



Athena Institute

Environmental Impact Estimator

Companion LCI Database Report Series

The LCI Database Reports CD, a companion CD to the *ATHENA™ Environmental Impact Estimator* software CD, contains a series of life cycle inventory (LCI) and related reports commissioned by the Athena Sustainable Materials Institute to expand the Institute's knowledge base and support the *Estimator* software. The reports are specifically provided in this form to make our research and data development process transparent, recognizing that the LCI data is at the heart of the *Environmental Impact Estimator*.

The *Estimator* is a systems model for assessing the relative life cycle environmental implications of alternative building designs, and is intended for use by architects, engineers and researchers at the conceptual design stage. One objective is to put environmental considerations on a footing with other more traditional decision criteria. The *Estimator* makes the process relatively simple because the Institute has already done the LCI work; users of the software need not be concerned about this complex and costly step. However, many users want to be assured about the quality of the data, and to better understand how it was developed. They naturally want the *Estimator* to be more than a 'black box', so that they can feel confident using the results and advising clients accordingly. The reports CD is intended to provide that understanding and assurance.

Institute studies and publications fall into two general categories:

- investigative or exploratory studies intended to further general understanding of life cycle assessment (LCA) as it applies to building materials and buildings; and
- individual LCI studies dealing with specific industries, product groups or building life cycle stages.

All studies in this latter category are firmly grounded on the principles and practices of life cycle assessment, and follow our published Research Guidelines (included on the reports CD), which define boundary or scope conditions and ensure equal treatment of all building materials and products in terms of assumptions, research decisions, estimating methods and other aspects of the work.

However, integration of the LCI data is a primary function of the *Estimator* itself, and we therefore caution that individual LCI reports are not necessarily stand-alone documents. For example, a report may specify the amount of electricity used in production processes without taking account of the primary energy required to generate that electricity. Similarly, a report may include estimates of transportation requirements in mode and distance terms without including the energy use and emissions associated with that transportation. The essential missing energy production, conversion, and use estimates are the subject of entirely separate databases embedded in the *Estimator*.

In some situations, the *Estimator* also calls on related product databases to complete a calculation. For example, the report on concrete products includes estimates of reinforcing steel requirements, but the concrete report does not include the effects of producing that steel. Those effects are the subject of the separate steel report, and the *Estimator* calls on databases from both reports to complete its calculations.

The Institute will continue to expand and update its databases and further develop the *Environmental Impact Estimator*. We are committed to developing current, reliable data, to making it available in a readily usable form, and to maintaining research transparency.



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List of Companion Reports

Research Guidelines. Athena Sustainable Materials Institute, rev./97

PRODUCT LIFE CYCLE INVENTORY STUDIES

Cradle-to-Gate Life Cycle Inventory for Canadian and US Steel Production by Mill Type. Mar./02 Prepared by Markus Engineering Services.

Maintenance, Repair and Replacement Effects for Building Envelope Materials. Jan./02 Prepared by Morrison Hershfield Limited.

Cradle-to-Gate Life Cycle Inventory for Exterior Stucco Finishes. Oct./01 Prepared by George J. Venta, Venta, Glaser & Associates.

A Life Cycle Inventory of Selected Commercial Roofing Products. Apr./01 Prepared by Franklin Associates, a Service of McLaren-Hart/Jones.

A Life Cycle Inventory for Road and Roofing Asphalt. Mar./01 Prepared by Franklin Associates, a Service of McLaren-Hart/Jones.

Life Cycle Analysis of Asphalt Impregnated Fiberglass Built-Up Roofing Felts. Mar./01 Prepared by George J. Venta, Venta, Glaser & Associates.

Life Cycle Inventory of ICI Roofing Systems: Onsite Construction Effects. Mar./01 Prepared by Morrison Hershfield Limited.

Summary Report: A Life Cycle Analysis of Canadian Softwood Lumber Production. Apr./00 Prepared by Jamie K. Meil, Athena Sustainable Materials Institute. **Combined with original report:** *Raw Material Balances, Energy Profiles and Environmental Unit Factor Estimates for Structural Wood Products.* Mar./93 Prepared by Forintek Canada Corp.

Life Cycle Analysis of Residential Roofing Products. Mar./00 Prepared by George Venta, Venta, Glaser & Associates and Michael Nisbet, JAN Consultants.

Cement and Structural Concrete Products: Life Cycle Inventory Update. Oct./99 Prepared by Venta, Glaser & Associates. **Combined with original report:** *Raw Material Balances, Energy Profiles and Environmental Unit Factor Estimates for Cement and Structural Concrete Products.* Aug./93 Prepared by CANMET & Radian Canada Inc.

Life Cycle Analysis of Brick and Mortar Products. Sep./98 Prepared by George J. Venta, Venta, Glaser & Associates.

A Life Cycle Analysis of Solid Wood and Steel Cladding. Sep./98 Prepared by Jamie K. Meil, Athena Sustainable Materials Institute.

Life Cycle Inventory Analyses of Building Envelope Materials: Update and Expansion. Jun./99 Prepared by Dr. Gregory A. Norris, Sylvatica. **Combined with original report:** *An Exploratory Life Cycle Study of Selected Building Envelope Materials.* Jul./98 Prepared by Dr. Gregory A. Norris, Sylvatica.

Life Cycle Analysis of Gypsum Wallboard and Associated Finishing Products. Mar./97 Prepared by George J. Venta, Venta, Glaser and Associates.

INVESTIGATIVE STUDIES

Demolition Energy Analysis of Office Building Structural Systems. Mar./97 Prepared by M. Gordon Engineering.

Assessing the Relative Ecological Carrying Capacity Impacts of Resource Extraction. Aug./94 Prepared by Wayne B. Trusty and Associates & Dr. R. Paehlke, Environmental Policy Research.