GUY CARPENTER

TEXAS WINDSTORM INSURANCE ASSOCIATION

Texas Windstorm Insurance Association
2021 Reinsurance Planning

Meeting of the Board of Directors – February 23, 2021

MARSH & McLENNAN COMPANIES

2021 Reinsurance Planning

TWIA Reinsurance Planning
Key Considerations

- TWIA Exposure Summary
  - Policies; ($370M of written premium; 196k policies)
  - Exposures; ($60.1B exposed limit; $66.3B of insured values)
- Internal Funding Considerations
  - TWIA GWP Premium in 2020 (~$370M)
  - Catastrophe Reserve Trust Fund; (~$180M)
  - Pre/Post Event Debt; (~$1,000M; gross*)
- External Funding Considerations
  - Member Company Assessments; (~$1,000M)
  - Reinsurance up to 100 year – (Cost borne by TWIA)
  - Reinsurance in excess of 100 year – (Cost borne by Member Companies)
- Claims in Excess of Reinsurance – No defined funding

*Pre/Post Event Debt funding is subject to Issuance Expenses and Amortization Costs. These costs meaningfully reduce total claims paying capacity derived from these tranches.

TWIA Reinsurance Planning
Texas Administrative & Insurance Code (Extracts only)

- Texas Insurance Code Sec. 2210.453 (Extracts only)

  (b) The association shall maintain total available loss funding in an amount not less than the probable maximum loss for the association for a **catastrophe year with a probability of one in 100….**

  (d) The cost of the reinsurance purchased or alternative financing mechanisms used under this section in excess of the minimum funding level required by Subsection (b) shall be paid by assessments as provided by this subsection…

- Texas Administrative Code RULE § 5.4102 Definitions (Extracts only)

  (31) Losses--Amounts paid or expected to be paid on association insurance policy claims, **including adjustment expenses**, litigation expenses, other claims expenses, and other amounts that are incurred in resolving a claim for indemnification under an association insurance policy.

- Texas Administrative Code RULE § 5.4160 (Extracts only)

  (b) At the first regular board meeting in each calendar year, but before April 1, the association must **discuss with the board its methodology for determining its one-in-100-year probable maximum loss** for the calendar year….

  (c) After the board meeting described in subsection (b) of this section, but not later than April 1 of each year, the association must disclose to the Commissioner its one-in-100-year probable maximum loss for the calendar year and the association's method for determining that probable maximum loss.

  (d) In disclosing its method for determining its one-in-100-year probable maximum loss, the association must include:

  (1) the **hurricane model or models** it relied on, including the model vendors, the model names, and the versions of each model;

  (2) the **in-force date** and the **total amount of direct exposures** in force for the policy data used as the input for each hurricane model the association relied on;

  (3) all **user-selected hurricane model input assumptions** used with each hurricane model the association relied on;

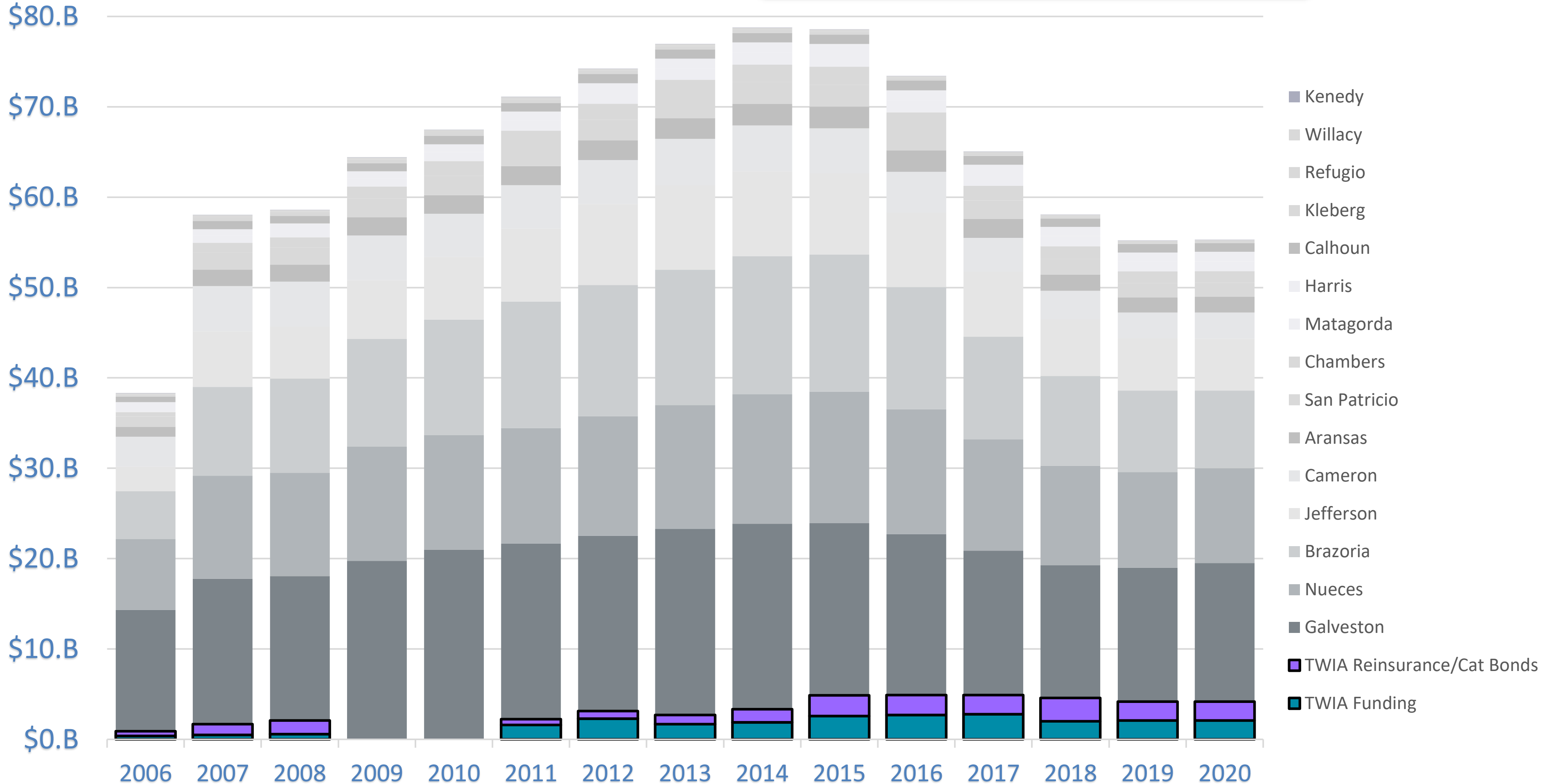
  (4) the **one-in-100-year probable maximum loss model output** produced by each hurricane model the association relied on;

  (5) if the association relied on more than one hurricane model, the methodology the association **used to blend or average** the hurricane model outputs, including all weighting factors used; and

  (6) **any adjustments** the association or another party made to the one-in-100-year probable maximum loss model outputs or the blended or averaged output, including any **adjustments to include loss adjustment expenses**.

TWIA Exposure and Risk Management Perspective
Catastrophe Funding Independent of Catastrophe Modeling

Total Claims Paying Resources ~$4B
Largest Single County Exposure ~$20B
Total Coastal Exposure ~ $55B



Source: TWIA Board of Directors Meeting Materials, Statistical Reports and Historical Data.

TWIA Invited Comment on Independent Rate Report*

Guy Carpenter's Role is that of Risk Management not Rate Making

When managing to a 100-yr PML (or any other target return period), the focus should not be on a Cat event of a specific category or hurricanes that make landfall only in an area with the most concentration. **Rather, the risk management approach should be a holistic one that considers a range of all possible events of different characteristics, size and path which could lead to loss level around the target 100-yr return period (plus any additional non-modeled loss like LAE).**

Guy Carpenter **agrees** that the risk management approach should be a holistic one.

Due to the infrequent nature of hurricane events, using company experience to manage or price for risk would have leave out the potential for losses in many regions, most noticeably in the concentrated Nueces region. Catastrophe models address this weakness by combining historical disaster information with current demographic, building, scientific and insurance data to determine the potential cost of catastrophes. Models are not perfect, but they are continually improving and are industry standard for use in hurricane rate filings and reinsurance purchases.

Guy Carpenter **agrees** that company experience and history are insufficient. Models are explicitly/intentionally used to provide insights beyond the scope of limited underlying data.
We also **agree** they are an industry standard for rate fillings and reinsurance purchasing.

The impact of the WTW recommendation highlighted in grey is approximately $466M less reinsurance limit purchased, which reduces TWIA's reinsurance spend by approximately $16.8M based on our market pricing assumptions for 2021. This results in a reduction of total reinsurance expenses as a % of premium from 18.7% to 16.1%. A reduction in reinsurance cost is a direct decrease to the fixed expenses found in Indication Exhibit 11.

Guy Carpenter **agrees** that TWIA could reduce the reinsurance spend by purchasing less reinsurance. However, we **disagree** that this is an effective Risk Management strategy for TWIA. Absorbing more volatility is not the way most insurance company address funding challenges, claims paying constraints and/or rate inadequacy.

WTW recommends that TWIA continue to utilize a multi-model approach; however, adjust the weighting from 50%/50% RMS/AIR to the below:

- Gross Modeled Hurricane Loss Ratio - **75%/25% RMS/AIR**
- Reinsurance Limit and PML determination - **75%/25% RMS/AIR**
- Modeled loss cost to reinsurance layer within rate filing - **50%/50% RMS/AIR**
  - This figure is used for the allocation of reinsurance cost, an amount determined by the reinsurance market. Since TWIA cannot control how a 3rd party reinsurer prices the reinsurance program, we believe a 50%/50% weight is a prudent long-term approach for this metric.

We believe the RMS model is a better fit for TWIA's Texas Tier I portfolio given its geographic and risk profile. For the purpose of rate filing and the 1-100 PML determination, we believe TWIA should continue to take into consideration AIR's view of risk, albeit with less weight. Although based on sound science and methodologies, there is still a high degree of uncertainty in modeled loss results from both models. Incorporating multiple views in risk management decision reduces uncertainties due to potential model change and provides a hedge against any potential unknown factors not considered in our analysis. Our recommendation is only valid when used in conjunction with our recommended use of long-term rates for hurricane modeling.

Guy Carpenter **disagrees** that one model has proven superior to the other in quantifying TWIA's risk.

The reason (historically) that TWIA has selected a blended view is to give equal weight to the research, analytics, science, expert opinion, and refinement that underpin two independent methodologies, as developed over decades.

While TWIA can take a view of it's portfolio of risk in any way it chooses, we have **no reason to believe that one model is now more accurate than the other** when evaluating TWIA's portfolio. Certainly not in a way that supports meaningfully reducing TWIA's ability to pay claims.

*Source: www.twia.org; *Residential and Commercial Rate Level Indications, September 4, 2020*

Hurricane Model Observations

- **Model Differences:** TWIA has considered a multiple model approach for at least 20 years. Model differences are readily identifiable and have been reviewed with TWIA at length historically. ***There is no persuasive evidence to suggest that one model is more accurate than the other.***

- **Primary and Secondary Modifiers:** We request and review all exposure data with TWIA prior to every modeling analysis. All risk characteristics and data assumptions are incorporated as and when available, reviewed & confirmed by TWIA. While it is best practice to include all available information, ***a higher number of secondary risk characteristics does not necessarily make the results more accurate*.**

- **Frequency Assumptions:** ***Neither models' assumptions are outside the range of reasonableness***. Both are widely used in Texas and in all other catastrophe prone areas.
  - "Near Term" – TWIA considers the near term perspective relative to coverage; Reinsurance Limit provides funding over a relatively short period of time, i.e. events occurring in the next treaty year.
  - "Long Term" – TWIA considers the long term perspective relative to the cost of coverage; Reinsurance Premium distributes annual volatility over a relatively long period of time;

- **Correlation to PCS Losses:** we review "model-to-actual" losses before, during and after every historical event. ***Both models have meaningfully underestimated TWIA's actual experience*** in its largest losses.

With no persuasive evidence that one model is more suitable than another, our recommendation from a Risk Management perspective is that TWIA maintain an equal blend of both models when determining its 1-100yr exposure

Catastrophe Modeling – Primary and Secondary Modifiers
TWIA & Peer Group (12 Wind Exposed Residual Markets)

Primary modifiers *are required data fields in catastrophe models. These attributes have the largest impact to modeling results, and the more accurately they are reported, the more accurate the modeling result will be.*

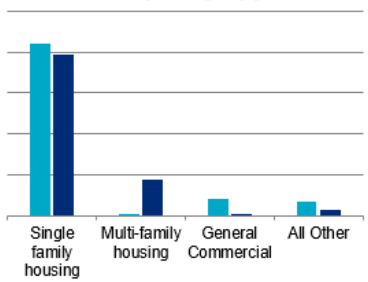
Secondary modifiers *include another layer of information about a particular property and they also contribute to a more accurate modeling result. These attributes are not required by catastrophe models but they should be included in catastrophe modeling data when possible.*

Primary Modifiers

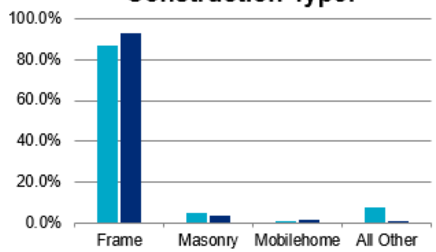
Geocode Level:
Street Address or better
95.9% TWIA **96.8%** Index

Number of Stories:
Unknown
0.7% TWIA **10.8%** Index

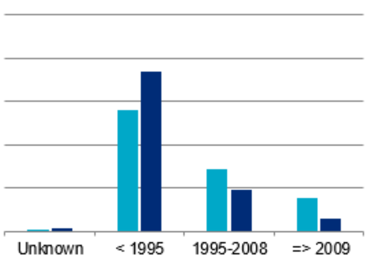
Occupancy Type:



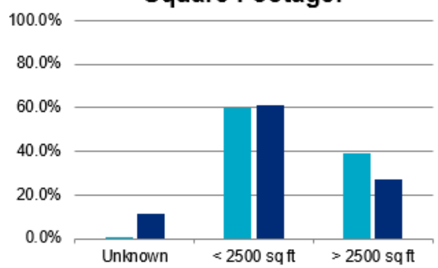
Construction Type:



Year Built:



Square Footage:



■ TWIA ■ Residual Market Index

Secondary Modifiers

Modifier	TWIA Captured	TWIA Not Captured	# of Res Mkts that capture & average %
Construction Quality	30.4%	69.6%	2 – 0.25%
Roof Covering	92.4%	7.6%	3 – 90.5%
Roof Age	97.1%	2.9%	4 – 90.6%
Roof Geometry	40.1%	59.9%	3 – 33.8%
Roof Anchor	0.0%	100.0%	1 – 1.5%
Cladding	49.7%	50.3%	5 – 40.8%
Opening Protection	19.3%	80.7%	3 – 0.6%

None of the residual markets included in the index capture the following secondary modifiers: roof equipment hurricane bracing, basement, commercial appurtenant structures, residential appurtenant structures, roof sheathing attachment, frame-foundation connection, ground-level equipment, and flashing and coping quality.

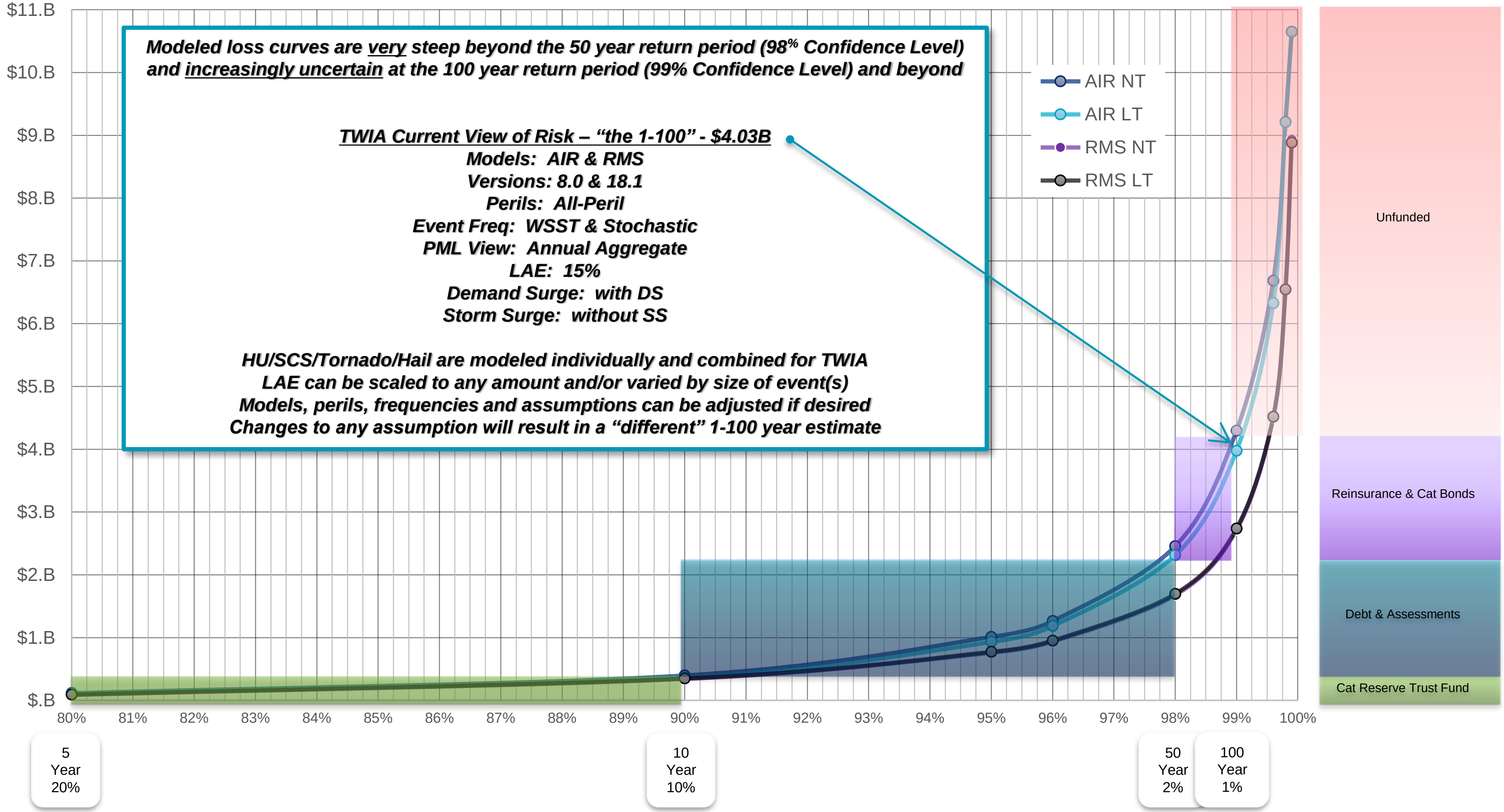
2021 Planning
Exposure & Catastrophe Modeling Summary

			2020 Planning	2021 Planning
TWIA Exposure @ 11/30		Policy Count	201,719	196,129
		Exposed Value(1)	$66.7B	$66.3B
		Exposed Limit(1)	$61.3B	$60.7B
		Projected TIV at 10/31	$58.9B	$58.9B
1-100 Year	**Long Term(2)**	RMS	$2.91B	$2.74B
		AIR	$4.11B	$3.98B
		Average (Loss Only)(3)	$3.51B	$3.36B
		Average (Loss & LAE)(4)	$4.04B	$3.86B
	Near Term(2)	RMS	$2.89B	$2.71B
		AIR	$4.38B	$4.30B
		Average (Loss Only)(3)	$3.63B	$3.51B
		Average (Loss & LAE)(4)	$4.18B	$4.03B

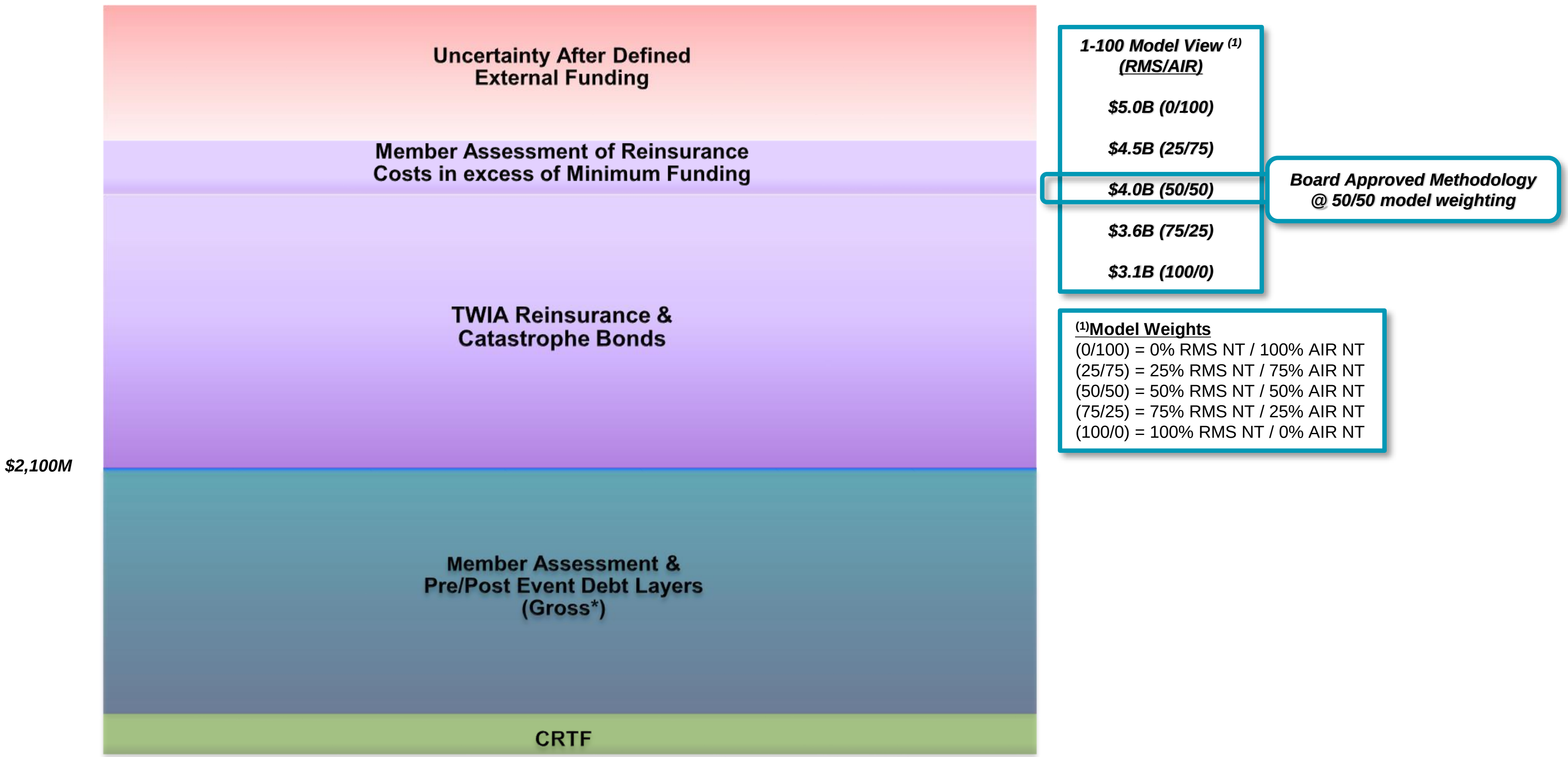
(1) Values and Limits are used within the models in order to evaluate damage as well as coverage.
(2) "Long Term" reflects RMS Long Term and AIR Standard Event rates. "Near Term" reflects RMS Medium Term and AIR WSST Rates
(3) All-peril, aggregate losses, with demand surge, ex-storm surge, 0% LAE
(4) includes 15% LAE which can be adjusted/factored as desired

Board Approved Methodology @ 50/50 model weighting

2021 Planning
Catastrophe Modeling Summary & Current Claims Paying Capacity



2021 Funding Chart
CRTF; Member Assessment; Pre/Post Event Debt; & Reinsurance

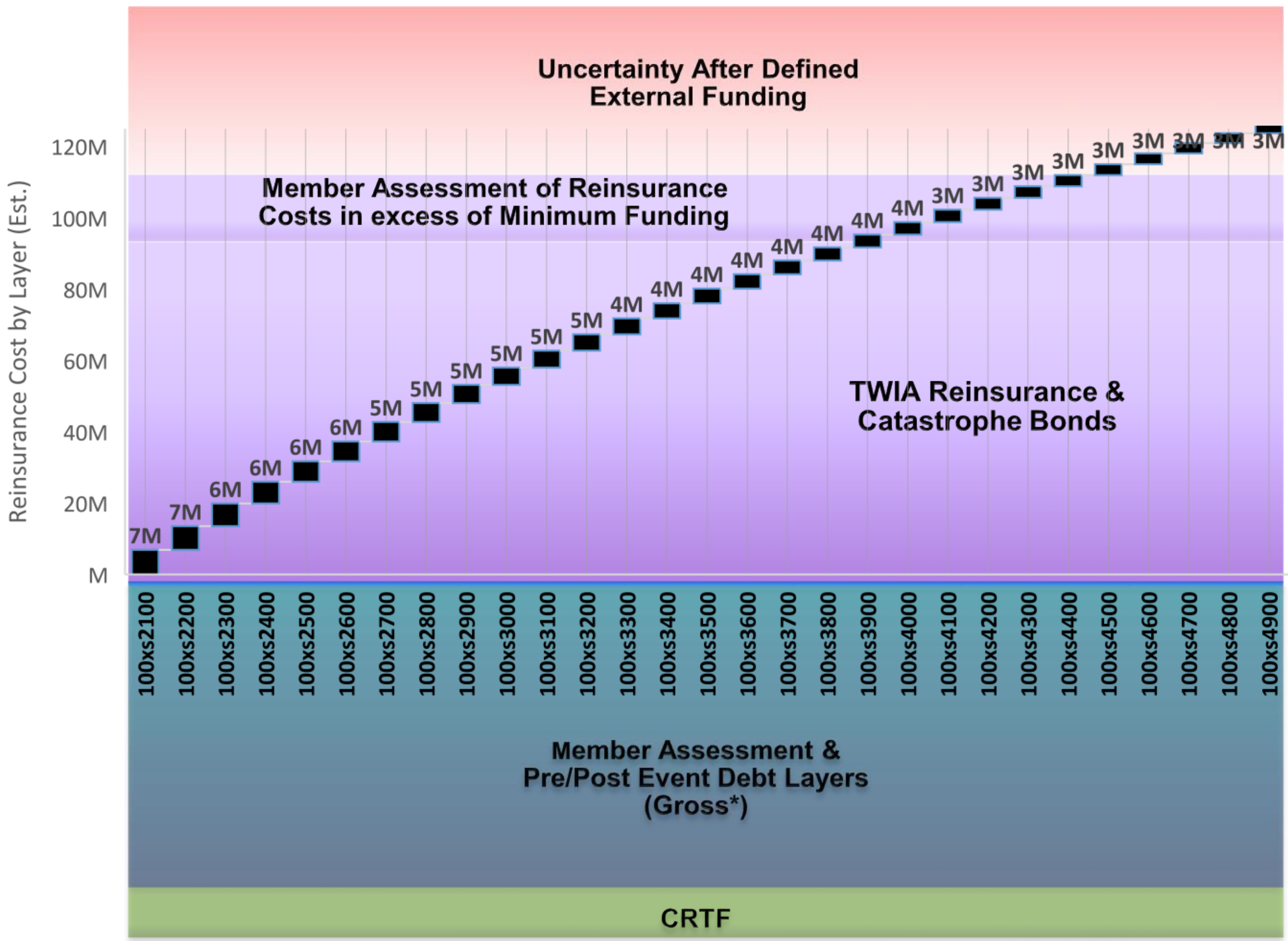


[1] **Model Weights**

(0/100) = 0% RMS NT / 100% AIR NT
(25/75) = 25% RMS NT / 75% AIR NT
(50/50) = 50% RMS NT / 50% AIR NT
(75/25) = 75% RMS NT / 25% AIR NT
(100/0) = 100% RMS NT / 0% AIR NT

***Pre/Post Event Debt funding of $1,000M subject to Issuance Expenses and Amortization Costs. These costs meaningfully reduce total claims paying capacity derived from these tranches. CRTF Balance approximately $180M**

2021 Reinsurance Premium Forecast
Incremental Reinsurance Cost (Est.)



1-100 Model View <u>(RMS/AIR)</u>	***Estimated Reinsurance Cost <u>xs Underlying Funding</u>***
$5.0B (0/100)	***$2,900M xs $2,100M = $126.5M***
$4.5B (25/75)	***$2,400M xs $2,100M = $112.0M***
$4.0B (50/50)	***$1,900M xs $2,100M = $95.3M***
$3.6B (75/25)	***$1,500M xs $2,100M = $80.2M***
$3.1B (100/0)	***$1,000M xs $2,100M = $58.1M***

***Estimated pricing to provide TWIA Board of Directors guidance on estimated cost, structure and layering alternatives. Consider a range of +/- 5% against the overall pricing curve with potential variation by layer at this granular level.**

Final Costs will reflect current market conditions, reinsurance and cat bond quotations, final structure and capacity requirements, changes in exposure and/or experience prior to placement, and other market based factors.

State of the Market
1/1/2021 US Property Cat Aggregate Overview

Pricing

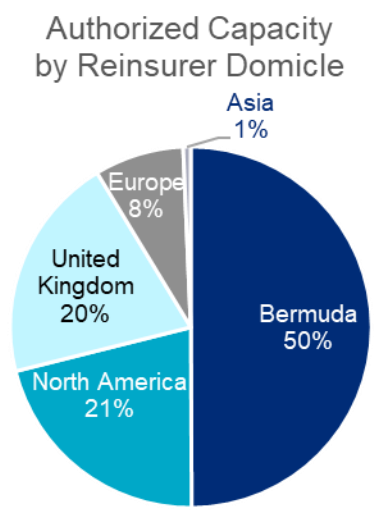
- Non-loss impacted programs risk adjusted flat to +15%
- Loss-impacted programs +20-50%
- Pricing for Aggregate covers continues to be heavily dependent on individual program experience

Terms and Conditions

- Retention increases or structure changes required on some loss-impacted programs, along with rate increases
- Increased market pushback on features such as franchise deductible
- No consensus on Communicable Disease wordings

Capacity

- Overall declining market appetite for catastrophe aggregate, especially for programs where long-term profitability has been a challenge
- Capacity available for long-term purchasers of aggregate products; reluctance from reinsurers to support new programs
- Less interest from new market entrants for this product compared to traditional occurrence covers



Catastrophe Aggregate pricing and capacity driven by long-term profitability

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GC SECURITIES

Disclosure

The source of information for any charts, graphs, or illustrations in this document is GC Securities Proprietary Database 2020, unless otherwise indicated.