

The North American Energy Scene

By John H. Lichtblau*

The North American energy market (United States and Canada) contains 5 percent of the world's population and consumes 27 percent of the world's energy. It is the world's largest regional energy market, i.e., larger than Western Europe or South and South East Asia (including China). It is self-sufficient in all fuels except oil in which it has a 65 percent self-sufficiency. This makes it the world's largest oil importing region. Its energy consumption has grown at an annual rate of about 1.7 percent in the last ten years (1985-95), or about two-thirds its economic growth rate. This was similar to the European energy/GNP ratio for the same period.

United States-Canadian Energy Relations

Numerically, the two-country region is, of course, totally dominated by the United States, which has nearly ten times the population of Canada and eleven times as many motor vehicles. But in the energy sector there is a real symbiosis between the two countries which I would like to discuss briefly before looking at the region's future developments. In the oil sector the United States has the world's largest net import requirements (7.9 mmb/d in 1995) while Canada is both an exporter and importer of oil. Last year it exported just over 1 million b/d of crude, all of it by pipeline to U.S. refineries, while importing nearly 600 mb/d of crude from overseas sources to supply the refineries in its eastern maritime provinces.

The United States is also the only export outlet for Canadian natural gas, absorbing about 52 percent of total Canadian production, and virtually the only import source of U.S. natural gas, supplying about 12.5 percent of total U.S. requirements. However, there is an essential difference between Canadian oil exports and Canadian gas exports to the United States: the oil exports displace U.S. imports from overseas sources while the gas exports displace U.S. domestic gas production which has substantial spare capacity and deliverability.

Canada also exports 6-8 percent of its electric power production to the United States. These imports have an environmental benefit for North America since they are generated primarily with hydropower, Canada's principal electric generating source (62 percent of total generation last year).

The Outlook to 2005

Now let us look at the ten-year period to 2005.¹ As I mentioned before, the United States will, of course, continue to dominate North America's economic and energy developments. We expect U.S. economic growth to continue at approximately the same 2.5 percent annual rate of the past ten years.

The trend of progressively slower growth in energy demand than in GDP should continue throughout the period, reflecting further government and private conservation ef-

*John H. Lichtblau is Chairman of the Petroleum Industry Research Foundation, Inc., New York City. This is an edited version of his remarks at the 19th IAEE International Conference, May 27-30, 1996 in Budapest, Hungary.

¹ See footnotes at end of text.

forts and improved technology in energy utilization, and assuming flat prices in real terms. From 1995 to 2005, the U.S. GDP can be expected to rise by 25-30 percent but total energy demand by only 10-12 percent.

Even at this slower growth rate in energy consumption, the United States will fall short of its committed target to reduce its greenhouse gas emissions to the 1990 level by the year 2000. Nor are we likely to achieve it by 2005. Of course, the impact of global warming on the earth is still debated within the scientific community. However, the States' steady improvement in energy efficiency, which can be expected to continue, should contribute to reducing its share in greenhouse gas emissions.

Oil

Oil will continue to be the dominant fuel in the U.S. energy sector, accounting for only slightly less than its current share of 40 percent of total energy demand by 2005. Thus, oil demand will grow throughout the 10-year period. By 2005, it should be more than one million b/d higher than its 17.9 million b/d level of 1995.

Oil Demand: Transportation is Still the Key

Gasoline will continue to be the prime oil product and will grow annually to at least 2000 after which it may level off at around 8 million b/d. But a slight further growth to 2005 is also quite possible. The U.S. Energy Information Administration, for instance, projects in its latest long-term forecast a U.S. gasoline demand increase from 8.2 million b/d in 2000 to 8.5 million b/d in 2005.

It may be difficult to comprehend why total miles driven and gasoline consumption keep rising in a country where everyone who wants a car has one. One major reason is the recent widespread, partly image-driven, shift from passenger cars to sports utility vehicles and other non-traditional passenger cars whose gasoline efficiency is substantially lower than that of regular cars. About 40 percent of all new vehicle sales are in this category.

Regarding alternative fuel vehicles (natural gas and electric) we foresee a growth from the current very low level to about 5 million units by 2005. However, during the same period the total U.S. vehicle fleet is likely to grow by about 25 million units. Only government mandates - for which there is little public or political support - could bring about a significant growth in electric vehicle sales. So far, these mandates are quite limited and contain many exemptions.

Demand for other transportation fuels, diesel and jet fuel, will rise faster than for gasoline, so that the transportation sector will maintain its two-thirds share of total U.S. oil consumption.

Oil Supplies: Gulf of Mexico Will Be the Star

U.S. crude oil production, which has been declining steadily from nearly 9 million b/d in 1985 to about 6.5 million b/d in 1995, will continue to decline in the next 10 years but at a much slower rate. The slow-down and even temporary reversal of the decline in the late '90s will be due primarily to sharp production increases in the Outer Continental Shelf (OCS) area of the Gulf of Mexico. New technology and reduced operating costs have recently opened up this area to large actual and planned production increases. Last year's production of nearly 1 million b/d may double by 2000 and then stay there until 2005 and beyond. This would briefly

offset declining production in the rest of the country.

Some of the new technologies and techniques may be applied in onshore production and over time could possibly change the long-held standard image of inevitably declining U.S. production and, hence, ever growing reliance on crude imports. However, for now, we still see total U.S. production rising only slightly to about 2000 and then declining again to 2005. (By contrast, the EIA in its latest long-term reference case sees an unabated decline in U.S. production to 2005 but an increase thereafter). On the basis of the above supply/demand projections, net U.S. oil import requirements should rise from 7.9 million b/d last year to about 9.5 million b/d by 2005, an increase in U.S. net import dependency from 46 percent to 50 percent.

However, the North American *regional* import dependency will remain lower because of the substantial volume of U.S. imports from Canada. In 1995 North America's net import dependence was only 38 percent (excluding intra-regional trade of crude and products). Whether the substantially lower regional import dependency is meaningful for the United States is a function of the reliability of imports from Canada. Given the physically integrated nature of Canadian crude oil imports and the NAFTA treaty, the availability of Canadian crude to U.S. refiners can be rated very highly. Furthermore, Canadian exports to the States can be expected to rise over the next 10 years since production is likely to grow faster than consumption. This will be due in part to the coming on stream of offshore production in eastern Canada. Total Canadian production by 2005 could be 400-500 thousand b/d higher than last year's 2.4 million b/d.

The growth in imports from Canada will be part of the ongoing shift of U.S. oil imports from the eastern to the western hemisphere. Other reasons are the growing export capacity in Latin America, including such newcomers as Colombia, all of which are located closer to U.S. markets than Middle East and African supply sources. Meanwhile, Middle East suppliers are redirecting their exports to the rapidly growing Asian markets.

From a security point of view the shift to Latin American supply sources may not be significant since there is only one world oil market and a disruption anywhere affects prices everywhere. However, the closer supply sources are preferable logistically to U.S. importers and may reduce their inventory requirements.

One more point on U.S. oil imports. We can expect to see a moderate but noticeable shift in the composition of imports from crude to products during the next 10 years. This will reflect the fact that no new refineries have been built in the United States for many years, while a number of existing ones have been shut down and that operating plants whose capacity has been raised, operate at an annual average of 90 percent of capacity.

Natural Gas

The North American natural gas market is strictly regional, i.e., almost no trade with other regions, and will remain that way for the next ten years and probably longer. Currently, its annual consumption of 25 tcf is split 88/12 between the United States and Canada. The production split is directionally the same - 78/22 - while the proven reserves split is about 70/30. Over the next 10 years, we expect U.S. gas demand to grow at an annual rate of about 1.5 percent and Canadian demand at twice that rate. But by 2005, U.S. gas

demand will still be six times as high as Canadian demand.

Gas Demand: The Story is Electricity

In both countries gas demand growth will be largest, and fastest in the electric power sector, both in the utilities and the nonutility generators in industry and commerce. The underlying reason is the growth in electric power demand, reflecting the growing intensity of electric utilization of new equipment in home and business in North America. However, there are some uncertainties. The electric power industry in both the United States and Canada is undergoing basic restructuring from regulated utility status to competitive enterprise. This is likely to make electric power more competitive with other fuels, primarily gas, in certain end-use markets. However, if electric power demand rises more rapidly as a result of greater competitiveness and lower rates, more fuel will be needed to generate power. Gas is the preferred growth fuel for this purpose. As of now, we see combined gas demand for electric utility and nonutility power generation rising 50-60 percent over the next 10 years. By 2005 electric power generation may account for one-third of total U.S. gas demand compared to 24 percent in 1995. In Canada too, electric power generation is the fastest growth market for natural gas.

The growing use of gas as a generating fuel is, of course, an environmentally positive development since it curbs the growth in coal, still the principal power generating fuel in the United States. However, gas, together with oil, must also make up for the leveling off and decline in nuclear power which is about to stop growing and will start to decline after the year 2000. Whatever the problems with nuclear power, it does not contribute to global warming or air pollution. It currently accounts for 20 percent of U.S. electric utility power generation, slightly more than gas's share. Thus U.S. coal demand for power generation (coal's only major market) will continue to grow at nearly the same rate as in the last ten years. But its sulfur emissions will be much reduced, both by additional desulfurization facilities at power plants and the shift from high-sulfur eastern to low-sulfur western coal in the United States.

Gas Supplies: Alberta and the Gulf Coast Will Compete

On the supply side the aggressive competition in the U.S. market between domestic and Canadian gas will continue in the long-term but may be curtailed in the short-term because of pipeline constraints in Canada. Canadian exports are currently close to their pipeline capacity so that for the next few years there will be very little room for incremental exports. After 2000, enough new pipelines will have been constructed to permit once again substantial growth in Canadian gas exports.

Meanwhile, the U.S. competitive position has improved substantially by a recent "sea change" in U.S. gas finding and production costs. The Gulf of Mexico OCS, the only growth area in U.S. oil production, will also be the major, but not the only, source of growth in domestic gas production. OCS Gulf production and Canadian imports will provide 75 percent of the approximately 3.5 tcf increase in U.S. gas demand over the next 10 years. After a 2-3 year hiatus due to the Canadian pipeline constraint, there will again be fierce competition between these two major supply sources.

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⁵ Paul Tempest, "The Changing Structure of The Global Oil & Gas Industries" (A Paper presented to the 20th ICEED Conference, Boulder, Colorado, April 1993), p-4.

⁶ *Energy World Journal*, London, Dec. 1995, p.3.

⁷ Herman Mulder, "Energy: The Risk of Underinvestment," *Petroleum Review*, London, Dec. 1993, pp. 569-570.

⁸ Khalidzad, *The United States & The Persian Gulf*, p. 96.

⁹ *Ibid.*, pp. 99-106, also the *Sunday Times*, London, 21, July 1996, p.p. 14-15.

¹⁰ *The Japanese Times*, Sunday, 30 June 1996, p.21.

¹¹ Rosemary Hollis, "Stability in The Middle East: Three Scenarios," *Petroleum Review*, London, May 1996, pp. 205-207.

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Perspective on the Future

I would like to close with a brief summary of the dynamics of the North American energy market as we enter the 21st century. The most visible long-term change is the sweeping deregulation of gas and electric utility markets and the transportation of their fuels. This is part of an ongoing process, not limited to North America. It reflects the current philosophy that the market is a better allocator of these fuels than the government.

Another changing attitude in the United States is the tacit acceptance of growing dependence on imported oil. Until recently there was a highly politicized fear in the States of ever becoming more than 50 percent dependent on imported oil, even including Canadian imports. There is still talk from various special interest groups that our growing import dependency threatens our national security. But the official

position – while this might be true, the economic benefits of low cost foreign oil supplies outweigh the security risks and, therefore, nothing needs to be done to arrest this trend – is likely to remain the basis of our oil import policy. The government's misguided sale of a small share of our Strategic Petroleum Reserve for budgetary reasons is an indication of the downgrading of our national security concern.

Gas will clearly be the "fuel of the future" in stationary energy uses in both countries. It will also have a small but growing role in automotive fuels. The known North American resource bases can support the expected growth in gas demand well into the next century.

Coal was the principal source of electric power generation at the beginning of the 20th century and will have the same position at the beginning of the 21st century and probably several decades into it. It will also continue to be North America's only fuel with a net export balance.

Nuclear power was invented in the United States 51 years ago and is now being gradually phased out. There have been no new plants built for over 20 years and existing ones are gradually reaching the limit of their operable life span. The reason for the phasing out of this most advanced form of power production is largely public fear of accidents and the nuclear waste disposal problems. Had nuclear power maintained its projected growth of the 1960s, American coal production would by now be in a decline phase. But as we all have learned, projections and reality often have quite separate lives.

Footnotes

¹ Most energy forecasts in this article are based on projections by the Petroleum Industry Research Foundation, Inc.

OIL MARKET CONSULTANCY SERVICE

Dr. Mamdouh G. Salameh
Director & Chief Economist
World Bank Consultant
UNIDO Technical Expert

Spring Croft, Sturt Avenue
Haslemere
Surrey GU27 3SJ
England

Tel: 44-1428-644137
Fax: 44-1428-656262

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