



Table of Contents

1. PowerPoint Presentation of SDCB 201 Course
2. Glossary
3. Useful Internet Links
 - 3.1 General Links
4. Marketing Green Buildings
 - 4.1 The Economic Case for “Green Buildings” “High Performance Buildings”
 - 4.2 A Guide to Green Building Resources – Financing and Supporting Resources
5. Design Tools
 - 5.1 Why Use Assessment Tools (PowerPoint Presentation)
 - 5.2 Comparison of Two Tools - Athena and Envest (PowerPoint Presentation)
 - 5.3 Life Cycle Assessments – Case Studies
 - 5.4 Environmental Impact Estimator – Description of Software



Table of Contents (Continued)

6. Integrated Design Approach

- 6.1 Guide to Value Analysis and the Integrated Design Approach
- 6.2 Case Study – International Netherlands Group (ING) Bank, Amsterdam, Netherlands
- 6.3 Success Stories – Manasc Isaac Architects Ltd.
- 6.4 Transforming Your Practice: Integrated Design Charrettes for Sustainable Buildings

7. Life Cycle Costing

- 7.1 NIST Handbook 135 - Life Cycle Costing Manual
- 7.2 ASTM Standards on Building Economics
- 7.3 Life Cycle Costing Data Sources and Software
- 7.4 Financial Tables



1. PowerPoint Presentation of SDCB 201 Course



PowerPoint Presentation 1-1



PowerPoint Presentation 1-2



PowerPoint Presentation 1-3



PowerPoint Presentation 1-4



PowerPoint Presentation 1-5



2. Glossary

Refer also to the Life Cycle Costing Glossary, pages GL-1 to GL-6, in the NIST 135 Handbook.

Biodegradable

Capable of decomposing rapidly under natural conditions.

Blackwater

Blackwater is the wastewater produced by toilets and urinals.

Brownfields

Brownfields are areas of land previously used for industrial activities. These sites are usually in central urban locations, and they are usually contaminated.

Commissioning

Commissioning is a systematic, documented and collaborative process that includes inspection, testing and training conducted to confirm that a building and its component systems are capable of being operated and maintained in conformance with design intent.

Daylighting

The method of illuminating building interiors with natural light.

Daylighting controls

Devices that allow for user or automated changes in the amount of artificial lighting within interior spaces designed for daylight such as electrical switching controls, exterior or interior louvers, and dimming devices.

Depletion

Depletion is the result of the extraction of resources from the environment faster than they can be created. Depletion can be subdivided into abiotic depletion and energy depletion.

Ecolabel

Official award granted to a number of product alternatives in a product group conforming to the environmental criteria as set for that group, usually on the basis of a life cycle assessment.

Ecology

Totality or pattern of relationships between organisms and their environment.

Ecosystem

The complex of a community and its environment that functions as an ecological unit in nature.

Efficient detailing

Design detailing that eliminates or reduces the amount of materials used. For example, designing with a module to reduce cutoff waste or leaving structural material or mechanical systems exposed to eliminate finishing costs or superfluous finishes.



2. Glossary (Continued)

Embodied energy

The total energy that a product "contains", including all energy used in growing, extracting and manufacturing it plus the energy used to transport it to the point of use. The embodied energy of a structure includes the embodied energy of its components plus the energy used in construction.

Emission

Discharge of entities (such as chemicals, heat, noise and radiation) to the environment from the system studied.

Environmental LCA

Part of a broader LCA in which only environmental consequences are considered.

Extraction

Use of materials or resources obtained directly from the environment by an economic process.

Filtration

Treatment process for removing solid particulate matter from water by passing it through porous media such as sand or artificially produced filters. This process is often used to remove particles that contain pathogenic organisms.

Fossil fuel

A fuel such as coal, oil and natural gas, produced by the decomposition of ancient (fossilized) plants and animals.

Freshwater

Naturally occurring water having a low concentration of salts. It is generally accepted as suitable for extraction and treatment to produce potable water.

Global warming (greenhouse effect)

Environmental problem caused by pollution. Global warming potential is defined as the amount of CO₂ (in kg) emitted. Mostly caused as a result of the burning of fuels, and by emission of CH₄.

Graywater

Wastewater that does not contain toilet wastes and can be reused for irrigation after simple filtration. Wastewater from kitchen sinks and dishwashers may not be considered graywater in all cases.

Green design

Design which focuses on environmental considerations.



2. Glossary (Continued)

Hazardous wastes

Wastes with toxic, infectious, radioactive or flammable properties that pose a substantial actual or potential hazard to the health of humans and other living organisms and the environment.

Heat island

The additional heating of the air over a city as the result of the replacement of vegetated surfaces with those composed of asphalt, concrete, rooftops and other man-made materials.

Hydrological cycle

Biogeochemical cycle that collects, purifies and distributes the earth's fixed supply of water from the environment to living organisms, and then back to the environment.

Indoor air quality (IAQ)

According to the U.S. Environmental Protection Agency (EPA) and National Institute of Occupational Safety and Health (NIOSH), the definition of good indoor air quality includes (1) introduction and distribution of adequate ventilation air; (2) control of airborne contaminants; and (3) maintenance of acceptable temperature and relative humidity. According to ASHRAE Standard 62-1989, indoor air quality is defined as "air in which there are no known contaminants at harmful concentrations as determined by cognizant authorities and with which a substantial majority (80 percent or more) of the people exposed do not express dissatisfaction."

Integrated Design Process

The integrated design process is a design technique which includes a team of professionals to consider "global" solutions which encompass all disciplines (mechanical, electrical structural, materials experts, quantity surveyors, operations and maintenance personnel, etc.) when developing a building concept. Team meetings are usually held frequently during schematic design and design development phases, with additional "full table" reviews held periodically throughout the project.

Life cycle

The consecutive, interlinked stages of a product, beginning with raw materials acquisition and manufacture, continuing with its fabrication, manufacture, construction and use, and concluding with any of a variety of recovery, recycling or waste management options.

Life Cycle Assessment

A cost concept and a method to evaluate the environmental effects of a product or activity holistically, by analyzing the entire life cycle of a particular product, process or activity. Life cycle assessment is typically described in four complementary phases: initiation, inventory analysis, impact assessment and interpretation.



2. Glossary (Continued)

Life Cycle Costing

Life-Cycle Costing is a method of economic analysis that sums all relevant project costs over a given study period in Present Value (PV) terms or today's dollars.

Life Cycle Inventory

A life cycle inventory involves gathering data on all processes and environmental interventions which appear during the life cycle of a product, building or service. Life cycle inventories usually include the following steps: developing a process flow chart, collecting data, defining the system boundaries, and processing the data.

Non-renewable resource

Resource that exists in a fixed amount (stock) in various places in the earth's crust and has the potential for renewal only by geological, physical, and chemical processes taking place over hundreds of millions to billions of years. Examples are copper, aluminum, coal and oil.

Overall life cycle assessment (LCA)

Study of many aspects of a product process, considering the complete life cycle through a range of aspects such as the environment, costs and safety.

Photovoltaic

The generation of electricity from the energy of sunlight, using photocells.

Quality of life

Notion of human welfare (well-being) measured by social indicators rather than by "quantitative" measures of income and production.

Recyclable materials

Materials that are capable of being recycled are typically made of a single component or of materials that can be separated.

Recycling

To collect and/or process waste from a system that results in a useful application in the same or in another system.

Renewable energy

Energy resources such as wind power or solar energy that can keep producing indefinitely without being depleted.

Resource efficiency

A term used to describe the efficient use of materials in design and construction. For example, design strategies that reduce material use or enable materials to be salvaged, reused or recycled.



2. Glossary (Continued)

Runoff

Portion of rainfall, melted snow or irrigation water that flows across the ground's surface and is eventually returned to streams. Runoff can pick up pollutants from air or land and carry them to receiving waters. Impervious surfaces such as asphalt, concrete and rooftops significantly increase runoff in urban areas.

Scrubber

Air pollution control device that uses a spray of water or reactant to reduce or remove pollution from air.

Sedimentation

Settling of matter to the bottom of a liquid or water body, notably a reservoir.

Sewage

Organic waste and wastewater produced by residential and commercial establishments.

Sewer

Channel or conduit that carries wastewater, sewage and storm water from their source to a treatment plant or receiving stream. A sanitary sewer conveys household and commercial wastes, a storm sewer transports rain run-off and a combined sewer is used for both purposes.

Smog

Combination of smoke and fog in which products of combustion such as hydrocarbons, particulate matter and oxides of sulphur and nitrogen occur in concentrations that are harmful to human beings and other organisms.

Stormwater management

The process of collecting, storing and treating rainwater, especially rainwater runoff that occurs in the first few minutes of a storm event. This initial rainwater contains the highest concentrations of contaminants, such as petroleum hydrocarbons or particles from erosion or other sources.

Sustainability

Sustainability is a state in which interdependent natural, social and economic systems prosper today without compromising their future prosperity.

Thermal mass

Mass in a building (furnishings or structure) that is used to absorb solar gain during the day and to release the heat as the space cools in the evening. Thermal mass can assist in the proper functioning of passive systems.



2. Glossary (Continued)

Volatile organic compounds (VOCs)

Organic compounds that evaporate readily and contribute to air pollution mainly through the production of photochemical oxidants.

Waste

Materials without any positive commercial value created by an economic process. (Sometimes a by-product with a low value or one, which makes only a small contribution to the total revenue, is also considered as waste). A distinction can be made between waste that is re-processed in the economic system with resulting emissions, and final waste, which is introduced into the environment.

Watershed

An area of land that, as a result of topography, drains to a single point or area.

Water table

Level below which water-saturated soil is encountered. It is also known as groundwater surface.



3. Useful Internet Links

3.1 General Links

<http://www.athenaSMI.ca>

The ATHENATM Sustainable Materials Institute

<http://www.greenbuildingsbc.com/>

Green Buildings BC

<http://buildlca.rmit.edu.au/>

Environment Australia – Greening the Building Life Cycle

<http://www.bfrl.nist.gov/oe/software/bees.html>

Building for Environmental and Economic Sustainability

<http://www.nrel.gov/lci/>

U.S. Life-Cycle Inventory Database Project

<http://www.nrel.gov/hpbportal/metrics/>

Metrics - High Performance Buildings

http://www.cmhc-schl.gc.ca/en/imquaf/himu/himu_002.cfm

CMHC/OAA Continuing Education for Architects

<http://www.igsnetwork.com/boreal/>

IGS Active Network

<http://epa.gov>

United States Environmental Protection Agency

<http://www.usgbc.org/>

United States Green Building Council

<http://www.astm.org>

ASTM International Standards Worldwide

<http://www.iisbe.org>

International Initiative for a Sustainable Built Environment

<http://renovation.pentagon.mil/sustainabledesign.htm>

Sustainable Design & Constructability

<http://www.wbdg.org/>

Whole Building Design Guide



4. Marketing Green Buildings



4.1 The Economic Case for “Green Buildings”
“High Performance Buildings”



4.2 A Guide to Green Building Resources – Financing
and Supporting Resources



5. Design Tools



5.1 Why Use Assessment Tools



5.2 Comparison of Two Tools – Athena and Envest



5.3 Life Cycle Assessments – Case Studies



5.4 Environmental Impact Estimator –
Description of Software



6. Integrated Design Approach



6.1 Guide to Value Analysis and the Integrated Design Approach



6.2 Case Study – International Netherlands Group (ING) Bank, Amsterdam, Netherlands



6.3 Success Stories – Manasc Isaac Architects Ltd.



6.4 Transforming Your Practice: Integrated Design Charrettes for Sustainable Buildings



7. Life Cycle Costing



7.1 NIST Handbook 135 - Life Cycle Costing Manual

7.2 ASTM Standards on Building Economics



E833-02 Standard Terminology of Building Economics



E917-99 Standard Practice for Measuring Life-Cycle Costs of Buildings and Building Systems



E964-93(1998)e1 Standard Practice for Measuring Benefit-to-Cost and Savings-to-Investment Ratios for Buildings and Building Systems



E1057-99 Standard Practice for Measuring Internal Rate of Return and Adjusted Internal Rate of Return for Investments in Buildings and Building Systems



E1074-93(1998)e1 Standard Practice for Measuring Net Benefits for Investments in Buildings and Building Systems



E1121-98 Standard Practice for Measuring Payback for Investments in Buildings and Building Systems



E1185-93(1998)e1 Standard Guide for Selecting Economic Methods for Evaluating Investments in Buildings and Building Systems



7. Life Cycle Costing (Continued)

7.3 Life Cycle Costing Data Sources and Software

7.3.1 General

- Sustainable Federal Facilities:
A Guide to Integrating Value Engineering, Life-Cycle Costing,
and Sustainable Development
(U.S. Federal Facilities Council)
<http://books.nap.edu/catalog/10093.html>

7.3.2 LCC Publications

- NIST Handbook 135 – Life Cycle Costing Manual:
Sieglinde Fuller and Stephen R. Petersen
(included in CD-ROM)
- Life Cycle Costing for Design Professionals:
Second Edition: Dr. Stephen J. Kirk, AIA, CVS and Alphonse J. Dell’Isola, P.E., CVS.
Contact Steve Kirk: KirkAssociates@aol.com
- ASTM Standard on Building Economics
(Compendium) – Fourth Edition
www.astm.org

7.3.3 Operating Maintenance and Repair Costs

Means 2002 Facilities Maintenance and Repair Cost Data (hard copy and CD-ROM)
www.rsmeans.com

Whitestone 2002 Maintenance and Repair Cost Reference
www.whitstoneresearch.com

7.3.4 LCC Software

NIST Building Life Cycle Cost (BLCC) Software (free download)
www.bfrl.nist.gov/oae/oae.html

NIST Building for Environmental and Economic Sustainability (BEES) Software
(free download)
www.bfrl.nist.gov/oae/oae.html

National Resources Canada RETRSCREEN
Renewable Energy Software (free download)
www.retrscreen.net

Whitestone MARS Facility Maintenance and Repair Cost Forecast System
www.whitstoneresearch.com

GES Technologies Montreal – System for Asset Renewal and Resource Allocation (SARRA)
www.ges-int.com



7. Life Cycle Costing (Continued)

7.4 Financial Tables

Download financial tables at <http://www.lifecyclecosting.ca>