OIL OUTLOOK

USGS Optimistic on World Oil Prospects

A new 5-year assessment of the global store of oil bodes well for the world as a whole, but ill for the United States

All the bellyaching lately about the price of gasoline in the United States might be taken as a sign that the world is feeling the first pangs of a global oil shortage. Pessimists, after all, have warned that world production could peak sometime in this decade (*Science*, 21 August 1998, p. 1128). The U.S. Geological Survey (USGS) would beg to differ.

By its recently released estimate,* the world has 20% more oil awaiting discovery in yet-to-be-found fields than the USGS estimated 6 years ago. And a newly analyzed category—oil lurking in and around known fields—offers almost as much additional oil as in those undiscovered reservoirs. Thomas Ahlbrandt, the Denver-based director of the USGS's 5-year assessment, shares the upbeat outlook of many analysts: "I don't see peaking in the next decade at all," he says, or for that matter in the 25-year projection of the study.

The prospect of billion-barrel gushers to come doesn't change the pessimists' view, however. Even if the additional oil is really there, they argue, it pushes back the global production peak—and the end of the era of cheap oil—by years, not decades. And the assessment itself holds grim prospects for the world's leading oil consumer. "We're not running short of oil in the world, but for the United States I have deep concerns," says Ahlbrandt. "The U.S. was richly endowed, but we've used a lot of it"—almost half by the latest count. Getting enough in the next decades will mean ever-greater dependence on other countries, especially those of the Persian Gulf.

The new USGS assessment is the fifth and most optimistic in a series dating back to 1981. The latest is the product of a larger effort using for the first time a closely documented, uniform approach to evaluating potential deposits, according to Ahlbrandt.

That new approach and the latest information from around the world led to an increase in estimates of so-called undiscovered oil, oil that lies in fields that have not been found. To estimate what hasn't yet been seen, geologists evaluate the chances that the starting material for oil—organic matter such as ocean plankton—was laid down in a given spot, that it was encased in porous rock, that it was heated to the proper point, and that the resulting oil could have seeped up to fill a self-sealed reservoir of permeable rock. Adding up those chances around the world (plus estimates made previously for the United States alone), the USGS study finds that a mean of 732 billion barrels of oil remains to be discovered in fields yet to be drilled. That's up 20% from the previous USGS estimate of undiscovered oil made in 1993.

In a first for world oil assessments, the USGS also estimated how much the apparent sizes of known fields are likely to grow as drilling hits previously unrecognized pockets of oil within and just beyond the edges of fields already producing oil. USGS analysts, believing that this "field growth" was not great, had not specifically assessed it. But by the mid-1990s, Ahlbrandt and his colleagues saw signs that field growth was substantial and unaccounted for. By looking at the history of field growth around the world, including intelligence information and proprietary data made available by oil companies, they projected that the apparent size of existing fields would grow from initial estimates by an average of about 25%. That makes for another 612 billion barrels of oil. "We see the phenomenon wherever we look," says Ahlbrandt. "It makes me less worried" about the world starting to run short of oil in the next few decades.

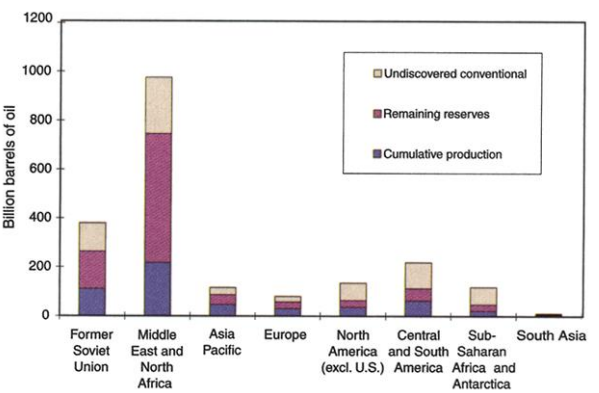
The new USGS figures bolster the contention by most industry experts and resource economists that ever-improving technology for finding and efficiently extracting oil will hold off the peak in world oil production and keep prices down, perhaps until midcentury.

The pessimists still see the glass half empty. "Finding a billion barrels here and a billion barrels there doesn't change the nature of the argument," says energy analyst James MacKenzie of the World Resources Institute in Washington, D.C. The important transition, explains economist Robert Kaufmann of Boston University, is not when the world runs out of oil, but "when we go from steadily growing production to when production stagnates or declines while demand continues to grow."

That happened in the U.S. lower 48 states in 1970, pessimists are fond of pointing out, and no amount of new technology has reversed the subsequent decline in production. Alaskan oil production has also peaked, and some analysts see the stagnation of North Sea production in the past several years as a peak as well. One of the world's hottest prospects, the Caspian Sea, has 42 billion barrels of undiscovered oil according to the assessment, but MacKenzie calculates that it takes 400 billion barrels of oil to move the world production peak back just 6 years. With global consumption running at 27 billion barrels a year and increasing 1.5% to 2% a year, even the USGS figures push the peak of world production back years, not decades, from the pessimists' consensus date of 2015, says MacKenzie.

The timing of the world oil peak may remain contentious, but optimists and pessimists alike agree that the United States will become increasingly dependent on foreign oil. U.S. production shows no signs of recovering, while the new assessment assigns even more resources to the Middle East and the Organization of the Petroleum Exporting Countries (OPEC) that it dominates. Mexico and China suffered sizable decreases in undiscovered oil, while the Middle East enjoyed an increase of 48%. And field growth is expected to be particularly large in the former Soviet Union and the Middle East, says Ahlbrandt. At the same time, non-OPEC production has stagnated over the past 3 years, which could be the production peak predicted for 1999 by the Paris-based International Energy Agency of the Organization for Economic Cooperation and Development. The second coming of OPEC, which analysts expected in the next decade or so, could be sooner rather than later.

–RICHARD A. KERR



Uneven allotments. The amounts of oil already produced, known to be in the ground, and yet to be discovered vary by region.

CREDIT: USGS

*greenwood.cr.usgs.gov/energy/WorldEnergy/DDS-60