Measure difference in cost expectations
What buyers expect vs. what they *should* expect to pay

We begin by measuring perceived and rational climate cost expectations, and the difference between them, to quantify the extent of mispricing.

▶ Buyer Expectation / Insurance Assessment:

$$Risk \; = \; \frac{historic \; loss}{frequency} \; * \; \frac{historic \; loss}{severity}$$

▶ Scientific Climate-conditioned Expectations

$$Risk = f\left(hazard \begin{bmatrix} intensity \\ * \\ probability \end{bmatrix}, exposure, vulnerability\right)$$

Source: risQ

Analyze the impact on asset values
Econometric modeling for climate & COVID-19

Valuations reflect many years of cash flow expectations so increasing annual costs coupled with growing uncertainty about new expenses will have large valuation impacts.

▶ Before rationalization

$$Asset \; Value = \frac{Net \; Operating \; Income}{Capitalization \; Rate}$$
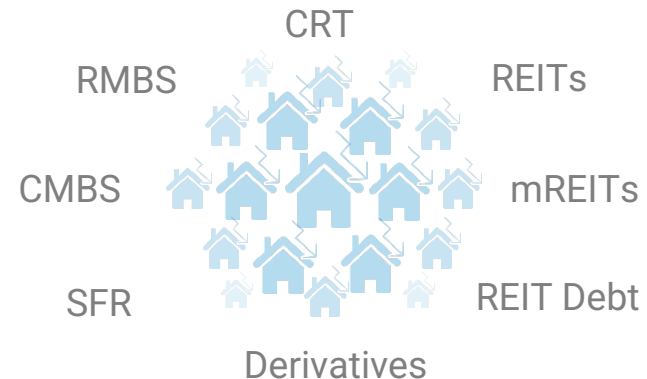
▶ After rationalization

$$Asset \; Value = \frac{NOI - Additional \; Cost \; Expectations}{Cap \; Rate + Additional \; Risk \; Premium}$$

Quantify the impact of changing asset values
Mortgage performance and complex real estate securities and derivatives

Default probabilities and losses accelerate when borrower equity approaches zero. Valuation moves also impact voluntary prepayment speeds and workout strategies.

$$\begin{matrix} Mortgage \\ losses \end{matrix} \; = \; f \begin{pmatrix} FICO \\ Original \; LTV \\ Value \; Appreciation \\ etc. \end{pmatrix}$$

CRT

RMBS   REITs

CMBS   mREITs

SFR   REIT Debt

Derivatives

Estimated Cost Breakdown for Average Home in Madera County, CA

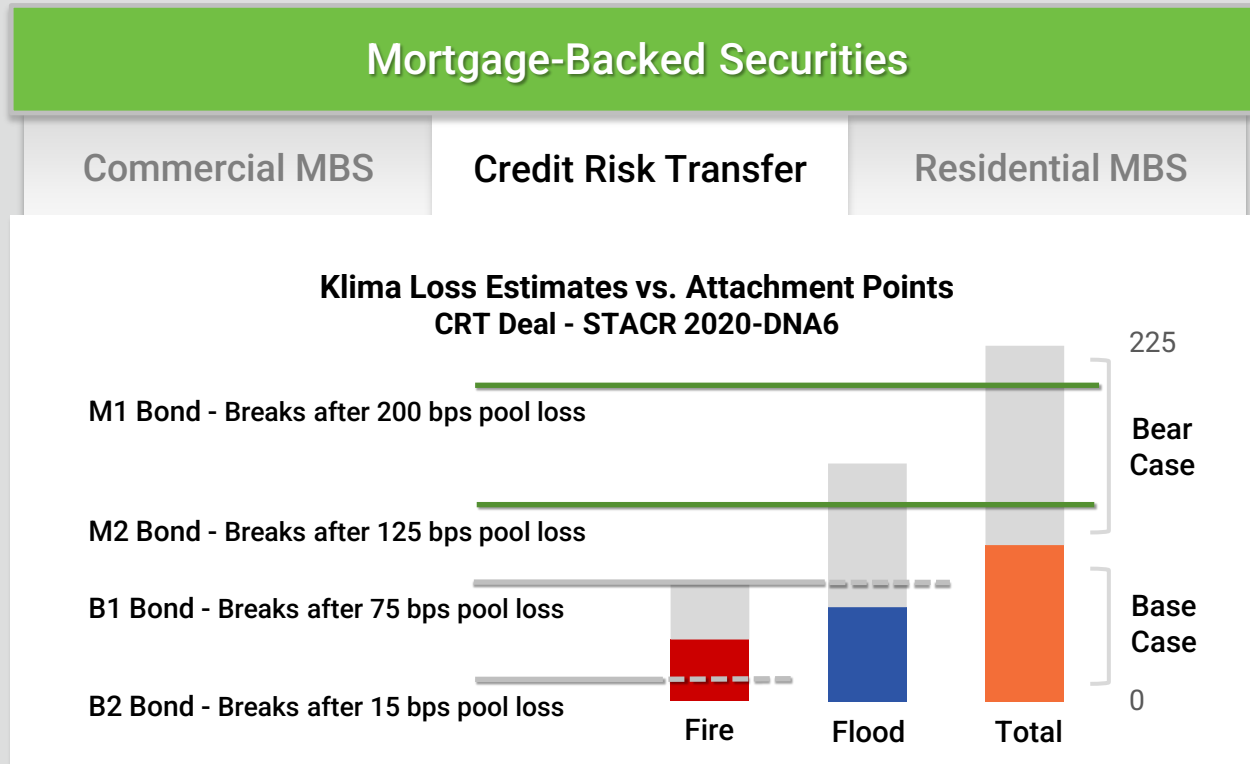|	**Current Climate Costs** (What it costs today.)		**Rational Climate Costs** (What it *should* cost.)	
"Revenue" (Rent Savings)		$27,286		$27,286
Annual Costs	Standard Insurance Policy	($703)	DIC Policy	($457)
	Other Costs - Tax, Maintenance, etc.	($9,494)	Other Costs - Tax, Maintenance, etc.	($9,494)
			CA FAIR Supplemental Ins.	($2,552)
NOI		$17,088		$14,782
CapRate $(r-g)$		4.5%	Base Case 4.5% - (-0.66%) RCP 4.5	Bear Case 4.5% - (-0.97%) RCP 8.5
Home Value		$379,738	$286,575 Base -25%	$229,265 Bear -40%

First of its kind linking technology from Level11 and risQ produces location-precise climate risk estimates for agency loans, blinded to comply with borrower privacy regulations.
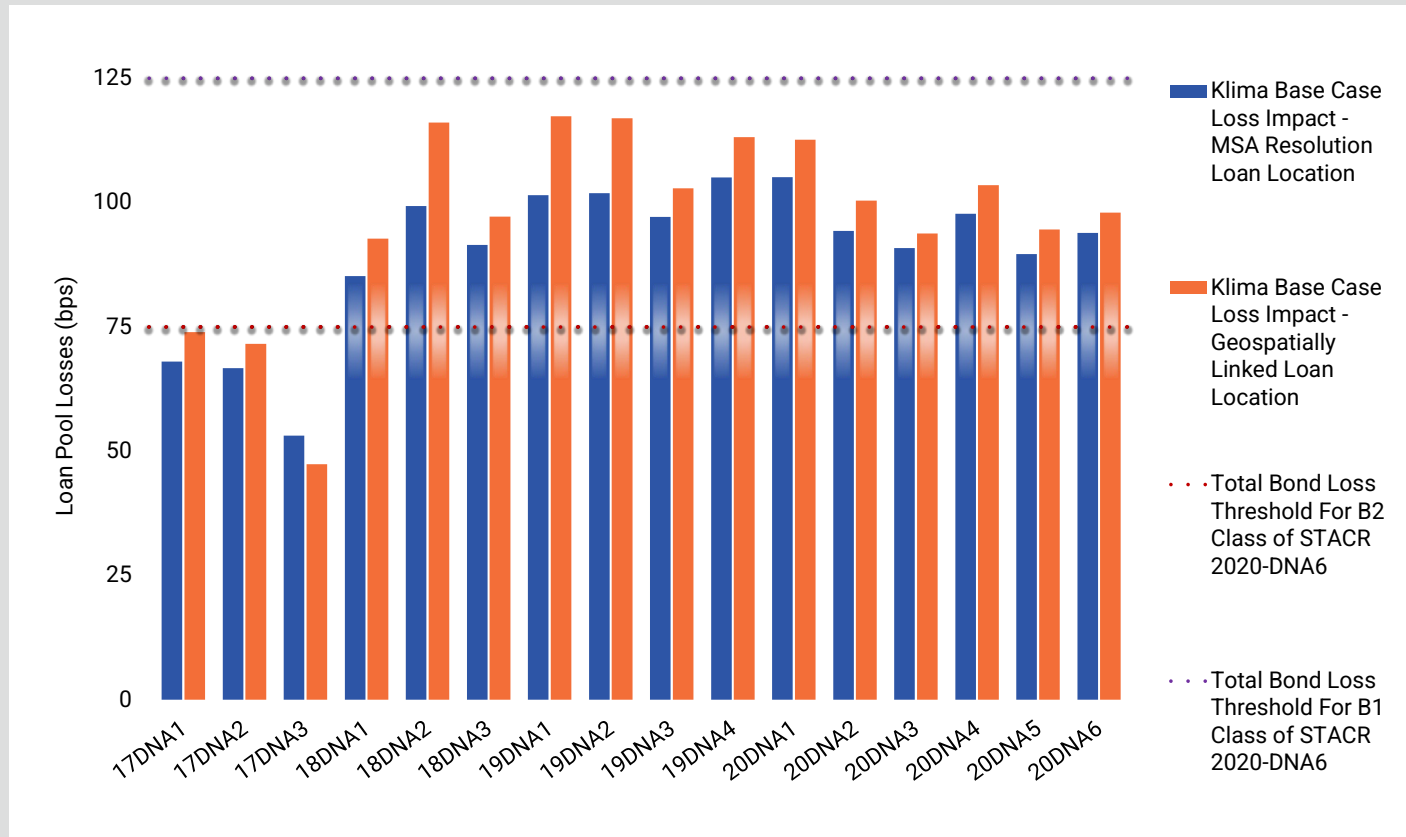
When climate-related loan losses exceed embedded structural protection
➜ 🔺 Investor Principal Losses can erode returns

Mortgage-Backed Securities

Commercial MBS	Credit Risk Transfer	Residential MBS

Klima Loss Estimates vs. Attachment Points
CRT Deal - STACR 2020-DNA6

225

M1 Bond - Breaks after 200 bps pool loss

Bear Case

M2 Bond - Breaks after 125 bps pool loss

B1 Bond - Breaks after 75 bps pool loss

Base Case

B2 Bond - Breaks after 15 bps pool loss

0

Fire Flood Total

Investment directive ➤ Buy bonds that are safe in Base case repricing scenario.

Actionable Insight ➤ Only invest in M1 or M2 bond from DNA6.