



**THE ECONOMICS OF  
WASTE INCINERATION  
TO GENERATE ELECTRICITY  
IN THE REGION OF  
METRO VANCOUVER**

**By Jack L. Carr\***  
**February 17, 2014**

\* Professor Emeritus of Economics, University of Toronto

I am a Professor Emeritus of Economics at the University of Toronto (150 St. George Street, Toronto, Canada, M5S 3G7), where I have taught since 1968. I am also a former acting Chair of the Department of Economics and a former Director of Graduate Studies. I have a B. Com. degree from the University of Toronto and an M.A. (economics) and Ph.D. (economics) from the University of Chicago. My research and teaching interests focus primarily on monetary economics, financial economics and law and economics. I attach a copy of my curriculum vitae which summarizes my research and teaching experience.

## INTRODUCTION

On October 11, 2013 the Region of Metro Vancouver passed Bylaw 280, which if approved by the provincial government, would force private collectors of residential and commercial non-hazardous waste to send these materials to the Region's processing, treatment and disposal facilities such as incinerators or waste to energy facilities, materials recovery, composting and/or landfills. This regulation is commonly referred to as Flow Control. Flow Control will result in a system where all users of the system are charged the same amount; \$107 a tonne in 2013 and \$108 a tonne in 2014 in tipping fees. It should be noted that tipping fees in Metro Vancouver were at a constant level of \$65 a tonne from 1991 to 2007. By 2010 these fees were \$82 a tonne. The July 19, 2013 Finance Committee meeting of Metro Vancouver projected that tipping fees would increase to \$157 a tonne by 2017. These tipping fees of \$157 a tonne represent a significant increase (ie. 47%) over currently charged tipping fees.

## ECONOMIC EFFECTS OF FLOW CONTROL

Economic theory defines a sole seller of a product or service as a monopoly and a sole buyer of a product or service as a monopsony. What is the economic rationale for Metro Vancouver to set up a monopsony, where there is a sole buyer of waste materials?<sup>1</sup> With monopsony, competition in disposing of waste is completely eliminated.

A possible rationale for Metro Vancouver to institute Flow Control is the belief that incinerators or waste to energy facilities are the most efficient method of waste disposal and flow control is needed to ensure adequate long run supplies of waste materials for the incinerators. I believe this rationale for Flow Control is incorrect and that the imposition of Flow Control will impose a number of harmful effects on the economy of Metro Vancouver.

1. If incinerators or waste to energy facilities were the most efficient technology then they would prevail in the free market without the need for flow control. If incinerators or waste to energy facilities were the most efficient technology then private firms would build them on their own and because they were the most efficient technology these private incinerators would be able to charge lower tipping fees than the tipping fees currently charged by existing waste disposal technologies. These private firms would be able to enter into long term supply arrangements with existing haulers to provide for a sufficient supply of waste materials for the incinerator.<sup>2</sup>
2. The fact that Bylaw 280 forces private collectors of waste to send their materials to the incinerator and the fact that the proposed tipping fees are higher than the fees charged by existing competing technologies means that the incinerator or waste to energy facilities are not the most efficient technology. The incinerators or waste to energy facilities require significant subsidies to make them economically viable.
3. It is inefficient and wasteful of resources to implement the inefficient technology of incinerators and waste to energy facilities. It is not clear why the Region of Metro Vancouver is pursuing an inefficient waste disposal technology.
4. The subsidies to make incinerators and waste to energy facilities viable will result in higher costs to the residents of Metro Vancouver and in addition these subsidies will slow economic growth.

<sup>1</sup> It should be noted that the monopsonist in this case pays a negative price for waste materials, that is haulers pay a tipping fee for the disposal of waste materials.

<sup>2</sup> If long term contracts are difficult to negotiate then vertical integration of haulers and incinerator companies could solve any costly contracting problem.

# JACK LESLIE CARR

5. There is competition in the waste hauling business. Higher tipping fees will be passed on to the end user. Higher tipping fees for commercial waste will result in higher costs of waste collection for commercial users and this will increase the cost of doing business in Metro Vancouver. An increased cost of business will depress economic activity in Metro Vancouver. In the uncertain economic times facing North America, there is no need for policies which further depress economic activity.
6. Higher tipping fees for residential users will result either in higher costs for waste disposal (if waste is privately collected) or higher taxes (if collected by the municipality). These higher user costs or higher taxes will also have a negative impact on economic activity.
7. Flow Control does not give direct subsidies to incinerators. Flow Control results in hidden subsidies (via higher tipping fees) to the incinerators or waste to energy facilities. As such the public may not realize the full cost of Flow Control. Good public policy requires full transparency of the costs and benefits of the policy.
8. If Flow Control and incineration were an efficient policy, it would be expected to be increasingly adopted. As of 2011, there are 89 waste to energy facilities in the US but since 1997 only one new facility has been built due to public opposition because of high costs of such facilities, the identified health risks and the increase in practices such as recycling and composting.
9. The American Economic Review (AER) is one of the leading economic journals. An article in the August 2011 AER by Nicholas Z. Muller, Robert Mendelsohn and William Nordhaus concluded that the Solid Waste Combustion and Incineration Industry had the highest Gross External Damages (i.e. Air Pollution ) relative to the value added of the industry. Specifically air pollution costs from the solid waste combustion and incineration industry were 6.72 times the value added of this industry. This value exceeded the values of all other industries.
10. It is significant to note that the pollution costs from the solid waste combustion and incinerator industry exceeded the value added of this industry.<sup>3</sup>

## CONCLUSIONS

The elimination of competition in the waste disposal industry, will have significant negative economic effects. It will result in higher costs for the end users of waste disposal and this will depress economic activity. The subsidization of an inefficient disposal technology will result in a waste of resources which will also depress economic activity. I would recommend that the provincial government not approve Bylaw 280 of the Region of Metro Vancouver.

Jack Carr  
Professor Emeritus of Economics

<sup>3</sup> Value added is the value of goods and services of this industry, minus the value of the intermediate goods used in production of the goods and services.

## PERSONAL DATA

Address (Business)	Department of Economics University of Toronto 100 St. George Street, Room 4072 Toronto, Ontario M5S 3G3 (416) 978-5396	1978 - Present	Professor of Economics University of Toronto
		1973 - 1978	Associate Professor of Economics University of Toronto
Address (Home)	163 Banbury Road Don Mills, Ontario M3B 2L7 (416) 445-8251	1975 - 1976	Visiting Associate Professor of Economics University of California, Los Angeles
Birthdate	August 9, 1944	1968 - 1973	Assistant Professor of Economics University of Toronto
Birthplace	Toronto		
Marital Status	Married		
Dependents	Three	1968 - Present	Research Associate Institute for Policy Analysis University of Toronto

## EDUCATION

1965	University of Toronto B.Com.
1968	University of Chicago M.A. (Economics)
1971	University of Chicago Ph.D. (Economics)
	Doctoral Dissertation "A Dynamic Monetary Model of Business Fluctuations"

## Supervisor of Ph.D. Research

Professor Milton Friedman, Department of Economics, University of Chicago	1990, 1991, 1992	SSHRC Research Grant \$36,000
	1993, 1994	Canadian Bankers Association Research Grant \$30,000

## Teaching and Research Experience

1987 - 1988	Acting Chairman, Department of Economics
1983 - 1985	Associate Chairman, Department of Economics and Director of Graduate Studies

## List of Honours, Prizes, etc.

1965	Honourary Woodrow Wilson
1965-68	Lily Honor Fellowship
1975	Canada Council Leave Fellowship
1982	SSHRC Leave Fellowship \$12,500
1987, 1988	SSHRC Research Grant \$35,000
1990, 1991, 1992	SSHRC Research Grant \$36,000
1993, 1994	Canadian Bankers Association Research Grant \$30,000

Listed in Who's Who in Economics, A Biographical  
Dictionary of Major Economists 1700-1986. Second  
edition ed. by Mark Blaug. The MIT Press, 1986.  
(Living economists are listed if their work is frequently  
cited as measured by Social Science Citation Index).

## Details of Present Appointment in the University

Professor of Economics, University of Toronto  
Research Associate, Institute for Policy Analysis

## RECORD OF SCHOLARLY WORK

### List of Publications in Refereed Journals

“Money Supply, Interest Rates and the Yield Curve”, Journal of Money, Credit and Banking, August, 1972, pp. 582-594, co-authored with L.B. Smith.

“A Suggestion for the Treatment of Serial Correlation: A Case in Point”, Canadian Journal of Economics, May 1972, pp. 301-306.

“Correcting the Yield Curve: A Re-Interpretation of the Duration Problem”, in the Journal of Finance, (Sept. 1974) co-authored with P.J. Halpern and J.S. McCallum.

“A Suggestion for a New Monetary Indicator”, in the Journal of Monetary Economics (Aug. 1975) co-authored with L.B. Smith.

“The Operation of the Canadian Economy under Fixed and Flexible Exchange Rates: Simulation Results from the TRACE Model”, Canadian Journal of Economics, Feb. 1976, co-authored with G.V. Jump and J.A. Sawyer.

“Public Land Banking and the Price of Land”, Land Economics, Nov. 1975, pp. 316-330, co-authored with L.B. Smith.

“Tax Effects, Price Expectations and the Nominal Rate of Interest”, Economic Inquiry, June 1976, pp. 259-269, co-authored with L.B. Smith and J.E. Pesando.

“Mieselman’s Error Learning Model: Some Further Canadian Evidence”, Journal of Business Administration, Vol. VIII, Nov. 1, 1976, co-authored with P.J. Halpern and J.S. McCallum.

“Public Land Banking and the Price of Land: A Reply”, Land Economics, November 1976, (co-authored with L.B. Smith).

“The Zero Coupon Yield Curve: A Response to the Comments”, Journal of Finance, Sept. 1978.

“Interest Rate Deductibility and Effective Tax Rates”, Financial Analysts Journal, May/June, 1981, co-authored with P.J. Halpern.

“The Role of Money Supply Shocks in the Short-Run Demand for Money”, Journal of Monetary Economics, Sept. 1981, co-authored with M. Darby.

“Ricardo and the Non-Neutrality of Money in a World with Taxes”, 1982, Vol. 14 in the History of Political Economy, co-authored with J. Ahiakpor.

“Comments on Punitive Damages in Tort Law”, University of Southern California Law Review, November 1982.

“The Economics of Symbols, Clan Names and Religion”, Journal of Legal Studies, June 1983, co-authored with J. Landa.

“Housing Finance Contracts and the Non-Neutrality of Inflation”, Nov. 1983 in Housing Finance Review, (co-authored with L.B. Smith).

“Greenline Investors Service. Shall We Keep Brokers and Banks Apart”, Canadian Business Law Journal, (co-authored with A. Milne and S.T. Turnbull), Dec. 1983, pp. 257-271.

“Monetary Anticipation and the Demand for Money”, September, 1985. Journal of Monetary Economics (with M. Darby and D. Thornton).

“Comments on Time, Property Rights and the Common Law”, Washington University Law Quarterly, Fall, 1986, pp. 793-865.

“Unlimited Liability as a Barrier to Entry”. Journal of Political Economy, August 1988, pp. 766-784 (with F. Mathewson).

“The Canadian Charter of Rights and Freedom: Impact on Economic Policy and Economic Liberty Regarding Women in Employment: Comments on Marilyn Pilkington”, Manitoba Law Journal, Summer 1989.

“The Size of the Government Sector and Economic Growth”, American Economic Review, March 1989.

“Unlimited Liability and Free Banking in Scotland”, Journal of Economic History, September 1989 (joint with S. Glied and F. Mathewson).

“Giving Motorists a Choice Between Fault and No-Fault Insurance: An Economic Critique”. San Diego Law Review, March 1990.

“The Economics of Law Firms: A Study in the Legal Organization of the Firm”, Journal of Law and Economics, October 1990.

“A Reply to Gilson”, Journal of Political Economy (joint with F. Mathewson), April 1, 1991.

“Stability in the Absence of Deposit Insurance: The Canadian Banking System, 1890-1967” (21 pp). Journal of Money, Credit and Banking, November 1995. With F. Mathewson and N. Quigley.

“Law Firms” in The New Palgrave Dictionary of Economics and The Law (joint with F. Mathewson), 1998.

“The MacKay Report: What Kinds of Change, Challenge and Opportunity”, Canadian Business Law Journal, February, 1999, pp.235-247.

“Defending The Current Monetary System”, ISUMA: Canadian Journal of Policy Research, Volume 1, No 1 (Spring 2000).

“Real and Monetary Shocks to the Canadian Dollar: Do Canada and the United States Form an Optimal Currency Area”, The North American

Journal of Economics and Finance 70 (2002) pp. 1-19. (With John Floyd)

“Inflation, Financial Development and Income Inequality”(2005), “Kredit and Kapital” (joint with Kam Hon Chu).

## Books and Monographs

Cents and Nonsense: The Economics of Canadian Policy Issues, Holt, Rinehart and Winston, Toronto, 1972, 134 pp., co-authored with F. Mathewson and J. McManus.

The Macroeconomic Effects of an Arctic Gas Pipeline on the Canadian Economy, Report No. 6, Institute for Policy Analysis, University of Toronto, 135 pp., co-authored with G.V. Jump and J.A. Sawyer.

The Structure of a National Financial Facility for the Canadian Credit Union System: Studies for Decision Making: Study No. 2, 42 pp. National Association of Canadian Credit Unions, 1976.

Wage and Price Controls: Panacea for Inflation or Prescription for Disaster, Fraser Institute, 1976, 49 pp. Reprinted in Illusions of Wage and Price Controls, J.L. Carr, et. al., Fraser Institute, 1976. Translated into Spanish, 1982.

The Money Supply and Monetary Policy, 67 pp., Policy and Economic Analysis Program, Policy Paper No. 6, Institute for Policy Analysis, University of Toronto, 1978.

Liability Rules and Insurance Markets, Consumer and Corporate Affairs Canada, 1981, co-authored with P.J. Halpern.

Tax-Based Income Policies: A Cure for Inflation, Fraser Institute, 1982 (with William Scarth and Robert Schuettinger).

The Day Care Dilemma - Fraser Institute, 1987. Ensuring Failure: Financial System Stability and Deposit Insurance in Canada, C.D. Howe Institute, 1994. Co-authored with G.F. Mathewson and N.C. Quigley.



## Chapters in Books

---

- "Demand and Cost: An Empirical Study of Bell Telephone of Canada", Ch. 5 in Telecommunications for Canada, edited by T. English, Methuen Publications, Toronto, 1973.
- "Speculation and Land Prices", Ch. 5, in Housing in Canada, edited by H. Lithwich. A report submitted to Robert Andras, Minister Responsible for Housing.
- "The Money Supply and the Rate of Inflation", in Essays in Monetary Aspects of Inflation, Nold, Carr and Winder. Information Canada, 1973.
- "The Economic Rationale for Centrals", Ch. 9 in Studies for Decision Making: Liquidity in the Credit Union System: Study No. 1, National Association of Canadian Credit Unions, 1976.
- "Comments on the Way Ahead: A Framework for Discussion" in Which Way Ahead: Canada After Wage and Price Controls by D. Auld, J. Carr et. al., Fraser Institute, 1977.
- "Public Land Banking and the Price of Land", in Public Property: The Habitat Debate Continued ed. by L.B. Smith and M. Walker. Fraser Institute 1977, (co-authored with L.B. Smith).
- "Inflation, Uncertainty and Future Mortgage Instruments" (with L.B. Smith) In North American Housing Markets into the 21st Century, edited by G. Gow and M. Goldberg, Ballinger, Cambridge, Mass., 1983.
- "Le Bilinguisme Au Canada: L'Usage Consacré-T-II L'Anglais Monopole Naturel?", Economie et langue ed. Francois Vaillancourt (Quebec 1985).
- "Monetary Policy: The Last Fifty Years", forthcoming in Proceedings of the Fifth Canadian-Hungarian Roundtable.

- "Canada and the Pacific Rim: Trade and Growth Prospects", in Proceedings of the First Annual Symposium in Canada, edited by B. Joie, Tapei: Tamkang University Press, 1988, (joint with G.V. Jump and T. Wilson).
- "Capital Market Controls and Money" in Rating Economic Freedom, ed. by Stephen Easton and Michael Walker. The Fraser Institute, 1992.
- "Deposit Insurance, Savings and Economic Growth" in Economic Policy, Financial Markets and Economic Growth Westview Press, 1993.
- "The Economics of Symbols, Clan Names, and Religion" in Trust, Ethnicity and Identity by Janet Landa. University of Michigan press, 1994.
- "A Monetary Constitution for the Americas" in Money and Markets in the Americas: New Challenges for Hemispheric Integration. Edited by James Dorn and Roberto Salinas-Leon. CATO Institute. With Kam Chu (30 pages).

## Working Papers and Others

---

- "Instrumental Variables Versus Two-Stage Least Squares Approaches to the Estimation of Economy-Wide Econometric Models", Working Paper Series, No. 7104, Institute for Policy Analysis, University of Toronto co-authored with G.V. Jump.
- "Inflation in Canada: Causes and Effects", Canadian Banker and ICB Review, March/April, 1974.
- "Is There a Stable Short-Run Phillips Curve", Working Paper Series No. 7713, Institute for Policy Analysis, University of Toronto.
- "The Role of Money Supply Shocks in the Short-Run Demand for Money", Discussion Paper No. 98. Department of Economics, University of California, Los Angeles (co-authored with M. Darby).
- "Year-End Review of Monetary Policy", in Economic Policy Review, Vol. I, No. 1, 1979), Institute for Policy Analysis, University of Toronto.

- "Taxes and the Relationship Between the Price Level and Relative Prices", Working Paper Series No. 7919, Institute for Policy Analysis, University of Toronto.
- "Ricardo and the Non-Neutrality of Money in a World with Taxes", (co-authored with James Ahikpor), Working Paper Series No. 7920, Institute for Policy Analysis, University of Toronto.
- Report to the Committee of the Supreme Court of Ontario on Fixing Capitalization Rates in Damage Actions, February 1980, (with M. Segal and R. Walker).
- "The Economics of Symbols, Clan Names and Religion", (co-authored with J. Landa). Working Paper Series No. 8115, Institute for Policy Analysis, University of Toronto.
- "The Economics of Usury Laws", Law and Economics Workshop Series, Number WSV-15, February 1983, (with J. Landa).
- The Growth in Government Regulation and Economic Growth, November 1983. A submission to the Royal Commission on the Economic Union and Development Prospects for Canada.
- "Discount Brokerage and the Role of the Financial Institutions", Canadian Banker, February 1984 (with S. Turnbull).
- "Monetary and Fiscal Policy in Canada: The Last Twenty-Five Years", Professional Administrator, Vol. VII, No. 1, Winter 1984-85.
- "Regulations of Canadian Financial Institutions and Some Comments on the Federal Green Paper", Canadian Banker, Vol. 95, No. 2 (October, 1985)
- "Unlimited Liability as a Barrier to Entry", Working Paper Series No. 8603, Department of Economics and Institute for Policy Analysis, University of Toronto (co-authored with F. Mathewson).
- "The Size of the Government Sector and Economic Growth", Working Paper Series No. 8616.

- Department of Economics and Institute for Policy Analysis, University of Toronto.
- "The Economics of the Legal Organization of Firms". Working Paper Series, Department of Economics and Institute for Policy Analysis. (co-authored with F. Mathewson).
- "The Role of the Economic Expert", Advocates Quarterly, December, 1987.
- "Comments on Marilyn Pilkington's "The Canadian Charter of Rights and Freedom: Impact on Economic Policy and Economic Liberty Regarding Women in Employment." Paper presented on conference of Economic Policy and Canadian Charter of Rights.
- "Canada and the Pacific Rim: Trade and Growth Prospects", International Economics Program Working Paper DP 87-9, Dec, 1987. "Increased Competition for Canadian Banks: The Case of American Express", Canadian Law Newsletter, Summer 1989.
- "Can Increased Regulation and Consumer Protection Enhance the Stability of the Canadian Financial System" (17 pp.). Policy Options. June, 1995. With F. Mathewson and N. Quigley.
- Submission to House of Commons Finance Committee on Bill C-100 which will reform financial institution regulation. August 1995.
- Filed Affidavit On the Economics of Welfare Reform, in the constitutional challenge to Ontario welfare changes. October, 1995.
- "The Economic Rationale for the Ontario Welfare Reductions", Canada Watch, January, 1996.
- Submission to The Standing Committee On Finance and Economic Affairs, Hearings on Draft Legislation To Amend The Insurance Act and Other Acts Related to Automobile Insurance, February, 1996.
- Appeared before Competition Tribunal in Interac case. April, 1996.



