

LEED Silver Certification for Alberta Infrastructure Facilities

Design & Technology Series #16



Fig. 1: Lillian Osborne High School LEED Silver 2012 (Used with permission from Edmonton Public Schools)

What is LEED

Leadership in Energy and Environmental Design (LEED) is a globally recognized green building rating system adopted by Alberta Infrastructure in 2006. LEED certification provides third-party verification to ensure buildings are designed and built to meet high-performance standards for Albertans.

A high-performance building impacts more than just energy costs; it impacts the health and well-being of the occupants, surrounding community, and environment.

Technical Design Requirements

The Technical Design Requirements for Alberta Infrastructure Facilities (TDR) establishes requirements for projects and outlines mandatory credits that projects must achieve in the following LEED categories:

- Integrative Process
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality

Future Targets

In addition to the 2030 "net-zero energy ready" model building code target, code development will include greenhouse gas (GHG) emissions in the 2025 National Model Codes and embodied GHG emissions in the 2030 National Model Codes. LEED Silver certification allows Infrastructure to be an industry leader in the adoption and advancement of these changes.

Sustainability Goals of our Clients

Infrastructure's clients, from Alberta Health Services to school boards across the province, are developing their own sustainability goals, priorities, and strategies. Delivering high-performance facilities further enables end-users of Infrastructure-delivered projects to achieve their goals.

The Integrative Process early in design allows school boards and project teams to set priorities for each project. This includes the health and well-being of building occupants.

After project completion, the communication of the sustainable building features has been found to engage occupancy, particularly students in LEED certified schools.

Schools

A cost/benefit study on LEED Silver certification for schools compared school projects constructed over the past 15 years. The study compared similar schools from within the same school board where information was available on the operational energy use for the facilities.

Cost of LEED: In two of the school boards, the capital cost of LEED certified schools was lower in 4 of 7 comparisons. Additionally, the 40-year energy costs were lower in 5 of 7 comparisons. These findings align with the following sustainable building industry knowledge:

- Project requirements and design decisions are the primary influence on cost differences.
- Third-party verification through LEED certification provides added value to ensure the project's high-performance requirements are achieved.

Beyond code minimum: In the third school division in the study, LEED-certified schools were designed to exceed code minimums, a requirement not applied to non-LEED schools. A closer review revealed that the primary cost drivers were design features that provide long-term benefits by enhancing durability, maintainability, and occupant health.

Other findings: The operation and maintenance on the facilities by school boards has a significant impact on energy consumption. This demonstrates the need to work with school boards as innovative technologies are incorporated into design.

Healthcare Facilities

A LEED study conducted on healthcare facilities went into further detail including an energy analysis, life cycle cost analysis (LCCA) and a triple bottom line (TBL) analysis.

The study selected three existing facilities, a health campus, a continuing care centre, and a rural hospital, all of which achieved LEED Silver on initial construction. The designs were reviewed, and energy conservation measures (ECMs) developed to bring the designs up to National Energy Code for Buildings (NECB) 2020 and LEED v4.1 Silver requirements as required in the TDRv7.

The ECMs developed are in line with both current design practices, as well as emerging design strategies. Current design practice includes LED lighting, improved envelope performance, and air-side heat recovery. Emerging design strategies include increased adoption of advanced heat recovery chiller technology.

Energy Analysis

Updating the existing designs to NECB 2020 required the biggest investment, with increases in capital cost from 6% to 18%. The additional cost to achieve LEED Silver over NECB 2020 was dramatically less, with increases in capital cost from 0.2% to 4%.

The study demonstrated that the health campus project experienced the lowest percent increase in capital cost due to the complexity of hospital design.

The utility cost savings for going beyond the NECB 2020 code minimum and achieving LEED Silver were between 6% and 8% for the three projects.

Life Cycle Cost Analysis

The LCCA provides a holistic representation of project costing over the 75-year life cycle of a healthcare facility by including utility costs, maintenance, repair, and replacement costs.

The high-performance technologies required to achieve the energy savings needed for LEED Silver come with additional costs for maintenance and repair. However, there are also replacement cost savings from reduced lighting and smaller cooling equipment.

The additional costs had the greatest impact on the continuing care facility, as the electricity savings were limited. The comparison of the annualized return on investment is presented in Figure 2.

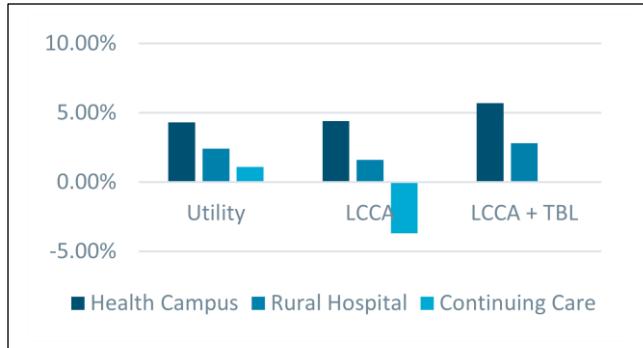


Fig. 2: 75-year annualized ROI LEEDv4.1 vs NECB 2020

Triple Bottom Line Analysis

The TBL analysis adds an additional perspective by including the social, environmental and economic impacts of the sustainable design features of LEED certification. The stakeholders included in this analysis included the building owner, occupants, and surrounding community.

- Social: health, productivity, noise pollution, congestion
- Environmental: air pollution, carbon emissions, water
- Financial: electricity, natural gas, water costs

The LCCA and the TBL can be combined to demonstrate the true ROI for LEED certification. The continuing care facility experiences the largest change again, returning a positive ROI with LEED Silver.

Conclusion

The sustainable design practice of LEED certification has been a part of Alberta Infrastructure building design practice for almost two decades. These studies confirm to following:

- School projects designed to achieve LEED Silver certification do not necessarily result in higher overall project costs; in many cases, other design decisions have a greater impact on the project budget.
- Healthcare projects designed to meet the higher energy performance requirements and sustainability features for LEED Silver, demonstrate a positive ROI.

For further information contact: Sustainability INFRAS-TSBGreenBuildings@gov.ab.ca

Technical Services and Procurement Branch, Alberta Infrastructure

©2025 Government of Alberta | April 16, 2025