The iconic dome of Berkeley Lab has a new roof — a cool roof made of shingles that look much the same but reflect nearly twice as much sunlight as the last roof installed two decades ago.

Researchers at Berkeley Lab have shown that reflective “cool roof” materials help combat climate change in two ways: by saving energy on air conditioning and by mitigating the “heat-island effect,” which occurs when acres of dark roofs absorb heat, causing surrounding air temperatures to rise. Our researchers estimate that if about three quarters of our nation’s commercial buildings switched to cool roofs, the U.S. would save enough energy on air-conditioning each year to reduce CO₂ emissions by about 6 million metric tons, the equivalent of taking more than a million cars off the road. Berkeley Lab researchers have collaborated with roofing manufacturers for over a decade to develop attractive cool roofing materials in a wide range of colors.

The 110-foot dome, made of steel girders covered by thick wooden planking, shelters the Advanced Light Source, a third-generation synchrotron that produces X-ray beams a billion times brighter than the sun. In 2011, afflicted by spots of dry rot and prone to leaks, the roof needed replacement. The new roof shingles have a solar reflectance index (SRI) rating of 30, one point better than the 29 specified by Secretary of Energy Steven Chu, who in 2010 directed all Department of Energy facilities to install cool roofs, if economically feasible, when constructing new roofs or replacing old ones.

Throughout Berkeley Lab, 48 facilities have cool roofs, covering a total of 519,000 square feet, or 44 percent of the total roof area. Most are flat roofs covered in “Berkeley Gray,” a color developed by the lab for the benefit of uphill neighbors who objected to the bright reflections off all-white roofs from below.

In 2010, Director Paul Alivisatos began Berkeley Lab’s Sustainable Science Initiative, which encourages lab facilities to use Lab-developed technology and/or methods to optimize energy efficiency. Applying a cool roof product to the ALS dome is one example of a sustainable Berkeley Lab innovation in action.