

Energy Policy and Energy Analysis: Flawed Analysis Means Flawed Policy

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The Bush Administration may well be moving towards a deeply flawed approach to energy policy. This is partly due to an unrealistic emphasis on trying to solve our problems by developing US oil and gas reserves. And, it is partly, the result of the antiquated and deeply flawed models the US uses to understand energy trends. Somewhat ironically, the EIA, IEA, and OPEC all make roughly the same badly outdated mistakes in their energy modeling, as do most independent planners and consultants.

US Estimates Make it Clear that the Key Energy Resources are Outside the US

Even if the US could exploit all of its oil reserves, it still has only 2.6% of the world's proven oil reserves. In contrast, it consumed nearly 26% of all the world's oil last year. The Department of Energy projects that US oil consumption will rise from a daily average of around 19 million barrels a day (MMBD) in recent years to over 25 MMBD by 2020. Even with aggressive efforts to exploit new reserves and use enhanced oil recovery technology, US production capacity is projected to remain at a little over 9 MMBD by 2020. This is a shortfall of some 16 MMBD. The most aggressive possible development of sources of oil production in the US might just add 2 MMBD to US production by 2020. This would still leave a shortfall of 14 MMBD that would have to come from imports.

The situation is only marginally better for gas. The US has 3.2% of the world's proven reserves, but produces and consumes 23.2% of the world's total consumption. Furthermore, the Department of Energy projects that demand will increase from around 22 trillion cubic feet in recent years to 31.5 trillion cubic feet in 2020. If we cannot make this increase in domestic gas production, our oil imports will go up.

The same is true if we cannot increase coal use from around 1,000 million short tons to nearly 1,300, and if we cannot limit nuclear power consumption from dropping from around 630 billion kilowatt hours to a projected 427 billion. As for hydroelectricity and renewables, we already project a major growth from the use of around 11 quadrillion British thermal units to 14.4 in 2020. In practice, environmental efforts to cut hydroelectric power use could offset the increase in energy use of renewables. In any case, we will be lucky to get 10% of our total energy consumption from hydroelectricity and renewables, while we are projected to get over 40% of our energy from oil. Even a 50% increase in the projected total US use of hydroelectricity and renewables in 2020 would only make a limited dent in our future dependence on oil imports.

US Government Calculations of US Energy Dependence on Imports are Little More than Sophisticated Analytic Rubbish

A new "Project Independence" makes no more sense today than it did during the Ford Administration, but the Bush Administration faces additional problems. Any emphasis on trying to increase US domestic energy production to reduce US dependence on oil imports is dependent on how realistic our measures are of what that dependence is. Unfortunately, our present methods of estimation are so out of date that they are little more than sophisticated analytic rubbish.

This may seem like a strong statement, but consider the following realities:

- Our present estimates only address direct imports of crude oil and product. They show that net imports have risen from a modern low of 4.3 million barrels a day (MMBD) in 1982, to 6.6 MMBD in 1990, and an average of 10.1 MMBD in 2000. According to the Energy Information Agency of the Department of Energy, they will rise by about 53% between now and 2020.
- The problem is that these estimates ignore all of our indirect imports of oil in the form of goods and services from other nations that can only provide us with such exports if they get large amounts of oil.
- The US is steadily globalizing its economy. In the process, it is systematically moving manufactures offshore, while it is expanding services and high technology/low heavy manufacturing content activities.

- We have no idea of our true current dependence on energy imports – which must include the energy used to make what we import.
- We have no idea of where we are going or how to address the scale of our future import dependence. Virtually all forecasts call for a major increase in manufactured imports from East and South Asia, almost all of which depend on the increased export of oil and gas from the Gulf.

US Government Calculations of US Energy Risks are Parochial to the Point of Being Xenophobic

The US has no clear methodology for assessing the interaction between its growing dependence on global trade and the energy risks affecting supply to the manufacturing nations it depends upon. We still analyze energy interruption risks almost solely in terms of the impact on the US domestic economy and on our GDP – not our GNP.

US energy forecasts have no way to tell policymakers how important it is to the use to ensure a secure and steadily expanding flow of energy to our trading partners in Europe and Asia. The Energy Information Agency does estimate, however, that our key trading partners in Asia now import some 15.9 MMBD and that their imports will increase to 30.7 MMBD by 2020 – an increase of well over 90%. Our European trading partners import 16.6 MMBD of oil today and will import 191. MMBD in 2020 – an increase of 15%.

Acting as if the US could significantly reduce its energy dependence on oil imports simply by reducing direct import, when our major trading partners already need 32.5 MMBD a day to support their economies makes no sense at all. It defies the realities of globalism.

We Have no Meaningful Forecasts of Long-term Oil and Gas Supply

Our forecasting models are equally deficient. EIA, IEA, and OPEC models of global energy balances model future energy supply in terms of projected energy demand, with only minor efforts to model actual trends supply. It is tacitly assumed that supply will rise to equal demand over time, and there is little effort to model actual plans to increase oil production capacity, etc. This leads to a cyclical tendency to reduce near term supply estimates to match reality that has now been going on for nearly three decades.

At the same time, our Middle East policy largely ignores the fact that the Department of Energy projects a major mid and long-term global increase in dependence on the Gulf, and on nations like Iran, Iraq, and Libya in our models. US sanctions planning has no energy component. At the same time, the EIA estimates that Gulf exports will increase from 15.3 MMBD to 36.4 MMBD by 2020. This is an increase of 21.1 MMBD. It is also an increase of nearly 140%, and accounts for 86% of the total global increase in exports the EIA projects over the next twenty years.

We Have no Real Models of the Required Global Energy Infrastructure

The EIA projects that oil exports alone must rise from 53.2 MMBD in 1997 to 77.6 MMBD by 2020. This is a rise of nearly 70%. Only 9.0 MMBD of this 24.4 MMBD will go to the industrialized world. A total of 10.9 MMBD will go to the Pacific Rim and China – and must move almost entirely by sea. Another 8.9 MMBD will go to the rest of the developing world.

The economics of energy call for maximum economies of scale in all equipment and facilities, and minimum inventory achieved through maximum reliance on on-time delivery. This is an inherently fragile structure requiring massive changes in energy infrastructure. The market may well be able to accomplish the changes but market forces do no insure against vulnerability.

We have no models or forecasts of how this will occur. We have no policy regarding global energy infrastructure.

Energy Substitution Modeling, and Calls for Increase Reliance on Alternative Energy, are Parochial and Uncertain

We have been sloganizing about finding substitutes for fossil fuels, and US dependence on imports for nearly 30 years. In the processing, our solutions have gone from one new source of energy to another: Nuclear power, fusion, synfuels, conservation, solar, fuel cells, etc. The historical accuracy of our models is terrible, except for hydroelectric energy.

It seems fair to say that we really cannot model penetration into the US market with the accuracy necessary to support choosing between options. In the real world, this may never matter. The EIA reference case projects only a 3.2 Quad increase in all forms of alternative energy (Non-oil, gas, coal, and nuclear) for all of North America between 1997 and 2020. This compares with 17.6 Quads for oil, 12.1 Quads for gas, 5.4 Quads for coal, and 3.2 Quads for nuclear. Yet, North America is continent with the highest projected absorption rate for advanced new energy technology.

It is politically incorrect to say this, but our own projections indicate that even if the US government could somehow double or triple the currently projected use of alternative energy supplies for the entire North American continent by 2020, the impact on energy import dependence and US use of fossil fuels would be almost negligible – even if one ignores our growing global economic dependence on the energy supplies to other countries.

If one looks at the issue globally – and remember that virtually all increases in “other” energy supply come from hydro and no new energy technology – the EIA projects a global increase of 16.1 Quads between 1997 and 2000. This is all of 7% of the total 227.8 Quad increase in global energy consumption projected between 1997-2020, and new alternative energy supplies are probably less than 3% of the global total. Put differently, if we doubled projected worldwide use of alternative energy supplies by 2020; it really would not change the situation. In fact, the probable noise level in our models assumptions about future price – and unstated assumptions about improvements in conservation – would have far more statistical importance.

Either our models are totally wrong, or our politically correct approach to alternative energy will pay off only after most of the readers of this memo are long dead.

Thinking Forward

The Bush Administration seems to be reverting to the policies of the Ford Administration by trying to reduce US dependence on energy imports by increasing domestic production of fossil fuels. There is a good potential case for policies to ease constraints on environmentally safe drilling and energy production, create new generating plants, and improve our energy infrastructure. The fact is, however, that any new attempt to actually reduce US dependence on imports will have to build on analytic quicksand. There are times when policy really does require improvements in the way the government models and analyzes the situation and we have a real energy crisis in the way we now approach these tasks.