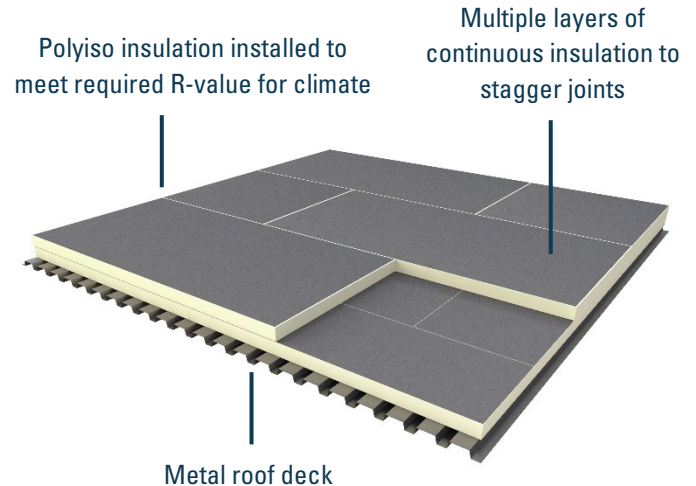


Why is Proper Insulation Critical During Building Roof Replacement?

Insulation, whether in a public or commercial building, has a tremendous impact on the energy efficiency, resilience, cost savings, and the comfort of a space. While insulation can be an inconspicuous and sometimes overlooked building feature, it spans the entire surface area of a building's roof and helps to protect other aspects of building performance.

Roof insulation is particularly important for building performance as the roof comprises the largest single side of most buildings. Recognizing the importance of an energy-efficient building thermal envelope, modern energy codes have set minimum requirements for insulation installed entirely above the roof deck.

For **low-sloped roofs** with insulation entirely above deck, which is typical of public and commercial buildings, standards require that roof insulation be installed in multiple layers with staggered joints to reduce air flow through gaps and require that it meets the prescribed **minimum R-value** requirement for the building's climate zone, space conditioning category, and roof construction type.

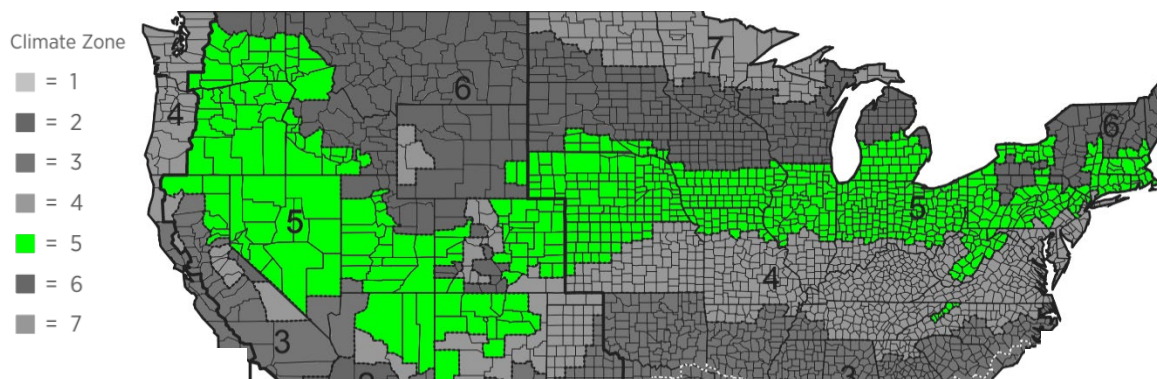


Above: A low-sloped roof assembly that is typical of commercial and public buildings. Diagram depicts multiple layers of polyiso insulation installed with staggered joints to reduce air flow through gaps.

Finding the Right Insulation for U.S. Climate Zone 5

When selecting the proper roof insulation for your building, it is critical to consider the climate zone for your location. Cities located in **U.S. Climate Zone 5** are characterized as **cold climates**, which is defined as an area with between 5,400 and 9,000 heating degree days on a 65 degrees Fahrenheit basis.

U.S. Climate Zone 5 - Cold Climates | Example City – Chicago, IL



Insulation for cities located in **Climate Zone 5**, such as **Chicago, IL**, must consider factors that help to regulate cold seasonal temperatures and prevent heat from escaping, which is caused by insufficient insulation and gaps that create air leaks.

Potential Savings Estimates for Buildings in Climate Zone 5

During a roof replacement, installing additional roof insulation to meet the prescribed minimum R-value established by building energy standards for your region is estimated to yield cost savings and enhance overall performance for each of the building types modeled below. For buildings located in **Climate Zone 5**, current model energy codes require a **minimum R-30** for roof insulation installed entirely above the deck.

Building Type	Annual Total Energy Savings	Cumulative Total Energy Cost Savings	Cumulative Energy Cost Savings per SF	Total CO ₂ e Savings per SF
Primary School 	9%	\$339,153	\$4.58	74.95 lbs.
Retail Store 	7%	\$74,178	\$2.97	48.48 lbs.
Strip Mall 	6%	\$86,876	\$3.86	57.27 lbs.
Small Office 	7%	\$20,507	\$3.73	42.72 lbs.

In cold climate zones where building energy expenditure is often dominated by heating processes, an inefficient thermal building envelope can waste gas and electricity, generating unnecessarily high utility bills.

The estimated payback of using code-compliant levels of insulation at the time of roof replacement can help companies and building owners realize a faster return on investment, while also locking in long-term energy savings at no additional operation and maintenance cost for the life of the investment – **typically 30 to 40 years**. The result is greater cost savings, improved building performance, and downstream emissions benefits, as well as decreased risk and likelihood of premature maintenance and repairs. When viewed as a long-term investment, code-compliant levels of roof insulation entirely above deck can help companies reach energy reduction goals while cutting costs and carbon emissions in the process. **This analysis was prepared by ICF. For more information on insulation and to access the full report, visit www.polyiso.org.**

About PIMA

For more than 30 years, the Polyisocyanurate Insulation Manufacturers Association (PIMA) has served as the voice of the rigid polyiso industry, proactively advocating for safe, cost-effective, sustainable, and energy-efficient construction. Organized in 1987, PIMA is an association of polyiso manufacturers and industry suppliers. Polyiso is one of North America's most widely-used and cost-effective insulation products.