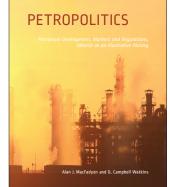


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PETROPOLITICS: PETROLEUM DEVELOPMENT, MARKETS AND REGULATIONS, ALBERTA AS AN ILLUSTRATIVE HISTORY

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NOTES AND REFERENCES

Notes

- 1. Over the years government departments and agencies responsible for regulations and statistics concerning the petroleum industry have undergone name changes. For example, the Alberta Energy Resources Conservation Board has been variously known as the Turner Valley Conservation Board: Petroleum and Natural Gas Conservation Board; Oil and Gas Conservation Board; Energy Resources Conservation Board (twice!); and Energy and Utilities Board. Departmental responsibility in Alberta has been undertaken by Lands and Mines; Mines and Minerals; Energy and Natural Resources; and Energy. Federally, we have seen the Department of Natural Resources; of Energy Mines and Resources; of Energy; and of Energy and Natural Resources. In this book, and in the References, we normally use the title at the time at which the document referred to was issued. The main exception is with ongoing publications from the main provincial regulatory agency, which are usually sourced here as published by the ERCB (Energy Resource Conservation Board).
- 2. Government publications typically come from the issuing source, so publisher data (location and name) are not included. Government publications listings (for government departments or agencies) begin with the name of the government (e.g., 'Alberta' or 'Canada'). Reports from important Commissions commonly referred to under the name of the Head of the Commission are usually listed both under the appropriate government and also under the name of the Head.
- 3. This reference list includes all documents referred to in the text of the book. Statistical sources used for Tables and Figures are referenced in the Table or Figure.

- Adelman, Morris A. 1964. "Efficiency of Resource Use in Crude Petroleum." *Southern Economic Journal* 31: 101–22.
- . 1972. *The World Petroleum Market*. Baltimore, MD: Johns Hopkins University Press.
- ——. 1980. "The Clumsy Cartel." The Energy Journal 1, no. 1: 43–53.
- ——. 1984a. "Oil Supply and Demand." In David Hawdon (ed.), *The Energy Crisis Ten Years After*, 57–78. New York: St. Martin's Press.
- ——. 1984b. "International Oil Agreements." *The Energy Journal* 5, no. 3: 1–10.
- ------. 1986. "Scarcity and World Oil Prices." *Review of Economics and Statistics* 68, no. 3: 387–97.

——. 1989. "The Evolution of World Oil Markets." In G. Campbell Watkins (ed.), Petro Markets: Probing the Economics of Continental Energy, 1–16. Vancouver: Fraser Institute.

- ——. 1990. "Mineral Depletion with Special Reference to Petroleum." *Review of Economics and Statistics* 72: 1–10.
- ——. 1992. "Finding and Development Costs in the United States, 1945–1986." In John Moroney (ed.), Advances in the Economics of Energy and Resources, 7:11–58. Greenwich, CT: JAI Press.
- ------. 1993a. "Modelling World Oil Supply." *The Energy Journal* 14, no. 1: 1–32.
- ------. 1993b. *The Economics of Petroleum Supply*. Cambridge, MA: MIT Press.
- 1995. The Genie Out of the Bottle: World Oil since 1970. Cambridge, MA: MIT Press.
- ——. 2002. "World Oil Production and Prices, 1947–2000." Quarterly Review of Economics and Finance 42: 169–91.

Adelman, Morris A., John C. Houghton, Gordon M. Kaufman, and Martin Zimmerman. 1983. *Energy Resources in an Uncertain Future*. Cambridge, MA: Ballinger.

Adelman, Morris A., and G. Campbell Watkins. 1992. "Reserve Asset Values and the Hotelling Valuation Principle." (Working Paper MIT-CEEPR-92-004WP.) Cambridge, MA: Center for Energy and Environmental Policy Research at the Massachusetts Institute of Technology.

------. 2002. "Costs of Aggregate Hydrocarbon Additions." The Energy Journal 25, no. 3: 37–51.

------. 2008. "Reserve Prices and Mineral Resource Theory." The Energy Journal 29, no. 1: 1–16.

Aguilera, Roberto F., Robert G. Eggert, C. C. Gustavo Lagos, and John E. Tilton. 2009. "Depletion and the Future Availability of Petroleum Resources." *The Energy Journal* 30, no. 1: 141–74.

Allais, Maurice. 1957. "Method of Appraising Economic Prospects of Mining Exploration over Large Territories." *Management Science* 3: 285–347.

Alberta. 1927. Report for the Scientific and Research Council of Alberta on Alberta Oil Sands (Clark and Blair Report).

Alberta. 1950. *Report on the Alberta Oil Sands* (Blair Report).

Alberta. Department of Economic Development. 2003. Oil Sands Industry Update.

Alberta. Department of Economic Development and Tourism. (various years). *Facts on Alberta*.

Alberta. Department of Economic Development and Trade. 1991. Alberta Industry and Resources.

Alberta. Department of Economic Development and Department of International and Intergovernmental Relations. 2001. *Alberta Service Exports Survey*.

Alberta. Department of Energy. n.d. *Alberta Gas Reference Price History*. Available at www.energy.gov.ab.ca/ NaturalGas/1322.asp

- ——. (various years). Annual Reports.
- ——. 2002. Alberta's Oil and Gas Tenure.

------. 2003. Oil and Gas Fiscal Regimes: Western Canadian Provinces and Territories. (Revised 2006 and 2011.)

——. 2006. Alberta Oil Sands Royalty Guidelines, Principles and Procedures, November 30, 2006. Edmonton: Alberta Energy.

——. 2007a. Royalties in Review: Background Information.

— 2007b. Alberta Royalty Review 2007. Royalty Information Series.

——. 2007 (October 25). *The New Royalty Framework*.

------. 2008 (June). Method for Evaluating Bitumen in Applicable Non-Arm's Length Transactions: Draft for Implementation Consultation.

Alberta. Department of Energy and Natural Resources. (various years). *Annual Reports*.

——. 1983. Oil and Gas Tenure Legislation and Practice in the Province of Alberta.

Alberta. Department of Lands and Mines. (various years). *Annual Report.*

Alberta. Department of Mines and Minerals. (various years). Annual Report. ——. 1972 (April). Review of Royalty Provisions Applicable to Leases of Petroleum and Natural Gas Owned by the Crown in Right of Alberta.

Alberta. Energy Resources Conservation Board. (various years). *Alberta Oil and Gas Industry Annual Statistics* (Report ST-17).

——. (various years). Alberta Oil Sands Annual.

——. (various years). *Cumulative Annual Statistics of the Western Oil and Gas Industry* (Report ST-17).

———. (various years). Reserves of Crude Oil, Gas, Natural Gas Liquids and Sulphur, Province of Alberta (Report ST-18).

———. (various years). Reserves Report and Supply/Demand Outlook (Report ST-18 or ST-98).

- ——. 1973. Review of Field Pricing of Gas in Alberta (Report 73-I).
- ——. 1974. Review of Field Pricing of Gas in Alberta (Report 74-P).

——. 1976. Report and Decision on the Review of Procedures for Determining the Reserves of Gas Surplus to the Requirements of Alberta (Report 76-C).

——. 1979. Alberta's Gas Supply Protection – Procedures and Formulae (Report 79-1.)

——. 1981. Estimates of Ultimate Potential and Forecasts of Allowable Production Capacity of Alberta Crude Oil and Equivalent (Report 81-B).

- ——. 1983. Alberta Oil Supply, 1983–2007 (Report 83-E).
- ------. 1985. Alberta Oil Supply, 1985–2010 (Report 85-A).

— 1987. Gas Supply Protection for Alberta: Policies and Procedures.

——. 1988. Alberta Oil Supply, 1988–2003 (Report 88-E).

——. 1990. Alberta Oil Supply, 1990–2004: Update of ERCB 88-Е (Report 90-А.)

— 2011. Unconventional Gas Regulatory Framework-Jurisdictional Review January 28, 2011. (Report 2011-A).

Alberta. Energy and Utilities Board. (various years). Annual Statistics.

Alberta. Energy and Utilities Board and National Energy Board. 2005. *Alberta's Ultimate Potential for Natural Gas* (Report 2005-A).

Alberta. Financial Management Commission. 2002. *Moving* from Good to Great (Tuer Commission).

Alberta. Financial Investment and Planning Commission. 2007. Preserving Prosperity: Challenging Alberta to Save (Mintz Commission).

Alberta. Government of Alberta. 1972 (April). Position Paper: Tentative Natural Resource Revenue Plan for the Government of the Province of Alberta.

- ------. 1986 (October). Policy Statement Respecting Long-Term Protection for Consumers of Natural Gas.
- ——. 1991. Discussion Paper Toward 2000 Together.
- ——. 2002. The Savings Question: A Discussion Paper.

——. 2010. Energizing Investment: A Framework to Improve Alberta's Natural Gas and Conventional Oil Competitiveness.

- Alberta. Heritage Savings Trust Fund. 2008. *Business Plan*, 2008–11. (Summary available at www.finance.alberta.ca/ publications/budget/budget2008/heritage.pdf.)
- Alberta. Oil and Gas Conservation Board. (various years). Oil and Gas Industry Annual Report.
- -----. 1957 (August). Letter to all operators "Re: Proration Plan and Economic Allowance."
- ——. 1960. Report on an Application of Great Canadian Oil Sands Limited under Part A of the Oil and Gas Conservation Act.
- ——. 1961. Gas Export, 1950–1960.
- ——. 1962. Supplemental Report to the Lieutenant Governor in Council with respect to the Application of Great Canadian Oil Sands Limited.
- . 1963. Report to the Lieutenant Governor in Council with respect to the Applications of Cities Service Athabasca Inc. and Shell Canada Limited (Report 63-3).
- ——. 1964a. Report on an Application of Great Canadian Oil Sands Limited under Part a of the Oil and Gas Conservation Act (Report 64-3).
- ——. 1964b. Report and Decision on Review of Plan for Proration of Oil to Market Demand in Alberta (Report 64-10).
- ——. 1964c. Report on an Application of TransCanada Pipe Lines Limited under the Gas Resources Preservation Act (Report 64-1).
- ——. 1966. Report on an Application of TransCanada Pipelines Limited Under the Gas Resources Preservation Act, 1956 (Report 66-C).
- ——. 1968. Report of an Application of Atlantic Richfield Company, Cities Service Athabasca, Inc., Imperial Oil Limited and Royalite Oil Company, Limited under Part 6a of the Oil and Gas Conservation Act (Report 68-C).
- . 1969a. Supplement to the Report of an Application of Atlantic Richfield Company Cities Service Athabasca, Inc., Imperial Oil Limited and Royalite Oil Company, Limited under Part VI A of the Oil and Gas Conservation Act (Report 69-B).
- —. 1969b. Report of an Application of Atlantic Richfield Company, Cities Service Athabasca Inc., Imperial Oil Limited and Royalite Oil Company, Limited (Report 69-C.)
- ——. 1969c. Report and Decision on Review of Policies and Procedures for Considering Applications under the Gas Resources Conservation Act, 1956 (Report 69-D).
- Alberta. Oil Sands Ministerial Strategy Committee. 2006. Investing in Our Future: Responding to the Rapid Growth of Oil Sands Development-Final Report. Edmonton: Government of Alberta.
- Alberta. Petroleum and Natural Gas Conservation Board. 1951. The Petroleum and Natural Gas Conservation Board Plan for Proration to Market Demand.
- Alberta. Petroleum Marketing Commission. (various years). Annual Report.
 - -----. (various years). Selling Price Bulletin for Crown Petroleum.

- Alberta. Petroleum Monitoring Agency (PMA). (various years). *Annual Report.*
- Alberta. Royal Commission on Natural Gas. 1949. *Report* (Dinning Commission).
- Alberta. Royal Commission on Petroleum and Petroleum Products. 1940. *Report* (McGillivray Commission).
- Alberta Bureau of Statistics. (various years). *Industry and Resources*.
- ———. (various years). *Alberta Provincial Accounts*.
- Alberta Conservation and Utilization Committee. 1970. Untitled (report on bituminous tar sands development).
- Alberta Royalty Review Panel. 2007. *Our Fair Share. Report of the Alberta Royalty Review Panel* (Hunter Panel).
- Alexeev, Michael, and Robert Conrad. 2009. "The Elusive Curse of Oil." *Review of Economics and Statistics* 91, no. 3: 586–98.
- Allen, John A. 1920. *First Annual Report on the Mineral Industries of Alberta*. Edmonton: King's Printer.
- Anderson, F. J. 1976. "Price Formation in the Canadian Crude Oil Sector." *Canadian Public Policy* 2, no. 1: 1–16.
- Anderson, Jonathan. 2002. "The Alaska Permanent Fund: Politics and Trust." *Public Budgeting and Finance* (Summer): 57–68.
- Angevine, Gerry. 2010a. Towards North American Energy Security: Removing Barriers to Oil Industry Development. Vancouver: Fraser Institute.
- —. 2010b. North American Natural Gas: Reducing Investment Barriers. Vancouver: Fraser Institute.
- Atkins, Frank J., and Alan J. MacFadyen. 2008. "A Resource whose Time has Come? The Alberta Oil Sands as an Economic Resource." *The Energy Journal* (Special issue to acknowledge the contributions of Campbell Watkins to energy economics): 77–98.
- Bain, Joe Statin. 1968. *Industrial Organization* (2nd ed.). New York: John Wiley and Sons.
- Baldwin, J. R., and G. Gellatly. 2005. *Global Links: Long-term Trends in Foreign Investment and Foreign Control in Canada, 1960–2000.* Ottawa: Statistics Canada, Cat. #11-622-MIE-008.
- Baldwin, J. R., G. Gellatly, and D. Sabourin. 2006. *Changes in Foreign Control under Different Regulatory Climates: Multinationals in Canada*. Ottawa: Statistics Canada cat#11-624-MIE-n0013.
- Ballem, John Bishop. 1973. *The Oil and Gas Lease in Canada*. Toronto: University of Toronto Press. (A 4th edition is now available.)
- Barrie, Doreen Patricia. 2006. *The Other Alberta: Decoding a Political Enigma*. Regina: University of Regina, Canadian Plains Research Center.
- Barsky, Robert, and Lutz Kilian. 2004. *Oil and the Macroeconomy since the 1970s*. (NBER Working Paper 10855.) Cambridge, MA: National Bureau of Economic Research.
- Baumol, William J. 1986. "Contestable Markets: An Uprising in the Theory of Industry Structure." *American Economic Review* 72, no. 1: 1–15.

Baumol, William J., J. C. Panzer, and R. D. Willig. 1988. Contestable Markets and the Theory of Industrial Structure. New York: Harcourt Brace Jovanovich.

Beach, Floyd K. 1954. "History of Land Regulations and Land Grants in Western Canada." *Canadian Oil and Gas Industries* 7 (nos. 5 and 6).

Beach, Floyd K., and J. L. Irwin. 1940. *The History of Alberta Oil*. Edmonton: Department of Lands and Mines.

Bernard, Jean-Thomas, and Robert J. Weiner. 1992. "Transfer Prices and the Excess Cost of Canadian Oil Imports: New Evidence on Bertrand versus Rugman." *Canadian Journal of Economics* 25, no. 1: 22–40.

Berndt, Ernst R. 1977. "Canadian Energy Demand and Economic Growth." In Michael Walker and G. Campbell Watkins (eds.), *Oil in the Seventies: Essays on Energy Policy*, 44–84. Vancouver: Fraser Institute.

Berndt, Ernst R., and Paul E. Greenberg. 1989. "Canadian Energy Demand after the Oil Shocks." In G. Campbell Watkins (ed.), *Petro Markets: Probing the Economics of Continental Energy*, 69–103. Vancouver: Fraser Institute.

Berndt, Ernst R., C. J. Morrison, and G. Campbell Watkins. 1981. "Dynamic Models of Energy Demand: An Assessment and Comparison." In E. R. Berndt and B. C. Field (eds.), *Modelling and Measuring Natural Resource Substitution*, Chapter 6. Cambridge, MA: MIT Press.

Bertrand, Robert J. 1981. *The State of Competition in the Canadian Petroleum Industry* (7 vols.). Ottawa: Canada Supply and Services.

Blackman, Warren, and Alan J. MacFadyen. 1974. "Provincial Royalties and Energy Sources." Calgary: University of Calgary Discussion Paper.

Blackorby, Charles. 1990. "Economic Policy in a Second-Best Environment." *Canadian Journal of Economics* 23, no. 4: 748–71.

Blackorby, Charles, and David Donaldson. 1990. "A Review Article: The Case against the Use of the Sum of Compensating Variations in Cost-Benefit Analysis." *Canadian Journal of Economics* 23, no. 3: 471–94.

Blair, John M. 1976. The Control of Oil. New York: Vantage.

Blair, Sidney M. 1951. *Report on the Alberta Bituminous Sands*. Edmonton: Alberta Sessions Paper No. 49.

Boadway, Robin, F. Flatters, and A. Leblanc. 1983. "Revenue Sharing and the Equalization of Natural Resource Revenues." *Canadian Public Policy* 9, no. 2: 174–80.

Bohi, Douglas R., and W. David Montgomery. 1982. *Oil Prices, Security and Import Policy*. Washington, D.C.: Resources for the Future.

Bohi, Douglas R., and Michael A. Toman. 1984. *Analysing Non-Renewable Resource Supply*. Baltimore, MD: Johns Hopkins University Press.

Bohi, Douglas R., and Michael A. Toman (with a contribution by Margaret A. Walls). 1996. *The Economics of Energy Security*. Dordrecht: Kluwer Academic.

Borden, Henry. 1958. *First Report of the Royal Commission on Energy.* Ottawa: Queen's Printer.

——. 1959. Second Report of the Royal Commission on Energy. Ottawa: Queen's Printer. Bradley, Paul G. 1972. Economic Problems in the Regulation of Resource Exports: The Case of Natural Gas.
(Discussion Paper no. 92.) Vancouver: Department of Economics, University of British Columbia.

——. 1989. "Petroleum Supply: Lessons of the 1980s." In G. Campbell Watkins (ed.), *Petro Markets: Probing the Economics of Continental Energy*, 41–68. Vancouver: Fraser Institute.

Bradley, Paul G., and G. Campbell Watkins. 1982. "Chapter 4. "Crude Oil Pricing in Canada." In G. Campbell Watkins (ed.), *The Canadian Oil Industry: An Analysis*, 93–131. Calgary: Shell Canada.

------. 2003. Canada and the United States: A Seamless Energy Border? (The Border Papers, no. 78). Toronto: C. D. Howe Institute.

Brandie, G. W., R. H. Clark, and J. C. Wiginton. 1982. "The Economic Enigma of the Tar Sands." *Canadian Public Policy* 8: 156–64.

Brandt, Adam. 2009. Review of Evidence for Global Oil Depletion Technical Report 6: Methods of Forecasting Future Oil Supply (UKERC/WP/TPA/2009/021). London: UK Energy Research Centre.

Breen, David. H. 1993. *Alberta's Petroleum Industry and the Conservation Board.* Edmonton: University of Alberta Press and the Energy Resources Conservation Board.

British Petroleum (BP). (various years). *Statistical Review of World Energy*.

Brown, Stephen P. A., and Mine K. Yücel. 2008. "What Drives Natural Gas Prices." *The Energy Journal* 29, no. 2: 45–60.

Brownlie, Keith. 2005. "Alberta's Oil and Gas Industry in the Era of the Kyoto Protocol." In G. Bruce Doern (ed.), *Canadian Energy Policy and the Struggle for Sustainable Development*, Chapter 8. Toronto: University of Toronto Press.

Bruce, Christopher, Ronald Kneebone, and Kenneth McKenzie (eds.). 1997. A Government Reinvented: A Study of Alberta's Deficit Elimination Program. Toronto: Oxford University Press.

Bucovetsky, M. W. 1964. *The Taxation of Mineral Extraction*. (Studies of the Royal Commission on Taxation, no. 8.) Ottawa: Queen's Printer.

Burton, A. Gordon. 1966. *Comments re Taxation of the Oil and Gas Industry*. (Studies of the Royal Commission on Taxation, no. 12.) Ottawa: Queen's Printer.

Cairns, Robert D. 1985. "Reform of Exhaustible Resource Taxation." *Canadian Public Policy* 11, no. 4: 649–58.

. 1987. "An Economic Assessment of the Resource Amendment." *Canadian Public Policy* 13, no. 4: 502–14.

Camp, Frederick W. 1976. *The Tar Sands of Alberta Canada*. Calgary: Cameron Engineers.

Canada. 1985. The Western Accord: An Agreement between the Governments of Canada, Alberta, British Columbia and Saskatchewan on Oil and Gas Pricing and Taxation.

Canada. Agreement on Natural Gas Pricing. 1985 (October 31). An Agreement among the Governments of Canada, Alberta, British Columbia and Saskatchewan. (Halloween Accord). Canada. Combines Investigation Act, Director of Investigation and Research. 1981. *The State of Competition in the Canadian Petroleum Industry* (7 vols.) (Bertrand Report).

Canada. Corporations and Labour Unions Return Act (CALURA). (various years). Annual Report.

Canada. Department of Energy. 2006. Oil and Gas Equipment Services Industry Report – October 2006.

Canada. Department of Energy, Mines and Resources. (various years). *The Canadian Oil Market*.

------. (various years). Natural Gas Price Monitoring Report.

——. (various years). The Canadian Petroleum Industry Monitoring Survey.

------. 1973. An Energy Policy for Canada–Phase 1 (2 vols.).

——. 1976. Energy Strategy for Canada: Policies for Self-Reliance.

- ——. 1977. Oil and Natural Gas Resources of Canada–1976. (Report EP77-1).
- ------. 1978. Energy Futures for Canadians. (Prepared by James E. Gander and Fred W. Belaire.)

——. 1980 (October 28). The National Energy Program.

- ——. 1981 (September 1). Memorandum of Agreement between the Government of Canada and the Government of Alberta Relating to Energy Pricing and Taxation.
- ------. 1982 (June). The National Energy Program: Update 1982.
- -----. 1984. A New Canadian Natural Gas Export Pricing Policy.
- ——. 1987. Energy in Canada:An Overview.

Canada. Department of External Affairs. 1987. The Canada-US Free Trade Agreement.

Canada. Economic Council of Canada. 1977. Living Together: A Study of Regional Disparities.

——. 1984. Western Transition.

—. 1985. *Connections: An Energy Strategy for the Future.*

Canada. Geological Survey of Canada. 1987. Conventional Oil Resources of Western Canada/ Medium and Light. (GSC paper no. 87-26.)

Canada. National Energy Board. (various years). Annual Report.

— . 1960. Report to the Governor in Council in the Matter of the Application under the National Energy Board Act of Trans-Canada Pipe Lines Limited, Alberta and Southern Gas Co. Limited, Alberta Natural Gas Company, WestCoast Transmission Company Limited, Canada-Montana Pipe Line Limited and Niagara Gas Transmission Limited.

------. 1966. Report to the Governor in Council Regarding the Application of Trans-Canada Pipe Lines Limited.

------. 1967. Report to the Governor in Council Regarding the Applications of Alberta and Southern Gas Co. Ltd., Alberta Natural Gas Co., and Canadian-Montana Pipe Line Co.

- . 1969. Energy Supply and Demand in Canada and Export Demand for Canadian Energy, 1966–1990.
- . 1970. Report to the Governor in Council in the Matter of the Applications of Alberta and Southern Gas Co.

Ltd., Alberta Natural Gas Co., Canadian- Montana Pipe Line Co., Consolidated Natural Gas Ltd., and Westcoast Transmission Co. Ltd.

- ——. 1972. Potential Limitations of Canadian Petroleum Supplies – Preliminary Report.
- ——. 1974a. Report to the Governor in Council in the Matter of the Pricing of Natural Gas being Exported under Existing Licenses.
- ------. 1974b. Report to the Minister in the Matter of the *Exportation of Oil*.
- ——. 1975a. Report to the Governor in Council in the Matter of the Pricing of Natural Gas Being Exported under Existing Licenses.
- ------. 1975b. Canadian Oil: Supply and Requirements.
- ------. 1977a. Canadian Oil Supply and Requirements.
- ------. 1977b. Report to the Governor in Council in the Matter of the Pricing of Natural Gas Being Exported under Existing Licenses
- ——. 1978. Canadian Oil Supply and Requirements.
- ——. 1979a. Canadian Oil Supply and Requirements.
- ——. 1979b. Canadian Natural Gas: Supply and Requirements.
- . 1981a. A Report to the Minister covering Certain Matters relating to the Pricing of Natural Gas in the Domestic Market, Pursuant to Subsection 22(2) of the National Energy Board Act: Phase II of an Application by TransCanada PipeLines Limited under part IV of the National Energy Board.
- ——. 1981b. Canadian Energy Supply and Demand, 1980–2000.
- ——. 1982. Reasons for Decision in the Matter of Phase I The Review Phase of the Gas Export Omnibus Hearing, May 1982.
- ------. 1983. Reasons for Decisions in the Matter of Phase II The Licence Phase and Phase III – The Surplus Phase3 of the Gas Export Omnibus Hearing, 1982.
- ------. 1984. Canadian Energy Supply and Demand, 1983-2005.
- ——. 1986a. Canadian Energy Supply and Demand, 1985–2005.
- ——. 1986b. Reasons for Decision in the Matter of TransCanada PipeLines Ltd.
- ------. 1986c. Reasons for Decision, in the Matter of Phase 1, The Surplus Determination Procedures Phase of the Gas Export Omnibus Hearing (1985).
- ——. 1987. Reasons for Decision in the Matter of Review of Natural Gas Surplus Determination Procedures.
- ——. 1988. Canadian Energy Supply and Demand, 1987–2005.
- ——. 1990. Reasons for Decision, Review of Certain Aspects of the Market-Based Procedure.
- ------. 1991. Canadian Energy Supply and Demand, 1990–2010.
- ——. 1992. Natural Gas Market Assessment: Long-Term Canadian Natural Gas Contracts.
- ——. 1994. Canadian Energy Supply and Demand to 2020.
- ——. 1996. Natural Gas Market Assessment: 10 Years after Deregulation.
- ——. 1997. Natural Gas Market Assessment: Long-term Canadian Natural Gas Contracts: An Update.

-. 1999. Canadian Energy Supply and Demand to 2025. —. 2000. Canada's Oil Sands: A Supply and Market Outlook to 2015. —. 2001. Conventional Heavy Oil Resources of the Western Canadian Sedimentary Basin. —. 2002. Canadian Natural Gas Market Dynamics and Pricing: An Update. —. 2004. Canada's Oil Sands: Opportunities and Challenges to 2015. —. 2006. Canada's Oil Sands: Opportunities and Challenges to 2015 An Update. —. 2008. Canadian Natural Gas: Review of 2007/08 & Outlook to 2020. —. 2011. Canada's Energy Future: Energy Supply and Demand Projections to 2035. Canada. Petroleum Monitoring Agency. (various years: 1979-87). Canadian Petroleum Industry Monitoring Survey. (various years: 1986–94). Canadian Petroleum Industry Monitoring Report. Canada. Restrictive Trade Practices Commission. 1986. Competition in the Canadian Petroleum Industry. Canada. Royal Commission on Canada's Economic Prospects. 1957. Final Report (Gordon Commission). Canada. Royal Commission on Economic Union and Development Practices. 1986. Final Report (Macdonald Commission). Canada. Royal Commission on Energy. 1958. First Report (Borden Commission). -. 1959. Second Report (Borden Commission). Canada. Royal Commission on Taxation. 1966. Report (Carter Commission) (6 vols.). Canada. Statistics Canada. n.d. CANSIM Data Base. Canadian Association of Petroleum Producers (CAPP). (various years). Statistical Handbook. Calgary: CAPP. Canadian Oil Companies. 1958. Submission to the Royal Commission on Energy (Borden Commission). Canadian Petroleum Association (CPA). (various years). Statistical Yearbook. Canadian Public Policy. 1980. Vol. 6 (Supplement 1). Special Edition on the Alberta Heritage Trust Fund. 1981. Vol. 7 (4). Special Issue on Regional Economic Disparities. Canadian Tax Foundation. (various years). Provincial and Municipal Finances. Toronto: Canadian Tax Foundation. (various years). The National Finances. Toronto: Canadian Tax Foundation. Carrigy, M. A. (ed.). 1974. Guide to the Alberta Oil Sands. Edmonton: Alberta Research Council. Carter, Kenneth. 1966. Report of the Royal Commission on Taxation (6 vols.). Ottawa: Queen's Printer. Caves, Richard E., and Richard H. Holton. 1959. The Canadian Economy: Prospect and Retrospect. Cambridge, MA: Harvard University Press. Chan, Kok-Sum. 1993. Replacement Costs for Oil and Gas in Western Canada: 1970-1991. Calgary: Canadian **Energy Research Institute**

Chan, Kok-Sum, Garth Renne, Michelle Heath, and John Stariha. 1994. Saskatchewan's Potential for E.O.R. and *Horizontal Drilling: Vol. 1.* Calgary: Canadian Energy Research Institute.

Chastko, Paul. 2004. *Developing Alberta's Oil Sands; From Karl Clark to Kyoto*. Calgary: University of Calgary Press.

Clark, Karl A., and Sidney M. Blair. 1927. *The Bituminous Sands of Alberta*. Edmonton: Alberta Science and Research Council.

Coase, Ronald. 1960. "The Problem of Social Cost." *Journal of Law and Economics* 3, no. 1: 1–44.

Coffey, William J., and Mario Polèse. 1987a. "Trade and Location of Producer Services: A Canadian Perspective." *Environment and Planning A* 19, no. 5: 597–611.

Coffey, William J., and Mario Polèse (eds.). 1987b. *Still Living Together: Recent Trends and Future Directions in Canadian Regional Development*. Montreal: Institute for Research on Public Policy.

Collins, A. F. 1980. "The AHSTF: An Overview of the Issues." *Canadian Public Policy 6* (Supplement 1): 158–65.

Comfort, Darlene J. 1980. *The Abasand Fiasco*. Edmonton: Friesen Printers.

Copithorne, Lawrence W. 1979. *Natural Resources and Regional Disparities: A Study Prepared for the Economic Council of Canada.* Ottawa: Economic Council of Canada.

Copithorne, Lawrence W., Alan J. MacFadyen, and Bruce Bell. 1985. "Revenue Sharing and the Efficient Valuation of Natural Resources." *Canadian Public Policy, Supplement* 11, no. 3: 465–78.

Courchene, Thomas J. 1976. "Equalization Payments and Energy Royalties." In Anthony D. Scott (ed.), *Natural Resource Revenues: A Test of Federalism*, 73–107. Vancouver: University of British Columbia for the British Columbia Institute for Economic Policy Analysis.

——. 1981. "The National Energy Program and Fiscal Federalism: Some Observations." In G. Campbell Watkins and Michael Walker (eds.), *Reaction: the National Energy Program*, 77–101. Vancouver: Fraser Institute.

——. 1984. Equalization Payments: Past, Present and Future. Toronto: Ontario Economic Council.

 2005. Resource Revenues and Equalization. (IRPP Working Paper 2005-04, revised, September).
 Montreal: Institute for Research on Public Policy.

——. 2006. "Energy Prices, Equalization and Canadian Federalism: Comparing Canada's Energy Price Shocks." *Queen's Law Journal* 31: 644–95.

Crane, David. 1982. *Controlling Interest: The Canadian Oil and Gas Stakes*. Toronto: McClelland & Stewart.

Craze, R. C., and J. W. Granville. 1955. "Well Spacing." Houston: Humble Oil and Refining Co.

Crommelin, Michael. 1975. "Government Management of Oil and Gas in Alberta." *Alberta Law Review* 13: 146–211.

Crommelin, Michael, and Andrew R. Thompson (eds.). 1977. Mineral Leasing as an Instrument of Public Policy. Vancouver: University of British Columbia Press (for the British Columbia Institute for Economic Policy Analysis). Crommelin, Michael, Peter H. Pearse, and Anthony Scott. 1976. "Management of Oil and Gas Resources in Alberta: An Economic Evaluation of Public Policy." Vancouver: University of British Columbia Department of Economics, Discussion Paper no. 76-19. (Revised version published in the *Natural Resources Journal*, April 1978.)

Cuddington, John T., and Diana L. Moss. 2001. "Technological Change, Depletion, and the U.S. Petroleum Industry." *American Economic Review* 91, no. 4: 1135–48.

Dahl, Carol A. 1991. "U.S. and World Oil Production and Production Costs in the 1980s." In Wilfred Kohl (ed.), *After the Oil Price Collapse: OPEC, the United States, and the World Oil Market*, 108–31. Baltimore, MD: Johns Hopkins University Press.

Daintith, Terence. 2010. *Finders Keepers? How the Law of Capture Shaped the World Oil Industry*. Washington, D.C.: Resources for the Future Press.

Daly, H. E. (ed.). 1973. *Toward a Steady State Economy*. San Francisco: W. H. Freeman.

Daniel, Terrence E., and Harry M. Goldberg. 1982. "Moving Towards World Pricing for Oil and Gas." *Canadian Public Policy* 8, no. 1: 3–13.

Danielsen, Albert L. 1982. *The Evolution of OPEC*. New York: Harcourt, Brace Jovanovich.

DataMetrics Limited. 1984. *The Oil and Gas Investment Climate: Changes Over a Decade.* (CERI Study no. 20.) Calgary: Canadian Energy Research Institute.

Davidson, Paul. 1963. "Public Policy Problems of the Domestic Crude Oil Industry." *American Economic Review* 53, no. 1: 85–108.

Davis, Jeffrey, Rolando Ossowski, James Daniel, and Steven Barnett. 2001. "Stabilization and Savings Funds for Nonrenewable Resources: Experience and Fiscal Policy Implications." (IMF *Occasional Paper No. 205.*) Washington, D.C.: International Monetary Fund.

Debanné, J. G. 1974. "Oil and Canadian Policy." In Edward W. Erickson and Leonard Waverman (eds.), *The Energy Question: An International Failure of Policy, Vol. 2: North America*, 125–47. Toronto: University of Toronto Press.

DeGolyer, Everette L., and Lewis W. MacNaughton. (various years). *Twentieth Century Petroleum Statistics*. Dallas: United States Office of Naval Petroleum and Oil Shale Reserves.

de Mille, George. 1969. *Oil in the Canada West: The Early Years*. Calgary: de Mille.

Desbarats, Catharine M. 1989. *Empirical Modelling of Canadian Petroleum Exploration Activity*. Oxford, U.K.: Oxford Institute for Energy Studies.

Deutsch, C. V., and J. A. McLennan. 2005. *Guide to SAGD* (Steam Assisted Gravity Drainage) Reservoir Characterization using Geostatistics. Edmonton: Centre for Computational Geostatistics.

Diaz, Aldo, and Tarek M. Harchaoui. 1997. "Accounting for Exhaustible Resources in the Canadian System of National Accounts: Flows, Stocks and Productivity Measures." *Review of Income and Wealth* 43, no. 4: 465–85.

Dinning, Robert. J. 1949. *Enquiry into Reserves and Consumption of Natural Gas in the Province of Alberta: Report*. Edmonton: Kings Printer.

Dixit, Avinash, and Robert S. Pindyck. 1994. *Investment under Uncertainty*. Princeton: Princeton University Press.

Dobson, Wendy. 1981. *Canada's Energy Policy Debate*. (Observation no. 23.) Montreal: C. D. Howe Institute.

Doern, G. Bruce. 1992. Canadian Energy Policy and the Struggle for Sustainable Development. Toronto: University of Toronto Press.

Doern, G. Bruce, and Monica Gattinger. 2003. *Power Switch: Energy Regulatory Governance in the Twenty-First Century.* Toronto: University of Toronto Press.

Doern, G. Bruce, and Glen Toner. 1985. *The Politics of Energy: The Development and Implementation of the* NEP. Toronto: Methuen.

Dormaar, Johan, and Robert A. Watt. 2008. *Oil City: Black Gold in Waterton Park*. Lethbridge: Lethbridge Historical Society.

Dunbar, R. B., Melanie Stogran, Pauline Chan, and Koksum Chan. 2004. *Oil Sands Supply Outlook: Potential Supply and Costs of Crude Bitumen and Synthetic Crude Oil in Canada, 2003–2017.* Calgary: Canadian Energy Research Institute.

Dvir, Eyal, and Kenneth Rogoff. 2009. *Three Epochs of Oil.* NBER Working Paper no. 14927. Washington, D.C.: National Bureau of Economic Research.

Easterbrook, William T., and Hugh G. Aitken. 1956. *Canadian Economic History*. Toronto: Macmillan.

Eden, L. 1994. *Multinationals as Agents of Change: Setting a New Canadian Policy on Foreign Direct Investment* (Discussion paper no. 1). Ottawa: Industry Canada.

Edie, Donald Colin. 1976. "Natural Gas Pricing in Alberta." *Alberta Law Review* 14: 455–73.

Edwards, Michael. 1972. 1973 Alberta Short-run Crude Oil Supply. Calgary: University of Calgary, M. A. thesis.

Eglington, Peter, and James A. Nugent. 1984. An Economic Analysis of Enhanced Oil Recovery in Conventional Light Oil Pools in Alberta (Economic Council of Canada, Discussion Paper no. 260). Ottawa: Economic Council of Canada.

Eglington, Peter, and Maris Uffelman. 1983. Observed Costs of Oil and Gas Reserves in Alberta, 1957–1979 (Economic Council of Canada, Discussion Paper no. 235). Ottawa: Economic Council of Canada.

 . 1984. An Economic Analysis of Oilsands Policy in Canada: The Case of Alsands and Wolf Lake (Economic Council of Canada, Discussion Paper no. 259). Ottawa: Economic Council of Canada.

Emery, J. C. Herb. 2006. "1986 The Bloom Comes off the Wild Rose Province." In Michael Payne, Donald Wetherell, and Catherine Cavanagh (eds.), *Alberta Formed Alberta Transformed*, 702–25. Calgary and Edmonton: University of Calgary Press and University of Alberta Press.

Emery, J. C. Herb, and Ronald D. Kneebone. 2008. "Socialists, Populists, Resources, and the Divergent Development of Alberta and Saskatchewan." *Canadian Public Policy* 34(4): 419–40.

- —. 2009. "Will It Be Déjà Vu All Over Again?" SPP Briefing Paper 2, no. 1. Calgary: University of Calgary School of Public Policy.
- Empey, William F. 1981. "The Impact of Higher Energy Prices in Canada." *Canadian Public Policy* 7, no. 1: 28–35.
- Energy Information Administration (EIA). 1995. The Value of Underground Storage in Today's Natural Gas Industry. DOE/EIA-0591(95).
- ——. 2006. U.S. Underground Natural Gas Storage Developments: 1998–2005.
- ------. 2010. Short-term Energy Outlook, November 2010.

——. 2013. Annual Energy Outlook.

- Englehardt, Rob, and Marius Todirescu. 2005. "An Introduction to Development in Alberta Oil Sands." Edmonton: University of Alberta School of Business.
- EnviroEconomics Inc. 2010. Fossil Fuels At What Cost? Government Support for Upstream Oil Activities in Three Canadian Provinces: Alberta, Saskatchewan and Newfoundland and Labrador. Prepared by Dave Sawyer and Seton Stiebert for the Global Subsidies Initiative of IISD. Winnipeg: International Institute for Sustainable Development (IISD).
- Esso Canada. (various years). Crude Oil Pricing Bulletin.
- Evans, J. 1986. OPEC, Its Member States and the World Energy Market. Burnt Hills, Essex: Longmans.
- Fattouh, Bassam. 2010. "The Dynamics of Crude Oil Price Differentials." *Energy Economics* 32, no. 2: 334–42.
- Ferguson, Barry G. 1985. *Athabasca Oil Sands, Northern Resource Exploration 1875–1951.* Regina: Canadian Plains Research Center.
- Finch, David. 2007. *Pumped: Everyone's Guide to the Oil Patch*. Calgary: Fifth House.
- Firey, Walter I. 1960. *Man, Mind and Land: A Theory of Resource Use.* Westport, CT: Greenwood.
- Fitzgerald, J. Joseph. 1978. Black Gold with Grit: The Alberta Oil Sands. Sidney, BC: Gray's Publishing.
- Florida, Richard L. 2005. *Cities and the Creative Class*. New York: Routledge.
- Fluker, Shaun. 2005. "The Jurisdiction of Alberta's Energy and Utilities Board to Consider Broad Socio-Ecological Concerns Associated with Energy Projects." *Alberta Law Review* 42: 1085–98.
- Foat, Ken D., and Alan J. MacFadyen. 1983. *Modelling Exploration Success in Alberta Oil Plays*. (CERI Study no. 19.) Calgary: Canadian Energy Research Institute.
- Foley, Gerald. 1976. *The Energy Question*. Harmondsworth, UK: Penguin.
- Fossum, J. E. 1997. Oil, the State and Federalism: The Rise and Demise of Petro-Canada as a Statist Impulse. Toronto: University of Toronto Press.
- Foster, Peter. 1982. *The Sorcerer's Apprentice: Canada's Super-Bureaucrats and the Energy Mess.* Toronto: Collins.
- Foster Research. 1980. Report for the Alberta Government on A Re-assessment of the Elements of an Economic Strategy for the Province of Alberta. Washington, D.C. and Calgary: Foster Research.

- Frank, Helmut J. 1966. *Crude Oil Prices in the Middle East.* New York: Praeger.
- Frankel, Jeffrey A. 2010. *The Natural Resource Curse: A Survey*. NBER Paper no. 16541. Washington, D.C.: National Bureau of Economic Research.
- Gaffney, Mason (ed.). 1967. *Extractive Resources and Taxation*. Washington: Committee on Taxation Resources and Economic Development.
- Gainer, Wallace D., and Thomas J. Powrie. 1975. "Public Revenue from Canadian Crude Petroleum Production." *Canadian Public Policy* 1, no. 1: 1–12.
- Garnaut, Ross, and Anthony Clunies-Ross. 1977. "A New Tax for Natural Resource Projects." In Michael Crommelin and Andrew R. Thompson (eds.), *Mineral Leasing as an Instrument of Public Policy*, 78–91. Vancouver: University of British Columbia for the British Columbia Institute for Economic Policy Analysis.
- Gately, Dermot. 1984. "OPEC: A Ten-year History." *Journal of Economic Literature* 22: 1100–1144.
- George, Rick. 2012. *Sun Rise: Suncor, the Oil Sands and the Future of Energy.* Toronto: Harper Collins Canada.
- Georgescu-Roegan, N. 1973. "Energy and Economic Myths." Southern Economic Journal 41: 347–81.
- Gilley, O. W., G. V. Karels, and R. P. Leone. 1986. "Uncertainty, Experience and the 'Winner's Curse' in OCS Lease Bidding." *Management Science* 32: 673–82.
- Globerman, S. 1999. Implications of Foreign Ownership Restrictions for the Canadian Economy – A Sectoral Analysis (Discussion Paper no. 7). Ottawa: Industry Canada.
- Goodnight, R.C., E.L. Dougherty, and D.H. Thurnae, 1970. "Optimizing the Scheduling of Oil Field Development." Paper presented to the 21st Annual Technical Meeting of CIM. Calgary.
- Gould, Ed. 1976. *The History of Canada's Oil and Gas Industry*. Toronto: Hancock House.
- Gow, Bonar Alexander (Sandy). 2005. Roughnecks, Rock Bits and Rigs: The Evolution of Oil Well Drilling Technology in Alberta, 1883–1970. Calgary: University of Calgary Press.
- Gray, Earle. 1970. *The Great Canadian Oil Patch*. Toronto: Maclean-Hunter.
- Griffin, James M. 1985. "OPEC Behavior: A Test of Alternative Hypotheses." *American Economic Review* 75, no. 5: 954–63.
- Griffin, James M., and Clifton T. Jones. 1986. "Falling Oil Prices: Where Is the Floor?" *The Energy Journal* 7, no. 4: 37–50.
- Griffin, James M., and Henry B. Steele. 1986. *Energy Economics and Policy* (revised ed.). Orlando: Academic Press.
- Griffin, James M., and David Teece. 1982. OPEC Behaviour and World Oil Prices. London: George Allen and Unwin.
- Guichon, Dave, Bernadette Ho, and Robert Froehlich. 2010. "Natural Gas Liquid Extraction Rights in Alberta: An

Evolving Landscape." *Alberta Law Review* 47, no. 2: 347–85.

Gulen, S. Gurcan. 1999. "Regionalization in World Crude Oil Markets: Further Evidence." *The Energy Journal* 20, no. 1: 125–39.

Habib, Allen. 2009. *Exhaustible Resources and Future Generations*. IAPR Technical Paper 09. Calgary: University of Calgary Institute for Advanced Policy Research.

Halpern, Paul, André Plourde, and Leonard Waverman. 1988. *Petro-Canada: Its Role, Control, and Operations*. Research Study for the Economic Council of Canada. Ottawa: Canada Supply and Services.

Hamilton, James D. 2009. "Understanding Crude Oil Prices." The Energy Journal 30, no. 2: 179–206.

— 2011. "Historical Oil Shocks." Working Paper WP-005 of EC3. Berkeley: UC Center for Energy and Environmental Economics.

Hamilton, Richard E. 1973. "Canada's Exportable Surplus Natural Gas Policy: A Theoretical Analysis." *Land Economics* 49: 251–59.

——. 1974. "Natural Gas and Canadian Policy." In Edward W. Erickson and Leonard Waverman (eds.), *The Energy Question: An International Failure of Policy*, *Vol. 2: North America*, 149–69. Toronto: University of Toronto Press.

Hansen, Petter V., and Lars Lindholt. 2008. "The Market Power of OPEC, 1973–2001." *Applied Economics* 40: 2939–59.

Hanson, Eric J. 1958. *Dynamic Decade: The Evolution and Effects of the Oil Industry in Alberta*. Toronto: McClelland & Stewart.

Hardy, W. G. (editor-in-chief). 1967. *Alberta: A Natural History*. Edmonton: M. G. Hurtig.

Harris, D. P. 1984. *Mineral Resources Appraisal*. Oxford: Clarendon Press.

Hartley, Peter R., Kenneth B. Medlock, and Jennifer E. Rosthal. 2008. "The Relationship of Natural Gas to Oil Prices." *The Energy Journal* 29, no. 3: 47–65.

Hartshorn, Jack E. 1967. Oil Companies and Government: An Account of the International Oil Industry in Its Political Environment (2nd ed.). London: Faber & Faber.

-----. 1993. Oil Trade: Politics and Prospects. Cambridge: Cambridge University Press.

Hartwick, John M. 1990. "Natural Resources, National Accounting and Economic Depreciation." *Journal of Public Economics* 43: 291–304.

— . 1994. "National Wealth and Net National Product." Scandinavian Journal of Economics 96: 253–56.

Heath, Michelle. 1992. *Alberta's Conventional Oil Supply How Much? How Long.* Calgary: Canadian Energy Research Institute.

Heath, Michelle, Kok-Sum Chan, and John Stariha. 1995. Conventional Oil Supply & Oil and Gas Replacement Costs. Calgary: Canadian Energy Research Institute.

Helliwell, John F. 1979. "Canada's Energy Policy." In J. M. Hollander, M. K. Simmons, and David O. Wood (eds.), *Annual Review of Energy*, 1979, 175–229. Palo Alto: Annual Reviews Inc.

Helliwell, John F., and Gerry May. 1976. "Taxes, Royalties and Equity Participation as Alternative Methods of Dividing Resource Revenues: The Syncrude Example." In Anthony D. Scott (ed.), *Natural Resource Revenues: A Test of Federalism*, 153–80. Vancouver: University of British Columbia for the British Columbia Institute for Economic Policy Analysis.

Helliwell, John F., and Robert N. McRae. 1981. "The National Energy Conflict." *Canadian Public Policy* 7, no. 1: 15–23.

——. 1982. "Resolving the Energy Conflict: From the National Energy Program to the Agreements." *Canadian Public Policy* 8, no. 1: 14–23.

Helliwell, John F., and Anthony Scott. 1981. *Canada in Fiscal Conflict: Resources and the West*. Vancouver: Pemberton Securities.

Helliwell, John F., Mary E. MacGregor, and André Plourde. 1983. "The National Energy Program Meets Falling World Oil Prices." *Canadian Public Policy* 9, no. 3: 284–96.

Helliwell, John F., Mary E. MacGregor, Robert N. McRae, and André Plourde. 1986. "The Western Accord and Lower World Oil Prices." *Canadian Public Policy* 12, no. 2: 341–55.

Horner, Doug. 2011. "What Lies Beneath." *Alberta Views* 14, no. 2: 31–34.

Hubbert, M. King. 1956. "Nuclear Energy and the Fossil Fuels." (Publication #95.) Houston: Exploration and Production Research Division, Shell Development Company.

——. 1962. Energy Resources: A Report to the Committee on Natural Resources of the National Academy of Sciences-National Research Council. Washington, D.C.: National Academy of Sciences and National Research Council.

Hughes, Jonathan E., Christopher R. Knittel, and Daniel Sperling. 2008. "Evidence of a Shift in the Short-Run Price Elasticity of Gasoline Demand." *The Energy Journal* 29, no. 1: 113–34.

Hyde, Bob. 1978. *Petroleum Leasing Contracts and Uncertainty*. Calgary: University of Calgary, M. A. thesis.

Hyndman, R. M., and M. W. Bucovetsky. 1974. "Rents, Rentiers and Royalties: Government Revenue from Canadian Oil and Gas." In Edward W. Erickson and Leonard Waverman (eds.), *The Energy Question: An International Failure of Policy, Vol. 2 North America*, 191–214. Toronto: University of Toronto Press. Imperial Oil Ltd. 1958. Supplementary Submission to the Royal Commission on Energy (July).

Innes, Harold. 1927. *The Fur Trade in Canada*. Toronto: Oxford University Press.

International Monetary Fund (IMF). (various years). International Financial Statistics. Washington, D.C.: International Monetary Fund.

InterProvincial Pipe Line Company. 1958. Submission to the Royal Commission on Energy.

Ismail, Kareen. 2010. "The Structural Manifestation of the Dutch Disease: The Case of Oil Exporting Countries." *IMF Working Papers 10-103*. Washington, D.C.: International Monetary Fund.

Jacoby, Neil. 1974. *Multinational Oil, A Study in Industrial Dynamics*. New York: Macmillan.

Jaffe, Amy Myers, and Robert Soligo. 2007. "The International Oil Companies." Houston: The James A. Baker III Institute for Public Policy at Rice University.

James, Patrick. 1990. "The Canadian National Energy Program and Its Aftermath: A Game-Theoretic Analysis." *Canadian Public Policy* 16, no. 2: 174–90.

Jenkins, Glenn P. 1977. *Capital in Canada: Its Social and Private Performance, 1965–1974.* (Economic Council of Canada Discussion Paper no. 98.) Ottawa: Economic Council of Canada.

Jones, Clifton T. 1990. "OPEC Behaviour under Falling Prices: Implications for Cartel Stability." *The Energy Journal* 11, no. 3: 117–29.

Jump, G. V., and T. A. Wilson. 1975. "Macro-economic Effects of the Energy Crisis, 1974–1975." *Canadian Public Policy* 1, no. 1: 30–38.

Kagel, John. H., and Dan Levin. 2002. "Bidding in Common Value Auctions: A Survey of Experimental Research." In John H. Kagel and Dan Levin (eds.), *Common Value Auctions and the Winner's Curse*, 1–84. Princeton: Princeton University Press.

Kahneman, Daniel, Paul Slovic, and Amos Tversky (eds.). 1982. Judgment under Uncertainty: Heuristics and Biases. Cambridge: Cambridge University Press.

Kahneman, Daniel, Richard H. Thaler, and Jack L. Knetsch. 1991. "The Endowment Effect, Loss Aversion, and Status Quo Bias: Anomalies." *Journal of Economic Perspectives* 5, no. 1: 193–206.

Kaufman, Gordon M. 1987. "Oil and Gas Resource and Supply Assessment." In Richard L. Gordon, Henry D. Jacoby, and Martin B. Zimmerman (eds.), *Energy: Markets* and Regulations, 259–80. Cambridge, MA: MIT Press.

Kaufman, Robert K., and Cutler J. Cleveland. 2001. "Oil Production in the Lower 48 States: Economic, Geological, and Institutional Determinants." *The Energy Journal* 22, no. 1: 27–49.

Kellogg, Ryan. 2010. *The Effect of Uncertainty on Investment: Evidence from Texas Oil Drilling*. NBER Working Paper no. 16974. Washington, D.C.: National Bureau of Economic Research.

Kemp, Alexander. 1987. Petroleum Rent Collection around the World. Halifax: Institute for Research on Public Policy.

Klassen, Henry C. 1999. *A Business History of Alberta*. Calgary: University of Calgary Press. Kleit, Andrew N. 2001. "Are Regional Oil Markets Growing Closer Together? An Arbitrage Cost Approach." *The Energy Journal* 22, no. 2: 1–15.

Kneebone, Ronald D., and Kenneth McKenzie. 1999. Past (In)discretions: Canadian Federal and Provincial Fiscal Policy. Toronto: University of Toronto Centre for Public Management.

Kolody, Anne. 1992. *Replacement Costs for Oil and Gas in Western Canada: 1970–1990.* Calgary: Canadian Energy Research Institute.

LaForest, Gerard. V. 1969. *Natural Resources and Public Policy under the Canadian Constitution*. Toronto: University of Toronto Press.

Lasserre, Pierre. 1985. "Discovery Costs as a Measure of Rent." Canadian Journal of Economics 18: 474–83.

Lawrey, Roger, and G. Campbell Watkins. 1982. "Chapter Six: Canadian Oil Trunk Pipelines." In G. Campbell Watkins (ed.), *The Canadian Oil Industry: An Analysis*, 132–63. Calgary: Shell Canada.

Laxer, Gordon, and John Dillon. 2008. *Over a Barrel: Exiting from NAFTA's Proportionality Clause*. Edmonton: Parkland Institute and Canadian Centre for Policy Alternatives.

Laxer, James. 1970. *The Energy Poker Game*. Toronto: New Press.

——. 1974. *Canada's Energy Crisis*. Toronto: James Lewis and Samuel.

——. 1983. Oil and Gas: Ottawa, the Provinces and the Petroleum Industry. Toronto: James Lorimer.

Leibenstein, Harvey. 1976. *Beyond Economic Man: A New Foundation for Microeconomics*. Cambridge, MA: Harvard University Press.

Leland, Hayne E. 1978. "Optimal Risk Sharing and the Leasing of Natural Resources, with Application to Oil and Gas Leasing on the OCS." *Quarterly Journal of Economics* 92, no. 3: 413–37.

Levitt, Kari. 1970. *The Silent Surrender: The Multinational Corporation in Canada*. Toronto: Macmillan.

Levy, Walter J. 1958. "Market Outlets for Canadian Crude Oil: Problems and Prospects." In Canadian Devonian Petroleums Ltd. et al., *Submission to the Royal Commission on Energy*. Calgary: Canadian Devonian Petroleums.

Lewis, David E., and Andrew R. Thompson. 1971 and following years. *Canadian Oil and Gas*. Toronto: Butterworths.

Libecap, Gary D., and James L. Smith. 2002. "The Economic Evolution of Petroleum Property Rights in the United States." *Journal of Legal Studies* 31, no. 52: 5589–5608.

Libecap, Gary D., and Steven N. Wiggins. 1984. "Contractual Responses to the Common Pool: Prorationing of Crude Oil Production." *American Economic Review* 74, no. 1: 87–98.

——. 1985. "The Influence of Private Contractual Failure on Regulation: The Case of Oil Field Unitization." *Journal* of Political Economy 93, no. 4: 690–714.

Lind, Robert C. (ed.). 1982. *Discounting for Time and Risk in Energy Policy*. Washington, D.C.: Resources for the Future. Lithwick, N. H. 1977. *Regional Economic Policy: The Canadian Experience.* Toronto: McGraw-Hill Ryerson.

Livernois, John R. 1987. "Empirical Evidence on the Characteristics of Extractive Technologies: The Case of Oil." *Journal of Environmental Economics and Management* 14, no. 1: 72–86.

Livernois, John R., and D. L. Ryan. 1987. "Testing for Nonjointness in Oil and Gas Exploration: A Variable Profit Function Approach." *International Economic Review* 30, no. 2: 479–504.

Livernois, John R., and Russell S. Uhler. 1987. "Extraction Costs and the Economics of Nonrenewable Natural Resources." *Journal of Political Economy* 95: 195–203.

Lovejoy, Wallace F., and Paul R. Homan. 1967. *Economic* Aspects of Oil Conservation Regulation. Baltimore, MD: Resources for the Future.

Low, Cecilia A. 2009. "The Rule of Capture: Its Current Status and Some Issues to Consider." *Alberta Law Review* 46: 799–829.

Lucas, Alistair, and Ian McDougall. 1983. "Petroleum and Natural Gas and Constitutional Change." In Stanley Beck and Ivan Bernier (eds.), *Canada and the New Constitution: The Unfinished Agenda*, Vol. II, 19–54. Montreal: Institute for Research on Public Policy.

MacAvoy, Paul W., and Robert S. Pindyck. 1975. *Price Controls and the Natural Gas Shortage*. Washington: American Enterprise Institute for Public Policy Research.

MacDonald, D. G., M. Power, and J. D. Fuller. 1994. "A New Discovery Process Approach to Forecasting Hydrocarbon Discoveries." *Resource and Energy Economics* 16, no. 2: 147–66.

MacFadyen, Alan J. 1988. "Decision Making with Expected Values and Certainty Equivalences: A Diagrammatic Comparison." *Resources Policy* 14, no. 2: 146–49.

MacFadyen, Alan J., Lawrence W. Copithorne, and Bruce Bell. 1985. "Case Studies of Oil Rent Collection Devices Used in Alberta." In *Proceedings of the Conference, Strategy for Energy Policy*, 127–34. Calgary: University of Calgary.

MacFadyen, Alan J., and K. D. Foat. 1985. "Modeling Conventional Crude Oil Supply: Complexity in an Uncertain World." In *Proceedings of the Conference, Strategy for Energy Policy*, 43–58. Calgary: University of Calgary.

MacRae, Duncan. 1979. *Policy Analysis for Public Decisions*. North Scituate, MA: Duxbury Press.

Manne, Alan S. 1976. "ETA: A Model for Energy Technology Assessment." *Bell Journal of Economics 7*, no. 2: 379–406.

Mansell, Robert L. 1975. Evaluating the Impact of Accelerated Rates of Investment on the Regional Economy: The Case of Alberta. (University of Calgary, Department of Economics, Discussion Paper no. 33.) Calgary: Department of Economics, University of Calgary.

-----. 1981. "Texas and Alberta: A Comparison of Regional Economies." *Texas Business Review* 55: 241–46.

——. 1997. "Fiscal Restructuring in Alberta: An Overview." In Christopher J. Bruce, Ronald D. Kneebone, and Kenneth J. McKenzie, eds., A Government Reinvented: A Study of Alberta's Deficit Elimination Program, Chapter 1. Toronto: Oxford University Press.

Mansell, Robert L., and Lawrence Copithorne. 1986. "Canadian Regional Economic Disparities: A Survey." In Kenneth H. Norrie, *Disparities and Interregional Adjustment*, 1–57. Toronto: University of Toronto Press, for the Royal Commission on the Economic Union and Economic Prospects for Canada.

Mansell, Robert L., and Michael B. Percy. 1990. *Strength in Adversity: A Study of the Alberta Economy*. Edmonton: University of Alberta Press.

Mansell, Robert L., and Ronald Schlenker. 1988. "An Analysis of the Regional Distribution of Federal Fiscal Balances." (Department of Economics Working Paper.) Calgary: University of Calgary, Department of Economics.

Mansell, Robert L., Ronald Schlenker, and John Anderson. 2005. "Backgrounder: Revenue, Fiscal Balances and National Sharing." Calgary: Institute for Sustainable Energy, Environment and Economy (ISEEE).

Mansell, Robert L., and Robert W. Wright. 1981. A Model of the Alberta Economy. (University of Calgary, Department of Economics, Discussion Paper no. 62.) Calgary: Department of Economics, University of Calgary.

McClements, Jr., Robert. 1968. "The Athabasca Tar Sands." In James D. Hilborn (ed.), *Dusters and Gushers: The Canadian Oil and Gas Industry*. Chapter 5. Toronto: Pitt Publishing.

McCray, Arthur W. 1975. *Petroleum Evaluation and Economic Decisions*. Englewood Cliffs, NJ: Prentice-Hall.

McCrossan, R. G. 1969. "An Analysis of Size Frequency Distribution of Oil and Gas Fields of Western Canada." *Canadian Journal of Earth Sciences* 6: 201–11.

McCrossan, R. G., and J. W. Porter. 1973. "The Geology and Petroleum Potential of the Canadian Sedimentary Basin-A Synthesis." In Canadian Society of Petroleum Geologists (CSPG), Memoir 1, *The Future Petroleum Provinces of Canada*, 589–720. Calgary: Canadian Society of Petroleum Geologists.

McCullum, Hugh. 2006. *Fuelling Fortress America: A Report* on the Athabasca Tar Sands and U.S. Demands for *Canadian Energy*. Ottawa: Canadian Centre for Policy Alternatives, the Parkland Institute, and the Polaris Institute.

McDonald, Stephen L. 1963. *Federal Tax Treatment of Income from Oil and Gas*. Washington, D.C.: Brookings Institute.

——. 1970. "Distinctive Tax Treatment of Income from Oil And Gas Production." *Natural Resources Journal* 10, no. 1: 97–112.

— . 1971. Petroleum Conservation in the United States: An Economic Analysis. Baltimore, MD: Johns Hopkins, for Resources for the Future.

McDougall, Ian A. 1973. "The Canadian National Energy Board: Economic "Jurisprudence' in the National Interest or Symbolic Reassurance?" *Alberta Law Review* 11: 327–82.

- —. 1983. Marketing Canada's Energy: A Strategy for Security in Oil and Gas. Toronto: James Lorimer and Canadian Institute for Economic Policy.
- McDougall, John N. 1975. The National Energy Board and Multinational Corporations: The Politics of Pipe Lines and Natural Gas Exports, 1960–1971. (Ph.D. dissertation) Edmonton: University of Alberta.
 —. 1982. Fuels and the National Policy. Toronto:
- Canada's Energy Trade." *Canadian Public Policy* 17, no. 1: 1–13.
- McGillivray, A. A. 1940. Alberta's Oil Industry: The Report of a Royal Commission Appointed by the Government of the Province of Alberta under the Public Inquiries Act to Inquire into Matters Connected with Petroleum and Petroleum Products. Edmonton, Alberta: Royal Commission to Inquire into Matters Connected with Petroleum and Petroleum Products.
- McLachlan, Michele. 1990. *Replacement Costs for Oil and Gas in Western Canada: Methodologies and Application.* Calgary: Canadian Energy Research Institute.
- ------. 1991. Replacement Costs for Oil and Gas in Western Canada: 1970–1989. Calgary: Canadian Energy Research Institute.
- McRae, Robert N. 1982. "A Major Shift in Canada's Energy Policy: Impact of the National Energy Program." *Journal of Energy and Development* 7, no. 2: 173–98.
- ------. 1985. "A Survey of Canadian Energy Policy: 1974–1983." The Energy Journal 6, no. 4: 49–65.
- Mead, Walter J. 1979. "An Economic Analysis of Crude Oil Price Behavior in the 1970s." *Journal of Energy and Development* 4, no. 2: 212–28.
- ——. 1984. "Competitive Bidding under Asymmetrical Information: Behavior and Performance in the Gulf of Mexico Drainage Lease Sales, 1954–1969." *Review of Economics and Statistics* 66: 505–8.
- ------. 1994. "Toward an Optimal Oil and Gas Leasing System." *The Energy Journal* 15, no. 4: 1–18.
- Melvin, James R. 1987. "Regional Inequalities in Canada: Underlying Causes and Policy Implications." *Canadian Public Policy* 13, no. 3: 304–17.
- Miller, C. C., and A. B. Dyes. 1959. "Maximum Reservoir Worth – Proper Well Spacing." *Journal of Petroleum Technology* 11 (11): 334–40.
- Mintz, Jack, and Duanjie Chen. 2010. "Taxing Canada's Cash Cow: Tax and Royalty Burdens on Canada's Oil and Gas Investments." SPP Briefing Papers 3(3). Calgary: University of Calgary School of Public Policy.
- Mitchell, Robert, Brad Anderson, Marty Kaga, and Stephen Eliot. 1998. "Alberta's Oil Sands: Update on the Generic Royalty Regime." Paper presented October 1998; available on Alberta Energy website <http://www.energy.alberta.ca/OilSands/1190.asp>.
- Moroney, John R., and M. Douglas Berg. 1999. "An Integrated Model of Oil Production." *The Energy Journal* 20, no. 1: 105–24.

- Mumey, Glen, and Joseph Ostermann. 1990. "Alberta Heritage Fund: Measuring Value and Achievement." *Canadian Public Policy* 16, no. 1: 29–50.
- Muskat, Morris. 1949. *Physical Principles of Oil Production*. New York: McGraw–Hill.
- National Task Force on the Oil Sands. 1995. A Recommended Fiscal Regime for Canada's Oil Sands Industry. Edmonton: Alberta Chamber of Resources.
- Nemeth, Tammy. 2006. "1980 Duel for the Decade." In Michael Payne, Donald Wetherell, and Catherine Cavanagh (eds.), *Alberta Formed Alberta Transformed*, 676–700. Calgary and Edmonton: University of Calgary Press and University of Alberta Press.
- Newton, W. L. 1969. "Statement made at Hearings before the United States Senate Subcommittee on Antitrust and Monopoly." In *The Petroleum Industry, Part 1*, 40–83. Washington, D.C.: U.S. Senate Subcommittee on Antitrust and Monopoly.
- Nikiforuk, Andrew. 2008. *Tar Sands: Dirty Oil and the Future* of a Continent. Vancouver: Greystone Books and the David Suzuki Foundation.
- Nordhaus, William D. 1973. "The Allocation of Energy Resources." *Brookings Papers on Economic Activity* 3: 529–76.
- Norrie, Kenneth H. 1981. "The National Energy Program: A Western Perspective." In G. Campbell Watkins and Michael Walker (eds.), *Reaction: the National Energy Program*, 105–24. Vancouver: Fraser Institute.
- Norrie, Kenneth H. (coordinator). 1986. *Disparities and Interregional Adjustment*. Toronto: University of Toronto Press, for the Royal Commission on The Economic Union and Economic Prospects for Canada.
- Norrie, Kenneth H., and Michael B. Percy. 1981. *Westward Shift an Interregional Adjustment: A Preliminary Assessment.* (Economic Council of Canada Discussion paper no. 201.) Ottawa: Economic Council of Canada.
- . 1982. Energy Price Increases, Economic Rents and Industrial Structure in a Small Regional Economy. (Economic Council of Canada Discussion Paper no. 220.) Ottawa: Economic Council of Canada.
- . 1983. Economic Rents, Province-Building and Interregional Adjustment: A Two-Region General Equilibrium Analysis. (Economic Council of Canada Discussion Paper no. 230.) Ottawa: Economic Council of Canada.
- Norrie, Kenneth H., Richard Simeon, and Mark Krasnick (eds.). 1986. *Federalism and Economic Union in Canada*. (Collected research studies of the Royal Commission on the Economic Union and Development Prospects for Canada ; v. 59.) Toronto: University of Toronto Press.
- Odell, Peter. 1986. *Oil and World Power* (4th ed.) Middlesex, U.K.: Penguin.
- Oil in Canada (various issues).
- Oilweek (various issues).
- Ontario. Ontario Energy Board. 1986. Amended Reasons for Decision 414-1 (Union), 429 (Consumer's Gas), 430-1 (ICG).

—. 1987. Reasons for Decision in the Matter of a Hearing Respecting Contract Carriage Arrangements on the Consumer's Gas Co. Ltd.'s, ICG Utilities (Ontario) Ltd.'s and Union Gas Ltd.'s Ontario Distribution Systems.

Organization for Economic Cooperation and Development (OECD). (various years). *Oil Statistics Supply and Demand*. Paris: Organization for Economic Cooperation and Development.

Organization of Petroleum Exporting Countries (OPEC). 2006. Long-term Strategy.

Osborne, Dale K. 1978. "Cartel Problems." *American Economic Review* 68, no. 5: 947–49.

Owram, Doug. 1982. *Economic Development of Western Canada – An Historical Overview* (Economic Council of Canada Discussion paper no. 219). Ottawa: Economic Council of Canada.

Page, Talbot. 1977. *Conservation and Economic Efficiency*. Baltimore, MD: Johns Hopkins University Press.

Parkland Institute. 2010. *Misplaced Generosity: Extraordinary Profits in Alberta's Oil and Gas Industry*. (Author: Regan Boychuk.) Edmonton: The Parkland Institute.

Parra, Francisco. 2004. *Oil Politics: A Modern History of Petroleum*. London: I. B. Tauris.

Pembina Institute. 2004. When the Government is the Landlord: Economic Rent, Non-renewable Permanent Funds, and Environmental Impacts Related to Oil and Gas Developments in Canada. Calgary: Pembina Institute for Appropriate Development.

Penrose, Edith. 1968. *The Large International Firm in* Developing Countries: The International Petroleum Industry. London: Allen and Unwin.

Phlips, Louis. 1983. *The Economics of Price Discrimination*. Cambridge: University of Cambridge Press.

Pindyck, Robert S. 1999. "The Long-Run Evolution of Energy Prices." *The Energy Journal* 20, no. 2: 1–27.

Plourde, André. 1986. Oil and Gas in Canada: A Chronology of Important Developments – 1941–1986 (PEAP Energy Study #86-5). Toronto: Institute for Policy Analysis, University of Toronto.

——. 1988. "On Aspects of Oil and Gas Trade." *The Energy Journal* 9, no. 4: 107–10.

——. 1989. "Canadian Fiscal Systems for Oil and Gas: An Overview of the Last Two Decades." *Energy Studies Review* 1, no. 1: 1–15.

------. 1991. "The NEP Meets the FTA." *Canadian Public Policy* 17, no. 1: 14–24.

——. 1993. "Natural Gas Trade in North America: Building Up to the NAFTA." *The Energy Journal* 14, no. 3: 51–73.

——. 2005. "The Changing Nature of National and Continental Energy Markets." In G. Bruce Doern (ed.), *Canadian Energy Policy and the Struggle for Sustainable Development*, Chapter 2. Toronto: University of Toronto Press.

——. 2009. "Oil Sands Royalties and Taxes in Alberta: An Assessment of Key Developments since the mid-1990s." *The Energy Journal* 30, no. 1: 111–39.

Plourde, André, and G. Campbell Watkins. 1998. "Crude Oil Prices between 1985 and 1994: How Volatile in Relation to Other Commodities?" *Resource and Energy Economics* 20, no. 3: 245–62.

Plourde, André, and Leonard Waverman. 1989. "Canadian Energy Trade: The Past and the Future." In G. Campbell Watkins (ed.), *Petromarkets: Probing the Economics of Continental Energy*, 141–80. Vancouver: Fraser Institute.

Power, M., and J. D. Fuller. 1992. "A Review of Methods for Estimating Future Hydrocarbon Supply." *Energy Studies Review* 4, no. 2: 128–45.

Powrie, Thomas L, and W. D. Gainer. 1976. *Canadian Policy Toward Trade in Crude Oil and Natural Gas: A Review of the Alternatives*. Ottawa: Economic Council of Canada.

Pratt, Larry. 1976. *The Tar Sands-Syncrude and the Politics of Oil.* Edmonton: Hurtig.

——. 1984. "Energy, Regionalism and Canadian Nationalism." Paper based on the David Alexander Memorial Lecture delivered at Memorial University, September 24, 1984.

Precht, Paul, and Carmen Rokosh. 1998. *Alberta's Oil Sands: The New Paradigm*. Edmonton: Department of Energy.

Prince, J. Philip. 1980. *Enhanced Oil Recovery Potential in Canada*. Calgary: Canadian Energy Research Institute.

Proctor, R. M., G. C. Taylor, and J. A. Wade. 1984. Oil and Natural Gas Resources of Canada, 1983 (Paper no. 83-31 of the Geological Survey of Canada). Ottawa: Canada Supply and Services.

Quinn, David, and Andy Luthin. 1997. Finding and Development Costs for Oil and Gas in Western Canada, 1992– 1996. Calgary: Canadian Energy Research Institute.

Quiran, G. David, and Basil A. Kalyman. 1977. "The Financial Position of the Petroleum Industry." In Michael Walker and G. Campbell Watkins (eds.), *Oil in the Seventies: Essays on Energy Policy*, 212–40. Vancouver: Fraser Institute.

Richards, J., and Larry Pratt. 1979. *Prairie Capitalism: Power* and Influence in the New West. Toronto: McClelland & Stewart.

Roth, Bernard J. 2009. "NAFTA, Alberta Oil Sands Royalties and Change: Yes We Can?" *Alberta Law Review* 46, no. 2: 335–76.

Rowse, John G. 1986. "Allocation of Canadian Natural Gas to Domestic and Export Markets." *Canadian Journal of Economics* 19, no. 3: 417–42.

 . 1987. "Depletable Resource Recovery Profiles and Efficient Resource Allocation." *Resources and Energy* 9: 309–26.

——. 1990. "Discount Rate Choice and Efficiency in Exhaustible Resource Allocation." *Canadian Journal of Economics* 23: 772–90.

Ruitenbeek, Jack. 1985. "Economics of In-Situ Oilsands Production: Some Implications for Public Policy." *Canadian Public Policy* 11 (July supplement): 407–14.

Ryan, J. 1973a. "An Analysis of Crude-Oil Discovery Rate in Alberta." *Bulletin of Canadian Petroleum Geology* 21: 219–35. —. 1973b. "An Estimate of the Conventional Crude-Oil Potential in Alberta." *Bulletin of Canadian Petroleum Geology* 21: 236–46.

Safarian, Ed. 1973. *Foreign Ownership of Canadian Industry*. Toronto: University of Toronto Press.

Scarfe, Brian L. 1980. "The Federal Budget and the Energy Program, October 28, 1980: A Review." *Canadian Public Policy* 7, no. 1: 1–14.

Scarfe, Brian L. 1984. "The New Oil Price Scenario and the Chretien-Zaozirny Agreement: A Comment." *Canadian Public Policy* 10, no. 3: 340–46.

Scarfe, Brian L., and Edwin W. Rilkoff. 1984. Financing Oil and Gas Exploration and Development Activity. (Economic Council of Canada Discussion Paper # 274.) Ottawa: Economic Council of Canada.

Schwartz, S. L., J. D. Fuller, and W. T. Ziemba. 1985. "Longrun Effects of the Canadian National Energy Agreements." *The Energy Journal* 6, no. 1: 63–78.

Schweitzer, Thomas T. 1982. *Migration and a Small Long-term Econometric Model of Alberta* (Economic Council of Canada Discussion Paper no. 221). Ottawa: Economic Council of Canada.

Scott, Anthony, D. 1973. *Natural Resources: The Economics of Conservation*. (Revised ed.) Toronto: McClelland & Stewart.

Sen, Amartiya. 1987. On Ethics and Economics. Oxford: Blackwell.

Serletis, Apostolos, and Ricardo Rangel-Rui. 2004. "Testing for Common Features in North American Energy Markets." *Energy Economics* 26, no. 3: 401–14.

Shaffer, Ed H. 1968. *The Oil Import Program of the United States, An Evaluation*. New York: Praeger.

Shell Canada. (various years). Crude Oil Pricing Bulletin.

Siegel, Daniel R. 1985. "Estimating Potential Social Losses from Market Failure: Oil Exploration in Alberta." *Rand Journal of Economics* 16: 537–52.

Sierra Systems. 2010. Project Committee Final Technical Report on Alberta's Natural Gas & Conventional Oil Investment Competitiveness to the Alberta Department of Energy. Edmonton: Sierra Systems Group. (Available from Alberta Department of Energy.)

Simpson, Jeffrey. 1984. *Discipline of Power: The Conservative Interlude and the Liberal Restoration*. Toronto: Macmillan of Canada.

Simpson, R. A., P. N. Thorsteinsson, Kenneth G. Miller, M. W. Matthews, D. A. McGregor, and Frederic H. Finnis. 1963. Oil and Gas Production and Taxes (Canadian Tax Foundation no. 33). Toronto: Canadian Tax Foundation.

Skeet, Ian. 1988. OPEC: Twenty-five Years of Prices and Politics. Cambridge: Cambridge University Press.

Slagorsky, Z. Charles, and Janice L. Pasay. 1985. *Estimated Petroleum Finding Costs in Alberta*, 1970–1983. Calgary: Canadian Energy Research Institute. Smith, James L. 2005. "Inscrutable OPEC? Behavioral Tests of the Cartel Hypothesis." *The Energy Journal* 26, no. 1: 51–82.

— 2009. "World Oil: Market or Mayhem." *Journal of Economic Perspectives* 23, no. 3: 145–64.

— 2010. "On the Portents of Peak Oil (and Other Indicators of Resource Scarcity)." Paper 10-010 of the Center for Energy and Environmental Policy Research (CEEPR). Cambridge, Ma: CEEPR, A joint Center of the Department of Economics, MIT Energy Initiative and Sloan School of Management, Massachusetts Institute of Technology.

Smith, Peter J. 1991. "The Politics of Plenty: Investing Natural Resource Revenues in Alberta and Alaska." *Canadian Public Policy* 17, no. 2: 139–54.

Smith, Roger S. 1992. "Income Growth, Government Spending, and Wasting Assets – Alberta's Oil and Gas." *Canadian Public Policy* 18, no. 4: 387–412.

Somerville, H. H. 1977. A History of Crown Rentals, Royalties and Mineral Taxation in Alberta to December 31, 1972. Edmonton: Department of Energy and Natural Resources.

Sorrell, Steve, and Jaimie Speirs. 2009. UKERC Review of Evidence for Global Oil Depletion Technical Report 5: Methods of Estimating Ultimately Recoverable Resources (July 2009: REF UKERC/WP/ TPA/2009/020). London: UK Energy Research Centre.

Sosa, Sebastian, and Nicolas E. Magud. 2010. "When and Why Worry about Real Exchange Rate Appreciation? The Missing Link between Dutch Disease and Growth." IMF Working Papers 10-271. Washington, D.C.: International Monetary Fund.

Stanford Research Institute. 1972. *The Market Price for Natural Gas from Sources in Western Canada, 1972–1990.* Menlo Park, CA: Stanford Research Institute.

Stigler, George J. 1972. "The Process of Economic Regulation." Antitrust Bulletin 17, no. 1: 207–35.

Stiglitz, Joseph E. 1975. "The Efficiency of Market Prices in Long Run Allocations in the Oil Industry." In Gerald M. Brannan (ed.), *Studies in Energy Tax Policy*, 55–97. Cambridge, MA: Ballinger.

Syncrude Canada. (various years). Annual Reports.

 Tanner, James N. 1986. Reserves of Hydrocarbons in Alberta: A Review of Canadian Petroleum Association and Alberta Energy Resources Conservation Board Estimates and Methodology (CERI Research Report no. 86-2).
 Calgary: Canadian Energy Research Institute.

Taylor, Amy, Matthew Bramley, and Mark Winfield. 2005. Government Spending on Canada's Oil and Gas Industry. Calgary: Pembina Institute.

Thaler, Richard H. 1995. *Quasi-rational Economics*. New York: Russell Sage Foundation.

Thirsk, Wayne R., and Robert R. Wright. 1977. "The Impact of the Crude Oil Subsidy on Economic Efficiency in Canada." *Canadian Public Policy* 3, no. 3: 355–64.

Thompson, Andrew R. 1965. "Basic Contrasts underlying Petroleum Land Policies of the US and Canada." *Journal of Canadian Petroleum Technology* 3, no. 2: 80–87. Thompson, Erica, Steve Sorrell, and Jamie Speirs. 2009. UKERC Review of Evidence on Global Oil Depletion Technical Report 2: Definition and Interpretation of Reserve Estimates (July 2009: REF UKERC/WP/ TPA/2009/017). London: UK Energy Review Centre.

Toombs, R. B., and R. A. Simpson. 1957. A Survey of the Petroleum Industry in Canada during 1956. Ottawa: Department of Mines and Technical Surveys, Mineral Resources Division.

Toronto Dominion Bank. 2003. *The Calgary Edmonton Corridor: Take Action Now to Ensure Tiger's Roar Doesn't Fade*. Toronto: TD Economics.

Tuer, David. 2002. *Moving from Good to Great: Report of the Commission on Alberta Financial Management*. Edmonton: Government of Alberta.

Tyerman, Peter. 1976. "Pricing of Alberta's Oil." *Alberta Law Review* 14: 427–54.

Uhler, Russell S. 1976. "Costs and Supply in Petroleum Exploration: The Case of Alberta." *Canadian Journal of Economics* 9: 72–90.

- . 1977. "Economic Concepts of Petroleum Supply." In Michael Walker and G. Campbell Watkins (eds.), Oil in the Seventies: Essays on Energy Policy, 2–42.
 Vancouver: Fraser Institute.
- -----. 1979. Oil and Gas Finding Costs. (Canadian Energy Research Institute, Study no. 7.) Calgary: Canadian Energy Research Institute.

——. 1981. Oil Reserves Prices. (University of British Columbia Programme in Resource Economics, Resources paper no. 66.) Vancouver: University of British Columbia. Department of Economics.

Uhler, Russell S., and Peter C. Eglington. 1983 (October). *The Potential Supply of Crude Oil and Natural Gas Reserves in Alberta*. Ottawa: Economic Council of Canada.

United States of America. Cabinet Task Force on Oil Import Control. 1970. *The Oil Import Question: A Report on the Relationship of Oil Imports to National Security.* Washington, D.C.: U.S. Government Printing Office.

Urquhart, Ian. 2010. "Petrostate?" *Alberta Views*, October: 27–32.

Usher, Dan. 2007. "The Reform of Equalization Payments." *Canadian Public Policy* 33, no. 3: 337–66.

Van Meurs, A. Pedro H. 1971. *Petroleum Economics and* Offshore Mining Legislation. Amsterdam: Elsevier.

Verleger, Philip K. 1982. Oil Markets in Turmoil: An Economic Analysis. Cambridge, MA: Ballinger.

 . 1986. "The Evolution of Oil as a Commodity." In Richard L. Gordon, Henry D. Jacoby, and Martin B. Zimmerman (eds.), *Energy, Markets and Regulation: Essays in Honor of M. A. Adelman*, 161–86. Cambridge, MA: MIT Press.

Vidas, Harry, and Bob Hugman. 2008. Availability, Economics, and Production Potential of North American Unconventional Natural Gas Supplies. Fairfax, VA: INGAA Foundation.

Walker, Michael. 1981. "The National Energy Program: An Overview of its Impact and Objectives." In G. Campbell Watkins and Michael Walker (eds.), *Reaction: The National Energy Program*, 3–31. Vancouver: Fraser Institute.

Walls, Margaret A. 1992. "Modelling and Forecasting the Supply of Oil and Gas: A Survey of Existing Approaches." *Resources and Energy* 14, no. 3: 287–309.

Warrack, Allan A., and Russell R. Keddie. 2000. "Alberta Heritage Fund vs. Alaska Permanent Fund: A Comparative Analysis." Paper presented at the 39th Annual Meeting of the Western Regional Science Association, Kauai, Hawaii.

Watkins, G. Campbell. 1970. "Prorationing and the Economic Efficiency of Crude Oil Production: A Comment." *Canadian Journal of Economics* 3, no. 2: 511–15.

------. 1971. Proration and the Economics of Oil Reservoir Development, Province of Alberta. Research thesis, University of Leeds.

------. 1975. "Competitive Bidding and Alberta Petroleum Rents." *Journal of Industrial Economics* 23: 301–12.

——. 1977a. "Canadian Oil and Gas Pricing: Perspectives and Problems." In Michael Walker and G. Campbell Watkins (eds.), Oil in the Seventies: Essays on Energy Policy, 86–124. Vancouver: Fraser Institute.

------. 1977b. "Cost of Supply: Oil Enhanced Recovery Schemes in Alberta." *Bulletin of Canadian Petroleum Geology* 25, no. 2: 433–40.

——. 1981. "Mr. Lalonde and the Price Mechanism: Or Never the Twain Shall Meet." In. G. Campbell Watkins and Michael Walker (eds.), *Reaction: The National Energy Program*, 55–73. Vancouver: Fraser Institute.

——. 1982a. "Canadian Public Policy and the Export of Natural Gas." (Department of Economics Discussion Paper no.75.) Calgary: University of Calgary Department of Economics.

 . 1982b. "Basic Features of the Canadian Oil Industry."
 In G. Campbell Watkins (ed.), *The Canadian Oil Industry: An Analysis*, 12–24. Calgary: Shell Canada.

——. 1987a. "Living under a Shadow: US Oil Policies and Canadian Oil Pricing." In Robert L. Gordon, H. D. Jacoby and Martin B. Zimmerman (eds.), *Energy Markets and Regulation*, 31–57. Cambridge, MA: MIT Press.

——. 1987b. "Postscript: Canadian Policy Perspectives." In Alexander Kemp, *Petroleum Rent Collection around the World*, 325–42. Halifax: Institute for Research on Public Policy.

 . 1989. "Eccentric Orbits: Canadian Oil and Gas Pricing, 1947–1987." In G. C. Watkins (ed.), *Petro-Markets: Probing the Economics of Continental Energy*, 105–40. Vancouver: Fraser Institute.

 . 1990. Canadian Controls on Natural Gas Exports: Recent Developments. (ICEED Occasional Paper no. 11.) Boulder, CO: International Research Center for Energy and Economic Development.

------. 1991a. "Deregulation and the Canadian Petroleum Industry: Adolescence or Maturity?" In W. Block and G. Lermer (eds.), *Breaking the Shackles*, 215–52. Vancouver: Fraser Institute.

- ——. 1991b. "The United States-Canada Free Trade Agreement: Implications for Oil and Gas." In Proceedings of the Thirteenth World Petroleum Congress, 77–85. Chichester: John Wiley and Sons.
- . 1991c. "The Economic Analysis of Energy Demand: Perspectives of a Practitioner." (Department of Economics Discussion Paper Series, No. 129.) Calgary: Department of Economics, University of Calgary.
- ——. 1992. "The Hotelling Principle: Autobahn or Cul de Sac." (IAEE Presidential Address). *The Energy Journal* 13, no. 1: 1–25.
- ——. 1993. "The NAFTA and Energy: A Bridge Not Far Enough?" In Steven Globerman and Michael Walker (eds.), Assessing NAFTA: A Trinational Analysis, 193– 225. Vancouver: Fraser Institute.
- . 1994. "Constitutional Imperatives and the Treatment of Energy in the NAFTA." Oil and Gas Law and Taxation Review 12, no. 7: 199–205.
- Watkins, G. Campbell, and Paul G. Bradley. 1982. "Government Policy and the Canadian Crude Oil Supply Sector." In G. C. Watkins (editor), *The Canadian Oil Industry: An Analysis*, 61–92. Calgary: Shell Canada.
- ——. 1987. "Net Value Royalties: Practical Tool or Economists' Illusion?" *Resources Policy* 13, no. 4: 279–88.
- Watkins, G. Campbell, and Robert Kirby. 1981. "Bidding for Petroleum Leases: Recent Canadian Experience." *Energy Economics* 3: 182–86.
- Watkins, G. Campbell, and Brian Scarfe. 1985. "Canadian Oil and Gas Taxation." *The Energy Journal* 6 (Special Tax Issue): 17–36.
- Watkins, G. Campbell, and Karen C. Sharpe. 1970. "The Long-Term Cost of Alberta Crude Oil." *Journal of Canadian Petroleum Technology* 9, no. 1: 22–27.
- Watkins, G. Campbell, and Leonard Waverman. 1985. "Canadian Natural Gas Export Pricing Behaviour." *Canadian Public Policy* 9 (Supplement): 415–26.
- -----. 1993. "How Might North American Oil and Gas Markets Have Performed with a Free Trade Agreement in 1970?" *The Energy Journal* 14, no. 3: 119–53.

- Watkins, M. H. 1963. "A Staple Theory of Economic Growth." *Canadian Journal of Economics and Political Science* 29: 141–58.
- Waverman, Leonard. 1972. "National Policy and Natural Gas: The Cost of a Border." *Canadian Journal of Economics* 5, no. 3: 331–48.
- ------. 1973. Natural Gas and National Policy: A Linear Programming Model of North American Natural Gas Flows. Toronto: University of Toronto Press.
- ------. 1975. "The Two-price System in Energy: Subsidies Forgotten." *Canadian Public Policy* 1, no. 1: 76–88.
- —. 1980. "The Visible Hand: The Pricing of Canadian Oil Resources." In Ontario Economic Council (ed.), *Energy Policies for the 1980s: An Economic Analysis*, 25–58. Toronto: Ontario Economic Council.
- . 1984. "Canadian Energy Policy after 1985: Lessons from the Present." In Edward A. Carmichael and Corina M. Herrera (eds.), *Canada's Energy Policy, 1985* and Beyond, 39–58. Toronto: C. D. Howe Institute.
- ——. 1987. "The Impact of \$(US)15 Oil: Introduction." Canadian Public Policy 13, no. 1: 1–8.
- Waverman, Leonard, and G. Campbell Watkins. 1985.
 "The Regulation of the Canadian Downstream Oil Industry: Nature, Impacts and Remedies." (PEAP Policy Study no. 85-1.) Toronto: Policy and Economic Analysis Program, University of Toronto.
- Weiner, Robert J. 1991. "Is the World Oil Market 'One Great Pool'?" *The Energy Journal* 12, no. 3: 95–107.
- Wiggins, Steven N., and Gary D. Libecap. 1985. "Oil Field Unitization: Contractual Failure in the Presence of Imperfect Information." *American Economic Review* 75, no. 3: 368–85.
- Wilkinson, Bruce W. 1984. "Energy Revenue Sharing." In Edward A. Carmichael and Corina M. Herrera (eds.), *Canada's Energy Policy*, 1985 and Beyond, 59–69. Toronto: C. D. Howe Institute.
- Willig, Robert D. 1976. "Consumer's Surplus without Apology." *American Economic Review* 6, no. 4: 589–97.
- Willson, Bruce F. 1980. *The Energy Squeeze: Canadian Policies for Survival.* Toronto: James Lorimer and Canadian Institute for Economic Policy.
- Winberg, Alan R. 1987. *Managing Risk and Uncertainty in International Trade: Canada's Natural Gas Exports*. Boulder, CO: Westview Press.
- Yergin, Daniel. 1990. *The Prize: The Epic Quest for Oil, Money, and Power*. New York: Simon and Schuster.
- Yu, Qing. 2003. An Application of the Berg/ Moroney Models of Crude Oil Supply to Western Canada and Alberta. Calgary: University of Calgary, M.A. thesis.
- Zimmermann, Erich W. 1951. *World Resources and Industries*. (Revised ed.) New York: Harper and Brothers.

INDEX

Note: references including Tables and Figures are in **bold**.

А

abandonment and reserves, 84, 102, 346-47 economics of, 57, 58-9, 178, 180-81, 346, 384, 454, 461 policy-induced earlier, 28, 67, 74, 261, 297-98, 300, 301, 305, 308, 310, 314, 322, 323-24, 325, 327, 332, 346-47, 455, 459 regulation of, 25, 28, 111, 269, 272, 452 Abasands Oil, 143 ability to pay, 289, 327, 393, 458 absolute cost advantage, 69, 70 accelerator process, 414, 434 Access to the Future Account (Alberta), 447 ad hoc model, 173-74, 193-94 *ad valorem* royalty, **73–75**, 164, 295, 297–**99**, 307, 309, 321-22, 324-25, 331, 340, 346, 402, 459 Adelman, M. A., 12, 37, 41, 43, 45, 49, 51, 52, 57, 77, 84, 102, 118, 119, 173, 183, 230, 235, 242, 271, 281, 281, 463 adjustment processes by the petroleum industry, 37, 45, 58, 61, 113, 119, 120, 123, **127**, 181, 195–97, 198, 209, 251, 268, 280, 406, 456 for appreciation of reserves (see appreciated reserves) for price changes (see inflation) in the economy, 154, 243, 252, 263, 264, 416-17, 420, 433, 434, 437, 438-89, 445, 456, 457 in the market, 46, 50, 52. 62-63, 65, 78, 103-4, 113-14, 121, 154, 238, 260, 281, 285, 362, 368, 385, 389, 461 adoptability, 83 agglomeration, 242, 415, 430, 431, 445, 450 aggregate demand, 62, 407-8, 412, 413-14, 434, 445

aggregation, 184, 194 Agreement on Natural Gas Markets and Price (Halloween Agreement), 365, 392, 405, 466 agriculture, 409, 412, 413, 423, 425, **426**, 427-29, 432, 435, 449. AGTL company (Alberta Gas Trunk Line, later NOVA), 30-32, 352, 355, 367, 371, 390, 401 Aguilera, R. F., 84, 464 Aitken, H. G., 412, 469 Alaska, 10, 126, 158, 264, 317, 368, 446, 447, 465, 476, 477 Alaska Highway natural gas pipeline, 396 Alberta Advantage, 436, 443, 447 Alberta and Southern company, 30, 356, 361, 387, 395, 467 Alberta (province) economy of, 417-30, 432-42, 449-50 geography and geology of, 91-96, 142-43, 147-48, 180-82, 202-9 government of (see government of Alberta) history of the petroleum industry in, 19-34, 85-91, 104-12, 118-29, 142-46, 148-50, 226, 272-73, 308-9, 316, 352-59, 366-69, 389-90, 405-6 natural gas in (see natural gas) oil in (see bitumen, heavy oil, oil, oil sands and synthetic crude oil) population, 19, 409, 417, 419-20, 438-41, 449-50 Alberta Energy Research Institute, 9, 146 Alberta Geological Survey, 356 Alberta Heritage Savings Trust Fund Act, 447, 448 Alberta Innovates, 9, 146 Alberta Heritage Savings Trust Fund (AHTSF, see Heritage Fund) Alberta Petroleum Marketing Commission, 108, 133, 250, 261, 392, 393, 396, 465

.....

Alberta Research Council, 33, 142-47 Albian Sands company, 9, 148, 152 Alcan Oil Company, 43 Alexeev, M., 416, 465 Algeria, 38, 39, 43, 44, 51 Allais, M., 201, 464 Allen, J. A., 147, 465 allocation factor (prorationing), 156, 187, 273-74, 275, 277 Alsands company, 152, 161, 469 altruism, 236 Anderson, B., 474 Anderson, F. J. , 244, 465 Anderson, John, 473 Anderson, Jonathan, 446, 465 Angevine, G., 264, 352, 465 Anglo Persian Oil Company (see British Petroleum) Angola, 39, 43, 451 AOSTRA (Alberta Oil Sands and Technology Research Authority), 9, 146 API degrees, 3, 12, 108, 124 appreciated reserves, 23, 85, 90, 184, 189, 190, 207, 212 Arab oil embargo, 126 Arab-Israeli hostilities, 45, 126, 235, 243 arbitrage, 36, 37 Arbitration Amendment Act (Alberta), 363 associated gas, 7, 15, 273, 349, 357, 403, 405 Athabasca, 20, 93, 109, 110, 141-43, 145-48, 156 Athabasca Oil Sands Conference, 143, 146 Atkins, F. J., 145, 465 Atlantic Canada, 29, 128, 228, 421 Atlantic Richfield Company, 134, 148, 160 attenuated growth, 26, 415-16 availability for contracting test (natural gas), 373-74 average cost and economies of scale (see monopoly, natural), 10, 11, 69, 393

and petroleum production, 69, 74, 124, 188–89, 286 curve, **58–59**, 183, 189–90, **295–300** marginal cost and, 183, 187 measures of, 182–84, 186, 187, 188–91

B

backward linkage, 412, 414, 417 Bain, J. S., 131, 465 balance wheel producer (OPEC), 46, 51 balanced budget, 443 Baldwin, J. R., 136, 465 Ball, M., 142-43 Ballem, J. B., 306, 465 Banff-Aquitaine company, 22, 137 Barnett, S., 469 Barrett, D., 247 Barrie, D. P., 139, 465 barriers to entry, 69, 70-71, 104, 232, 387, 397 Barsky, R., 262, 465 basic royalty, 316, 334, **335**, 342, 345 Baumol, W. J., 33, 67, 114, 465, 466 Beach, F. K., 109, 308, 466 Beaverhill Lake, 92, 93, 93, 187, 206, 207, 208 Bell, B., 334, 335, 336, 338, 468, 473 Bell, R., 142, 145 bequest motivation, 445 Berg, M. D., 200, 474, 478 Bernard, J.-T., 233, 466 Berndt, E. R., 14, 61, 126, 360, 466 Bertrand, R. J., 108, 115, 130, 132, 230, 233, 235, 466, 467 beyond economic reach resources, 370, 372, 379, 383, 384 beyond reach markets (oil sands), 157-58 bidding (see bonus bidding) bilateral monopoly, 71 biogas, 355 biomass, 3, 15, 17 bitumen, 15, 29, 51, 146, 154-55, 178, 425 characteristics of, 3, 5–10, 141–47, 153, 159, 169 costs, 145, 151-54, 159, 175, 185 history of industry, 142-46, 148 mining of, 9, 33, 34, 132, 141-42, 143-44, 145, 146-49, 150-53, 155-56, 159-61, 164-67, 168-69, 177, 185, 330, 425, 429, 435 NEB conditional forecasts, 176, 177-79, 185, 218, 219-20 prices, 145, 162, 163, 166-67, 254 production, 20, 24, 30, 32, 33, 104, 128, 139, 142, 148, 149, 150, 169 resources/reserves, 33, 38, 142, 146-48 royalties, 150, 164, 165, 166-69, 445 shipments, 31, 128–29, 136, 148, 163 upgrading, 9, 10, 15, 109, 126, 143, 144, 145, 146, 148, 149-50, 151, 152, 153, 155, 159, 161, 162–63, 164, 166, 167, 168–69, 185, 330-34, 435 Bitumount company, 143-46, 148 Blackman, W., 187, 466 Blackorby, C., 14, 65, 466 Blair, J. M., 41, 466 Blair, S. M., 144, 145, 147, 151, 464, 466, 468 Blakeney, A., 247

blended crude, 9, 10, 29, 125, 128 blended price, 124, 252-54, 259, 331, 391 Block A, 312, 320 blowouts, 25, 28, 34, 269, 273, 411, 461 BNA Act, 224-25, 346, 290, 306, 326, 329 Boadway, R., 33, 446 Board of Transport Commissioners (Canada), 226-27 Bohi, D. R., 56, 172, 243, 488 bonus bids (see also mineral rights sales) definition, objectives and regulations, 21, 25, 27, 154, 164, 166, 303, 308–10, 313, 320-21, 325-6, 328-30, 453, 461 economic aspects, 188-89, 192, 241, 248, 284, 295-97, 300-301, 302, 303-5, 314-15, 318, 322–24, 337, 402, 459–60 revenues, 27-28, 199, 307, 310-11, 319, 320, 324, 332, 340, 411, 442 boom-bust, 26, 415, 417 Borden Commission (Royal Commission on Energy) purpose, 117, 227 recommendations, 117-18, 227-31, 234, 238, 377, 466, 468 Borden, H., 117, 227 Bourassa, R., 247 Bradley, P. G., 60, 108, 109, 113, 116, 118, 119, 132, 227, 230, 233, 235, 240, 264, 300, 366, 377, 383, 385, 386, 436, 466, 478 Bramley, M., 476 brand loyalty, 69 Brandie, G. W., 152, 466 Brandt, A., 173, 466 Breen, D. H., 26, 120, 227, 271, 272, 273, 306, 308, 325, 466 Brent oil, 37, 41, 108, 109, 127 British Petroleum (BP, Anglo Persian Oil, Anglo Iranian Oil)), 12, 13, 38, 39, 40, 42, 44, 117, 134, 147, 161, 164, 466 Brown, J. G., 110 Brown, S. P. A., 369, 466 Brownlie, K., 264, 466 Bruce, C., 442, 443, 446, 473 Bucovetsky, M. W., 316, 327, 328, 466, 471 built-in stabilizer, 430 Burton, A. G., 327, 466 Butane, 2, 4, 10, 15, 354

С

Cairns, R. D., 224, 291, 301, 328, 466 Calgary, 20, 93, 236, 252, 330, 405, 409, 441 Calgary-Edmonton corridor, 435-46 California, 30, 37, 106, 116, 143, 356, 363, 387, 397, 400, **401**, 405 Camp, F. W., 151, 466 Campbell, A. D., 247 Canada division of powers (see constitution) government of (see government of Canada) oil production, 39, 174-80, 214-20, 229-30, 244, 246, 251 oil reserves, 39, 87 Ottawa River valley, 118–19, 229, **232–34**, 236-37, 239-43, 356-58

Canadian Association of Petroleum Producers (CAPP), 31, 32, 33, 83, 84, 85, 86-87, 88, 90, **91**, 98, **153**, **163**, 181, 182, 187, 194, 197, 215-16, 238, 239, 259, 354, 468 Canadian Oil company, 115, 156, 227, 468 Canadian ownership charge (COC), 331, 339 Canadian Petroleum Association (CPA), 83, 84, 85, 86, 88, 98, 187, 246, 468 Canadian Public Policy, 248, 446, 468 Canadian Society of Petroleum Geologists (CSPG), 98 Canadian Tax Foundation, 33, 241, 317, 326, 468 Canadian Western Natural Gas Company, 387 Canadianization charge, 253, 259 CANSIM (see Statistics Canada) capital asset pricing model (CAPM), 327-28 capital consumption allowance (CCA), 321, 326-28, 330, 339 capital intensity, 327, 389, 423, 425, 429, 433-44 capital stock, 411, 414, 446 carbon dioxide, 4, 8, 10, 154, 458 Cardium formation, 92, 93, 95, 187, 207-8 Carrigy, M. A., 142, 468 cartel, 39, 44–52, 70–71, 246, 249, 252, 361 Carter Commission, 326-27, 328-29, 468 Carter, K., 327-28, 468 cash flow, 161, 181, 196-97, 199, 209, 283, 300, 315, 325, 460 Caves, R. E., 413, 417, 468 central economy, 412-13 CERI (Canadian Energy Research Institute), 153, 180, 181, 182, 189, 190, 191 Champion, L., 143 Chan, K.-S., 180-82, 190, 468, 469, 471 Chan, P., 469 Chastko, P., 142, 468 Chen, D., 324, 325, 339, 404, 474 Chevron company (Standard Oil of California), 42, 131, 134 Chicago, 119, 120, 121, 125, **127**, 128, 232, 249, 256 China, 39, 52, 128, 136 Cities Service company, 134, 145, 151, 156, 157, 160 Clark, J., 330 Clark, K. A., 142-47, 468 Clark, R. H., 466 Cleveland, C. J., 200, 472 closed economy, 386, 413-44, 416 Clunies-Ross, A., 300, 470 CNRL (Consolidated Natural Resources company), 9, 148, 150, 356 coal, 3, 4, 12, 15, 27, 32, 33, 45, 154, 356, 363, 377, 389, 396, 425, 427 bed methane, 38, 355-6, 368, 374, 460 Coase, R., 270-71, 468 Coffey, W. J., 424, 268 cognitive biases, 144, 283 Cold Lake, 9, 10, 93, 141-42, 147-49, 157, 161-62, 164, 169, 313 Collins, A. F., 446, 468 collusion, 51, 62, 71 Combines Investigation Act (Canada), 130, 467 Comfort, D. J., 143, 468

commoditization natural gas and, 361, 367-68, 406 oil and, 46, 80, 256, 361 commodity charge, 367 commodity value (natural gas), 358-63, 390, 392, 395-96, 399 common carrier, 11, 31, 128, 132, 226, 336, 366, 371, 406 competition (see also effective, perfect and workable competition, bi-lateral monopoly, monopoly, monopsony, oligopoly and oligopsony) characteristics and types of, 32, 62-63, 67-72, 103-4, 108, 135-36, 157, **192-93**, 284, 292-93, 296, 300, 303-4, 323, 384, 399, 453, 456 in the petroleum industry (see also OPEC), 13, 32, 43, 111-15, 127-28, 130-33, 361-63, 367, 387, 392-97, **399-402** Competitiveness Review Committee (Alberta), 319 concentration ratios, 131, 132-33, 134 concession (oil), 44, 117 condensate, 10, 15, 30, 51, 104, 106, 110, 125, 128, 130, 175, 180, 202, 203, 349 ConcoPhillips company, 131, 160 Conrad, R., 416, 465 conservation, 7, 25, 158, 225 and petroleum consumption, 32-33, 37, 43, 247, 250-51, 262, 263-65, 267, 269, 290, 381, 383, 454, 456 and petroleum production (see also prorationing), 2, 4, 25-26, 56, 75, 225, 256, 269-87, 301, 355, 372, 373, 383, 389, 454 Boards (see ERCB, EUB, OCCB and PNGCB) Conservation and Utilization Committee (Alberta), 158-59, 465 Conservative government (Alberta), 159, 247 Conservative government (federal), 126, 249, 251, 330 constitution and natural resources, 224-26, 245, 272, 289, 332, 404-5 Constitution Act (Canada Act, see also BNA Act), 224-26 construction (industry), 19, 150, 154, **425**, **426**, 427-29, 435 Consumers Price Index (CPI), 197, 253, 254, 358, 458 consumers' surplus, 65, 68-9, 73, 79, 234, 236-37, 238, 239, 240, 257, 260, 338 consumption (deliveries/revenue/sales), 14, **32**, 33, 36, 48, 50, 53, 65, 137, 265, 316, 329, 333, 377, 391, 407, 451, 455, 461 and aggregate demand, 409-11, 413-14, 423, 442, 445-46 and demand, 61, 63, 66, 72, 78-79, 104, 238, 257, 260, 289, 269 of natural gas, 2, 21, 30, 349, 351, 353-54, 357-9, 361, 366-68, 370, 375-76, 382-83, 386-89, 391-96, 398-99, 401, 406, 456

of oil (Canadian), 21, 24, 30, 37-38, 52, 105-6, 111-14, 116, 119-20, 125-26, 128, 136, 157–58, 228–29, 236, **239**, 240, 242, 250, 254, 256-58, 261, 280-82, 338 of oil (United States), 158, 230, 232, 234 of oil (world), 43, 45-49, 263, 315 contestable market, 114 Contingency Account (Alberta), 444 conventional oil (see oil) Copithorne, L. W., 334, 335, 336, 338, 433, 468, 473 core market (natural gas), 376, 382, 393-94, 397 cores (well), 15, 356, 453 corporate income tax and rent shares, 164, 225, 295, 313, 317-18, 324, 332, 334, 335, 336-38, 459-60 economic effects, 166, 299-300, 321, 340 regulations, 25, 136, 160, 164, 167-68, 304, 321, 325-30, 339-40, 402, 404-5 Corporations and Labour Unions Return Act (CALURA, Canada), 137, 467 correlative property rights, 75, 110, 270, 285 cost minimization, 166, 281, 459 cost of service regulation, 31, 33, 352, 387, 395 costs (see also under stages of industry activity, expenditures, supply) of petroleum (see under bitumen, natural gas, oil and synthetic crude oil) problems in estimation (see also joint products), 172, 182–84, 188–91 replacement (see replacement cost) supply (see supply price) unit costs (see average, marginal and user costs) Courchene, T., 248, 290, 468 covert controls, 107, 117-20, 126, 139 Crane, D., 252, 468 Craze, R. C., 287, 468 Crommelin, M., 27, 291, 293, 305, 306, 315, 468, 469 Crown land (see mineral rights, Crown) crude oil (see oil) Cuddington, John T., 213, 469 cultural sovereignty, 137, 139, 413, 441 current deliverability test (natural gas), 380-81 cyclical effects, 23, 242, 407-8, 413, 414, 415, 443 cyclical steam simulation, 149 D Dahl, C. A., 40, 469 Daintith, T., 26, 41-42, 270-71, 284, 469

Daintith, T., 26, 41–42, 270–71, 284, 469 Daly, H. E., 4, 469 Daniel, J., 469 Daniel, T. E., 244, 469 Danielsen, A. L., 41 469 DataMetrics Limited, 135, 328, 334, **390**, 469 Davidson, P., 56, 75, 469 Davidson, T., 147 Davis, J., 446, 469 Davis, W. G., 247 de Mille, G., 109, 111, 469 deadweight loss, 236, 237, 260 Debanné, J. G., 244, 469 Debt Retirement Account (Alberta), 443 debundling, 366, 394 deep-cut gas plants, 355 deferred gas, 372-73, 379, 383 deflation, 62, 242, 408, 420, 437 DeGolyer, E. L., 235, 469 degradation effect (depletion or stock effect), 23, 56, 88, 174, 176, 189, 191–93, 194, 204-9, 211-13, 355, 412, 416, 430, 432, 448, 455 deliverability appraisal (natural gas), 372-74, 380-81, 383 deliveries (see consumption) demand (economic, see also consumption) aggregate (see aggregate demand) and the market, 36-38, 62-63, 67, 68, 72-73, 103-4, 223, 238-39 curve, 54, 61-63, 65, 68, 69, 72-73, 236, 238-39, 259-61, 359-60 elasticity (see under elasticity) estimation of, 63 function, 60-61, 63, 360 meaning and relation to consumption, 54, 63, 103, 174 depletion allowance, 322, 326-32, 339, 405 depletion effect (see degradation effect) deposit (of oil, see reservoir) deregulation, 29, 268, 437, 360 of natural gas markets, 30-31, 351-52, 357-58, 364, 366-67, 373-74, 376, 381-82, 385, 388, 391–93, 397, 401–3, 406 of oil markets, 107-8, 120-22, 127-28, 133, 139, 198, 224, 251, 258, 262-64, 268, 274, 280, 336-37, 338-40, 365, 391, 405 Desbarats, C. M., 198-99, 469 Deutsch, C. V., 9, 469 development (stage of the petroleum industry) and oil supply, 56-58, 69, 73, 77, 91, 114, 172-74, 181-83, 193, 229, 233, 234, 242, 245, 265, 305, 314, 354-56, 357, 384 and prorationing, 270, 272-87 and royalties/taxes, 291, 297, 305, 314, 321-22, 325, 326, 328-32, 335, 337 costs, 84, 91, 151-53, 186-92, 195-96 expenditures, 20, 24, 49, 88, 172, 186-92, 195–**96**, 197–**98**, 199, 209, 210, 334, 345 reserves additions, 89-90, 101 types and characteristics of activity, 5-8, 12-13, 16, 17-18, 20, 23-24, 28 Devonian formation, 21, 26, 92-94, 111, 142, 187, 205-7, 313 Diaz, A., 416, 469 differential rent, 58, 292, 323 Dillon, J., 267, 472 diluent, 10, 162-63 Dinning Commission (Alberta), 369-70 Dinning, R. J., 369, 465, 469 discount rate, 67, 100, 183, 186, 188, 276-77, 279, 287, 296, 334-37. discounted cash flow rate, 283 discoveries (see also reserves, additions) characteristics and importance, 22-23, 41, 75, 115, 184, 201, 210, 271, 358, 405

economic analysis and, 6, 11, 24, 56-57, 76, 85, 88, 178, 183, 187, 191-93, 202-12, 384-85 quantities and discovery size, 20, 24, 27, 85, **88-91**, **93-96**, 98-100, 101, 176, 181, 214, 219-20, 314, 316 significant Alberta finds, 20, 22, 26, 93-95, 99, 110–12, 142, 226, 382, 384 discovery allowance, 282 discovery process model, 98-99, 171, 173-74, 175, 180, 202, 208, 210, 212 diseconomies, 69, 272, 277-82, 284-85 disequilibrium, 104, 129 dislocation costs, 439 distillation, 11, 16, 145 distribution (see marketing) diversification, 19, 160, 163, 264, 327-28, 407, 415-17, 430-36, 438, 442, 446-47, 450 dividend withholding tax, 241 Dixit, A., 284, 469 Dobson, W., 244, 469 Doern, G. B., 244, 247, 264, 330, 466, 469, 475 domestic activities, 409 Dominion Lands Act (federal), 306 Donaldson, D., 14, 65, 466 Dormaar, J., 110, 469 Dougherty, E. L., 470 dry hole/trap/well, 6, 21, 22, 59, 96, 275, 277, 286-87, 291-94, 296, 298, 300-302, 315, 336, 345 Dunbar, R. B., 146, 153, 469 duration (lease), 303, 305, 308, 320 Dutch Disease/Adjustment, 415-17, 432, 434-35, 438 Dvir, E., 41, 469 Dyes, A. B., 287, 474

E

Easterbrook, W. T., 412, 469 econometric models, 97-8, 173-74, 181, 192-94, 197-201, 209-13, 258, 418, 434, 437 Economic Council of Canada, 186-87, 194, 248, 418, 433-34, 467 economic development, 135, 158-60, 290, 412, 415, 417-23, 432, 436, 449-50, 458 economic equalizers (stabilizers), 430, 433, 438-42 economic rent definition, significance and government objectives regarding, 25, 27, 57-58, 65, 135, 186, 199, 289–93, 339, 359, 400, 402, 411, 438, 444, 445, 457–60 ex ante and ex post, 291-92, 294-300, 305, 313, 315, 323-24, 335, 453, 459 methods of collection by government, 293-301, 306-331, 338-40, 405, 458-60 sharing of, disagreements about, 264, 316-17, 329-30, 340 sharing of, company, consumer and government shares, 166, 187-88, 249, 257-58, 260-61, 264, 332-38, 386, 403-4, 445, 458-60, 461 economies of scale, 10, 11, 29, 31-33, 68-70, 72, 133, 144, 155, 242, 352, 368, 379, 415–18, 430-31, 437, 445, 450

Ecuador, 39, 43 Eden, L., 138, 469 Edie, D. C., 363, 469 Edmonton, 20, 93, 108, 142-44, 148, 151, 308, 405, 409, 435-36, 441, 458 as basing point for prices, 55, 106, 108-9, 112, 116, 119, 122, 127, 129, 151, 162, 259 as pipeline terminus, 10, 30, 116–17, 119, 122, 128-29, 132, 226, 244, 259 education, 69, 412, 431, 436, 442, 446-47 Edwards, M., 57, 469 effective competition, 32, 70-71, 104, 135, 292-93, 362, 392 efficiency (economic), as a goal, 14, 64–67, 221, 224, 233, 235–36, 272, 431 estimates of, 236-40, 260-61, 277-82, 314, 323, 331-32 features of, 68-70, 73, 76, 78-80, 139, 243, 263-64, 268, 271, 301, 315, 328, 298, 412, 438, 456-58 efficiency (technical), 8, 14, 23, 151, 155, 168, 205, 283, 292, 414, 445, 447, 452, 461 effort, 5, 16, 22-23, 172, 190, 192-93, 200-205, 211-12, 292-93, 297, 301, 320, 336, 349, 355 Eggert, R. G., 464 Eglington, P. C., 152, 186–91, 194–**95**, 199, 201, 204-6, 469, 477 elasticity, 50, 196, 386 of demand, 49, 61-62, 120, 234, 238-39, 246, 260-61, 315, 360, 400-401 of expenditures, 196 of reserves additions/discoveries, 205, 207, 209, 260-61 of royalties, 323 of substitution, 198 of supply, 60, 62, 177-80, 238-39, 261, 384 Eliot, S., 474 Ells, S., 142-43, 145 Emery, J. C. H., 418, 436, 442, 469 empathy, 236 Empey, W. F., 408, 470 employment in the oil industry, 34, 242, 418, 429 total, 25, 243, 247, 409, 414-15, 424-45, 445, 449 Enbridge (InterProvincial) pipeline company, 10, 30–31, 55, 114–16, 119–20, 126, 128–29, 132-33, 226, 231-32, 251, 256, 260, 263, 472 Energy and Utilities Board (EUB, Alberta, see also Energy Resources Conservation Board), 27, 28, 33, 85, 88, 110, 147, 148, 152, 155, 167, 181, **207**, 273, 352, **354**, 355, 370, 464 Energy Information Administration (EIA, see under United States) Energy Policy for Canada, 137, 244, 467 Energy Resources Conservation Board (see also EUB, OGCB, PNRCB, EUB) criticisms of, 27, 155, 461 data and statistics from, 8, 9, 10, 21, 30, 32, 38, 83, 84, 85-90, **91-93**, 96, 100-101, 105-6, 108, 129, 141-42, 146-49, 150, 152, **163**, 180, 187, 203, **206**–7, 251, 353-54, 355-56, 384, 390, 464

history of, 26-27, 110, 272-73, 370 natural gas exports/removal permits (see also under natural gas), 370-76 natural gas prices and, 361-63, 373 oil sands approvals (see also under synthetic crude oil), 51-61, 167 output regulation by (see also prorationing), 60, 133, 272-87 powers and responsibilities of, 27, 147, 155, 266, 273, 285, 352, 361, 375-6, 392, 452, 460 Energy Strategy for Canada, 121, 123, 467 Engelhardt, R., 9, 146, 470 engineering process model, 173-74 enhanced oil recovery (EOR) economics of, 57-58, 74, 183, 185-87, 196, 183, 281, 345 reserves, 75, 84-85, 88, 90, 100-101, 175, 176, 178-81, 184, 206, 214, 219-20 special programs, 167, 210, 252, 254, 319, 322, 331 technology, 7-8, 16, 24, 28, 56, 141-42, 146, 148, 168, 436 EnviroEconomics Inc., 321, 470 environment (the), 2, 6, 14, 18, 27-28, 31, 33-34, 67, 154-55, 158-61, 169, 266, 268, 290, 351, 383, 411-12, 445, 452-53, 457, 461 equalization, 121, 248, 290, 329, 222, 437 equilibrium (see under market) equity as a social goal, 64–66, 221, 224, 235, 240, 250, 264, 329, 332, 339, 389, 431 shareholding, 30, 42, 132, 136-37, 160-61, 224, 236, 240-42, 244, 246, 249, 252, 257, 266, 275, 300, 314, 326-27, 334, 388 Esso (Imperial Oil, Standard Oil of New Jersey, Exxon) company, 9, 34, 20-22, 42, 108, 110-11, 114-15, 117-19, 121, 124, 127, 131-32, 134, 137, 147-49, 152, 156, 160, 164, 228, 230, 309, 470 established reserves, 16, 24 natural gas, 355-56, 370-72, 378-81, 383-85 oil, 84, 86-88, 90, 93, 96, 98-102, 128, 148, 178-81, 219-20 ethane, 2, 15, 354, 433, 436 Europe, 37-39, 44-47 Evans, J., 43, 470 ex ante and ex post rent (see under economic rent) excess (spare) capacity, 49, 52, 76-77, 115, 120, 152, 157, 226, 229, 234, 258, 272, 279-80, 286, 367, 392, 394 exchange rate, 111-12, 119, 122-23, 127, 235, 416 exhaustibility (see fixed stock assumption) expectations, 35, 66, 135, 263, 283 about geology/technology, 83, 101, 198, 301, 309, 349 about prices, 23, 47, 51, 129, 167, 190-91, 197, 316, 368, 385, 443 about profits, 150, 180, 292, 295 and supply, 55-56, 58, 61, 130, 172, 174, 292 expenditures (petroleum industry) estimating and forecasting of, 173, 182-84, 185-90, 194-200, 210, 286-87, 291

levels of (see under exploration, development and lifting) exploration and joint product problems (see under joint products) and open access (see open access) and royalties/taxes, 291-94, 292, 298-305, 308-16, 320-25, 326, 328-33, **334-39**, 459 and supply, 56-58, 73, 84-85, 90-91, 174, 182-85, 187-89, **193-96**, **197-99**, 202-4, 208-12, 229, 233-34, 242, 265, 268, 280, 282, 285, 334-39, 345-46, 357, 384-85, 408, 418, 435, 452-53, 460 costs, 210-12, 278, 334-37, 362, 410 expenditures, 20, 138, 195-99 history in Alberta, 20–22, 26–27, 109–11, 115, 220, 308-16, 320-25, 339, 355-58, 405, 461 incentives (see incentives) reserves additions (see discoveries) types and characteristics of activity, 5–6, 12-13, 15, 16, 17, 21-24, 27, 41, 69, 83, 88-90, 93-94, 96-102, 145, 173, 201, 225, 245, 291, 328, 349, 355, 452-53, 461 extraction (see lifting) exports export base model, 26, 412-14, 415, 417-18, 430, 449 in the macroeconomy, 410, 312-13, 414, 415, 416, 428-29, 433, 449-50 of gas (see under natural gas) of oil (see under oil) quotas/controls, 24, 77-78, 121, 126, 172, 244-45, 250-51, 257-58, 262-63, 366, 455, 458, 461 surplus calculations (see under natural gas, exports, removal and licensing) taxes, 35, 79, 121-12, 124-25, 237-40, 244-45, 248-51, 252, 256-57, 267, 268, 329, 331, 391, 404–5, 461 Exportation of Power and Fluids and Importation of Gas Act (federal), 226, 394 extension (outpost/stepout) drilling, 6, 8, 16, 23-24, 56, 59-60, 75, 84-85, 88, 175, 183, 187, 206, 210, 261 extensive diseconomies (see under prorationing) extensive margin, 211, 272 externalities, 64-65, 67, 209, 221, 269, 327-28, 461 extraterritoriality, 136

F

fairness (see also equity), 116, 162, 164, 236, 252, 255, 329, 332–33, 399, 403, 457, 461
Fattouh, B., 37, 470
Federal Power Commission (FPC, see under United States)
Ferguson, B. G., 142, 144–45, 470
finance sector, 425–26, 435
Financial Investment and Planning Advisory Commission (Alberta; Mintz Commission), 444, 448–49, 464

Financial Investment and Planning Commission (Alberta, Tuer Commission), 442, 443-44, 446, 448, 464, 477 Finch, D., 109, 470 Finnis, F. H., 475 FIRA (Foreign Investment Review Agency, federal), 138 Firey, W. I., 83, 470 First Ministers Conferences, 246-49 fiscal burden, 289, 337, 340 Fiscal Management Act (Alberta), 443 fiscal policy, 62, 409, 437, 443 Fiscal Responsibility Act (Alberta), 443 fishing, 412, 426, 429 Fitzgerald, J. J., 142, 145, 160, 470 Fitzsimmons, R.C., 142-44 fixed cost, 133, 281, 294-96 fixed stock assumption, 66, 81, 84, 176-77, 201, 242-43, 389, 415, 432, 442, 455-56 Flatters, F., 466 Florida, R. L., 441, 470 flow rent, 338 Fluker, S., 154, 155, 470 Foat, K. D., 88, 92-93, 137, 173, 207-9, 470, 473 Foley, G. , 4, 470 footage, 23, 174, 184, 189, 192, 199, 202-3, 205, 209, 321 foreign investment (ownership, control), 33-34, 104, 130, 135-**39**, 159, 240-41, 244, 247, 252, 291, 327, 328, 332, 386, 388 Fort McMurray, 3, 9, 20, 141, 142, 143, 145, 147, 149, 152, 159, 166 forward linkage, 19, 412-13, 417, 449 Fossum, J. E., 470 Foster, P., 247, 330, 470 Foster Research, 152, 470 Frank, H. J., 41, 283, 470 Frankel, J. A., 416, 470 freehold lands, 5, 21, 225, 271, 289, 306, 310, 311-12, 324, 330, 331, 352, 402 free-rider, 302 Free Trade Agreement (FTA, Canada/United States), 126-27, 138, 139, 224, 264-68, 388, 397-98, 461, 467 Froehlich, R., 470 full marginal development cost, 191-92 full-cycle costs, 182 Fuller, J. D., 97, 473, 475, 476 futures market, 47, 50, 406

G

G&G (geological and geophysical), 5, 13, **16**, 20, 21, 22, 23, 27, 85, 88, 183, 192, 210, 301, 336 Gabon, 39, 43 Gaffney, M., 291, 470 Gainer, W. D., 241, 256, 332–33, 470, 475 gainfulness, 83 Garnaut, R., 300, 470 gas (*see* natural gas) gas cap, 47, 110, 354 gas hydrates, 366 *Gas Resources Preservation Act* (Alberta), 370–71, 375, 376, 377, 392 gasified coal, 355 Gately, D., 43, 470 gathering (of petroleum), 9, 13, 16, 24, 29, 30, 55, 77, 132, 172, 352, 371 GATT, 230, 237, 264-65 Gattinger, M., 264, 469 GCOS (see Suncor) GDP, 200, 242, 260, 262, 408, 410–12, 413–15, 429-30 industry shares, 415, 418, 425-28, 431, 435 price deflator, 21, 22, 151, 189, 190, 317, 403, 429 Gellatly, G., 136, 465 general equilibrium, 240, 414, 434, 438 generational perspective, 431 generic oil sands royalty, 165-68, 325, 459 Geneva agreements, 244 geological formations, 5-7, 16, 22, 26, 33, 38, 88, 91, 93, 96–97, 99, 110, 141, 155, **204–6**, geological play, 23, 26, 32, 41, 50, 57, 91-101, 110, 111, 121, 137, 143, 157, 173, 174, 175, 176, 180-81, 189, 193, 201-9, 212, 213, 270, 300-301, 303, 309, 313, 315, 345, 417, 455 Geological Survey of Canada (GSC), 83, 93-**95**, **98–100**, 101, 175, 208, 212, 467 George, R., 148, 470 Georgescu-Roegan, N., 4, 470 Gillespie, A., 249 Gilley, O. W., 297, 470 global warming, 33, 34, 154, 461 global(ization), 35, 37, 38, 168, 257, 284, 431, 438, 461 Globerman, S., 138, 470 Goldberg, H. M., 244, 460 Golden Spike field, 114 gold-plating, 292, 293 good production practice (GPP), 25, 256, 274 Goodnight, R.C., 287, 470 Gordon Commission, 377, 468 Gould, E., 109, 470 government of Alberta Alberta Bureau of Statistics (ABS), 429 Alberta Heritage Trust Savings Fund (see Heritage Fund) Conservation Boards (see ERCB, EUB, OGCB, PNGCB) Department of Economic Development, 428, 464 Department of Economic Development and Tourism, 429, 464 Department of Economic Development and Trade, 429, 464 Department of Energy, 28, 148, 152, 155, 161, **165**, 167, 168, 181, 305, 306, **312**, 318, 324, 368, 375, 403, 464 Department of Energy and Natural Resources, 28, 165, 312, 464 Department of International and Intergovernmental Relations, 428, 464 Department of Lands and Mines, 109, 307-8, 464 Department of Mines and Minerals, 21, 28, 106, 306, 312, 464

disagreements with federal government, 245-46, 247-50, 254, 316, 329, 331, 390-91, 404 federal-provincial agreements, 160, 164, 246, 248-50, 254-55, 331, 332, 338-39, 364, 365, 390-91, 396, 405, 437 natural gas policies (see also specific policies), 361–62, 369–76, 392 oil policies (see also specific policies), 254, 272-74 oil sands policies (see also specific policies), 143, 153-61, 164-68 petroleum industry and government finances, 28, 442-49 Petroleum Marketing Commission (APMC, see Alberta Petroleum Marketing Commission) rent collection and mineral rights policies (see also under economic rent), 306-13, 316-22, 330, 339, 341-42, 402-3 share of rent/revenue (see under economic rent) government of Canada Department of Energy, 467 Department of Energy, Mines and Resources (EMR), 98, 99, 137-38, 186, 241, 251, 255, 375, 382, 393, 467 Department of External Affairs, 467 Department of Natural Resources, 98 disagreements with Alberta, 245-46, 247-50, 254, 316, 329, 331, 390-91, 404 federal-provincial agreements, 160, 164, 246, 248-50, 254-55, 331, 332, 338-39, 364, 365, 390-91, 396, 405, 437 free trade agreements (see FTA and NAFTA) natural gas policies (see also specific policies), 363-65, 377-83, 390-91, 395-97, 404-5 oil policies (see also specific policies), 118-26, 143, 160, 162, 164–66, 167, 229–30, 244-56, 338-39 Petroleum Monitoring Agency (PMA), 5, 34, 135, 137-38, **259**, **390**, 465, 468 rent collection policies, 325-31 share of rent/revenue (see under economic rent) Gow, B. A., 5, 470 Granite Wash formation, 92, 93, 209 Granville, J. W., 287, 268 Gray, E., 109, 111, 137, 142, 470 Great Canadian Oil Sands company (GCOS, see Suncor) Greenberg, P. E., 61, 126, 360, 466 Griffin, J. M., 43, 51, 57, **235**, 470 Groningen field, 416 gross reserves additions, 24, 88, 90, 173, 190, 244 gross royalty, 74, 164-68, 297, 307, 314, 315, 323, 325, 332 growth (economic) in the Alberta economy, 19, 409, **417-30**, 432-42 models of, 409-17 GSC (see Geologic Survey of Canada) Guichon, D., 470

Gulen, S. G., 37, 471 Gulf of Mexico, 41, 42 Gulf Oil company, 115, 363, 390 Gulf Plus pricing, 41, 111 Gulf War, 47, 263

Η

Habib, A., 445, 471 half-cycle costs, 182, 334, 335 Halloween Agreement (see Agreement on Natural Gas Markets and Price) Halpern, P., 252, 471 Hamilton, J. D., 41, 47, 49, 471 Hamilton, R. E., 358, 387, 388, 471 Hansen, P. V., 51, 471 Hanson, E. J., 109, 110, 137, 417-18, 424, 425, 471 Harchaoui, T. M., 411, 468 Hardisty field, 162, 168 Hardy, W. G., 91, 471 Harris, D. P., 97, 471 Hartley, P. R., 369, 471 Hartshorn, J. E., 41, 471 Hartwick, J. M., 411, 471 Hatfield, R.B., 247 health, 27, 28, 34, 67, 266, 412, 435, 442, 446, 461 Heath, M., 180-81, 190, 468, 471 heavy fuel oil (HFO), 12, 15, 360 heavy oil characteristics and technology, 3, 8, 15, 104, 126, 143, 146, 147, 159, 180 exports and export tax, 125-26, 251 markets and shipping, 10, 29 prices, 108-9, 122, 129, 130, 141-42, 162-3, 178-80, 217-20, 450 production and reserves, 33, 51, 85, 98, 99-100, 126, 132, 148, 161, 175, 176-77, 181, 214-16, 219, 436 taxes and royalties, 166-67, 317, 330, 340, 459 Hees. G., 229 Helliwell, J. F., 109, 124, 125, 126, 199, 209-10, 224, 244, 250, 253, 256, 258, 262-63, 316, 326, 337-38, 352, 389, 408, 420, 471 Heritage Capital Fund (Alberta), 448 Heritage Fund (Heritage Savings Trust Fund, Alberta), 417, 430, 465 purpose and policies, 248, 407, 412, 442, 443, 446-50 reviews of, 444, 448-49 size of, 446-47, 448-49 HHI (Hirschman-Herfindahl Index), 131-34 Ho, B., 470 Hoffman, G., 142 Holton, R. H., 413, 417, 468 Homan, P. R., 271, 281, 473 Horizon project, 9, 148, 150 horizontal drilling/well, 88, 96, 141, 148, 169, 181, 213, 322, 356, 368 Horner, D., 28, 471 hot water extraction, 9, 142-44, 146 Houghton, J. C., 464 housing, 415, 434, 439, 441 Hubbert, M. K., 201, 471 Hughes, J. E., 61, 471

Hugman, B., 368, 477 human capital, 414, 446 hurdle rate, 283, 300 hybrid model, 173–74 Hyde, B., 301, 471 Hyndman, R. M., 316, 471 hypothetical diseconomies, 277–79, 282

I

identification problem, 63, 184 International Energy Agency (IEA), 263, 265 immigration (see migration) Imperial Oil Company (see Esso) imports, 73, 78-79, 144, 328, 377, 408 by U.S., 119, 121, 128, 158, 230-33, 234, 236, 239, 240, 256, 267, 281, 284, 386, 395, 400 in the macroeconomy, 410, 412, 414, 416, 434, 435, 438 of natural gas, 38, 379, 382, 385, 406 of oil, 38, 66, 116, 117–18, 124, 126, 128, 129, 136, 160, 223, 224, 226-27, 229-30, 239, 243, 246, 248, 252-53, 256, 258, 263, 266, 391, 456 prices, 121, 124, 248, 253, 257, 259, 265, 331 quota (see also United States, government, USOIQP), 265 ticket (U.S.), 230-31 in situ price (value), 56 incentive pricing (natural gas), 122, 397 incentive schemes, 42, 114, 128, 186, 265, 272, 275, 276, 280, 301, 309, 311-12, 318, 320-21, 323, 324-25, 327-28, 330-33, 340, 396-99, 402, 303-4, 460 income (see GDP, PI and PDI) income distribution, 66, 241-42, 457 income tax (see corporate and personal income tax) independent companies, 12, 13, 43, 44, 104, 117, 228, 230, 232, 284, 285 Independent Petroleum Association of Canada (IPAC), 83 Indian (Aboriginal) reservations, 21, 146, 225, 306 individualistic liberalism, 14, 64, 65–66, 409, 410 indivisibilities, 183 Indonesia, 37, 39, 43, 44 industrial policy, 430-31, 447 industrial structure, 427 Industry Advisory Committee (Alberta), 320 infant industry, 416, 431 inflation, 49, 121, 244, 247, 248, 252, 253, 408, 414, 457 adjustments for, 22, 26, 28, 40-41, 46, 151, 161, 183, 185, 188, 190, 197, 199, 214, 254, 334, 358, 403, 420, 446, 447, 448, 449 in oil industry costs, 150, 152, 166, 189 local, 154, 163, 415, 435, 438, 442, 445 initial reserves, 23, 24, 84, 85, 148, 203, 208, 211 injection wells/fluids, 7, 8-9, 24, 147, 149, 154, 211, 322, 354 Innes, H., 412, 472 Input-Output (I-O) models, 412, 418 instability

and oil, 25, 41-42, 43, 49, 50, 52, 90, 140, 213, 270, 281-82, 284, 432, 436, 442, 443, 444 and the economy, 424-45, 430, 432, 434, 442, 460 integrated companies (see also majors and vertical integration), 12-13, 17-18, 32, 42, 104, 114, 115, 132, 137, 138, 139, 328 intensive diseconomies (see under prorationing) intergenerational equity, 25-26 International Bitumen Company, 142-43 International Monetary Fund (IMF), 123, 472 international trade (see exports and imports, FTA and NAFTA) InterProvincial Pipe Line Company (see Enbridge) intertemporal depletion, 175, 294, 324, 339, 453, 549 inventories (stockpiles), 45, 47, 50, 62, 103, 106, 194-95, 243, 263, 266, 369, 411 of reserves, 84, 102, 355, 257, 369, 381, 383-85, 370 strategic, 47, 263, 456 IORT (incremental Oil Revenue Tax), 331, 334 Iran, 39, 40, 43, 44, 45, 249 Iraq, **39**, 40, 43, 44, 47, 52 Irwin, J. L., 466 Ismail, K., 416, 472 ISPG (Independent Society of Petroleum Geologists), 180 Israel, 243

J

Jackpine project, 148 Jacoby, H., 472, 477 Jacoby, N., 472 Jaffe, A. M., 43, 472 James, P., 254, 469 Jenkins, G. P., 135, 472 joint products and economic analysis, 15–16, 183–84, 193– 94, 201, 202, 210, 211, 318, 460 in exploration, 23, 88, 193–94, 203, 203, 205, 291, 315, 349, 452 in lifting, 351 in refining, 12, 360 Jones, C. T., 51, 57, 470, 472 Jump, G. V., 408, 472

K

Kaga, M., 475 Kagel, J. H., 296, 472 Kahneman, D., 268, 284, 296, 472 Kalyman, B. A., 328, 475 Karels, G. V., 470 Kaufman, G. M., 97, 173, 464, 472 Kaufman, R. K., 200, 472 Kearl project, 148 Keddie, R. R., 466, 477 Keg River formation, **91–94**, 101, 121, **207–8**, 212, 313 Kellogg, R., 55, 472 Kelsey, H., 109 Kemp, A., 291, **334–38**, 472, 473

kerosene, 16, 145, 360 Keynesian model, 413-14, 417, 434 Keystone pipeline, 128, 129 Kilian, L., 262, 465 Kinder Morgan Company (see Trans Mountain Pipeline) Kirby, R., 315, 478 . Klassen, H. C., 307, 472 Kleit, A. N., 37, 472 Kneebone, R. D., 418, 442, 466, 469, 472, 473 Knetsch, J. L., 472 Knittel, C. R., 471 knowledge externality, 431 Kolody, A., 187, 472 Krasnick, M., 433, 474 Kuwait, 39, 43, 44, 47, 49

L

LaForest, G. V., 224, 472 Lalonde, M., 251, 396 land rental and sales (see mineral rights) Lasserre, P., 191-92, 472 law of one price, 36-38 Lawrey, R., 10, 31, 119, 132, 472 laws of thermodynamics, 4, 14 Laxer, J., 120, 224, 267, 472 learning-by-doing (learning effects), 144, 151, 209, 389 leases (mineral rights) definition and regulations, 21, 155, 302, 303, 306-7, 308-11, 313, 320, 325 economic aspects, 22, 301, 303, 323, 386 Leblanc, A., 466 Leduc as start of oil industry growth, 21, 22, 24, 26, 30, 110, 127, 128, 129, 139, 203, 272, 280, 282, 284, 313, 356, 358, 359, 405, 409, 417, 418, 419, 423, 425 field, 137, 226, 308, 309 play, 92-95, 111, 204, 205, 207-8 Leibenstein, H., 292, 472 Leland, H. E., 301, 472 Leone, R. P., 470 Levin, D., 296, 472 Levitt, K., 136, 472 Levy, W. J., 117, 228 Lewis, D. E., 342, 472 Libecap, Gary D., 270, 271, 472, 478 Liberal government (Federal), 122, 246, 249, 251, 329, 330, 405 Libertarian, 64 Libya, 39, 43, 44 licences (mineral rights), 5, 308, 312-13, 320 licences, natural gas export (see under natural gas, exports, licencing) life cycle model, 173-74 life index (see R/P ratio) lifting (production or operation) and supply, 56-60, 103, 104 and the rule of capture, 41, 60, 253-54, 270, 453-54 and timing effects, 28, 56, 188, 446 costs, 56, 57, 58, 91, 182, 191-92, 211, 291, 369 expenditures, 21

types and characteristics of activity, 5, 7-8, 9, 2-3, 16, 17-18, 24-5 Lind, R. C., 67, 472 Lindholt, L., 51, 471 Lithwick, N. H., 424, 473 Livernois, J. R., 210, 211-12, 473 Lloydminister, 10, 220, 125, 162 LNG (liquefied natural gas), 38, 375, 385, 406 Lobbying, 116, 442 location quotient, 424-45 logistic curve, 201 long-run, 55, 57-58, 60, 61, 62, 66, 75, 112, 159, **196**, 280, 292, 305, **359**, 360, 368, 385, 402 loss aversion, 268, 271 loss carry forward, 326 Lougheed, P., 158, 247, 254, 264, 331, 361, 433, 436 Lovejoy, W. F., 271, 281, 473 Low, C. A., 270, 272, 285, 472 LPGs (Liquified Petroleum Gases), 8 LTRC (long-term replacement cost), 189-90 Lucas, A., 224, 473 luck, 90-91, 188-89, 190, 396, 399 Luthin, A., 187, 190-91, 475

Μ

MacAvoy, P. W., 386, 473 Macdonald Commission (federal), 433, 468 MacDonald, D. G., 208, 473 MACE model, 262, 337-38 MacEachan, A., 251 MacFadyen, A. J., 88, 92, 93, 137, 155, 173, 187, 207-8, 209, 283, 334-35, 336, 338, 465, 266, 470, 473 MacGregor, M., 471 MacNaughton, L. W., 235, 469 MacRae, D., 64, 473 macroeconomics, 18, 25-26, 29, 62, 121, 136, 140, 235, 240, 242, 247, 261-63, 283, 337, 349, 407, 408-9, 412-17, 430, 437-38, 456-58 made-in-Canada price, 122-23, 126, 251, 153, 155, 127, 330 Magud, N, E., 416, 476 majors (oil companies), 32, 44-46, 49, 69, 104, 110, 114, 117, 118, 127, 130, 132–33, 135, 137, 145, 159, 226–27, 228, 230, 231, 233, 182, 284, 291 Manne, A. S., 67, 473 Manning, E. C., 156, 159, 370 Mansell, R. L., 260, 418, 424-25, 430, 432, 433-34, 436, 437-8, 439, 473 marginal benefits of exploration (MBE), 192-93 marginal cost and petroleum production, 57-58, 64, 73, 146, 185, 199, 236 and profit, 65, 68, 71, 112, 294-300 and reserves additions, 173, 191–93, 209, 210, 212 and royalties, 74-75, 297-99 and supply curve, 55-56, 58-59, 68-69, 172, 182 - 83components of, 56

curve, 58-59, 68-69, 70, 73, 142-43, 234, 294-300, 399 of exploration (MCE), 192-93 problems in estimating, 182-85, 188-89, 191 marginal opportunity cost of investment, 50, 187 marginal product of exploration (MPE), 192-93 marginal user cost (see user cost) market (the) for RPPs, 11, 17, 133 functioning of and equilibrium in, 14, 29, 31, 54, 62–63, 65, 67, 71–79, 103–4, 139, 223-24, 263, 292-93, 361, 386, 456-58 natural gas markets, 37, 359-69, 388-89, 392-94, 399-401, 405-6 oil markets, 35-52, 108-9, 111-16, 120, 124, 126-29, 157, 233, 252, 256, 268, 282-84 performance, 133-34 structure, 128, 129-33, 293 types of competition (see also separate types, e.g., oligopoly), 62-63, 67-71 market based procedure (MBP, natural gas), 382-83, 397 market demand prorationing (see under prorationing) market power (see also monopoly and oligopoly) definition and effects, 67-72, 104, 114, 133, 221, 284, 293, 400 in the natural gas market, 352, **357-61**, 393, 400-402 in the oil market, 11, 37, 41-51, 72, 112-16, 130, 133, 139, 233, 452, 454, 458 marketable gas, 354-55, 356, 373 marketing sector of the petroleum industry (distribution), 2, 5, 10, 12, 16, 17, 32-33, 137-38, 361, 392, 393, 394, 397 Matthews, M. W., 476 maximum efficient/permissive rate (MER/ MPR), 114, 273–75, 277, 279, 286 May, G., 250, 471 McClements, Jr., R., 10, 473 McConnell, R.G., 110, 142, 145 McCray, A. W., 283, 473 McCrossan, R. G., 98, 202, 473 McCullum, H., 155, 473 Mcdonald, J.A., 328 McDonald, S. L., 41, 42, 56, 57, 75, 271, 291, 327, 473 McDougall, I. A., 224, 226, 399, 473 McDougall, J. N., 264, 377, 388, 395, 399, 474 McGillivray, A.A., 110, 465, 474 McGillivray Commission, 110-11, 465, 474 McGregor, D. A., 476 McKenzie, K., 443, 466, 472, 473 McKinnon, I., 227 McLachlan, M., 187, 189-91, 474 McLennan, J. A., 9, 469 MCRA (marginal cost of reserves additions), 192-93 McRae, R. N., 244, 337, 471, 474 Mead, W. J., 43, 297, 474 Medicine Hat, 20, 110, 405 medium-run, 57, 59, 104, 181

Medlock, K. B., 471 Melvin, J., 418, 474 Memorandum of Agreement (provincial/ federal, see under National Energy Program) MER (maximum efficient recovery), 60 Mexico, 39, 41, 163, 168, 246, 264, 266, 376, 385, 397, 461 mid-continent (USA), 116, 119, 126, 128, 228, 235 Middle East, 9, 37, 38, 39, 42-43, 44, 47, 48, 50, 52, 69, 102, 117, 119, 120, 129, 136, 140, 159, 224, 227, 230-31, 232, 233, 243, 249, 256, 263, 409, 415 migration, 154 Miller, C. C., 287, 474 Miller, K. G., 476 mineral rights, Crown definition, terms and significance, 5-6, 21-22, 25, 27, 74, 121, 145-46, 154-55, 164, 172, 225-26, 246, 254, 270, 283, 289-91, 299, 301-20, 322-26, 329-30, 332, 339, 340, 352, 376, 392, 402-3, 442-45, 459 sales (see bonus bids) types (see leases, licences, permits and reservations) mineral rights, freehold (see freehold lands) Mineral Taxation Act (Alberta), 309 Mines and Minerals Act (Alberta), 309-10 mining industry, 135, 413, 425-29 of oil sands (see under bitumen) Minnesota, 228, 231, 396 Mintz Commission, 444, 448-49, 464 Mintz, J., 324, 325, 339, 404, 474 Mitchell, R., 166, 474 Mobil Oil Company (Socony-Mobil, Standard Oil of New York), 9, 42, 131, 134, 137 Mocal Energy Company, 160 models of growth (see under growth) monetary policy, 409, 416 monopoly and oligopoly, 71, 113, 116 and transportation or natural gas industries, 11, 31, 393-94, 400 bilateral, 71 definition and effects, 67-68, 69-70, 129, 132, 192, 327 laws relating to, 10, 43, 70, 271 natural, 11, 69, 70, 293, 352 power, 11, 67, 146, 302, 303 price discrimination, 68-69 public, 293-94 monopsony and Alberta natural gas, 31, 231, 232, 356, 389-90 definition and effects, 70, 71, 116 Montana, 111, 231, 232, 356, 401 Montgomery, W. D., 243, 466 Montreal, 29, 30, 36-37, 38, 108-9, 117-18, 121, 124-29, 133, 226-29, 231, 234-35, 237-38, 243, 245, 251, 255, 256, 258-61, 263, 359, 363, 391, 399, 435 Moroney, J. R., 200, 463, 474, 478

Morres, F. D., 247 Morrison, C. J., 466 Moss, D. L., 469, 213 most-favoured-nation clause (MFN), 358, 362, 305 motor gasoline, 3, 11, 12, 15, 32, 33, 61, 67, 145, 230, 244, 410 multiplier, 414, 417-18, 434 Mumey, G., 447, 474 Murphy Oil Company, 134, 160-61 Muskat, M., 286, 474

Ν

NAFTA (North American Free Trade Agreement), 127, 139, 224, 264-68, 376, 386, 388, 397-98, 461 NARG (North American Regional Gas Model), 387 National Accounts, 411 national activities, 409 National Energy Program (NEP) economic effects of, 256-64, 268, 320-21, 324, 333-38, 419-20, 437 end of, 126, 264, 365, 392, 405 introduction and purposes, 122, 251-52, 254-56, 330, 390-91, 437 Memorandum of Agreement, 122–23, 124, 254-55, **259**, 260, 317, 331-34, 365, 391, 405 NEP Update, 122, 125, 255, 317, 331, 333 policies in (see also specific policies), 121-**26**, 252–56, 317, 330–33, **353–54**, **364**–65, 390-92, 399, 402, 404-5 national oil company (NOC), 43, 252, 293 National Oil Policy (NOP) introduction and purposes, 118, 202, 229 economic effects of, 129, 233-44, 262, 264 end of, 121, 230, 232, 245, 256 policies in (see also specific policies), 118-20, 133, 229-30, 231 National Parks, 21, 146, 225 national security (see security of supply) National Task Force on the Oil Sands, 165-66, 479 nationalization, 41, 46, 303 natural gas characteristics, 3-4, 9, 10, 11, 15, 16, 37, 183-84, 202, 451, 452-53 contrast with oil, 3, 8, 15, 23, 24, 32, 33, 37-38, 165, 264, 319, 352, 356-58, 366, 432, 454 economic view of, 193-94, 202-6, 210, 211-12, 383-89, 398-402 exports, 19, 27, 29, 70, 353-54, 356, 369, 398-401, 456 licensing (Canada) and removal authorization (Alberta), 126, 226, 251, 265, 351, 357, 363, 369-89, 395-98, 399, 404, 456 history in Alberta, 20, 30, 70, 109–10, 137, 142, 272-73, 352-69, 405-6, 451 price, domestic, 21, 250, 358-64, 365-69, 389-90, 391-94, 398, 428 price, export, 31, 38, 357, 362, 364-65, 391,

392, 394-97, 399-402, 404

production, 20-21, 155, 248, 353-54, 356, 428 regulation of (see also specific programs), 25, 29, 31, 121, 126, 25-27, 250, 263-64, 272-73, 331, 363-83, 389-98 resources/reserves, 20, 24, 352, 353-54, 354-56 royalties/taxes, 311-12, 319, 331, 402-5 sales of (see under consumption) shipment, 6-7, 10, 11-12, 30, 31-32, 69, 70, 225, 227, 352, 357, 367-68, 387, 392-94 natural gas plants gas processing, 2, 10, 13, 16, 28, 29, 209, 351, 354-55, 390, 394, 402-3, 407, 413, 418 gas processing allowance, 402 Natural Gas Policy Act (U.S.), 400 Natural Gas Pricing Agreement Act (Alberta), 390 natural monopoly (see under monopoly) National Energy Board (NEB, federal) Act, 31, 132, 227, 229, 377, 378, 379, 395 data and statistics, 32, 83, 86, 99-100, 101, 125, 129, 142, 146, 152, 172, 174-78, 179-80, 181-82, 185-86, 207, 213, 214-20, 244, 261, 355, 358, 366, 369, 387, 467-68 formation and duties of, 117, 212, 227, 229, 250, 265, 365, 371, 395 regulation of natural gas, 126, 266, 357, 363-65, 369, 371-72, 374, 375, 377-83, 385, 387, 388, 389, 395-97, 399-400 regulation of oil, 118, 125-26, 230, 244-45, 250-51, 266 regulation of pipelines, 31, 132, 352, 356, 392 Nemeth, T., 251, 264, 474 neoclassical model, 414, 445 Net Domestic Product, 410 net financial transfer, 434 net profit tax/royalty (resource rent royalty), 74, 300, 314, 315, 325 net social benefit (see also efficiency, economic), 65, 236-40, 241, 328 netback price, 79, 111, 112, 127, 149, 181, 195–96, 259, 333-34, 352, 367-68, 392, 399-401 neutrality, 25, 289, 301, 314, 315, 321, 431, 447, 450, 459 New Brunswick, 225, 247 new oil prices, 122-23, 124, 247, 254-55, 258-59, 260-61, 332, 333, 335 royalties, 75, 122, 210, 316-19, 320, 330, 334-35, 341 new well royalty reduction, 322 Newfoundland and Labrador, 247, 248, 433 Newton, W. L., 119, 235, 474 Nexen Company, 149, 150, 160 NGGLT (natural gas and gas liquids tax), 339, 391, 402, 404-5 NGLs (natural gas liquids), 4, 10, 15, 16, 29, 52, **311-12**, 319, 351, 354-55, 402, 403 Nigeria, 36-37, 38, 39, 43, 44 Nikiforuk, A., 142, 154, 155, 474 Nippon Oil Company, 160 Nisku, 92, 93, 94, 205, 207-8 nominal price (see under price) non-associated gas, 4, 8, 10, 15, 205, 349, 352, 354, 355, 403, 405

non-conventional gas (unconventional gas), 15, 33, 38, 355-56, 368, 404 non-conventional oil (see bitumen, oil sands and synthetic crude oil) non-Crown land (see freehold land) non-tradable good, 434 Nordhaus, W. D., 39, 67, 474 normal profit, 56, 70, 135, 150–51, 241, 291, 292, 293, 299, 327, 339 Norman Wells, 111 normative economics, 15, 64-67, 68, 71, 73-74, 76, 79, 80, 233, 235-36, 243-44, 260, 388 NORP (New Oil Reference Price), 122-25, 254-56, 259, 261, 317, 333, 335, 342 Norrie, K. H., 244, 418, 432, 433, 434, 273, 274 North Dakota, 129 North Sea, 37, 41, 108, 127, 129, 246, 317 North Slope oil, 126, 158 Northern Gateway pipeline, 128, 129 Northwestern Utilities company, 134, 387 Norway, 39, 246, 317, 446 NOVA Company (see AGTL) Nova Scotia, 225, 247, 248, 249, 409 nuclear power, 33, 52, 154 Nugent, J. A., 186-87, 190, 469 NYMEX, 406

0

Occidental company, 44, 152, 160 Odell, P., 41, 474 oil (conventional, see also bitumen, oil sands, refined petroleum products and synthetic crude oil) characteristics and technologies, 3-4, 7, 12, 15, 20-34, 35, 39, 83-84, 91-93, 108, 355, 451, 453-55 costs, 24, 91, 185–92, 210–12 economic view of, 2, 13-15, 16, 17, 18, 48-49, 53-80, 85, 102, 103-4, 171-74, 192-212, 233-44, 256-64, 274-280, 281-84, 345-47, 407-9, 452-61 exports, 19, 29, 39, 66, 104-6, 116-17, 121, 125-26, 224, 226-27, 229-30, 236-38, 244-45, 250-51, 257-58, 260, 377, 455, 456 export tax (see under exports) history in Alberta, 20-22, 26-29, 85-91, 104-12, 116-29, 137, 226-32, 244-56, 272-74, 417-18 imports (see under imports) price, domestic, 107-8, 109-23, 124-29, 133, 228, 235, **244–56**, 390–91, **428**, 456-57 prices, world (see under OPEC) production, 5-13, 20, 38-39, 104, 105-6, 110-21, 126, 128-29, 131, 214-20, 229-30, 428 regulation of (see specific programs), 25-28, 31-33, 117-26, 223-68, 269-85 reserves/resources, 20, 38-39, 83-102 sales of (see under consumption) supply models cost estimation, 182-92, 210-12 NEB, 174-78, 179-80, 185-86, 214-20 output estimation, 200-210

Oil and Gas Conservation Board (OGCB, Alberta, see also Energy Resources Conservation Board, ERCB), 20, 85, 106, 110, 114, 116, 133, 156, 233, 272–77, 357, 370, 463, 465 Oil and Gas Conservation Act (Alberta), 26, 114, 115, 272 oil equivalence, 15, 184, 394 Oil in Canada, 134, 474 oil sands (see also bitumen and syncrude) 2, 149-69 contrast with conventional oil, 22, 24, 104, 132, 142, 169, 249, 402, 450, 460 history, 24, 33, 109, 142-46, 155-61, 169 location and characteristics, 3, 9, 10, 11, 34, 93, 122, 141-44, 147, 148, 169 Oil Sands Development Policy (Alberta), 156, 157 Oil Sands Ministerial Strategy Committee (Alberta), 169, 465 production, 20, 106, 128-29, 142, 148-50, 169, 175, 429 regulation of (see also specific programs), 28, 154–61, 162, 164–67, 252–55, 258, 260, 267, 300 reserves/resources, 38, 146-48, 185 royalties/taxes, 164-67, 168, 300, 312, 319, 324, 325, 330-31, 442, 459 shipment of, 31, 37, 128-29, 136 oil shale, 3, 17, 38, 147 oil-intent, 203 oil-in-the-ground, 182, 187-90, 191, 318 Oilweek, 131, 134, 187, 249, 474 Oklahoma, 37, 112, 128, 129, 214, 271 old oil price, 107-8, 121, 123-25, 210, 247, 255, 258-59, 261, 333 royalty/tax, 75, 316-17, 323, 331, 334-35, 341-43, 345 oligopoly and the Alberta petroleum industry, 113-16, 130, 135, 281, 284, 401 definition and effects, 62, 70-71, 104, 293 in the world market, 42-43, 47, 49-51, 289 oligopsony, 71, 109, 113-16, 281, 284, 392, 399 Ontario, 29, 30, 32, 67, 87, 112, 115, 117–18, 126, 128-29, 226, 228, 240, 242-43, 256, 263, 356, 379, **390**, 392-93 Ontario Energy Board, 392-93 provincial government, 160, 247, 248, 249, 256, 290, 393, 397, 437-38 open access, 78, 128, 292, 302, 304, 314-16, 325, 392, 433, 452 operation (see lifting) opportunity cost (see also marginal opportunity cost of investment), 50, 55, 154, 184, 260, 268 optimal tariff, 284 optimism bias, 442 optimization model, 173-74 193-94, 22, 282, 287 option value, 185, 346, 452 Organization for Economic Cooperation and Development (OECD), 47, 246, 475

Organization of Petroleum Exporting Countries (OPEC), 13, 39-40, 48, 316, 318, 339, 408, 415 and the world oil price, 13, 35, 38, 43-48, 49-52, 70, 113, 121, 124, 140, 159, 316, 361, 452, 454-55, 458 impact on Alberta/Canada, 66, 120-21, 123, 129, 151-52, 159, 162, 245, 247, 250, 255-58, 267, 301, 309, 313, 315, 329, 332, 363, 365, 368, 395, 398, 400-402, 408, 423, 458, 475 impact on oil importing nations, 62, 159, 246, 262, 401-2 Osborne, D. K., 113, 475 OSLO project, 161 Ostermann, J., 447, 474 Ottawa River valley (see under Canada) output (see production) overt controls (see also specific policies, e.g. price controls), 120, 123, 126, 139, 258-59, 260-64, 267, 332, 333, 338, 340, 365, 408, 437-38 Owram, D., 417, 418, 475

Р

P&NG reservations (see reservations) Pacific Gas Transmission Canada company, 30, 356, 405 PAD (Petroleum Administration District, USA), 106, 230 Page, T., 66, 475 Pan Alberta Gas company, 363, 366 Pan Canadian company, 131, 148, 152 Panzer, J. C., 466 Par oil/price, 106, 108, 316, 334, 341-42 Parkland Institute, 318 Parra, F., 43, 475 partial equilibrium, 240 Pasay, J. L., 187, 476 Peace River oil sands, 93, 141, 148 peak-day requirements, 370-72, 378-79 Pearse, P. H., 469 Pembina field/play, 22, 37, 94, 137, 187, 204, 206, 275, 278-79, 285, 313, 320 Pembina Institute, 317-18, 475 Penrose, E., 41, 475 pentanes plus, 4, 10, 15, 30, 106, 141, 163, 175, 215, 255, 354 Percy, M. B., 260, 418, 424-25, 430, 432, 433-34, 437, 473, 474 perfect competition, 62-63, 69, 71, 130, 303, 304 peripheral economy, 412-13 permeability, 6-8, 10, 33, 96, 101, 270, 281, 355, 368, 453 permits (mineral rights), 22, 308, 313, 320 permits, natural gas export (see under natural gas, exports, licencing) Persian Gulf, 41, 43, 44, 45, 121, 128, 228, 230, 235, 255 Personal Disposable Income (PDI), 421-23, 430 Personal Income (PI), 421-23, 417-18, 424, 430 personal income tax, 326–27, 423, 436, 457

Petro-Canada company, 12, 13, 124, 127, 137, 138, 149, 152, 160, 252, 331, 332 Petro-Canada Public Participation Act (Canada), 252 petrochemicals, 2, 4, 267, 352, 418, 425, 433, 436, 450, 458 petroleum (see bitumen, heavy oil, natural gas, oil, oil sands and synthetic crude oil) Petroleum Administration Act (federal), 249-50, 390 Petroleum and Natural Gas Conservation Board (PNGCB, Alberta, see also ERCB), 26, 110, 273, 465 Petroleum Compensation Charge (PCC), 253-55, 259, 331, 338 Petroleum Incentive Program (see PIP) petroleum industry, 64, 65, 69, 96, 104, 116, 130, 151, 200, 251, 304, 451-52 and the macroeconomy, 242, 407-9, 417-30, 432-50, 458 definition and sectors of, 5-16, 17-18, 71-72 downstream activities (see also development, exploration and lifting), 5-10, 16, 17-18, 21-29 expenditures (see under exploration, development and lifting), market structure in (see market structure) profitability of, 135 upstream activities (see also marketing, refining and transportation), 5-10, 16, 17-18, 29-33 Petroleum Marketing Act (Alberta), 250 Petroleum Monitoring Agency (see under government of Canada) Petroleum and Gas Revenue Tax (PGRT), 331-33, 334-35, 338-39, 402, 405 petropolitics, 1, 18, 19, 35, 64, 1129, 139 PGRT (Petroleum and Gas Revenue Tax), 331-32, 333, 334-35, 338-39, 402, 405 Phlips, L., 69, 104, 401, 475 physical waste, 4, 17, 25, 75, 110, 270, 273, 303, Pindyck, R. S., 50, 55, 200, 284, 386, 473, 475 PIP (Petroleum Incentive Payments), 321-22, 330-32, 333-35, 337, 339, 402 Pipeline Act (Canada), 226 pipeline tariffs (see under tariffs) Plains region (Alberta) 26, 320 play (see geological play) Plourde, A., 164, 166-68, 244, 264, 267, 316, 368, 389, 471, 475 Polèse, M., 418, 468 policy analysis, 14, 66, 79, 80, 443 Policy Statement by the Government of Alberta Respecting Long-Term Protection for Consumers of Natural Gas, 375-76 political economy, 139, 221, 246, 413, 433, 446 pollution, 26, 64, 65, 80, 221, 461 Pond, P., 109, 142 pool (see reservoir) pooling regulations, 272, 265 population, 19, 25, 28, 50, 61-62, 81, 142, 236, 242, 409, 412, 413, 415, 417, 419-20, 429-31, 444, 445, 449-51 porosity, 4, 6-7, 96-97, 183, 453 Porter, J. W., 98, 473

postage stamp tariff, 32, 352, 367 potash, 409 Power, M., 97, 173, 473, 475 Powrie, T. L., 241, 256, 332-33, 470, 475 Pratt, L., 142, 145, 159-60, 250, 418, 431-33, 475 Precht, P., 162, 475 prepayments (natural gas), 71, 394 price of reserves (PRES), 56, 192-93 price ceiling, 39, 72, 77-79, 115, 253-55, 395, 399 determination of (see market, functioning of) differentials (see quality differentials) elasticity (see under elasticity) fixing/controls, by producers, 45-47 fixing/controls, by the government, 29, 33, 43, 46, 78–79, 107, 121–24, 126, 139, 162, 172, 244-50, 252, **257-63**, 267, 329-30, 336-37, 339, **361-65, 389-91**, 402, 404, 423, 437, 460 freeze, 121, 160, 244, 246, 260 leadership, 71, 113–14, 115 of natural gas (see under natural gas) of oil (see under bitumen, oil and synthetic crude oil) supply (see supply price) translating nominal (as-spent/current) into real (constant), 22, 40, 41, 46, 54, 178, 183, 253 primary recovery (see under recovery) Prince Edward Island (P.E.I.), 247 Prince, J. P., 186, 475 Princess field, 110 principle of changing circumstances, 45 principle of the sanctity of the contract, 45 Proctor, R. M., 475 producers' surplus (see also economic rent), 58, 65, 69, 73, 78, 79 production and supply, 54-55, 63, 103, 171, 174 decline, 24, 41, 49, 52, 56, 58-59, 85, 111, 122, 128, 142, 179, 181, 270, 297, 319, 325, 346-47, 357 function, 16, 85, 174, 193, 198, 200-205, 210, 212, 412 of natural gas (see under natural gas) of oil (see under bitumen, oil, oil sands and synthetic crude oil) stage of the oil industry (see development, exploration and lifting) productive capacity (producibility), 6, 16, 24, 41, 49, 50, 104, 114, 116, 120, 129, 155, 156, 175-76, 215-16, 234, 242, 250, 258, 272-73, 279, 282, 285, 368, 374, 455 Productivity Capacity Check (natural gas), 381 profit maximization, 53, 56, 60, 70, 172, 174, 191, 192, 194, 198, 204, 272, 274, 276, 280, 283, 294 profitability, 67, 117, 133, 134-36, 145, 161, 165, 167, 181, 182, 194, 273, 274, 280, 287, 298, 300, 305, 314, 333, 442, 460 ratio, 199, 209-10 propane, 4, 10, 15, 354, 370-71, 375 proportionality clause (FTA, NAFTA), 265-67, 376, 298

prorationing 1950 plan, 273, 274-76 1957 plan, 273-74, 276-77 1964 plan, 274 diseconomies, extensive, 77, 272, 277, 280-82, 285 diseconomies, intensive, 271-72, 277-80, 282, 285, 318 history of, 270-74, 284, 454 market demand and, 27, 28, 31, 70, 110, 114, 120, 128, 132, 223, 226, 233-34, 236-37, 239, 258, 269-88, 304, 328 oil sands and, 155-57, 160 price effects, 323, 42, 76-77, 79, 108, 114, 116, 128, 129-30, 133, 230, 280-81, 282-85, 388, 454, 456 proved reserves, 38, **39, 87**, 373, 383 province building, 431, 432, 434, 436, 439, 448 provincial Accounts, 411, 425, 429, 465 Provincial Lands Act (Alberta), 307 public administration, 425, 426 public choice perspective, 431 public good, 139, 146, 235 public interest, 1, 28, 154, 155, 156, 159, 161, 221, 227, 246, 352, 361-62, 370, 377, 382, 395, 431, 461 public monopoly (see under monopoly) public utility, 293-94 Puget Sound, 116, 118, 226

Q

Qatar, **39**, 44, 451 quality difference/differential, 12, 37, 41, 108–**9**, 119, 121, 122, 124, 125–26, 129, 162–**63**, 231, **235**, 249, 250, 253, 256, 258–**59**, 261, 323, 367, 393, 453, 461 quantity fixing, 46–47, 51 quasi-rent, 291, 292, 294, 333 Quebec, **30**, 118, 120, 128, 143, 226, 228, 243, 247, 248, 258, 363, 437 Quinn, G. D., 187, 190–**91**, 475

R

R/P ratio for natural gas, 21, 24, 353-54, 356-58, 366, 381-82, 384-85, 387, 388, 393, 398 for oil (Canada and Alberta), 21, 24, 39, 102, 121, 156-59, 356, 366, 384 for oil (other countries), 39, 48-49 Rainbow (Zama), 22, 94, 137, 204, 208-9 Rangel-Rui, R., 369, 476 rate of return, 48, 70, 135, 150, 161, 186, 187, 260, 283, 293, 300, 327 real estate, 435, 439, 441 real price (see under price) recovery (see by type, e.g., primary, secondary, EOR) factor, 7-8, 25, 60, 84, 85, 97, 99-100, 181, 355, 454 recycling of oil revenues, 262, 408 physical, 4, 224, 243, 354, 452 redetermination clause, 363, 373, 390, 392 Refined Petroleum Products (RPPs), 3, 5, 10, 11–12, **15, 16, 17**, 18, 20, 32, 33, 38, 41,

108-9, 133, 144, 162-63, 224, 225, 228 230, 233, 360, 368, 410 refining, 2, 5, 11-12, 15, 16, 32-33, 55, 61, 69, 70, 72, 103, 104, 108, 114, 133, 137-38, 144, 162-63, 233, 360, 427 Regan, G., 247 Regina, 111-12, 115, 441 regional economic instability (REI), 424 regional economy, 81, 154, 158, 159, 161, 163, 242, 407, 412, 414, 415, 418, 430, 431, 433-34, 438, 458 regressive price change/tax, 241-42, 335, 457 re-injected gas, 269, 354 relinquishment of gas sales, 376 of mineral rights, 27, 302, 305, 309, 323, 320, 325, 453, 461 remaining reserves, 24, 40, 84, 86-90, 101, 102, 203, 274, 354, 356, 381 renegotiation, 31, 306, 362, 266, 382, 387, 392, 398-99 Renne, G., 468 rent collection (see under economic rent) rent seeking, 191, 268 rent shares (see under economic rent) rentals (mineral rights) economic aspects of, 22, 73, 297-98, 314, 45 payments, 307-8, 311-12, 319 regulations, 212, 27, 155, 164, 303, 307-13, 320 replacement cost, 135, 182, 189-91, 339 replacement value, 396, 400 representative firm, 194 research and development (R&D), 136, 431, 436 Research Council of Alberta (see Alberta Research Council) reservations (mineral rights), 22, 308, 30-33, 320 reserves (see also various types of reserves) additions, 23, 24, 55-57, 58, 85-91, 93, 94, 99-101, **175-82**, **186-89**, **200-11**, **214**, 234, 259, 274, 298, **353–55**, 366, 388, 455 definition, categories and significance, 96-99, 102, 122, 171, 212-13, 244, 258, 380-81 formula (natural gas), 380-81 of natural gas (see under natural gas) of oil, Alberta/Canada (see under bitumen, natural gas, oil and synthetic crude oil) of oil, ex-Canada, 39-40, 120 reservoir (deposit, pool) characteristics of, 3-9, 17, 22-24, 35, 38, 54, 84-85, 91, 93, 96, 98, 101-2, 141-48, 159, 173-74, 183, 185-86, 189, 201-2, 269-71, 273-74, 294, 302, 304, 315-16, 354-55, 362, 369, 383, 402, 408, 452-54, 458, 460 depletion of, 24, 26, 41-42, 56-60, 120, 174, 185, 195, 211, 256, 271, 303, 325, 357, 374, 453-54 economic development of, 14, 53-60, 99, 116, 122, 203, 211, 213, 242, 267, 271-73, 275-77, 285-87, 292, 303, 334-37, 346 residual supplier, 43, 51, 232 Resource Allowance, 330, 331, 334–35, 339, 405

resources (see also under bitumen, natural gas, oil and synthetic crude oil) definition, 83-84, 146-47 limits (see fixed stock assumption) resources curse, 416 resource rent royalty (see net profit tax/ royalty) **Restrictive Trade Practices Commission** (RTPC, Canada), 130, 132, 233, 468 revenue (see consumption) revisions and extensions, 85, 88, 210 Richards, J., 418, 431-33, 475 Rilkoff, E. W., 194-99, 200, 333, 476 risk (and uncertainty) economic, 31, 44, 50, 51, 52, 90, 114, 135, 140, 166, 252, 283, 296, 304-5, 327-28, 329, 339, 367, 368, 387, 461 political, 29, 39, 50-51, 52, 119, 160, 161, 29, 243, 249, 258, 304-5, 315, 322, 346 preferences, 96, 132, 161, 172, 186, 271, 296, 300, 301-2, 303-4, 323, 328, 339, 367, 387, 446, 453, 459, 460 sharing, 90-91, 292, 294, 298-99, 301-2, 305, 308, 314-15, 324-25, 329, 387, 459, 460, 461 technical, 25, 33, 96, 99, 115, 152, 153, 164, 166, 188-89, 198, 271, 282, 291, 303, 304-5, 313, 314, 328, 345, 383, 411, 416, 456, 461 Rogoff, K., 469 Rokosh, C., 162, 475 Rosthal, J. E., 471 Roth, B. J., 267, 475 Rowse, J. G., 386, 475 Royal Commission on Canada's Economic Prospects (see Gordon Commission) Royal Commission on Canadian Energy (see Borden Commission) Royal Commission on the Economic Union and Development Practices in Canada (see Macdonald Commission) Royal Commission on Natural Gas (see Dinning Commission) Royal Commission on Petroleum and Petroleum Products (see McGillivray Commission) Royal Commission on Taxation (see Carter Commission) Royal Trust company, 115 Royalite Oil company, 134, 137, 151, 156 rovalties amounts collected, 28, 153, 165, 275, 307, 311-12, 343-45, 423 definition, significance and regulatons, 25, 27, 65, 122, 164–68, 225, 240, 250, 307– 9, 313, 316-20, 321-22, 325, 329-30, 331, 339, 341-42, 394, 402-4, 405, 442 economic aspects and effects of, 15, 16, 28, 54, 56, **73-75**, 100, 152, 195, **297-99**, 300, 314-16, 322-25, 340, 345-47, 386, 459-60 on natural gas (see under natural gas) on conventional oil (see under oil) on oil sands (see under bitumen, oil sands and synthetic crude oil)

Royalty Review Panel (Alberta), 167–68, 317–18, 324, 340, 403–4, 465 Ruitenbeek, J., 159, 475 rule of capture definition and applicability, 26, 41, 110, 223, 270, 302, 313, 453–54, 461 effects of, 41–42, 75–79, 110, 269, 270–72, 280–83, 284–85 Russia, **39**, 41, 408 Ryan, D. L., 210, 473 Ryan, J., 93, 201, 475–76

S

Safarian, E., 136, 476 SAGD (steam-assisted gravity drainage), 9, 149, 152 sales (see consumption) Sarnia, 111, 112, 115, 116, 128, 129, 156, 228, 251, 256, 258, 260, 263 Saskatchewan and equalization, 248 as a market, 111, 112 government of, 122, 246-47, 365 petroleum industry in, 87, 98, 100, 120, 126, 132, 181, 240, 242, 247, 271, 291, 306, 319, 401, 409 population and the economy, 19, 409, 415, **417-24**, 432, 434, 441 Saudi Arabia, 35, 38, 40, 41, 42, 43, 44, 46-47, 51, 119, 121, **123**, 147, **235**, 255, 415 scarcity rent/value (see also user cost), 48, 49, 58, 292 Scarfe, B. L., 194, 196-98, 199, 200, 244, 251, 259, 291, 316, 323, 332, 333, 476, 478 Schlenker, R., 437, 473 Schreyer, E., 247 Schwartz, S. L., 264, 476 Schweitzer, T. T., 439, 476 Scott, A. D., 26, 224, 291, 415, 469, 471, 476 seasonality, 50, 133, 367, 369, 394 secondary recovery, 8, 252-53 second-best, 65–66, 240, 284, 256–57 Secret Agreement (1967), 120, 232 security of supply, 14, 29, 31, 39, 51-52, 160, 228, 230-32, 235, 236, 243-44, 245, 247, 251, 255, 263, 265, 267, 268, 328, 376, 391 sedimentary basin, 4, 5, 20, 56, 98-99, 101-2, 111, 115, 175, 180, 199, 209, **214**, 224, 252, 306, 313, 355, 357, 381 seismic, 5, 22, 93, 193, 213, 312 Select price, 316, 317, 341-42 self-interest, 221, 246 self-sufficiency, 228, 245, 247, 248, 254, 261, 268, 413, 430, 431 Sen, A., 64, 476 Serletis, A., 369, 476 services sector of the economy, 425-28, 429, 434, 435, 438-39, 442, 450 shadow price, 65 Shaffer, E. H., 118, 230, 231, 232, 476 shareholders (see under equity) Sharp, Karen C., 187, 478 Shell Oil company, 9, 42, 108, 117, 127, 131, 134, 148, 149, 150, 152, 156, 230

short-run, 49–50, 55, 57–59, 60, 61–63, 104, 129, 133, 178, 196, 224, 234, 238, 243, 246, 260, 270, 274, 292, 359, 368, 385, 400, 407, 412, 414 Siegel, D. R., 208-9, 476 Sierra Systems, 319, 476 Simeon, R., 433, 474 Simpson, J., 247, 330, 476 Simpson, R. A., 109, 243, 476, 477 Sinopec Oil Sands Partnership, 160 Skeet, I., 43, 476 Slagorsky, Z. C., 187, 476 Slave Lake/Point, 92, 94, 208 sliding scale royalty, 74-75, 166, 168, 295, **297-99**, 305, 307, 309, 314, 316, 318-19, 322, 324, 347, 403, 460 Slovic, P., 472 Smith, J. L., 47, 52, 202, 270, 472, 476 Smith, P. J., 447, 476 Smith, R. S., 411, 476 social contract, 223 costs/benefits, 14, 64-65, 76, 78-9, 154, 186, 187-88, 190, 236-41, 244, 297, 323, 328 interest/perspective/policy, 1, 2, 13, 14, 34, 64-65, 67, 79, 80, 137, 139, 155, 160, 189, 209, 413, 415, 441, 447, 452, 453, 455 norms/values, 137, 441 rate of discount, 296 risk, 161 Social Credit government (Alberta), 158, 159, 293, 436 Socony Oil company (see Mobil) Soligo, R., 43, 472 Somerville, H. H., 306, 476 SOOP (Supplemental Old Oil Production), 122-23, 125, 255, 258, 259, 261 Sorrell, S., 97, 476, 477 Sosa, S., 416, 476 sour gas/oil, 10, 28, 34, 154, 235 spare capacity (see excess capacity) specific gravity, 3, 7, 147 royalty, 73-74 Speirs, J., 97, 476, 477 Sperling, D., 471 spot market/price/sales, 41, 45-47, 50, 113, 124, 127-28, 129, 358, 361, 366-67, 388, 393, 394, 397, 406 SPR (strategic petroleum reserve) (see under inventories) stabilization, 128, 261-62, 267, 302, 431, 438, 443, 444, 446, 449 stagflation, 262, 408, 457 Standard Oil Company (see Esso) Stanford Research Institute, 358, 476 staples theory, 412-13, 418 Stariha, J., 180–81, 187, 190, 468, 471 Statement on New Natural Gas Policies for Albertans (Alberta), 373 Statistics Canada (CANSIM), 83, 123, 138, 410, 421, 425, **426-27**, 468 status quo effect, 271 Steele, H. B., 235, 470

Stigler, G. J., 27, 476 Stiglitz, J. E., 301, 476 stock effect (see degradation effect) stockpiles (see inventories) Stogran, M., 469 Storage, 8, 10, 50, 367, 369, 393, 394 straddle plant, 10, 355, 401 STRC (short-term replacement cost), 189-90 strict controls (see overt controls) subjective probability model, 97, 98-99, 175, 208 subsidy (see also incentive schemes), 27, 65, 253, 259, **261**, 301, 321, 329, 332, 333, 391, 457 substitutability/substitutes, 12, 15, 33, 35, 39, 43, 61, 63, 118, 154, 159, 198, 229, 243, 264, 349, 359-60, 353, 367, 368, 379, 389, 391, 396, 400, 423 successor perspective, 431, 445 Suez, 44, 116, 243 sulphur, 2, 3, 5, 10, 15, 16, 28, 29, 55, 108, 124, 127, 141, 144, 145, 162, 169, 351, 402, 403 Suncor Company (GCOS), 9, 33, 131, 145, 148-49, 150, 151-52, 156-57, 161, 162, 164-68, 169, 177, 250, 252, 254 sunk cost (see fixed cost) superdepletion, 330, 332 Superior, Wisconsin, 116, 119 supplemental royalty, 316-17, 319, 334-35, 342-43, 345 supply (economic, see also production) and costs, 56–60, 65, 172, 173, 182–92, 200, 210-12, 362 and the market, 12, 13, 17, 36-38, 45, 52, 62-63, 65, 67, 72-73, 103-4, 223, 238-39 curve, 54-60, 65, 72-73, 159, 171, 182-84, 186, 187–89, 191, 234, **238–39**, 241, 259, 383-84 elasticity (see under elasticity) function, 54-55, 63, 171-72, 174, 200, 280, 360 meaning and relation to production, 54-45, 63, 103, 171, 174 models and estimation of, 63, 98, 172-222 security of and disruptions in (see security of supply) supply aggregators, 366, 392, 393 supply cost (price), 55, 100, 112, 150-51, 152, 175, 182, 185-87, 199, 362 Sustainability Fund (Alberta) syncrude (*see* synthetic crude) Syncrude Canada company, 9, 33, 124, 145, 148-49, 150, 151-53, 157-61, 162, 164-68, 169, 177, 249–50, 252, 254, 257, 259, **261** Syncrude levy, 250, 253 synthetic crude oil, 3, 5, 15, 17 characteristics of, 9, 146-47, 153, 162, 163 costs, 144-45, 150-52, 161, 185 exports, 158, 163 history of early development, 142-46, 148, 169 NEB conditional forecasts, 176, 177-79, 217, 219-20

prices, 122-25, 145, 151, 162, 167, 254-55, 259

production, **33**, **104–6**, 128, 139, 148–50, 154, 159, 169, 256 resources/reserves, 38, 146–48, 177 royalties, 164, **165**, 166, 167–68 shipments, 30, 136, 163

Т

take-or-pay (TOP), 71, 393–94, 397, 406 tankers, 10, 37 Tanner, J. N., 83, 84, 86, 88, 476 target price, 47, 50-51, 52, 395 tariff export/import, 128, 177, 228, 231, 232, 268, 284, 328 pipeline, 11, 31-32, 36, 38, 41, 41-43, 72, 108, 112, 115, 117, 119, 124, 127, 132-33, 226, 227-28, **235**, 251, **259**, 263, 351, 352, 357, 359, 364, 366, 390, 391, 392, 401 tar sands (see oil sands) tax reference price, 43, 44 taxation (see specific taxes and economic rent, collection of) Taylor, A., 167, 476 Taylor, G. C., 99, 475 Teck company, 148 Teece, D., 43, 470 Teheran-Tripoli Agreement, 44-45, 244 Terasen (see Trans Mountain Pipeline) term contract, 46, 357-58, 359, 361-62, 363, 366-67, 375, 376, 382-83, 387, 388, 392, 393, 394, 397, 398, 454 tertiary recovery/oil, 8, 122, 123, 125, 167, 186, 252-53, 255, 259, 322, 331, 332 Texaco company, 117, 131, 230, 240, 390 Texas, 20, 34, 37, 41, 43, 55, 112, 128, 129, 163, 230, 271, 324, 415, 454 Thaler, R. H., 268, 271, 472, 476 The Savings Question (Alberta), 447-48, 464 Thirsk, W. R., 256, 260, 476 Thompson, A. R., 291, 306, 342, 468, 470, 472, 476 Thompson, E., 476 Thorsteinsson, P. N., 476 tight gas, 15, 38, 368 Tilton, J. E., 464 time value of money (see also discount rate), 161, 182, 184, 188 timing of lease sales, 290, 296, 303-4, 305 Todirescu, M., 146, 470 Toman, M. A., 56, 173, 243, 466 Toner, G., 244, 330, 469 Toombs, R. B., 109, 477 Torch Energy company, 161 Toronto, 30, 36-37, 111-12, 117, 126, 128, 226, 228, 233, 235, 237, 256, 284, 337, 359, 360, 363-65, 390-91, 396-97, 399, 400, 401, 405, 438, 441 Toronto Dominion Bank, 435, 436, 477 Toward 2000 Together, 436, 464 trade (see exports and imports) trade agreements (see FTA and NAFTA) transaction costs, 271 TransCanada PipeLine company (TCPL), 30, 31, 70, 128, 227, 352, 356, 357, 360, 361, 363, 366, 371, 373, 387, 390, 392-94, 405-6

TransMountain Pipeline company (Terasen, Kinder-Morgan), 10, 30, 114, 128, 129, 132, 226 transportation sector of the economy, 160, 241, 425-27, 436 services in the petroleum industry, 5, 10-11, 12, 13, 16, 29-31, 69, 103, 128, 138, 230, 367, 375, 380, 392-93, 418 trap, 4, 6, 7, 8, 33, 83, 91, 355 trend gas, 371-72, 374, 378 Trudeau, P. E., 245, 251, 264, 329 trunk pipeline, 10, 12, 29, 30, 31, 116, 122, 132, 227, 371 Tuer, D., 443-44, 446, 448, 449, 464, 477 Turner Valley, 20, 26, 93-94, 98, 110-11, 137, 271, 272-73, 307 Tversky, A., 268, 472 two-tier pricing (natural gas), 396 Tyerman, P., 250, 477

U

Uffelman, M., 152, 187-88, 189-90, 197, 469 Uhler, R. S., 56-57, 60, 93, 191, 194-95, 197, 199, 201-7, 211, 477 ultimate potential/reserves, 8, 24, 84, 85, 90, **94-95**, 96-99, **100-101**, 102, 147, 270, 274, 356, 385, 442, 459 uncertainty (see risk) unconventional gas (see non-conventional gas) unemployment, 62, 136, 248, 262, 408, 413-14, 421-22, 425, 433, 450, 458 uniform border pricing (natural gas), 264, 365, 381, 395-96, 400-401 United Arab Emirates (UAE), 39, 40 United Kingdom (UK), 39, 42, 47, 224, 246 United States of America (U.S.) domestic petroleum industry, 10, 26, 37, 39, 41, 42, 47, 57, 72, 102, 116, 126, 129, 197, 200-201, 213, 246, 256, 258, 270-71, 276, 281, 297, 306, 313, 329, 368, 383-84, 408 government of Cabinet Task Force on Oil Import Control, 43, 118, 230, 477 Department of Energy, 265 Energy Information Administration (EIA), 49, 147, 368–69, 470 Federal Power Commission (FPC), 377, 395, 400, 401 free trade agreements (see FTA and NAFTA) Oil Import Quota Program (USOIQP), 29, 104, 116, 118-20, 158, 226, 228, 230-33, 236-40, 242, 244, 258 petroleum policies, 33, 41-43, 133, 118, 129, 132, 136, 158, 226, 243, 249, 271, 284, 326–27, 377, 395, 396, 400, 454, 547 Presidential Proclamation, 230-32 natural gas imports, 30, 353-54, 356-58, 362, 364-65, 367, 377, 381, 385-88, 395-402, 404, 405 oil imports, from Canada, 29, 30, 72, 105-7, 112-13, 115-16, 118-21, 124-25, 128-29,

139, 228-40, 243-44, 245, 248, 256, 263, 274-75, 331, 456-57 oil imports, from ex-Canada, 30, 33, 72, 111-12, 117, 126, 226, 284 unitization, 110, 269, 270-72, 274, 278, 279, 280-82, 285, 301, 304, 454 upgrading (see under bitumen) Urquhart, I., 137, 477 user cost, 56, 57, 58, 60, 65, 68, 75, 135, 159, 184, 185, 191–92, 209, 212, 234, 271, 283, 292, 294-95, 297, 339, 385, 446 Usher, D., 248, 477 USSR, 42, 43, 48 UTS Energy company, 148 utilities gas (see also marketing), 30, 33, 357-58, 371-74, 376, 387, 391-94, 397 sector of the economy, 425-27

v

value added, 163, 411, 412, 423, 425, 428-29, 432 Van Meurs, P., 283, 291, 318, 477 Venezuela, 3, 39, 40, 42, 43, 44, 117, 120, 163, 226, 227, 228, 231, 233, 243 Verleger, P. K., 361, 477 vertical integration, 12-13, 17-18, 32, 42, 46, 69, 71-72, 104, 114, 115, 132, 137-39, 328 Vidas, H., 368, 477 Viking, 92, 93, 95, 206, 207, 208 volumetric reserves estimation model, 97, 98-**99**, 175, 176 Voyager upgrader, 150 VRIP (volume related incentive price), 364, 396 w

Wabasca, 141, 147 Wade, J. A., 99, 475 Wainwright, 110, 134 Walker, M., 251, 466, 468, 474, 475, 477, 478 Walls, M. A., 97, 173, 466, 477 Wa-pa-su, 109 Warrack, A. A., 446, 477 waste (see physical waste) waterflood, 8, 231 Waterton, 20, 110 Watkins, G. C., 4, 10, 31, 32, 43, 56, 61, 75, 77, 102, 108, 109, 113, 116, 118, 119, 122, 124, 127, 132, 184, 185, 186, 187-88, 227, 230, 235, 240, 242, 244, 256, 264, 267, 275-79, 285, 291, 292, 300, 305, 315, 316, 323, 332, 334, 335, 365, 366, 368, 369, 378, 381, 389, 400-401, 436, 463, 464, 466, 468, 472, 474, 475, 477-78 Watkins, M. H., 412, 478 Watt, R. A., 110, 469 Waverman, L., 241, 244, 256, 264, 267, 367, 381, 383, 386, 389, 400-401, 420, 469, 471, 475, 478 Weiner, R. J., 37, 233, 466, 478 welfare (see also efficiency) economics, 221, 409, 410 losses, 68-78, 386, 400 well servicing grants, 322

well spacing, 7, 28, 75, 172, 182, 272, 273-77, 279-82, 285-87, 454 Westcoast Transmission company, 30, 358, 387, 395 Western Accord, 126, 264, 322, 338, 365, 381, 466 Western Canadian Sedimentary Basin (WCSB), 98-**99**, 101, 111, 115, 175, 176-77, 180, 181, 199, 209, **214–16**, 224 Western Economy, 343 Wiggins, S. N., 271, 478 Wiginton, J. C., 466 wildcat drilling/wells, 6, 22, 23, 321, 328, 345 Wilkinson, B. W., 224, 478 Willig, R. D., 234, 446, 478 willingness to pay, 14, 236, 410

Willson, B. F., 224, 278 Wilson, T. A., 408, 472 Winberg, A. R., 227, 352, 369, 478 Winfield, M., 476 winner's curse, 296–97 Winnipeg, 36, 111–12, 115 Winnipeg Agreement (Syncrude), 160, 164 within economic reach resources, 372, 373 Wolf Lake, 161, 164 work commitments, 302–3, 304, 305, 307 workable competition, 62, 71, 136 world oil market, 35–52, 72, 120, 127–28, 158, 233, 251, 361, 457 World Petroleum Congress, 84 World War II, 19, 20, 41, 42, 43, 67, 102, 140, 147, 385, 409, 419

Wright, R. R., 256, 260, 476 Wright, R. W., 433–44, 473 WTI (West Texas Intemediate), 127, 129 Wyoming, 235

X–Y–Z x-inefficiency, 201, 292

Yergin, D., 41, 478 Yildrim, E., 165 Yu, Q., 200, 478 Yücel, M. K., 369, 466

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