



THE ATHENATM INSTITUTE IS THE ONLY NORTH AMERICAN SOURCE FOR COMPREHENSIVE, CONSISTENT AND COMPARABLE DATABASES FOR A WIDE RANGE OF BUILDING MATERIALS AND PRODUCTS DEVELOPED USING ACCEPTED LCA PROCEDURES. AND THE ATHENA SOFTWARE FOR DOING WHOLE BUILDING LCA IS THE ONLY SUCH TOOL IN NORTH AMERICA.



The ATHENA Institute
www.athenaSMI.ca

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The ATHENATM Sustainable Materials Institute was incorporated as a Canadian not-for-profit organization in 1997 to carry forward work on sustainable building materials started in the early 1990's. *The Institute's objective is to foster sustainability of the built environment*, primarily by meeting the building community's need for better information and tools that will allow environmental considerations to be factored into the design process from the conceptual stage onward.

The Institute is headquartered in the Ottawa area, with research on the project taking place in centres across Canada and the US through contracts with affiliated research organizations and individuals.

The Institute's work program and activities are supported by memberships, as well as by grants from both the public and private sectors. Members include various departments and agencies of the Government of Canada, the US Department of Energy, the Building Research Establishment in the UK, and representatives of the North American wood products, cement, and energy industries.

There are three main thrusts to the Institute's activities, all of which are directed at meeting the primary objective:

- developing comprehensive, comparable life cycle assessment (LCA) databases for building materials and products;
- developing and making available software that incorporates the databases and makes them readily usable in the design process;
- maintaining collaborative relationships and participating in international activities to further the science of LCA in relation to buildings and of sustainable building in general.

The ATHENA Databases

The Institute has developed a set of regional Canadian databases for key building products, covering 90 – 95% of the structural and envelope systems of typical commercial, institutional, light industrial and residential buildings. Databases include wood, steel and concrete products used in structural applications, cladding products, insulation and barrier materials, gypsum wallboard and related finishing materials, and selected glazing and window framing options.

The Institute has also developed databases for energy use and related air emissions for on-site construction of a building's structural assemblies, and has examined the energy requirements for the demolition of structural systems. Work is now proceeding on other products as well as on the operations and maintenance stage of a building's life cycle.

The ATHENA Software

The ATHENATM software makes it possible for designers and others to access reliable LCA-based answers without having to actually undertake LCA. It is a practical, easy-to-use decision support tool that provides high quality environmental data and assists with the complex evaluations required to make informed environmental choices.

ATHENA integrates the Institute's databases so that architects, researchers and policy analysts can easily assess the relative environmental effects of design options for all or part of a building, including different material mixes. They can then select the option that minimizes energy use, greenhouse gas emissions and other environmental effects.

The Importance of Life-Cycle Assessment

LIFE-CYCLE ASSESSMENT has been widely accepted within the environmental research community as the only legitimate basis on which to compare alternative materials, components and services.

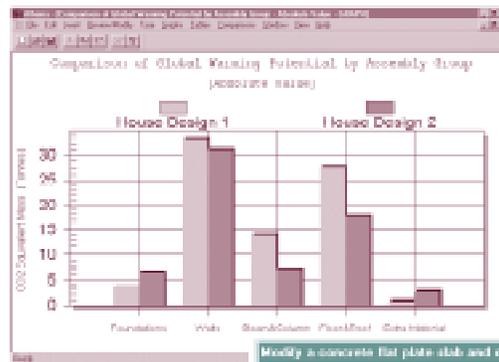
A recent study of nearly 500 sectors in the US economy found that the construction sector produces the most CO2 emissions through the manufacture, transport and use of materials. At about 300 million metric tons, the sector creates more upstream fossil CO2 emissions than the direct total fossil CO2 emissions of all US state and local government electric utilities.

Another study comparing embodied and operational energy use in Canadian office buildings indicated embodied energy intensities ranging up to an equivalent of more than 20 years of operating energy use. The study also confirmed that the embodied energy of buildings can be significantly influenced by material selection or other design decisions.

LCA is the accepted route to properly document and understand these and other critical environmental effects, such as toxic releases to water.

How to use the software

1. Enter a general description of a building project, including location.
2. Specify a design by selecting from typical assemblies and entering basic dimensions, or by entering specific quantities of individual products. Depending on the assembly, you can also select from pre-set load and component material options, or simply accept the defaults.
3. Go to the results and comparison menus to see results and compare options in tables or graphs, and in as much or as little detail as you choose. A researcher wanting detail can see the results by specific energy forms or waste substances, by activity stage and by assembly. An architect may only be interested in tabular or graphical displays of summary measures by building assembly and for the total design. The model also allows the user to make direct comparisons among alternative designs.



◀ One of many options for comparative graphical results.

▶ A typical dialogue box for entering a structural assembly.

Where to get it

The current version of the software, which provides a dynamic model for environmental assessment of the *structural* components of a building design from the resource extraction through on-site construction stages of the life cycle, can be freely downloaded from the Institute's web site at www.athenaSMI.ca. Subsequent versions of the model will incorporate additional building products and the rest of the life cycle, and apply to retrofit as well as new building design decisions.

Consulting Services

The ATHENA Institute also offers a range of consulting services including:

- environmental assessments of specific building designs and of retrofits or major renovations;
- the principles and practice of LCA at the product or process level;
- training in the use of Athena; and
- general advice and guidance in support of client sustainability efforts

Services are tailored to meet a client's specific needs in a cost-effective manner.

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