

Validus Reinsurance, Ltd. Singapore Branch Public Disclosure

For the fiscal year ended December 31, 2020

Purpose

This document is meant to satisfy the public disclosure requirements, as outlined in Notice 124 of the Monetary Authority of Singapore (the “MAS”), for the Validus Reinsurance, Ltd. Singapore Branch (the “Singapore Branch”).

The information in this document is directly extracted from or based on information from the Validus Reinsurance, Ltd. (“Validus Re Ltd.”) Consolidated Financial Statements, which can be found on the Bermuda Monetary Authority (“BMA”) website located at <http://www.bma.bm>; and the MAS Insurance Company Returns for the Singapore Branch, which can be found on the MAS website located at <http://www.mas.gov.sg/>.

The information provided below is for the fiscal year ended December 31, 2020 and contains disclosures relating to Validus Re Ltd., the parent and head office of the Singapore Branch. Hereinafter, “the Company”, “us” or “we” is used to describe any or all of Validus Re Ltd. and its subsidiary companies.

Note: Paragraph 10 of Notice 124 states: “Where any disclosure which relates to activities conducted at the group* level or at the head office level (as the case may be) has been made at the group level or head office level (as the case may be), a licensed insurer, may cross-refer to those disclosures made at the group level or head office level (as the case may be). *Group refers to the ultimate holding company, its subsidiaries and any other company or entity treated as part of the ultimate holding company’s group of companies according to the Accounting Standards.”

All financial information contained herein relating to Validus Re Ltd. includes results from the Singapore Branch and is expressed in thousands of U.S. dollars utilizing U.S. GAAP unless otherwise indicated. Singapore specific amounts are presented in accordance with the statutory requirements of the annual MAS Insurance Company Returns.

Information provided herein should be referenced in conjunction with additional information provided in the sources cited above.

Company Profile

Validus Re Ltd. was incorporated under the laws of Bermuda on October 19, 2005. The Company is 100% owned by Validus Holdings, Ltd. (the “parent company” or “Validus Holdings”) which was also incorporated under the laws of Bermuda on October 19, 2005. Validus Re Ltd. is registered as a Class 4 insurer under The Insurance Act 1978 of Bermuda, amendments thereto and the Insurance Account Rules 2016 (the “Legislation”). The Company primarily offers treaty reinsurance coverage on a global basis in the Property and Specialty lines markets.

The Company’s Canada branch office commenced writing underwriting business on January 1, 2020. The Canada branch office is subject to regulation by the Office of the Superintendent of Financial Institutions Canada (“OSFI”). Under regulations and guidelines prescribed by OSFI, the Canada branch office is required to maintain prescribed levels of capital, which are dependent on the type and amount of insurance policies in force and the nature of the Canada branch office’s assets.

Most recent capital transactions

On June 15, 2018, the Bermuda Monetary Authority (“BMA”) approved the merger of IPC Re Limited (“IPCRe”) with the Company, with the Company being the surviving entity, in accordance with the provisions of Section 108 of the Companies Act, 1981.

On July 18, 2018, Validus Holdings completed its previously announced definitive agreement and plan of merger (the “Merger Agreement”) with American International Group, Inc. (“AIG”) in accordance with Section 105 of the Bermuda Companies Act 1981. Pursuant to the Merger Agreement, Validus Holdings merged with an existing AIG subsidiary, with Validus Holdings continuing as the surviving corporation and as a wholly-owned subsidiary of AIG.

On September 1, 2018, in order to align Validus Re Ltd.’s U.S. entities (i.e. Validus Specialty, Inc. and all of its subsidiaries including Western World and CRS (“Validus Specialty Group” or “Validus Specialty”)) under AIG’s U.S. consolidated tax group, the Company sold its interest in Validus Specialty Group to AIG Property Casualty Inc. in exchange for a note receivable from AIG International Holdings GmbH.

Nature of the Business

Validus Re Ltd. seeks to establish itself as a leader in the global reinsurance markets. The Company’s principal operating objective is to use capital efficiently by underwriting reinsurance contracts with superior risk and return characteristics. The primary underwriting objective is to construct a portfolio of reinsurance contracts that maximizes return on equity subject to prudent risk constraints on the amount of capital exposed to any single event. Risks are managed through a variety of means, including contract terms, portfolio selection, diversification, including geographic diversification, and proprietary and commercially available third-party vendor catastrophe models.

The Company operates as a global provider of reinsurance products, operating primarily through Validus Reinsurance, Ltd. and Validus Reinsurance (Switzerland) Ltd., as well as Lloyd’s Syndicate 1183, which is managed by Talbot Holdings Ltd.

Validus Re Ltd. maintains a branch office in Singapore which commenced operations in December, 2009 and a branch office in Canada which commenced writing business on January 1, 2020 (as noted above).

The Company, including the Singapore Branch, primarily concentrates on property and other reinsurance risks commonly referred to as short-tail in nature due to the relatively brief period between the occurrence and payment of a claim.

Details of gross premiums written by line of business for the Company, are provided below:

(US Dollars in thousands)	Year Ended December 31, 2020		Year Ended December 31, 2019		Year Ended December 31, 2018	
	Gross	Gross	Gross	Gross	Gross	Gross
	Premiums Written	Premiums Written (%)	Premiums Written	Premiums Written (%)	Premiums Written	Premiums Written (%)
Property	\$ 953,913	39.6%	\$ 1,047,181	52.0%	\$ 793,186	55.4%
Specialty - Short-tail	1,010,864	41.9%	601,856	29.8%	442,731	30.9%
Specialty - Other	444,689	18.5%	366,212	18.2%	195,932	13.7%
Total	\$ 2,409,467	100.0%	\$ 2,015,249	100.0%	\$ 1,431,850	100.0%

Note: Figures provided in the table above and in the line of business descriptions immediately following are based on Validus Re Ltd. Consolidated Financial Statements, excluding the Company's support of Funds at Lloyd's obligations for Lloyd's Syndicate 1183 ("Talbot Syndicate"), an affiliate for the years ended December 31, 2019 and 2018, respectively. The Company's commitment to support Funds at Lloyd's obligations for the Talbot Syndicate ended on December 31, 2019.

Property: The Company primarily underwrites property reinsurance business on a catastrophe excess of loss, per risk excess of loss, aggregate excess of loss and proportional basis.

Property catastrophe excess of loss: Property catastrophe reinsurance covers insurance companies' (referred to as "ceding companies" or "cedants") exposures to an accumulation of property and related losses from separate policies, typically relating to natural disasters or other catastrophic events. Property catastrophe reinsurance is generally written on an excess of loss basis, which responds when aggregate claims and claim expenses from a single occurrence for a covered peril exceed a certain amount specified in a particular contract. (In regards to the Singapore Branch, coverage for property catastrophe in Asia is more evenly distributed between pro-rata and excess of loss). Under these contracts, the Company provides protection to an insurer for a portion of the total losses in excess of a specified loss amount, normally up to a maximum amount per loss and/or an aggregate amount across multiple losses, as specified in the contract. In the event of a loss, most contracts provide for coverage of a second occurrence following the payment of a premium to reinstate the coverage under the contract, which is referred to as a reinstatement premium. The coverage provided under excess of loss reinsurance contracts may be on a worldwide basis or limited in scope to specific regions or geographical areas. Property catastrophe reinsurance contracts are typically written on an "all perils" basis, providing protection against losses from earthquakes and hurricanes, as well as other natural and man-made catastrophes such as floods, tornadoes, fires and storms. Coverages may also be written to provide limited coverage based on named perils only, such as windstorm-only coverage. The predominant exposures covered are losses stemming from property damage and business interruption coverage resulting from a covered peril. Certain risks, such as terrorism, cyber crime, war or nuclear contamination may be excluded, partially or wholly, from certain contracts. Gross premiums written on property catastrophe business during the year ended December 31, 2020 were \$544,748.

Property per risk excess of loss: Property per risk reinsurance provides coverage for ceding companies' excess retention on individual property and related risks, such as highly-valued buildings. Per risk reinsurance protects cedants on a "single risk" basis. A "risk" in this context might relate to one building, or a group of buildings, or to one insurance policy which the cedant treats as a single risk. Coverage is usually triggered by a large loss sustained by an individual risk rather than by smaller losses which fall below the specified retention of the reinsurance contract. Such property per risk coverages are generally written on an excess of loss basis, which provides the reinsured with protection beyond a specified amount up to the limit set within the reinsurance contract. Gross premiums written on property per risk excess of loss business during the year ended December 31, 2020 were \$17,579.

Property aggregate excess of loss: Property aggregate excess of loss provides coverage for ceding companies on an aggregate basis for losses occurring over a specified period of time, typically one year, as opposed to coverage for losses due to one single occurrence. Losses from each occurrence are typically subject to a franchise deductible, and amounts exceeding that deductible are aggregated over the period to determine the aggregate ultimate loss. This aggregate ultimate loss is in turn subject to limits and deductibles in the aggregate. Gross premiums written on property aggregate excess of loss business during the year ended December 31, 2020 were \$181,380.

Property proportional: Property proportional contracts require that the reinsurer share the premiums as well as the losses and loss expenses in an agreed proportion with the reinsured. Gross premiums written on property proportional business during the year ended December 31, 2020 were \$210,206.

Specialty – Short-tail: This line consists of reinsurance on aerospace and aviation, agriculture, composite, marine, other specialty (composed of contingency, crisis management and life and accident & health), technical lines, terrorism, trade credit, and workers' compensation. The Company seeks to underwrite specialty lines with very limited exposure correlation with its property portfolios. The Company's specialty - short-tail lines are written on an excess of loss and proportional basis. Gross premiums written on specialty - short-tail business during the year ended December 31, 2020 were \$1,010,864.

Specialty - Other: This class provides reinsurance on casualty and financial lines of business on both a proportional and excess of loss basis. Gross premiums written on specialty - other business during the year ended December 31, 2020 were \$444,689.

Details of gross premiums written by line of business for the Singapore Branch, based on information provided in the MAS Insurance Company Returns and presented in thousands of Singapore Dollars, are provided below:

(Singapore Dollars in thousands)	Year Ended December 31, 2020		Year Ended December 31, 2019		Year Ended December 31, 2018	
	Gross	Gross	Gross	Gross	Gross	Gross
	Premiums	Premiums	Premiums	Premiums	Premiums	Premiums
	Written	Written (%)	Written	Written (%)	Written	Written (%)
Property	S\$ 46,771	84.8%	S\$ 39,513	76.9%	S\$ 28,862	79.1%
Marine and Aviation	8,250	15.0%	6,225	12.1%	4,069	11.2%
Casualty and Others	145	0.3%	5,663	11.0%	3,547	9.7%
Total	S\$ 55,166	100.0%	S\$ 51,401	100.0%	S\$ 36,478	100.0%

Corporate Governance

Board of Directors

The directors of the Company oversee the management of the Company's business and affairs and are responsible for the corporate governance framework. The directors are elected annually at the Company's annual general meeting and as at December 31, 2020, consisted of the following persons, each of whom is either a senior executive of the Company or of AIG:

- Patrick Boisvert;
- Catherine Duffy; and
- Christopher Schaper

Patrick Boisvert is the Chief Financial Officer of Validus Reinsurance, Ltd. Patrick joined the Company in 2012 and has 25 years of experience, including over 20 years in the financial services industry. Prior to this role, Patrick was the Chief Financial Officer of Flagstone Reinsurance Holdings SA. He was previously Chief Financial Officer of West End Capital Management and Vice-President Fund Administration at BISYS Hedge Fund Services. He started his career with Ernst & Young, and he is a member of the CPA Institute of Québec.

Catherine Duffy serves as AIG's Country Manager in Bermuda. She leads local operations, including a cross-functional team, and drives the achievement of AIG's strategic objectives in Bermuda. Cathy is the "face of AIG" within Bermuda for customers, brokers, reinsurers, and others. She also coordinates with North American product leaders to provide direction to local underwriting teams. Cathy is a veteran of the Bermuda International Insurance Industry with experience across many aspects of the industry. She was the first Bermudian woman to gain her CPCU and the author of the first comprehensive book tracing the historical development of the International Insurance Industry, *Held Captive - A History of International Insurance in Bermuda*. Cathy earned a Bachelor Business Administration in Insurance from Howard University. She has completed executive management programs through MIT as well as Wharton. Recently Cathy was chosen to be a Fellow in the Women's International Forum.

Christopher (Chris) Schaper is responsible for AIG's assumed reinsurance business which brings together the business operations of Validus Re Ltd., AlphaCat and Talbot Treaty under one global enterprise of AIG RE. Chris has over 30 years of insurance and reinsurance industry experience. He joins AIG from Marsh & McLennan Companies, where he was CEO of Victor Insurance Holdings, Marsh's managing general agent business and one of the largest MGA's in the world. He joined Marsh in 2016 and was also a member of the Marsh Operating Committee. Prior to that, Mr. Schaper served as President of Montpelier Re Ltd. and Underwriting Chairman of Blue Capital, Montpelier's capital markets entity. Previously, Mr. Schaper held several leadership positions at Endurance Specialty Insurance Ltd., including Chief Underwriting Officer and Head of Reinsurance, and Head of Casualty Treaty Reinsurance. Earlier in his career, Mr. Schaper held roles at Gerling Global Financial Products, Employers Reinsurance Corporation (a division of GE Capital), CIGNA and USF&G.

Executive Officers:

The Company's executive officers are responsible for the development and execution of the Company's internal controls, budgets, strategic plans and objectives. As at December 31, 2020, the executive officers consisted of the following persons:

- Christopher Schaper;
- Patrick Boisvert;
- Kevin Downs;
- Brant Kizer;
- Stephen Bardill;
- Marc Haushofer;
- Paul Roberts;
- Jesse DeCouto;
- Andrew Tudor-Thomas;
- Angeline Ang;
- Heather Legg; and
- Lorraine Dean.

Christopher (Chris) Schaper – Chief Executive Officer

Chris also serves as a director. Please refer to "Current Directors" section above for details of his experience and qualifications.

Patrick Boisvert – Executive Vice President & Chief Financial Officer

Patrick also serves as a director. Please refer to "Current Directors" section above for details of his experience and qualifications.

Kevin Downs has served as Executive Vice President and Chief Actuary of Validus Reinsurance, Ltd. since 2013. Prior to this role, Kevin served as Senior Vice President and Reserving Actuary for Validus Reinsurance Ltd. upon joining the firm in May, 2009. Kevin has over twenty years of experience in the insurance and reinsurance industry, serving previously as a Senior Consulting Actuary for Towers Perrin, where he was responsible for managing the firm's relationship with various Bermuda reinsurance companies. Prior to joining Towers, Kevin worked for ACE Ltd. in both Philadelphia and London, where he was involved in reserving and settling liabilities for the firm's long-tail legacy exposures. Kevin began his career as a Pricing Actuary at General Accident Insurance in Philadelphia. Kevin holds a B.S. degree in Mathematics from the University of Notre Dame and is a Fellow of the Casualty Actuarial Society.

Brant Kizer has served as Senior Vice President and Chief Risk Officer of Validus Reinsurance, Ltd. since 2013. Prior to this role, Brant served as Vice President of Group Risk for Validus Holdings, Ltd. since joining the firm in February 2012. Brant has over 25 years of experience in the insurance and reinsurance industry, serving previously as Assistant Director, Risk Analytics with the Bermuda Monetary Authority, where he led the Internal Capital Model review initiative, from January 2009 to February 2012. Prior to joining the BMA, Brant served as Director of Capital Markets Development Corporation from June 2007 to January 2009, Vice President then President and Director of Select Reinsurance Ltd. from June 2000 to June 2007 and Assistant Vice President of XL Capital Ltd. from May 1997 to June 2000. Before moving to Bermuda, Brant began his career at USAA in San Antonio, Texas. Brant holds a B.B.A. in Finance and Actuarial Science from the University of Texas at Austin, where he graduated with High Honors.

Stephen C. Bardill has been Executive Vice President of Validus Reinsurance, Ltd. since its formation in December 2005. He is responsible for International property reinsurance and the overseas offices of the

Company. He has over 25 years of insurance/reinsurance experience and was previously Vice President of IPC Re, Bermuda from 1997 to November 2005. Previous employers include Norwich Winterthur Reinsurance in London and Royal Insurance, UK. Stephen is ACII qualified and a graduate of the University of North London.

Marc Haushofer is Executive Vice President of Validus Reinsurance, Ltd. Marc joined the Company in 2008 to head the Asia-Pacific region. Under his management, the company opened a representative office in early 2009 followed by a Branch at the end of the same year. Marc has been elected as Chairman of the Singapore Reinsurers' Association in 2016 and has just been reconfirmed. Prior to his assignment with Validus Re Ltd., he was the CEO of Munich Re's Singapore Branch Office for South-East Asia. He has 35 years of extensive insurance and reinsurance industry experience, with over 25 years dedicated to the Asian marketplace.

Paul Roberts was recently promoted to Executive Vice President, Head of Marine and Energy for Validus Re Ltd. based in Bermuda. He started his career at Willis Faber and Dumas in 1985 and worked in both the Marine Excess of Loss Treaty department in London and New York as a Divisional Director with responsibilities for London market and international clients. In 1996, Paul moved to Allianz Cornhill where he assumed responsibility for the Marine Excess of Loss Account, a worldwide portfolio. In 2002, Paul moved to Bermuda with Rosemont Reinsurance as an SVP with responsibility for the Marine Reinsurance portfolio. This was followed by a move in December 2005 to be one of the founding members of Validus Reinsurance, Ltd., as SVP Underwriting for the Marine Treaty portfolio. Since then, Paul has held various roles within the broader group including Talbot Treaty and latterly SVP in Zurich with Validus Reinsurance (Switzerland) Ltd with responsibility for the Marine, Energy and Specialty portfolio written by the Swiss company.

Jesse DeCouto is Executive Vice President and leads the Financial Lines segment at Validus Reinsurance, Ltd., which includes Mortgage, Trade Credit, Structured Credit, Political Risk and Surety. Jesse joined Validus Re Ltd. in 2007 as a Vice President and Specialty Lines Underwriter and was a Senior Vice President for Marine & Energy and Specialty Lines Underwriting. Prior to joining Validus Re Ltd., Jesse worked at Partner Re for a total of 8 years as a U.S. Property Cat Underwriter in Bermuda and a Pricing Actuary for Partner Re in Greenwich, Connecticut. Jesse earned his MBA at the College of Insurance, New York in Financial Risk Management and his B.S. in Biomedical Engineering from the University of Miami, Florida. Jesse is an Associate of the Casualty Actuarial Society.

Andrew Tudor-Thomas was recently promoted to Executive Vice President, Head of US Property for Validus Re Ltd. based in Bermuda. He is responsible for developing and executing the US Property department business plan and strategy, incorporating platforms in Bermuda, London and New York. Andrew has worked at Validus Re Ltd. since January 2013 where he joined as Vice President. Andrew previously worked as a US Treaty underwriter for Beazley Syndicates at Lloyds and started his career at Guy Carpenter in London working in the US Wholesale Treaty team. Andrew is an Associate of The Chartered Insurance Institute (ACII).

Angeline Ang is Senior Vice President and Financial Controller for the Validus Re Ltd. Singapore Branch. She joined the company in 2009 and is responsible for all financial accounting & regulatory requirements of the Branch office.

Heather Legg serves as the Chief Agent of the Canadian Branch of Validus Reinsurance, Ltd. Heather has 25 years of experience in the Canadian reinsurance industry, 22 of which have been in the role of a reinsurance intermediary, starting with Guy Carpenter and spending the last 19 years with Aon. Heather earned a Masters in Business Administration from McGill University. She is a Fellow, Certified Insurance Professional and currently serves as Chair of the Board of Directors of Against the Grain Theatre.

Lorraine Dean served as Company Secretary for the Validus group since March 2008. Previously, Lorraine held similar positions with Global Crossing and Appleby Spurling Kempe. As at the date of issuance of this report, Lorraine is no longer an Officer for Validus Re Ltd.

Enterprise Risk Management

Risk Management Framework

The Company promotes sound risk management practices at all levels of the organization, and has implemented an Enterprise Risk Management (“ERM”) framework (the “Framework”) that is aligned with the Company’s culture and responds to the needs of the business. The Framework establishes, identifies, assesses, quantifies and manages risks and opportunities. The Framework is designed to:

- Establish the principles by which the Company can evaluate the risk/reward trade-offs associated with key strategic and tactical decisions.
- Establish a risk governance structure that, in respect of all activities related to ERM, operates with clearly defined roles and responsibilities.
- Identify and assess all risks and causes of risks arising out of the Company’s strategic initiatives, internal processes, and external environment.
- Establish a set of responses to manage the Company’s risks within its stated risk appetite and risk tolerances.
- Establish procedures through which near miss and actual incidents, that either have the potential to impact or have impacted the Company, are reported and reviewed in order to inform the risk identification and assessment process.

Risk Governance:

Our risk governance philosophy reflects the overall governance of the Company while adhering to the overall strategy of the Company.

The Company’s Board of Directors provides broad oversight of risk management for Validus Re Ltd. and is responsible for, among other things, approving the Framework, working with management to ensure ongoing, effective implementation of the Framework and reviewing the Company’s specific risk limits as defined in the Framework, including limits related to major categories of risk. The implementation of risk policies and oversight of risk management is the responsibility of the Validus Re Risk Management Committee (“VRMC”). The VRMC reports to the Company’s Board of Directors and is governed by a charter that is reviewed and approved annually. The VRMC also has a subcommittee, the Model Validation Subcommittee, which is governed by a charter that is reviewed annually. Various risk policies are in place to facilitate consistent risk assessment across the Company and to ensure that strategic business decisions are supported by effective modeling and analysis.

Risk Appetite

The Company’s risk appetite is expressed through a series of qualitative and quantitative statements, principles, limits, and tolerances that, in the aggregate, convey the Company’s risk and reward preferences and set the risk parameters within which the Company operates. The risk appetite is proposed by management and approved by the Board of Directors.

The significant quantitative measures include meeting minimum returns on capital and risk-adjusted capital over a full insurance industry cycle, managing the probability of break-even net income or better, meeting or exceeding budgeted net income over a calendar year, and managing the probability of losing specified percentages of shareholders’ equity in a calendar year. They also include probability thresholds in respect of maintaining a buffer above regulatory and rating agency capital levels.

The Company also sets levels of concentration risks within its risk appetite, including those related to probable maximum losses, zonal aggregates and the contribution of various risk categories to the overall assessment of the Company's risk capital.

Risk Classification

Risks are broadly divided into those that the Company assumes explicitly and from which it derives income and those that are a by-product of the operating and business environment, from which the Company does not earn income.

The risks assumed are categorized as catastrophe, reserve and premium risks (also together referred to as insurance risk), market (or investment) risk and credit risk. The Company's goal is to get adequately compensated for these risks, while creating optimal insurance and investment portfolios subject to the constraints of the Company's risk appetite. The remaining risks are categorized as operational and strategic risks, which typically include emerging risks, for which the Company's goal is to identify, assess and mitigate to the extent considered appropriate.

Risk Ownership

The Company's risk management philosophy is to entrust risk identification and control activities with the employees who have the responsibility for and expertise in the areas giving rise to each risk. This approach not only creates workflow efficiencies, it also promotes awareness of and accountability for risk at all levels of the Company. As such, primary risk ownership is assigned to the managers of functional areas. The risk identification and control activities are embedded in the job descriptions of risk owners and control operators and monitored by the VRMC.

Risk Assessment, Control and Mitigation

The Company performs a regular risk assessment process that considers the likelihood and impact of causes of risk, both before and after the existence of relevant controls. The approaches used to identify and update causes of risk include scenario building, incident and near-miss reporting and market intelligence. We have established controls to appropriately manage the likelihood and impact of risks, focused on those with the most significance and after considering the tolerance level established for each risk. We may also design new controls in response to the incident reporting process.

The Company also has in place policies, including underwriting, investment, and credit policies, to manage the assumption of risk. These policies provide for the Company's risk limits, tolerance levels and other guidelines, as well as the processes for ensuring compliance with the desired risk profile of the Company. The Company has at its disposal a variety of risk mitigation tools, including the purchase of reinsurance and retrocessional coverage, which it uses to ensure that its risk profile stays within prescribed limits and tolerance levels.

Exposure Management

In order to manage the assumption of insurance risk, the Company has established risk limits through both qualitative and quantitative considerations, including market share, history of and expertise in a class of business or jurisdiction, transparency and symmetry of available information, reliability of pricing models and availability and cost of reinsurance. These limits are reviewed at least annually and aligned to the overall risk appetite established by the Company's Board of Directors. In addition, an exposure management policy is in place to ensure appropriate and consistent risk assessment and aggregation of exposures that accumulate.

Three tools are used to measure and manage exposures:

- Absolute maximum limits - these are defined based on the underlying peril or coverage and include measures such as zonal aggregates, which convey the maximum contractual loss exposure.

- Probable maximum loss - these are defined where probabilistic event sets exist for underlying perils and are established for most natural catastrophe, aviation and upstream energy coverage, and convey an extreme but likely loss exposure.
- Realistic disaster scenarios ("RDSs") - these are either prescribed by third parties or developed internally and convey a more intuitive view of potential loss outcomes.

The Company will often use multiple tools to validate its exposure measurement and ensures that at least one of these tools is available for each class of business.

Model Validation Framework

The Company relies extensively on a wide range of models to support key decisions made across the business, and has implemented a Model Validation Framework to establish a uniform set of validation and governance standards that ensure the quality and reliability of key models across the Company.

Portfolio Optimization:

The Company has developed a comprehensive and integrated Economic Capital Model ("ECM") framework to facilitate the consistent assessment of risk, including risks classified as operational. This framework includes assessment at the individual operating company level, as well as across the Company. Using the ECM framework, the Company is able to assess the impact on risk appetite metrics of key strategic and tactical decisions as well as the risk/return trade-offs associated with these decisions, including growth strategy, new product launch, business mix and retrocession strategy, mergers and acquisitions, planning and budgeting, investment strategy and capital management.

It is the goal of the Company to make the most efficient use of its capital and to achieve an adequate return for its shareholders. To that end, the Company seeks to maximize net income given the amount of capital at risk and subject to the risk limits, tolerance levels and other constraints that are imposed by our business, regulatory, and rating agency environments. The Company has therefore put in place portfolio optimization procedures, including the integrated use of the ECM within the annual planning process, in order to help shape portfolios that optimize their respective risk return profiles.

Underwriting Risk Management

The Company's underwriters manage risk by monitoring a number of qualitative and quantitative indicators. Our in-house pricing platform, the Validus Capital Allocation and Pricing System ("VCAPS"), a proprietary computer-based system for modeling, pricing, allocating capital and analyzing catastrophe-exposed risks, provides reinsurance underwriters with a real-time view of the risk-adjusted profitability of each account. This tool allows our underwriters to examine the effects of contract terms and conditions as well as analyze the contribution of a contract to our overall risk capital and its impact on the projected incurred loss for one of our key stress scenarios. The Company believes that giving our underwriters the tools to make sound decisions is critical to our long-term success. To that end, we strive to create an environment that promotes close cooperation between our underwriting, catastrophe modeling, risk, claims, and actuarial functions.

All of the Company's underwriters adhere to a strict set of underwriting guidelines and letters of authority that specifically address the limits of their underwriting authority and their referral criteria.

The Company's current underwriting guidelines and letters of authority include:

- Lines of business that a particular underwriter is authorized to write;
- Exposure limits by line of business;
- Contractual exposures and limits requiring mandatory referrals; and
- Levels of analysis to be performed by lines of business.

In general, our underwriting approach is to:

- Seek high quality clients who have demonstrated superior performance over an extended period;
- Evaluate our clients' exposures and make adjustments where their exposure is not adequately reflected;
- Apply the comprehensive knowledge and experience of our entire underwriting team to make progressive and cohesive decisions about the business they underwrite; and
- Employ our well-founded and carefully maintained market contacts within the group to enhance our robust distribution capabilities.

Our underwriters have the responsibility to analyze all submissions and determine if the related potential exposures meet with both the Company's risk profile line size and aggregate limitations, in line with the business plan. In order to ensure compliance, we run appropriate management information reports and subject all lines to regular audits.

Use of Models

A pivotal factor in determining whether to found and fund the Company was the opportunity for differentiation based upon superior risk management expertise; specifically, managing catastrophe risk and optimizing our portfolio to generate attractive returns on capital while controlling our exposure to risk, and assembling a management team with the experience and expertise to do so. The Company's proprietary models are updated to reflect the latest science and data for the given peril-region of interest. This has enabled the Company to gain a competitive advantage over those reinsurers who rely exclusively on commercial models for pricing and portfolio management. The Company has made a significant investment in expertise in the risk modeling area to capitalize on this opportunity. The Company has assembled an experienced group of professional experts who operate in an environment designed to enable them to use their expertise as a competitive advantage. While the Company uses both proprietary and commercial probabilistic models, catastrophe risk is ultimately subject to absolute aggregate limitations as discussed above.

Commercial Vendor Models: The Company licenses major commercial vendor models, including RMS and AIR, to assess the adequacy of risk pricing and to monitor its overall exposure to risk in correlated geographic zones for various natural catastrophe perils. The vendor models provide information that enables the Company to aggregate exposures by correlated event loss scenarios, which are probability-weighted. This enables the generation of exceedance probability curves for the portfolio and major geographic areas. All models have their strengths and weaknesses; our internal research efforts target a greater understanding of, and if necessary, changes to frequency and severity for key peril-regions.

The Company also uses its quantitative expertise to improve the reliability of the vendor model outputs and expedite scientific review and operationalization of their findings to formulate its view of risk in the following areas:

- Ceding companies may report insufficient data and many reinsurers may not be sufficiently critical in their analysis of this data. The Company generally scrutinizes data for anomalies that may indicate insufficient data quality. These circumstances are addressed by either declining the program or, if the variances are manageable, by modifying the model inputs and outputs and pricing to reflect insufficient data quality;
- Performing independent checks on the accuracy of reported building characteristics through third-party tools and the use of licensed data sources;
- Prior to making overall adjustments for changes in variable metrics, the Company carefully examines the adjustment against the latest scientific studies and technology available to ensure its impact to the business is thoroughly evaluated before adopting it into its systems; and
- To properly quantify risk, the Company frequently adjusts vendor models in advance of their updates based on the latest scientific studies and claims data from recent events.

In addition, many risks, such as second-event covers, aggregate excess of loss, or attritional loss components, cannot be fully evaluated using the vendor models. In order to better evaluate and price these risks, the Company has developed proprietary analytical tools, such as VCAPS and other models and data sets.

Proprietary Models: In addition to making frequency and severity adjustments to the vendor model outputs, the Company utilizes VCAPS to assist in pricing submissions and monitoring risk aggregation.

VCAPS uses the output of catastrophe models to generate a 100,000-year simulation set, which is used for both pricing and risk management. This approach allows more precise measurement and pricing of risk given the underlying exposures. The two primary benefits of this approach are:

- VCAPS takes into account annual limits, event/franchise/annual aggregate deductibles, and reinstatement premiums. This functionality allows for more accurate evaluation of treaties with a broad range of features, including both common (reinstatement premium and annual limits) and complex features (second or third event coverage, aggregate excess of loss, attritional loss components, covers with varying attachment across different geographical zones or lines of businesses and covers with complicated structures); and
- VCAPS's use of 100,000-year simulations enables robust pricing of catastrophe-exposed business. This capability is possible in real-time operation because the Company has designed a computing hardware platform and software environment to accommodate the significant computing needs.

In addition to VCAPS, the Company uses other proprietary models and other data in evaluating exposures.

Geographic Diversification

The Company actively manages its aggregate exposures by geographic or risk zone to maintain a balanced and diverse portfolio of underlying risks. The coverage the Company is willing to provide for any risk located in a particular zone is limited to a predetermined level, thus limiting the net aggregate loss exposure from all contracts covering risks believed to be located in any zone. Contracts that have “worldwide” territorial limits have exposures in several geographic zones. Generally, if a proposed contract would cause the limit to be exceeded, the contract would be declined, regardless of its desirability, unless the Company buys reinsurance or retrocessional coverage, thereby reducing the net aggregate exposure to the maximum limit permitted or less.

The following table sets forth the gross premiums written allocated to the territory of coverage for the Company:

(US Dollars in thousands)	Year Ended December 31, 2020	
	Gross Premiums Written	Gross Premiums Written (%)
United States	\$ 810,554	33.6%
Worldwide excluding United States ^(a)	67,873	2.8%
Australia and New Zealand	6,295	0.3%
Europe	58,734	2.4%
Latin America and Caribbean	46,831	1.9%
Japan	72,769	3.0%
Canada	23,835	1.0%
Rest of the world ^(b)	38,164	1.6%
Sub-total, non United States	314,501	13.1%
Worldwide including United States ^(a)	519,624	21.6%
Other locations non-specific ^(c)	764,788	31.7%
Total	\$ 2,409,467	100.0%

(a) Represents risks in two or more geographic zones.

(b) Represents risk in one geographic zone.

(c) The other locations non-specific category refers to business for which an analysis of exposure by geographic zone is not applicable since these exposures can span multiple geographic areas and, in some instances, are not fixed locations.

Note: Figures provided in the table above are based on the Validus Re Ltd. Consolidated Financial Statements.

The following table sets forth the gross premiums written by line of business and allocated to the territory of coverage for the Singapore Branch based on information provided in the MAS Insurance Company Returns:

(Singapore Dollars in thousands)	Year Ended December 31, 2020	
	Gross Premiums Written	Gross Premiums Written (%)
China	S\$ 34,086	61.8%
Japan	8,691	15.8%
Korea	11,184	20.3%
Thailand	630	1.1%
Philippines	768	1.4%
Taiwan	855	1.5%
India	-	0.0%
Others	- 1,048	-1.9%
Total	S\$ 55,166	100.0%

The effectiveness of geographic zone limits in managing risk exposure depends on the degree to which an actual event is confined to the zone in question and on the Company's ability to determine the actual location of the risks believed to be covered under a particular insurance or reinsurance contract. Accordingly, there can be no assurance that risk exposure in any particular zone will not exceed that zone's limits. Further control over diversification is achieved through guidelines covering the types and amount of business written in product classes and lines within a class.

Reinsurance Management

The Company enters into reinsurance and retrocession agreements in order to mitigate its accumulation of loss, reduce its liability on individual risks and enable it to underwrite policies with higher limits. The ceding of the risk does not legally discharge the Company from its primary liability for the full amount of the policies, and the Company is therefore required to pay the loss and bear collection risk relating to the possibility that the reinsurer or retrocessionaire fails to meet its obligations under the reinsurance or retrocession agreement.

Retrocession: The Company monitors the opportunity to purchase retrocessional coverage for its reinsurance business on a continual basis and employs the VCAPS modeling system to evaluate the effectiveness of risk mitigation and exposure management relative to the cost. This coverage may be purchased on an indemnity basis as well as on an index basis (e.g., industry loss warranties ("ILWs")). The Company also considers and at times uses alternative retrocessional structures, including collateralized quota share facilities and other capital markets products (e.g. catastrophe bonds), where the pricing and terms are attractive.

When the Company buys retrocessional coverage on an indemnity basis, payment is for an agreed upon portion of the losses actually suffered. In contrast, when the Company buys an ILW cover, which is a reinsurance contract in which the payout is dependent on both the insured loss of the policy purchaser and a measure of the industry-wide loss, payment is made only if both the Company and the industry suffer a loss, as reported by one of a number of independent agencies, in excess of specified threshold amounts. With an ILW, the Company bears the risk of suffering a loss while receiving no payment under the ILW if the industry loss was less than the specified threshold amount.

Reserve for Losses and Loss Expenses

For reinsurance companies, a significant judgment made by management is the estimation of the reserve for losses and loss expenses. The Company establishes its reserve for losses and loss expenses to cover the estimated incurred liability for both reported and unreported claims.

Loss reserves are established due to the significant periods of time that may lapse between the occurrence, reporting and payment of a loss. To recognize liabilities for unpaid losses and loss expenses, the Company estimates future amounts needed to pay claims and related expenses with respect to insured events. The Company's reserving practices and the establishment of any particular reserve reflects management's judgment concerning sound financial practice and does not represent any admission of liability with respect to any claim. Unpaid losses and loss expense reserves are established for reported claims ("case reserves") and incurred but not reported ("IBNR") claims.

The nature of the Company's high excess of loss liability and catastrophe business can result in loss expenses and payments that are both irregular and significant. Such losses are part of the normal course of business for the Company. Adjustments to reserves for individual years can also be irregular and significant. Conditions and trends that have affected development of liabilities in the past may not necessarily occur in the future. Accordingly, it is inappropriate to extrapolate future redundancies or deficiencies based upon historical experience.

Validus Re Ltd's reinsurance loss reserves are established based upon an estimate of the total cost of claims that have been incurred, including estimates of unpaid liability on known individual claims, the costs of additional case reserves on claims reported but not considered to be adequately reserved in such reporting

("ACRs") and amounts that have been incurred but not yet reported. ACRs are used in certain cases and are calculated based on management's estimate of the required case reserve on an individual claim less the case reserves reported by the client. The Loss Reserve Committee follows catastrophe event ultimate loss reserve estimation procedures for the investigation, analysis, estimation and approval of ultimate loss reserving.

For reported losses, case reserves are established within the parameters of the coverage provided in the impacted reinsurance contracts. Where there is a reported claim for which the reported case reserve is determined to be insufficient, an ACR or individual claim IBNR estimate will be booked that is adjusted as claims notifications are received. Information is obtained from various sources including brokers, proprietary and third party vendor models and internal data regarding reinsured exposures related to the geographic location of the event, as well as other sources. Generally accepted actuarial techniques are used in the IBNR estimation process. Historical insurance industry loss emergence patterns, as well as estimates of future trends in claims severity, frequency and other factors, are used in establishing loss reserves.

Loss reserves represent estimates, including actuarial and statistical projections at a given point in time, of the expectations of the ultimate settlement and administration costs of claims incurred. Such estimates are not precise in that, among other things, they are based on predictions of future developments and estimates of future trends in loss severity and frequency and other variable factors such as inflation, litigation and tort reform. This uncertainty is heightened by the low frequency high severity nature of the reinsurance business written, thereby providing limited claims loss emergence patterns that directly pertain to the reinsurance operations. This continues to necessitate the partial use of industry loss emergence patterns in deriving IBNR, which contribute to the inherent uncertainty within the loss reserve estimation process and therefore will differ from actual experience. Further, expected losses and loss ratios are typically developed in part by using outputs from vendor and proprietary computer models and these expected losses and loss ratios are a significant component in the calculation of IBNR. Finally, the uncertainty surrounding estimated costs is greater in cases where large, unique events have been reported and the associated claims are in early stages of resolution. As a result of these uncertainties, it is likely that the ultimate liability will differ from such estimates, perhaps materially.

The following table represents an analysis of paid and unpaid losses and loss expenses incurred and a reconciliation of the beginning and ending unpaid loss expenses for Validus Re Ltd. as at December 31, 2020 and 2019:

(US Dollars in thousands)	Years Ended December 31	
	2020	2019
Reserve for losses and loss expenses, beginning of year	\$ 2,724,823	\$ 4,127,360
Loss reserves recoverable, beginning of year	(1,119,707)	(1,291,891)
Net reserves for losses and loss expenses, beginning of year	1,605,116	2,835,469
Loss reserves commuted during the year ^(a)	-	(1,113,644)
Increase (decrease) in net reserves for losses and loss expenses in respect of losses occurring in:		
Current year	1,316,354	1,276,172
Prior years	(44,642)	(122,145)
Total incurred losses and loss expenses	1,271,712	1,154,027
Foreign exchange loss (gain)	34,128	9,470
Less net losses and loss expenses paid in respect of losses occurring in:		
Current year	(374,837)	(216,317)
Prior years	(399,340)	(1,063,889)
Total net paid losses	(774,177)	(1,280,206)
Net reserve for losses and loss expenses, end of year	2,136,779	1,605,116
Loss reserves recoverable, end of year	1,074,617	1,119,707
Reserve for losses and loss expenses, end of year	\$ 3,211,396	\$ 2,724,823

(a) On December 31, 2019, the Company commuted certain reinsurance agreements assumed from its affiliate, Talbot 2002 Underwriting Capital Ltd. Refer to Note 16 in the Validus Reinsurance, Ltd. Consolidated Financial Statements, "Related party transactions", for further information.

Incurred losses and loss expenses comprise:

	Years Ended December 31	
	2020	2019
Gross losses and loss expenses	\$ 1,477,480	\$ 1,489,467
Reinsurance recoveries	(205,768)	(335,440)
Net incurred losses and loss expenses	\$ 1,271,712	\$ 1,154,027

Note: Figures provided in the table above are based on the Validus Re Ltd. Consolidated Financial Statements. Insurance liabilities of the Singapore Branch are set in accordance with the MAS Insurance (Valuation and Capital) Regulations 2004. For year ended December 31, 2020, premium and claim liabilities, as provided in the MAS Insurance Company Returns, were S\$20,414 and S\$52,854, respectively.

The following table provides a summary of the Singapore Branch's insurance liabilities by claim and premium categories and by line of business as at December 31, 2020 and 2019:

(Singapore Dollars in thousands)	December 31, 2020		December 31, 2019	
Net reserves by claim and premium categories:				
Net reserves for claims reported and loss expenses	S\$	20,380	S\$	18,278
Net reserves for claims incurred but not reported		32,474		49,847
Net unearned premium reserve		20,414		18,633
Total net insurance liabilities	S\$	73,268	S\$	86,758
Net reserves by line of business:				
Property	S\$	55,918	S\$	66,536
Marine and Aviation		17,066		14,378
Casualty and Others		284		5,844
Total net insurance liabilities	S\$	73,268	S\$	86,758

Capital Adequacy

Validus Re Ltd. has operations which are subject to laws and regulations in the jurisdictions in which they operate, the most significant of which are Bermuda and Switzerland.

Validus Re Ltd. and its subsidiaries are required to maintain certain measures of solvency and liquidity which provide restrictions on declaring dividends and distributions. Statutory capital and surplus as at December 31, 2020 and 2019 and statutory net income for the years ended December 31, 2020 and 2019 for our reinsurance subsidiaries based in our most significant regulatory jurisdictions were as follows:

(US Dollars in thousands)	Statutory Capital and Surplus					
	Required		Actual		Statutory Net Income (Loss)	
	December 31,		December 31,		Years Ended December 31	
	2020	2019	2020	2019	2020	2019
Bermuda	\$ 1,036,557	\$ 866,018	\$ 3,784,457	\$ 3,646,426	\$ 91,797	\$ 394,812
Switzerland	454,000	324,000	1,144,560	1,309,826	(65,266)	87,453

Validus Reinsurance, Ltd. and its reinsurance subsidiaries based in Bermuda are required to maintain minimum statutory capital and surplus equal to the Enhanced Capital Requirement (“ECR”), where applicable, or the Minimum Solvency Margin (“MSM”). The ECR is equal to the higher of the MSM or the Bermuda Solvency Capital Requirement (“BSCR”) model. The BSCR for the relevant insurers for the year ended December 31, 2020 was filed with the BMA in April 2021. Therefore, the required statutory capital and surplus as at December 31, 2020 and 2019 of \$1,036,557 and \$866,018, respectively, are based on the sum of: (1) actual ECR for Validus Reinsurance, Ltd., and (2) minimum solvency margin of a Bermuda-based reinsurance subsidiary. As at December 31, 2020, Validus Reinsurance, Ltd.’s ECR exceeded the MSM of \$449,612 (December 31, 2019: \$788,235).

At December 31, 2020 and 2019, the actual statutory capital and surplus of the Company and the Bermuda based reinsurance subsidiaries exceeded the relevant regulatory requirements.

Validus Reinsurance, Ltd. maintains a branch office in Singapore. As the branch office is not considered a separate entity for regulatory purposes, the required and actual statutory capital and surplus amount includes amounts, as set out above, related to the applicable branch office. The branch office is subject to additional

minimum capital or asset requirements in their country of domicile. At December 31, 2020 and 2019, the actual capital and assets for the branch exceeded the relevant local regulatory requirements.

Additional information relating to Validus Re Ltd.'s statutory and regulatory requirements is provided in the Validus Re Ltd. Consolidated Financial Statements.

Investment Management

The overriding goal of our investment management is capital preservation, such that the assets of the Company are invested to provide for the timely payment of all contractual obligations of policyholders and creditors, ensuring our ability to underwrite future business and to satisfy all regulatory and rating agency requirements. We aim to achieve these objectives through a clearly defined process that is driven by the enterprise-wide risk and capital position of the Company to ensure assets are invested in accordance with our defined financial objectives and risk tolerances. Our approach considers the joint impact of underwriting and investment risks to the Company, in the context of clear prioritization of underwriting needs and opportunities. As such, we structure our investment portfolio to support policyholder reserves and contingent risk exposures with a liquid portfolio of high quality fixed-income investments with a comparable duration profile.

A significant portion of reinsurance contracts written by the Company provide short-tail reinsurance coverage for losses resulting mainly from natural and man-made catastrophes, which could result in payment of a substantial amount of losses at short notice. Accordingly, the Company's investment portfolio is primarily structured to provide liquidity, which means the investment portfolio contains a significant amount of relatively short-term fixed maturity investments. As such, we structure our managed cash and investment portfolio to support policyholder reserves and contingent risk exposures with a liquid portfolio of high quality fixed-income investments with a comparable duration profile.

The Company's Investment Guidelines require investments to have an average duration in the range of 0.75 years to 3.25 years. At December 31, 2020, the average duration of the Company's managed investment portfolio was 1.79 years (December 31, 2019: 2.29 years). This duration is reviewed regularly based on changes in the duration of the Company's liabilities and general market conditions.

The Company's Investment Guidelines also requires certain minimum credit quality standards for its managed fixed maturity portfolio. Further limits on asset classes and security types are also mandated. In addition, the Company stress-tests the downside risks within its asset portfolio using internal and external inputs and stochastic modeling processes to help define and limit asset risks to acceptable levels that are consistent with our overall ERM framework.

The value of the Company's managed fixed maturity portfolio will fluctuate with, among other factors, changes in the interest rate environment and in overall economic conditions. Additionally, the structure of the Company's overall managed investment portfolio exposes the Company to other risks, including insolvency or reduced credit quality of corporate debt securities, prepayment, default and structural risks on asset-backed securities, mortgage-backed securities and bank loans and liquidity risks on certain other investments, including hedge funds, fixed income investment funds and private equity investments.

Consistent with U.S. GAAP, the Company recognizes investments at their fair value in the Consolidated Balance Sheets. Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.

More information regarding investments and related valuation, risks and accounting policies can be found in the Validus Re, Ltd. Consolidated Financial Statements.

The Singapore Branch maintains a liquid portfolio of high quality fixed-income investments with a duration profile commensurate with its insurance liabilities.

Financial Performance

The following table provides consolidated statements of operations and comprehensive income for Validus Re Ltd. for the years ended December 31, 2020 and 2019 (expressed in thousands of U.S. dollars):

(US Dollars in thousands)	December 31, 2020	December 31, 2019
Revenues		
Gross premiums written	\$ 2,409,467	\$ 2,806,989
Reinsurance premiums ceded	(586,263)	(694,867)
Net premiums written	1,823,204	2,112,122
Change in unearned premiums	(180,355)	(230,251)
Net premiums earned	1,642,849	1,881,871
Net investment income	110,589	126,553
Net realized (losses) gains on investments	699	2,458
Net change in unrealized gains on investments	58,874	91,403
Other insurance related income and other income	12,750	62,599
Foreign exchange (losses) gains	(18,517)	4,037
Total revenues	1,807,244	2,168,921
Expenses		
Losses and loss expenses	1,271,712	1,154,027
Policy acquisition costs	354,757	531,679
General and administrative expenses	100,760	118,334
Share compensation expenses	1,686	1,799
Finance expenses	3,290	3,855
Transaction expenses	504	470
Total expenses	1,732,709	1,810,164
Income before taxes and income from operating affiliates and structured notes	74,535	358,757
Tax benefit	8,437	26,303
Loss from operating affiliates	8,245	8,708
Income from structured notes receivable from AlphaCat ILS fund	580	1,044
Net income and comprehensive income	91,797	394,812

Note: Figures provided in the table above are based on the Validus Re Ltd. Consolidated Financial Statements.

The following table provides information from Form 2 – Fund Profit and Loss Account, as provided in the MAS Insurance Company Returns, for the years ended December 31, 2020 and 2019 (expressed in thousands of Singapore dollars):

(Singapore Dollars in thousands)	December 31, 2020		December 31, 2019	
Income				
Gross premiums	S\$	55,166	S\$	51,401
Less: Outward reinsurance premiums		1,407		1,563
Investment revenue		1,964		3,412
Less: Investment expenses		(6)		11
Other income		2,341		185
Total income		<u>58,070</u>		<u>53,424</u>
Expenses				
Gross claims settled		43,763		35,787
Less: Reinsurance recoveries		3,060		5,549
Management expenses		5,292		5,628
Distribution expenses		15,313		12,297
Increase/(decrease) in net policy liabilities		(12,369)		24,481
Provision for doubtful debts/bad debts				-
Taxation expenses				-
Other expenses		391		738
Total Outgo		<u>49,330</u>		<u>73,382</u>
Net Income	S\$	<u>8,740</u>	S\$	<u>(19,958)</u>