

# Economics of Disaster Resilience

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# re·sil·ience

/rəˈzilyəns/ 

*noun*

1. the capacity to recover quickly from difficulties; toughness.  
"the often remarkable resilience of so many British institutions"
2. the ability of a substance or object to spring back into shape; elasticity.  
"nylon is excellent in wearability and resilience"



Resilience = value = profit



# The cost of vulnerability

- Poorly engineered buildings create a debris field
- People whose homes and businesses are destroyed do not buy goods and services
- Depressed businesses reduce consumption and employment



# How do we increase resilience?

- Insurance
- Building standards
- Planning





# Planning

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- 19% of Louisiana residents live in multifamily housing
- Residents prefer FORTIFIED
- FORTIFIED is profitable for owners
  - Inexpensive
  - High return

# Typical apartment building



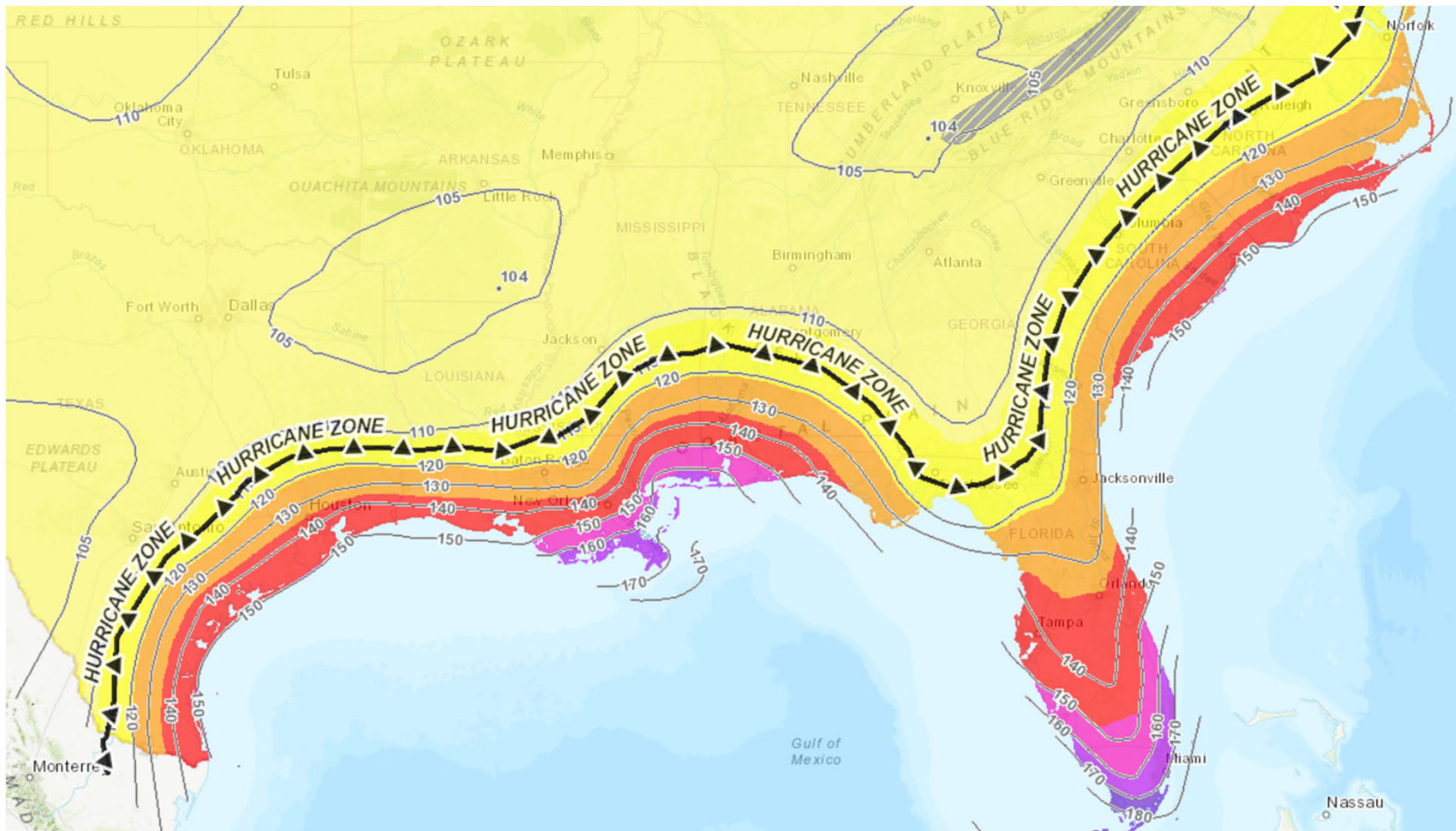


# Specs:

- 2 stories
- 30 units
- 30,000 square feet
- Construction cost = \$3,000,000
- FORTIFIED cost over code
  - \$6,600 - \$38,000
  - 0.23% to 1.27%



# ASCE Wind Zones (<https://asce7hazardtool.online>)

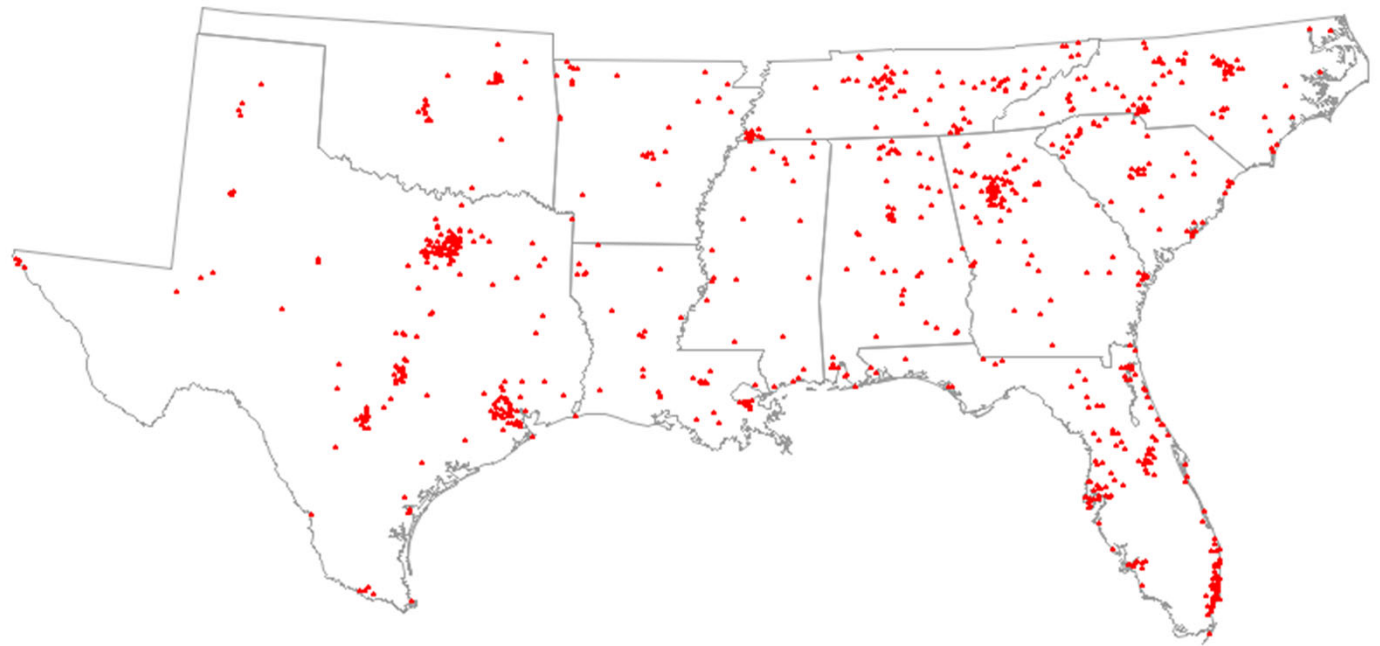


Marginal  
cost

Zone	Fortified Roof	Fortified Gold
Hurricane ( $\geq 140$ )	\$7,000	\$7,000
Hurricane ( $< 140$ )	6,600	38,000
High wind and hail	16,900	16,900

# Willingness to Pay Survey

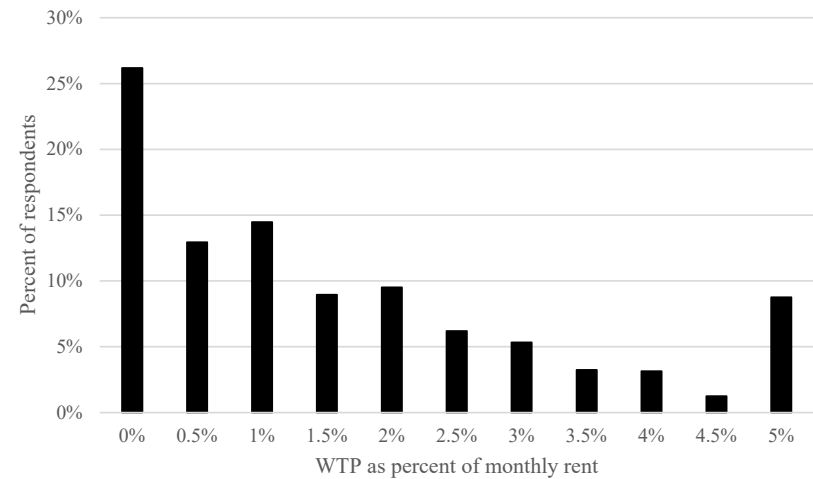
- 2021
- 1,050 Respondents
- 11 states



“How much more rent would you pay to live in a FORTIFIED apartment complex?”

## Willingness to Pay Survey

- 74% willing to pay at least 0.5%
- AR, OK, TN = \$6 / month
- Coastal states = \$12 / month





# Wind Insurance Discounts

Table 2: Average Expected Insurance Premium Reductions from FORTIFIED

FORTIFIED Program	Wind zone	Expected loss	Risk load	Premium			Discount	
				Standard	Roof	Gold	Roof	Gold
Hurricane	>140	\$5,327	\$10,653	\$15,980	\$14,694	\$9,858	\$1,286	\$6,122
Hurricane	$\leq$ 140	2,170	4,340	6,511	5,598	4,254	913	2,256
HWH	<115	2,002	2,002	4,003	3,197	2,784	806	1,219

# Benefit /cost analysis

	Hurricane Roof >140	Hurricane Gold > 140	Hurricane Roof 115-140	Hurricane Gold 115-140	HWH Roof	HWH Gold
1 Loss/insurance savings	\$1,286	\$6,122	\$913	\$2,256	\$806	\$1,219
2 Increased demand	2,160	2,160	2,160	2,160	1,080	1,080
3 Annual benefit	3,446	8,282	3,073	4,416	1,886	2,299
4 Cost	7,000	7,000	6,600	38,000	16,900	16,900
5 Payback period (years)	2.03	0.85	2.15	8.61	8.96	7.35
6 Internal rate of return	49%	118%	47%	10%	9%	12%

# Thank you

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