



For Wind Mitigation, Federal Grants Provide \$5 Benefit for Each \$1 Invested

Introduction

Natural hazards present significant risks to many communities across the United States. Fortunately, there are measures governments, building owners, developers, tenants and others can take to reduce the impacts of such events. These measures—commonly called mitigation—can result in significant savings in terms of safety, prevent property loss and disruption of day-to-day life.

The National Institute of Building Sciences Multihazard Mitigation Council (MMC) undertook a study in 2017 to update and expand upon the findings of its *2005 Mitigation Saves* study on the value of mitigation. In the *2017 Interim Report* (now incorporated into the *2018 Interim Report*), the project team analyzed two areas of mitigation programs:

- **Federal grants:** The impacts of 23 years of federal grants made by the Federal Emergency Management Agency (FEMA), Economic Development Administration (EDA) and the Department of Housing and Urban Development (HUD), resulting in a national benefit of \$6 for every \$1 invested.
- **Beyond code requirements:** Designing new structures to exceed select provisions of the *2015 International Building Code (IBC)* and *International Residential Code (IRC)* and the adoption of the *2015 International Wildland-Urban Interface Code (IWUIC)*. This resulted in a national benefit of \$4 for every \$1 invested.

Results of Federal Grants for Wind Mitigation

Federal grants to mitigate wind damage are highly cost-effective. In 23 years, public entities have spent \$13.6 billion to mitigate future wind losses; these efforts will ultimately save the United States an estimated \$70 billion in avoided property losses, additional living expenses, business impacts, and deaths, injuries, and post-traumatic stress disorder (PTSD). Their total benefit-cost ratio (BCR) is approximately 5:1.

For wind resistance the mitigation measures examined include the addition of shutters, safe rooms, and other common measures. Table 1 provides BCRs for each natural hazard the project team examined. Figure 1 shows the benefits specifically attributable to federal flood mitigation grants. The national-level BCRs aggregate study findings across natural hazards and across state and local BCRs.

The estimated BCR depends largely on the level of hazard, alternative use of the facility, and accessibility. In-home safe rooms generally appear to be cost-effective, exhibiting an average BCR of 4.25. Large facilities with dual purposes, such as school gymnasiums and cafeterias, exhibit an average BCR of 8.0. In these cases, the cost of mitigation is simply the additional cost of hardening the facility.

Accessibility and use also strongly affect cost-effectiveness. For example, a shelter located at a hospital will likely protect life at any time of day throughout the year. Shutters appear to be highly cost-effective, particularly those that protect valuable equipment at utilities or industrial facilities. Shutters for ordinary public buildings without high-value contents produce a lower but still impressive BCR (about 3.5).






National Benefit-Cost Ratio Per Peril <small>*BCR numbers in this study have been rounded</small>		Federally Funded	Beyond Code Requirements
Overall Hazard Benefit-Cost Ratio		6:1	4:1
 Riverine Flood		7:1	5:1
 Hurricane Surge		Too few grants	7:1
 Wind		5:1	5:1
 Earthquake		3:1	4:1
 Wildland-Urban Interface Fire		3:1	4:1

Table 1. Benefit-Cost Ratio by Hazard and Mitigation Measure.

Benefit: \$70 billion

- 89% – Casualties & PTSD: \$62.0
- 5% – Property: \$3.5
- 4% – Additional living expenses, sheltering, indirect business interruption: \$3.0
- 2% – Insurance: \$1.5

billions 2016 USD

Cost: \$13.6 billion

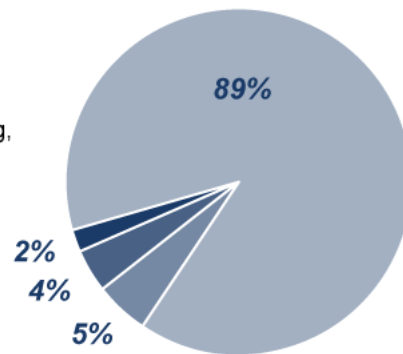


Figure 1. Contribution to benefit from federally funded wind grants.