

MARKET INCENTIVES STUDY – RESILIENT STRUCTURES
FINAL REPORT¹

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Table of Content

Executive Summary	6
1. Introduction.....	10
2. IBHS FORTIFIED™	12
3. Texas Homeowners Insurers Survey.....	15
3.1. Survey Structure and Background	15
3.2. Resilient Home Incentives	16
3.3. Current Policies.....	25
3.4. Hypothetical Scenarios	26
3.5. The Effects of IBHS FORTIFIED™ Standards (Loss Mitigation & Other Effects)	28
3.6. Importance of Information About Mitigation	29
3.7. Summary of Open-Ended Questions.....	30
4. Literature Review.....	35
4.1. Building Code and IBHS FORTIFIED Effectiveness	35
4.2. Economic Effectiveness.....	42
4.3. Perception	47
5. State Programs	53
5.1. Alabama	53
5.1.1. Overview.....	53
5.1.2. Program Description	54
5.1.3. Eligibility Requirements	55
5.1.4. Insurance Incentives.....	55
5.1.5. Other Incentives	57
5.1.6. Program Data	57
5.2. Florida.....	59
5.2.1. Overview.....	59
5.2.2. Program Description	60
5.2.3. Eligibility Requirements	66
5.2.4. Insurance Incentives.....	69
5.2.5. Other Incentives	71
5.2.6. Hurricane Loss Mitigation Program.....	74
5.3. Georgia.....	75
5.3.1. Overview.....	75

5.4.	Louisiana.....	76
5.4.1.	Overview.....	76
5.4.2.	Program Description	77
5.4.3.	Eligibility Requirements	77
5.4.4.	Insurance Incentives.....	78
5.4.5.	Other Incentives	80
5.4.6.	Program Data	81
5.5.	Minnesota.....	81
5.5.1.	Overview.....	81
5.5.3.	Eligibility Requirements	84
5.5.4.	Insurance Incentives.....	85
5.6.	Mississippi	86
5.6.1.	Overview.....	86
5.7.	North Carolina	87
5.7.1.	Overview.....	87
5.7.2.	Program Description	88
5.7.3.	Eligibility Requirements	89
5.7.4.	Insurance Incentives.....	91
5.8.	Oklahoma.....	92
5.8.1.	Overview.....	92
5.9.	Rhode Island	93
5.9.1.	Overview.....	93
5.10.	South Carolina	94
5.10.1.	Overview.....	94
5.10.2.	Program Description	95
5.10.3.	Eligibility Requirements	98
5.10.4.	Insurance Incentives.....	99
5.10.5.	Other Incentives	102
5.10.6.	Program Data and Analysis.....	103
	REFERENCES	105

List of Tables

Table: Summary of State Incentives Programs	9
Table 1: FORTIFIED Designations	13
Table 2: Residential Insurers Profile.....	15
Table 3: Distribution of responses by incentives	18
Table 4: Average percent discount in premiums among “somewhat” & “highly” likely insurers	22
Table 5: Suggested benchmark average premium discount.....	23
Table 6: Premium discounts after home upgraded to FORTIFIED standards	25
Table 7: Share of current policies with IBHS FORTIFIED or other resilient features.....	26
Table 8: Percent premium discounts with IBHS FORTIFIED standards	26
Table 9: Receptiveness to Scenario 1	27
Table 10: FORTIFIED Designations Wind Premium Discounts for Alabama Homes	56
Table 11: Number of completed FORTIFIED homes over time	58
Table 12: FORTIFIED Sample Discounts in Louisiana	80
Table 13: SC Safe Home Program - Resilient Mitigation Award Estimation Example	97
Table 14: SC Safe Home Program - Sustainable Mitigation Award Estimation Example	97
Table 15: SC Safe Home Program - Hurricane Shuttering and Protective Barrier Systems Award Estimation Example	98
Table 16: Homeowners Mitigation Credits - Average Savings Realized and Max. Credits Available	100
Table 17: SC Safe Home Grants Awarded by County from 2013-2023.....	104

List of Figures

Figure 1: Support for State Incentive Programs for Resilient Retrofits	17
Figure 2: Likelihood to increase policies with wind and hail coverage in response to resilient programs. 19	
Figure 3: Likelihood of providing premium discounts on policies with wind and hail coverage.....	20
Figure 4: Likelihood to provide mitigation points for resilient features and related premium credits	20
Figure 5: Likelihood of premium discounts for FORTIFIED Gold, Silver and Roof standards	21
Figure 6: Premium discount benchmark	22
Figure 7: Lower deductibles	24
Figure 8: Likelihood of considering economic aftereffects of mitigation	29
Figure 9: Important role of insurers in communicating about FORTIFIED standards.....	30
Figure 10: Screenshots of Summary of Inspection & Home Hardening Upgrades	71

Market Incentives Study – Resilient Structures

Executive Summary

Texas A&M University of Galveston (TAMUG) was contracted by the Texas Department of Insurance (TDI) to conduct a study of the effects of resilient structures on market incentives for writing windstorm and hail insurance in the 14 Tier 1 coastal counties of Texas and parts of Harris County. The study was conducted in accordance with Texas Insurance Code Section 2210.015.

The study involved developing and administering a voluntary survey of insurers, a review of resilient construction standards including IBHS FORTIFIED™ standards, and scholarly research related to their effectiveness in mitigation losses, economic effects, and public perceptions about them. The study also provided an in-depth review of incentive programs related to resilient retrofits and structural upgrades in states where such programs have already been initiated.

Insurer Survey

The voluntary survey was divided into multiple sections, aiming to cover various aspects of insurers' knowledge, perceptions and opinions regarding the IBHS FORTIFIED Home Standards² and other resilient standards for residential homes. It was sent to all insurers writing homeowners (HO) policies in Texas.

The response rate was 30% (23 responders consisting of 48 insurance companies in total), corresponding to 37% of the Texas residential property insurance market based on 2023 premiums written. Notably, a very small percentage (1%) of the responding insurers' current policies with windstorm and hail coverage are written for homes that have IBHS FORTIFIED or other resilient feature certifications (the most common certification is the IBHS Roof standard), which likely reflects the low uptake of IBHS FORTIFIED standards in Tier 1 territories and Texas statewide, with the prevalence of the Roof standard possibly due to its lower cost compared to the Gold and Silver standards.

Survey Results: Support for a resilient home incentives program

- The majority of insurers (57%) indicated either somewhat or strong support for a program to promote IBHS FORTIFIED or other resilient home standards, 17% were neutral on the matter, and 20% were somewhat or strongly unsupportive.
- Most insurers expressed support for a program to provide grants to homeowners to fully or partially cover eligible costs for resilient retrofits. The most common suggested grant amount was \$10,000.
- Fewer than half of insurers, including those supportive of IBHS FORTIFIED and similar standards, are likely to increase the number of homeowners' policies with windstorm and hail coverage they write in Tier 1 counties or statewide.
- Insurers are likely to offer premium discounts in Tier 1 and statewide for resilient features, with the higher percentage in premium indicated for the Gold standard, followed by Silver and Roof.
- Insurers were neutral about establishing a voluntary premium discount benchmark for homes with resilient standards in Tier 1 areas or statewide.
- Most insurers were neutral on offering lower deductibles, with more expressing opposition than support.
- The majority of insurers indicated that they support offering an endorsement option that would cover the additional cost to upgrade non-fortified homes to IBHS FORTIFIED standards when making repairs after significant damage to the home.

² For more information about the IBHS FORTIFIED™ standards please refer to the following website:
<https://fortifiedhome.org/solutions/>

Survey Results: Mandatory requirement for premium discounts and endorsement

Insurers were asked whether certain scenarios would change how much they write in Tier 1 or statewide. The hypothetical scenarios were:

1. All insurers are required to provide reasonable premium discounts on policies with windstorm/hail coverage for homes certified with IBHS FORTIFIED standards or featuring resilient elements in Tier 1 counties (or statewide).
 - Most insurers were receptive to reasonable premium discounts for policies covering homes that meet IBHS FORTIFIED or other resilient standards, but they wouldn't increase the number of policies they write.
2. All insurers are required to offer an endorsement that gives homeowners in Tier 1 counties the option to upgrade their non-fortified homes to meet IBHS FORTIFIED or other resilient standards. (Assume the endorsement applies in the event of damage requiring replacement or significant repairs to that part of the home, and that the endorsement is offered for an additional premium).
 - Most insurers would not guarantee to offer windstorm/hail coverage for Tier 1 homes that were repaired to meet those resilient standards.

Survey Results: Summary of insurers' concerns related to the impact that resilient standards may have on their business operations

- Adjusting rates and implementing discounts to capture resilient standards would require substantial time and resources from IT, product, actuarial, and sales teams.
- Insuring FORTIFIED homes or IBHS-certified roofs at a required discount could lead to a loss in premium income, requiring adjustments to rates for all policies.
- The reinsurance market may not adopt the same view on reduced risk from fortified structures.
- Lack of historical data on the effectiveness of fortified structures against severe weather events.

Survey Results: Summary of concerns from unsupportive insurers

- Need to establish comprehensive building codes, ensure their effective enforcement, and regulate the roofing sector to ensure compliance.
- Should standardize inspection and roof construction reports to speed up the review process for determining that resilient features are in place.
- Need to develop a program or underwriting guidelines that include inspections to identify necessary repairs or upgrades.
- Need to understand how the IBHS FORTIFIED or other standards are factored in reinsurance costs.
- Need third-party data and modeling to demonstrate or validate a loss reduction benefit for resilient standards, both on average and in tail events.
- Need to establish additional programs specifically targeting hail damage.

Survey Results: Importance of information about resilient standards and the role of insurers

- Insurers maintain a conservative approach regarding communicating about potential roof upgrades when a loss is paid. Insurers primarily focus on restoring properties to their pre-loss condition without encouraging resilient retrofits. Insurer responses emphasized customer choice and responsibility, and they had concerns about communicating the benefits of resilient retrofits while later being blamed if a resilient roof suffered damage from a weather event.
- Overall, insurers take a cautious approach to communications primarily because of a lack of currently available discounts for homes that meet resilient standards.

Summary of the Literature Review

Scholarly research consistently underscores the benefits of enforcement of building codes and IBHS FORTIFIED programs, highlighting their role in mitigating structural damage and also enhancing community resilience by preventing income and job losses, increasing property values, and reducing insurance costs. For instance, homes in Missouri with stronger building code enforcement exhibit 10-20% lower average hail-related losses. Similarly, the Florida Building Codes have been shown to reduce windstorm-related damages by as much as 72%, with a corresponding benefit-cost ratio of 6:1. Economic analyses from Oklahoma further support these findings, revealing a benefit-cost ratio of approximately 3:1.

The research shows that retrofitting homes to meet IBHS FORTIFIED designations significantly reduces wind-related damages, with roof improvements alone reducing expected losses by 40-79%, depending on the level of retrofitting. During Hurricane Sally in 2020, nearly 17,000 homes in Alabama with FORTIFIED designations experienced minimal or cosmetic damage, despite the hurricane's Category 2 winds reaching 105 mph.

The research on homeowners' mitigation behavior highlights the significant role of risk perception, past experiences, and expectations of government assistance in shaping decisions regarding mitigation behavior. Notably, the literature indicates that the extent and adoption of mitigation strategies can be substantially increased through improved communication, targeted incentives, and heightened awareness of available programs. Specifically, the incentive programs in several states have been instrumental in encouraging homeowners to adopt FORTIFIED standards. The success of these programs highlights the role of state-level incentives in fostering widespread adoption of resilient construction practices, ultimately contributing to reduced damages and enhanced economic stability in the face of natural disasters.

Summary of State Incentives Programs

The study conducted a detailed analysis of incentive programs for resilient retrofits and structural upgrades in the following states: Alabama, Florida, Georgia, Louisiana, Minnesota, Mississippi, North Carolina, Oklahoma, Rhode Island, and South Carolina, where such programs have already been implemented or recently initiated. The primary focus was to capture the following aspects: (i) program descriptions, (ii) eligibility requirements, (iii) insurance incentives, (iv) other incentives (e.g., tax deductions), and (v) program data and analysis. In some states, including Georgia, Mississippi, Oklahoma, and Rhode Island, these programs were only recently initiated, and their descriptions are limited due to the lack of available details. The table on the next page summarizes these programs.

Table: Summary of State Incentives Programs

States	Program Name	Grant Program	Grant Amount	Requires IBHS FORTIFIED	Insurance Incentives	Program Reports	Program Funding
Alabama	Strengthen Alabama Homes	✓	up to \$10,000	✓	✓	Annual Report, 2022	\$20 mil
Florida	My Safe Florida Home	✓	up to \$10,000*	NA	✓	NA	\$200 mil
	Hurricane Loss Mitigation Program	✓	NA	NA	✓	Annual Report, 2022	\$3.5 mil
Georgia	NA	NA	NA	✓	✓	NA	NA
Louisiana	Louisiana Fortify Homes Program	✓	up to \$10,000	✓	✓	NA	\$30 mil
Minnesota	Strengthen Minnesota Homes	✓	up to \$10,000	✓	✓	NA	\$1 mil
Mississippi	NA	NA	NA	NA	✓	NA	NA
North Carolina	Strengthen Your Roof	✓	up to \$8,000	✓	✓	NA	\$20 mil
Oklahoma	Strengthen Oklahoma Homes	✓	TBA	✓	✓	NA	NA
Rhode Island	NA	NA	NA	NA	✓	NA	NA
South Carolina	South Carolina Safe Home Mitigation	✓	up to \$7,500**	✓	✓	Status Report, 2023	\$2.2 mil

*Matching grants. **Matching and non-matching grants.

Incentives Program Study – Resilient Structures

1. Introduction

Damage to residential roofs from natural windstorms such as hurricanes, tornadoes, and severe thunderstorms poses a significant threat to property and safety in many regions (e.g., coastal areas) of the United States. Since 1990, tropical storms and hurricanes have accounted for 42.7% of insured losses (Hartwig and Weisbart, 2012; Malik et al., 2013). There were 42 hurricanes classified as billion-dollar disasters in the United States from 1980 to 2018, amounting to almost a trillion dollars in damage (Kranzler et al., 2020; Smith, 2019).

The vulnerability of existing housing stock is particularly concerning, as millions of homes built since 1980 are located in high-risk coastal areas (Malik et al., 2013). The magnitude of this problem is underscored by the substantial economic losses incurred in recent years, with insured values for coastal counties from Texas to Maine exceeding \$10.5 trillion (Medders et al., 2015). In 2021 alone, the United States experienced an estimated \$145 billion in insured losses due to natural disasters, with Hurricane Ida accounting for \$75 billion of that total (Ghosh et al., 2023; Smith, 2022; Walsh, 2022). The year 2021 was one of the three costliest and deadliest years for natural disasters in the past five decades (Ghosh et al., 2023; Smith, 2022). According to a study by the U.S. Congressional Budget Office (2019), annual insurance losses from wind are estimated at around \$14 billion, while combined losses from wind and associated flooding reached to about \$34 billion (Petrolia et al., 2023). Over the last 20 years, there has been a 40% increase in severe storms, further highlighting the escalating threat (Petrolia et al., 2023; van Loenhout et al., 2020).

When roof coverings or sheathing fail during high wind events, it can lead to extensive water intrusion, resulting in damage to building interiors, contents, and potential displacement of occupants (Brown et al., 2015). Roof damage is particularly concerning, as it can occur from winds as low as 50 miles per hour (Petrolia et al., 2023). Given the substantial costs associated with wind-related damage, there is a growing recognition of the importance of mitigation strategies and resilient construction techniques for reducing property losses and enhancing community recovery after natural disasters. Investing in disaster mitigation strategies can lead to cost savings when a disaster occurs: for every dollar spent on disaster mitigation designs, about four times the amount

can be saved (Ghosh et al., 2023; Szoke, 2014). This underscores the critical need for homeowners, builders, and policymakers to prioritize wind damage mitigation and advocate for increased resilience in residential construction.

Mitigating wind damage and advocating for resilience in residential construction has become crucial for reducing property losses and enhancing community recovery after natural disasters. According to Malik et al. (2013), homes built to modern engineering-based building codes throughout coastal counties in Florida after 1996 have shown significant improvement in reducing damage, with up to 60% fewer claims filed for homes constructed after the implementation of improved wind resistance standards. Newer homes that comply with the current building codes are typically less vulnerable to wind and wind-driven rain damage than older homes (FEMA, 2023). However, recent evidence has shown that despite newer buildings exhibiting improved structural performance, they remain vulnerable to wind and water intrusion damage (FEMA, 2023). This can occur when wind-driven rain penetrates the building envelope through components (e.g., wall and roof coverings, roof ventilation, soffits, doors, and windows) damaged by strong winds (FEMA, 2023). Thus, implementing wind retrofit measures on existing homes can significantly improve their performance during high-wind events, reducing damage, property losses, and avoiding displacement of homeowners (Brown et al., 2015; FEMA, 2023; Malik et al., 2013; Perotin, 2013; Wang et al., 2021).

By investing in wind damage mitigation and promoting resilient building practices, communities can significantly reduce the long-term costs and disruptions associated with windstorms. State incentive programs to retrofit roofs aim to strengthen homes against wind, hail, and hurricane damage, not only protecting individual homeowners but also contributing to broader community resilience (Petrolia et al., 2023). Programs such as the Insurance Institute for Business & Home Safety's (IBHS) FORTIFIED Home™ designation have emerged as promising solutions, offering standardized approaches to strengthen homes against wind-related perils and potentially reduce both the frequency and severity of property damage (Awondo et al., 2023).

This report reviews the IBHS FORTIFIED standards (section 2), followed by a summary of results from a voluntary survey of insurers regarding their support for and overall perception of possible FORTIFIED home program incentives in Texas (section 3). Section 4 reviews scholarly literature related to the effectiveness of resilient standards in mitigating wind-related damages,

their economic effects, and private individual and public sector perceptions of their effectiveness. Last, Section 5 provides an overview of incentives programs initiated by various states to encourage and support the adoption of resilient roof structures and IBHS FORTIFIED standards.

2. IBHS FORTIFIED™

The IBHS FORTIFIED™ program provides a comprehensive framework for retrofitting residential structures to enhance their resilience against severe weather events. Introduced in 2010, this program aims to provide guidance for both retrofitting existing homes and constructing new ones to better withstand high winds and wind-driven water intrusion associated with tropical storms, hurricanes, and other natural hazards (Malik et al., 2013; Petrolia et al., 2023). By implementing specific mitigation techniques, such as strengthening the roof, securing openings, and reinforcing the building envelope, the program aims to significantly reduce the risk of damage from high winds and wind-driven water intrusion associated with tropical storms and hurricanes.

FORTIFIED offers three tiers of designations (i.e., Roof, Silver, and Gold) for various types of buildings (see Table 1), including residential homes, multifamily properties, and commercial structures (FORTIFIED, n.d.-a). Every subsequent level in the program builds upon the enhancements of the previous one (see Table 1 below), signifying a progressive increase in safeguarding and robustness against natural disasters (Malik et al., 2013; Petrolia et al., 2023).

The first level of FORTIFIED is Roof (Bronze), and its main goal is to keep water out of the home by addressing the roof system of a house (including soffits and gable ends; FORTIFIED, n.d.-i). The second level, Silver, addresses the Roof requirements in addition to attached structures (e.g., porches), openings, and the bracing of gable ends (FORTIFIED, n.d.-i). Gold is the third level, which requires pressure-rated doors and windows, an engineered continuous load path for the main structure of the home, and chimneys to be well anchored into the roof structure (FORTIFIED, n.d.-i).

Table 1: FORTIFIED Designations

National Standard for Resilience	FORTIFIED Roof	FORTIFIED Silver	FORTIFIED Gold
Enhanced Roof Deck Attachment	✓	✓	✓
Sealed Roof Deck	✓	✓	✓
Locked Down Roof Edges	✓	✓	✓
Impact-resistant Shingles Rated by IBHS**	✓	✓	✓
Wind and Rain-Resistant Attic Vents	✓	✓	✓
Impact Protection for Windows & Doors*		✓	✓
Impact* & Pressure-Rated Garage Doors		✓	✓
Chimney Bracing		✓	✓
Reinforced Soffits*		✓	✓
Anchored Attached Structures		✓	✓
Gable End Bracing		✓	✓
Pressure-rated Windows & Doors*			✓
Stronger Exterior Sheathing*			✓
Engineered Roof-to-Wall Connections			✓
Engineered Wall-to-Foundation Connections			✓
* Required in Hurricane Prone Areas Only			
** Required for the optional Hail Supplement to a FORTIFIED designation			

Source: obtained from <https://fortifiedhome.org/solutions/>

The FORTIFIED program takes a systems-based approach, focusing on improving the performance of vulnerable building components rather than isolated elements. It offers an incremental approach that allows homeowners to strengthen their homes in stages, addressing the most common failure points first and building upon previous improvements (Malik et al., 2013). This stepped approach enables homeowners to progressively enhance their home's resilience, with each level providing more comprehensive protection against wind-related hazards.

Once mitigation work has been completed and verified, a FORTIFIED designation will be issued by IBHS, which certifies that a home has been built, renovated, or re-roofed according to FORTIFIED standards (FORTIFIED, n.d.-c). This designation, often required for insurance premium discounts, is valid for five years from the issue date (FORTIFIED, n.d.-c). To maintain the designation, a redesignation inspection must be conducted before expiration, with a one-year

grace period allowed for renewal (FORTIFIED, n.d.-c). If the home has been modified or the designation has been expired for more than five years, additional documentation or a new evaluation may be required (FORTIFIED, n.d.-c).

The implementation of FORTIFIED measures has shown promising results in reducing wind-related losses and increasing property values. In May 2023, IBHS recognized a significant milestone of 50,000 FORTIFIED home designations, with more than 80% of those designations in Alabama (Alabama Department of Insurance, 2023). FORTIFIED standards have been adopted in various states (e.g., Alabama, Louisiana, Oklahoma, North Carolina, etc.) where insurance premium savings may be offered by insurance companies to homeowners who install wind mitigation features and obtain a FORTIFIED designation (FORTIFIED, n.d.-b). By promoting and standardizing wind mitigation techniques for residential buildings, the FORTIFIED program offers a comprehensive approach to reducing wind-related damages and increasing overall structural resilience in hurricane (and windstorm) prone regions.

3. Texas Homeowners Insurers Survey

3.1. Survey Structure and Background

The survey for residential property (homeowners, HO) insurers was launched online via the Qualtrics platform on July 8, 2024. Insurers were given 1.5 months to complete it. The survey was sent to all residential insurers in Texas, a total of 159 companies, representing 80 different insurer groups.³ In total, 23 individual company or group responses were received for residential property carriers.⁴ Group responses also listed the names of companies in their respective groups. Overall, we counted that 48 individual companies responded to this survey. Therefore, the response rate for homeowners insurers was estimated at 30%. Based on 2023 premiums written, the responding homeowners' insurers accounted for 37% of the Texas residential property insurance market. Two residential carriers did not provide their company or group name. However, since they submitted survey responses, their input is included where applicable. Of the respondent insurers or insurer groups writing HO policies in Texas, 20 also wrote HO policies in Tier 1 counties (Table 2).

Table 2: Residential Insurers Profile

Description	Number responded
Insurers writing HO statewide in TX	23
Insurers writing HO in TX Tier 1	20
Insurers writing HO with wind and hail in Tier 1	15

Source: Authors

³ We noted that at least 10 emails were bounced back and not delivered to indicated contact emails.

⁴ Initial number of responses where 28. Out of 28 only 23 (82%) wrote homeowners (HO) policies in Texas. Since the survey was intended only for residential insurers, we did not request additional information from the 5 companies that indicated they did not write HO policies in Texas.

The survey was divided into multiple sections, aiming to cover various aspects of insurers' knowledge and opinions regarding the IBHS FORTIFIED™ Home Standards⁵ and other resilient standards for homes. The survey also assessed the following subject areas:

- Their willingness to offer and expand wind and hail coverage in Texas seacoast territories if similar programs or incentives promoting resilient retrofits were implemented in Texas.
- The composition of the insurers' current books of homeowners policies, including policies written on homes that have IBHS FORTIFIED and other resilient feature certifications.
- The insurers' potential actions in response to hypothetical scenarios in which Texas mandated specific changes for residential policies with resilient features.
- The insurers' perceptions of the effectiveness of IBHS FORTIFIED structures in mitigating losses and other economic impacts.
- Their role in educating and communicating with policyholders about the importance of these standards for risk mitigation.

3.2. Resilient Home Incentives

3.2.1. Support for the Resilient Home Incentives Program

Insurers were given a brief introduction to programs established in several coastal states to encourage the adoption of IBHS FORTIFIED™ standards and other resilient measures for residential homes in coastal communities.⁶ The section on incentives specifically aimed to gauge insurers' support for implementing similar programs in Texas. Insurers were informed that, in return, these states require insurers to offer premium discounts or reduced deductibles for homes meeting a resilient (or FORTIFIED™) standard. In some states, insurers also provide homeowners with an endorsement option that allows the homeowner to upgrade a non-fortified home to meet the IBHS FORTIFIED™ standard or other resilient standards when filing a roof replacement claim after a loss.

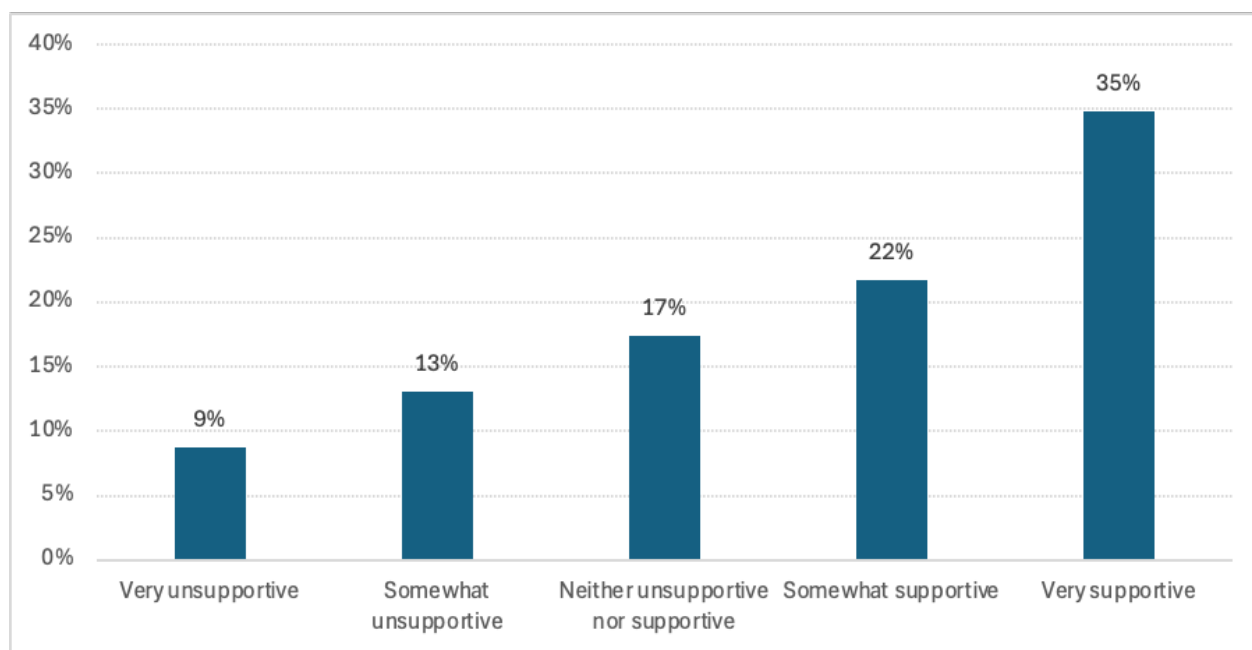
In Figure 1, we present the distribution of insurers by their level of support for such incentive programs to assist coastal homeowners with resilient retrofits. The bar heights correspond to the

⁵ For more information about the IBHS FORTIFIED™ standards please refer to the following website: <https://fortifiedhome.org/solutions/>

⁶ Details of different state-specific programs are provided in Section 5 of the report.

percentage of insurers by their support level (strongly unsupportive, somewhat unsupportive, neither unsupportive nor supportive, somewhat supportive, very supportive). The majority of insurers (57%) indicated either somewhat or strong support for these initiatives, with the largest percentage being very supportive of such programs. However, it is important to note that 17% of insurers were neutral on the matter, and 20% were still somewhat or strongly unsupportive of the incentives.

Figure 1: Support for State Incentive Programs for Resilient Retrofits



After exploring the general support for resilient program initiatives in Texas, the survey provided specific options that could be considered to increase the number of homes in Texas meeting IBHS FORTIFIED™ or other resilient standards. The question listed seven options based on existing programs in other states, and also included an 'Other' category to allow insurers to express their own option or general concerns and thoughts. Insurers could select multiple options and also were able rank their selected choices.

It is noteworthy that, except for one insurer or insurer group, all participants selected more than one option, with the majority choosing at least three. As shown in Table 3, most insurers were generally supportive of the program providing grants to cover eligible costs for resilient retrofits, either fully or partially. The common suggestion was to cover \$10,000, similar to the program in

Louisiana.⁷ In some cases, insurers proposed covering 25% or 50% of eligible costs. This option was ranked as the top choice among the alternatives. Insurance companies that selected the 'Other' option suggested providing tax incentives for upgrades, guaranteeing low or no-interest loans for homeowners to upgrade roofs, and simplifying the qualification process.

Table 3: Distribution of responses by incentives

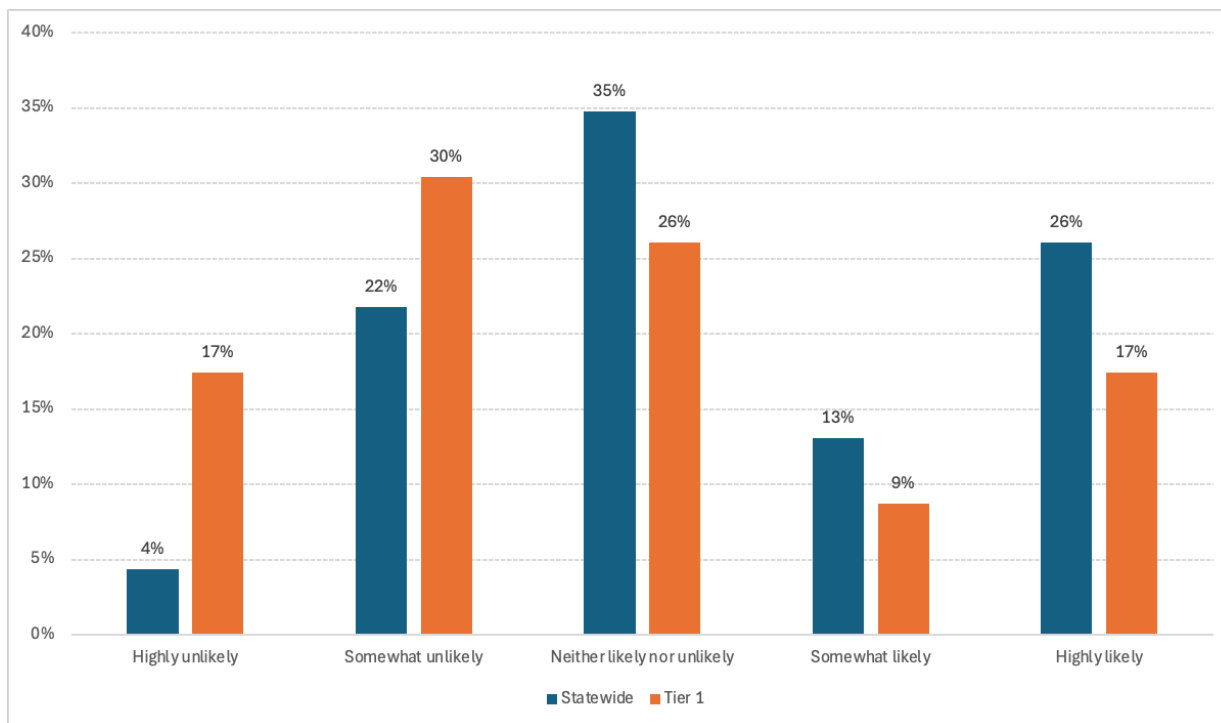
Incentives	Number of responses	Average amount, USD
Provide grants to cover eligible costs fully	10	
the amount should be determined based on the household income	6	
Provide grants up to a certain amount (please specify an amount)	10	\$11,250*
Provide matching grants (please specify an amount)	10	\$10,000**
Cover the verification certificate fees for the resilient/FORTIFIED standards	11	
The grants should be exempt for state and federal taxes	14	
Other (Please specify)	4	

Notes: *One insurer suggested \$15K, and another \$20K, while all others indicated either \$10K or full coverage of the cost. **The majority proposed 100% coverage of the cost up to \$10K, without requiring matching and with any remaining cost covered by the policyholder, or a 50/50 cost-sharing arrangement.

Interestingly, most insurers support IBHS FORTIFIED™ and similar standards, but less than half of insurers are likely to increase the number of homeowners' policies with windstorm and hail coverage across the state or in Tier 1 counties. Specifically, survey responses indicated that 47% of insurers are unlikely to increase their policies in Tier 1, compared to 26% who are likely to do so. In contrast, for statewide coverage, 39% of insurers are likely to increase coverage, while 26% are unlikely. This inconsistency may suggest that insurers' willingness to undertake risk in Tier 1 is not high, even with resilient homes. This hesitancy was also reflected in the open-ended comments discussed in sub-section 3.7.

⁷ For more details about the Louisiana Fortify Homes Program please refer to the following link: <https://ldi.la.gov/fortifyhomes#:~:text=The%20LFHP%20grants%20up%20to,winds%20and%20other%20severe%20weather.>

Figure 2: Likelihood to increase policies with wind and hail coverage in response to resilient programs



Importantly, most insurers are not willing to take on additional windstorm and hail risk in Tier 1 areas even for homes with resilient standards. However, they are more likely to offer premium discounts. This suggests that initiatives aimed at resilient structures among existing policyholders could address affordability concerns related to windstorm and hail coverage. We found that 70% of insurers are likely to offer premium discounts statewide, while 60% are likely to do the same in Tier 1 (Figure 3). A similar trend was observed in their likelihood to provide premium credits for certain resilient features (e.g., hurricane shutters, roofs, etc.), although the percentage of likely insurers was smaller compared to those offering overall premium discounts (Figure 4 shows 61% statewide and 52% in Tier 1). Critically, in all three types of questions related to increasing the number of policies, premium discounts, and premium credits for certain resilient features, insurers who indicated they were "unlikely" to participate also noted that no other mitigation programs would prompt them to increase coverage or reduce premiums.

Figure 3: Likelihood of providing premium discounts on policies with wind and hail coverage

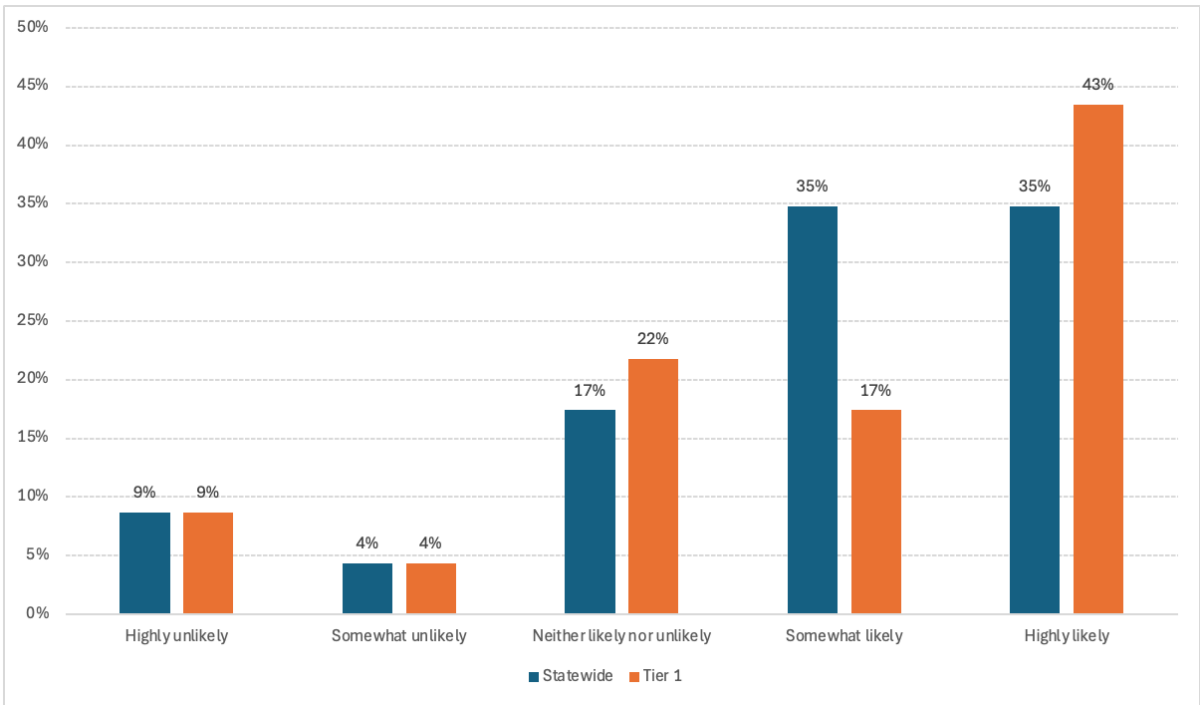
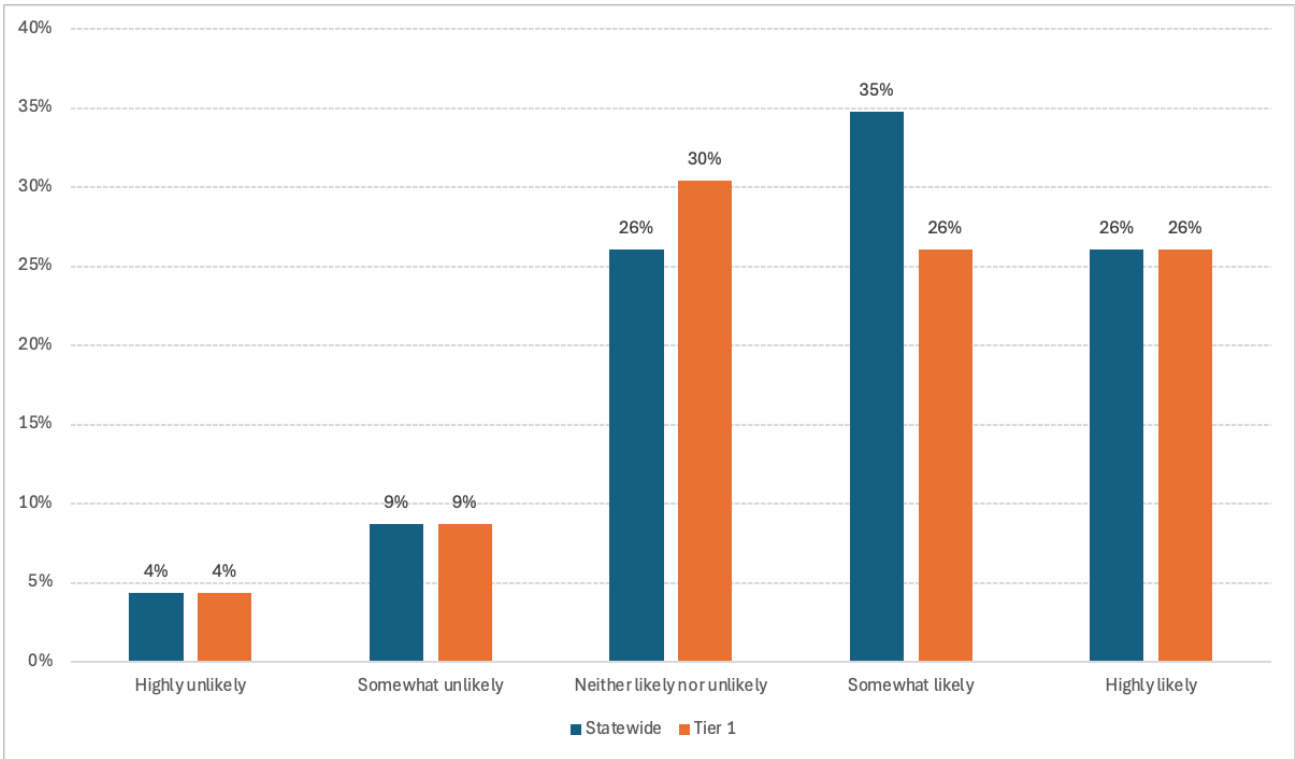
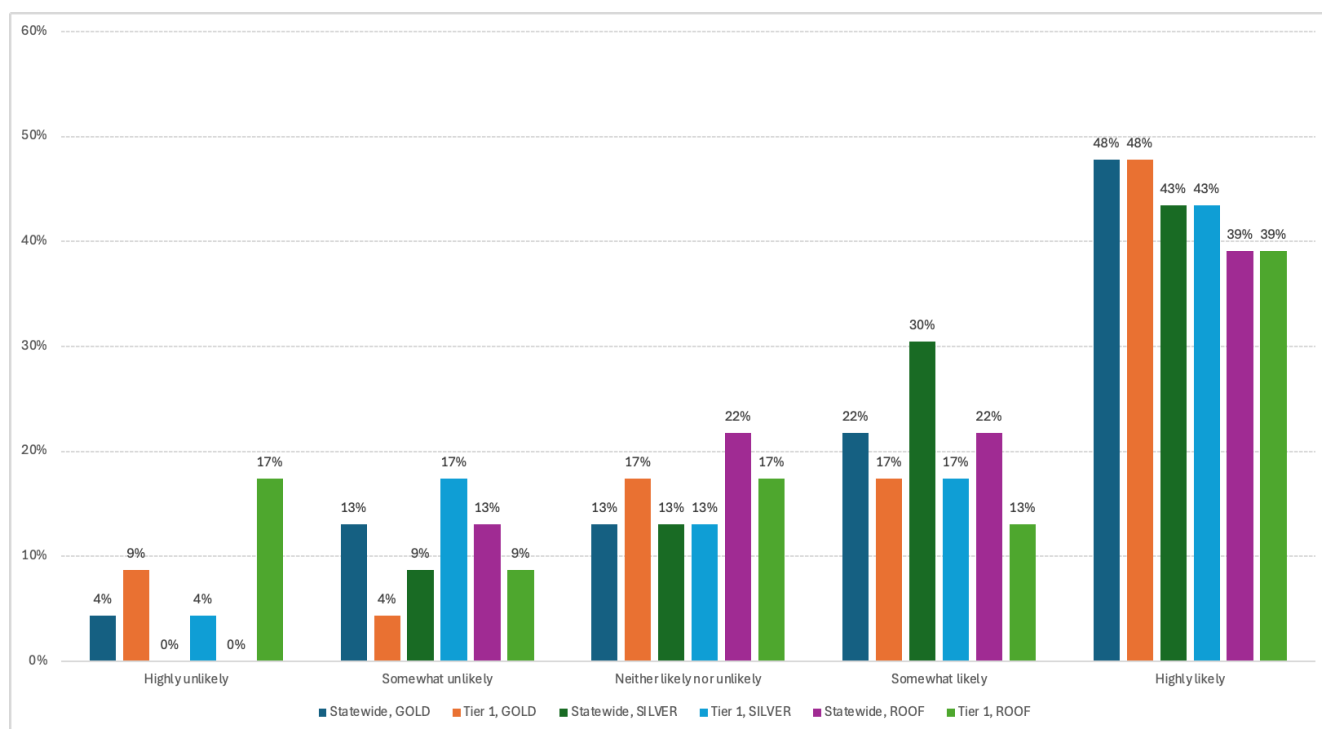


Figure 4: Likelihood to provide mitigation points for resilient features and related premium credits



Next, we asked questions specifically related to premium discounts for HO policies with windstorm and hail coverage that met IBHS FORTIFIED™ standards (Gold, Silver, and Roof). Figure 5 presents responses regarding the insurers' likelihood of premium discounts statewide, as well as in Tier 1 territories. We note that insurers who were "highly likely" to offer premium discounts generally indicated a higher percentage reduction in premium for the Gold standard, followed by Silver and Roof standards. However, the responses were mixed for insurers classified as "somewhat likely," with the highest percentage indicating a reduction for Silver in the statewide context. Insurers categorized as "somewhat likely" also selected the highest percentages for the Roof standard compared to the Gold standard. The average premium discount for the Gold standard, as indicated by the "somewhat" and "highly" likely insurers, was 8% for the overall policy and 19% for the windstorm and hail portion of the policy (Table 4).⁸

Figure 5: Likelihood of premium discounts for FORTIFIED Gold, Silver and Roof standards



⁸ We want to caution readers that these percentage reductions should not be taken at their face value. Some insurers were reluctant to specify a particular percentage discount without holistically evaluating the risks, taking into account various property-related risk factors and the overall standing of their business.

Table 4: Average percent discount in premiums among “somewhat” & “highly” likely insurers

	Gold	Silver	Roof
Overall HO policy premium discount	8.7	6.2	6.4
Discount on Wind and Hail portion of the premium	18.6	13.6	12

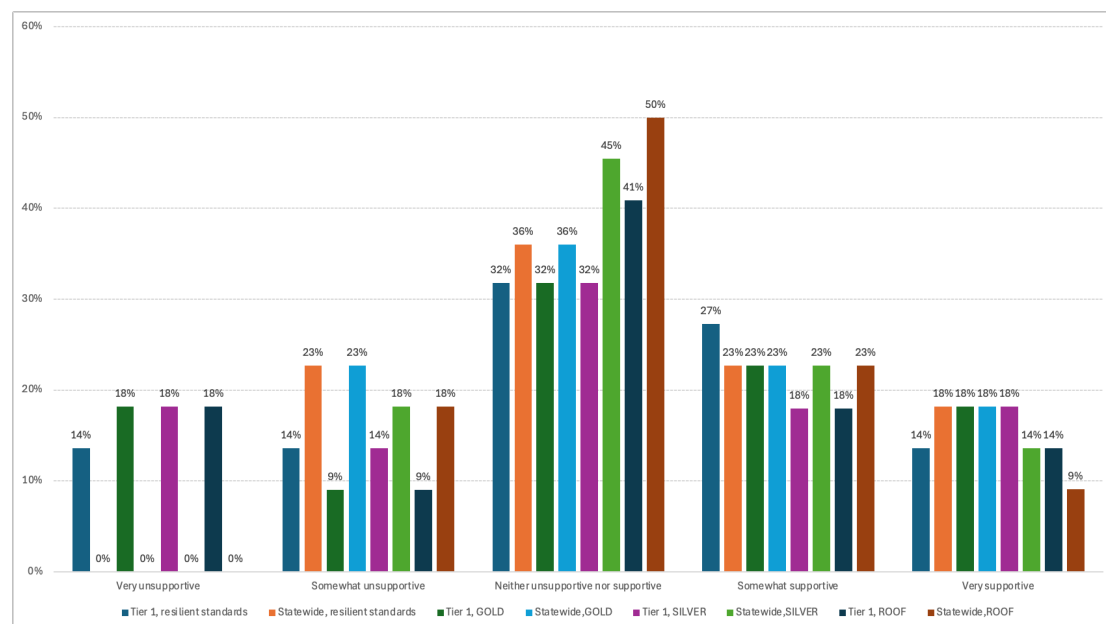
Notes: The response rate is based on the total number of 17 responses received for the Gold and Silver standards, and 14 for the Roof standard.

3.2.2. Voluntary Premium Discount Benchmark

The next set of questions were aimed at measuring insurers’ support for a voluntary premium discount statewide or in Tier 1 areas for general resilient standards and the three types of IBHS FORTIFIED™ standards. The follow-up questions prompted insurers to indicate what the reasonable premium discount benchmarks would be.

As shown in Figure 6, across all categories (general resilient standards and specific IBHS FORTIFIED™ standards), the largest grouping of insurers (32-50%) were neither supportive nor unsupportive of the voluntary premium discount benchmarks, both statewide and in Tier 1 territories. In terms of overall support, there seem to be more insurers with neutral positions than those in favor of or opposed to such initiatives.

Figure 6: Premium discount benchmark



The companies that indicated support for this initiative also shared their thoughts on the reasonable premium discount benchmarks that the state should consider. These suggestions are shown in Table 5 and indicate that, on average, they recommend a 10-12% average overall premium discount, with the highest discount suggested for the IBHS FORTIFIED™ Gold standards.

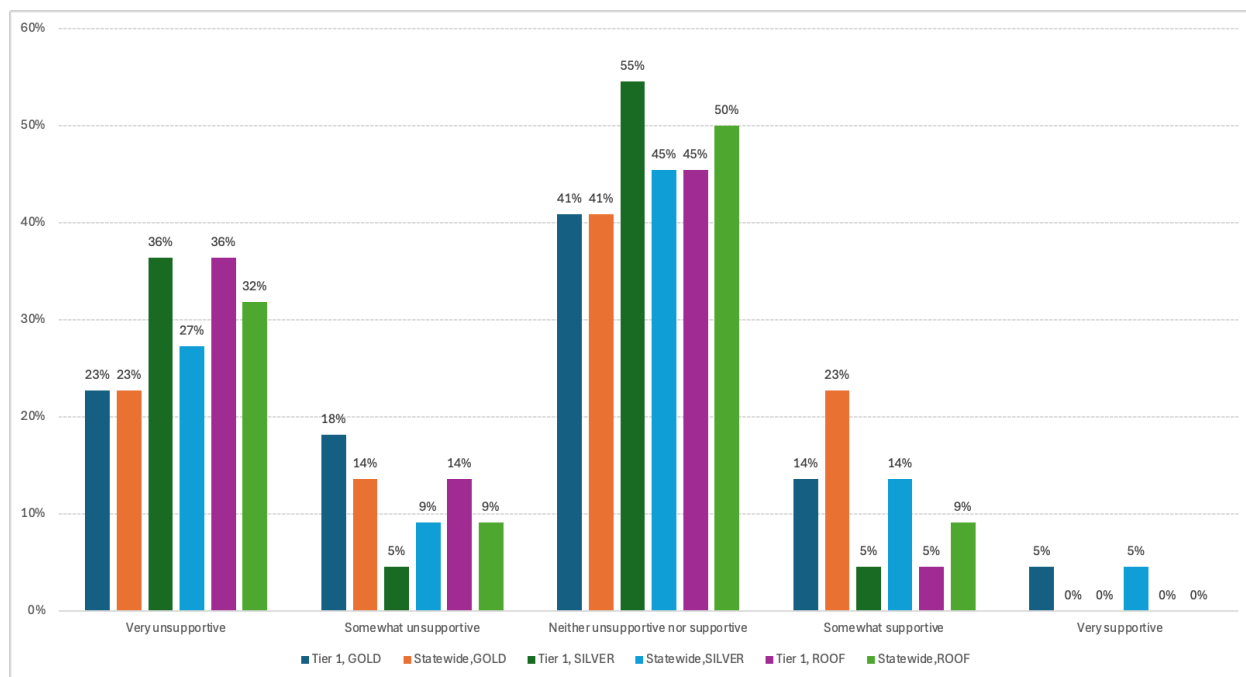
Table 5: Suggested benchmark average premium discount

Standards	Average overall premium discount
Tier 1, resilient standards	12.22%
Statewide, resilient standards	12.67%
Tier 1, FORTIFIED Gold	13.89%
Statewide, FORTIFIED Gold	11.25%
Tier 1, FORTIFIED Silver	11.38%
Statewide, FORTIFIED Silver	10.75%
Tier 1, FORTIFIED Roof	NA
Statewide, FORTIFIED Roof	11.71%

3.2.3. Lower Deductibles

The survey also explored insurers' willingness to lower deductibles on policies with windstorm and hail coverage for homes meeting IBHS FORTIFIED™ standards, specifically for Gold, Silver, and Roof standards, both statewide and in Tier 1 counties. As reported in Figure 7, the largest grouping of insurers was neither supportive nor unsupportive of offering lower deductibles. Notably, more insurers were also unsupportive or strongly unsupportive of lowering deductibles than supportive of lowering deductibles. Only three insurers indicated they were “somewhat supportive” of lower deductibles on Tier 1 homes meeting the Gold standard, and only one insurer was for Tier 1 homes meeting Silver and Roof standards. On average, insurers indicated they would lower deductibles by 9% for the Gold standard and approximately 7% for Silver and Roof standards in Tier 1.

Figure 7: Lower deductibles



3.2.4. Endorsement to upgrade non-fortified homes to meet the IBHS FORTIFIED standards

Overall, 14 insurers indicated that they somewhat or strongly support offering an optional endorsement that would pay for homeowners to upgrade their non-fortified homes to IBHS FORTIFIED™ standards when repairing their homes following a loss. The remaining 8 insurers were neutral about this option. The survey also asked insurers to indicate the minimum and maximum premium discounts (for overall premiums and for the windstorm/hail portion of the premium) they would offer to homeowners who upgrade their homes to meet FORTIFIED standards when replacing a roof after a loss. On average, as indicated in Table 6, insurers would offer an overall premium discount in the 9-16% range for Gold, 5-11% for Silver, and 4-8% for Roof standards. The reductions on the windstorm/hail portion of the premium were slightly higher: 12-21% for Gold, 7-16% for Silver, and 5-11% for Roof standards.

Table 6: Table 6: Premium discounts after home upgraded to FORTIFIED standards⁹

Standards	Minimum	Maximum
Overall policy premium		
Gold	8.61%	16.17%
Silver	5.36%	10.89%
Roof	3.78%	8.06%
Windstorm/Hail portion of premium		
Gold	11.82%	20.88%
Silver	7.41%	15.71%
Roof	5.29%	11.12%

3.3. Current Policies

To better understand insurers' experiences with the IBHS FORTIFIED™ standards, the survey asked what percentage of their current Texas statewide or Tier 1 policies with windstorm and hail coverage included IBHS FORTIFIED™ certification or certification for other resilient features. We further examined the distribution of Gold, Silver, and Roof standards among the IBHS FORTIFIED™ policies.

As shown in Table 7, only about 1% of companies' policies with windstorm and hail coverage are written on home with IBHS FORTIFIED™ or other resilient feature certifications. Among them, the most common certification is for the IBHS Roof standard, followed by Silver and Gold. This distribution likely reflects the low uptake of IBHS FORTIFIED™ standards in Texas

⁹ We note that these suggested premium discounts should be taken with caution as many insurers indicated they would need to consider various other nuances when determining premiums. Many insurers left these questions blank or indicated a 0% discount until “actuarially justified”.

statewide and Tier 1 territories, with the prevalence of Roof standards possibly due to their relatively lower cost compared to the Gold and Silver standards.

Regarding premium discounts for IBHS FORTIFIED™ standards, as shown in Table 8, only 4 insurers indicated they offer discounts, which averaged 9%, 13%, and 15% for Roof, Silver, and Gold standards, respectively.

Table 7: Share of current policies with IBHS FORTIFIED or other resilient features

	Texas Statewide	Texas Tier 1
IBHS FORTIFIED certification	0.86%	0.68%
Certification for other resilient features	1.27%	1.33%
IBHS certified Gold *	1.25%	1%
IBHS certified Silver*	1.5%	1.25%
IBHS certified Roof*	2.4%	2.75%

Notes: *Only four insurers responded.

Table 8: Percent premium discounts with IBHS FORTIFIED standards

	Texas Statewide	Texas Tier 1
IBHS certified Gold *	14.75%	15%
IBHS certified Silver*	12.75%	12.75%
IBHS certified Roof*	9%	9%

Notes: * Only four insurers responded.

3.4. Hypothetical Scenarios

All insurers were presented with two hypothetical scenarios in which Texas established guidelines and specific requirements related to resilient standards. The survey asked insurers to indicate how they would perceive such requirements, what adjustments they might consider, and what other impacts (financial or otherwise) these requirements might have on their business operations. Specifically, Scenario 1 involved requirements related to premium discounts, while Scenario 2 involved endorsements that give homeowners the option to upgrade to FORTIFIED standards when making repairs, as described below:

Scenario 1: Assume Texas requires all insurers to provide reasonable premium discounts on policies with windstorm/hail coverage for homes certified with IBHS FORTIFIED standards or featuring resilient elements in Tier 1 counties (or statewide).

Scenario 2: Assume Texas requires all insurers to offer an endorsement that gives homeowners in Tier 1 counties the option to upgrade their non-fortified homes to meet IBHS FORTIFIED™ or other resilient standards. (Assume the endorsement applies in the event of damage requiring replacement or significant repairs to that part of the home, and that the endorsement is offered for an additional premium).

As shown in Table 9, most insurers are receptive to the idea of reasonable premium reduction requirements for homeowners' policies with IBHS FORTIFIED™ or other resilient standards. However, their receptiveness is higher for statewide policies than for those in Tier 1 counties.

Table 9: Receptiveness to Scenario 1

Scenario: Required premium discount	Tier 1	Statewide
Be receptive to such a program	59% (13)	64% (14)
Not be receptive to such a program	41% (9)	36% (8)

*Number of responses are listed in parentheses

Among the 13 insurers receptive to such a program in Tier 1 and 14 insurers receptive to a statewide program, 8 said they would continue writing the same number of policies with windstorm and hail coverage in Tier 1, and 9 said they would continue writing the same number statewide. Meanwhile, 5 insurers in both groups indicated they would increase the number of policies in both Tier 1 and statewide.

For Scenario 2, the survey asked whether insurers would guarantee offering windstorm/hail coverage to homes that were repaired and upgraded to meet those resilient standards. Fourteen insurers (63.64%) indicated they would not guarantee offering windstorm/hail coverage, while 8 (36.36%) indicated they would guarantee offering that coverage .

3.5. The Effects of IBHS FORTIFIED™ Standards (Loss Mitigation & Other Effects)

The insurers were presented with a statement suggesting that mitigation is effective in reducing future disaster losses.

“According to the National Institute of Building Standards, for every \$1 spent on mitigation, the nation saves \$6 in future disaster costs. However, the effectiveness of mitigation depends on the extent of its adoption in a given area.”

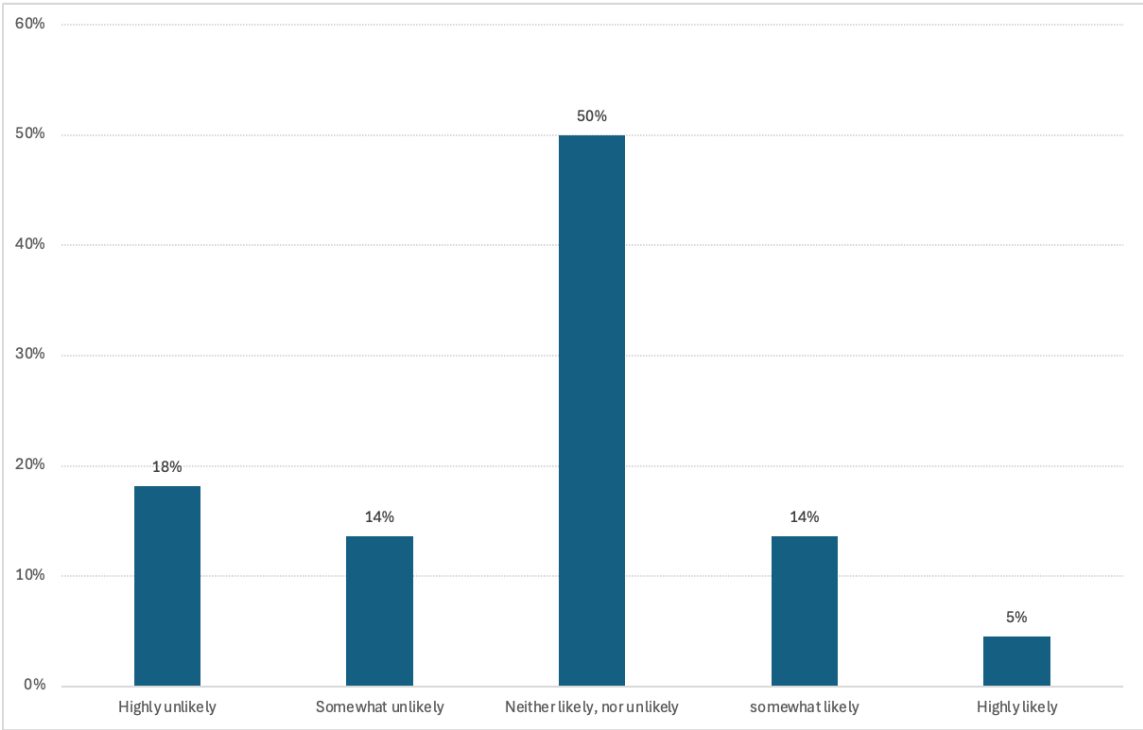
Insurers were asked to indicate what level of uptake of IBHS FORTIFIED™ standards (Roof, Silver, Gold) or generally resilient standards for homes (e.g., new constructions or roof replacements) would likely prompt them to offer more policies with windstorm/hail coverage in Tier 1 counties. On average, responses indicated that a 35% uptake in resilient standards would prompt insurers to increase windstorm and hail coverage in Tier 1. Only 8 insurers indicated that they would require an uptake level of 50% or higher.

To further illustrate the potential multiplier effects of the FORTIFIED home standards, we also provided the following statement:

“In addition to loss reduction, structural mitigation and property fortification may have other multiplier effects by promoting local economic activities (increasing local GDP, output growth, and employment in other sectors) and positively affecting the local housing market by increasing property values. Combined, these direct and indirect benefits, will likely boost the demand for other types of insurance that you provide.”

We asked the insurers to indicate the likelihood that they would consider the economic aftereffects of mitigation as important factors in deciding whether to write windstorm/hail coverage policies in Tier 1 for homes certified as IBHS FORTIFIED™ standards. The responses, presented in Figure 8, show that half of the insurers are neutral on the matter, while 32% are unlikely, and 19% are likely to consider these economic multiplier effects in their underwriting decisions in Tier 1 territories. This may suggest that insurers are generally unaware of these effects, and more empirical evidence may be needed to validate the indirect benefits of mitigation and to provide solid evidence of loss avoidance associated with IBHS FORTIFIED™ standards that insurers frequently mention in their open-ended comments summarized in sub-section 3.7.

Figure 8: Likelihood of considering economic aftereffects of mitigation

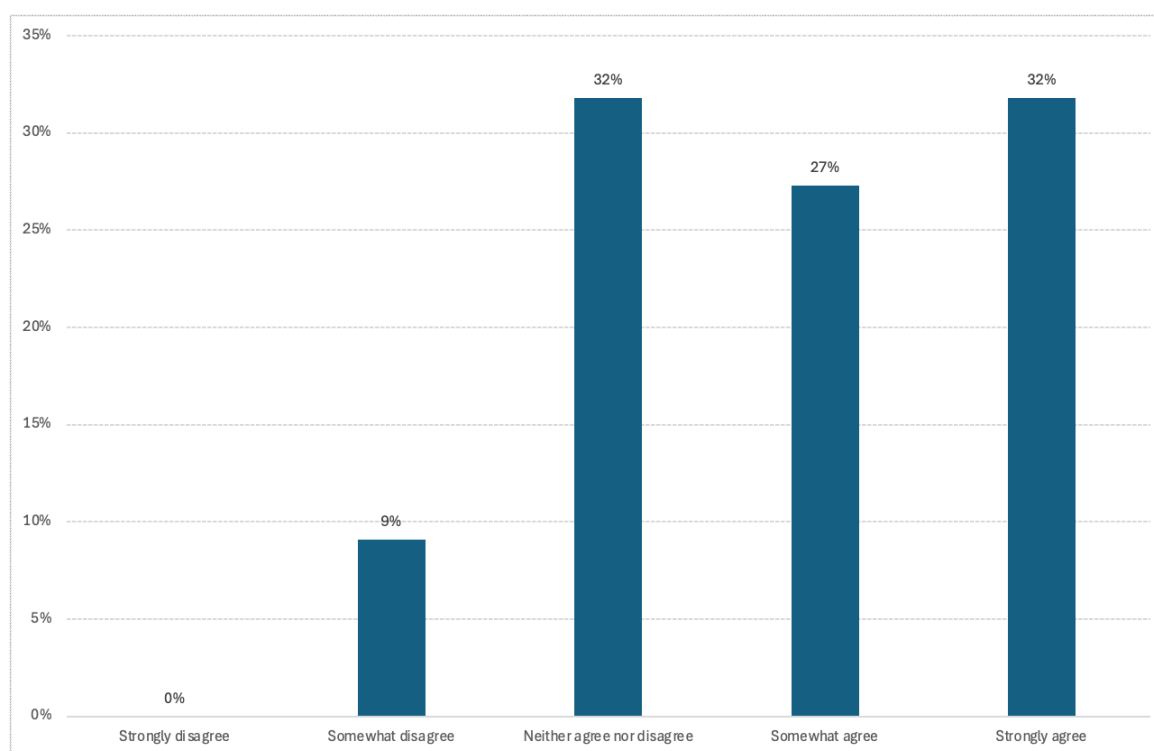


3.6. Importance of Information About Mitigation

To assess the level of awareness about IBHS FORTIFIED™ standards among policyholders, we asked insurers whether their customers were familiar with resilient standards. The majority (72%) indicated that their policyholders were aware of these standards.

Additionally, we highlighted that insurers can play a critical role in educating and raising awareness among policyholders about resilient standards, which could, in turn, increase demand for FORTIFIED retrofits. We asked the surveyed insurers if they agreed that insurers play a critical role in communicating information about FORTIFIED standards and the associated savings. The majority (59%) agreed that insurers play a key role in promoting awareness, 32% neither agreed nor disagreed, and only 9% did not believe insurers play an important role.

Figure 9: Important role of insurers in communicating about FORTIFIED standards



Notably, 68% of the surveyed insurers do not inform customers about IBHS FORTIFIED™ or other resilient standards or the associated savings. The majority also do not encourage policyholders to upgrade their roofs when they are being repaired or replaced. Among the small number of insurers (only 7 in our sample) who do inform their customers, most (85%) also explain the differences between the various standards (e.g., Gold, Silver, Roof certified) and the corresponding savings. As a result of this communication, an average of 13% of policyholders (with responses ranging from 5% to 30%) have upgraded their roofs during repair or replacement.

3.7. Summary of Open-Ended Questions

3.7.1. Insurers' feedback on the overall impacts of resilient home standards on their business operations

We solicited insurers' open-ended feedback on various types of impacts (financial or otherwise) that the implementation of resilient standards might have on their business operations. Four important aspects discussed below were consistently highlighted in responses.

- **Resources and operational impacts**

Specifically, the insurers were concerned that adjusting rates and implementing discounts to capture resilient standards would require substantial time and resources from IT, product, actuarial, and sales teams. The majority of them thought that new data, technology, and system buildouts would be necessary to capture relevant information on IBHS FORTIFIED or other resilient standards. Moreover, additional staff may be needed to collect and review certification forms or documentation for resilient homes, as well as an increased underwriting time to ensure an accurate and timely review process.

- **Financial consideration**

The insurers were concerned that offering to insure FORTIFIED homes or IBHS-certified roofs at a required discount could lead to a loss in premium income, requiring adjustments to rates for all policies. Furthermore, they were concerned that if the reinsurance market does not adopt the same view on reduced risk from FORTIFIED structures, the benefit of premium discounts may be short-lived due to increased reinsurance costs, which could eventually be passed back to customers.

- **Risk management**

Insurers mentioned that they may need the ability to limit exposure or implement stop-loss agreements to prevent significant losses from a single event when offering discounts. Also, the majority were concerned about the lack of historical data on the effectiveness of FORTIFIED structures against severe weather events in coastal regions. The shifting weather conditions may make it challenging to determine the appropriate discount percentages or changes needed over time.

- **Long-term benefits**

Some insurers highlighted that if discounts incentivized more insureds to fortify their homes, over time, losses would reduce, leading to lower premiums in high-risk areas like Tier 1 counties.

3.7.2. Summary of comments of neutral or unsupportive insurers

An open-ended comment option was provided to all insurers who indicated that they remained neutral or unlikely to support any state-level initiatives (e.g., full grants, matching grants, tax deductions, etc.) or mandates related to resilient retrofits, or who expressed an unwillingness to

communicate the importance of these initiatives to policyholders. Some have stated that they do not have the appetite for additional windstorm/hail risks in the Tier 1 counties. They were concerned regarding the regulatory frameworks and code enforcement, evidence of loss reduction, cost consideration, and complimentary programs, as summarized below.

Regulatory Framework and Code Enforcement

- The need to establish and enforce comprehensive codes.
- Compliance with established codes (e.g., the 2006 International Residential Code).
- Regulating the roofing sector to ensure compliance with safety and performance standards.

Standardized inspection

- Standardized inspection and roof construction reports will likely speed up the review process and also promote premium discounts (referencing Florida's wind mitigation forms).
- The need to develop a program or clear underwriting guidelines that include inspections to identify necessary repairs or upgrades.
- The need to understand how the IBHS FORTIFIED™ or other standards are factored in reinsurance costs.

Evidence of Loss Reduction and Risk Assessment

- Need to demonstrate a loss reduction benefit for different IBHS FORTIFIED™ (e.g., Gold, Silver and Roof) standards is important for integrating these benefits into pricing structures.
- The need for third-party data and modeling to validate that homes with mitigation features have materially lower catastrophe risk, both on average and in tail events.
- There was a growing recognition of the potential benefits of partnering with catastrophe modeling companies, such as AIR, to demonstrate how the IBHS FORTIFIED™ standards can effectively reduce loss severity during major storms.

Cost Implications of FORTIFIED Standards

- While IBHS FORTIFIED standards may reduce the frequency of claims, they could lead to higher replacement costs during severe events.

Focus on Hail Damage

- The need for additional programs specifically targeting hail damage was also highlighted. This potentially suggests that while roof surface impact ratings are important, they may not be sufficient on their own to reduce risk.

3.7.3. Summary of comments regarding communicating IBHS FORTIFIED standards

Overall, insurers appear to be reluctant to communicate IBHS FORTIFIED™ standards to potential policyholders and generally take a cautious approach primarily due to the lack of currently available discounts for them and concerns about customer confusion.

Lack of Incentives to Communicate

- Some insurers feel there is no necessity to communicate about IBHS FORTIFIED™ standards because their current discounts for homes do not account for these standards.

Concerns Over Customer Confusion

- Insurers express concerns that framing additional costs of upgrade as potential savings may lead to customer confusion. If customers invest in FORTIFIED standards but do not immediately see expected benefits, it could result in a negative experience, damaging their trust in insurers.

Alternative Certifications

- While some insurers do not actively communicate about IBHS FORTIFIED standards, they still inform customers about other certifications such as those from Underwriting Laboratories or programs offered by specific insurers.

Insurers maintain a conservative approach regarding communicating roof upgrades after a loss has been paid and primarily focus on restoring properties to their pre-loss condition without encouraging resilient retrofits. The emphasis was made on customer choice and responsibility, combined with inconsistent communication about the benefits of resilient retrofits.

Policy Limitations and Coverage

- Insurers do not provide endorsements that allow insureds to upgrade their roofs in the event of a loss, limiting coverage to repair or replacement with materials of "like, kind, and quality."
- Claims handling is centered on restoring the insured's property to its pre-loss condition, with no incentives to upgrade materials.

Customer Responsibility and Choice

- Insurers emphasize that the choice to upgrade roof materials should be made by customers themselves. They encourage customers to choose what makes sense for their individual situations, reinforcing the notion that financial responsibility lies with the insured.
- Some agents discuss roof types with insureds, but claims adjusters typically just discuss replacing roofs with the same material and do not discuss upgrades because they are out-of-pocket expense for the customer.
- At the time of a loss, customers are often not receptive to additional costs associated with upgrades, suggesting a reluctance to take on additional financial burdens at the time of repair.

4. Literature Review

Wind damage from natural disasters, including hurricanes, tornadoes, and severe thunderstorms, poses significant threats to residential properties, particularly in the coastal regions of the United States. Over the last few decades, these events have caused extensive economic losses, with hurricanes alone accounting for nearly a trillion dollars in damage between 1980 and 2018. Homes in high-risk areas are particularly vulnerable, emphasizing the importance of resilient construction and mitigation strategies. Although modern building codes have improved the wind resistance of newer homes, they are still prone to wind-driven rain and water intrusion. Retrofitting older homes with wind-resistant features can greatly reduce damage, prevent homeowner displacement, and aid in community recovery. Programs such as the Insurance Institute for Business & Home Safety's (IBHS) FORTIFIED Home™ designation offer standardized approaches to improving wind resilience. Investing in mitigation efforts not only reduces future costs but also highlights the need for proactive measures from homeowners, builders, and policymakers to enhance wind damage prevention and residential construction resilience. This section reviews the academic literature on the effectiveness of building codes and IBHS FORTIFIED™ standards in mitigating wind-related property losses, their economic impacts, and public and private perceptions of these outcomes.

4.1. Building Code and IBHS FORTIFIED Effectiveness

Building codes play a crucial role in mitigating wind damage, particularly through roof retrofit requirements. IBHS emphasizes the importance of statewide adoption and enforcement of modern building codes in its Rating the States: 2024 Edition report (IBHS, 2024). The report highlights that states with strong building code systems, such as Florida and Virginia, have implemented specific provisions for roof retrofits to mitigate damage from windstorms. These provisions often include requirements for improved roof deck attachment, sealed roof decks, and wind-rated roof coverings. For instance, the Florida Building Code (FBC), which has consistently ranked at the top of IBHS's ratings, was created in 2001 and implementation took place statewide in 2002 to effectively augment wind-resistant construction practices (Giammanco et al., 2023; IBHS, 2024).

The effectiveness of wind-resistant construction can be supported by a study conducted after Hurricane Michael made landfall in Florida in 2018. Bakkensen and Blair (2022) relied upon high-resolution imagery captured 2 months after Hurricane Michael in Bay County to identify temporary roof coverings, which served as a reliable indicator of damage, particularly due to the

USACE's "Blue Roof" initiative that provided free tarps to affected households. The authors initially found that homes built after the FBC implementation showed a reduction in the probability of damages by 2 to 14% and were less likely to require temporary roof protection compared to those built prior to implementation of FBC (Bakkensen and Blair, 2022). Interestingly, this study also revealed positive externalities associated with wind-resistant construction, as homes surrounded by other code-compliant structures experienced a further reduction in the likelihood of roof damage, suggesting that the benefits of wind-resistant construction extend beyond individual properties (Bakkensen and Blair, 2022).

In addition to showing the importance of the adoption of building codes in mitigating losses, empirical research has demonstrated substantial economic benefits associated with their effective enforcement. Czajkowski and Simmons (2014) examined hail damage in Missouri, where they analyzed insurance data from over 200,000 customers. The study employed industry loss and exposure-based regression models, and their findings revealed that ZIP codes with more favorable Building Codes Effectiveness Grading System (BCEGS) ratings, which measure the quality of code enforcement, experienced between 10-20% lower losses on average compared to areas with weaker or no enforcement (Czajkowski and Simmons, 2014). With average hail damage claims being approximately \$7,500 per home, the 20% reduction from effective building codes translates to an average savings of \$1,500 per property (Czajkowski and Simmons, 2014). The authors illustrate the aggregate economic impact using Missouri data, where approximately 4,000 impacted homes would result in \$6 million in annual savings, which represents only 20% of the total property insurance market in the state (Czajkowski and Simmons, 2014).

In another study, Czajkowski et al. (2017) analyzed insurance loss data through the Insurance Services Office (ISO) from 2001-2010 and found that homes built after implementation of the FBC experienced a 72% reduction in losses compared to homes constructed prior to the FBC, with an additional 15-25% reduction when combined with favorable local BCEGS ratings. This can be further supported by Simmons et al. (2018), who relied upon the same 10-year data set, found that homes built to the FBC reduced windstorm losses up to 72%. Using a regression discontinuity model, the researchers demonstrated that the FBC achieved a benefit-cost ratio of 6 to 1, indicating that every dollar spent on enhanced construction requirements saved six dollars in avoided damage costs over the life of the structure (Simmons et al. 2019). Furthermore, Simmons et al. (2019)

analyzed the economic performance of Florida's building code across different wind risk zones using the same ISO data set (from 2001-2010). The study revealed that homes in non-wind-borne debris regions experienced reductions of 57% in direct losses and 81% in full losses, while homes in wind-borne debris regions showed reductions of 32% in direct losses and 64% in full losses (Simmons et al., 2019).

Expanding beyond Florida's experience, Simmons et al. (2020) analyzed the potential implementation of wind-resistant building codes across 20 states prone to wind damage, finding that eight states demonstrated positive benefit-cost ratios, with Mississippi, Oklahoma, and Alabama achieving payback periods under 20 years. The researchers found that even if construction costs increased by 20% and mitigation effectiveness decreased by 20%, the enhanced codes would remain cost-effective for Mississippi and Oklahoma, demonstrating the robust economic value of these regulations (Simmons et al., 2020). Notably, to increase likelihood of adopting building code standards, a payback of less than 20 years would more likely appeal to residents, which the analysis revealed the top states with the highest benefit-cost, with Mississippi achieving the highest benefit-cost ratio of 4.13, followed by Oklahoma at 4.10 and Alabama at 3.18 (Simmons et al. 2020).

Following Moore, Oklahoma's implementation of enhanced building codes after experiencing three violent tornadoes in less than 15 years, Simmons et al. (2015) evaluated the economic effectiveness of applying these standards statewide. The researchers estimated that of the \$69.8 billion in expected residential tornado losses over 50 years in Oklahoma, approximately 30% or \$10.7 billion could be mitigated through enhanced building codes (Simmons et al., 2015). Using engineering recommendations and input from the Moore Association of Home Builders that estimated increased construction costs at \$1 per square foot, the researchers demonstrated that the enhanced requirements provided a benefit-cost payback of 3.2 to 1, suggesting the economic viability of implementing these standards across Oklahoma (Simmons et al., 2015).

In addition, examining the market response to enhanced building codes in Moore, Simmons and Kovacs (2018) employed a difference-in-difference regression model comparing Multiple Listing Services (MLS) data between Moore and neighboring town, Norman, to assess potential market impacts. Despite adding approximately \$2.00 per square foot in construction costs with some builders reporting costs as high as \$2.50 per square foot, their analysis revealed no significant

effect on price per square foot, home sales, or new building permits (Simmons and Kovac, 2018). The researchers suggested that the relatively small percentage increase in overall construction costs (about 2%) was not large enough to affect the price of housing and that some builders in Oklahoma City market had already adopted some features of the enhanced code prior to its enactment, meaning the incremental cost was less for these builders and was already priced into the market (Simmons and Kovac, 2018). The researchers demonstrated that municipalities can implement enhanced building codes for wind resistance without fear of driving away development or negatively impacting their real estate markets, suggesting that concerns about regulatory costs deterring growth may be overstated (Simmons and Kovac, 2018).

Furthermore, Giammanco et al. (2023) conducted a comprehensive two-part study to evaluate building performance in southwest Florida during Hurricane Ian (2022), by assessing roof cover damage and performance of the modern FBC implemented in 2002. The researchers assessed 3,646 single-family homes, 327 light commercial buildings, and 230 multifamily structures (e.g., townhomes and duplexes) using aerial imagery from NOAA and EagleView, as well as street-level imagery from the National Science Foundation's Structural Extreme Events Reconnaissance teams (Giammanco, Newby, & Pogorzelski, 2023; Giammanco et al., 2023). The authors considered structural damage as failures of building components, such as failures of roof decking materials, roof systems failures, observable damage to structural framing components, compromised end-walls, partial collapses, and complete structural failures of the building (Giammanco, Newby, Pogorzelski, & 2023; Giammanco et al., 2023). To maintain focus on wind-related impacts, zones affected by severe storm surge and buildings with clear indications of structural damage primarily caused by storm surge were omitted from the assessment.

The study's findings strongly support the effectiveness of the FBC in mitigating structural wind damage to buildings, while also highlighting ongoing challenges with roof cover performance. Of the 455 single-family homes built under the modern FBC and assessed by the researchers, none exhibited any visible evidence of structural damage from wind (Giammanco, Newby, Pogorzelski, & 2023; Giammanco et al., 2023). In contrast, homes built prior to the FBC implementation had damage severities on average 1.9 times higher than those built under the modern FBC, with this difference increasing to 2.3 times for homes that likely experienced peak winds above 130 mph (Giammanco, Newby, Pogorzelski, & 2023; Giammanco et al., 2023). However, the study also

revealed damage to building components (i.e., siding, fascia, and soffits), as well as roof cover materials, with asphalt shingles showing a 52% damage rate, tile roofs a 42% damage rate, and even the best-performing metal roofs experiencing up to 11.4% damage for single-family homes (Giammanco, Newby, Pogorzelski, & 2023; Giammanco et al., 2023). This suggests that while the FBC has been successful in improving overall structural resilience, there is still a need for improved testing standards and product designs to enhance the performance of roof coverings in hurricane conditions (Giammanco, Newby, Pogorzelski, & 2023; Giammanco et al., 2023). The latest edition of the FBC (8th) went into full effect on January 1, 2023, and closely mimics IBHS FORTIFIED Gold standard and introduced new roofing provisions that apply statewide, including for all roof replacements necessitated by Hurricane Ian to closely align with the specifications of the IBHS FORTIFIED Roof standard (Giammanco et al., 2023).

Homes with an IBHS FORTIFIED designation have shown to be effective in mitigating wind-related damage. For instance, there were nearly 17,000 homes in Alabama that contained a FORTIFIED designation at the time Hurricane Sally made landfall in 2020 (IBHS, 2024, Pillion, 2020). Hurricane Sally was a Category 2 hurricane with wind speeds that reached about 105 mph, and approximately 95% of FORTIFIED homes incurred minimal or cosmetic damage (IBHS, 2024, Pillion, 2020). Malik et al. (2013) conducted a comprehensive analysis to evaluate the effectiveness of the IBHS FORTIFIED Home Hurricane program in reducing hurricane loss vulnerability. The authors utilized loss relativity study results from Applied Research Associates and Risk Management Solutions to estimate the benefits of strengthening existing homes to meet FORTIFIED Home Hurricane designations. They carefully selected building features to match the strengthening accomplished by FORTIFIED retrofits and compared these to typical existing construction and new construction built to the FBC (Malik et al., 2013).

The study's results demonstrated significant reductions in expected losses for homes retrofitted to FORTIFIED standards. For the Roof (Bronze) level designation, which primarily focuses on roof system improvements, the analysis showed that achieving a Bronze 1 designation (improvements without roof covering replacement) could result in approximately 40% of the benefit of building a home to new engineering-based building codes. Furthermore, attaining a Bronze 2 designation (improvements with roof covering replacement) yielded between 45% and 79% of the benefit of building to new standards (Malik et al., 2013). These findings were based

on estimates of average annualized loss costs and were normalized by the difference in loss estimates for existing construction compared to new construction built to the FBC. The authors noted that these results tend to highlight the benefits of mitigation against more common, less intense events due to their higher probability of occurrence (Malik et al., 2013). Overall, the study provided strong evidence for the effectiveness of FORTIFIED standards, particularly at the Roof (Bronze) level, in significantly reducing wind-related damages to residential roofs.

To test realistic wind-related damages and mitigation strategies, IBHS opened its Research Center in 2010 to focus on 4 wind-related natural perils: wildfire, hail, high wind, and wind-driven rain (Standohar-Alfano et al., 2017). In their paper, Standohar-Alfano et al. (2017) describes the extensive research capabilities of the Research Center, which contains a small-scale laboratory and a large test chamber that is capable of subjecting full-scale residential structures to the mentioned natural perils. A custom-made firebrand generator system is utilized within the Research Center to simulate firebrand exposure observed in wildfires for both small- and large-scale tests (Standohar-Alfano et al., 2017). To simulate realistic hailstorm impacts on building materials, the test chamber is equipped with 72 impact barrels to propel laboratory-created ice spheres of various sizes at full-scale buildings (Standohar-Alfano et al., 2017). The large test chamber is able to simulate Category 3 hurricane winds to allow for a more realistic assessment of building performance compared to traditional wind tunnels or component-level testing (Standohar-Alfano et al., 2017). The chamber facility is equipped with an array of 105 fans to generate wind speeds up to 58 m/s (130 mph), simulating realistic atmospheric boundary layer conditions (Standohar-Alfano et al., 2017). For wind-driven rain, the facility employs a sophisticated system of spray nozzles arranged in a grid across the fan inlet, capable of producing realistic raindrop size distributions and deposition rates (Standohar-Alfano et al., 2017). This setup allows researchers to evaluate the vulnerability of building envelopes to water intrusion under various wind and rain conditions, a critical aspect of the FORTIFIED program's focus on reducing interior damage.

Brown et al. (2015) conducted an extensive study at the IBHS Research Center to evaluate the effectiveness of various roof sealing mitigation strategies specified to FORTIFIED standards in reducing wind-driven rain entry during hurricanes. The researchers constructed a full-scale residential structure and tested multiple roof configurations under simulated hurricane conditions where the wind was powerful enough to remove roof covering but not strong enough to remove

roof sheathing (Brown et al., 2015). The study utilized a custom water collection system installed in the attic space, which was divided into zones to isolate and pinpoint vulnerable points of water entry (Brown et al., 2015). Tests were conducted using three wind speed records (low, medium, high) and two water delivery rates (medium, high) for each roof system or venting configuration, with the building oriented at various angles relative to the wind direction (Brown et al., 2015).

The results of the study provided strong evidence for the effectiveness of sealed roof deck strategies in mitigating water intrusion. Brown et al. (2015) found that all tested sealed roof deck methods significantly decreased water entry rates compared to control cases with no mitigation measures. For instance, when comparing a bare roof deck (control) to a roof deck with seams taped at sheathing joints, water entry rates were reduced by at least 85% for drainage zones affected by soffit-related water entry, and by at least 97% for other zones not affected by soffit water entry (Brown et al., 2015). The authors noted that while some roof areas remained more susceptible to water entry than others, the overall reduction in water intrusion was substantial across all tested mitigation strategies (Brown et al., 2015).

As previously mentioned, several states have implemented incentive programs to encourage the adoption of FORTIFIED standards and roof retrofitting. These state-level initiatives, coupled with potential insurance premium discounts for FORTIFIED designated homes, serve as significant incentives for homeowners to invest in wind mitigation measures and enhance the resilience of their properties. Alabama, for example, offers a grant up to \$10,000 for resilient roofing through the Strengthen Alabama Homes program, in which homes with a FORTIFIED designation can receive insurance discounts of up to 30% for inland homes and up to 55% for coastal homes (Smart Home America, n.d.; Strengthen Alabama Homes, n.d.). South Carolina's Safe Home program offers a resilient mitigation grant up to \$6,000 (matching grant) or \$7,500 (non-matching grant) for homeowners that retrofit their homes to meet the South Carolina Safe Home and IBHS FORTIFIED guidelines (South Carolian Department of Insurance, n.d.) Additionally, homeowners in North Carolina on the Outer Banks and Barrier Islands who are insured through the North Carolina Insurance Underwriting Association (NCIUA) may be eligible for a grant of up to \$8,000 toward the cost of a FORTIFIED Roof (Strengthen Your Roof, n.d.). The success of the program in Alabama, which leads the country with more than 42,000 FORTIFIED designations, suggests that such incentive programs can be effective in promoting

adoption of resilient building practices (Awondo et al., 2023). Following the success of Alabama, other states followed suit and started to create their own state programs, such as Louisiana (Louisiana Fortify Homes Program), Minnesota (Strengthen Minnesota Homes), and Oklahoma (Strengthen Oklahoma Homes) (Louisiana Department of Insurance, n.d.; Minnesota Department of Commerce, 2024; Oklahoma Insurance Department, 2024).

4.2. Economic Effectiveness

Wind retrofit measures extend beyond mitigating physical damage and can provide economic benefits as well. In their study, Wang et al. (2021) examine the physical and socioeconomic effects of residential wind retrofits using the 2011 Joplin, Missouri tornado as a case study. Their methodology integrated multiple models (e.g., computable general equilibrium model) to assess the impact of three retrofits strategies to improve community resilience and computing metrics for physical, economic, and social sectors (Wang et al., 2021). It is worth noting that the authors do not consider the budget or cost of the retrofit strategies. When comparing scenarios with different retrofit strategies, the study found that more advanced retrofit measures led to substantial reductions in economic losses. For instance, the total household income loss was reduced from \$60.5 million (Retrofit strategy 1) to \$38.3 million when using the most comprehensive retrofit strategy (Retrofit strategy 3), which combines clay tiles as the roof covering, utilizes roof sheathing nailing pattern scheduled for 8dC6/6, and employs two H2.5 clips for the roof-to-wall connection (Wang et al., 2021)¹⁰. The economic benefits were not limited to household income; the study also examined impacts on employment and domestic supply across various sectors. The total loss in domestic supply commercial decreased from \$202.6 million (Retrofit strategy 1) to \$26.9 million with the most advanced retrofit strategy (Retrofit strategy 3) (Wang et al., 2021). Similarly, total job losses were reduced from 2,942 to 1,744 individuals when comparing Retrofit strategy 1 to Retrofit strategy 3 (Wang et al., 2021, p. 10). These findings demonstrate that residential wind retrofits can have far-reaching positive effects on a community's economic resilience, mitigating losses across multiple economic indicators and sectors.

¹⁰ 8dC6/6 refers to the nailing pattern for roof sheathing. 8d common nails were used to attach sheathing panels spaced at 6/6 in. H2.5 clips refer to a H2.5 hurricane tie.

Perotin (2013) evaluates the cost-effectiveness of wind retrofit measures, focusing on those outlined in FEMA's Wind Retrofit Guide for Residential Buildings. The analysis revealed that certain retrofit measures become cost-effective at wind speeds of 140 mph or higher, with benefit-cost ratios (BCR) exceeding 1.0 (Perotin, 2013). Specifically, the research found that the "Basic w/ roof cover w/ shutters" mitigation package, which includes strengthening the roof system and protecting openings, demonstrated cost-effectiveness in high wind speed areas. For instance, in regions with design wind speeds of 150 mph or greater, the BCR for the Basic package with roof cover replacement and shutters ranged from 2.9 to 10.9 (195 mph wind speed), indicating a substantial return on investment (Perotin, 2013). In addition, the authors found that the "Intermediate" and "Basic w/ shutters" packages were consistently the most cost-effective of all eight packages (Perotin, 2013).

In a similar study, Torkian et al. (2014) evaluated various mitigation sets, combining different retrofit measures such as roof improvements, window protection, and structural enhancements. The researchers found that the benefit-cost ratios (BCRs) for these mitigation sets varied depending on the region and the specific combination of measures implemented. For instance, in South Florida, one of the more comprehensive mitigation sets (Set 1b) demonstrated the highest BCR of 1.66 (Torkian et al., 2014, p. 156). The economic effectiveness of retrofits was further analyzed by examining the spatial distribution of BCRs across Florida. The study produced benefit-cost maps that illustrated the varying effectiveness of different mitigation sets in different regions. These maps revealed that while some mitigation measures were highly cost-effective in South Florida and the Keys, their economic benefits diminished in central and northern parts of the state (Torkian et al., 2014). For example, Set 2, which excluded roof-to-wall connection retrofits, showed higher BCRs than Set 1 in north and central regions, despite being less comprehensive. This spatial variation in economic effectiveness highlights the importance of tailoring mitigation strategies to specific geographic locations and risk profiles. The study also noted that certain low-cost measures, such as installing window protection (Set 4), could yield positive BCRs across larger geographic areas, making them attractive options for homeowners seeking cost-effective improvements (Torkian et al., 2014). These findings provide valuable insights for policymakers and homeowners, suggesting that while comprehensive retrofits offer the highest protection, even partial mitigation measures can be economically beneficial in reducing potential wind damage costs.

The cost-benefit analysis of IBHS FORTIFIED designations, as presented by Ghosh et al. (2023), provides some interesting results when determining return on investment for FORTIFIED designations in Oklahoma, in which, at the time, there were only 18 homes with a FORTIFIED designation. The study found that the additional cost of FORTIFIED designation ranged from 1% to 2.6% of a home's sale price, with an average of 1.1% for FORTIFIED Roof (Bronze), 1.6% for FORTIFIED Silver, and 2.25% for FORTIFIED Gold designations (Ghosh et al., 2023). Although the actual discounts offered in Oklahoma were difficult to determine due to limited adoption of the program and the absence of data from insurance carriers, the researchers assumed a 10%, 15%, and 20% discount for Roof (Bronze), Silver, and Gold designations respectively (Ghosh et al., 2023). Regardless of applied discounts, the insurance carrier can play a role in whether a FORTIFIED designation leads to a financial return on investment (Ghosh et al., 2023). The authors calculate the potential return on investment by comparing the additional costs of FORTIFIED construction to the expected insurance premium savings (Ghosh et al., 2023). They consider four different interest rates (0%, 1.9%, 5%, and 10%) over a 15-year period to account for the time value of money and opportunity costs (Ghosh et al., 2023, p. 310). The analysis reveals that homeowners who do not actively invest can recover the costs of FORTIFIED designation in 7 to 9 years, depending on the designation level. For conservative investors expecting a 5% return, the recovery period extends to 13 or 14 years. However, the study notes that homeowners anticipating a 10% return on investments would not recover costs through insurance savings alone (Ghosh et al., 2023).

Ghosh et al. (2023) emphasize that while the financial benefits vary based on factors such as location and individual financial strategies, FORTIFIED designations can offer significant economic advantages. The authors suggest that production homebuilders are best positioned to offer FORTIFIED homes as an option, leveraging common weather events in Oklahoma, use economy of scale to reduce costs, and increase return on investment during a normal homeownership period (Ghosh et al., 2023). For small-volume and custom builders, the viability of FORTIFIED designations depends more on individual customer preferences and experiences with severe weather events (Ghosh et al., 2023). The cost-benefit analysis by Ghosh et al. suggests that FORTIFIED designations can be financially advantageous for many homeowners, particularly those in high-risk areas or those with longer-term housing plans (2023). However, the study also

indicates that the economic case for FORTIFIED homes is not universal and may require additional incentives or education to drive widespread adoption (Ghosh et al., 2023).

Regarding multifamily structures, Powell et al. conducted a cost-benefit analysis of the FORTIFIED Multifamily™ Wind program, focusing on the economic value for owners of multifamily residential buildings (2022). The study employed a multi-faceted approach to assess both the marginal costs and benefits of implementing FORTIFIED standards. To estimate costs, the researchers used Xactimate software to calculate the expenses of constructing standard and FORTIFIED structures in three representative locations, coastal (with and without debris requirements), and inland areas (tornados, hail, and straight-line winds) (Powell et al., 2022). The analysis considered a hypothetical 30,000 square foot, two-story apartment building with 30 units as a baseline. The marginal cost of FORTIFIED construction was found to vary between 0.3% and 1.4% of the total building cost, with an average of 0.56% (Powell et al., 2022). For the benefits analysis, the researchers employed the AIR Worldwide Touchstone catastrophe model to estimate reductions in expected losses for FORTIFIED buildings. They modeled the hypothetical structure in various locations across the southeastern United States and calculated average expected losses for standard construction, FORTIFIED Roof, and FORTIFIED Gold designations in different wind speed zones (Powell et al., 2022). The study also incorporated potential increases in rental income based on a survey of multifamily housing residents, which found that tenants (74%) were willing to pay slightly higher rent for FORTIFIED apartments (Powell et al., 2022). The economic effectiveness of the program was evaluated using payback periods and internal rates of return (IRR). The results showed impressive returns, with IRRs for Gold designations ranging from 8.1% (8.3% Roof) for high wind and hail zones to 72% for Gold designations (39% for Roof) in the Hurricane windborne debris zones that are greater than 140 mph (Powell et al., 2022). The FORTIFIED Gold designation for Hurricane windborne debris zones (>140 mph) had the fastest payback period, being less than 17 months, while the payback period was 9.6 years for FORTIFIED Gold in the high wind and hail zones (Powell et al., 2022). These findings suggest that FORTIFIED Multifamily construction can be a highly effective economic investment, particularly in high-risk coastal areas.

The impact of IBHS FORTIFIED designations on home values has been the subject of recent empirical studies, providing valuable insights into the economic benefits of wind-resistant

construction practices. Two notable studies conducted in coastal Alabama offer compelling evidence of the positive effect FORTIFIED designations have on property values. Awondo et al. (2023) examined the economic value of windstorm loss mitigation features on coastal home values, focusing specifically on the IBHS FORTIFIED Home™ program. The study utilized data from 1,054 home sales in Baldwin County, Alabama, between 2014 and 2017, including 235 FORTIFIED-designated properties (Awondo et al. 2023). Employing a hedonic pricing model with both fixed-effects and spatial regression approaches, the researchers controlled for various house characteristics and addressed potential spatial dependence in the data (Awondo et al. 2023). Their findings revealed a substantial increased sales price for FORTIFIED homes, with an average of 7% for properties located at the median distance (3.8 miles) from the coast (Awondo et al. 2023). This premium was highest (up to 15%) for homes nearest the coast and decreased to zero at about 8 miles inland (Awondo et al. 2023). Importantly, the study found that FORTIFIED construction and distance from the coast act as substitutes in terms of risk mitigation, suggesting that FORTIFIED designations are particularly valuable for coastal properties (Awondo et al. 2023).

Supporting these findings, Petrolia et al. (2023) conducted a similar study examining the impact of the FORTIFIED Home Program on residential property values in coastal Alabama, focusing on Mobile and Baldwin counties. Using a larger dataset of 30,286 properties, including 2,908 with FORTIFIED designations, from 2011 to 2021, the researchers employed a hedonic price regression analysis with various subsamples and a nearest-neighbor matching approach (Petrolia et al., 2023). The authors found that homes with FORTIFIED designations commanded an approximately 2-4% greater sales price (Petrolia et al., 2023). This effect was most pronounced in the full sample analysis, which showed a 7.7% increase in sales price for FORTIFIED homes (Petrolia et al., 2023). However, when the sample was restricted to exclude sales below \$100,000, the premium decreased to 3.6% (Petrolia et al., 2023). The study also revealed that the impact was strongest for new home sales and FORTIFIED Gold designations, suggesting that builders may be the primary beneficiaries of the added value (Petrolia et al., 2023). Interestingly, the researchers found that homes destined for future FORTIFIED designations also sold at higher prices, indicating a potential predisposition for higher-value properties to seek FORTIFIED certification (Petrolia et al., 2023).

Both studies highlight the significant economic value created by the FORTIFIED program for coastal homeowners. The increased sales price for FORTIFIED homes typically exceeds the cost of building or retrofitting to meet FORTIFIED standards, indicating a positive return on investment. Furthermore, these findings suggest that policies promoting FORTIFIED homes or stronger building codes have the potential to create substantial value for coastal homeowners. The authors of both studies emphasize the importance of raising awareness about the FORTIFIED program among potential buyers, real estate agents, appraisers, and financial institutions to fully realize its benefits in the market (Awondo et al., 2023; Petrolia et al., 2023).

4.3. Perception

Risk perception plays a crucial role in how individuals prepare for and respond to wind-related hazards, influencing decisions regarding insurance and mitigation efforts. The decision to invest in wind mitigation measures or purchase wind insurance is influenced by various factors, including risk preferences, expectations of government assistance, and personal experiences. Through review of theoretical and empirical literature, Bakkensen and Conte (2022) highlight that risk-averse individuals are more likely to invest in adaptation measures and purchase insurance, while risk-loving individuals are more likely to live within hazard-prone areas and less likely to adapt. Petrolia et al. (2013, 2015) found that while risk aversion increased the probability of purchasing wind insurance, it did not significantly affect mitigation decisions. Past experience with wind damage has been shown to significantly increase both the likelihood of purchasing wind insurance and the extent of mitigation efforts undertaken, aligning with the concept that personal experience can heighten risk awareness and motivate protective behaviors (Petrolia et al., 2015).

Although there have been conflicting studies, expectations of government disaster assistance could create a charity hazard effect, where individuals are less likely to purchase insurance or invest in mitigation if they believe they will receive aid in the event of a disaster (Davlasheridze and Miao, 2019; Kousky et al., 2018; Landry et al., 2021; Petrolia et al., 2013, 2015). Petrolia et al. (2013) found that individuals' perceived expectations of hurricane damage positively correlated with their decision to purchase flood insurance, suggesting that those who anticipate greater potential losses are more likely to seek financial protection. Furthermore, they found that post-disaster aid indicated a positive relationship with insurance purchases. However, the same study noted that the perceived frequency of future storms did not significantly impact insurance

decisions, indicating that the magnitude of potential damage may be more influential than the likelihood of an event occurring. In a further study, Petrolia et al. (2015) found that their results did not show a statistically significant effect of perceived eligibility for post-disaster aid on either wind insurance purchase or mitigation efforts; however, they maintained the hypothesis that heightened perceptions of aid eligibility would negatively impact both decisions. In addition, they found that location can play a factor in obtaining wind insurance, as those who live within the coastal zone are more likely (32%) to hold a wind policy, although residents in areas where wind peril was excluded from standard homeowner's policies, implying higher risk zones, undertook fewer mitigation activities than individuals in lower risk areas (Petrolia et al., 2015). Landry et al. (2021) found that households that exhibit optimistic expectations of eligibility for government disaster aid are between 25% and 42% less likely to hold a flood insurance policy.

In a study that examined wind insurance, flood insurance, and mitigation behavior, Laird et al. (2021) utilized cross-sectional survey data at a household level coupled with experimentally derived risk preference information to examine decisions in obtaining wind and flood insurance and mitigate hurricane risk within the Gulf Coast of the U.S. The authors found that the choice to purchase wind and flood insurance are each positively correlated with the level of hazard mitigation, while the correlation between wind and flood insurance holdings was not statistically significant (Laird et al., 2021). The authors do note that while their model shows a reasonably good fit, support for the effects of structural parameters (risk preferences and risk perceptions) is mixed, suggesting that the results raise questions of external validity of experimentally derived risk preference measures that can be applied to actual insurance and mitigation decisions (Laird et al., 2021). Nonetheless, they also found that individual perceptions of risk can influence decisions for flood insurance but found that risk perception measures have no effect on hazard mitigation or wind insurance holdings, further highlighting the nuanced nature of risk perception (Laird et al., 2021). However, the authors do acknowledge that more research on potential instruments and external and internal validity is needed (Laird et al., 2021). Their study also highlighted the importance of past experiences with storm damage in shaping insurance decisions and mitigation choices, where probabilities of wind and flood insurance are increased by 4.1% and 3.3%, respectively, and mitigation count is increased by 0.6 measures (Laird et al., 2021). Mortgages also play a role in insurance holdings, where homeowners located within a special flood hazard

area with a mortgage were 21% and 9.5% more likely to have flood and wind insurance, respectively (Laird et al., 2021).

The relationship between perceived risk and protective actions is not always straightforward. Although You and Kousky (2024) find that insured households are less likely to experience high financial burdens (short-term and long-term) following a disaster, they note that lower-income households tended to perceive insurance as less useful, despite potentially deriving greater benefits from coverage. Collier and Kousky (2024) also found that many households remain uninsured despite the benefits of insurance and that lower-income and minority households experience more limited access to recovery funding. Ahmadiani and Landry (2017) examined the potential for multi-peril coastal hazard insurance that would bundle coastal erosion and flood coverage, finding that such products could be more attractive to coastal residents and potentially increase overall insurance uptake. However, the effectiveness of insurance in promoting risk reduction may be modest, as Kousky (2019) notes that the impact of insurance on incentives for ex-ante risk reduction is much needed.

Although primarily focused on flood insurance, Landry and Turner (2020) found that coastal residents in Georgia, an area with historically lower hurricane risk when compared to other areas in the Southeastern U.S., generally expect future coastal storms and hazards to worsen. Their study revealed that perceived damages, risk tolerance, and wealth exposure were significant determinants of flood insurance purchases, which may also apply to wind insurance decisions given the interrelated nature of hurricane risk. Awareness of one's flood zone designation and attitudes towards community risk management initiatives were also correlated with insurance uptake, suggesting that both individual risk perception and community-level factors play a role in protective behaviors (Landry & Turner, 2020). Homeowners are less likely to relocate following a storm, as Landry et al. (2022) point out that coastal residents strongly preferred rebuilding and a willingness to pay to upgrade mitigation features to reduce risk, while also exhibiting negative housing utility associated with buyouts if the land were redeveloped. This preference suggests that perceived place attachment or other factors may outweigh perceived risks in some decision-making contexts, complicating efforts to promote risk-reduction strategies in vulnerable coastal areas.

Understanding the perception of homeowners regarding retrofitting their roofs to mitigate damage is crucial for developing effective strategies to enhance coastal resilience and reduce the devastating impacts of hurricanes and severe weather events on residential properties. Kranzler et al. (2020) conducted a mixed-methods study to identify effective message strategies for encouraging coastal homeowners in Alabama and Florida to install high wind-resistant (HWR) roofs. The researchers employed an elicitation study with 74 participants to identify salient beliefs, followed by a larger survey of 533 homeowners to assess these beliefs' potential as campaign targets (Kranzler et al., 2020). The most promising beliefs for messaging included that HWR roofs would protect one's family and that family and community members are likely to install them (Kranzler et al., 2020). The study found that protection and resilience benefits were common themes, alongside financial considerations (Kranzler et al., 2020). Interestingly, the study found differences in the promise of beliefs when considered individually versus as part of thematic groups, highlighting the complexity of message development (Kranzler et al., 2020). The research provides empirical evidence for effective belief targeting in hurricane mitigation campaigns and highlights the importance of considering both individual beliefs and thematic groupings in message design, and emphasizes the need to tailor messages based on homeowners' perceived risk and loss potential (Kranzler et al., 2020).

Some recent studies have shed light on homeowner perceptions and behaviors regarding retrofitting homes to mitigate hurricane damage, revealing challenges in coastal resilience efforts. In 2017, Javeline & Kijewski-Correa (2019) conducted a survey in New Hanover County, North Carolina and created 3 indices to measure a home's current structural mitigations (Home Protection Index), actions homeowner has taken to mitigate measures (Homeowner Action Index), and future intentions to mitigate structural vulnerabilities (Homeowner Intention Index). Out of 662 respondents, it was revealed that homes were minimally protected against wind and flood hazards, with a mean Home Protection Index of 0.48 out of 1 (Javeline & Kijewski-Correa, 2019). Homeowners had taken few voluntary mitigation actions, with a mean Homeowner Action Index of only 0.15, and 34% having taken no action at all (Javeline & Kijewski-Correa, 2019). A significant lack of awareness about structural vulnerabilities was observed, with 25% to 50% of respondents unaware of their homes' protective features (Javeline & Kijewski-Correa, 2019). Future intentions to implement protective measures were also low, with a mean Homeowner Intention Index of 0.07 (Javeline & Kijewski-Correa, 2019). Interestingly, the perceived cost of

mitigation was not found to be a sufficient explanation for the lack of action, suggesting that other factors play significant roles in homeowners' decision-making processes (Javeline & Kijewski-Correa, 2019)

Building on these findings, Javeline et al. (2022) investigated the relationship between insurance incentives and homeowner behavior in the same area. Contrary to common assumptions about insurance creating perverse incentives, the study found that homeowners aware of insurance incentives were more likely to live in better-protected residences and to have taken incentivized actions to improve their homes' resilience (Javeline et al., 2022). However, awareness of these incentives was limited, with only 18.3% of respondents reporting receiving credits, discounts, or lowered deductibles for hurricane protection measures, while 27.4% were unaware if they were receiving such benefits (Javeline et al., 2022). Although the majority of homeowners do not support insurance mandates, the survey data indicated that approximately half of all respondents (47.5%) would consider the installation of window protections in return for premium discounts, suggesting a potential willingness to engage in mitigation efforts if properly incentivized (Javeline et al., 2022). This lack of awareness suggested a significant gap in communication between insurers, policymakers, and homeowners. The findings indicate that insurance incentives, when properly communicated and implemented, could play a positive role in promoting resilience rather than creating moral hazard (Javeline et al., 2022). It is worth noting that the survey employed by the researchers was done prior to the launch of North Carolina's Strengthen Your Roof grant program in 2019. As previously mentioned, the grant program is only applicable to homeowners who are insured with NCIUA and reside within Outer Banks or Barrier Islands (Strengthen Your Roof, n.d.). Perception of insurance incentives and mitigation retrofits may reveal different results now that the Strengthen Your Roof program has been in effect for around 5 years. Nonetheless, both studies emphasize the critical need for increased awareness and education among coastal homeowners about their homes' vulnerabilities and the importance of structural mitigation measures. They suggest that current incentives and information campaigns may be insufficient to motivate voluntary action, highlighting the potential for improving coastal resilience through better alignment of stakeholder interests and more effective communication of resilience incentives (Javeline & Kijewski-Correa, 2019; Javeline et al., 2022)

Grant programs may be an effective means of incentivizing homeowners in retrofitting their homes to mitigate damage. Jasour et al. (2018) conducted a study on homeowner decision-making regarding hurricane retrofits, aiming to predict retrofit take-up rates, understand incentive effects, and identify characteristics of retrofit-prone homeowners. The research utilized a mixed logit model combining revealed and stated preference survey data, which was conducted between fall 2012 and spring 2013, from 303 eastern North Carolina homeowners, addressing four types of hurricane damage retrofits (Jasour, et al., 2018). It was revealed that grants significantly increased retrofit likelihood, with the probability of retrofitting openings or roof-to-wall connections increasing by 0.12 when offered (Jasour et al. 2018). Conversely, low-interest loans and insurance premium reductions showed no significant effect (Jasour et al. 2018). Proximity to coastline, younger age, newer homes, and recent hurricane experience were associated with higher retrofit probability (Jasour et al. 2018). The study suggest that targeted grant programs, focusing on coastal areas and recent hurricane-affected homeowners, might be most effective for encouraging retrofits. The research also highlighted the importance of tailoring incentives to specific retrofit types and homeowner demographics, challenging a one-size-fits-all approach to retrofit incentives (Jasour et al. 2018).

Furthermore, in Oklahoma, where the adoption of FORTIFIED homes is still limited, Ghosh et al. (2023) conducted 27 interviews with independent insurance agents regarding insurance discounts for FOTIFIED designations and found that most insurance agents (67%) were completely unaware of the FORTIFIED program (Ghosh et al., 2023). This lack of awareness among professionals in the insurance industry suggests that homeowners in the region may also have limited knowledge about the program and its benefits. However, when homeowners are informed about the potential benefits, there appears to be some willingness to pay for FORTIFIED features. A survey of multifamily housing residents found that 74% of participants were willing to pay additional rent to live in a FORTIFIED Multifamily home, with an average acceptable increase of 2.17% (\$23.38) of rent among those willing to pay more than zero (Powell et al., 2022). These findings indicate that while overall awareness and adoption of FORTIFIED and roof retrofitting programs may be low, there is potential for increased uptake if homeowners are properly informed about the benefits and if incentives are effectively communicated.

5. State Programs

In response to the growing losses associated with hurricanes and severe windstorms, several states have implemented various retrofit programs to mitigate the impact of these severe weather events on residential structures. Many of these programs (e.g., Strengthen Alabama Homes, Louisiana Fortify Homes Program, Strengthen Minnesota Homes) have adopted the Insurance Institute for Business and Home Safety (IBHS) FORTIFIED standards as their retrofitting guidelines. By incorporating these mitigation techniques into their state-level initiatives, these programs aim to reduce the risk of damage to residential properties during hurricanes and windstorms, ultimately improving community resilience and reducing the financial burden on homeowners and insurers. This report reviews state-specific mitigation and insurance incentive programs from Alabama, Florida, Georgia, Louisiana, Minnesota, Mississippi, North Carolina, Oklahoma, Rhode Island, and South Carolina.

5.1. Alabama

5.1.1. Overview

The state of Alabama established the Strengthen Alabama Homes (SAH) program in 2011 to help homeowners upgrade their homes with wind retrofitting modifications to reduce property damage from hurricanes and severe windstorms (Alabama Department of Insurance, n.d.; Strengthen Alabama Homes, n.d.-a, b). The program is funded by the insurance industry in Alabama and is not connected to the state's general budget or any federally funded programs (Strengthen Alabama Homes, n.d.-a, b). The SAH provides grants of up to \$10,000 to eligible homeowners to assist with the cost of wind retrofitting their homes (Alabama Department of Insurance, n.d.; Strengthen Alabama Homes, n.d.-a, b).

SAH adopted the IBHS FORTIFIED Home™ program as its retrofitting standard. To be eligible for the SAH grant program, applicants must meet several criteria, such as claiming their primary residence in a county where grants are being awarded, providing proof of active homeowners policies and wind insurance coverage, and obtaining a home evaluation from a certified FORTIFIED™ Evaluator (Strengthen Alabama Homes, n.d.-a, b). Homes with a FORTIFIED designation can receive discounts on the wind portion of their homeowner's insurance

premium, with most insurers in Alabama offering discounts of up to 30% for inland homes and 55% for coastal homes (Smart Home America, n.d.). Additionally, Alabama residents who retrofit or upgrade their homes to withstand wind or flood damage may be eligible for a tax deduction of up to \$3,000 (Alabama Department of Revenue, n.d.; FORTIFIED, n.d. -d; Strengthen Alabama Homes, n.d.-b.). Studies have shown that FORTIFIED homes sell for nearly 7% more than non-FORTIFIED homes and are less likely to suffer frequent damages, resulting in lower expenses and avoided costs associated with stress and logistical challenges following severe wind events (Awondo et al., n.d.; Petrolia et al., 2023; Strengthen Alabama Homes, n.d.-a, b).

5.1.2. Program Description

In 2011, the Alabama State Legislature passed ACT 2011-643, which created the SAH program. This program aims to help Alabama homeowners upgrade their homes with wind retrofitting modifications that reduce property damage caused by hurricanes and other severe windstorms (Alabama Department of Insurance, n.d.; Strengthen Alabama Homes, n.d.-a, b). The program's funding is provided by the insurance industry in Alabama, and it is not connected to the state's general budget or any federally funded programs (Strengthen Alabama Homes, n.d.-a, b). Subject to available funding, the Alabama Department of Insurance (ALDOI) provides grants to eligible homeowners to assist with the cost of wind retrofitting their homes, ultimately improving the community's resilience to weather events and reducing insurance rates (Alabama Department of Insurance, n.d.; Strengthen Alabama Homes, n.d. -a, b).

SAH adopted the IBHS FORTIFIED Home™ program as its retrofitting standard to protect homes from storm damage. Although the grant award may not cover the entire cost of retrofitted work, SAH will pay the cost of mitigation up to \$10,000 for work that meets the FORTIFIED Roof or Silver standard (Strengthen Alabama Homes, n.d.-a, b). Prior to any work, a FORTIFIED evaluation must be performed by a certified FORTIFIED Evaluator to review the current condition of a home and provide the homeowner and contractor documentation of the work that is needed to reach the designated FORTIFIED standard (Strengthen Alabama Homes, n.d.-a, b). The homeowner must pay a small fee for the evaluation. The fee varies by evaluator and is not covered by the grant (Strengthen Alabama Homes, n.d.-a, b). Upon completion of the evaluation, the homeowner can choose three contractors from a list of SAH-trained and qualified contractors to provide bids for the mitigation work. Contracts for all work are between the homeowner and

contractor (Strengthen Alabama Homes, n.d.-a, b). The grant award letter will be provided to the homeowner once all three bids have been submitted. The homeowner must have the grant award letter from SAH before any work can begin (Strengthen Alabama Homes, n.d.-a, b). The homeowner is not required to pay for any mitigation work up-front but will be responsible for any cost above the grant award amount (Strengthen Alabama Homes, n.d.-a, b). Once the mitigation work is completed, the home will receive a certificate for an IBHS FORTIFIED designation. SAH will issue a payment up to the grant amount directly to the contractor on behalf of the homeowner (Strengthen Alabama Homes, n.d.-a, b).

5.1.3. Eligibility Requirements

To be eligible for the SAH grant program, applicants must meet several criteria. First, they must claim their primary residence in a county where grants are being awarded, and the residence cannot be a condominium or mobile home (Strengthen Alabama Homes, n.d.-a, b). The home must be in good repair, and the applicant must provide proof of an active homeowners insurance policy and wind insurance coverage before the grant is paid (Strengthen Alabama Homes, n.d.-a, b). If the home is located in a special flood hazard area, the applicant must also have flood insurance, either through the National Flood Insurance Plan or a private insurance carrier (Strengthen Alabama Homes, n.d.-a, b). Additionally, applicants must obtain a home evaluation from a certified FORTIFIED™ Evaluator approved by the SAH program. The evaluator can be selected after completing the grant application (Strengthen Alabama Homes, n.d.-a, b). As previously mentioned, mitigation work must meet the standard of FORTIFIED Roof or Silver. Finally, the grant payment will be issued directly to the contractor by the program on behalf of the applicant, but only after all grant requirements have been satisfied (Strengthen Alabama Homes, n.d.-a, b).

5.1.4. Insurance Incentives

Homes within Alabama with a FORTIFIED designation must receive discounts on the wind portion of their homeowner's insurance premium. Act No. 2015-313, which amended Chapter 31D of the Insurance Code, expanded the eligibility for insurance premium reductions to property owners throughout Alabama who retrofit their residential or commercial properties to improve their resistance to hurricane and windstorm damage (Alabama Legislature, 2015). Previously, only property owners in coastal counties were eligible for these premium reductions. The act now

allows owners of qualifying properties in any county in the state to benefit from lower insurance premiums by strengthening their buildings against potential wind-related damage (Alabama Legislature, 2015). According to Bulletin 2016-07, policyholders who upgrade their properties to meet the IBHS standards can receive substantial discounts on their hurricane and other wind/hail insurance premiums. The specific discount percentages may vary depending on the level of IBHS certification achieved by the policyholder's property. Most insurers in Alabama offer discounts of up to 30% for homes inland and 55% for homes in coastal areas applicable to their wind insurance premium (Smart Home America, n.d.; see Table 10 below). Once mitigation work is completed for a home, SAH will ensure the homeowner is receiving the appropriate insurance discount (Strengthen Alabama Homes, n.d.-a, b). The table below highlights the three levels of protection and discounts for FORTIFIED standards.

As of January 1, 2020, insurance companies in Alabama are mandated to provide homeowners of single-family, owner-occupied residences with the option to upgrade their non-FORTIFIED homes to meet the IBHS FORTIFIED Roof™ standards for their specific geographic location (Alabama Department of Insurance, 2019b). This upgrade is offered as an endorsement to the homeowner's policy for an additional premium, which should include the cost of IBHS certification. Insurers may provide homeowners with the eligibility requirements for the FORTIFIED Roof upgrade (Alabama Department of Insurance, 2019b). The property must meet the IBHS FORTIFIED standard, as specified in Section 27-31D-2, at the time of the upgrade, which will occur when the property experiences a covered loss that requires a full roof replacement (Alabama Department of Insurance, 2019b). Partial roof replacements are not eligible for this endorsement. Insurance companies are required to offer this endorsement to all new business and at the time of the first renewal in 2020 for existing non-FORTIFIED homes, and the format of the offer can be determined by the insurer (Alabama Department of Insurance, 2019b).

Table 10: FORTIFIED Designations Wind Premium Discounts for Alabama Homes

FORTIFIED Standard	Inland	Coastal
FORTIFIED Roof	20-25%	25-35%
FORTIFIED Silver	25-30%	35-45%
FORTIFIED Gold	30% Min	45-55%

Source: Obtained from <https://www.smarthomeamerica.org/resources/alabama-fortified-insurance-discounts-sheet>

5.1.5. Other Incentives

Alabama residents who retrofit or upgrade their homes to withstand wind or flood damage may be eligible for a tax deduction (FORTIFIED, n.d. -d). Residents are able to deduct the lesser of 50% of the cost or up to \$3,000 for mitigation work (Alabama Department of Revenue, n.d.; Strengthen Alabama Homes, n.d.-a). In addition, the taxpayer must obtain a certification as required in Chapter 31D, Title 27, Code of Alabama 1975, or the Alabama Residential and Energy Codes Board (Alabama Department of Revenue, n.d.).

Another incentive for homeowners in Alabama to upgrade their roofs is that FORTIFIED homes sell for nearly 7% more than non-FORTIFIED homes (Strengthen Alabama Homes, n.d.-a). Awondo et al. investigated the effect of the FORTIFIED Home™ construction standards on home resale values in Mobile and Baldwin counties in Alabama (2016). Using a hedonic regression model and data from CoreLogic and IBHS, the study finds that switching from a conventional construction standard to a FORTIFIED designation increases the resale value of a home by 6.8% (Awondo et al., 2016). The study suggests that the cost of constructing or retrofitting a home to meet the FORTIFIED Home™ standards is often less than 7% of the home's value, which the benefit of the designation will likely outweigh the cost (Awondo et al., 2016). This finding indicates that the benefits of obtaining a FORTIFIED designation are likely to exceed the costs, even without considering additional benefits such as insurance premium discounts, potential savings on uninsured rebuilding costs, and the avoidance of temporary housing inconveniences in the event of a disaster (Awondo et al., 2016). The authors conclude that building or retrofitting houses to meet FORTIFIED standards is an economically sound investment. Such designations should be considered by appraisers and financial institutions when appraising property values for the mortgage process (Awondo et al., 2016).

5.1.6. Program Data

Limited program data is reported through the ALDOI's annual report, in which 2017-2022 is currently available. The Table 11 below highlights the number of homes that were retrofitted within the program as reported. According to the 2017 Alabama Department of Insurance Annual Report, 399 homes were retrofitted to the FORTIFIED standard during that year. The program had projected completing 450 FORTIFIED retrofits with its 2017 funding allocation (Alabama

Department of Insurance, 2017). It is worth noting that the reports from 2018-2022 do not provide a specific number of homes that were completed within the respective year, as it did in 2017, but were rather reported as the total number of homes completed since program inception (Alabama Department of Insurance, 2018, 2019a, 2020, 2021, 2022). Therefore, an approximate number was calculated for each year by subtracting the previous year's total number of completed homes within the program. In addition, the exact same key accomplishments for the SAH program in 2021 were reported within the 2022 annual report, which is likely an error within the report. Grant payments within the program amounted to about \$6,056,500 and \$15,924,965 for 2021 and 2022, respectively (Alabama Department of Insurance, 2022). Through personal correspondence with the SAH staff, approximately 6,563 homes have been retrofitted through the SAH program to the FORTIFIED standards, with the majority being the Roof (Bronze) standard.

Table 11: Number of completed FORTIFIED homes over time

	2017	2018	2019	2020	2021	2022*
Available Funding	\$4.5 mil	NA	NA	NA	\$15 mil	\$15 mil
Approximate Completed FORTIFIED Homes	399	671	629	406	923	923
Total Completed Homes Reported Since Program Inception	753	1,121	1,750	2,156	3,079	3,079

Notes: *2022's annual report contains the same number of completed homes as 2021, which is likely due to an error. Source: Alabama Department of Insurance's Annual Reports 2017-2022.

Based on the study by Awondo et al. (2023), which investigates the effect of resale value for homes with FORTIFIED designations in Baldwin County in Alabama, data provided by IBHS shows that retrofitting a home to meet the FORTIFIED Roof standard costs about \$4.74 per square. For a typical unfortified home in the study's sample, with an average home footprint size of 2,378 square feet, the total cost of retrofitting would be approximately \$11,272, which represents about 4.2% of the home's value (Awondo et al., 2023). Petrolia et al. (2023) emphasize the broader benefits of FORTIFIED designations beyond the observed price premium, such as reduced damage expenses, avoided stress and logistical challenges, and insurance discounts. Regarding the effectiveness of the IBHS FORTIFIED Home program, Petrolia et al. (2023) mention that FORTIFIED homes are less likely to suffer frequent damages compared to non-FORTIFIED homes, resulting in lower damage expenses and avoided costs associated with stress and logistical challenges following severe wind events.

5.2. Florida

5.2.1. Overview

The state of Florida has implemented several programs to mitigate the impact of hurricanes on residential properties, including the Hurricane Loss Mitigation Program (HLMP), My Safe Florida Home (MSFH) program, and the Florida PACE program.

The HLMP, established by Florida's Division of Emergency Management, is a state-funded program that aims to minimize hurricane damage through various initiatives, such as public education, hurricane research, and promoting property resiliency through retrofits (Florida Division of Emergency Management, n.d., 2023a). The program's funding is allocated to the Shelter Retrofit Program, the Mobile Home Tie-Down Program, and research conducted by Florida International University's Hurricane Research Center (Florida Division of Emergency Management, 2023a). The HLMP grants are awarded to governmental entities, nonprofit organizations, and educational institutions, based on their proposed mitigation projects' ability to reduce losses and rebuilding costs (Florida Division of Emergency Management, 2023b).

The MSFH program offers free wind mitigation inspections and grants to eligible homeowners to strengthen their homes against storms (My Safe Florida Home, 2023). The program focuses on improvements to roofs, windows, and doors, with special provisions for Low-Income homeowners (My Safe Florida Home, 2023). Homeowners can receive an inspection report that summarizes their home's current hurricane-resistant features, potential insurance discounts, and recommendations for further improvements (My Safe Florida Home, 2023). Grants are awarded on a matching basis, with the state contributing \$2 for every \$1 spent by the homeowner, up to \$10,000 (My Safe Florida Home, 2023). The MSFH program has also launched a Condominium Pilot program to support condominium associations in enhancing the resilience of their buildings (My Safe Florida Home, n.d.-a).

The Florida PACE program, administered by the Florida PACE Funding Agency, provides voluntary financing options for property owners to make hurricane-hardening and energy-efficient improvements to their homes (Florida PACE, n.d.-a). Eligible improvements include roof replacements, window and door upgrades, and other measures that increase a property's resilience

against hurricanes (Florida PACE, n.d.-b). The program offers long-term, fixed-rate financing through assessments added to property tax bills, with interest rates ranging from 6% to 12.99% and no down payments (Florida PACE, n.d.-a).

To evaluate the effectiveness of the HLMP program the Florida Division of Emergency Management submits annual reports to the state legislature detailing the activities and outcomes of the HLMP (Florida Division of Emergency Management, 2023a). These reports provide insights into the program's performance, including the number of projects funded, the total amount awarded, and the return on investment achieved through the implemented mitigation measures (Florida Division of Emergency Management, 2023a). For example, in the 2022 fiscal year, 14 projects were completed, with \$2.6 million awarded and \$2.3 million spent on public and residential properties (Florida Division of Emergency Management, 2023a). The Florida Legislature has also enacted Section 627.0629 of the Florida Statutes, which requires insurers to provide discounts, credits, or other rate differentials to consumers who implement windstorm damage mitigation techniques (F.S. 627.0629, 2023). This statute ensures that homeowners who invest in hurricane-resistant improvements can benefit from reduced insurance premiums (F.S. 627.0629, 2023).

5.2.2. Program Description

5.2.2 – a: Hurricane Loss Mitigation Program

In accordance with Florida Statute (F.S.) Subsection 215.559, the HLMP was established by Florida's Division of Emergency Management (Division) and is a state-funded mitigation program designed to minimize hurricane damage as a response to the devastating impact of Hurricane Andrew on Florida's insurance market (Florida Division of Emergency Management, n.d.). The Hurricane Catastrophe Trust Fund provides an annual budget of \$10 million to allow the program to fund activities that promote public education and public information, hurricane research activities, as well as promoting property resiliency through retrofits made to residential, commercial, and mobile home properties (Florida Division of Emergency Management, n.d., 2023a). About 65% of HLMP funding is dedicated to the Shelter Retrofit Program, Mobile Home Tie-Down Program, and Florida International University's (FIU) Hurricane Research Program (Florida Division of Emergency Management, 2023a). The remaining 35% is dedicated to the

HLMP Grant to improve community resiliency through flood and wind mitigation measures (Florida Division of Emergency Management, n.d., 2023a).

Senator Ed Hooper sponsored bill SB 578 during the 2022 General Session to extend the HLMP beyond its original sunset date of June 30, 2022, to June 30, 2032 (Florida Division of Emergency Management, 2023a). Although SB 578 was ultimately laid on the table, its companion bill, CS/CS/HB 837, successfully passed. In addition to repealing the sunset date, the bill transferred the Mobile Home Tie-Down Program from Tallahassee Community College (TCC) to Gulf Coast State College (GCSC) and expanded the Shelter Retrofit Program to include new construction (Florida Division of Emergency Management, 2023a). These changes came into effect on July 1, 2022.

Of the annual \$10 million, \$3 million is directed to the Shelter Retrofit Program which aims to construct or retrofit existing public facilities to allow them to be utilized as public shelters (Florida Division of Emergency Management, 2023a). The Division is required to prioritize the allocation of funds for projects outlined in the annual Shelter Development Report, as mandated by s. 252.385(3). Priority is given to projects located in regional planning council regions that have shelter deficits and those that optimize the utilization of state funds. \$2.8 million is allocated to the GCSC to administer the Mobile Home Tie-Down Program, which is aimed at exploring, testing, and promoting innovative techniques to improve the wind resistance of manufactured homes, ultimately reducing property damage caused by high wind events (Florida Division of Emergency Management, n.d., 2023a). The program focuses on tie-down systems designed to anchor manufactured homes securely to the ground (Florida Division of Emergency Management, n.d.). While traditional tie-down systems rely on longitudinal ground anchors and straps that are susceptible to corrosion and deterioration, the new tie-down system incorporates lateral foundation systems with longitudinal stabilizer devices or ground stabilizer plates wherever feasible (Florida Division of Emergency Management, n.d.). To ensure compliance and effectiveness, all tie-down retrofit services provided through this program must adhere to the Rules of the Department of Highway Safety and Motor Vehicles, Division of Motor Vehicles, Chapter 15C-1, General (Florida Division of Emergency Management, n.d.).

FIU is allocated \$700,000 to administer funds and dedicated them to hurricane research and outreach conducted by the International Hurricane Research Center (IHRC), which is a multi-

disciplinary education and research organization that focuses on reducing loss of life and damage caused by hurricanes through effective mitigation strategies (Florida Division of Emergency Management, n.d., 2023a). IHRC conducts basic and applied research, which such studies includes storm hazard and vulnerability mapping, household mitigation and evacuation, economic loss modeling, and long-term community recovery (Florida Division of Emergency Management, n.d.).

The remaining \$3.5 million is allocated towards the HLMP Grant in order to fund various organizations, including governmental entities, and non-profit organizations (Florida Division of Emergency Management, n.d., 2023a). The primary objective of this funding is to enhance the resilience of residential, community, and government structures within their respective communities (Florida Division of Emergency Management, n.d., 2023a). Such funded activities can include inspections, retrofitting existing structures, and constructing or modifying buildings specifically designed to improve the overall resilience of the structure to withstand flooding and hurricane-force winds (Florida Division of Emergency Management, n.d.).

5.2.2 – b: My Safe Florida Home

The MSFH program, introduced during the 2022 legislative session and administered by the Department of Financial Services (DFS), aims to support eligible homeowners by providing free wind mitigation home inspections and offering wind mitigation grants to strengthen their homes against storms (My Safe Florida Home, n.d.-b). Homeowners who participate in the program may be able to reduce their insurance premiums by obtaining a wind mitigation inspection, particularly if they have not previously submitted a form to their insurance company. The inspection evaluates the presence of various wind-damage mitigation features, including roofing materials, roof shape, storm shutters, and attachments such as hurricane clips for walls and roofs (My Safe Florida Home, n.d.-b). Moreover, homeowners who have completed a wind mitigation inspection may be eligible to apply for grant funds that match their personal expenditures. The state will contribute \$2 for every \$1 spent by homeowners, up to a maximum of \$10,000, to assist them in covering the costs of recommended improvements (My Safe Florida Home, n.d.-b).

The MSFH program focuses on two primary areas for wind mitigation improvements: roofs and structures, and openings (My Safe Florida Home, n.d.-b). In the roofs and structures category, the program aims to enhance the strength of roof deck attachments, reinforce roof-to-wall connections, and install secondary water barriers for the roof. It is important to note that while

townhouses are now eligible for opening protections such as door and window upgrades, they are not eligible for roof repairs under this program (My Safe Florida Home, n.d.-b). The openings category includes upgrades to exterior doors, garage doors, and windows (My Safe Florida Home, n.d.-b).

As part of the My Safe Florida Home Program, the Florida State Legislature has designated \$25 million to offer homeowners a comprehensive Home Hurricane Inspection at no cost and without any obligation (My Safe Florida Home, 2023). See eligibility requirements below for homeowners who are eligible for a free inspection. Homeowners are able to initiate the application process by visiting MySafeFLHome.com and following the Application Portal. Upon approval of the inspection application, the program notifies the homeowner via email (or an alternative method if necessary) and provides the name and contact information of the assigned inspector (My Safe Florida Home, 2023). The inspector contacts the homeowner within one week to schedule the free inspection, which typically takes one hour to perform. Within two weeks of the inspection date, the homeowner receives an email notification that their report is ready for download through the Applicant Portal (My Safe Florida Home, 2023).

The initial inspection report provides the homeowner with a summary of the current hurricane-resistant features of the home and recommendations for improvements to mitigate wind damage (My Safe Florida Home, 2023). For townhouses, the only upgrade recommendation available is opening protection (My Safe Florida Home, 2023). The report also includes potential insurance discounts available from the initial inspection and after recommended mitigation improvements have been made, as well as a range of cost estimates for the recommended mitigation improvements (My Safe Florida Home, 2023). The purpose of the MSFH home inspection report is to identify specific actions homeowners can take to strengthen their homes against hurricane winds and serve as a resource to guide them in making their homes as hurricane-resistant as possible (My Safe Florida Home, 2023).

If the homeowner believes they meet the eligibility requirements (see below), they may apply for the grant component of the MSFH program in the Applicant Portal (My Safe Florida Home, 2023). Per section 215.5586(2)(b), F.S., the MSFH program grants are awarded on a matching basis, with the homeowner contributing \$1 for every \$2 provided by the state, up to a maximum state contribution of \$10,000 towards the total cost of the mitigation project (My Safe Florida

Home, 2023). In essence, the homeowner is responsible for funding 1/3 of the project cost, while the state reimburses the remaining 2/3, not exceeding \$10,000 (My Safe Florida Home, 2023). Grants are only disbursed after the mitigation work has been completed by an approved Program Contractor, the work has been re-inspected by the Program, and the homeowner has made full payment for the work (My Safe Florida Home, n.d.-b, 2023). Low-Income (LI) homeowners, as defined under section 420.0004 (11), who meet all other grant application requirements are eligible for a grant of \$10,000 without the obligation to provide a matching amount (My Safe Florida Home, 2023). It is important to note that not all applicants who have received an inspection through the MSFH program will be eligible for a grant. Furthermore, grants for townhouses, as defined in section 481.203, F.S., may only be used for opening protection when recommended by a hurricane mitigation inspection (My Safe Florida Home, 2023).

The MSFH program limits grant reimbursement to the specific improvements recommended in the homeowner's inspection report (My Safe Florida Home, 2023). Any additional or alternative improvements not included in the report will not be eligible for funding under this program (My Safe Florida Home, 2023). There are a total of 5 authorized improvements covered by the program which are listed and described below.

- **Improvement 1:** Strengthening Roof Deck Attachment. This improvement involves adding additional or longer nails to better secure plywood sheets to roof trusses, reducing the risk of the plywood being blown off during a hurricane (My Safe Florida Home, 2023.).
- **Improvement 2:** Reinforcing Roof-to-Wall Connections. Metal tie-down clips are installed to attach roof rafters to walls, minimizing the possibility of roof uplift during a hurricane (My Safe Florida Home, 2023).
- **Improvement 3:** Creating a Secondary Water Barrier. A Secondary Water-Resistant Barrier (SWR) is added to prevent water intrusion. MSFH funds, up to \$10,000, may be used to replace the roof if the final product includes the SWR (My Safe Florida Home, 2023). There are three methods to install an SWR: (1) using full-coverage self-adhered underlayment directly on the roof deck material during reroofing; (2) applying seam tape on all joints and seams of the roof decking material during reroofing, along with a nailed down underlayment; or (3) installing foam adhesive on all seams and joints from the attic side if not replacing the roof (My Safe Florida Home, 2023). The grant covers costs related

to re-covering the roof after adding the SWR. Additionally, improving the roof covering's survivability by upgrading to stronger hurricane-resistant shingles, attached with properly sized and applied nails, is recommended (My Safe Florida Home, 2023). The roof covering can be replaced with tile, metal, or shingle, but upgrading the roof covering without adding SWR is not allowed (My Safe Florida Home, 2023). All portions of a contiguous roof must be replaced with SWR, and MSFH funds shall not be used for partial repairs or patching (My Safe Florida Home, 2023).

- **Improvement 4: Opening Protection (Windows).** This improvement involves installing impact windows or hurricane shutters. For townhouses, grants may only be used for opening protection when recommended by a hurricane mitigation inspection. If a homeowner already has compliant hurricane shutters, requests for impact windows will be denied (My Safe Florida Home, 2023).
- **Improvement 5: Opening Protection Exterior Doors (Including Garage Doors).** Hurricane-rated doors or garage doors are installed to protect against wind damage. Grants may be approved to replace unprotected doors that include glass with impact doors or shutters (My Safe Florida Home, 2023). However, requests to replace solid doors will be denied unless specifically recommended in the inspection report or if the homeowner provides documentation from their insurance agent stating that replacing solid doors with impact-tested products will result in a premium discount (My Safe Florida Home, 2023). Improvements 4 and 5, which focus on opening protection for windows and exterior doors, are often combined as it is recommended to undertake them together. From July 1, 2022, to June 30, 2024, retail purchases of impact-resistant doors, garage doors, and windows were exempt from the 6% state sales tax in Florida (My Safe Florida Home, 2023). Under Improvement 5, there are three levels of opening protection:
 - **Improvement Standard:** The most affordable option, which involves using temporary structural panels for windows that need to be installed when a serious storm threatens. For one-story homes, this includes panels for each window, while two-story homes would have a combination of standard shutters on the first floor and permanently attached shutters on the second floor.
 - **Improvement Permanently Attached:** This level includes protective devices that are permanently attached to the house and deployed when a hurricane approaches.

- Improvement Permanently Deployed: The highest level of protection, which includes impact-rated glass windows, doors, or hurricane screens that do not require any installation when a hurricane is approaching (My Safe Florida Home, 2023).

After receiving a grant approval email for a matching or Low-Income grant from the MSFH program, homeowners can request quotes from up to three approved contractors, whose list will be provided in the approval email (My Safe Florida Home, 2023). Upon grant approval, the funds are reserved for the homeowner. However, it is essential to note that the final inspection, which initiates the reimbursement process, must be completed within one year of the approval date or before July 1, 2024, whichever comes first (My Safe Florida Home, 2023). After one year, homeowners may apply for an extension, but funding is limited, and the MSFH program cannot guarantee future approvals (My Safe Florida Home, 2023). Each homeowner is eligible to receive only one grant (My Safe Florida Home, 2023). As previously stated, disbursement of funds will only be granted after the final inspection has been completed and all improvements were verified. The homeowner must have contributed funds up to 1/3 of the cost of the project to be reimbursed for the remaining amount up to a maximum of \$10,000 (My Safe Florida Home, 2023).

The Florida Legislature has allocated \$30 million to the Department of Financial Services to establish the My Safe Florida Condominium Pilot program (My Safe Florida Home, n.d.-a). As the program is being developed, updates will be provided throughout the various stages through the MSFH website (My Safe Florida Home, n.d.-a). Initially, the Department staff will conduct bids and award contracts to entities responsible for running the program's day-to-day operations (My Safe Florida Home, n.d.-a). Following this, inspection and grant application forms and procedures will be developed before the program's launch (My Safe Florida Home, n.d.-a). Funding included in the budget is not effective until July 1, 2024, and it is expected that program applications will not be available for public use until Fall 2024 (My Safe Florida Home, n.d.-a). It is important to note that this program is exclusively for condominium associations and not individual condo unit owners. Only associations that complete the program's application and approval process prior to starting construction will be eligible for grant funding.

5.2.3. Eligibility Requirements

5.2.3 – a: Hurricane Loss Mitigation Program

The Division receives funding for the HLMP through two primary sources: section 215.555(7)(c), Florida Statutes, and the grants and aid appropriation category, as allocated by the Legislature (Florida Division of Emergency Management, 2023b). Governmental entities, nonprofit organizations, and public and private educational institutions are eligible to receive the HLMP grant (Florida Division of Emergency Management, 2023b). Individual homeowners and for-profit organizations that do not qualify as private educational institutions are ineligible (Florida Division of Emergency Management, 2023b).

To be eligible for a grant under the HLMP, the proposed mitigation retrofit improvements must demonstrate their ability to reduce losses or minimize rebuilding costs following a disaster (Florida Division of Emergency Management, 2023b). Proposers are required to identify structures that do not comply with the current edition of the Florida Building Code (FBC). When assessing the effectiveness of a specific retrofit improvement, the Division prioritizes the reduction in risk exposure associated with the mitigation of a structure rather than the age of the structure itself. However, the Division encourages proposers to focus on structures that do not comply with the 2002 edition of the FBC or later, as retrofitting these properties may result in the most significant savings for the Hurricane Catastrophe Fund (Florida Division of Emergency Management, 2023b).

An Evaluation Committee assesses and evaluates each proposal submitted. Committee members independently evaluate the proposals based on established evaluation categories to ensure uniform rating (Florida Division of Emergency Management, 2023b). The review of these categories will demonstrate the proposer's understanding of the project and highlight their qualifications, approach, and capabilities to ensure a quality product (Florida Division of Emergency Management, 2023b). The scores assigned by each Evaluation Committee member for each proposal are totaled and divided by the number of team members to calculate an average total score for each proposal (Florida Division of Emergency Management, 2023b). To be considered for an award, proposers must achieve an average score of 95 points or higher on the Technical Proposal. If a proposer receives a Technical Proposal score below 95 points, their proposal will not be considered further (Florida Division of Emergency Management, 2023b). The following points for each category is as follows: transmittal letter, table of contents, executive summary, project team, work plan, need/justification/vulnerability, and Attachment B Acknowledgement Form (Florida Division of Emergency Management, 2023b). The point distribution for each

category is as follows: transmittal letter (2 points), executive summary (8 points), project team (10 points), work plan (35 points), need/justification/vulnerability (70 points; Florida Division of Emergency Management, 2023b).

The Division awards State-Funded Grant Agreements to the most responsive and responsible proposers whose proposals are deemed to be the most advantageous to the Division (Florida Division of Emergency Management, 2023b). Awards are offered based on the overall average scores, starting with the proposer with the highest average score and proceeding to the next highest, until all funds have been allocated or all eligible proposals have been funded (Florida Division of Emergency Management, 2023b). In order to utilize all available funds, the Division may offer partial funding to Proposers (Florida Division of Emergency Management, 2023b). A Notice of Intent to Award is announced and posted on the MyFloridaMarketPlace (MFMP) Vendor Information Portal following the final evaluation and totaling of scores at a Selection Committee meeting (Florida Division of Emergency Management, 2023b).

5.2.3 – b: My Safe Florida Home

MSFH program offers free home inspections to any Floridian who has a homestead exemption on their primary residence. The primary residence must be either a site-built, single-family home (constructed at its permanent location) or a townhouse, which is defined as a single-family unit constructed in a series or group of attached units separated by property lines, with each townhouse considered a separate building not exceeding three stories in height, per section 481.203 (F.S.; My Safe Florida Home, 2023). However, certain types of properties are not eligible for free home inspections, including mobile homes or manufactured homes, condominiums or apartments, cooperative residences, multi-family dwellings (duplex/triplex/quadplex), second/vacation homes, rental properties, uninsured properties, businesses, and villas (My Safe Florida Home, 2023.).

To be eligible for the MSFH program grant, applicants must meet several criteria. First, they must have applied for, been approved for, and received a free home hurricane inspection through the program (My Safe Florida Home, 2023). Second, applicants must provide proof of homestead exemption, which can be obtained from their local Property Appraiser or Tax Collector's Office (My Safe Florida Home, 2023). Third, applicants must provide insurance documentation showing that their home has an insured value of \$700,000 or less, along with a copy of their current property insurance declarations page, which can be obtained from their home insurance company (My Safe

Florida Home, 2023). Applicants participating in the Low-Income grant are exempt from providing proof of the home's insured value (My Safe Florida Home, 2023). Fourth, the initial building construction permit for the home must have been issued prior to January 1, 2008, and this information can be obtained from the local Property Appraiser's website or office (My Safe Florida Home, 2023). Finally, homeowners must make their home available for a final inspection, which is provided at no cost to the homeowner, after construction is completed to ensure that the improvements meet the program's requirements (My Safe Florida Home, 2023).

5.2.4. Insurance Incentives

Section 627.0629 of the Florida Statutes outlines the legislative intent and requirements for insurers to provide savings to consumers who install or implement windstorm damage mitigation techniques, alterations, or solutions to their properties to prevent windstorm losses (F.S. 627.0629, 2023). The statute mandates that rate filings for residential property insurance include actuarially reasonable discounts, credits, or other rate differentials, as well as appropriate reductions in deductibles, for properties with fixtures or construction techniques that have been demonstrated to reduce windstorm loss (F.S. 627.0629, 2023). These fixtures or construction techniques encompass, but are not limited to, those that enhance wind uplift prevention, roof strength, roof covering performance, roof-to-wall strength, wall-to-floor-to-foundation strength, opening protection, and window, door, and skylight strength (F.S. 627.0629, 2023).

The Office of Insurance Regulation (OIR) is tasked with determining the discounts, credits, and other rate differentials that reflect the full actuarial value of such revaluation. Effective October 1, 2023, insurers are required to provide information on their websites about available hurricane mitigation discounts, accessible from the home page or the primary page for property insurance policyholders or applicants. The OIR must reevaluate and update the qualifying fixtures or construction techniques and corresponding discounts every five years, starting from January 1, 2025 (F.S. 627.0629, 2023).

The statute allows rate filings to include factors that reflect how building code enforcement in a particular jurisdiction addresses wind damage risk. Rate filings must also provide variations from rate factors based on individual property inspections by a licensed home inspector, which may be at the cost of the insured (F.S. 627.0629, 2023). Mobile home insurance rate filings must include

appropriate discounts or rate differentials for homes constructed to comply with specific standards (i.e., American Society of Civil Engineers Standard ANSI/ASCE 7-88) and tie-down requirements provided by state law. The Florida Legislature believes that separating hurricane insurance premiums from other coverages in rate filings and premium notices will benefit consumers (F.S. 627.0629, 2023). By requiring residential property insurance rate filings to be divided into hurricane coverage rates and rates for all other coverages, and by ensuring that premium notices clearly indicate the separate costs for hurricane coverage and all other coverages, consumers will have greater confidence that their hurricane premiums are lawful (F.S. 627.0629, 2023). Additionally, this separation will provide consumers with more detailed information about the various components that make up their property insurance premiums.

To ensure a smooth transition, insurers are permitted to implement an approved residential property insurance rate filing gradually over a period of several years (F.S. 627.0629, 2023). However, insurers choosing to phase in their approved rates must provide an informational notice to the OIR outlining their planned schedule for implementing the rate changes (F.S. 627.0629, 2023). Furthermore, insurers may offer appropriate discounts of up to 10% of the annual premium to mobile home owners who provide evidence of current tie-down inspections (F.S. 627.0629, 2023). Rate filings that include adjustments related to Florida Hurricane Catastrophe Fund premiums must include a complete calculation of the insurer's catastrophe load (F.S. 627.0629, 2023). Lastly, insurers may file rating plans with justified premium discounts based on windstorm mitigation construction standards developed by independent, nonprofit scientific research organizations (F.S. 627.0629, 2023).

As discussed within the MSFH program, the inclusion of wind damage coverage can significantly increase the overall cost of a homeowner's insurance policy, with premiums potentially rising by 30% to 50% (My Safe Florida Home, n.d.-b) Homeowners can potentially lower their home insurance premiums by making wind mitigation upgrades to their home (My Safe Florida Home, 2023). As discussed above, the initial MSFH inspection will provide an inspection report which will provide a summary of inspection pages. This summary will include an assessment of the current hurricane-resistant features that enhance the home's resilience against hurricane damage. (My Safe Florida Home, 2023). An estimate of the potential savings on the homeowner's wind insurance premium based on their home's existing hurricane-resistant features

will also be provided (My Safe Florida Home, 2023). In addition, recommendations for additional wind mitigation features could be implemented to further fortify the home against hurricanes (My Safe Florida Home, 2023). Implementing these improvements may result in wind insurance premium discounts from the homeowner's insurer. The images shown (Figure 10) below are samples of what the summary of the inspection may potentially look like within the report.

Figure 10: Screenshots of Summary of Inspection & Home Hardening Upgrades

Current Hurricane Resistant Features of Your Home

These are the current features of your home that make your home more resistant to hurricane damage:

② Roof Covering	✓	③ Roof Deck Attachment	✓	④ Roof to Wall Attachment	✓
⑤ Roof Geometry		⑥ Secondary Water Resistance (SWR)	✓	⑦ Opening Protection	

Current Potential Savings to Your Wind Insurance Premium

Below is your current estimated wind insurance premium savings based on the current condition of your home. These values are estimated using OIR Form 1699 of Florida rates. For a more accurate estimate of potential premium savings, contact your insurance provider or agent.

Your current estimated wind insurance premium discount based on Form OIR-B1-1699 is:

76%

Missing Hurricane Resistant Features from Your Home

These are some hurricane resistant features that your home doesn't currently have, or improvements that you can make to your home:

② Roof Covering		③ Roof Deck Attachment		④ Roof to Wall Attachment	
⑤ Roof Geometry	✗	⑥ Secondary Water Resistance (SWR)		⑦ Opening Protection	✗

PLEASE NOTE: Although 'Roof Geometry' is considered a hurricane resistant feature for Florida homes and specific shapes can provide savings for wind insurance premiums, making any improvements to the geometry of your roof are NOT covered through the My Safe Florida Home Grant Program.

Notes: Screenshots were taken from the My Safe Florida Home Homeowners' Guide; the left figure corresponds to the summary of inspection and the right figure corresponds to the home hardening upgrade reports, respectively.

Home Hardening Upgrades

As a result of this inspection, we have identified the following home hardening upgrade for your home. This upgrade may result in a potential premium discount.

Home Upgrade	Potential Discount
<div> Add opening protection (eg. hurricane shutters) </div>	<div> + 5% (see note) </div>

Note: The potential discount increase is not done in the aggregate
 If you elect to perform two or more upgrades pursuant to this report, you will not receive an aggregate (combined) total premium discount based on the numbers displayed above.
 In other words, if recommendation A provides an estimated 19% discount and recommendation B provides an estimated 15% discount, you would not be eligible for a total 34% discount.
 To get the final premium discount amount, please contact your Florida-licensed insurance agent.

Add Opening Protection

One area of focus is the opening protection for windows, skylights, (glazed openings) doors, and garage doors. Protecting your home's openings with impact-rated shutters or installing impact-rated doors and windows can help prevent debris from breaking through and creating pressure inside the home. This pressure may cause the roof structure to fail. This part of the inspection can be very confusing to the average homeowner. There are generally three levels of possible credit for this segment of the inspection.

- The highest level of credit is when **ALL** of your openings are Large Missile Impact Rated (Level A.1). This means your doors, windows, garage doors, skylights, glass block, etc. are all protected by, or are rated at, the highest level.
- Because this is not required by code in all jurisdictions, your home may qualify for the second level (Level A.2) which is where **all** of your glazed openings are Large Missile Impact Rated (or protected by products that qualify as such) but your solid entry doors and garage door are verified to be wind and pressure rated. This may be likely if your home was built after 2002 and in an area that does not require impact doors.
- The third option is when your glazed openings (**all** the openings on your home that contain glass) are Large Missile Impact Rated (or protected by products that qualify as such) and your solid doors and garage door cannot be identified to be wind and pressure rated (Level A.3).

If you are not currently receiving an Opening Protection discount on your policy, contact your Florida-licensed insurance agent to confirm which level you will need to achieve in order to obtain the discount.

5.2.5. Other Incentives

5.2.5 - a: Florida PACE

The Florida PACE Funding Agency (FPFA), established under the authority of the Florida Legislature, is an independent special purpose local government tasked with providing voluntary financing options to Florida property owners for hurricane-hardening and energy-efficient home improvements (Florida PACE, n.d.-a). Florida PACE, a public entity, oversees program administrators who work with homeowners to finance their projects through long-term, fixed-rate assessments added to their property tax bills. This financing is available in all counties across the state of Florida (Florida PACE, n.d.-a).

Florida Statute 163.08 lists numerous qualifying improvements, with the majority of Florida property owners using the financing for roofs, windows/doors, air conditioners, generators, and more (Florida PACE, n.d.-a). To secure voluntary financing, applicants must meet certain eligibility requirements, including having no delinquent property taxes for three years, being current on all mortgage debt, having no notices of default in the preceding three years, and no involuntary liens (Florida PACE, n.d.-a). Notably, no money down or credit checks are required (Florida PACE, n.d.-a). Florida PACE provides funding for a variety of roofing projects aimed at improving home safety, efficiency, and value (Florida PACE, n.d.-b). These projects include roof replacement, repair, insulation, cool roof installation, skylight installation, gutter and drainage system upgrades, roof coating, attic ventilation, energy-efficient roofing, and emergency roofing services. By supporting these projects, the program helps homeowners enhance their property's resilience and sustainability (Florida PACE, n.d.-b).

Interest rates for PACE financing range from approximately 6% to 12.99%, which is significantly lower than credit card interest rates, a common method for financing home upgrades. Homeowners are not required to make any down payments, and all closing fees, which are approximately 6.99% of the loan amount, are included in the financing total. The lower interest rates compared to unsecured debt, such as credit cards, are attributed to the predictability of the annual payment, which is included in the property tax bill (Florida PACE, n.d.-a). PACE offers financing options for homeowners with low credit scores to improve their homes' hurricane-hardening and energy-efficiency features at reasonable interest rates (Florida PACE, n.d.-a). This program is accessible to all Floridians, including those with impaired credit, giving them the opportunity to live in safe and efficient homes (Florida PACE, n.d.-a).

A property owner can lose their home due to a PACE assessment, as it is a lien on the property. If a homeowner fails to pay their tax/assessment bill each year, the government has a formal process of placing a tax lien on the property, and the homeowner has an extended period to pay the bill before any tax deed proceedings begin. As an additional protective measure, Florida state statute prohibits a PACE assessment on a property unless it has sufficient equity (Florida PACE, n.d.-a). The amount financed cannot exceed 20% of the property's just value (assessed value) without a mortgage lender's approval (Florida PACE, n.d.-a).

5.2.5 – b: Mobile Home Tie-Down (HLMP)

As part of the HLMP, the Mobile Home Tie-Down Program, previously administered by TCC and overseen by GCSC, received about \$2.8 million in funding (Florida Division of Emergency Management, 2023a). The program aims to enhance the wind resistance of mobile homes and manufactured homes installed in 1999 or earlier by contracting licensed mobile home installers to retrofit additional tie-downs (Gulf Coast State College, n.d.). While the program does not aim to bring these homes up to current building codes, it strives to maximize wind resistance within the constraints of available funding, physical characteristics, and the condition of the premises (Gulf Coast State College, n.d.). The added tie-down and anchoring systems have the potential to reduce damage to mobile homes caused by windstorms, tornadoes, or hurricanes (Gulf Coast State College, n.d.).

The program covers all costs, including skirting removal and re-installation services, and all contractor fees are paid by GCSC (Gulf Coast State College, n.d.). Individual applications are for stand-alone, individually-owned homes that are not within a manufactured home community that has a park manager and/or HOA (Gulf Coast State College, n.d.). Park applications are for mobile home and manufactured home parks and communities that do have a park manager and/or HOA, in which the HOA president or park manager that represents the entire community is the preferred contact (Gulf Coast State College, n.d.).

After receiving an application, GCSC sends a vendor to conduct a site visit to evaluate program eligibility for parks (Gulf Coast State College, n.d.). Parks and individuals are then assigned to a vendor, and an approval letter identifying the assigned vendor is sent to the park representative or individual homeowner, along with required authorization forms (Gulf Coast State College, n.d.). When possible, a program presentation and Q&A session is scheduled with the park during

community HOA meetings (Gulf Coast State College, n.d.). The vendor collects authorization forms, and the park or individual homeowner is scheduled for a home pre-inspection, skirting removal, and tie-down installation (Gulf Coast State College, n.d.). Post-inspections are completed as required, and homeowners receive a Certificate of Completion (Gulf Coast State College, n.d.). Due to the current waiting list, it may take several months or years before a home is serviced. To ensure every interested home is reached, the program is not currently revisiting previously served parks (Gulf Coast State College, n.d.). However, a database of those requesting a return visit is maintained, and they will be contacted once this service resumes (Gulf Coast State College, n.d.).

5.2.6. Hurricane Loss Mitigation Program

The Florida Division of Emergency Management is required to submit a comprehensive report and evaluation of its activities under Section 215.559 (F.S.) to the Speaker of the House of Representatives, the President of the Senate, and the Majority and Minority Leaders of both chambers on January 1st of each year (Florida Division of Emergency Management, 2023b). Upon completion, the report is delivered to the Office of Insurance Regulation (OIR), which reviews the report and provides recommendations to the insurance industry as deemed appropriate, which recommendations may be utilized by insurers for potential discounts or rebates in accordance with Section 627.0629. The Office of Insurance Regulation must issue these recommendations within one year of receiving the report from the division (Florida Division of Emergency Management, 2023b). Currently, HLMP annual reports are available for 2017 – 2022. The reports cover the State Fiscal Year (FY), which is from July 1 through June 30 (Florida Division of Emergency Management, 2023b). The reports include evaluations for the HLMP Grant, Shelter Retrofit Program, and Mobile Home Tie-Down Program, as well as research performed by FIU.

Based on the latest annual report that is available (i.e., 2022), 26 projects were eligible for funding for FY 2021, however, only 14 were awarded due to limitations of funds (Florida Division of Emergency Management, 2023b). HLMP leadership decided to fund the remaining eligible 12 applicants from FY 2021 for FY 2022, which 11 applicants had accepted (Florida Division of Emergency Management, 2023b). Project agreements had a performance closeout date of June 30, 2022; however, extensions were granted for December 31, 2022, due to the COVID-19 pandemic, supply chain issues, and halting of projects (Florida Division of Emergency Management, 2023b). A benefit-cost analysis was performed for the FY 2022 recipients, which totaled around \$2.1

million with about 64.24% return on investment. About 14 projects (including from previous years) were completed during FY 2022, of which about \$2.6 million was awarded for the projects, and just over \$2.3 million was actually spent on public and residential properties (Florida Division of Emergency Management, 2023b). For FY 2023, 15 projects were approved for the HLMP grant, which there is a balanced set of non-residential and residential wind mitigation projects totaling around \$2.8 million.

5.3. Georgia

5.3.1. Overview

While there is no state program in Georgia, the Georgia Underwriting Association (GUA), which is referred to as the FAIR plan, provides insurance coverage for building and personal property against the loss of windstorm, hail, fire and other perils. The GUA aims to promote the enhancement, protection, and preservation of real estate in Georgia while supporting organized community growth (Georgia Underwriting Association, n.d.). To further this goal, the GUA's Board of Directors has adopted the FORTIFIED Home program, which is administered by the IBHS (Georgia Underwriting Association, n.d.). The FORTIFIED Home program offers credits for wind peril under homeowners and dwelling policies, with three levels of designation: Roof (Bronze) (5% credit), Silver (7.5% credit), and Gold (10% credit; Georgia Underwriting Association, n.d.). To receive these credits, homeowners must provide certification from IBHS confirming their home meets the FORTIFIED for Safer Living standards (Georgia Underwriting Association, n.d.).

The process of obtaining a FORTIFIED Home designation involves six steps. First, homeowners complete a free online application (Georgia Underwriting Association, n.d.). Second, they schedule an evaluation with an IBHS Certified FORTIFIED Evaluator (Georgia Underwriting Association, n.d.). Third, the chosen evaluator performs an on-site assessment of the home (Georgia Underwriting Association, n.d.). Fourth, the homeowner receives a customized Current Condition Report detailing the home's status and any necessary improvements (Georgia Underwriting Association, n.d.). Fifth, if retrofits are required, the homeowner implements the suggested upgrades and has them verified by a certified evaluator (Georgia Underwriting

Association, n.d.). Finally, once all improvements are verified, the homeowner receives a FORTIFIED Designation Certificate, which can be submitted to the GUA for applicable discounts (Georgia Underwriting Association, n.d.). The FORTIFIED Home Designation is valid for five years, and after this period, a re-designation audit is necessary, focusing primarily on the condition of the roof covering (Georgia Underwriting Association, n.d.). If significant structural changes have occurred or if systems covered by FORTIFIED requirements have been damaged or upgraded since the original designation, a more comprehensive audit may be required (Georgia Underwriting Association, n.d.).

5.4. Louisiana

5.4.1. Overview

Louisiana has implemented several programs. Most notably, the Louisiana Fortify Homes Program (LFHP) offers grants of up to \$10,000 to homeowners who want to improve their roofs to comply with the FORTIFIED™ Roof standard set by IBHS (Louisiana Department of Insurance, n.d.-b). The state also passed the Louisiana State Uniform Construction Code in 2005 and introduced incentives to encourage homeowners to adopt the code and fortify their homes (Louisiana Department of Insurance, n.d.-c). Insurance companies are required to offer discounts to property owners who build or retrofit structures to comply with the code or install damage mitigation improvements (Louisiana Department of Insurance, n.d.-c).

Louisiana also offers tax incentives to promote resilient construction and retrofitting. Act 462 of the 2007 Regular Session excludes local sales and use taxes when purchasing storm shutter devices to protect windows from damage during hurricanes or storms (Louisiana Department of Insurance, n.d.-c). Act 467 of the 2007 Regular Session introduced tax deductions for homeowners who voluntarily retrofit their existing residential structures to comply with the State Uniform Construction Code (Louisiana Department of Insurance, n.d.-c; Louisiana Department of Revenue, 2009).

5.4.2. Program Description

Modeled after the Strengthen Alabama Homes program, Louisiana lawmakers appropriated \$30 million to the LFHP in June 2023 within a budget bill that was approved after establishing the program in 2022 absent funding (Porter et al., 2023). LFHP, established as a special fund in the state treasury to provide grants for the program, offers a maximum of \$10,000 to homeowners who want to improve their roofs to comply with the FORTIFIED™ Roof standard set by IBHS (Louisiana Department of Insurance, n.d.-b; Louisiana H.B. No. 612, 2022). This initiative is designed to assist Louisiana homeowners in making their roofs more resilient to severe weather conditions and strong winds caused by hurricanes (Louisiana Department of Insurance, n.d.-b). Homeowners must select an approved FORTIFIED™ Contractor to perform the work, and grant funds are paid directly to the contractors (Louisiana Department of Insurance, n.d.-b). Any costs exceeding the full grant amount are the responsibility of the homeowner, and grant funding is limited to construction costs (Louisiana Department of Insurance, n.d.-b).

In the wake of hurricanes Katrina and Rita, the Louisiana Legislature passed the state's first mandatory statewide building code, known as the Louisiana State Uniform Construction Code, during the 2005 First Extraordinary Legislative Session (Louisiana Department of Insurance, n.d.-c). The code's implementation was further supported by Act 335 of the 2007 Regular Session, which provided resources for training and enforcement. To encourage homeowners to adopt the new building code and fortify their homes against storms and hurricanes, the Legislature introduced incentives that remain in effect. These incentives aim to motivate homeowners to strengthen their homes by adhering to the construction standards outlined in the Louisiana State Uniform Construction Code (Louisiana Department of Insurance, n.d.-c). See further below for a discussion of incentives.

5.4.3. Eligibility Requirements

To be eligible for the LFHP grant, homeowners must provide proof of a homestead exemption and an active residential insurance policy with wind coverage (Louisiana Department of Insurance, n.d.). If the property is located in a Special Flood Hazard Area, proof of a flood insurance policy is also required (Louisiana Department of Insurance, n.d.). Certain types of homes, such as new construction, condominiums, mobile homes, and those on a foundation with unrestrained stacked

masonry or stone (dry-stack foundation), are not eligible for the program (Louisiana Department of Insurance, n.d.). However, duplexes and similar structures may qualify if they serve as the homeowner's primary residence and have a verifiable homestead exemption (Louisiana Department of Insurance, n.d.).

Homes must be in good repair, as determined by a FORTIFIED™ Evaluator, which the homeowner is responsible for paying evaluation fees throughout the entire evaluation process, with prices set by the Evaluator (Louisiana Department of Insurance, n.d.). It is recommended that homeowners confirm the availability of a FORTIFIED™ Contractor to perform the work before paying for an evaluation (Louisiana Department of Insurance, n.d.). To maintain eligibility, homeowners must not begin work on the project before receiving approval from the program (Louisiana Department of Insurance, n.d.). The completed project must meet the FORTIFIED™ Roof standard to receive grant funding, which is paid directly to contractors (Louisiana Department of Insurance, n.d.).

5.4.4. Insurance Incentives

Louisiana legislation, particularly Act 323 of the 2007 Regular, requires insurance companies to offer discounts to property owners who build or retrofit structures to comply with the Louisiana State Uniform Construction Code and/or install damage mitigation improvements or use construction techniques that reduce the risk of loss from windstorms or hurricanes (Louisiana Department of Insurance, n.d.-c). The premium discounts apply to one- or two-family owner-occupied homes and modular homes, but not to commercial or commercial residential properties with three or more units, manufactured homes, or mobile homes (Louisiana Department of Insurance, n.d.-c). Discounts are granted based on the damage mitigation improvements and construction techniques listed on the Louisiana Hurricane Loss Mitigation Form, which include factors such as, but not limited to: building design, roof bracing, secondary water barriers, opening protection, roof-to-wall strength, roof deck attachment, roof covering performance, wall-to-floor-to-foundation strength, window, door, and skylight strength, and other mitigation improvements or construction techniques determined by the insurer to reduce the risk of loss due to wind (Louisiana Department of Insurance, n.d.-c).

To be eligible for the discounts, the property must be inspected and certified by a building code enforcement officer, registered architect or engineer, or a registered third-party provider authorized by the Louisiana State Uniform Construction Code Council (Louisiana Department of Insurance, n.d.-c). For premium discounts, proof of eligibility must be provided by the insured, which may include the Louisiana Hurricane Loss Mitigation Form or other documentation demonstrating compliance with the State Uniform Construction Code, such as permits, certificates of occupancy, inspection reports, or receipts (Louisiana Department of Insurance, n.d.-c). Insurers may also conduct their own independent inspections if deemed necessary (Louisiana Department of Insurance, n.d.-c). The Louisiana Hurricane Loss Mitigation Form must be submitted to insurance companies to verify completed mitigation measures. Section 1 of the form must be completed by the homeowner, and the remaining sections must be completed and endorsed by a qualified wind mitigation surveyor (Louisiana Department of Insurance, n.d.-d). Homeowners are able to compare how a fully mitigated home can reduce insurance rates by visiting Louisiana’s homeowners rate comparison guide (Louisiana Department of Insurance, n.d.-d.).

Additionally, Act 30 of the 2021 Regular Session provides discounts and insurance rate reductions to residential and commercial buildings built or retrofitted to IBHS standards, which are designed to reduce the threat of loss due to windstorm events (Louisiana Department of Insurance, n.d.-c). Based on an IBHS FORTIFIED discount sheet, Table 12 below shows a representative sample of discounts, but it does not include all FORTIFIED discounts filed with the Louisiana Department of Insurance (FORTIFIED, n.d.-f). It should be noted that coverages and discounts vary by carrier and are subject to change (FORTIFIED, n.d.-f). The discounts listed in the table are based on mitigation rate filings with the Louisiana Department of Insurance as of June 1, 2022 (FORTIFIED, n.d.-f). Discounts are applicable to wind premiums and their amount may vary depending on the FORTIFIED designation level and location of the home (FORTIFIED, n.d.-f). Commissioner James Donelon reported that the new law had resulted in an average discount of around 20% off the total premium, and Louisiana Citizens Property Insurance Corporation (Citizens) policyholders in coastal Louisiana were getting a discount of about 24% (Louisiana Department of Insurance, 2024).

Table 12: FORTIFIED Sample Discounts in Louisiana

Insurance Companies	Discount
American National General	up to 30%
Amica Mutual	up to 20%
Anpac Louisiana	up to 30%
Centauri National	up to 30%
Gulf States	up to 15%
Hartford	up to 24%
Occidental	up to 52.5%
State Farm	up to 30%
USAA	up to 37%

Source: Obtained from https://fortifiedhome.org/wp-content/uploads/fortified-discounts_LA.pdf

5.4.5. Other Incentives

According to Act 462 of the 2007 Regular Session of the Louisiana Legislature, local sales and use taxes are excluded when purchasing storm shutter devices to protect windows from damage during hurricanes or storms. (Louisiana Department of Insurance, n.d.-c).

Act 467 of the 2007 Regular Session introduced tax deductions for homeowners who voluntarily retrofit their existing residential structures to comply with the Louisiana State Uniform Construction Code (Louisiana Department of Insurance, n.d.-c). This incentive is designed to encourage homeowners to upgrade their homes to meet the standards set forth in the statewide building code. The construction code retrofitting deduction allows homeowners to claim an amount equal to 50% of the cost paid or incurred for the retrofit, not exceeding \$5,000 per retrofitted residential structure (Louisiana Department of Insurance, n.d.-c; Louisiana Department of Revenue, 2009). However, the retrofitting costs must be reduced by the value of any other financial incentives received from state, municipal, or federal sponsored financial incentives (Louisiana Department of Insurance, n.d.-c; Louisiana Department of Revenue, 2009).

To be eligible for the deduction, the homeowner must claim the homestead exemption for the retrofitted property, and the home cannot be used as rental property (Louisiana Department of Insurance, n.d.-c; Louisiana Department of Revenue, 2009). The deduction does not apply to construction, reconstruction, alteration, or repairs required by the State Uniform Construction Code for new residential structures or those damaged or destroyed (Louisiana Department of Revenue, 2009). Taxpayers who claim this deduction are not eligible for any other state tax

benefits for the same tangible personal property (Louisiana Department of Revenue, 2009). To claim the deduction, taxpayers must complete the retrofitting within the taxable year and retain documentation demonstrating compliance with the State Uniform Construction Code, receipts verifying project costs, and confirmation that the project was voluntary (Louisiana Department of Revenue, 2009). Qualifying improvements include roof deck attachment, secondary water barrier, roof covering, gable ends bracing, roof-to-wall connections, opening protection, and exterior doors, including garage doors (Louisiana Department of Revenue, 2009).

5.4.6. Program Data

The LFHP is still in its early stages. In a January 2024 announcement, Commissioner Donelon provided an update on the LFHP, reporting that it had accepted 3,000 applicants, with the first 1,500 being required to be Citizens policyholders (Louisiana Department of Insurance, 2024). As of November 14, 2024, the LFHP website shows 1,561 approved grants and 1,077 pending applications, with updates made daily. The Commissioner believes the program will succeed in providing grants to install 3,000 roofs and also encouraging tens of thousands of Louisiana residents to build stronger homes in the future (Louisiana Department of Insurance, 2024).

5.5. Minnesota

5.5.1. Overview

The Strengthen Minnesota Homes (SMH) program was established in 2023 to aid homeowners in improving the resilience of their homes against extreme windstorms and hail (Minnesota Department of Commerce, 2024). The program utilizes the FORTIFIED construction standard developed by IBHS (Minnesota Department of Commerce, 2024). The SMH program estimates that each qualifying household will receive a grant of approximately \$10,000 to support the cost of upgrading their home to meet the FORTIFIED Roof™ standard (Minnesota Department of Commerce, 2024). Grants are awarded on a first-come, first-served basis, subject to available funding, and the commissioner may establish pilot projects to ensure equitable distribution of grants based on income demographics within counties (Minnesota Legislature, 2023). The program is subject to legislative appropriations, federal grants, or other funding sources, and all mitigation projects must comply with local building codes and FORTIFIED program standards

(Minnesota Legislature, 2023). The program is still being developed and has not officially launched yet, with no estimated program launch date.

5.5.2. Program Description

The SMH program, established by the Minnesota Legislature in 2023, aims to provide financial assistance to homeowners for improving the resilience of their homes against extreme weather events such as high winds and hail (Minnesota Department of Commerce, 2024). The program utilizes the FORTIFIED construction standard developed by IBHS, which consists of research-based construction upgrades designed to enhance a home's ability to withstand severe weather impacts (Minnesota Department of Commerce, 2024). The IBHS standards go above the building code, and these upgrades have been shown to reduce the costs of hail and wind-related damages by up to 60% (Minnesota Department of Commerce, 2024). The Minnesota Legislature appropriated \$1 million in planning funds to develop the program details over the next two years and established criteria for contractors and professionals to perform work on homes once the grant program becomes operational (Minnesota Department of Commerce, 2024). Additionally, the legislation requires insurance companies to offer premium discounts to Minnesotans who upgrade their existing roofs or build new roofs to the FORTIFIED standard (Minnesota Department of Commerce, 2024).

As explained in Chapter 57 in the 2023 session, an SMH Account has been established as a separate account within the state treasury's special revenue fund (Minnesota Legislature, 2023). This account will hold funds from various sources, including legal provisions, donations, allotments, and transfers (Minnesota Legislature, 2023). Any earnings generated by the account's assets, such as interest and dividends, will be credited to the account itself (Minnesota Legislature, 2023). The remaining balance at the end of a fiscal year will not be transferred to the general fund but will remain in the account until expended (Minnesota Legislature, 2023). The commissioner is responsible for managing the account and is authorized to use the funds for two primary purposes: issuing grants under the SMH program and covering reasonable administrative costs incurred while overseeing the program's implementation (Minnesota Legislature, 2023).

The SMH program estimates that each qualifying household will receive a grant of approximately \$10,000 to support the cost of upgrading their home to meet the FORTIFIED Roof™ standard (Minnesota Department of Commerce, 2024). However, it is important to note

that this grant amount may not be sufficient to cover the entire cost of the necessary upgrades, and homeowners may need to contribute additional funds to complete the project (Minnesota Department of Commerce, 2024). Grants awarded through the Strengthen Minnesota Homes program are intended to be used for retrofitting insurable properties to improve their resilience against wind and hail damage (Minnesota Legislature, 2023). The grant funds cannot be utilized for routine maintenance or repairs; however, they may be used in combination with repairs or reconstruction made necessary by wind or hail damage (Minnesota Legislature, 2023). Projects funded by these grants must be completed within a three-month timeframe from the date of grant approval and failure to adhere to this completion deadline may result in the forfeiture of the granted funds (Minnesota Legislature, 2023).

The commissioner is responsible for reviewing all applications for the SMH program to ensure completeness and accuracy, as well as verifying that applicants meet eligibility criteria (Minnesota Legislature, 2023). Grants are awarded on a first-come, first-served basis, subject to available funding (Minnesota Legislature, 2023). Approved applicants will receive an approval letter, and eligible contractors are prohibited from starting work until the grant is approved (Minnesota Legislature, 2023). To ensure equitable distribution of grants based on income demographics within counties for which the program is available, the commissioner may establish pilot projects to create a sustainable program distribution system within any geographic area in Minnesota (Minnesota Legislature, 2023). Once a grant application is approved, the eligible contractor selected by the homeowner can begin the mitigation work (Minnesota Legislature, 2023). Upon completion, the contractor submits a signed contract, invoice, and affidavit confirming compliance with FORTIFIED standards to the commissioner (Minnesota Legislature, 2023). An IBHS evaluator conducts required inspections (i.e., interim inspection during construction and final inspection) to confirm the work meets mitigation specifications (Minnesota Legislature, 2023). Grant funds are released only after a FORTIFIED designation certificate is issued for the home, with the program directly paying the eligible contractor on behalf of the homeowner (Minnesota Legislature, 2023). The homeowner is responsible for paying the remaining cost after receiving the IBHS FORTIFIED certificate (Minnesota Legislature, 2023). The program will confirm that the homeowner's insurer will provide the appropriate premium discount and will conduct random re-inspections to detect fraud and report any irregularities (Minnesota Legislature, 2023).

Chapter 57 of the 2023 session also outlines that the program does not create an entitlement for property owners or obligate the state of Minnesota to pay for residential property inspections or retrofits (Minnesota Legislature, 2023). The program is subject to legislative appropriations, federal grants, or other funding sources. All mitigation projects are contingent upon securing required local permits and inspections to comply with local building codes and applicable FORTIFIED program standards, and are subject to random reinspection at a later date (Minnesota Legislature, 2023). Per the SMH website, the program has not launched yet and there is currently no estimated program launch date (Minnesota Department of Commerce, 2024).

5.5.3. Eligibility Requirements

To be eligible for the SMH program, homeowners must own a single- or two-family home in Minnesota that is currently insured and not in a state of structural disrepair (Minnesota Department of Commerce, 2024). The home must have a qualifying existing roof and foundation, and the homeowner must allow a FORTIFIED certified evaluator to inspect the home to confirm eligibility (Minnesota Department of Commerce, 2024). The SMH website indicates that additional criteria based on location and income will be added later (Minnesota Department of Commerce, 2024).

Contractors working on projects funded by the program must meet specific requirements and maintain current certificates, licenses, and proof of insurance with the program office (Minnesota Department of Commerce, 2024). These requirements include possessing in-force general liability and workers' compensation policies, a certificate of compliance from the commissioner of revenue, and completing the FORTIFIED Roof for High Wind and Hail training provided by IBHS (Minnesota Department of Commerce, 2024). Non-profit contractors or those affiliated with qualified non-profit organizations may be eligible for free training (Minnesota Department of Commerce, 2024).

Evaluators must also meet program eligibility requirements and submit current certificates and licenses to the commissioner (Minnesota Department of Commerce, 2024). They must be in good standing with IBHS, maintain an active certification as a FORTIFIED home evaluator for high wind and hail, possess a Minnesota business license, be registered with the secretary of state, and complete the program training (Minnesota Department of Commerce, 2024). Non-profit

organizations or those affiliated with qualified non-profit organizations may be eligible for free training (Minnesota Department of Commerce, 2024).

5.5.4. Insurance Incentives

As outlined in Section 56 of Chapter 57 in the 2023 session, insurers must provide premium discounts or rate reductions to owners who build or locate new insurable properties or retrofit existing properties to meet the insurable property requirements in Minnesota (Minnesota Legislature, 2023). Owners must submit and maintain certificates issued by IBHS proving compliance with the FORTIFIED program standards to receive the discounts or rate reductions (Minnesota Legislature, 2023).

Participating insurers must submit actuarially justified rates and rating plans to the commissioner for both new and retrofitted insurable properties (Minnesota Legislature, 2023). Insurers may offer more generous mitigation adjustments in addition to the required discounts and rate reductions (Minnesota Legislature, 2023). These adjustments apply only to policies that include wind coverage and can be applied to either the wind coverage portion of the premium or the total premium if wind coverage is not separated in the rate filing (Minnesota Legislature, 2023).

Rates and rating plans submitted to the commissioner cannot be used until 60 days after filing, unless approved earlier by the commissioner (Minnesota Legislature, 2023). The commissioner evaluates the submitted rates and plans to ensure that cost savings directly attributable to the FORTIFIED program standards are passed along in full to qualified policyholders (Minnesota Legislature, 2023). Participating insurers must resubmit rates and rating plans at least once every five years and provide the commissioner with all requested information necessary to meet the requirements of this subdivision (Minnesota Legislature, 2023). The commissioner may annually publish the premium savings experienced by the policyholder (Minnesota Legislature, 2023).

5.6. Mississippi

5.6.1. Overview

Although there is no known state-related grant program for homeowners in Mississippi, the state requires insurance discounts for resilient properties. According to Senate Bill No. 2709, amendments to Sections 83-75-1 and 83-75-3 establish a phased implementation timeline for mandatory wind loss mitigation discounts (Mississippi Legislature, 2020). Beginning July 1, 2013, insurers must provide discounts for new insurable properties in five coastal counties (Harrison, Hancock, Jackson, Stone, and Pearl River) that are built to resist hurricane damage (Mississippi Legislature, 2020). Discounts were expanded to new residential properties statewide on July 1, 2019, covering mitigation against tornadoes and other windstorms (Mississippi Legislature, 2020). Finally, effective July 1, 2021, discounts are mandated for new commercial properties statewide that meet windstorm mitigation standards (Mississippi Legislature, 2020).

Furthermore, the Mississippi Windstorm Underwriting Association (MWUA), a residual market insurer for windstorm and hail perils in the coastal part of the state, provides a unique endorsement option for its policyholders (FORTIFIED, n.d.-b). This endorsement, which is offered at no additional cost, comes into effect when a covered claim leads to the replacement of a roof (FORTIFIED, n.d.-b; Insurance Journal, 2020). In such cases, MWUA will provide additional funds to help cover the expense of upgrading to a FORTIFIED Roof (FORTIFIED, n.d.-b; Insurance Journal, 2020). MWUA will cover up to \$1,500 in extra costs for materials and labor associated with the roof upgrade (FORTIFIED, n.d.-b; Insurance Journal, 2020). Furthermore, if the home successfully achieves the FORTIFIED Roof designation, MWUA will also reimburse up to \$500 for any inspection or evaluation fees incurred during the certification process (FORTIFIED, n.d.-b; Insurance Journal, 2020).

MWUA provides homeowners with premium discounts for homes that have earned an IBHS FORTIFIED designation. The discounts vary depending on the level of FORTIFIED certification achieved (FORTIFIED, n.d.-g; Insurance Journal, 2020). Homes with a FORTIFIED Roof designation are eligible for a 20% discount on their premiums, while those with a FORTIFIED Silver designation can receive a 25% discount (FORTIFIED, n.d.-b; Insurance Journal, 2020). The highest level of certification, FORTIFIED Gold, qualifies for a substantial 30% discount on

premiums (FORTIFIED, n.d.-b; Insurance Journal, 2020). Moreover, MWUA offers an additional 5% credit to homeowners who have not only obtained a FORTIFIED designation but have also taken steps to mitigate tree hazards on their property (FORTIFIED, n.d.-b; Insurance Journal, 2020).

5.7. North Carolina

5.7.1. Overview

The North Carolina Insurance Underwriting Association (NCIUA), the residual market for beach and coastal properties in the state, initiated the Strengthen Your Roof program, which aims to improve the resilience and weather resistance of properties insured by NCIUA by providing financial assistance to offset the replacement costs of qualified roofs (Strengthen Your Roof, n.d.-b). The grant program offers up to \$8,000 for the replacement of roofs with an IBHS FORTIFIED Roof™, with grants being limited in number and awarded on a first-come, first-served basis until all funds have been allocated or until December 31, 2024 (Strengthen Your Roof, n.d.-b). The grant process involves several stages, including application submission, review by the NCIUA Grant Team and IBHS, construction, and final approval (Strengthen Your Roof, n.d.-e). Eligibility for the grant program is determined by NCIUA and IBHS, with specific requirements for different residential dwelling types (Strengthen Your Roof, n.d.-b).

In addition to the Strengthen Your Roof grant program, North Carolina offers various insurance incentives for homeowners who invest in wind-resistant construction. Residential Windstorm Mitigation Credits are available through private insurance companies and North Carolina wind pools, with discounts ranging from 5-12% on the wind/hail coverage cost for features such as hip roofs, window protection, and IBHS FORTIFIED Home™ designations (North Carolina Sea Grant, 2021). NCIUA also provides a complimentary endorsement (PF 01 11 08 23) to policyholders' insurance policies, which offers coverage to assist in obtaining an IBHS FORTIFIED Roof™ (North Carolina Insurance Underwriting Association, 2023). The number of possible grants awarded through the Strengthen Your Roof program has increased from approximately 1,660 in 2019 and 2020 to 2,500 in 2020 and 2021, with a grant maximum of around \$6,000 (Strengthen Your Roof, 2019, 2020, 2021).

5.7.2. Program Description

NCIUA established under Article 45 of Chapter 58 of the North Carolina General Statutes, is a non-profit organization that provides essential property insurance. NCIUA operates independently, without financial support from federal, state, or local governments. In accordance with its statutory mandate and plan of operation, and with the support of the North Carolina Commissioner of Insurance, NCIUA implements mitigation measures in North Carolina's coastal region to enhance property resilience against severe wind events.

As part of these efforts, NCIUA launched a Pilot Grant Mitigation Program called Strengthen Your Roof. This grant program aims to improve the resilience and weather resistance of properties insured by NCIUA by providing financial assistance to offset the replacement costs of qualified roofs. The grant program offers grants of up to \$8,000 for the replacement of roofs with an IBHS FORTIFIED Roof™ (Strengthen Your Roof, n.d.-b). The grants are limited in number and are awarded on a first-come, first-served basis until all funds have been allocated or until December 31, 2024, whichever occurs first. Applicants are advised to apply promptly to secure their grant (Strengthen Your Roof, n.d.-b). The maximum grant amount is \$8,000, and if an application is approved, NCIUA will reserve this amount for the installation of an IBHS FORTIFIED Roof™ (Strengthen Your Roof, n.d.-b). If the total cost of the roof installation is less than \$8,000, the grant will be limited to the total cost and will be disbursed upon completion of the roof replacement and receipt of the IBHS FORTIFIED Roof™ designation certificate (Strengthen Your Roof, n.d.-b).

It is important to note that currently, grant funds are subject to tax liability, and the policyholder is responsible for any tax obligations associated with receiving the grant (Strengthen Your Roof, n.d.-b). NCIUA will require the policyholder to complete a W-9 form, which requests the policyholder's taxpayer identification number (Strengthen Your Roof, n.d.-b). Policyholders are advised to consult with a tax advisor regarding any potential tax implications (Strengthen Your Roof, n.d.-b). NCIUA continues to advocate for legislation that would protect North Carolina residents who receive state-based Strengthen Your Roof grants from having to pay federal and state income tax on the grant money they receive (Strengthen Your Roof, n.d.-b).

The grant process for the Strengthen Your Roof program, administered by NCIUA, consists of several stages involving the policyholder, the NCIUA Grant Team, IBHS, the contractor, and the FORTIFIED Evaluator (Strengthen Your Roof, n.d.-e). The process begins with the policyholder

submitting an application, which requires 4 photographs surrounding the home, through the Strengthen Your Roof website and is then reviewed by the NCIUA Grant Team for pre-eligibility and by IBHS for eligibility for an IBHS FORTIFIED Roof™ designation (Strengthen Your Roof, n.d.-e). Once approved, the policyholder can request bids from contractors, which they can select from a list of contractors who are knowledgeable and experienced with IBHS FORTIFIED Roof™ (Strengthen Your Roof, n.d.-e). The contractor can recommend a preferred FORTIFIED evaluator for the project, which the policyholder will be required to approve, or an evaluator will be assigned by the grant team (Strengthen Your Roof, n.d.-e). The FORTIFIED evaluator will inspect the property before, during, and after construction to ensure compliance with FORTIFIED standards in order to award an IBHS FORTIFIED Roof designation (Strengthen Your Roof, n.d.-e). Upon completion, the evaluator submits documentation to IBHS for review and issuance of the IBHS FORTIFIED Roof™ designation certificate (Strengthen Your Roof, n.d.-e). The contractor submits the final invoice, and the policyholder completes a W-9 form to receive the grant payment from NCIUA (Strengthen Your Roof, n.d.-e).

5.7.3. Eligibility Requirements

NCIUA policyholders with homeowners or dwelling policies that provide wind coverage for properties located along the Outer Banks and Barrier Islands are eligible for the Strengthen Your Home grant, subject to program eligibility and rules (Strengthen Your Roof, n.d.-b). These territories generally include the area south and east of the Inland Waterway from the South Carolina line to Fort Macon (Beaufort Inlet), and south and east of Core, Pamlico, Roanoke, and Currituck Sounds to the Virginia line (Strengthen Your Roof, n.d.-b). To be eligible, policyholders must have a current and eligible policy that was effective on or before August 1, 2023 (Strengthen Your Roof, n.d.-b). The eligible policy types include HO2, HO3, or HO8 Homeowners policies; DP1 or DP2 Dwelling policies; HW2, HW3, or HW8 Homeowners Wind policies; or WD1, WD2, or WD3 Dwelling Wind Policies (Strengthen Your Roof, n.d.-d). Second, the policyholder's property must be located in specific areas of the North Carolina Outer Banks or Barrier Islands, which are designated as rating territories 110 and 120 (Strengthen Your Roof, n.d.-d). Only policyholders who meet both of these conditions are eligible to apply for a grant program; however, it is important to note that submitting an application does not guarantee acceptance into the program (Strengthen Your Roof, n.d.-d).

NCIUA determines initial eligibility for the grant program, while IBHS will assess whether the home qualifies for an IBHS FORTIFIED Roof™ (Strengthen Your Roof, n.d.-b). The FORTIFIED Home Program is applicable to specific residential, single-family, and two-family dwelling types, including but not limited to:

- Single-family detached homes: These are freestanding residential buildings occupied by one family and are limited to three stories above grade. This category also includes detached single-family factory-built modular homes that are designed, built, and sited to meet all local building code requirements (Strengthen Your Roof, n.d.-b).
- Two-family dwelling units (duplex): These are freestanding residential buildings occupied by two families and are limited to three stories above grade. To be eligible for a FORTIFIED designation, the entire two-family building, including both dwelling units, must be evaluated under the appropriate FORTIFIED requirements, and the entire building must meet all requirements for the designation being considered. Individual units are not eligible for designation unless the entire building is being designated (Strengthen Your Roof, n.d.-b).
- HUD manufactured homes: These are single-family residential homes manufactured to HUD's Zone II or Zone III Manufactured Home Construction and Safety Standards adopted after July 1994. The home must be sited on and properly attached to a permanent foundation. HUD manufactured homes built before July 1994 and Zone I homes built after July 1994 are not eligible (Strengthen Your Roof, n.d.-b).
- Townhouses: These are single-family dwelling units constructed in a group of three or more attached units, in which each unit extends from foundation to roof and has a yard or public way on not less than two sides. Townhouses are limited to three stories above grade, and mixed-use (commercial and residential) buildings are not eligible. To be eligible for a FORTIFIED designation, the entire townhouse building, including all townhouse units composing the building, must be evaluated under the appropriate FORTIFIED requirements, and the entire building must meet all requirements for the designation being considered. Individual townhouse units are not eligible for designation unless the entire building is being designated (Strengthen Your Roof, n.d.-b).

Eligibility is determined by each building's unique attributes, and not all mobile and manufactured homes are eligible (Strengthen Your Roof, n.d.-b). To qualify, at a minimum, these homes must have been constructed after July 1994, meet IBHS foundation and building requirements, and have a HUD Zone IV designation (Strengthen Your Roof, n.d.-b).

5.7.4. Insurance Incentives

In North Carolina, homeowners located near the coast (rating territories 110, 120, 130, 140, 150, and 160) may be eligible for discounts on their homeowners insurance, with some insurers offering discounts of up to \$700 off property owners insurance (FORTIFIED, n.d.-e). The discount amount is determined by the location of the home and the level of FORTIFIED protection installed (FORTIFIED, n.d.-e). Residential Windstorm Mitigation Credits are available through private insurance companies and North Carolina wind pools, for which there are two discount options that are available for common homeowner or dwelling coverage (North Carolina Sea Grant, 2021).

The first discount option is for a hip roof and/or window protection (e.g., impact glass or certified storm shutters). Owners must provide their insurance agent with a photo of the hip roof and documentation that the window protection complies with national test standards and was properly installed. Plywood shutters are allowed by the N.C. Residential Building Code, but they do not qualify for the credit. Each option qualifies for a 5-6% discount on the wind/hail coverage cost, and they can be combined for an 11-12% discount (North Carolina Sea Grant, 2021).

The second discount is based on the three designation levels from IBHS FORTIFIED Home™ program for existing or new houses. Each level provides a 4-6% discount on the wind and hail premium (North Carolina Sea Grant, 2021). To qualify, a certified FORTIFIED Evaluator must inspect the house, and IBHS reviews the inspection results before issuing a certificate of compliance. The FORTIFIED designation is good for about 5 years in which an evaluator will need to re-inspect the home in order to extend the discounts for an additional 5 years (North Carolina Sea Grant, 2021).

For homeowners who are unable to obtain a FORTIFIED Roof before the next storm, it is recommended to ensure that their homeowners policy includes a FORTIFIED Endorsement (FORTIFIED, n.d.-e). NCIUA adds the endorsement (PF 01 11 08 23) for free, providing coverage to help NCIUA policyholders obtain an IBHS FORTIFIED Roof™, subject to policy terms and

conditions, as well as IBHS eligibility and requirements for the FORTIFIED Roof designation (North Carolina Insurance Underwriting Association, 2023). The endorsement coverage is effective for covered losses occurring on or after August 1, 2023 (North Carolina Insurance Underwriting Association, 2023). Under the endorsement, if a policyholder experiences a significant roof claim and the adjuster's investigation determines that the roof needs to be replaced, NCIUA will cover the additional costs, up to \$5,000, to install an IBHS FORTIFIED Roof™ (North Carolina Insurance Underwriting Association, 2023). In cases where a policyholder chooses to replace their roof for general maintenance purposes, without a roof claim, NCIUA will contribute up to \$600 to cover the cost of a FORTIFIED Evaluator to assist the policyholder in obtaining a FORTIFIED Roof™ (North Carolina Insurance Underwriting Association, 2023).

5.8. Oklahoma

5.8.1. Overview

Recently, the Governor of Oklahoma signed House Bill 3089 into law, which seeks to establish a grant program that will provide financial assistance to homeowners who wish to construct or retrofit homes to better withstand the damaging effects of severe weather events such as tornadoes, windstorms, and hail (Oklahoma Insurance Department, 2024). The Strengthen Oklahoma Homes Act will be administered by the Oklahoma Insurance Department (OID), which will offer grants to eligible residential property owners (Oklahoma Insurance Department, 2024). To qualify, applicants must own and occupy a single-family primary residence (Oklahoma Insurance Department, 2024). The grants will help homeowners meet the IBHS FORTIFIED standards by reinforcing the roofs with impact-resistant materials (Oklahoma Insurance Department, 2024). These funds will allow consumers to install impact-resistant shingles and make other improvements to their homes (Oklahoma Insurance Department, 2024). Many insurance companies also offer discounted premiums for homes with FORTIFIED standards, where Oklahoma's largest carriers offer insurance discounts up to 42% (FORTIFIED, n.d.-h; Oklahoma Insurance Department, 2024). The development of the grant program created by the Strengthen Oklahoma Homes Act will continue throughout the year, with the first grants expected to be awarded in 2025 (Oklahoma Insurance Department, 2024).

5.9. Rhode Island

5.9.1. Overview

There is no known state-related grant program within Rhode Island, however; homeowners may be able to waive their hurricane deductible if certain mitigation measures are implemented on the property (FORTIFIED, n.d.-b; Rhode Island Department of State, n.d.). To qualify for this waiver, the insured must allow their insurance provider to inspect the property or submit proof that the mitigation measures have been properly installed (Rhode Island Department of State, n.d.).

If the insurer has reserved the right to inspect or receive proof of installation, they may issue a new policy or modify the existing one to reflect the waiver of the hurricane deductible once the process is successfully completed, in accordance with state laws and regulations (Rhode Island Department of State, n.d.). Homeowners have the option to decline the deductible waiver in writing, even if they meet the mitigation requirements, in exchange for a lower insurance premium (Rhode Island Department of State, n.d.). The written declination should specify the chosen deductible and the difference in premium (Rhode Island Department of State, n.d.). In addition, insurers must provide clear and prominent notice of the mitigation requirements to their policyholders, and any changes to these requirements are considered material and are subject to specific regulations (Rhode Island Department of State, n.d.).

If an insurer requires the installation of any mitigation measures listed in the state's regulations, they must provide the following information to the insured in writing (Rhode Island Department of State, n.d.):

1. An explanation of the required mitigation measure(s) .
2. A description of the premium credit (in dollars) that will be applied if the mitigation measure(s) is installed and used by the insured.
3. A clear statement of the duration for which the mitigation measure(s) credit will apply.
4. An assurance that the insurer will not non-renew the insured due to a risk associated with a catastrophic loss.

If a Hurricane Deductible does not apply to a loss, the insurance company may apply the all-perils deductible, as specified in the policy, to the loss (Rhode Island Department of State, n.d.).

5.10. South Carolina

5.10.1. Overview

The South Carolina (SC) Safe Home Mitigation Grant Program provides financial assistance to homeowners along the coast to retrofit their single-family, owner-occupied homes to increase resilience against wind damage and hurricanes (South Carolina Department of Insurance, n.d.-d, 2023b). The program receives funding from the South Carolina Wind and Hail Underwriting Association (SCWHUA) and a dedicated source consisting of premium taxes paid by the SCWHUA and one percent of the insurance premium taxes collected annually (South Carolina Department of Insurance, 2024). Grant award amounts are determined by the applicant's total annual adjusted gross household income relative to the state median family income or the county area median income, whichever is higher (South Carolina Department of Insurance, n.d.-d, 2023b). Homeowners can apply for three types of mitigation awards: Resilient Mitigation Award, Sustainable Mitigation Award, and Hurricane Shuttering and Protective Barrier Systems Award (South Carolina Department of Insurance, n.d.-d). To be eligible for a grant, homes must meet specific criteria, such as being located in the coastal region of South Carolina, being owner-occupied and the owner's primary residence, and having no pre-existing damage (South Carolina Department of Insurance, n.d.-b). Since its inception in 2007, the SC Safe Home program has awarded 7,643 grants, amounting to approximately \$34.5 million, and has made a significant economic impact on coastal communities by generating employment opportunities in the construction and home improvement sectors (South Carolina Department of Insurance, 2024).

In addition to the SC Safe Home program, South Carolina offers various incentives to encourage homeowners to invest in mitigation measures. South Carolina law requires insurers to provide premium discounts, known as mitigation credits, for measures taken to fortify coastal homes and businesses against hurricane damage (South Carolina Department of Insurance, n.d.-c). The Omnibus Coastal Property Insurance Reform Act of 2007 provides income tax credits for the costs incurred in retrofitting a qualifying legal residence, limited to 25% of the total costs or

\$1,000, whichever is less, for any given taxable year (South Carolina Department of Insurance, n.d.-e).

5.10.2. Program Description

The SC Safe Home Mitigation Grant program, managed by the state's Department of Insurance, offers financial assistance to coastal homeowners for retrofitting their single-family, owner-occupied homes to increase resilience against hurricanes and high-wind damage (South Carolina Department of Insurance, n.d.-d, 2023). The SC Safe Home program receives funding from two primary sources. A smaller portion of the funding for staffing is provided through a grant from the SCWHUA; however, the majority of the program's funding comes from a dedicated source, which consists of all premium taxes paid by the SCWHUA and an additional one percent of the insurance premium taxes that is annually collected (South Carolina Department of Insurance, 2024).

The SC Safe Home program provides matching and non-matching grants, with award amounts determined by the applicant's total annual adjusted gross household income, which is adjusted for family size relative to the state median family income or the county area median income, whichever is higher of the two (South Carolina Department of Insurance, n.d.-d, 2023b). The U.S. Department of Housing and Urban Development (HUD) annually publishes the statewide and countywide income figures (South Carolina Department of Insurance, n.d.-d, 2023b). Grant funds from the program are intended solely for retrofitting purposes and cannot be used for remodeling, repairs, or new construction (South Carolina Department of Insurance, n.d.-b, d).

If the mitigation project cost exceeds the grant amount, the applicant is responsible for the remaining expenses (South Carolina Department of Insurance, n.d.-d). There are 3 mitigation award types that applicants can apply for, which are listed below.

- **Resilient Mitigation Award:** Roof retrofits that meet SC Safe Home Retrofit Guidelines **and** IBHS FORTIFIED Roof Program Retrofit Guidelines
 - Non-matching awards are capped at \$7,500, while matching awards are limited to \$6,000 (South Carolina Department of Insurance, n.d.-d).
- **Sustainable Mitigation Award:** Roof retrofits that meet SC Safe Home Retrofit Guidelines **only or** window replacement and opening protection retrofits that meet SC Safe Home Opening Protection Guidelines

- Non-matching awards have a maximum of \$5,000, and matching awards are capped at \$4,000 (South Carolina Department of Insurance, n.d.-d).
- Hurricane Shuttering and Protective Barrier Systems: Hurricane shuttering and protective barrier systems installation that meets SC Safe Home Opening Protection Guidelines
 - Matching and non-matching projects will not exceed \$3,000 (South Carolina Department of Insurance, n.d.-d).

There is approximately \$2.2 million available for funding for the program's current year (South Carolina Department of Insurance, 2023b). The first round of the program's 2023-2024 funding cycle commenced July 5, 2023, with a total award amount not exceeding \$1.1 million in the initial round (South Carolina Department of Insurance, n.d.-d, 2023b). The SC Safe Home program 2024-2025 funding cycle was made available on July 1, 2024. The program is currently not accepting any grant applications and will reopen for new applications in January 2025 (South Carolina Department of Insurance, 2023b).

The following retrofits are applicable under the SC Safe Home grant program: bracing gable ends, roof-to-wall connectors, secondary water barrier, exterior doors (including garage doors), opening protection (window replacement, hurricane shutters), roof covering, repairment or replacement of manufacture home piers, anchors and tie-down straps, roof deck attachment, and issues associated with weak trusses, studs, and structural components (South Carolina Department of Insurance, n.d.-d). In addition, SC Safe Home has partnered with the IBHS FORTIFIED Roof program to offer homeowners the opportunity to obtain dual designations when undertaking mitigation work on their home's roof (South Carolina Department of Insurance, n.d.-d). By selecting the Resilient Mitigation Award type, homeowners may become eligible for additional insurance benefits, as the standards for this award align with both the SC Safe Home program and the IBHS FORTIFIED Roof program requirements (South Carolina Department of Insurance, n.d.-d).

The SC Safe Home program has provided an award calculator in order to determine an estimated grant award (South Carolina Department of Insurance, n.d.-d). The tables 13-15 below are examples of potential grant awards, which were obtained directly South Carolina Department of Insurance (2023b).

Table 13: SC Safe Home Program - Resilient Mitigation Award Estimation Example

Resilient Mitigation Matching Grants	Resilient Mitigation Non-Matching Grants
Applicant's Annual Adjusted Gross Income for the household size exceeds 80% of the HUD median for the county in which the home is located and the state average for household size.	Applicant's Annual Adjusted Gross Income for the household size does not exceed 80% of the HUD median for the county in which the home is located or the state average for household size.
Maximum Award is \$6,000	Maximum Award is \$7,500
Homeowner matches Safe Home's contribution dollar- for-dollar up to the award maximum. *	No homeowner matching required. *
Example 1: New roof estimate = \$11,670 Safe Home pays: \$6,000 Homeowner pays: \$5,670	Example 1: New roof estimate = \$11,670 Safe Home pays: \$7,500 Homeowner pays: \$4,170.

Source: Obtained from <https://doi.sc.gov/DocumentCenter/View/14356/Bulletin-Number-2023-02-SC-Safe-Home-2023-24>

Table 14: SC Safe Home Program - Sustainable Mitigation Award Estimation Example

Sustainable Matching Grants	Sustainable Non-Matching Grants
Applicant's Annual Adjusted Gross Income for the household size exceeds 80% of the HUD median for the county in which the home is located and the state average for household size.	Applicant's Annual Adjusted Gross Income for the household size does not exceed 80% of the HUD median for the county in which the home is located or the state average for household size.
Maximum Award is \$4,000	Maximum Award is \$5,000
Homeowner matches Safe Home's contribution dollar- for-dollar up to the award maximum. *	No homeowner matching required. *
Example 1: New roof estimate = \$8,500 Safe Home pays: \$4,000 Homeowner pays: \$4,500	Example 1: New roof estimate = \$8,500 Safe Home pays: \$5,000 Homeowner pays: \$3,500.
Example 2: Window Replacement and Opening Protection estimate = \$4,700 Safe Home pays: \$2,350 Homeowner pays: \$2,350	Example 2: Window Replacement and Opening Protection estimate = \$4,700 Safe Home pays: \$4,700 Homeowner pays: \$0

Source: Obtained from <https://doi.sc.gov/DocumentCenter/View/14356/Bulletin-Number-2023-02-SC-Safe-Home-2023-24>

Table 15: SC Safe Home Program - Hurricane Shuttering and Protective Barrier Systems Award Estimation Example

Hurricane Shuttering & Protective Barrier Systems Matching & Non-Matching Grants	
Applicant's Annual Adjusted Gross Income for the household size exceeds 80% of the HUD median for the county in which the home is located and the state average for household size.	Applicant's Annual Adjusted Gross Income for the household size does not exceed 80% of the HUD median for the county in which the home is located or the state average for household size.
Maximum Award is \$3,000	Maximum Award is \$3,000
Homeowner matches Safe Home's contribution dollar- for-dollar up to the award maximum. *	Homeowner responsible for any costs of the mitigation project exceeding the amount of the grant award
Example 1: Hurricane Shuttering System Estimate = \$5,250 Safe Home pays: \$3,000 Homeowner pays: \$2,250	Example 1: Hurricane Shuttering System Estimate = \$5,250 Safe Home pays: \$3,000 Homeowner pays: \$2,250

Source: obtained from <https://doi.sc.gov/DocumentCenter/View/14356/Bulletin-Number-2023-02-SC-Safe-Home-2023-24>

5.10.3. Eligibility Requirements

To be eligible for a SC Safe Home grant, several criteria must be met. The home must be situated in the coastal region of South Carolina (South Carolina Department of Insurance, n.d.-b). and must be owner-occupied and the owner's primary residence (South Carolina Department of Insurance, n.d.-b). The home can be either site-built or manufactured/modular, but it must not have any pre-existing damage (South Carolina Department of Insurance, n.d.-b). Additionally, neither the home nor the homeowner can have previously received and used an SC Safe Home grant (South Carolina Department of Insurance, n.d.-b). With the enactment of 2017 SC Act No. 28, the SC Safe Home Program has eliminated the requirement that applicants' homes be insured for \$300,000 or less (South Carolina Department of Insurance, 2024). The residential property must be insured by a valid homeowners or dwelling insurance policy (South Carolina General Assembly, 2017). This policy should be issued by an insurer licensed in South Carolina or a surplus lines insurer, provided that the policy has been legally placed by an authorized broker operating within the state (South Carolina General Assembly, 2017). The insurance coverage for the residential property must be equal to or exceed the fair market value of the property, as defined in Section 12-37-3135(a)(2) and reflected in the county records (South Carolina General Assembly, 2017).

It is important to note that the program is not able to provide reimbursement for retrofits that have already been completed, as this is prohibited by state law (South Carolina Department of Insurance, n.d.-b). To qualify for the grant, homeowners must undergo an inspection and receive approval from the SC Safe Home program before commencing any retrofit work (South Carolina Department of Insurance, n.d.-b). The homeowner is responsible for contacting a certified wind inspector for the Wind Inspection Report, for which the homeowner must pay the cost directly to the inspector (South Carolina Department of Insurance, n.d.-b). The cost of the inspection can range from \$150 to \$250 depending on the size of the home (South Carolina Department of Insurance, n.d.-b). In order to apply for the grant, homeowners will need a copy of their latest 1040 or other income tax return, a copy of the homeowner's insurance declaration page, a copy of the homeowner's county tax assessment, and an inspection report and photographs of the home performed and collected by a participating SC Safe Home Inspector (South Carolina Department of Insurance, n.d.-b).

A home that is used for renting, as well as apartments, duplexes, or townhomes, will not qualify for the program (South Carolina Department of Insurance, n.d.-b). In addition, a home with an already damaged roof will not qualify (South Carolina Department of Insurance, n.d.-b). Currently, the following counties are eligible to be awarded grant funds: Beaufort, Berkeley, Charleston, Colleton, Dorchester, Florence, Georgetown, Horry, Jasper, Marion, and Williamsburg counties (South Carolina Department of Insurance, n.d.-b).

5.10.4. Insurance Incentives

South Carolina law mandates that insurers provide premium discounts, known as mitigation credits, for measures taken to fortify coastal homes and businesses against hurricane damage (South Carolina Department of Insurance, n.d.-c). These discounts are applied to the portion of the premium related to wind losses (South Carolina Department of Insurance, n.d.-c). However, the law does not specify the amount of the discounts or credits, leading to significant variations among insurers (South Carolina Department of Insurance, n.d.-c). In spring 2016, the South Carolina Department of Insurance conducted a survey of property insurers to create a guide for coastal homeowners (South Carolina Department of Insurance, n.d.-c). The guide includes a list of the maximum credit offered by each reporting insurer for various mitigation measures (South Carolina Department of Insurance, n.d.-c). It also summarizes the current average premium savings realized

by coastal homeowners ("Average Savings Realized") and the highest discount a coastal homeowner can expect, on average, across all reporting insurers ("Max. Credits Available"; South Carolina Department of Insurance, n.d.-c).

According to the guide by South Carolina Department of Insurance, policyholders who have implemented mitigation measures and claimed the associated credits have realized an average savings of 14% on their homeowners insurance premiums (n.d.-c). Furthermore, insurers offering coverage to coastal homeowners provided an average maximum premium credit of 48% in 2016, which has increased from 26% in 2008, when all available mitigation measures were combined (South Carolina Department of Insurance, n.d.-c). For storm shutters, coastal homeowners are currently saving an average of 8% on their annual insurance premiums (South Carolina Department of Insurance, n.d.-c). Depending on the type of shutter installed, insurers offer discounts of up to 12% for hurricane-rated storm shutters (South Carolina Department of Insurance, n.d.-c). The Table 16 below highlights the Average Savings Realized and Maximum Credits Available.

Table 16: Homeowners Mitigation Credits - Average Savings Realized and Maximum Credits Available

Mitigation Measures	Average Savings Realized	Max. Credits Available
Roof Tie Downs	5%	9%
Storm Shutters	8%	12%
Impact Resistant Glass	8%	12%
Openings	8%	15%
Wall to Floor Strength	5%	9%
Building Codes	9%	11%
IBHS	13%	20%
SC Safe Home	11%	9%(?)

Source: Obtained from <https://doi.sc.gov/DocumentCenter/View/9573/Homeowners-Mitigation-Credits---Brochure-Sept-2016?bidId>

Furthermore, the guide created by South Carolina Department of Insurance aims to help coastal property insurance consumers assess various mitigation measures and potential premium reductions (n.d.-c). However, it is crucial to note that the guide does not include all insurers offering coastal property insurance, as only certain insurers were required to report data (South Carolina Department of Insurance, n.d.-c). By law, all insurers must provide coastal property insurance policyholders with a notice outlining the availability and range of mitigation credits at

policy issuance and renewal (South Carolina Department of Insurance, n.d.-c). The Department of Insurance advises consumers to review this notice and consult with a licensed insurance agent or company representative to verify the specific criteria required to qualify for these discounts (South Carolina Department of Insurance, n.d.-c).

The guide outlines tables of the largest discount that insurers will offer for several mitigation measures and also provides the maximum discount for all mitigation measures combined (South Carolina Department of Insurance, n.d.-c). The following mitigation measures are listed: by-peril rating? (yes/no), storm shutters, roof tie downs, impact resistant glass, openings, wall to floor strength, IBHS, and SC Safe Home (South Carolina Department of Insurance, n.d.-c). The maximum discount an insurer will offer for all mitigation measures combined ranges from 10% (Foremost Insurance Co and Safeco Insurance Co of America) to about 97% (State Farm Fire & Casualty Co) (South Carolina Department of Insurance, n.d.-c).

It should be noted that the amounts shown within the tables are maximum available mitigation credits. A homeowner may be eligible for a credit that is lower than listed (South Carolina Department of Insurance, n.d.-c). As previously mentioned, mitigation credits and premiums vary between companies, and it is recommended to shop between different companies when purchasing a policy (South Carolina Department of Insurance, n.d.-c). For instance, some companies use Traditional Rating that would apply mitigation credits to the entire premium, while other companies use By-Peril Rating. Prior claims experience and data sources also vary by company (South Carolina Department of Insurance, n.d.-c). When viewing the tables provided in the guide, the Maximum Mitigation Credit Available column may appear inconsistent with the individual credits listed due to many insurance companies offering mitigation credits for items that are not included in the table, which can contribute to the overall maximum credit available (South Carolina Department of Insurance, n.d.-c). In addition, some insurance companies may impose a limit on the maximum mitigation credit that a policyholder can receive, regardless of the number or type of mitigation measures implemented (South Carolina Department of Insurance, n.d.-c). As a result, the maximum mitigation credit available may not be a simple sum of the individual credits listed in the table, and policyholders should consult with insurance providers to determine the specific mitigation credits available and any applicable limitations on the maximum credit they can receive (South Carolina Department of Insurance, n.d.-c).

5.10.5. Other Incentives

The Omnibus Coastal Property Insurance Reform Act of 2007 offers income tax credits to homeowners who invest in retrofitting their legal residences to increase resilience against hurricanes, rising floodwater, or other catastrophic windstorm events (South Carolina Department of Insurance, n.d.-e). Section 12-6-3660 provides a tax credit for the costs incurred in retrofitting a qualifying legal residence, limited to 25% of the total costs or \$1,000, whichever is less, for any given taxable year (South Carolina Department of Insurance, n.d.-e). Section 12-6-3665 allows an income tax credit of up to \$1,500 for state sales or use taxes paid on purchases of tangible personal property used to fortify one's legal residence (South Carolina Department of Insurance, n.d.-e).

Regulation 69-75 outlines the standards that must be met to qualify for these income tax credits, as described in the South Carolina Safe Home Resource Document for Mitigation Techniques (South Carolina Department of Insurance, n.d.-e). The resource document provides a comprehensive guide for homeowners, contractors, and inspectors to determine the appropriate products and procedures for each mitigation technique (South Carolina Department of Insurance, n.d.-e). Items used must have an ICC Evaluation Services Legacy Report or other test reports acceptable to building officials (South Carolina Department of Insurance, n.d.-e). Qualifying fortification measures for the tax credit include roof attachment, roof-to-wall connections, secondary water resistance, and opening protection (South Carolina Department of Insurance, n.d.-e). All retrofitting measures must comply with the current edition of the International Residential Code adopted by the South Carolina Building Codes Council or an engineer's or manufacturer's requirements for the wind speed at the home's location (South Carolina Department of Insurance, n.d.-e).

To claim the credit, a taxpayer must provide the Department of Revenue with a written certification report from a professional with experience in construction techniques, along with appropriate receipts, or an affidavit from the taxpayer certifying the implementation of the fortification measures, accompanied by copies of receipts (South Carolina Department of Insurance, n.d.-e). The final regulation took effect on June 26, 2009, and applies to all taxable years beginning after December 31, 2006 (South Carolina Department of Insurance, n.d.-e).

5.10.6. Program Data and Analysis

Since its inception in 2007, the SC Safe Home program has awarded 7,643 grants, totaling approximately \$34.5 million (South Carolina Department of Insurance, 2024). The program continues to make a significant economic impact on coastal communities by generating employment opportunities in the construction and home improvement sectors (South Carolina Department of Insurance, 2024). SC Safe Home mandates that contractors and wind inspectors participating in the program undergo training and testing by the Federal Alliance for Safe Homes (FLASH) through the Blueprint for Safety Training Program (South Carolina Department of Insurance, 2024). Currently, there are 88 approved contractors and inspectors working with the program, many of whom are certified to operate in multiple counties (South Carolina Department of Insurance, 2024).

Throughout the program's history, over 95% of SC Safe Home grantees have chosen to use the funds to retrofit their roofs (South Carolina Department of Insurance, 2024). Moreover, homeowners who have opted to replace their windows with impact-resistant systems and hurricane shutters through SC Safe Home have reported energy cost savings of up to 29% (South Carolina Department of Insurance, 2024). Structures retrofitted through the program have become more attractive risks to insurance companies, with homeowners reporting premium reduction savings of up to 24% from their insurance carriers (South Carolina Department of Insurance, 2024).

According to a report by the National Institute of Building Sciences, for every \$1.00 invested in mitigation, the nation saves \$6.00 in future disaster costs (2017; South Carolina Department of Insurance, 2024). Based on this finding, it is estimated that the grants awarded by SC Safe Home have potentially reduced the costs associated with future hurricanes and severe wind events by more than \$160 million, demonstrating the program's effectiveness in promoting resilience and mitigating the financial impact of natural disasters (South Carolina Department of Insurance, 2024). The Table 17 shows the number of grants awarded by the SC Safe Home program by county.

Table 17: SC Safe Home Grants Awarded by County from 2013-2023

County	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Beaufort	17	20	16	8	0	3	3	NA	9	5	3
Berkeley	82	85	91	50	6	81	30	NA	70	47	50
Charleston	72	81	156	133	12	242	112	NA	147	75	115
Colleton	3	2	10	5	0	4	3	NA	2	4	1
Dorchester	37	47	59	39	2	48	20	NA	26	11	31
Florence	0	0	0	3	1	0	0	NA	2	0	1
Georgetown	124	121	45	50	3	64	20	NA	22	13	14
Horry	391	419	291	225	31	311	77	NA	158	105	134
Jasper	2	0	2	3	0	1	0	NA	2	0	2
Marion	32	3	2	2	0	0	0	NA	1	1	0
Williamsburg	53	19	6	2	0	0	0	NA	0	0	1
Total	813	797	678	520	55	754	265	NA	439	261	352

Source: All data obtained from Status Reports on the South Carolina Coastal Property Insurance Market (2013-2023).

Notes: The only report that was unattainable was 2020 due to an incorrect link

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