Letters

U.S. Oil and Gas Consumption: Is Another Crisis Ahead?

Richard A. Kerr, in his Research News article "Oil and gas estimates plummet" (22 Sept., p. 1330), states that 86 billion barrels of oil (an estimated 35 billion barrels remaining plus 51 billion barrels recoverable in known U.S. fields) consumed at the recent rate of 5.4 billion barrels per year represents a 16-year supply. He states further that if imports provide 50% of U.S. needs, our domestic oil supply will last 32 years.

As M. King Hubbert has shown (*1*), however, the U.S. consumption of petroleum historically has increased exponentially at a rate of about 7% per year. If we calculate the lifetime of our domestic petroleum resources with an estimated consumption growth rate of 7%, we find that they will last about 11 years. If we assume reliance on foreign sources to meet half our demand, our own estimated 86 billion barrels plus imports of an equivalent quantity will have been exhausted in 16 years, not 32 years.

Until we recognize that our energy consumption grows exponentially, we will be continually surprised by petroleum shortfalls, budget deficits, and imbalance of trade and, as Kerr states, we "risk once again becoming hostage to the cartel."

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1. M. K. Hubbert, in National Academy of Sciences–National Research Council Committee on Resources and Man, *Resources and Man* (Freeman, San Francisco, CA, 1969), p. 163.

In my 20 March 1987 (p. 1467) *Science* article "Impending U.S. energy crisis," I argued that the United States was headed for a new energy crisis on the basis of an extrapolation of the early impacts of the 1986 world oil price collapse. The nature of the crisis was undefined because a number of possible scenarios were conceivable.

One problem was related to the certain growth of U.S. dependence on foreign oil, which I speculated would reach 50% within a few years. It is interesting and alarming to note that the American Petroleum Institute's (API's) final figures on U.S. oil production and consumption for 1989 (*1*) show that imports reached a 10-year high at 46% of demand. Behind the figures was the sharpest decline in U.S. domestic oil production in history. Not indicated in the API's report was a significant decrease in U.S. natural gas reserves and an unquantified drop in U.S. natural gas deliverability, which is the peak production capability of U.S. gas fields.

This information suggests three possible U.S. energy crisis scenarios. The first two relate to oil. While last year's roughly 7% decline in U.S. oil production may not be matched exactly in 1990 and beyond, further decreases are probable for the foreseeable future if recent conditions and trends continue. This further supports the possibility of a 60 to 70% dependence on foreign oil by the year 2000. At existing and projected levels of imports, there will be a growing vulnerability to supply disruption by natural disaster, manmade disaster (for example, another Exxon Valdez spill), or political action.

At the current price of roughly $22 per barrel, last year's import level would represent roughly a $64-billion drain on the U.S. economy. In light of the indicated trends, the nation appears headed for an imported oil bill that will grow to the $100-billion-per-year level around the year 2000. I see no U.S. goods or services available for export to balance such a loss. Therefore, another likely U.S. energy crisis probably will take the form of a gargantuan drain on the U.S. economy for oil imports.

A more immediate threat is a natural gas deliverability crisis. During the relatively mild winter of 1988–1989, there were a small number of gas curtailments to schools and factories around the United States. The recent unseasonable "cold snap" was very close to causing similar curtailments early in the 1989–1990 heating season. The subsequent swing to unusually warm weather averted a gas delivery crisis for the time being. However, there is a growing probability that widespread gas curtailments will occur as natural gas reserves continue to dwindle, which is likely because of reduced U.S. exploration and production.

The probability of at least one of these U.S. energy crisis scenarios occurring is substantial, if not certain. It is sad that we as a nation do not seem to have the will to avert such problems.

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1. *Oilgram News*, 18 January 1990, p. 5.

Punitive Damages and Innovation

In the article "Innovation on trial: Punitive damages versus new products" (15 Dec., p. 1395), Richard J. Mahoney and Stephen E. Littlejohn urge various reforms of rules governing punitive damages. Unfortunately, the article is not an objective or penetrating analysis of the relationship between punitive damages and innovation, and a few points may serve to illustrate its tendentious quality.

1) Mahoney and Littlejohn shrug off the fact that punitive damage awards often are reduced on appeal, asserting that, "on the contrary," the reduction in these awards is less (by an unspecified amount) for business defendants than for individuals.

2) They note that mean settlements tend to be 60 to 150% higher in cases alleging punitive damages than in other cases, and they treat this statistic as proof that punitive damages are extortionate. Yet, they do not mention the obvious hypothesis that plaintiffs are more likely to allege punitive damages in those cases in which liability is clearest. Such cases should generate higher settlements even if punitive damages were eliminated.

3) They assert, without explanation, that "[t]he law already ensures adequate compensation for nearly all conceivable harm." Evidently, their criterion for adequacy is not the economist's conception of making a wrongdoer bear the full social cost of its conduct, for existing damage rules do not compensate plaintiffs for all costs to themselves and to others and Mahoney and Littlejohn imply that insurance or other payments from collateral sources should reduce damage awards.

Manufacturers *have* suffered some egregiously erroneous awards in product liability cases. Compensatory as well as punitive damages for injurious, defective products are imposed wrongly on some occasions, and civil damages surely discourage some innovation; but these outcomes will persist whether the cause of action is negligence or strict liability. An intelligent prescription for reform must address the magnitude of these (and other) effects under alternative legal regimes. Mahoney and Littlejohn summarize some aspects of the limited information available on punitive damages, but their analysis of these data and their conclusions would more appropriately have been placed on the pages reserved for editorial opinions or News & Comment.

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