## Assessing the energy issues from a Canadian perspective

## by Ronald S. Ritchie

For two decades the world has been speeding ever faster down a road which has an end. It has been escalating its demand for energy at a rapid pace, directing more and more of that demand to one energy source, oil, and recently, as a result, looking in almost every region to the huge Persian Gulf reserves as the principal source of energy needs for its future economic growth.

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That this pattern must be drastically changed in the not-too-distance future was not news to many informed participants and observers in the industrialized world well before the dramatic world oil market events of 1973. But it has taken the price and supply action of OPEC members (Organization of Petroleum Exporting Countries) to bring the situation forcibly, even rudely, home to masses of citizens, and their governments, in both developed and developing countries around the world. In one sense, necessary long-run adjustments may have been expedited at the cost of short-run burdens, the extent of which is still somewhat unclear.

Viewed in a global perspective, the record of demand and supply of energy over the last three decades is an almost classic example of the impact of additive exponential growth patterns. There has so far in the world's history been a reasonably close correlation between economic expansion and energy consumption, between per capita use of energy in a society and its per capita production and, therefore, incomes. The relationship is easy to understand. Wherever man's output is limited to his own unaided efforts, that output and his income are small. Men have raised their production per capita and their incomes by combining more and more mechanical and other forms of energy with their own human efforts. Since the Second World War ended, this process has proceeded at an unprecedented pace and scale in the industrialized world and has begun in the developing economies.

North America, particularly the United States and Canada, has led in *per capita* energy consumption, as in *per capita* income, and has continued to raise both. In the past, two decades, though, Western Europe and Japan have gained rapidly in *per capita* terms and in absolute terms

Mr. Ritchie had recently retired as senior vicepresident of Imperial Oil Limited when he wrote this article. The views expressed in the article were those of the author. have multiplied their energy consumption. In addition, the developing economies, such as India, while their *per capita* demands are still small, have begun the same process. The achievement of many of their chief aspirations depends on its continuance. Thus, the world's demand for energy has been growing at annual rates which would double it every 12 to 15 years.

## Pattern of supply

Sooner or later, this growth pattern alone would force some alteration in the patterns of energy supply or some constraints on demand. In actuality, however, the effects of rapid growth of energy demand have been accentuated by a concurrent shift in the pattern of supply. More and more of the total demand has been focused on oil, thus magnifying the demand growth for oil even more. Here, too, North America led the way two or more decades ago with the decreased use of coal in home heating and the switch from coal to diesel fuel on the railroads. Most recently, particularly in North America, coal has been pushed further aside in the thermal generation of power and in many industrial uses by pressures and regulations aimed at limiting sulphur emissions into the atmosphere. The switch from coal to petroleum in Western Europe and in Japan has lagged behind that in North America slightly, but has been of almost the same dramatic proportions. By 1970, petroleum (oil and natural gas) supplied about three-quarters of the total energy consumption of the United States, more than two-thirds of that in Western Europe and Japan, and three-fifths of the energy consumption of the world as a whole. The rush to oil was still continuing.

There have, of course, been good reasons of cost and convenience for the trend. At least until the last few months, petroleum has generally been a very cheap source of energy. All through the Fifties and Sixties, oil has been in plentiful supply, with the marginal source being the lowcost oil of the Persian Gulf area. Natural gas, where it has been available, has usually been kept low in price by regulation. Coal has grown dearer because of rising labour costs not fully offset by improved technology. Then again, oil has special convenience advantages, particularly in the field of transportation, with today's technologies.

With rapid growth in total energy requirements and a steadily-shrinking contribution from coal, it is readily understandable that eastern hemisphere demands on the Persian Gulf area have been escalating rapidly despite new supply sources in Africa and in the North Sea during the

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