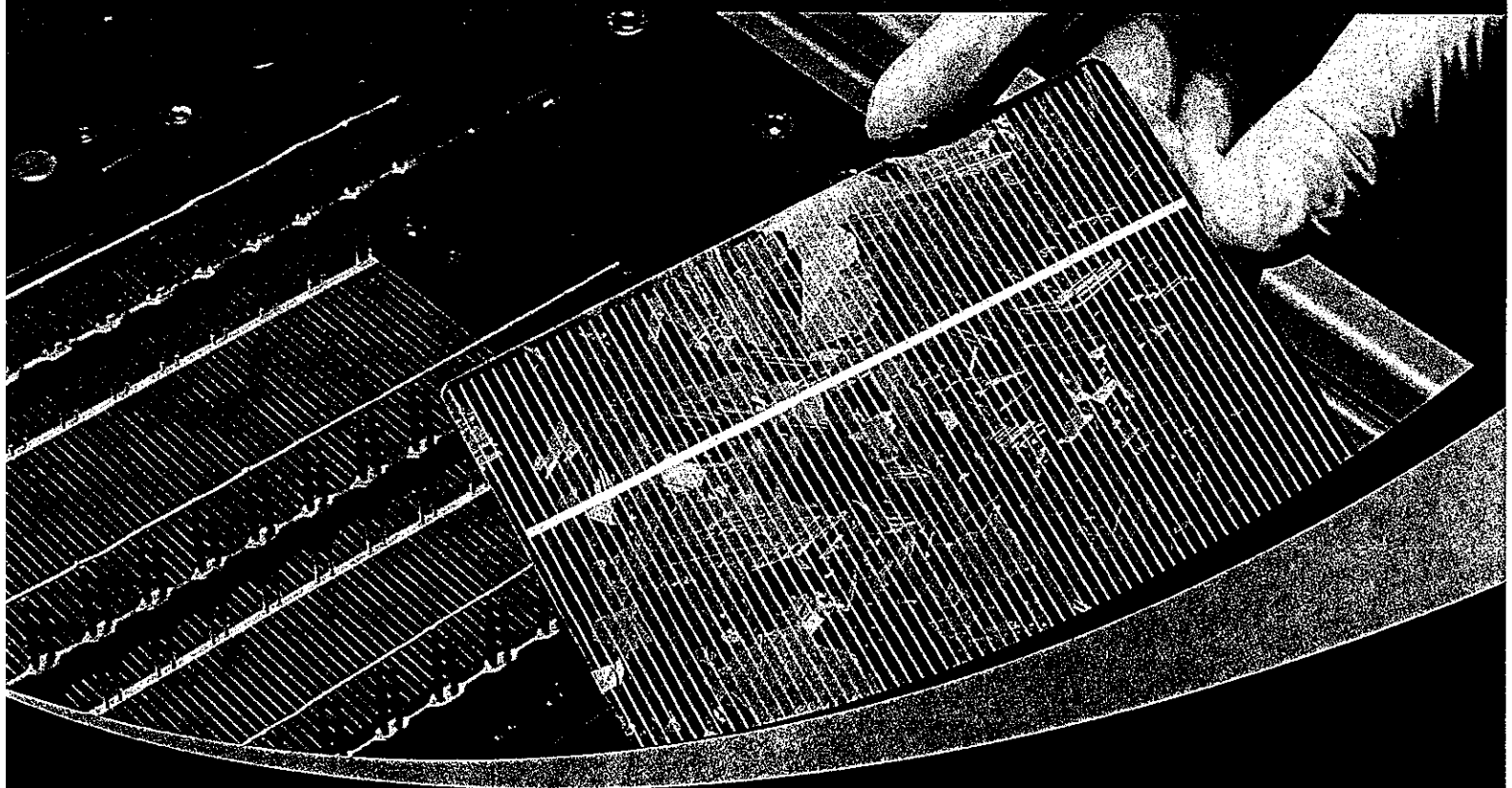
Clearly, the quest for energy independence – especially cutting the import of oil from nations that are not allies of the US, such as Venezuela and Iran – is nothing new. But Woolsey's approach for achieving energy autonomy is not one that would be familiar to those who only listen to the talking points trotted out by most Republicans and Democrats. He says the Republican »drill, baby, drill« mantra, at least when it refers to oil, represents a fundamental misunderstanding of how the global oil market functions. »There is no way with 2 percent of the world's oil that we can deal on an equal basis with OPEC (the Organization of Petroleum Exporting Countries), which controls 80 percent of the world's petroleum,« he says. Simply put, OPEC's control over supply in the global market means that the US can neither drill its way to energy freedom nor think that purchasing oil from friendly nations will be much help. »Even if we are not buying directly from the Iranians or the Venezuelans, we are adding to the demand of what is taken out of the worldwide oil pool,« he says of suggestions to drill for more oil within our borders or to get more from allies like Canada. »When you suggest that it would matter if it's American oil, you're not understanding the fundamental underlying situation.«

Add to that the ability of OPEC nations to extract their oil at much cheaper costs than domestic drillers and Woolsey believes there is no end to the stranglehold the Saudis and others will

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have on the oil market. »They lift oil for \$3, \$4, \$5 per barrel and we lift for tens of dollars per barrel,« he says. »They can raise and lower prices and do what John D. Rockefeller did with Standard Oil at the end of the 19<sup>th</sup> century and beginning of the 20<sup>th</sup>, which is drive competitors out of business.«

To illustrate the point that US oil independence is a naive fantasy, Woolsey points to the example of Great Britain in 2008. Thanks to its North Sea oil reserves, he says, the United Kingdom was technically oil independent – it could meet its domestic needs through its own production. So why was there a huge truckers' strike when the price of oil spiked to nearly \$150 per barrel? »They weren't exempt from the global oil market,« he says. »Being energy independent didn't do them a damn bit of good.«

### A future partnership

Nor is Woolsey impressed with President Obama's rhetoric on energy. »The president never gives a speech without talking about how solar and wind and geothermal are going to help with the oil problem. But we make less than 1 percent of our electricity out of oil.« As broken and »terrible« as he sees the current political dialogue on energy, Woolsey is pushing for an approach to electricity generation and transportation fuel that would fundamentally depart from today's paradigm.

For transportation, which is currently almost 100 percent reliant on petroleum-based products, Woolsey would like to see a long-term move towards electric vehicles. In the short-term, though, he believes it would be relatively easy to transition all buses and trucks to be powered by natural gas. The same basic recipe applies for the family car. For a small amount of money, he says automobile manufacturers can adapt their vehicles so they can run on a mixture of methanol from natural gas, biofuels and regular gasoline. To illustrate how quickly and dramatically this could reduce America's need for imported petroleum – a bill that costs the US \$1 billion daily, much of it borrowed

## A force for freedom

It's part of the job description when you're head of the Central Intelligence Agency (CIA) to think about nasty dictators. James Woolsey, who held that post for 2 years during President Bill Clinton's administration, has spent countless hours considering the geopolitical impacts of energy, especially oil. All this thought lead him to a few conclusions. Oil is anathema to democracy and contributes to much conflict and repression. »There are 22 countries in the world that earn 60 percent or more of their national income selling oil. All 22 of those are dictatorships or autocratic kingdoms,« he says.

The correlation is not a big surprise, he says, given that economies so reliant on a single huge source of revenue tend to enrich a tiny elite that runs society. Since history has shown that democracies don't fight one another, Woolsey says this so-called oil or resource abuse leads to repression and global instability. And sadly, US dependence on oil from so many dictators only worsens things. »We contribute to maintaining a number of countries that are not free and therefore much more of a threat to their own people and neighbors,« he says.

While Woolsey sees great promise for distributed photovoltaics (PV) in the US, its usefulness in developing nations with dictators could be even more transformative. That's because PV undercuts the ability of strongmen to buttress their power through the control of the electricity grid, which was the case with the late dictator



Power hungry: The late dictator of Zaire (now the Democratic Republic of Congo) Mobutu Sese Seko used control of the electricity grid to solidify his rule.

of Zaire, Mobutu Sese Seko. »Mobutu cut off villages, if they wouldn't back him,« he says. »The other great example is Lenin's line that the dictatorship of the proletariat is the rule of the Soviets plus electrification.«

Distributed solar electric generation and storage are obviously the opposite of centralized power. So besides being cheaper and cleaner than building or extending conventional electric systems in many countries, solar power can be a force for democracy and freedom, too.

from China – he points to the Chevy Volt, a plug-in electric and gasoline powered car, in his garage. »If I'm running on 85 percent methanol when I use liquid fuel in my Volt, then instead of the 90 miles per gallon I get now I'd be getting about 400 miles per gallon of gasoline because everything I'd be using would practically be electricity and methanol.«

For electricity generation, Woolsey envisions an increasing partnership between solar and natural gas, which he is convinced can be extracted in an environmentally sensitive way. What he'd like to see is solar handle an increasing proportion of America's daytime and peak-

ing electricity needs, while natural gas handles baseload power. The amount of solar that can be used for baseload power will increase, says Woolsey, with one important development. »The big kick for solar taking a very heavy role would come with affordable batteries,« he says. This partnership is one he thinks those in the solar industry should not fear, especially since he believes natural gas could get more expensive as it is increasingly used for transportation. »I think the growth stocks in electricity generation are solar and natural gas,« he says.

If only we could ask Patton, Muir and Gandhi.

Chris Warren