
Update

Natural Gas Market Assessment

As part of its on-going monitoring of the Canadian natural gas market, the National Energy Board (NEB) has released a report entitled *Natural Gas Market Assessment: Long-Term Canadian Natural Gas Contracts* (August 26, 1992, 63pp.). The report will be of special interest to anyone concerned with the growing exports of Canadian natural gas to the US. Prior to 1985, the year in which the deregulation of the gas industry in Canada and the US began, effectively all western Canadian natural gas was sold under long-term contracts. There were only a small number of buyers and sellers, and the format and structure of long-term contracts remained unchanged for almost three decades. These contracts were the foundation for much of the financing required to build the now-extensive Canadian natural gas pipeline network. Since 1985 the nature of contracts governing the sale of gas in both domestic and export markets has changed fundamentally. These changes and current trends in contracting are described in the report, which was prepared for the NEB by Peter Milne and Associates in association with Board staff.

Deregulation created the opportunity for a large number of

new buyers and sellers to enter the market. The northeastern US emerged as a major new market for Canadian gas. This has led to large investments in additional pipeline facilities in both Canada and the US, partly resulting from the rapid construction of facilities for the cogeneration of electricity and process heat in that region. The consequences of these important changes are reviewed in the report.

The most important changes since the onset of deregulation are:

- increased flexibility for both the buyer and the seller in long-term contracts;
- greater balance between the buyer's obligations to purchase and the seller's obligation to deliver;
- flexible and increasingly simpler contract pricing terms that track competitive market conditions more closely;
- shorter contract terms that enable the parties to adjust sooner and more fully to unanticipated structural changes in the natural gas industry;
- reduced contract volumes as smaller end-users and smaller producer/marketers enter the market and as large buyers and sellers continue to diversify their supply portfolios and market outlets; and
- unbundling gas sales and transportation service providing both buyers and sellers with a wider range of contracting options and choices.

The report also deals with the structure of export versus domestic contracts and the difference in terms between export and domestic contracts, including differences in long-term contract prices. There is a useful appendix which surveys the outstanding long-term contracts to December 31, 1991.

The report (catalogue no. ISBN 0-662-19891-3) is available without charge from the Regulatory Support Office of the NEB, 311 - 6th Avenue S.W., Calgary, Alberta, T2P 3H2 (Fax: (403) 292-5503).

Understanding the Carbon Cycle

An important advance in the understanding of the earth's carbon cycle has been reported. It is now possible to monitor changes in the oxygen-to-nitrogen ratio of the atmosphere to within five parts per million using an interferometric technique based on the refractive index of dry air. Assuming that the nitrogen inventory of the air remains constant, it is possible to calculate changes in the partial pressure of oxygen in the air. This information can be used to assess the rate of decline of the earth's oxygen content resulting from the burning of fossil fuels and from deforestation. It is also possible to calculate seasonal changes to estimate the global

production of plant matter in the sea. This new technique provides insight into the long-standing question of how much anthropogenic carbon dioxide goes to the ocean and how much is reabsorbed by photosynthesis. The latter calculation is possible because, though carbon dioxide is readily exchanged with the ocean, very little oxygen is transferred.

This very precise measurement of both the oxygen and the carbon dioxide contents of the atmosphere thus provides additional information concerning the world's carbon balance. An early inference from these studies is that the decrease of oxygen in the atmosphere is consistent with fossil fuel consumption: there is no need to call upon either a net production or net consumption of oxygen by the biosphere, as was formerly thought necessary.

These sensitive measurements indicate the ocean must be taking up all the carbon dioxide that does not stay in the atmosphere, about three gigatonnes of carbon (GtC) per year. This result implies that the long-run sustainable limit on emissions of carbon from fossil fuels is about 3 GtC/y, which is to be contrasted with the current emissions of about 5.9 GtC/y.

For more information, see 'Seasonal and Interannual Variations in Atmospheric Oxygen and Implications for the Global Carbon Cycle' by Ralph F. Keeling and Stephen R. Shertz, *Nature*, Vol. 358, August 27 1992, pp.723-727. In view of the importance of this paper, *Nature* has published a companion commentary by Wallace S. Broecker and Jeffrey P. Severinghaus (pp.710-711).

World Energy Congress in Madrid

Over 3000 delegates (75 from Canada) attended the 15th Congress of the World Energy Council (WEC) in Madrid, September 20-25, 1992. There were 14 technical sessions in which almost 250 papers were presented (eight from Canada). Prominent authorities were invited to give their views in key-note sessions on the topics of 'Energy Horizons in a World of Nine Billion Inhabitants' and 'Potential Global Climate Change — the Realities.' In the first session, a Minister from China, Zou-Jiahua, and a former Minister from India, Mrs. M. Ghandi, spoke of the need for extensive assistance to the developing countries in the energy field. The third speaker, Mrs. Helga Steeg, Director-General of the International Energy Agency, spoke of the importance of adopting market-based policies and stable and predictable fiscal regimes. In the second key-note session, Prof. José Goldemberg, then Minister of Education in Brazil, recommended immediate action of a precautionary nature to deal with the threat of global climate change, while M. F.-X. Ortoli, of TOTAL Petroleum in France, took the view it was premature to take such measures.

The Commission on Energy for Tomorrow's World, which was established at the preceding WEC Congress in Montreal in 1989, presented its preliminary conclusions on the outlook for energy to the year 2020, together with eight regional reports. This specially-constituted Commission called for a radical reappraisal of existing global policies to

provide adequate, affordable, and reliable energy services to all people since the majority of the world's population lacks the advantages such services offer at present. This Commission will continue its efforts in such areas as identifying the investment required to achieve greater efficiency in the use of energy, and improving the accessibility of developing countries to the energy supplies they need, including due recognition of the environmental consequences.

The Congress demonstrated a significant coherence notwithstanding the many uncertainties and challenges at both national and international levels. This coherence was based upon three basic propositions: the need to address the relief of poverty in the developing world, with energy being fundamental to economic development; acceptance of the concept of 'sustainability;' and general agreement that, while there is no prospective global shortage of energy, neither is there an emerging solution for the problem of enhancing energy supply and providing additional environmental protection. The challenges must be met on the basis of present knowledge and resources.

A limited number of copies of the 1992 National Energy Data (NED) Profile for Canada which was prepared for the Congress are available without charge. Information concerning WEC programs and the purchase of WEC publications may be obtained from E.P. Cockshutt, Energy Council of Canada, 305-130 Albert Street, Ottawa, Ontario, K1P 5G4 (Fax:(613) 993-7679) — R.B. Toombs

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