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REPRESENTING MINERAL FIBRE INSULATION MANUFACTURERS

A Case for Exterior Wall Insulation when Re-siding a Home

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Introduction

When it's time to replace the siding on our buildings due to age, damage, or aesthetics, we have a valuable opportunity to prioritize the upgrade of wall insulation for enhanced energy efficiency, health, and comfort for homeowners. Improving wall insulation during the siding replacement process offers significant benefits that go hand in hand with enhancing the overall energy efficiency and resiliency of our homes including a critical step towards a net-zero ready building. By taking advantage of this opportune moment, we can effectively address insulation deficiencies and reduce energy consumption in a cost-effective manner.

While mechanicals such as furnaces and air conditioners have a lifespan of approximately 10-15 years, the envelope can last the lifetime of a building (Enercare 2023, Hydro One 2022). Engaging in exterior re-insulation during a siding retrofit measure can be a once in a lifetime opportunity.

According to a 2017 study by Proskiw Engineering Ltd. titled "Survey of Conventional Retrofit and Replacement Practices for Residential Wall Systems", it was found that the material cost of insulation accounted for a relatively small proportion of the total retrofit cost, typically 15-20% (p. 34). This suggests that in the context of the three projects examined, the expense associated with insulation was minor when compared to the overall cost of the retrofits.

Before: mineral wool batts installed between horizontal strapping. Proskiw Engineering Ltd., 2017.

Upgrading Wall Insulation in a Sequential Process

Over the last few decades, approximately one million Canadian houses have been retrofitted to improve their energy performance. However, only about 4% of these have included upgrades to the exterior wall systems (Proskiw Engineering, 2017, p. 1). This means that significant retrofit potential exists within the balance of these non-retrofitted homes.

This project was carried out to benchmark conventional exterior wall retrofit strategies and practices for low-rise residential construction. Using three exterior wall retrofit projects comprising 98 dwelling units, as case studies, the project examined such issues as retrofit costs, scheduling, design, technical challenges, architectural impact, trade skills, durability, siding and cladding selection, etc.

Not surprisingly, it was found that exterior wall retrofits were most cost-effective when the siding, windows and doors were already scheduled for replacement. Since the siding typically represents a major part of the cost of an exterior wall retrofit (assuming the existing windows and doors are retained), only the incremental cost of the insulation system (insulation, fasteners, etc.) has to be expended to achieve the energy, resilience, health, and comfort benefits of a better-insulated wall (Proskiw Engineering, p. 65). The cost-effectiveness is further improved if the windows and doors are also being replaced since less time was required to integrate the new cladding system with the new windows and doors.

After: siding, trim, and other components installed. Proskiw Engineering Ltd., 2017.

Affordability

Using the three case study projects along with input from other contractors with long histories of performing these types of retrofits, it was noted that such work was generally part of a much larger upgrade to the overall building envelope as well as to the building interior. This held true for both public and private owners.

Using data from the three projects, the cost of the exterior wall retrofits ranged from $179 to $255 /m2 ($17 to $24 /ft2) of wall area, with RSI 1.32 to 2.12 (R-7.5 to R-12) insulation being added. These costs included: removal of the existing siding, additional insulation, house wrap, cladding, fasteners, and other miscellaneous costs (Proskiw Engineering, 2017, p. 33-34).

However, examination of the data showed that about 80% to 85% of the total cost was attributable to fixed costs (primarily removal of the existing siding, application of new siding, framing, fasteners, etc.). Only about 15% to 20% of the total cost was R-value dependent (Proskiw Engineering, 2017, p. 34). This suggests that more insulation could have been added for relatively modest additional cost.

Government Subsidies and Promotion

To further encourage the adoption of wall insulation upgrades during siding replacement projects, it is essential for governments to provide grants or incentive programs at this critical retrofit touchpoint to help reach our net zero targets. These initiatives can help create awareness of this often-missed opportunity and alleviate some of the financial burden associated with the exterior insulation improvements needed to keep up with our changing climate and building codes.

Canadians are choosing deferred maintenance projects over long-term sequential retrofits to meet our national emissions targets (ecoENERGY for Renewable Power, 2007-2011). In other words, Canadians are using government subsidies in large part to replace a measure they would have likely paid for themselves as opposed to engaging in a whole home retrofit plan. An envelope first approach would ensure the right sizing of mechanicals and renewables avoiding unintended consequences.

Canadian governments, at all levels, must allocate more focused resources to support and incentivize these upgrades, as they play a vital role in meeting our targets and protecting Canadians from climate change. By providing adequate financial support, governments can empower individuals and communities to undertake these essential retrofit projects, fostering greater resilience and sustainability in our built environment.

Enhanced Energy Performance

The combination of upgraded siding and improved wall insulation can significantly enhance the overall energy performance of the building. The insulation helps to prevent heat loss during colder months and heat gain during warmer months. This results in reduced energy consumption for heating and cooling, leading to lower utility bills, increased comfort for the occupants, and a more resilient home.

A well-insulated home with a proper building envelope can better withstand harsh weather conditions, potentially increasing its longevity.

Efficiency and Cost-Effectiveness

Undertaking wall insulation upgrades concurrently with siding replacement can result in increased efficiency and cost-effectiveness. The construction crew is already working on the exterior of the building, and materials and equipment are readily available.

This eliminates the need for additional mobilization costs and minimizes disruption to the building occupants. It streamlines the renovation process and can save time and money (Proskiw Engineering 2017, p. 65).

Seamless Integration

By addressing wall insulation during siding replacement, the insulation can be seamlessly integrated into the building envelope. This ensures that the insulation is properly placed and installed for desired performance outcomes.

When the siding is being replaced, it typically involves removing the existing exterior material, which provides access to the wall. This presents a prime opportunity to check the existing condition of the exterior wall and make any necessary improvements.

Insulation in Attics, Basements, and Siding

While focusing on wall insulation upgrades during siding replacement is essential, it is also crucial to consider other areas of the building that can benefit from insulation improvements. Sub-optimal attics, basements, interior wall cavities and exterior claddings are areas that can contribute to energy loss and inefficiency. Therefore, homeowners and building owners should extend their insulation efforts to these areas to create a comprehensive and effective thermal envelope.

Curb Appeal and Aesthetics

The 2017 study (Proskiw Engineering Ltd. titled "Survey of Conventional Retrofit and Replacement Practices for Residential Wall Systems") also found that the appearance of the retrofitted houses was radically improved by the exterior wall retrofits. They were transformed from "functional" houses into attractive and appealing homes. This clearly demonstrated that a properly designed and executed exterior wall retrofit can produce a dramatic improvement in the appearance of the house and, as a result, potentially generate stronger market values for the homeowner and/or building operator.

Energy efficient features are becoming increasingly desirable among homebuyers (Yun et al, 2023), and a well-insulated home can attract potential buyers and differentiate the property from others in the market.

Before and after. Proskiw Engineering Ltd., 2017.

The Time to Act is Now

Collectively, if we are serious about meeting our climate commitments and goals in the built environment for multi-measure deep energy retrofits, the time to act is now.

Undertaking exterior wall insulation upgrades during siding replacement offers a prime opportunity for homeowners and building owners to enhance the energy efficiency, comfort, and resilience of their properties. By addressing insulation at this critical retrofit touchpoint, we can create effective thermal envelope, mitigating energy loss and optimizing heating and cooling efficiency. This integrated strategy could lead to reduced utility bills and increased occupant comfort as well as right-sizing mechanicals and renewables to avoid unintended consequences.

Governments must play a pivotal role by providing grants and/or incentive programs to encourage uptake. Increased and focused financial support will empower individuals and communities to undertake these essential deep retrofit projects, moving us closer to achieving national emissions targets and fostering greater resilience and sustainability in our built environment.

Embracing these comprehensive upgrades at the right time empowers us to build a more sustainable and resilient built environment for generations to come.

Sources

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