SEEFAR
Building Analytics Inc.

Monetizing Building Sustainability

VALUE APPRAISAL GUIDE

WWW.SEEFAR-Valuation.com

The expressions 'Direct Comparison Approach' and 'Value-Added' are common phrases in the real property appraisal and mortgage financing field.[1] Understanding the need to blend these two techniques into the appraisal process is an essential step in helping the real property market to adopt building sustainability with more confidence.

Evidence for the importance of this is clearly demonstrated by the international concern for climate change. Most countries are now actively advancing the reduction of greenhouse gas emissions (GHGs) through improved energy efficiency in buildings. This has elevated the importance of monetizing building sustainability as a value-added premium to help optimize the investment value in buildings.

Beyond Visible Value

While the direct comparison approach is by far the most common technique used to appraise the market value of real property, this approach cannot reliably account for many important financial differences between buildings. As a result, the value-added technique is often used.

In most cases, the construction investments made to improve energy efficiency and to incorporate sustainability into a building's design are not visible to the average appraiser or owner.

As a result, buildings that have the genuine potential to reduce GHGs and/or ownership costs are often undervalued. The lack of a consistent and universal methodology for calculating the value-added means building investors must rely on erratic, incomplete, and often misleading building valuations. This dilemma hinders the market adoption of sustainable high-performance buildings,[2] slowing down the rate at which buildings can reduce GHG emissions.

The process for accurately calculating the value-added for a building requires a comprehensive understanding of the Total Cost of Building Ownership (TCBO), which can only be determined over time. While a simple comparison of the current or projected energy costs can be helpful, it is insufficient when determining the value-added.

The same applies to 'building energy rating' systems, which are very useful but insufficient when monetizing building sustainability. Neither the simple calculation method nor the rating system approaches can be used to determine the TCBO.

Canadian Uniform Standards of Professional Appraisal Practice (CUSPAP)

There are clauses within the CUSPAP that shape a general 'duty of care' for appraisers. These uniform standards help to ensure that a consistent and reasonable effort is made to avoid misleading information or foreseeable harm.

Disclosing the approach used for calculating the value-added benefits as part of an appraisal report would be a reasonable effort toward meeting these standards. The SEEFAR Valuation provides the professional and consistent approach needed to determine the value-added for building sustainability.

CUSPAP 5.2.1: It is unethical for a Member to develop, use or permit others to use, for any purpose, any report which the Member knows, or ought to know, is defective, erroneous, and/or misleading.

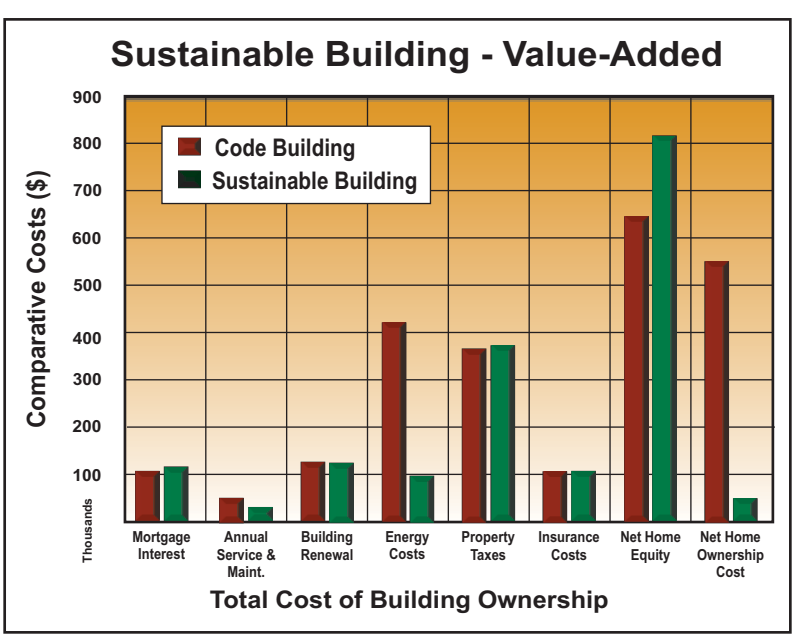
CUSPAP 5.2.2: A misleading report can be caused by omission or commission and may result from a single large error or a series of small errors that, when taken in aggregate lead to a report that is deemed to be misleading.

The dilemma is not about disclosing the value-added; it is more about how to calculate it in a consistent and professional manner.

Building Sustainability - Value-Added

Even with insufficient buildings for the direct comparison approach, sustainable buildings would command higher investment value over buildings that are code compliant. The challenge is to quantify and measure the value-added with limited market-derived evidence.

The following table shows the significant value-added difference between a code compliant home and a sustainable home over a 60-year useful life: In this example the value-added through building sustainability exceeds the initial purchase price of the home.



The SEEFAR-Valuation© Process Architecture

The word 'monetize' means, "to convert into or express in the form of currency." The SEEFAR-Valuation© limits it's assessment analysis to known costs and/or cost projections that are already expressed in the form of currency.

The SEEFAR-Valuation© focuses on the cost savings, and cost avoidance savings, that occur comparatively between the purchase alternatives. As a result, the SEEFAR Valuation is silent about the monetized value of softer factors such as:

- Occupant comfort
- Building related health considerations
- The impact of Indoor air quality

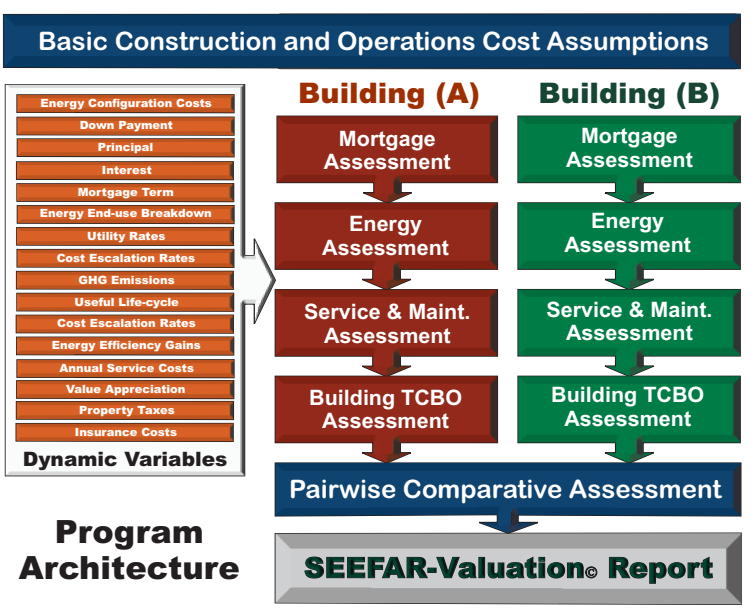
The factors included in the SEEFAR-Valuation© can be demonstrated in this example: In making a buying choice between two homes where Home A has a lower initial purchase price but higher costs of ownership, and Home B has a higher purchase price but lower costs of ownership, a buyer cannot make an informed selection without being aware of the current value of future costs. Costs needed for this calculation include:

- Mortgage interest
- Property taxes
- Property insurance
- Energy costs
- Annual service and maintenance
- Age-related building renewal

This aggregated cost is the TCBO. The SEEFAR-Valuation© accurately compares the TCBO differences between the purchase options over time. The aggregated difference needs to be expressed in terms of present dollars.

The architecture of the SEEFAR-Valuation© is both comprehensive and complex because it needs to account for all the costs of building ownership and the interaction between them over time. As a result, the 'input' assumptions include the known or projected baseline costs for each item, along with assumptions about how these costs are expected to change over time.

The four main cost areas and the sixteen dynamic variables are shown in the illustration below. Changes in the assumptions will allow for scenario modeling, and the assessment report offers flexible output to match the assessment objectives.



Preston Hartwig, M.A., RFPP, Partner, Swan River Office, RED RIVER GROUP

"The information contained in the SEEFAR Report provided the level of detail required to accurately calculate the "value added" by the energy efficient features of the home that I appraised. Having a comparison of the subject home's total cost of home ownership, compared to an average code compliant home, provided the solid data required to make an adjustment between the subject and other homes that have sold in the neighborhood. I could not imagine trying to quantify the value of the energy efficiencies without the information provided by the SEEFAR Report. It made a difficult task, simple and supportable."

This whole building life-cycle analysis approach is the foundation of the SEEFAR-Valuation©, and represents the structured application of a series of internationally recognized accounting calculations. It is both comprehensive and complex in scope. In fact, because of the considerable time involved in undertaking this level of analysis manually, it seldom gets used today.

A wide mix of other financial analysis approaches are commonly used today, including:

- Return on investment (ROI)
- Net present value (NPV)
- Internal rate of return (IRR)

While each of these approaches has recognized merit, they are ALL insufficient in their ability to provide the type of whole building life-cycle information needed to determine comparative building investment values. The common inconsistencies with these approaches often relate to 'time frame' and 'discount rate'.

There is a well-documented synergy between 'best value' and 'building sustainability.'

The SEEFAR Valuation Process Applications

The SEEFAR-Valuation© allows for a transparent analysis to be done of two comparative buildings. This comparative analysis could be done between any two buildings or building designs. Since 'sustainability' is not exclusively about energy consumption,[2] an analysis could be done between buildings that use different types of building features, like a 'metal' roof compared to 'asphalt shingles', or a 'traditional' hot water tank compared to a 'fibreglass' hot water tank.

The fundamental value of doing a SEEFAR-Valuation© is to help optimize the investment value. While in most cases, the best value will be derived from differences in energy efficiency, the TCBO can also be substantially reduced through a careful selection of sustainable materials which may not necessarily impact the energy efficiency of the building.

Design and Engineering Application

The SEEFAR-Valuation© is therefore useful during the design process, where alternative building components are being considered. This type of detailed life cycle analysis will reveal which component choices offer the lowest TCBO as a way of optimizing the capital investment. In a case like this, the comparative analysis is not between two different buildings, but two different designs for the same building.

This analysis is useful in the case of new construction, or major retrofit projects, particularly since it allows the investor to consider a 'whole building perspective' when making building improvement investments.

Home Buyer Application

Adding the TCBO to the initial purchase price of each home makes it possible to project the ownership cost requirement for each home over time. Once the home is sold, the net cost of home ownership can be calculated by subtracting the net selling price from the TCBO and the initial purchase price:

TCBO
+ initial purchase price
- net selling price
= actual cost of home ownership

The assessment results are intended to identify the best value for the money being invested. This formula can easily be modified to suit applications where the investment is related to major modifications on existing buildings.

Revenue Property Application

The SEEFAR-Valuation© can be used to help landlords forecast future building costs, predict ideal rental rates, and make informed decisions about building improvement or expansion investments. In cases where the sustainability of the building exceeds that of comparative rental options in the area, the SEEFAR-Valuation© will provide the landlord with the analysis needed to promote the building's advantages.

Building Appraisal Application

The differences in the costs between two buildings can, from a financial analysis perspective, be treated as a cash flow stream and discounted to determine the net present value of the cash flow over whatever time period suits the application. Appraisers then use this cash flow stream to support the determination of the value-added amount needed to supplement the direct comparison approach.

While the value-added doesn't change the direct comparison value, it does inform buyers and sellers about the 'value-in-use'[3] attached to the building with the lowest TCBO.

When the appraisal reflects the additional building sustainability values, it will decrease the market barriers to market adoption of sustainability. Today, some regional markets are planning to raise the minimum building code to make sustainable homes the standard for new construction.[4]

This approach to home appraisal will also provide mortgage lenders with the information they need to determine the relevant value of building sustainability as part of the credit risk and debt servicing calculations required to support a mortgage application.

Value-added Strategy

Given that each building will have its own unique sustainability value *footprint*, by using the net present cash flow stream value calculated by the SEEFAR-Valuation©, an appraiser can apply the type of 'economic obsolescence' factor needed to reflect the market situation. It is not uncommon for an appraisal to include a value-added premium for other features and amenities as a percentage of the cost; this percentage is normally arrived at using an economic obsolescence rate.

As the rate of market adoption for sustainable buildings grows, and comparables are available to support the direct comparison approach, the economic obsolescence factor can be adjusted.

While supply-and-demand in the market will have a significant bearing on the price a home can demand, measuring the credit risk and debt servicing will still remain critical for mortgage financing.

Uniform SEEFAR-Valuation© Report

A SEEFAR-Valuation© report (Form 1004A Assessment Report) is available for residential home applications. This report includes:

- A comparative description of the target and comparative homes
- A TCBO table that shows the net present value of the savings stream related to the sustainable value at five 5-year increments, and at 60-years. This table also shows the application of an economic obsolescence percentage
- An annual energy end-use distribution table
- A cumulative energy cost table
- A cumulative maintenance cost table
- A cumulative building renewal cost table

This report provides the appraiser with all the information needed to support the value-added conclusions that the appraiser wishes to use. It also provides the seller, the buyer and the realtor the information needed to understand the value-in-transfer attached to the home.

Mortgage Financing Application

Most mortgage lenders do not have access to the information needed to determine how, or if, sustainability changes the credit risk and debt servicing factors. The SEEFAR-Valuation© provides lenders with the well-defined value criteria needed to consistently determine the best mortgage product for more sustainable homes.

To the extent that the home buyer's debt servicing capabilities are enhanced by the lower TCBO values of a sustainable building, mortgage lenders will be able to use the SEEFAR-Valuation© to determine the amount of mortgage debt a buyer can service. It would not be unusual for a sustainable home to cost at least $275 less in monthly cash outflow over a 25-year mortgage term, than a code compliant home.

In fact, mortgage lenders who pursue mortgage financing of sustainable homes will enjoy lower credit risk than they would in lending for code complaint homes.

Dennis Cunningham, Manager, Environmental Sustainability, Assiniboine Credit Union

"The SEEFAR tool effectively illustrates the financial benefits of building with sustainability and high levels of energy efficiency in mind. It confirms that there is significant long-term value in making the additional upfront investment in building or purchasing a home that exceeds current building code energy consumption targets.

Intuitively one assumes that highly energy efficient homes should be less expensive to own and operate. In the financial services industry validating this is especially critical – mortgages are calculated using strictly defined criteria, not intuition. The SEEFAR tool can be used by a lender to accurately estimate the savings associated with energy efficiency. Those savings can then be incorporated into credit risk and debt servicing calculations.

I believe the SEEFAR tool will be invaluable to financial institutions looking to both accurately quantify the value of home energy efficiency from a financing perspective and encourage a more rapid shift to energy efficiency in residential construction."

Manitoba Hydro Study - Comparative Financial Analysis of Net Home Ownership Value

In May, 2017, Manitoba Hydro commissioned a study that examined the comparative financial impact of sustainability and energy efficiency. This study compared the TCBO of three similar new homes, each built to different standards, as follows:

- **Home A** was built to the minimum code standard
- **Home B** was built to the Power Smart standard
- **Home C** was built to the passive low energy standard

Using an early program module of SEEFAR, the TCBO analysis showed the following projected costs over the 60-year useful life of each home:

TCBO and Equity	Home A	Home B	Home C
Mortgage Interest	$110,730	$118,523	$119,002
Annual Service & Maint.	54,200	43,653	37,989
Building Renewal	131,897	141,646	127,560
Energy Costs	422,255	209,264	99,250
Property Taxes	362,368	365,252	370,129
Insurance Costs	110,286	111,806	111,806
Net Home Equity	642,128	813,417	813,417
Net Home Ownership Cost	$549,709	$277,097	$52,319

The design and layout were similar in all homes, and the aesthetic finishing features were basically identical. The key differences were found in the energy construction configuration designs used in each home. This would include design elements such as building envelope insulation levels, energy efficiency differences in heating, cooling, ventilation and water heating components, differences in annual servicing and maintenance costs, and differences in the useful life-cycle of building components subject to age-related replacement. All of the homes used electricity as the sole energy source.

The significant differences in the TCBO between the three home designs is an obvious reflection of the investment value that each home would support.

It would not be reasonably possible to defend avoiding inclusion of the value-added premium for Home C with a Net Home Ownership Cost of $497,390 lower than Home A, or for Home B with a Net Home Ownership Cost of $272,612 lower than Home A.

The study was based on 2017 electricity rates, so the cost differences shown above would increase as the base rate for electricity increases. They would also change if other energy sources were used. Carbon tax-equivalent cost in this study was insignificant since electricity was the only energy source. The Carbon tax-equivalent cost would be higher for most other energy sources.

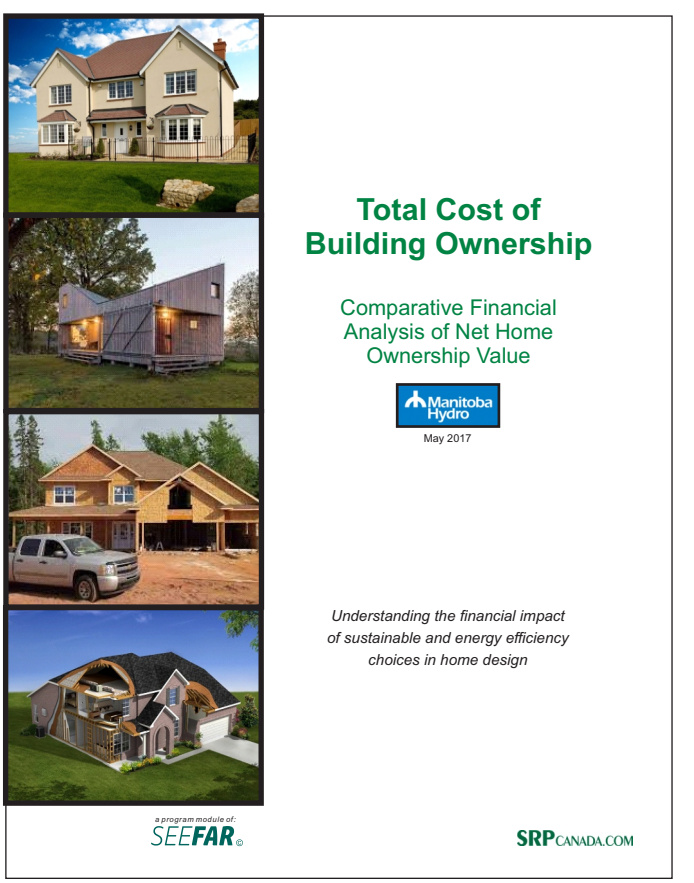
Economic Implications of Building Sustainability:

While the study did not include a detailed economic analysis, it did include a basic set of calculations defining the 'economic efficiency' improvement that the Province of Manitoba could realize from a broader adoption of high-performance homes.

At the current rate, Manitoba averages 6,500 new home starts per year. The assumption used in the study was based on 5,000 new homes per year, over a 10-year construction period. The study projected the economic efficiency that would result if these 50,000 homes were built as high-performance homes, as opposed to minimum code compliant.

Considering that the Net Home Ownership Cost difference between Home A and Home C is projected to be $497,390 over a 60-year useful life (as shown above), this shift would create an adjusted gain in economic efficiency of **$21.87 billion** before discounting the savings to present value.

It would also reduce the power generation demand these 50,000 new homes would make on Manitoba Hydro by **79%**.



1. The Direct Comparison Approach - The direct comparison approach in determining the market value of a property is the most appropriate for mortgage financing and is therefore relied heavily upon in the appraisal report. This method uses the principle of substitution as its basis. The concept is that if an appraiser knows the price that was paid for a comparable property (an appraisal typically uses three comparables) that is similar to the subject property and has recently sold in the same neighborhood as the subject property, the subject property should have a market value equal to that comparable property. (https://www.remic.ca/direct-comparison-approach-appraisal/)
2. A High Performance Building is a building that integrates and optimizes all major high-performance building attributes, including energy efficiency, durability, life-cycle performance, and occupant productivity. This definition is important because high performance is more than just energy efficiency. (https://www.nibs.org/page/hpbc)
3. Value-in-use or use value – The net present value (NPV) of a cash flow that an asset generates for a specific owner under a specific use. Value-in-use is the value to one particular user and may be above or below the market value of a property. (https://en.wikipedia.org/wiki/Real_estate_appraisal)
4. As spelled out in the California Energy Efficiency Strategic Plan, the state has ambitious goals for the development of zero net energy buildings. These include: all new residential construction will be zero net energy (ZNE) by 2020; all new commercial construction will be ZNE by 2030; 50% of commercial buildings will be retrofit to ZNE by 2030; and, 50% of new major renovations of state buildings will be ZNE by 2025. (http://www.cpuc.ca.gov/ZNE/)

206 - 848 Allegheny Drive, Winnipeg MB R3T4X2 • (204) 806-9332 • wayne.cole@srpcanada.com

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WWW.SEEFAR-Valuation.com