

Developing enhanced methods for evaluating window energy performance lifespan

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New windows are a significant investment, but unlike some home improvement projects, they come with an incentive: increased efficiency and cost savings over time thanks to reductions in energy bills.

Energy savings and carbon emission reductions promised by energy efficiency technologies such as advanced windows are only delivered if these new products maintain long-term [high performance](#). Some of the most important questions for consumers making such a purchase are: How long will the associated [energy savings](#) last, and do they change over time? For manufacturers, being able to demonstrate potential for long-term performance is a significant differentiator for their product in the marketplace.

Researchers with the National Renewable Energy Laboratory (NREL), the University of Colorado Boulder, and WinBuild Inc. recently published a technical report proposing new methods to evaluate how long windows sustain their energy performance.

"This method of testing is designed to focus on the energy performance of the window more explicitly than present methods," said Robert C. Tenent, a materials science researcher at NREL. "We want to know that when consumers place their faith in high-performance windows that the technologies will deliver on their promise. This also helps manufacturers gain the confidence to put more advanced efficiency products onto the market."

In the report "Guidelines and Specifications for Enhanced Durability Evaluation of Insulating Glass and Vacuum Insulating Glass Units," researchers outlined a proposed process flow for adoption of enhanced [durability](#) testing. The evaluation methods were developed by examining current testing standards, as well as methods being used internationally and in private industry.

The enhanced methods include adding [optical properties](#) and [thermal conductivity](#) as performance metrics after weathering cycles, increasing the number of thermal cycles in the weathering process, and a more detailed look at moisture uptake to allow manufacturers more insight on

how to improve performance.

The report is meant to serve as a starting point and guide for manufacturers, glass companies, [window](#) testing facilities, and other parties who are interested in enhanced durability evaluation of insulating glass units for their products. The work supports and complements existing testing methods rather than replacing them. The report is also intended to be a living document, and more data and information will be added based on results from NREL's research as well as other sources that may add more detail about improving durability evaluation.

The hope is that the new methods of durability evaluation will be adopted by manufacturers and others in the windows industry. NREL researchers are also available to help with implementation for organizations interested in the enhanced testing procedures.

"This is where we're starting," Tenent said. "We're going to improve the method that is outlined in the report as we and our partners learn more. This could provide a vehicle for those who want to prove that they went above and beyond and evaluated product durability with a more stringent protocol."

More information: Alliston Watts et al, Guidelines and Specifications for Enhanced Durability Evaluation of Insulating Glass and Vacuum Insulating Glass Units (2022). [DOI: 10.2172/1887442](https://doi.org/10.2172/1887442)

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