SUMMARY of NFRC's CARBON EMISSIONS AVOIDED

NFRC's Contribution to the Greater Good

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Decarbonization to fight climate change can take many forms, from clean renewable energy such as solar and wind, to more efficient or all-electric vehicles. A less discussed but equally important piece of the sustainability puzzle is windows, doors, and skylights.

Since its inception in 1989, the National Fenestration Rating Council (NFRC) has empowered homeowners to select the windows, doors, and skylights that provide comfort and save energy. As an independent nonprofit organization, NFRC has been a valuable resource over the last 30 years providing fair, accurate, and credible energy performance ratings of fenestration products, which are any opening in a building's exterior.

NFRC knows that consumers want to pick the most energy-efficient and cost-effective windows for their home. However, consumers need assistance with navigating the abundance of information available. Today's energy-efficient windows can dramatically lower the heating and cooling costs in homes while increasing the comfort for occupants and minimizing window surface condensation.

NFRC-certified products are independently tested, certified, and labeled, which provides consumers, builders, and municipalities with the information they need to compare and select energy-efficient windows, doors, and skylights.

$50 BILLION

Inefficient windows have been estimated to **cost the U.S. $50 billion annually in energy waste,** according to Lawrence Berkeley National Laboratory. NFRC's mission is to continue to bring that number down by rating products on how well they keep heat out during the summer and prevent heat from escaping in the winter. This research highlights just how valuable that work can be to not only reduce costs for businesses and households, but also keep our air as clean as possible.
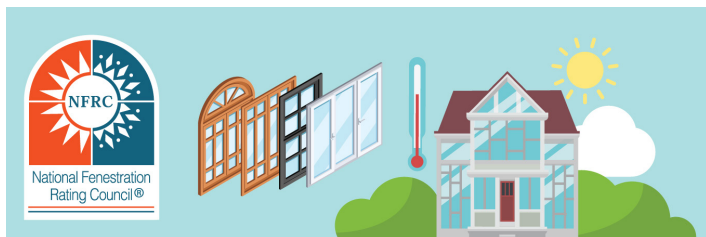
As communities set policies to reduce climate change, the emissions eliminated and reduced from high-performing fenestration products cannot be understated. Moving forward, estimates over the next 30 years provide a better understanding of the value of NFRC-certified, energy-efficient windows, doors, and skylights for consumers with clear, technically sound, reproducible, and unbiased reporting of carbon emissions avoided in residential buildings.

Methodology

In order to calculate the energy savings and related emissions avoided, two methodologies were developed and applied to reflect two periods.

1989 to 2018	2019 to 2049

While the methodology for the period from 1989 to 2018 used actual data of new, typical single-family homes built during this period and fenestration thermo-physical properties by U.S. State Energy Code Adoption, the methodology for 2019 to 2049 used a forecasting model to estimate new, typical homes built during this period.

These methodologies use the RESFEN software tool developed by Lawrence Berkeley National Laboratory. The tool calculates heating and cooling energy use and associated costs as well as peak demand for specific window products.
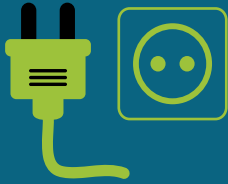
These estimations provide manufacturers, designers, engineers, architects, and users with fenestration products that have clear, technically sound, reproducible, and unbiased reporting of carbon emissions avoided in residential buildings.

Results

Estimated energy savings and related emissions avoided are as follows:

1989 to 2018

The estimated energy savings amount to **774,619.53 GWh** (Gigawatt hours). U.S. national weighted average marginal emission rate, the CO2 emissions avoided equals 547,772,975 metric tons from 1989 to 2018.

CO$_2$ **547 Million Metric Tons (MMT) of CO2 emissions avoided is equivalent to:**

About **116 million** passenger cars NOT driven for one year (in 2005, about 14 million passenger cars were operated on California roads).

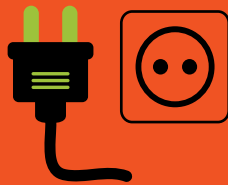**One year** of energy use by about 65 million average U.S. households.

Greenhouse gas emissions avoided by replacing about **20 billion** standard incandescent lamps with energy-efficient LEDs.

About **644 million** acres of pine or fir forests absorbing CO2 for one year.

2019 to 2049

The estimated energy savings amount to **522,578.34 GWh** (Gigawatt hours). Using the AVERT, U.S. national weighted average marginal emission rate, the CO2 emissions avoided equals 369,541,796 metric tons from 2019 to 2049.

CO$_2$ **369 Million Metric Tons (MMT) of CO2 emissions avoided is equivalent to:**

About **78 million** passenger cars NOT driven for one year.

One year of energy use by about 44 million average U.S. households.

Greenhouse gas emissions avoided by replacing about **14 billion** standard incandescent lamps with energy-efficient LEDs.

About **434 million** acres of pine or fir forests absorbing CO2 for one year.

Conclusion

For more than 30 years, NFRC has empowered consumers to compare and purchase windows, doors, and skylights with confidence that best meet their home's energy-saving needs. As the only independent non-profit organization with fair, accurate, and credible energy-performance ratings, NFRC reduces carbon emissions particularly as more states and local governments adopt building energy codes. Since its inception, it is estimated that more than 774k gigawatt hours of energy has been saved, resulting in 547 million metric tons of CO_2 emissions avoided.

Moving forward, NFRC-certified products are expected to continue to save energy in the next 30 years. Research suggests that by 2049 an estimated 522k gigawatt hours of energy could be saved; preventing 369 million metric tons of CO_2 emissions. These findings demonstrate the importance of windows, doors, and skylights in building a sustainable future.

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