

Marsh Energy Insights: Gas transmission loss and insurance trends





CONTENTS

- 1 Developments and Executive Summary
- 2 Gas Transmission Incident Data
 - Gas transmission buying trends analyzed
 - Property all risks - combined loss limits
 - Key property all risks coverage issues
 - Business interruption (BI) coverage
 - Terrorism and business interruption (BI) coverage
 - Cyber
 - Third-party liability (TPL) coverage limits
- 8 Conclusion
- 8 Recent Insight Papers Published by Marsh
- 9 About Marsh

DEVELOPMENTS AND EXECUTIVE SUMMARY

Gas transmission systems, both offshore and onshore, are strategically important assets that are integral to the reliability of power generation, industrial activity, and residential utility supply. Despite the growth currently being witnessed in the industry, Marsh data reveals that the loss incident rate and insurance ratings are declining.

Benchmarking data appears to show a large divergence of limits and coverage relating to gas storage and transmission programs. In many instances, organizations are taking advantage of the low cost of insurance in today's soft market and buying excessive limits for their gas storage and transmission assets. However, statistical analysis suggests it would be better for these companies to buy insurance at the right limit and instead get terrorism, cyber, and liability coverage included in their policy. After all, there is little point in buying insurance with large limits when key perils are excluded.



Paul Nicholson

Managing Director

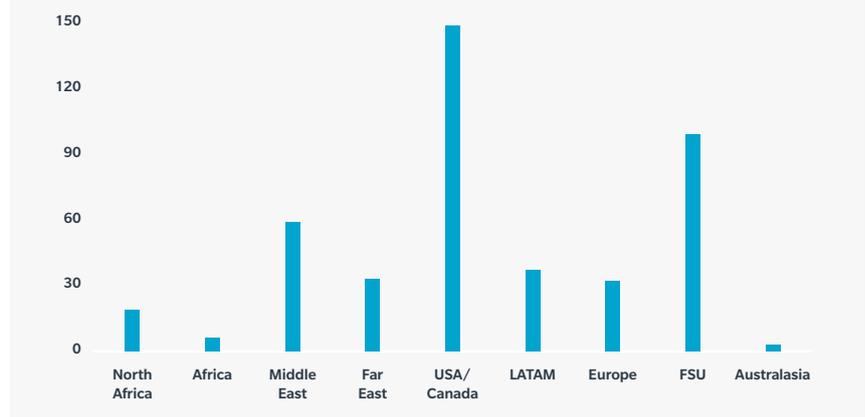
Gas and LNG Leader,

Marsh's Energy & Power Practice

External interference accounted for more than one third (35%) of incidents reported in Europe during the past decade.

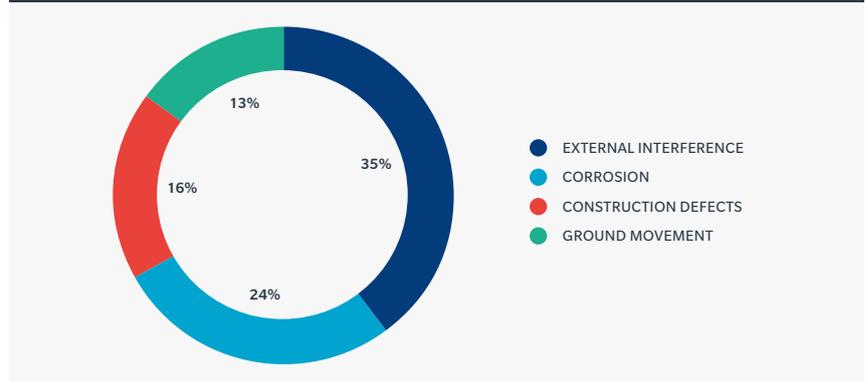
GAS TRANSMISSION INCIDENT DATA

FIGURE 1 Gas transmission incidents by region, 1974-2015
Source: Marsh's Benchmarking Survey Analysis.



Marsh's Energy Loss Database holds a significant number of events (423*) involving gas pipelines in both production and transmission operations (see FIGURE 1). When analyzed by region, the data reflects the size of the industry, with the largest incidence of losses occurring in the US and Former Soviet Union (FSU) countries, where the largest proportion of pipeline networks and processing facilities reside.

FIGURE 2 Causes of European gas transmission incidents 2007-2017
Source: GAS PIPELINE INCIDENTS: 9th Report of the European Gas Pipeline Incident Data Group (1917-2003), European Gas Pipeline Incident Data Group (EGIG), February 2015¹.



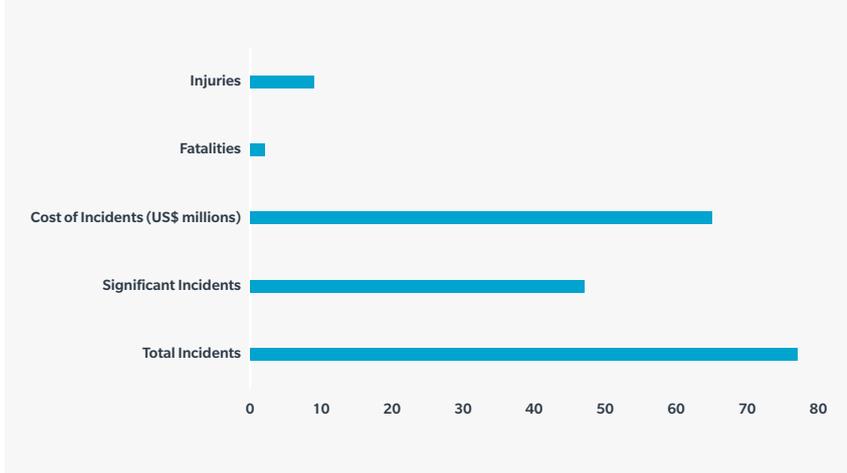
As can be seen in FIGURE 2, external interference accounted for more than one third (35%) of incidents reported in Europe during the past decade. Corrosion accounted for just under one quarter (24%) of incidents, closely followed by construction defects (16%), and ground movement (13%).

* Recorded between 1974 – 2015.

¹ Further data can be obtained from the US National Transportation Safety Board (NTSB) report on gas pipeline integrity, showing the statistical probability and effect of gas transmission incidents.

FIGURE 3 US incident data/average 1997-2017

Source: *Safety Report: Integrity Management of Gas Transmission Pipelines in High Consequence Areas*, National Transportation Safety Board (NTSB), January 2015².



According to *Safety Report: Integrity Management of Gas Transmission Pipelines in High Consequence Areas*, there were 375 gas transmission incidents in the US between 2010 and 2013. It states that incidents attributable to corrosion and material failure of pipe or welds alone resulted in 51 injuries and tragically eight fatalities. The total cost of these incidents was US\$466 million. The report stresses the need for improved integrity management (IM) programs and the reduction of risk threats from corrosion, manufacturing defects, equipment damage, third-party damage, and incorrect operations.

GAS TRANSMISSION INSURANCE BUYING TRENDS ANALYZED

Across our significant account base we have analyzed the insurance buying trends for property damage (PD), business interruption (BI),

third-party liability, sabotage and terrorism, and cyber classes. In all, we have looked at 18 cases – the majority of which are onshore.

PROPERTY ALL RISKS - COMBINED LOSS LIMITS (PD/BI)

Due to the nature of gas transmission systems, loss limits lend themselves to being applied across both PD and BI.

Combined loss limits (PB/BI) are normally determined by a loss analysis and an evaluation of repair times for key compression facilities. Pipelines can be repaired relatively quickly if adequate spare pipe spools are available and structured business continuity plans are in place.



SPOTLIGHT

Ghislenghien, Belgium, 2004

One of the most significant losses happened in Ghislenghien in Belgium in 2004. This loss was the result of external interference, with a gas pipeline close to a pipeline compressor station under construction.

This accident was qualified as Belgium's most serious industrial disaster in half a century. The human toll comprised 24 dead and 132 injured. The heat from the blast was felt nearly two kilometers from the scene of the accident and resulted in an estimated €100 million in damages (as at October 2004).

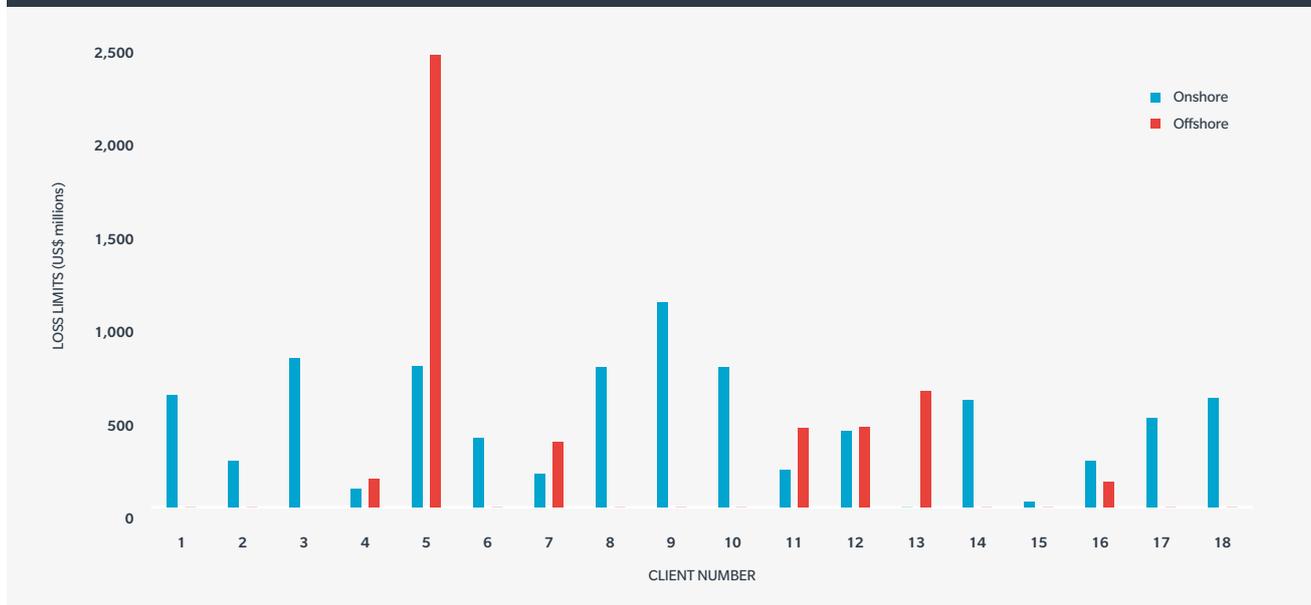
At the Ghislenghien site, the gas leak lasted more than 45 minutes before igniting and, in so doing, creating a pressure surge. This time lapse raised several questions. Experts found that gas had already started leaking from the pipeline, yet no automated shutoff mechanism had been triggered and no technician had been dispatched to the scene.

Over the past few years, considerable progress has been achieved in the design, construction, and monitoring of pipelines. Improvements, such as a revamped marking system, the use of concrete slabs during installation or construction, revised operational procedures, and enhanced information gathering and sharing practices, are all measures used to strengthen safety.

² Individual loss reports are also available on the US NTSB website at <http://www.nts.gov/investigations/AccidentReports/Pages/pipeline.aspx>.

FIGURE 4 Property damage and business interruption loss limits (US\$ millions)

Source: Marsh's Benchmarking Survey Analysis.



The data in FIGURE 4 reveals a large divergence of loss limits being purchased. We would generally predict estimated maximum loss (EML) values in the range of US\$200 million to US\$750 million, with larger operators buying limits at the higher end of this scale. Therefore, in some cases, the value of limits being purchased appears inadequate or excessive. Factors that may explain this disparity include:

- Offshore transmission operators tend to buy larger limits because remedial intervention costs would be higher.
- Project finance requirements can dictate higher limits.
- In the majority of cases, BI cover is being purchased mainly on a transportation tariff revenue basis (or storage tariff for gas caverns).
- Gas in pipeline coverage is not universally bought. Purchase is dependent upon the requirements of the transportation agreement and care custody and control issues.

KEY PROPERTY ALL RISKS COVERAGE ISSUES

The key coverage review issues for gas transmission and storage systems are as follows:

- Machinery breakdown cover for compression facilities.
- Corrosion exclusion language and buyback for sudden and unforeseen incidents arising from corrosion.
- Gas in pipeline and caverns.
- Adequate limits for natural catastrophe events.
- Additional operators extra expense (OEE) cover for gas storage cavern wells and BI trigger arising from uncontrolled wells and need to shut down.
- Strike, riot, and civil commotion cover.
- Minor works cover for pipeline remediation activity and expansions.

BUSINESS INTERRUPTION (BI) COVER

BI insurance is generally bought by single-pipeline entities when a particular pipeline scheme is their only revenue. In addition, since many asset sales are occurring in this midstream space, acquirers buy this cover to protect their investment.

The trends for gas transmission companies are as follows:

- Indemnity periods are, on average, 12 to 15 months (although they are generally longer where a contingent gas production facility could dictate an outage period).
- In order to obtain wide coverage, indemnity is best based on the planned transportation tariff revenue.
- A typical waiting period/deductible is between 30 and 45 days.

Suppliers and customer extension coverage is usually available on a named parties basis only and for a designated sub limit. The sub limit is usually based on contingent business interruption (CBI) risk analysis of the loss of the largest supplier facility or customer facility or contingent pipelines, coupled with alternative supply considerations (for example, via liquefied natural gas [LNG] or LNG floating storage and regasification unit [FSRU] terminals).

TERRORISM AND BUSINESS INTERRUPTION (BI) COVER

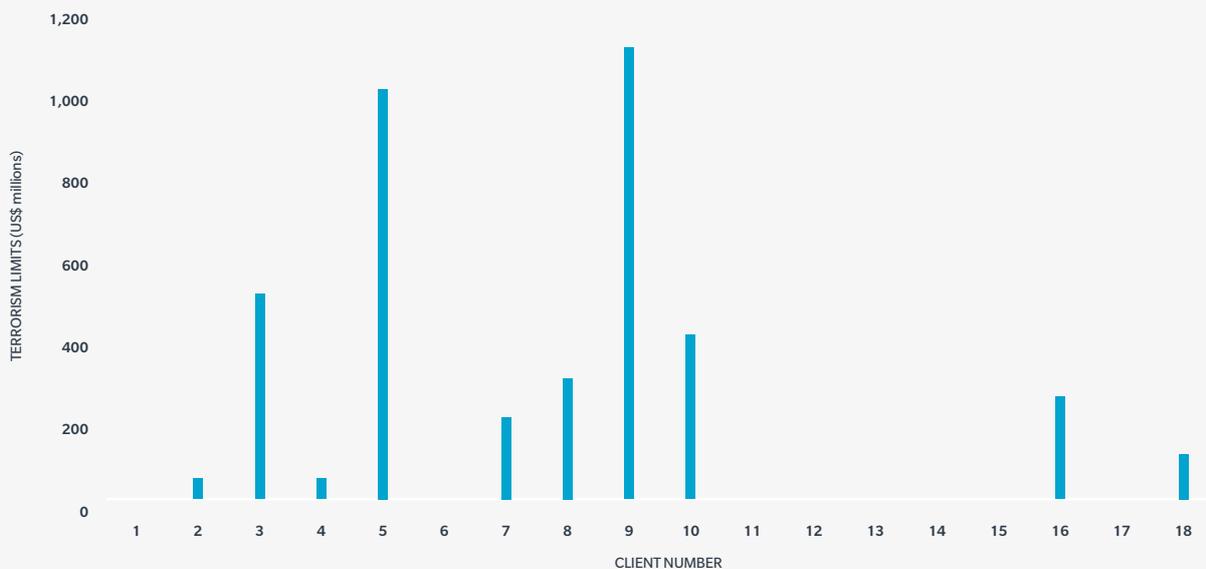
Gas transmission systems are increasingly coming under threat from sabotage and cyber-attack by terrorists, both in order to disrupt operations and create news headlines.

The large majority of operators purchase terrorism cover as it is very cost-effective. While BI cover is generally included within in these policies, the standard LMA 3300 form does not deal with the BI coverage detail well and needs specialist adaptation. Our experience shows that the BI section of the terrorism policy needs the same degree of attention to detail over BI and CBI extensions as the all risks property BI policy.

Offshore operators will generally obtain terrorism coverage as part of the offshore policy.

In high-threat regions, operators should consider the merits of wider political violence coverage versus sabotage and terrorism coverage.

FIGURE 5 Terrorism and business interruption loss limits (US\$ millions)
Source: Marsh's Benchmarking Survey Analysis.



There is increasing concern that public utility operators, including gas transmission operators, will become a prime target for cyber-attack.

The data in FIGURE 5 shows a consensus between around US\$200 million and US\$400 million as to the limit of coverage being purchased; however, this is somewhat inconsistent with the higher limits being purchased for All Risks and associated BI coverage. While the terrorism risk threat is geographically dependent, we would generally advocate that terrorism limits are based on the same estimated maximum loss (EML) analysis as for the all risks policy.

We can conclude from this that these terrorism and BI policies are under-scrutinized, both in terms of limit and coverage.

Third-party liability arising out of terrorism cover can be purchased cost-efficiently alongside PD/BI, but this is seldom the case and should therefore be considered where pipelines could affect industrial facilities or population centers.

CYBER

There is increasing concern that public utility operators, including gas transmission operators, will become a prime target for cyber-attack. Supervisory control and data acquisition (SCADA) systems that control the gas transmission networks are deemed to be more vulnerable than those in single-site environments as they are controlled using web-based frameworks.

In 2015, a gas system in the Ukraine was deemed to have been attacked and brought to a standstill by professional attackers. Reference to this can be found on <http://www.bbc.com/news/technology-35686498>.

In the majority of policies, there is an Institute Cyber Attack Exclusion Clause CL380 dated 10/11/03, or NMA2914/2915. The two latter exclusions contain some form of buy-back cover for fire and explosions.

In response to exclusions like these and the perceived threat from cyber-attack, Marsh's Energy Practice has developed a Cyber Gap Facility, with around US\$300 million of capacity to effectively buy back areas of cyber exclusion in all applicable policies – property, terrorism, BI, and third-party liability.

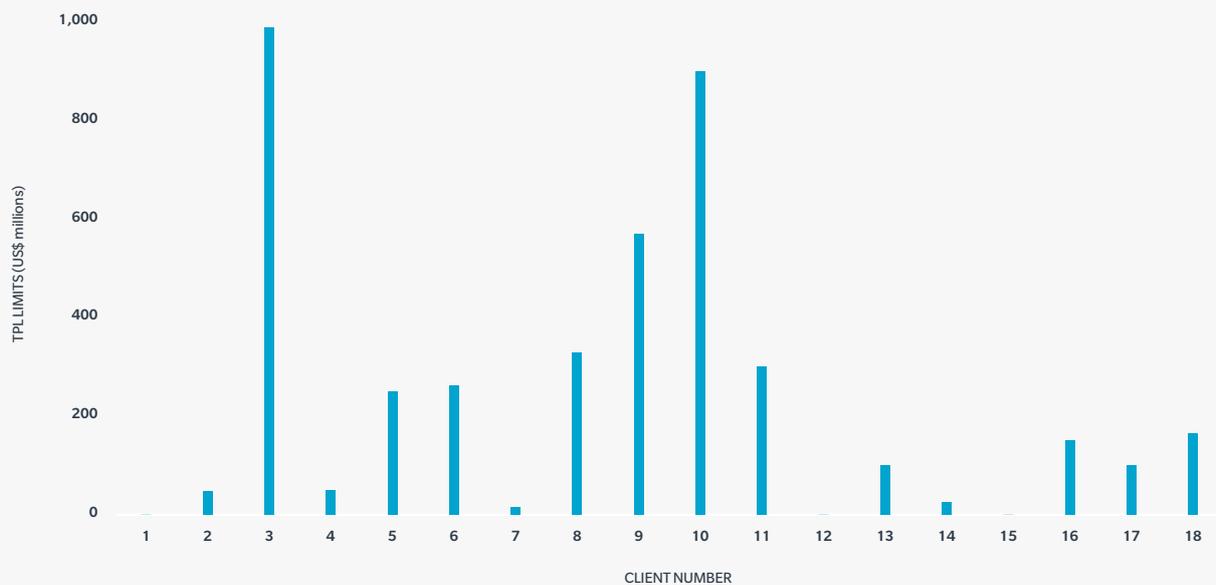
Risk transfer is facilitated via a cyber controls questionnaire. Premium pricing is competitive and can be financed from potential renewal savings from the principal policies in place.

THIRD-PARTY LIABILITY (TPL) COVERAGE LIMITS

Again, there is evidence of a wide divergence of limits being purchased by gas pipeline operators. In general, there are insufficient limits being purchased for the exposures.

FIGURE 6 Third-party liability limits of cover purchased (US\$ millions)

Source: Marsh's Benchmarking Survey Analysis.



Typically, operators buy limits in the range of US\$50 million to US\$300 million. Local and state companies, in particular, buy insufficient limits. With the trend to cheaper third-party liability (TPL) markets globally, operators should exploit extra market TPL capacity to best cover their exposures.

Exposures could present themselves at or close to:

- River, road, and railways crossings.
- Tie-ins to consumers, including power companies.
- Tie-ins from gas production facilities.
- Population centers.
- Industrial areas.
- Contract works – pipeline expansions.
- Other pipeline crossings or in the right of way.

The extent of TPL insurance cover should be designed with reference to contractual indemnities, caps, and insurance clauses in relevant contracts, such as transportation agreements, crossing agreements, rights of way, and gas offtake agreements.

Areas for coverage focus include:

- Products liability arising from poor gas quality.
- Excess employee liability.
- Marine liabilities, where applicable, for offshore pipelines.
- Terrorism-caused liability (via terrorism markets).
- Marine terminal operators for interfaces with FSRUs and LNG ships.
- Excess auto liability.

CONCLUSION

The loss incident rate and insurance ratings for gas transmission are declining. Nevertheless, benchmarking data appears to show that, in many instances, organizations are purchasing limits that would appear to be inadequate or excessive.

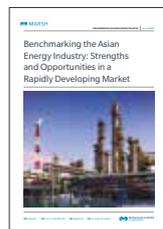
In order to ensure gas companies are purchasing the correct limits, organizations should place greater scrutiny on their insurance coverages, both in terms of limits and coverage. Normally this can be achieved by annually updating the EML risk profiles and risks registers on the pipelines concerned. The updates should be extended to include views of technical, safety, legal, and business functions.

RECENT INSIGHT PAPERS PUBLISHED BY MARSH



Energy Risk Quality Benchmarking in the Middle East

This paper contextualizes risk quality in the Middle East and explores regional trends to gauge the comparative risk quality of oil, gas, and petrochemical facilities relative to more than 500 similar facilities worldwide.



Benchmarking the Asian Energy Industry: Strength and Opportunity in a Rapidly Developing Market

A benchmarking study to gauge the comparative risk quality of Asian onshore oil, gas, and petrochemical facilities relative to more than 400 similar facilities worldwide.



The 100 largest losses 1974-2015: large property damage losses in the hydrocarbon industry

The 24th edition of *The 100 Largest Losses* reviews the 100 largest property damage losses that have occurred in the hydrocarbon processing industry since 1972. This review is based on Marsh's energy loss database, which compiles information gathered in the course of our interactions with the industry, as well as from the public domain.



Can energy firms break the historical nexus between oil price falls and large losses?

This new insights paper analyzes the historical sequential correlation between oil price falls, which led to energy firms cutting costs including safety training and education, which, in turn, led to an occurrence of significantly larger insured losses in the following period.



Power Market Update Q2 2016

Softening market conditions continue to prevail across the majority, if not all, product lines in the power generation sector, and the property sector in particular according to the latest Power Market

Update. Although losses continue to occur, these have not proven disastrous for the market.



Directors and officers (D&O) personal liability

The fall in oil price has squeezed margins leading to increased risk of insolvency, asset sales, and fueling mergers and takeovers.

Simultaneously, the expansion of regulatory powers to enhance accountability at both the company and individual level has increased the risk of legal action against directors and officers in this sector.



About Marsh

Marsh is a global leader in insurance broking and risk management. We help clients succeed by defining, designing, and delivering innovative industry-specific solutions that help them effectively manage risk. Marsh's approximately 30,000 colleagues work together to serve clients in more than 130 countries. Marsh is a wholly owned subsidiary of Marsh & McLennan Companies (NYSE: MMC), a global team of professional services companies offering clients advice and solutions in the areas of risk, strategy, and people. With 60,000 employees worldwide and annual revenue exceeding US\$13 billion, Marsh & McLennan Companies is also the parent company of Guy Carpenter, a global leader in providing risk and reinsurance intermediary services; Mercer, a global leader in talent, health, retirement, and investment consulting; and Oliver Wyman, a global leader in management consulting. Follow Marsh on Twitter [@MarshGlobal](#).

For more information, contact the energy team at one of our offices below or visit our website at: www.marsh.co.uk.

MARSH'S KEY ENERGY OFFICES

BEIJING

Unit 1506, North Tower
Kerry Centre 1 Guang Hua Road
Chao Yang District
Beijing, 100020
China
+86 10 6533 4070

CALGARY

222 – 3rd Avenue S.W.
Suite 1100
Calgary, Alberta T2P 0B4
Canada
+1 403 290 7900

DUBAI

Al Gurg Tower 3
Riggat Al Buteen
Baniyas Road, Deira
P.O.Box 14937, Dubai
United Arab Emirates
+971 4 223 7700

HOUSTON

1000 Main Street, Suite 3000
Houston
Texas 77002
United States
+1 713 276 8000

LONDON

Tower Place
London
EC3R 5BU
United Kingdom
+44 20 7357 1000

MADRID

Edificio Puerta Europa,
Paseo de la Castellana, 216
Madrid, E-28046
Spain
+34 914 569 400

MIAMI

200 S. Biscayne Blvd.
Suite 950, Miami
Florida
United States, 33131
+1 305 341 5075

MUMBAI

1201-02, Tower 2,
One Indiabulls Centre
Jupiter Mills Compound
841 Senapati Bapat Marg
Elphinstone Road (W)
Mumbai, 400013, India
+91 226 651 2900

NEW YORK

1166 Avenue of the Americas
New York
New York 10036-2708
United States
+1 212 345 6000

OSLO

Vika Atrium,
Munkedamsveien 45 D
Oslo
N-0123
Norway
+47 22 01 10 00

PERTH

Level 28, Exchange Plaza
2 The Esplanade
Perth, WA 6000
Australia
+61 8 9289 3888

RIO DE JANEIRO

Av. Rio Branco, 125 - 19º andar
CEP 20.040-006
Rio de Janeiro
Brazil
+55 21 2141 1650

SAN FRANCISCO

345 California Street
Suite 1300
San Francisco, CA 94104
United States
+1 415 743 8000

SINGAPORE

8 Marina View #09-02
Asia Square Tower 1
Singapore 018960
+ 65 6922 8388

MARSH IS ONE OF THE MARSH & McLENNAN COMPANIES, TOGETHER WITH GUY CARPENTER, MERCER, AND OLIVER WYMAN.

The information contained herein is based on sources we believe reliable and should be understood to be general risk management and insurance information only. The information is not intended to be taken as advice with respect to any individual situation and cannot be relied upon as such.

In the United Kingdom, Marsh Ltd is authorised and regulated by the Financial Conduct Authority.

Marsh Ltd, trading as Marsh Ireland is authorised by the Financial Conduct Authority in the UK and is regulated by the Central Bank of Ireland for conduct of business rules.

Copyright © 2017 Marsh Ltd. All rights reserved. GRAPHICS NO. 16-0534