



## INSIGHTS HIGH-TECH SHAMPOO, VIA THE DEPARTMENT OF ENERGY

by Becky Quick

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HEN PROCTER & GAMBLE

wanted to refine the formula of its venerable Head & Shoulders antidandruff shampoo, it turned to an unlikely source. General Electric went to the same place when it needed to make its jet-engine turbines more fuel-efficient. And Ford knocked on the same door when it wanted to find a more effective way to cool a car engine using the air that naturally streams under the hood.

The solutions for the tricky problems facing these *Fortune* 500 companies all came from—believe it or not—the government. Each of the companies found answers at the Oak Ridge National Laboratory, one of a handful of labs funded by the Department of Energy. At a time when the country seems divided between those who believe Big Business is the answer to all our problems and those who see big government as the only solution, the public-private partnership serves as proof that sometimes the two sides work better when they team up.

The Oak Ridge lab, nestled in the foothills of the Appalachian Mountains in eastern Tennessee, has a prestigious pedigree. It started as a top-secret facility during World War II, playing a critical role in America's race to develop the nuclear bomb. Antidandruff remedies may seem a far cry from the invention of atomic energy. But it turns out that the business of building a better shampoo (or airplane or car) requires massive computing power, and today Oak Ridge is home to the fastest supercomputer in the world. Its Titan computer can store 40 petabytes of information (that's the equivalent of 227,000 miles of stacked books). Titan's servers occupy 200 cabinets sprawled out in the lab, and it can perform more than 27 quadrillion calculations a second.

Machines like that don't come cheap. In fact, Titan came with a price tag of almost \$100 million, too rich for most corporations' tastes. "The government can take the risk better than a company can," says Suzy Tichenor, director of the industrial partnerships program at Oak Ridge.

The government is investing in brainpower. Academics from across the globe get access to the supercomputer to advance pure science and help us learn more about the world around us. So why would Washington want to let corporations log time on Titan? The technology is already paid for, so it isn't a big burden for Oak Ridge to share. More important, the facility

hopes the private sector's research will spur innovation and drive economic development, helping to jump-start our sputtering economy.

For Procter & Gamble, access to Oak Ridge means it can do things it had never imagined before—like delve deeper into understanding how different compounds react with one another at a molecular level or how human hair and skin absorb those agents. "This is chemistry being done almost like astronomy—where when you get bigger telescopes you can see farther and know more about it," says Tom Lange, director of P&G's model and simulation research and development. "In this case it's too small to see with a microscope, but we know it's there." For Head & Shoulders shampoo, the computer simulations meant a better formula that didn't separate like oil and vinegar—meaning the last wash in the bottle is just as effective as the first.

The broader scientific community also gets something out of the deal. Companies don't pay to use Titan, but they have to agree to make public the results of their research at Oak Ridge. In the case of P&G, some of its research is studying how molecules self-organize—information that would be useful to any researcher trying to figure out, say, a better system for delivering drugs into the body at a molecular level.

And don't forget P&G's rivals. The science would also be available to them, sparking a healthier, more innovative, and more competitive marketplace—the very thing Washington set out to accomplish in sharing Titan and potential proof that we'd all be better off if companies and the government could find more ways to partner. And you don't need a supercomputer to calculate *that*. ■