



Japan's Insurance Market 2022

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To Our Clients

It gives me great pleasure to have the opportunity to welcome you to our publication, 'Japan's Insurance Market 2022.' It is encouraging to know that over the years our publications have been well received even beyond our own industry's boundaries as a source of useful, up-to-date information about Japan's insurance market, as well as contributing to a wider interest in and understanding of our domestic market.

The insurance and reinsurance industries have been encountering a substantially changing business environment. For instance, insurance needs and risks have been rapidly diversifying and changing amid developments that include evolution and growing prevalence of digital technologies, increasingly severe natural disasters, and demographic trends in the form of a decreasing birthrate and an aging population. Meanwhile, the COVID-19 pandemic has greatly affected the economic climate as well as people's work and lifestyles.

Amid this increasingly changing environment and under TEAM TOA 2023, the Group's medium-term management plan, we aim to achieve sustainable growth in step with clients and society by providing optimal solutions and services to our clients. In addition, in pursuit of the Sustainable Development Goals (SDGs), we are promoting various group-wide initiatives to provide solutions to social challenges through our business activities.

Everyone at the Toa Re Group will do their utmost to ensure that the Group consistently fulfills its mission as a reinsurance company "Providing Peace of Mind," as articulated in the Toa Re Mission Statement. We look forward to your ongoing support going forward.

This year's publication is the first to be issued exclusively in electronic form, in recognition of the role that we all have in considering the environment and sustainability. I hope that our publication continues to provide a greater insight into the Japanese insurance market, and I would like to express my gratitude to all who kindly contributed so much time and effort towards its making.



Masaaki Matsunaga

President and Chief Executive
The Toa Reinsurance Company, Limited



The Offshore Wind Power Projects in Japan and Notable Differences with Europe

1.

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1. Introduction

Surrounded by ocean, Japan has great potential for offshore wind power generation, and expectations are rising for the development of this industry to contribute to the realization of a carbon-neutral society. Specific targets are set as the capacity of 10 GW by 2030 and 30 to 45 GW by 2040,¹ with expected development in two to four offshore areas (approximately 1 GW in total) annually.

Most of the onshore wind farms that have come online in Japan to date feature wind turbines in the 2 to 3 MW class, and the number of turbines limited to 20-30 units even for large-scale wind farms. Future offshore wind farms, however, will feature double-digit MW generation capacity turbines, with each farm consisting of around 30 to 100 turbines. The huge scale of this business (estimated to be several hundred billion yen), and the fact that the turbines are located offshore, will pose significant construction and operations management challenges compared to onshore wind projects.

Expectations for offshore wind projects are increasing, however, the supply chain of the Japanese wind power industry is not yet mature enough to support offshore wind projects, partly due to the fact that a large number of the onshore wind farms in Japan are relatively small in scale. In addition, the construction and maintenance of offshore wind facilities requires specialized construction technology, equipment and human resources, but Japan faces infrastructure shortfalls ranging from construction equipment and ships to specialists.

In its efforts to further develop the domestic offshore wind industry, Japan has much to learn from leading European companies, which already have extensive experience in managing the wide array of risks involved. At the same time, Japan faces unique risks that differ from those in Europe and must address those issues when adapting its implementation of European methodologies. Representative examples are natural disasters and the technical and social issues mentioned earlier. To minimize those risks, it is important to establish effective mechanisms and plans, but doing so still does not preclude the possibility of accidents. As such, insurance coverage will help to provide stability in the offshore wind projects. This report focuses on natural conditions, the business environment, technical requirements, and the role of insurance, and examines the differences with Europe and measures to accommodate those differences.

2. Natural Conditions

2.1. Earthquakes, Tsunami, Typhoons, and Lightning

Japan has a higher risk of natural disasters such as earthquakes, tsunami, typhoons, and lightning than those in Europe, which is a leader in the offshore wind business. Japan has therefore placed greater emphasis on regulations and guidelines to counter natural disasters than is the case in Europe. This has led Japan's national government, wind power industry participants, and manufacturers to implement a range of measures.

One example is the Sea of Japan side of the Tohoku region, where multiple offshore wind projects are being developed. The Japanese government's

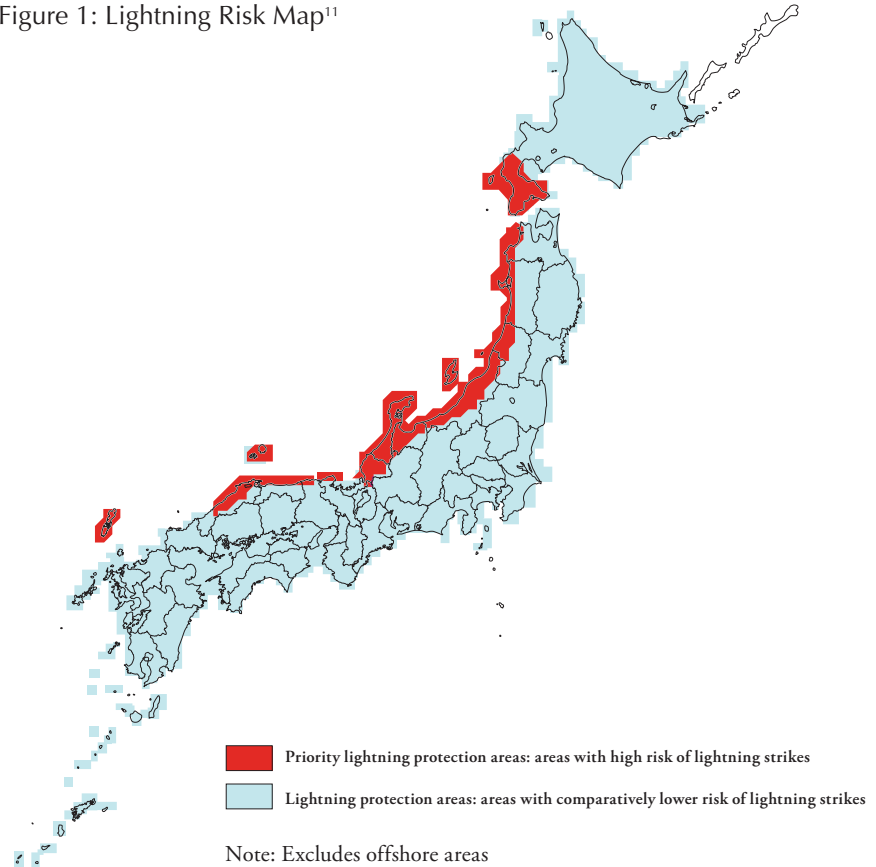


Headquarters for Earthquake Research Promotion has announced that the probability of an earthquake in this area with a seismic intensity of approximately 6.0 lower or higher (Japanese scale) is 6% to 26% for the 30 years beginning 2020.² In response, the technical standards formulated by the Ministry of Economy, Trade and Industry³ require offshore wind facilities to confirm their structural safety for rare and extremely rare earthquake motion as stipulated by the Building Standard Law. These standards are the same as those that onshore wind facilities are required to meet. Furthermore, the Japanese government has formulated the Unified Technical Standards for Offshore Wind Power Facilities⁴ (the Unified Standards), which elucidate standards for reducing the risk of wind turbine collapse or disintegration due to shaking from an earthquake, so that the offshore wind projects can be safely promoted.

The risk of tsunami is high in Japan because the risk of earthquakes is high, so the Unified Standards require that the foundations and towers of offshore wind turbines do not collapse or disintegrate given the tsunami assumptions of local governments. The risk of damage by a large-scale tsunami to a wind turbine is low because its nacelle⁵ and blades⁶ are located sufficiently high above the ocean surface. However, onshore facilities are necessarily exposed to tsunami risk. Onshore substations and warehouses for components are exposed to the risk that tsunami will wash away or destroy a large quantity of main and spare parts⁷ for wind turbines, along with the risk that power plant will be unable to sell power for extended periods if substations are flooded. Therefore, the study and implementation of remedial measures such as raising the level of buildings and installing equipment at greater height are necessary based on the tsunami risk for planned sites.

Typhoons, high winds, and lightning are other examples of natural disaster risks unique to Japan, in addition to earthquakes and tsunami. Typhoons and high winds in Japan involve wind speeds and directions that can fluctuate wildly, and those winds lead to damage to many onshore wind turbines. To mitigate risk and prevent recurring damage, business operators and experts have therefore considered and implemented measures such as adoption of the T-Class⁸ wind resistance design standard for configuring wind turbines to accommodate Japan's environmental conditions. Moreover, winter lightning with an extremely large electrical charge often occurs along the coastal areas of the Sea of Japan, and incidents caused by lightning strikes on wind turbines occur frequently. Compliance with technical standards assuming an electric charge of 600 coulombs or higher is therefore required⁹ to reduce such risk in priority lightning protection areas with high risk of lightning strikes (see Figure 1). Other measures under consideration to reduce lightning risk include increasing the area of the receptor,¹⁰ using highly conductive materials, and placing conductive tape on blade surfaces.

Figure 1: Lightning Risk Map¹¹



2.2. Certification

Third-party certification through design verification is effective for countering the risks of earthquakes, tsunami, typhoons, and lightning events peculiar to Japan described above. Wind turbine type certification specified by the International Electrotechnical Commission (IEC) and wind farm certification that evaluates strength and safety based on site environmental conditions are also utilized in the construction plan review required by the Electricity Business Act. Due to the fact that obtaining wind farm certification takes years and remarkable advances in wind turbine technological innovation and turbine size are ongoing, wind power operators therefore need to collaborate with wind turbine manufacturers from the initial stage of business development to gather the necessary design information, drawings and specifications. Given the frequency of typhoons in Japan as mentioned earlier, selecting wind turbine models with T-Class certification is a key consideration in developing wind farms because they effectively reduce the risk levels.

Beyond T-Class certification, Japanese and Asian markets require technology development such as for winter lightning, blades that address lower wind speed and component technologies for offshore wind turbines such as floating structures and mooring systems for mass production,¹² due to the difference in wind conditions

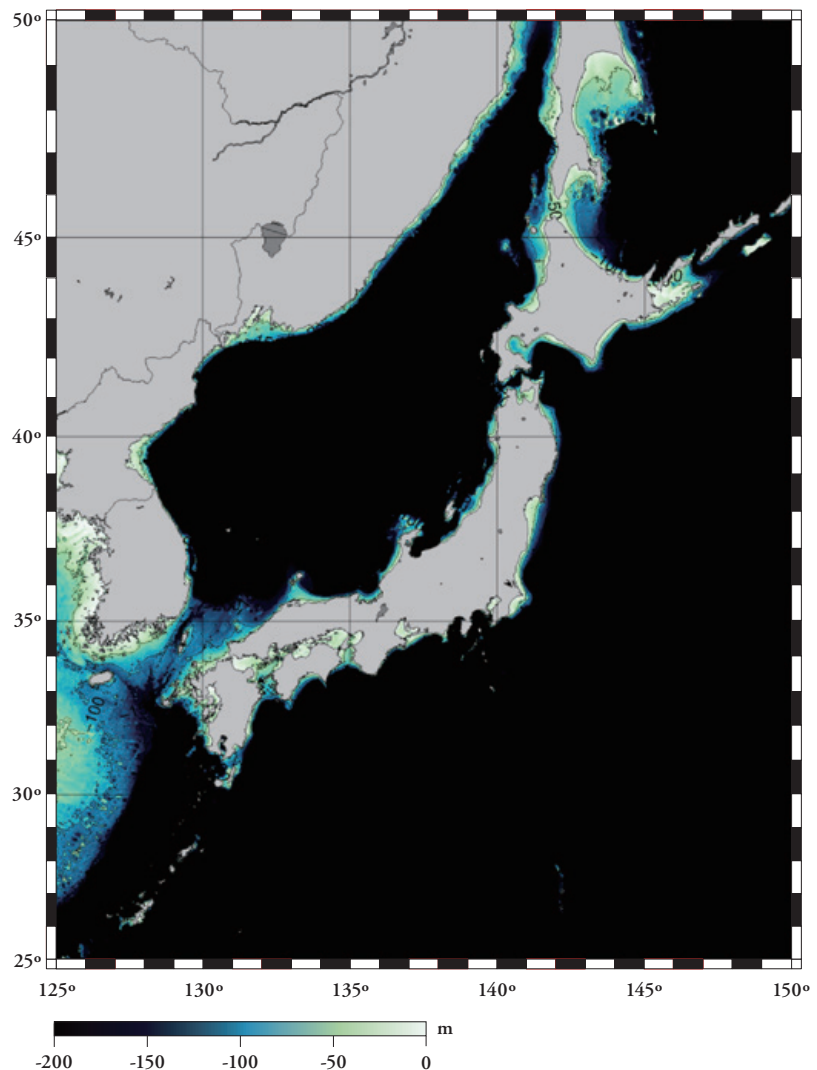


and natural disaster hazards with those in Europe. This suggests the need to respond to type certification for wind turbines that incorporates such new element technologies and to the wind farm certification. The development process when applying new element technologies should therefore include sufficient time to obtain and review the information required for certification of such element technology.

2.3. Steep Continental Slope and Floating Type Risk

Europe has many offshore wind turbines in the North Sea, but the continental shelf (where the water is shallower) in that area is more expansive than it is around Japan, where four tectonic plates meet and the continental slope is steep and closer to shore (see Figure 2). Fixed-bottom wind turbines are technically and economically limited to a depth of about 50m (see Figure 3), and offshore areas suitable for these turbines are limited around Japan. Public bids are therefore likely to include both floating and fixed-bottom turbines from the mid-2020s.

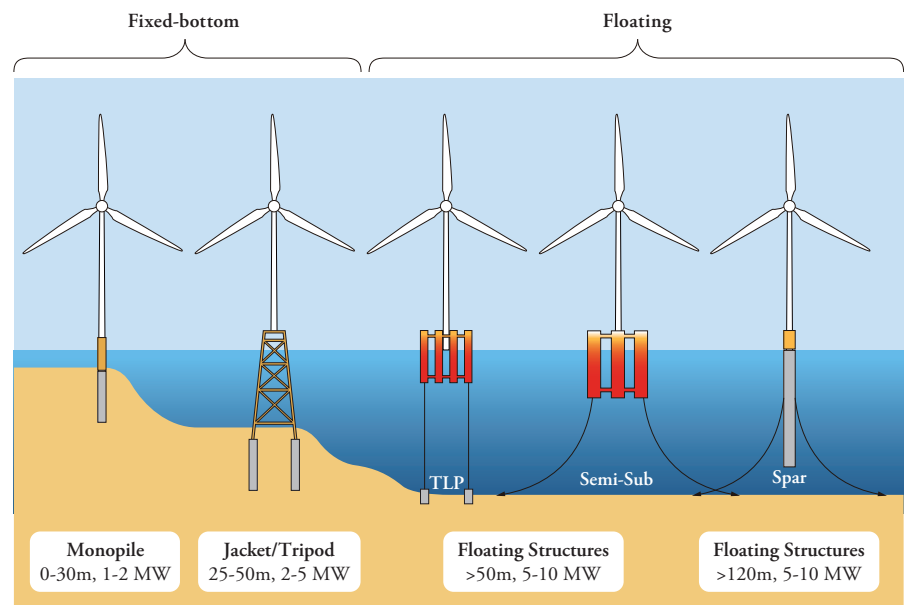
Figure 2: Ocean Depth around Japan¹³



1. The Offshore Wind Power Projects in Japan and Notable Differences with Europe

Unlike fixed-bottom turbines, floating turbines are exposed to the risk of accidents and failure in the construction of the floating structure, mooring cables and dynamic cables.¹⁴ Of particular note, the mooring cables are situated in a radius of about one kilometer around the floating structure, although this depends on mooring method and water depth. In addition, the dynamic cable needs to follow the sway of the floating structure and is not fixed or embedded in the seafloor. While fixed-bottom wind turbines are exposed to the risk of damage to cables, including damage from dragnets and anchors on the seafloor, floating wind turbines are exposed to greater risk because the mooring and dynamic cables are floating in the sea over a wide area.

Figure 3: Application Range for Fixed-bottom and Floating Wind Turbines¹⁵



Offshore wind operators absolutely need to mitigate the risk of damage to mooring and dynamic cables and the consequent risk that wind turbines or small vessels will capsize. To do this, they need to coordinate, build consensus with other stakeholders including the fishing industry, existing businesses and port authorities and monitor the ocean use by those stakeholders.



3. Business Environment

3.1. Shortage of Work Vessels

In 2020, annual worldwide demand (excluding China) for new offshore installation vessels was estimated to be somewhere between 8 to 13 vessels. Currently, 32 of these vessels are available. Demand for these work vessels is expected to be up to five times higher worldwide in 2030, and finding suitable work vessels is likely to be challenging given the increasing size of wind turbines.¹⁶ The Tohoku and Hokuriku regions, in the northern area of Japan, are particularly exposed to the risk of a more serious shortage of work vessels due to the concentration of demand for vessels from spring to autumn because construction is not possible in winter. In addition, cabotage regulations¹⁷ in Japan require special permission from the Ministry of Land, Infrastructure, Transport and Tourism to use work vessels that are registered overseas.

Use of Japanese-flagged ships, including Japanese-registered foreign ships, may be desirable, but on-board crane constraints, such as crane height and maximum lifting capacity given the increasing size of wind turbines, and the onboard availability of a dynamic positioning system (DPS), limit the number of suitable ships. In addition, the foundation and transition piece¹⁸ require accurate installation and both wind turbines and foundations are becoming larger, but Japan lacks the technical knowledge and experience to address these issues.

As mentioned above, Japan has no large-scale offshore wind project to date and therefore lacks relevant construction equipment and experience. Consequently, in terms of securing vessels with a construction track record and that have specifications suitable for the construction plan, the future offshore wind business will need to set the required parameters such as load capacity, crane lifting capacity and DPS availability for ship selection based on the wind turbine model data and construction schedule. The same is true for cable laying vessels and operations and maintenance (O&M) vessels, and the offshore wind operators will need to plan and secure the necessary ships before the start of construction and operation.

3.2. Immature Supply Chain and Expectations to Developers for Japan's Wind Industry Development

There is an oligopoly by several manufacturers of offshore wind turbines, and these are European and U.S. manufacturers. Almost all of their factories are located in the United States and Europe, which leads to significant delays and costs when recovering from accidents in Japan because of the extended shipping time. In addition, ocean conditions around Japan make transport of large wind turbine components and their maintenance or replacement difficult in winter. Therefore, there is a risk of prolonged shutdown periods if spare parts are not available in Japan in the event of a failure of or accident to a major component of the wind turbine.

Given the above situation, wind power operators must work with manufacturers and maintenance companies to secure the supply of spare parts and organize the systems to quickly recover from accidents and breakdowns. The offshore wind industry is already well-developed in Europe, where multiple offshore wind operators with large wind farms and O&M companies have inventories of common

spare parts, with a mature second-hand market providing an efficient backup system. Also, the factories of wind turbine manufacturers are located nearby, meaning quicker restoration because transportation takes less time.

Japan has few broad plains with good wind conditions such as those in Europe and the United States, which has inhibited the development of a large-scale wind power businesses and a domestic supply chain of spare parts manufactured locally. As a result, procurement periods and downtime can be lengthy. A potentially efficient means to shorten post-accident recovery time in Japan would involve standardizing spare parts with other wind farms around Asia in collaboration with European offshore wind operators. Formulating strategies for re-procurement as part of business development would also mitigate risk. This would involve using actual wind farm operating data and experiential accident data to itemize the materials and parts for specific projected accidents and their frequency, analyzing delivery lead time, purchasing long lead items in advance and guaranteed delivery contracts. It would also involve local purchase orders for items that can be manufactured in Japan. These initiatives would quantify the damage in the event of an accident and formulate the plans for quick recovery, and then the business plan can be covered by required insurance for property damage and downtime.

Unexpected accidents and failures are inevitable even with the above plans and countermeasures, but these plans and backup systems improve responsiveness to minimize the scale of damage and downtime. This also helps to prevent increases in insurance premiums after an accident and reduces the operating expenditures (OPEX). This is the true risk management as opposed to ad hoc risk countermeasures.

4. Technical Requirements

4.1. Shortage of Specialized Engineers for Offshore Wind Facilities

A survey conducted by the Ministry of Economy, Trade and Industry in 2017 pointed out that European countries have many third-party O&M companies and a strong pool of maintenance personnel due to the large number of wind turbine manufacturers in Europe and the high mobility of engineers among various companies, including wind turbine manufacturers, in the industry. The survey estimated the optimum number of wind turbine maintenance engineers for Japan at 690 for the 2,203 domestic wind turbines in operation at that time, assuming one engineer can service about 3.2 wind turbines. However, a 2019 survey indicated a shortage of about 190 maintenance engineers in Japan.¹⁹

Japan has had a shortage of wind power maintenance personnel from the start, and offshore wind facilities require maintenance personnel with even higher and wider specialties; training specialized personnel has therefore become an issue in the local industry. Examples of the required skills of maintenance personnel for offshore wind equipment include basic safety training (emergency measures, manual handling, fire prediction, work at height, and maritime survival skills) established by the Global Wind Organization (GWO),²⁰ which sets international training standards for wind facility workers. Other knowledge such as ship maneuvering



skills, diving skills, blade repair training, rope access, radio equipment handling skills, and English are also required, in addition to knowledge of wind turbine maintenance itself. Japan has training facilities that provide basic safety training based on GWO standards and various kinds of maritime survival training, and offshore wind projects need to utilize these facilities, secure maintenance personnel and improve their skills.

In addition, subcontractors who participate in operations and maintenance during the term of a long-term service agreement (LTSA) with a wind turbine manufacturer are required to (1) be registered as a vendor and (2) independently receive various kinds of training as required by the manufacturer. Offshore wind power generation is becoming a full-scale business in Japan, but the number of people who have experience maintaining offshore wind facilities is very limited. Japan needs to develop maintenance personnel, but this takes time because maintenance engineers require diverse skills. In addition, the lack of adequate training facilities and systems in Japan makes training and hiring maintenance personnel more difficult.

Measures to resolve the shortage of maintenance personnel for offshore wind facilities in Japan include promoting the training of local engineers in collaboration with wind turbine manufacturers, and dispatching engineers to manufacturers for training as part of conditions of purchase agreements and LTSA. Alternatively, if the consortium has a member with experience in the European offshore wind industry, it is desirable to have maintenance personnel dispatched from offshore wind facilities in Europe, or conversely, to dispatch maintenance personnel to wind farms in Europe, for technology transfer through hands on maintenance training from experienced technicians.

4.2. Restricted Access to SCADA Data

SCADA (supervisory control and data acquisition) systems are the mainstream for monitoring wind power generation. SCADA functions are roughly divided into three categories: monitoring, operations control, and data collection. Monitoring involves reading real-time data for wind turbines such as current wind speed, wind direction, power generated, and historical data including alarm history. Operations control involves remote delivery of stop, reset, and operation commands to the wind turbine, and output control in response to output suppression requests from an electric power company. Data collection involves aggregation and storage of historical wind turbine data such as 10-minute logs, alarm logs, trigger logs, and power generation logs transmitted from the wind turbines.

Given the shortage of maintenance personnel and many other factors that impact the ability to operate safely, the need for accurate and reliable initiatives that improve the use of SCADA data will likely increase in the future. Malfunctions detected at onshore wind facilities oblige the chief electrical engineer to immediately go to the turbines, visually check the abnormality, and give instructions to the operator and the maintenance company for wind turbine operation and maintenance. The use of data from SCADA systems and other sources is more

important at offshore wind farms because immediate access to the turbines is difficult. SCADA data enables companies to remotely detect, investigate and eliminate the cause of abnormalities rather than having to make on-site visual inspection or direct confirmation in the nacelle. Recent research and development has also confirmed that enhanced SCADA data analysis enables operating companies to detect signs of wind turbine failure in advance and to undertake preventive maintenance that precludes the occurrence of serious accidents to a certain extent.²¹

However, most of the operation and maintenance data of wind power generation equipment in Japan is aggregated and managed by overseas manufacturers, which do not typically share various types of data²² with responsible local operating companies. In addition, many power generation facilities do not fully utilize wind turbine operational data because of the poor performance of SCADA systems installed in the early days of the industry and the limited storage period of SCADA data.

There are many cases that show difficulties in identifying the root cause of accidents because SCADA data was only partially disclosed for the root cause analysis of serious accidents in onshore wind turbines. This suggests that detailed SCADA data is needed to accurately analyze the cause of accidents. The Japanese government has often discussed the importance of using SCADA data to prevent serious accidents of wind turbines with wind power operators and experts. Demands for offshore wind power operators to have greater access to enhanced data will likely increase further in the future. Given the foregoing, power generation companies need to discuss SCADA data access rights and scope during contract negotiations with wind turbine manufacturers.

In addition, the Unified Standards advocate the technique of monitoring and maintenance that involves not only SCADA but also an array of measurement sensors attached to various parts of the wind power generation equipment as a condition monitoring system (CMS) that monitors and identifies the state of each component. For example, monitoring vibration in the main shaft bearings, gearbox and generator enables to collect effective data for performing preventive maintenance to shorten downtime by predicting component failure and purchasing replacement parts prior to failure.

5. The Role of Insurance in the Offshore Wind Business

Offshore wind projects often employ project finance because capital expenditures are in the hundreds of billions of yen due to the scale of the business. The project implementation organization, location, and social environment are different for each project, so lenders' risks are also diverse.

Operating companies in the offshore wind business must comprehensively identify various risks, analyze them, and present a countermeasures plan. The guidelines and the proposal form for public bidding require companies to formulate and submit the countermeasures plan. At the same time, no plan is able to eliminate all risks, and accidents and breakdowns are common during the construction and



operation of offshore wind facilities. Insurance is an effective means of providing compensation for these accidents or breakdowns, and helps to ensure stable, competitive business operations without the need for excessive capital reserves. Project lenders also require necessary and sufficient insurance coverage to endorse a financing agreement.

Properly designed insurance coverage requires a full analysis and a formed recovery plan, from the planning stage, which includes the supply chain system and a frame agreement with the manufacturer based on analysis of the natural disaster risk, spare parts lead time, and downtime analysis as discussed above. Based on such a business plan that appropriately identifies risks, effective mitigation strategies, and recovery contingencies in the event of an accident, as a result, insurance companies are able to provide appropriate insurance after estimating maximum damages encompassing property damages and lost profits due to equipment downtime. The insurance provided with the understanding and agreement of lenders enables stable business operations with keeping its competitiveness.

6. Conclusion

This paper focused on differences in the business environment between Europe and Japan, and examined ways to reduce risk. Offshore wind projects in Japan need to respond to conditions and an environment that are different from those in Europe, including environmental issues such as earthquakes, typhoons, and lightning, and social issues such as supply chains and the shortage of engineers. The issues examined here serve as examples of risks and countermeasures, and all stakeholders involved need to accurately identify these risks in consideration of the circumstances in each project location and the project implementation organization, and to address them while incorporating the latest technological trends. Identifying risks and addressing them with the latest technologies enable companies to maintain high wind turbine operating rates. It will also support feasibility, stable operations, and increased earnings for power generation companies by forestalling the manifestation of risks and accidents, reducing the need for higher capital and operating expenditures.

The offshore wind industry is certainly not fully mature in Europe as technologies are constantly advancing and evolving; however, criteria and standards there based on the large body of extant performance and experiential data are very instructive. Hopefully, Japan's offshore wind industry will develop and contribute to the realization of a carbon-neutral society by overcoming the risks peculiar to Japan while incorporating the precedents from Europe.

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Renewable Energy: Offshore Wind and the Future

2.

Joseph Lone

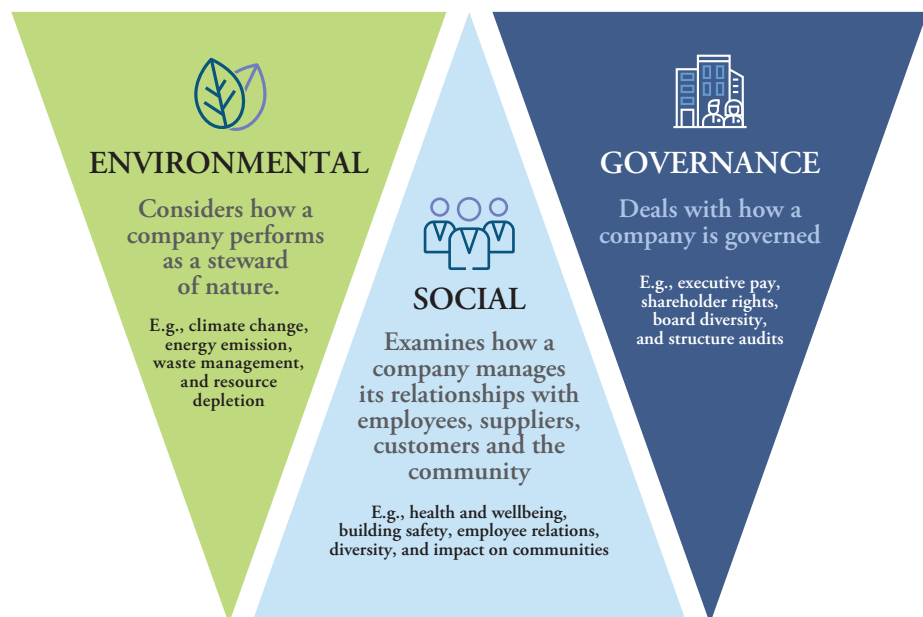
Partner, Marine & Energy Reinsurance, Arthur J. Gallagher (UK) Limited

1. Overview – The Opportunity

It is clear from the mounting, social, environmental and political pressure, that Renewable Energy is undoubtedly the future of energy. The 26th United Nations Climate Change Conference (COP 26) saw 200 countries adopt the Glasgow Climate Pact, aiming to turn the 2020s into a decade of climate action and support. The conference has also been a key catalyst in steering countries towards a Net Zero future. Net Zero is defined as achieving a balance between the carbon emitted into the atmosphere, and the carbon removed from it. A challenging yet necessary target, as participating countries currently produce 90% of global greenhouse gas emissions, leaving a significant footprint on the planet.

In addition to climate change protocols putting pressure on the inevitable shift towards Renewable Energy, other external factors are also accelerating this change. The Russian invasion of Ukraine and the subsequent sanctions and move (especially by the EU) to become less dependent on Russian oil and gas is one such factor.

As is the case in all markets, stakeholders must continue to adapt to the changing world around it, a situation the (Re)Insurance Energy Market now finds itself in. A key driver of this is the growing influence of Environmental, Social and Governance (ESG). ESG is an umbrella term used to reference the sustainability of a company, by measuring these three factors. Financial investors of companies also have a key focus on ESG, as it is their responsibility to show they are investing in a socially responsible, ethical, and sustainable way. With ESG in mind, more (Re)Insurance companies are increasing their awareness of and involvement in Renewable Energy in an attempt to showcase the greener future of their company.



Source: Dedalus Healthcare Limited



It is therefore the aim of this report to provide an in-depth, global and contextual understanding of why the expectation for Renewable Energy is so great.

Furthermore, with the global stage set, the growth of Offshore Wind and Floating Offshore Wind will be explored. Two areas that have grown exponentially in recent years and show the most longevity and therefore benefit to any assuming (Re)Insurers. Further prototypical 'offshore alternatives' are also considered.

Subsequent to which, the potential use of modelling and analytics to build frameworks to assess potential losses for Renewable Energy assets (globally) is also considered.

Finally, the key considerations and headwinds working against the Renewable Energy sector are discussed; before concluding with why, despite such issues, Renewable Energy and specifically Offshore Wind, should be considered as an immediate opportunity.

2. Growth and Expectations

Net Zero

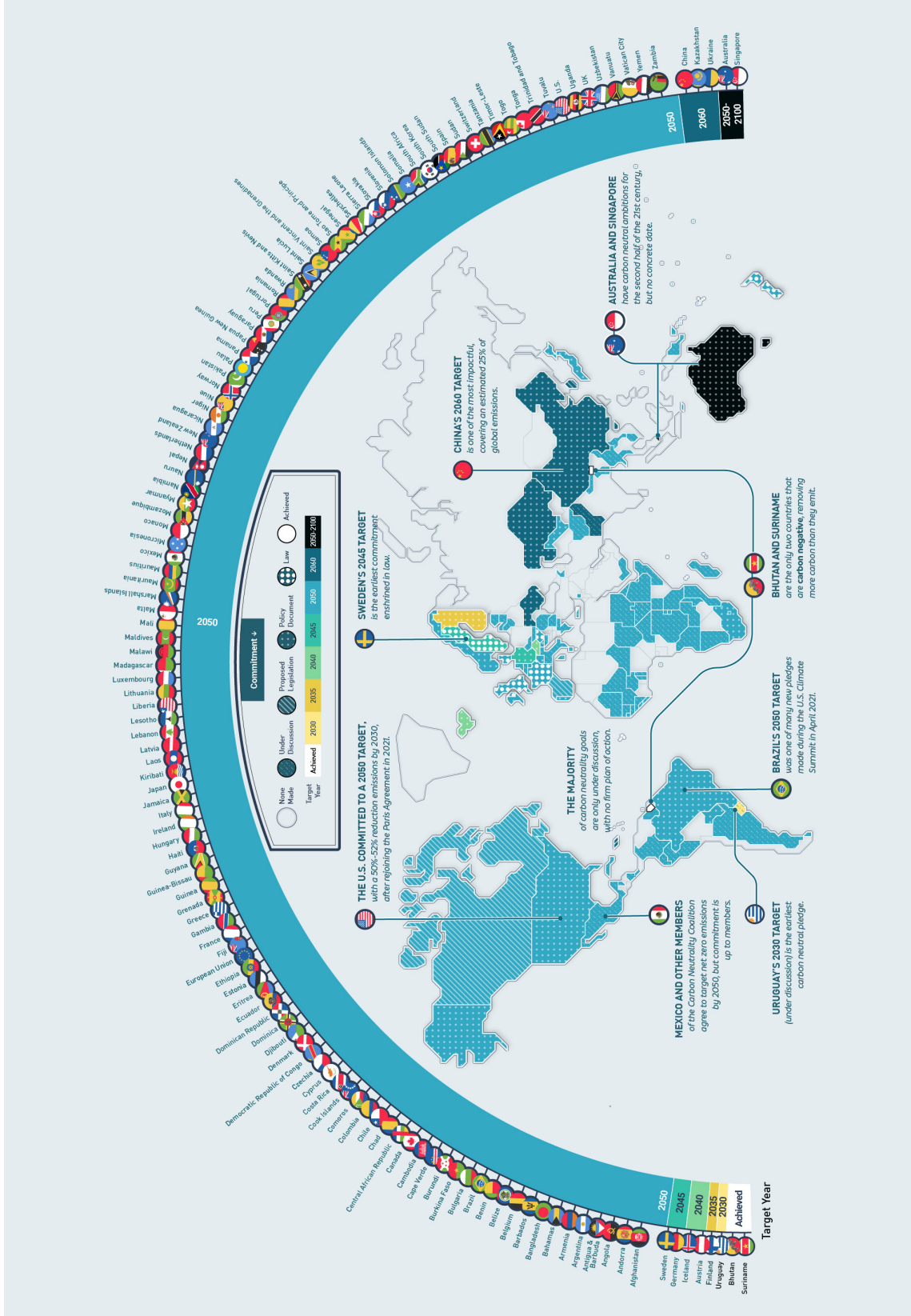
A review of the list of countries who have made legally binding commitments, or, proposed legislation in favour of carbon neutrality (Net Zero), by 2050, makes the expectations for the sector abundantly clear.

The map/infographic on the next page provides an in-depth study into the countries that have made such carbon neutral pledges, breaking them down by target year and the level of commitment. These commitments are grouped by; none made, under discussion, proposed legislation, policy document, law.

While it notes that *"the majority of carbon neutral goals are only under discussion with no firm plan of action,"* the point still remains that this same majority are investing a huge amount of time and capital into Renewable Energy solutions. It can therefore be said that the opportunity is on a truly global scale and as such, the expected growth in Renewable Energy will be exponential.

2. Renewable Energy: Offshore Wind and the Future

Race to Net Zero: Carbon Neutral Goals by Country



Source: Visual Capitalist



List of key countries committed to Net Zero, broken down by continent:

Asia:

- Japan: by 2050
- South Korea: by 2050
- China: by 2060

Europe:

- United Kingdom: by 2050
- European Union (27 Countries): by 2050
 - Sweden: by 2045
 - Germany: by 2045

North America:

- USA: 50-52% reduction in greenhouse gas pollution from 2005 levels by 2030 and committed to 2050.
- Canada: by 2050

South America:

- Brazil: by 2050
- Uruguay: by 2030
- Chile, Columbia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Haiti, Honduras, Paraguay and Peru have committed to a collective regional objective to have shifted to 70% Renewable Energy by 2030.

Oceania:

- Australia: by 2050
- New Zealand: by 2050

Despite promising targets, the global energy mix today is still heavily dominated by fossil fuels, with non-renewable sources accounting for more than 80% of energy consumption. It is however expected that by 2030 Renewable Energy will account for 50% of the power mix and 85% by 2050, a significant shift from the energy landscape we currently see.

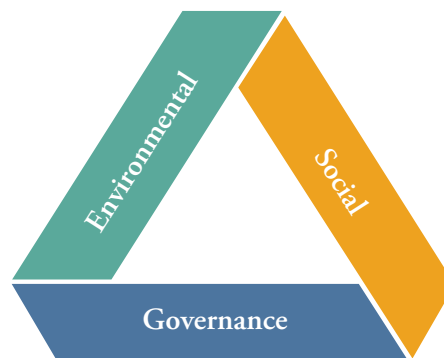
The Role of ESG

As outlined in the Overview, companies are now benchmarked and held accountable according to their ESG standards. Up until now this has been most prevalent in Europe, with the International Sustainability Standards Board (ISSB) being formed at COP 26 in November 2021. The ISSB has a global scope, but individual governments will decide whether the standards will be adopted as national requirements. As such, the focus of ESG is beginning to cascade across the globe. The Environmental aspect, which holds the most relevance for this report, relates to a company's efforts to actively reduce carbon emissions and operate sustainably. This includes anything from the where and how business is conducted, down to the office building's carbon emissions.

Where companies fall short of meeting these standards, fines can be served. A record fine of more than 90 million pounds was issued against Southern Water

Services Limited in the UK in 2021 for widespread pollution involving 6,971 unpermitted sewage discharges. Nevertheless, incentives are also given by many governments. A notable example is Japan's Renewable Sea Area Utilisation Act in 2019. This act allows the long-term use (up to 30 years) of certain sea areas for Offshore Wind power projects under permits issued by the Ministry of Economy, Trade and Industry (METI). In consideration of the impact that ESG will have on companies in the form of fines and incentives, this adds further foundation to the expectation of how big a role Renewable Energy will play in the future.

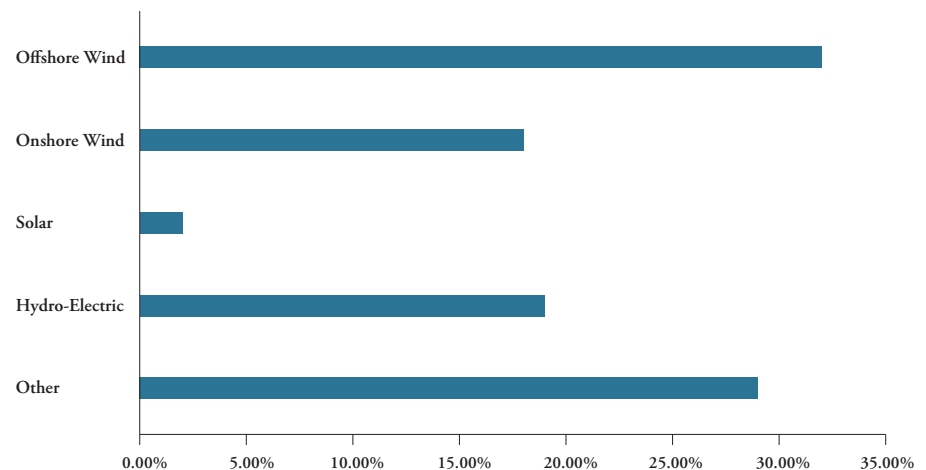
Furthermore, such ESG consideration is also starting to feature in many insurance company's underwriting requirements. Insurers are now being requested by their board to ask clients what their ESG position is, and what they are doing in this space. Whilst this is unlikely to determine whether business is won or lost at a commercial level, through similar incentives and penalties to the aforementioned, one can see how more and more ESG pressure will be mounted on companies to trade sustainably.



Areas of Growth

The following list provides a breakdown of how the global output of Renewable Energy is currently sourced:

Global Renewable Energy



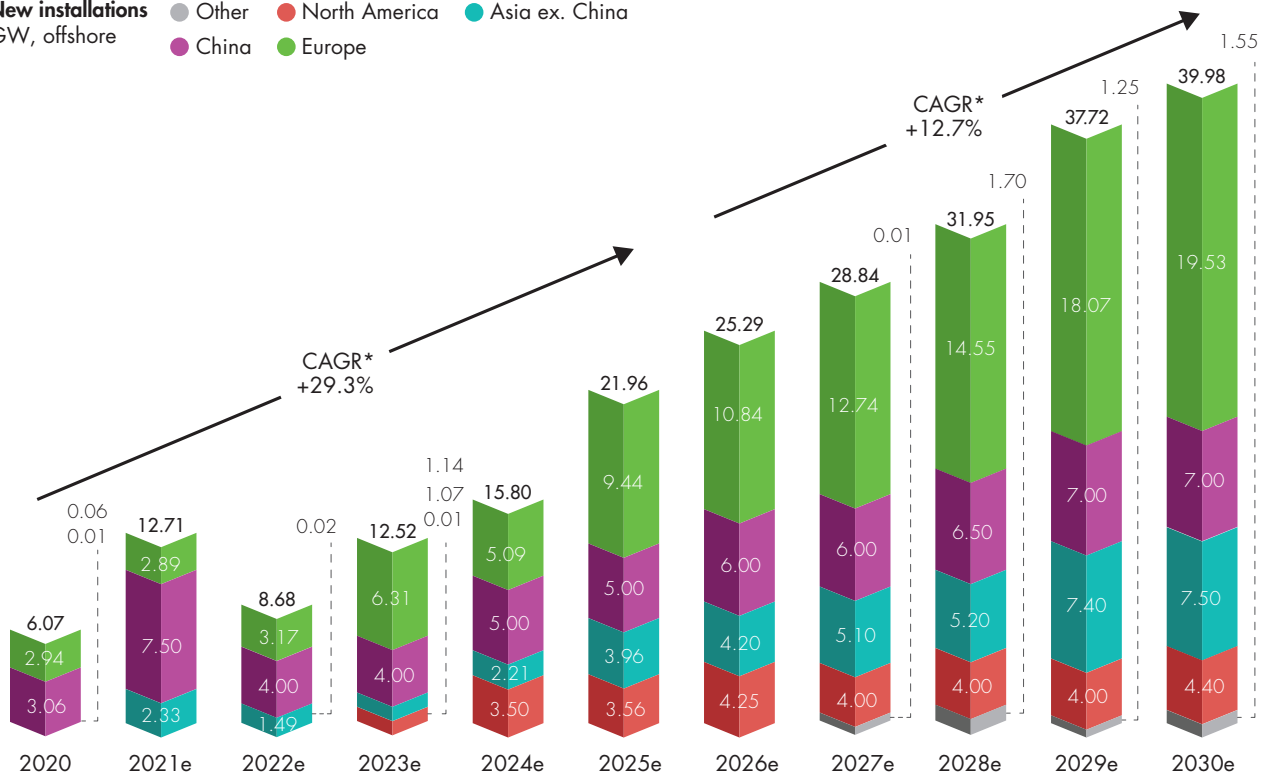
Source: Gallagher Re



As shown on the previous page, the majority of capital expenditure (CAPEX) has largely been into Offshore Wind and the subsequent success seen by early adopters, such as Europe, has created a domino effect around the globe. Net Zero commitments, reduced costs, improved technology and more powerful wind turbines have also driven its rapid adoption. The bar graph below predicts the continued and expected growth into 2030 by new installations.

Global Offshore Wind Growth to 2030

New installations ● Other ● North America ● Asia ex. China
GW, offshore ● China ● Europe



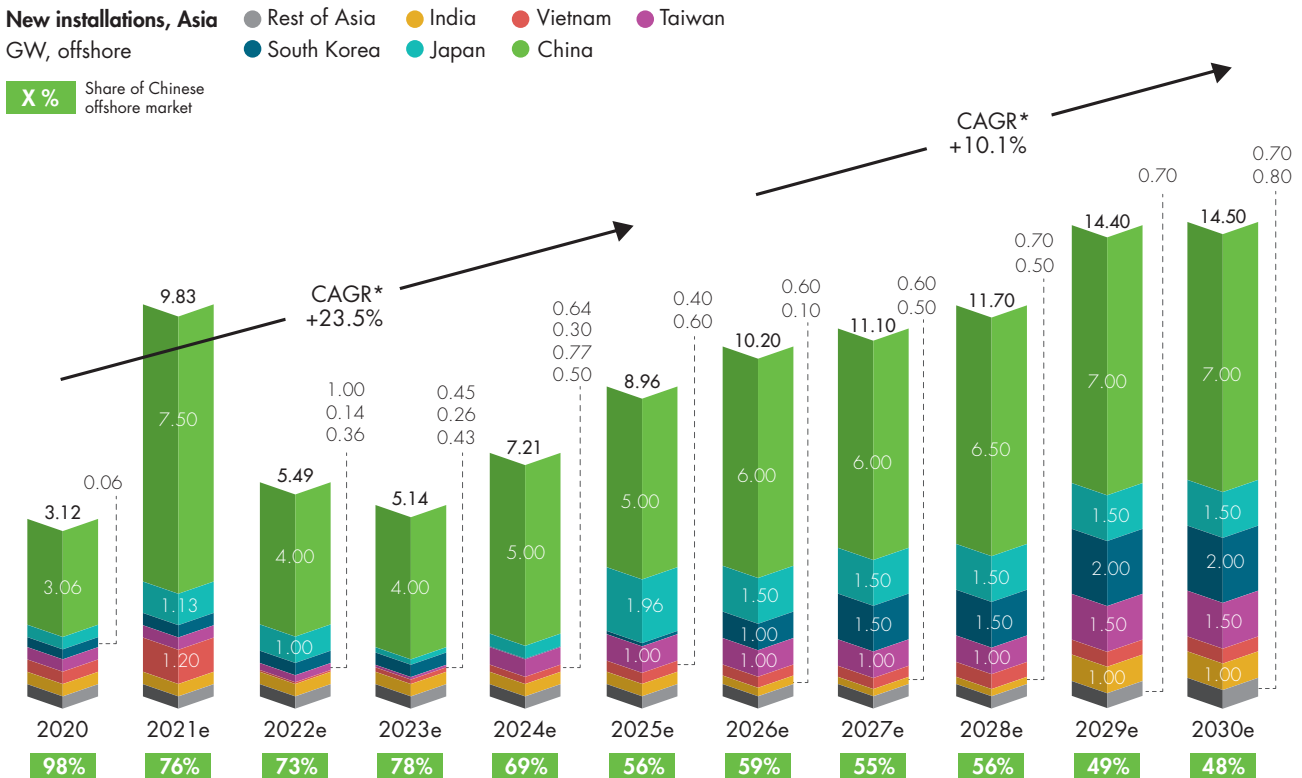
* CAGR = Compound annual growth rate
 Source: GWEC Market Intelligence, July 2021

As shown above, the key players in Offshore Wind are Europe, North America and Asia. In 2020, Europe had the largest market for Offshore Wind energy, with its active 22 GW making up 75% of total global installations. Other nations are now showing signs of catching up, for example North America is anticipated to make gains of up to 25 GW by 2030.

2. Renewable Energy: Offshore Wind and the Future

Asia is following suit and expected to see similar growth, for example by 2030, China is expected to have added 52 GW of new capacity. China's current capacity sits at 19.7 GW. Additional markets in Asia are also intending to increase their Offshore Wind capabilities. In December 2020, the Japanese government set a target to install 10 GW of Offshore Wind power by 2030 and 45 GW by 2040. The following bar graph further illustrates the clear upwards projection of global Offshore Wind growth in Asia by 2030, again by measuring new installations. When considering this rate of growth, it is of no surprise that Offshore Wind is expected to become a 1 trillion U.S. dollar industry by 2040.

Global Offshore Wind Growth to 2030 in Asia



* CAGR = Compound annual growth rate
Source: GWEC Market Intelligence, July 2021

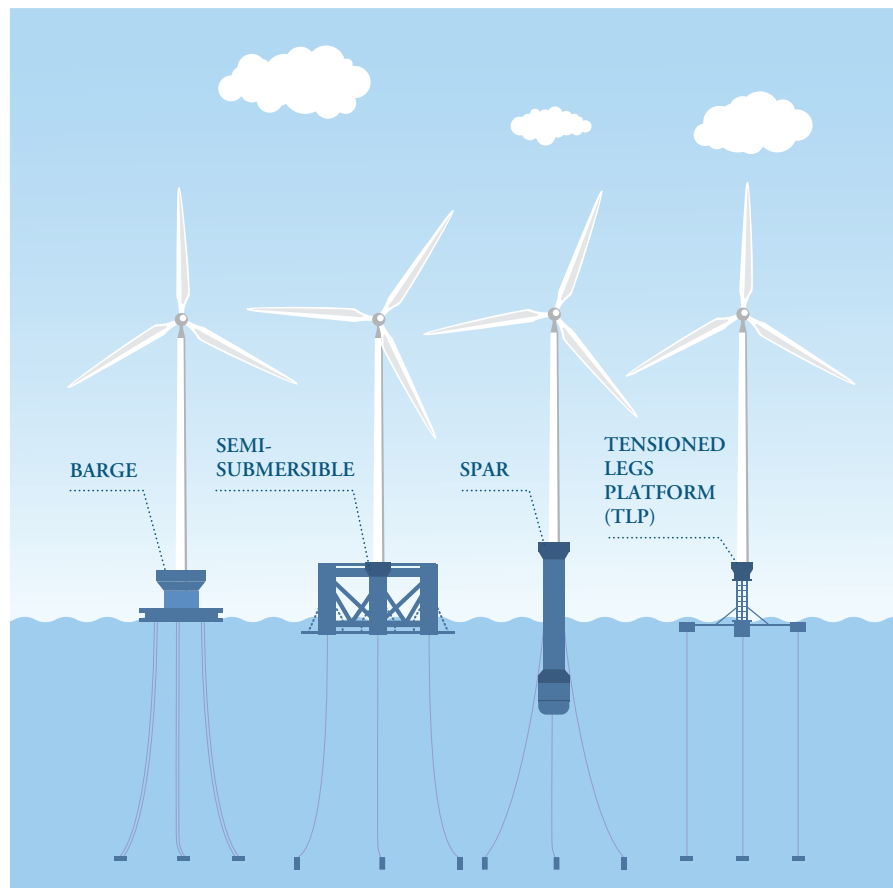


Floating Offshore Wind

Looking towards future growth, one facet of Offshore Wind that is expected to see a surge in investment is Floating Offshore Wind. Floating Offshore Wind assets will take one of the following forms:

- **Barge:** The shallowest draft of all of the floating foundation types.
- **Semi-submersible:** The current most popular concept, already proven, with good dynamic stability.
- **Spar:** The simplest concept. It achieves stability through ballast installed below its main buoyancy tank.
- **Tensioned Legs Platform (TLP):** Not widely deployed and typically requires a purpose-built installation vessel.

The Different Types of Floating Platforms for Wind Turbines



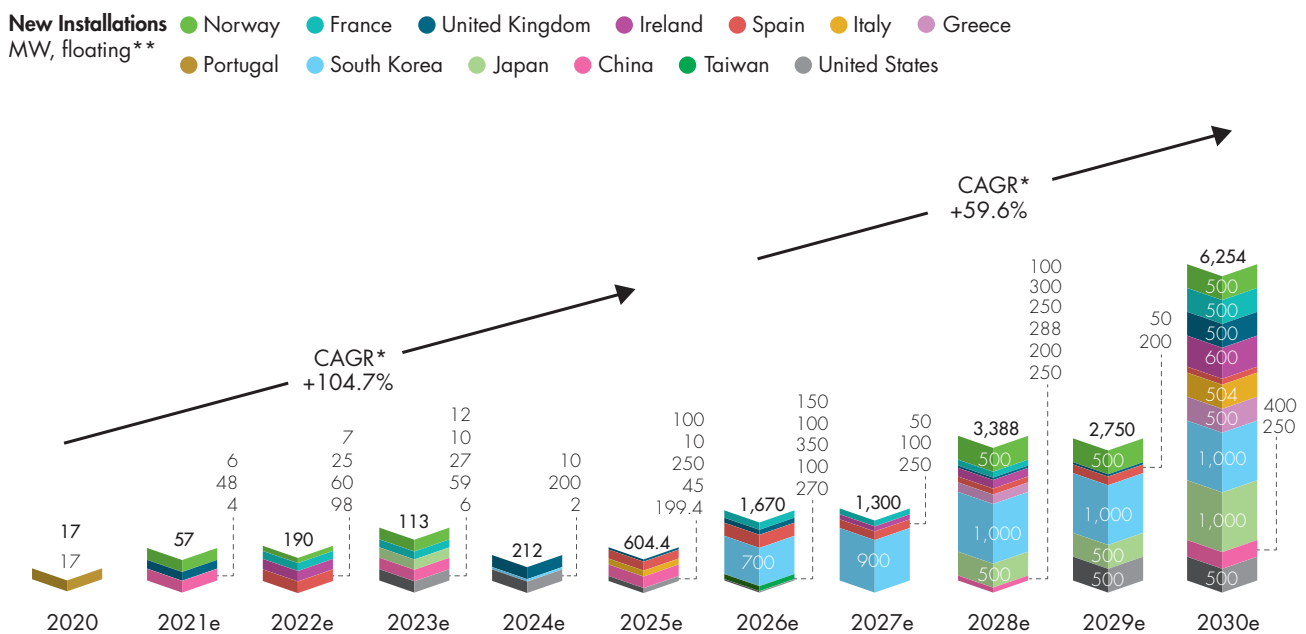
Source: Iberdrola, S.A.

The main benefit of Floating Offshore Wind is its ability to move around because it is not fixed to the seabed. As a result, these turbines can be moved to deeper waters where the wind is stronger, thereby improving energy efficiency.

2. Renewable Energy: Offshore Wind and the Future

Furthermore, its installation also has the added benefit for the environment around it, as it does not affect seabed ecosystems.

According to the International Energy Agency (IEA), moving into deeper waters using floating wind turbines has the potential to meet the world's electricity demand 11 times over by 2040. Japan is making great progress in this area with construction due to start in September 2022 on a Goto Floating Wind Farm LLC 16.8 MW floating offshore wind farm. It is expected to be fully commissioned by January 2024. Moreover, as can be seen in the bar graph below, Japan will be one of the key players in floating Offshore Wind by 2030 in respect of new installations.



* CAGR = Compound annual growth rate

** This floating wind outlook is already included in GWEC's global offshore wind forecast

Source: GWEC Market Intelligence, July 2021

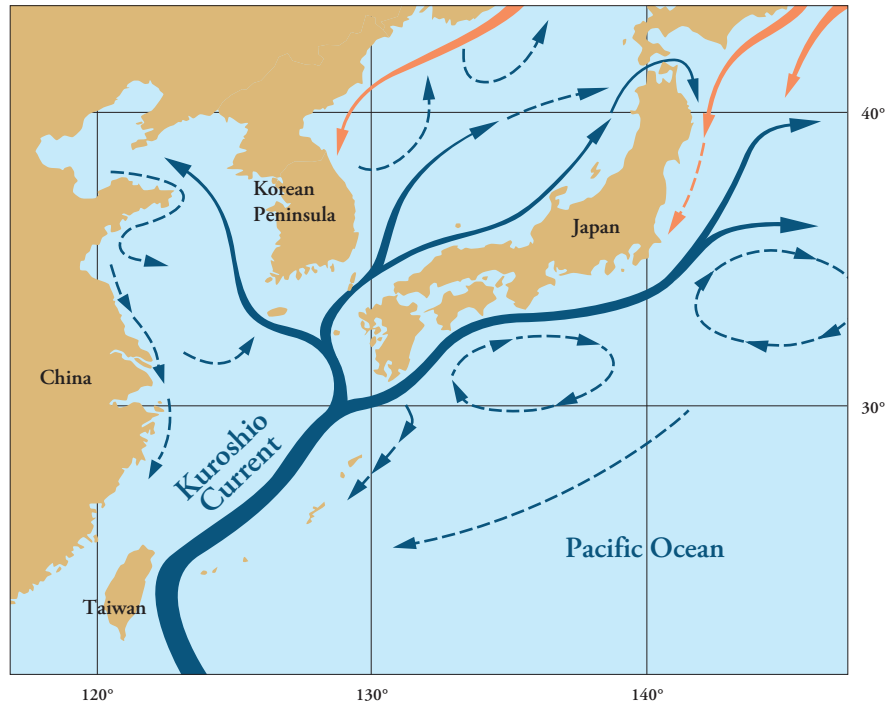
Offshore Alternatives

Technology, as ever, is evolving rapidly and the Offshore Renewable industry is taking advantage of this progress in order to meet the growing demands.

Other areas of advancement that are expected to help balance Japan's dependence on fossil fuels including other Offshore Renewable technologies. Most notably, tidal ocean thermal energy conversion and ocean currents.

Japan boasts one of the world's strongest currents in Kuroshio. There is a potential site in the Kuroshio Current, whereby new turbines, weighing over 300 tonnes could be installed. The design is such that these huge turbines would be anchored to the seabed with an embedded buoyancy adjustment system.

Japan's New Energy and Industrial Technology Development Organization (NEDO) estimates the Kuroshio Current could generate as much as 200 GW, being around 60% of Japan's current generating capacity.



Source: The Asia-Pacific Journal

Impact on the Insurance Market

Prior to the exponential growth in offshore renewables that we are seeing now, there were a select few insurers who supported Renewable Energy risks; while others entered the market and quickly withdrew following a series of losses. However, such growth and rapid improvement in the operational technology has resulted in many Renewable Energy risks becoming viable enough for underwriters to reconsider their position as a whole.

Furthermore, the upstream energy market is repositioning its capabilities to write Renewable Energy risks. In recent years, due to limited growth in Oil and Gas portfolios, coupled with demands from their existing client base, as they too manage their transition strategies in order to meet necessary targets, Upstream Energy underwriters have a growing appetite, in particular, for Offshore Wind.

These dynamics, in conjunction with mounting Environmental, Social and Governance (ESG) pressures, has led to a host of companies committing to writing Offshore Wind as part of their Energy portfolios. Companies are doing so by creating dedicated Renewable Energy teams and/or supporting Managing General Agents (MGAs) and consortiums, resulting in significantly increased capacity dedicated to writing offshore renewable risks. A further catalyst for such a shift in focus has been the Lloyd's of London Market's policy mandate, ending insurance coverage for coal, oil sands and Arctic energy projects by 2030.

Some of the larger insurance writers within the Renewable Energy space have specialist in-house teams of engineers who can assess and advise on the quality of risk. The knowledge taken from these teams, alongside newly formed committees and working groups, such as the Joint Rig Committee, has resulted in development of new wordings, which are now being incorporated within (re)insurance contracts. Examples include new Cable Protection System (CPS) exclusions and adjustments to Series Loss clauses, which all form part of the continued evolution seen within the offshore Renewable Energy market.

3. Global Renewable Energy Analytics Solutions

While natural catastrophe modelling and exposure management practices are well developed for property classes, marine and energy are still in a state of maturation. There remain several key challenges when assessing exposure and loss quantification for Renewable Energy:

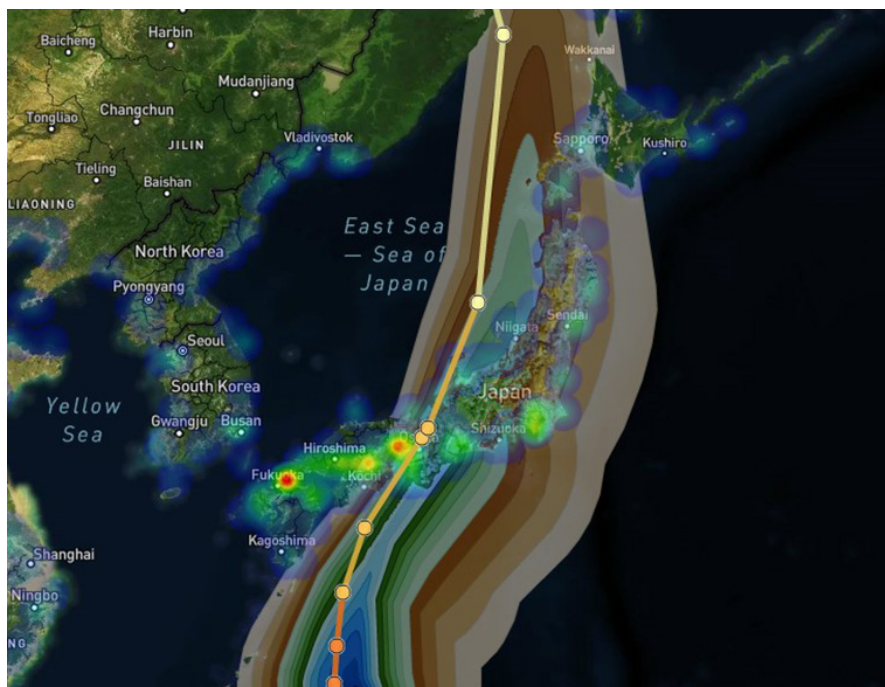
- Vulnerability – the complexity of renewable risks and their associated infrastructure are difficult to model and are exposed to more complex forms of loss. This, coupled with the rapid expansion in the sector means there is a large amount of construction/erection risk which requires a more bespoke view of vulnerability.
- Lack of claims data – due in-part to choice of location and engineered design, there have been limited claims to date from natural catastrophes, which makes further calibration of models extremely difficult.
- Vendor model coverage – while current vendor models do provide stochastic offerings they are limited in scope, both geographically and in granularity of risk differentiation.
- Exposure data – data capture and governance lags more developed classes (e.g., aggregated field values) and as a result accurate risk quantification becomes increasingly challenging.

Gallagher Re works with clients to address these challenges, from original exposure estimation through to bespoke View of Risk analysis. This is done via a number of approaches.

Using powerful geovisualisation tools, clients are able to assess spatial correlation between assets, identify concentrations of risk, overlay hazard data and get real-time event updates anywhere in the world. We continue to collaborate with leading data providers to help disaggregate, augment and refine exposure data to get the most robust view of exposure and risk.

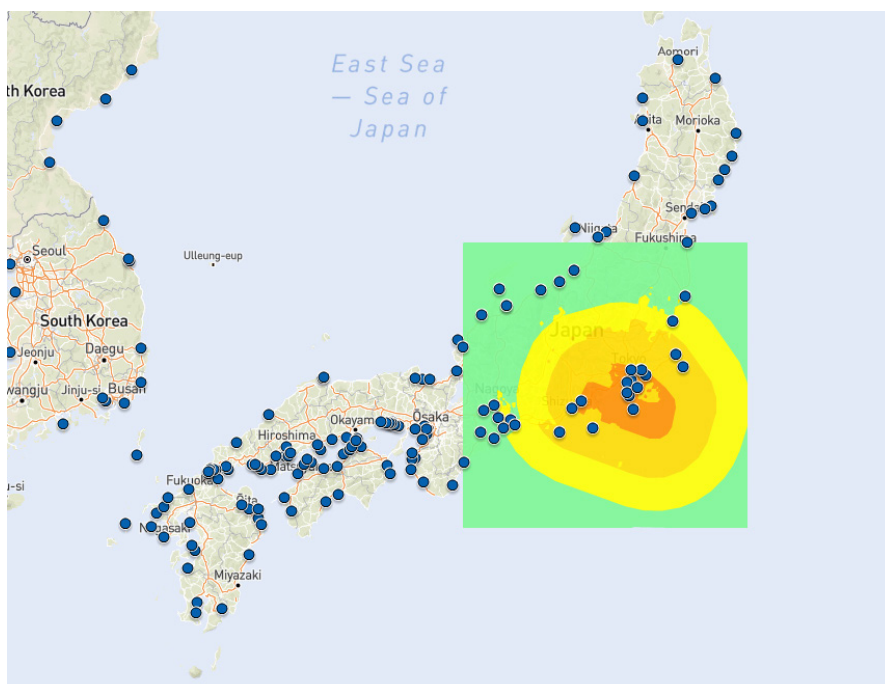


Typhoon Jebi Wind Field Overlaid on a Market Portfolio



Source: Gallagher Re using SpatialKey and Kinetic data

Shaking Intensity at Asset Locations for the Great Kanto Earthquake

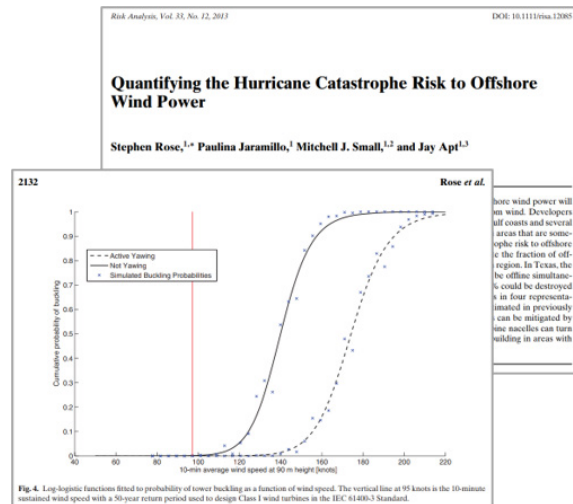


Source: Gallagher Re using SpatialKey and USGS data

Partnerships with leading research institutions through the Gallagher Research Centre, as well as participation on global risk initiatives provides us with unique access to a library of vulnerability information for Renewable Energy structures. This in conjunction with our proprietary CAR/EAR model, ENGINEER, allows for adjustment of modelled losses for all phases of construction and operation, differentiated by peril.

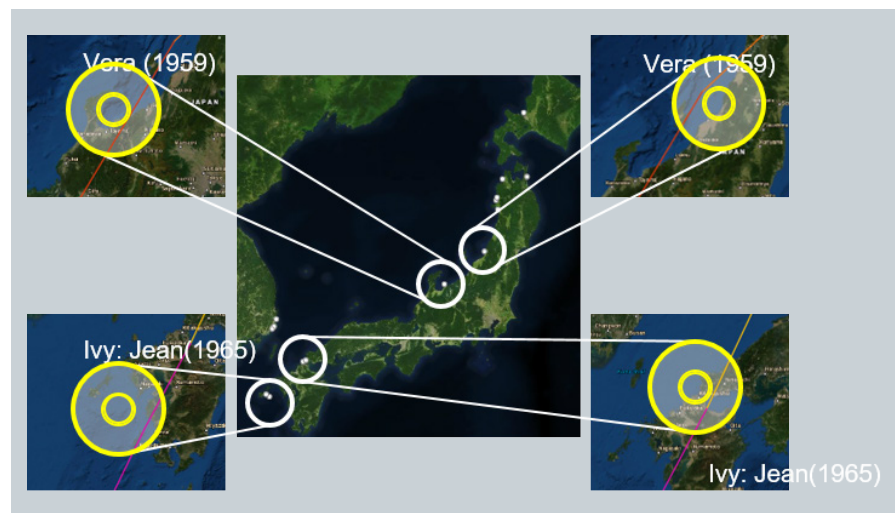
Combining these two capabilities allows us to build a framework for assessing potential loss for Renewable Energy assets globally on a deterministic basis for major perils, both onshore and offshore.

Academically Derived Vulnerability Curves for Offshore Wind Assets



Source: Rose et al

Identification of Historical Typhoons to Affect Japanese Offshore Development Areas



Source: Gallagher Re using SpatialKey and NOAA data



Where vendor catastrophe models do exist, our market-leading Model Research and Evaluation (MR&E) team provide expert insight into their suitability, and where appropriate, recommend modifications. This, in conjunction with claims data from both clients and the Gallagher group of companies, allow for bespoke model adjustments and formulation of own View of Risk.

To supplement vendor catastrophe modelling, Gallagher Re is building out global stochastic capability for Renewable Energy classes for Earthquake and Windstorm. This is particularly important for offshore structures where vendor models have limited coverage outside of the North Sea.

4. Key Considerations

Current Headwinds

It is worth noting that, like many other sectors at the moment, Renewable Energy is still feeling the effects of COVID-19, which have greatly impacted supply chains. As a result, suppliers and developers are under huge strain. This issue has been further exacerbated by the unprecedented demand. For example, there are over 300 Offshore Wind projects currently in the global pipeline. This demand has been driven by the factors previously mentioned in the report, to summarise:

1. Global commitment to Net Zero
2. Changing nature of the risk picture and technology (bigger turbines, deeper waters)
3. Growing ESG pressures

Such demand has also had a knock on impact in other areas of the Renewable Energy sector and created a shortage of qualified personnel. Most notably, recognised surveyors to carry out Site-Specific Assessments (SSA). Subsequently, there is a delay in companies procuring the necessary licences and approvals to proceed with pipeline projects (up to an 18-month waiting time). For the projects that make it beyond this stage, there is also only a select few vessels with the capability to tow the wind turbines out to sea to be built, causing further delays.

In addition to personnel issues, there is also the issue of local content laws. This is where legislation permits developers to build Renewable Energy assets, provided they use local resources and companies, rather than external third parties. This can cause further issues as there can be a big difference in the standards from one country to the next. Furthermore, there is also a lack of collaboration between joint venture parties in the process. Such shortages and personnel issues, along with the impact of inflation has caused price volatility and overall uncertainty in the market.

Insurance Trends

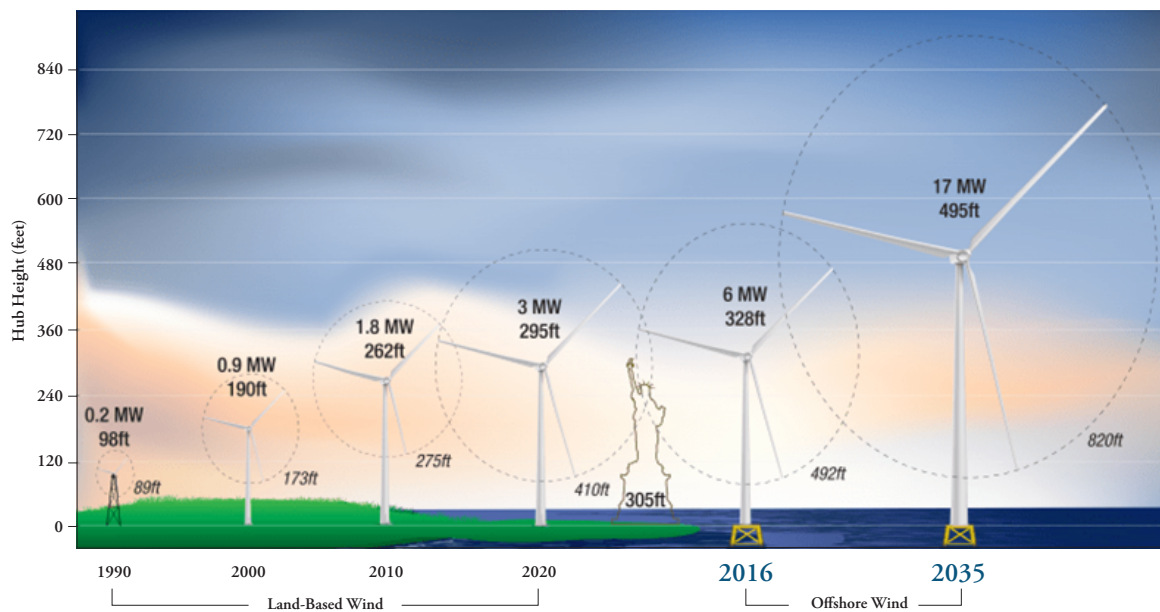
Presently, underwriters are scrutinising the wording of slips more than ever before. The implementation of Cable Protection System exclusions and Series Loss Clauses is a clear reflection of this, and the insurance industry's desire to create long-term stability in the market. Similarly, underwriters are now also carefully considering the level of deductibles and the rating being applied. This has come in

2. Renewable Energy: Offshore Wind and the Future

the wake of big Offshore Wind losses seen by manufacturers such as Orsted A/S within the last year.

While such trends in underwriting requirements may improve current loss ratios, there are other important challenges ahead. The most significant of which is the rapidly changing risk profile in Wind, as highlighted in the following graph.

Tracking the Height and MW Capacity of Turbines from 1990 to 2035



Wind Turbine Capacity MW/Hub Height (feet)
Rotor Diameter (feet)

Source: US Department of Energy

This illustrates the rate of change in wind turbines over time from the land-based turbines (1990 – 2020), to the projected future, being all offshore in deeper waters with bigger turbines.

The Opportunity

While there are some very real issues facing the Renewable Energy market, the expected (and existing) demand as a result of Net Zero commitments; projected growth in offshore and floating wind (active global Offshore Wind output is currently 278 GW and anticipated to be 638 GW by 2035); combined with the mounting pressure of ESG agendas, supports the view that Offshore Wind requires immediate consideration, to ensure the challenges and demands of the future can be fully realised and capitalised upon.



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Trends in Japan's Non-Life Insurance Industry

3

Non-Life Planning Department

The Toa Reinsurance Company, Limited

1. Overview of the Non-Life Insurance Industry

(1) Status of Non-Life Insurance Companies, Cooperatives and SASTI

Of the 54 non-life insurance companies currently operating in Japan, 33 companies are licensed as domestic insurers, including foreign capital domestic insurers, while 21 companies are licensed as foreign insurers.

Japan began liberalizing its insurance industry with the financial big bang in 1996. Its non-life insurance companies have increased operating efficiency since then while conducting mergers and business integrations in stages. As a result, the non-life insurance market has become an oligopoly comprising the three largest non-life insurance groups (in alphabetical order; MS&AD Insurance Group Holdings, Inc., Sampo Holdings, Inc. and Tokio Marine Holdings, Inc.). Based on statistics released by the General Insurance Association of Japan (GIAJ) and the fiscal 2021 financial results disclosed by these groups, we calculate that these three group companies account for more than 86% of net premium income written by the 29 GIAJ members.

The market also includes cooperative and mutual insurance companies, who offer fire, personal accident and automobile insurance. The main cooperatives that make up the Japan Cooperative Insurance Association Incorporated had premium income of about 2.5 trillion yen in fiscal 2020 (excluding life cooperatives and annuity cooperatives).

In another development, the Small Amount and Short Term Insurance (“SASTI”) business was introduced in Japan following an amendment to the Insurance Business Act in April 2006. SASTI companies, who are limited to selling insurance products in small amounts with limited terms, provide non-life or life insurance products. In fact, regulations make it much easier for SASTI companies to enter the insurance business than is the case of establishing a new insurance company. For example, SASTI companies need to register only and need not be licensed by the Financial Services Agency (FSA) to operate. The minimum capital required is 10 million yen, compared to 1 billion yen for an insurance company, and they may sell both life and non-life insurance products. The number of member companies of The Small Amount and Short Term Insurance Association of Japan continues to grow and the scale of the market continues to expand. Non-life insurance products sold in this market are mainly renters insurance, including fire insurance for the home contents of renters and rental housing liability insurance sold through the real estate agent channel, recent strong-seller pet insurance, and pecuniary insurance. Some SASTI companies have grown to the extent that they may choose to get a license to operate as an insurance company, while some existing non-life insurance companies have newly established SASTI companies.



The Small Amount and Short Term Insurance Market Data

Figure 1: Member Companies

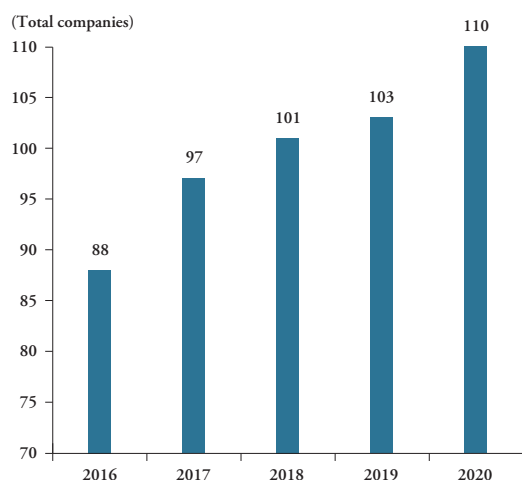
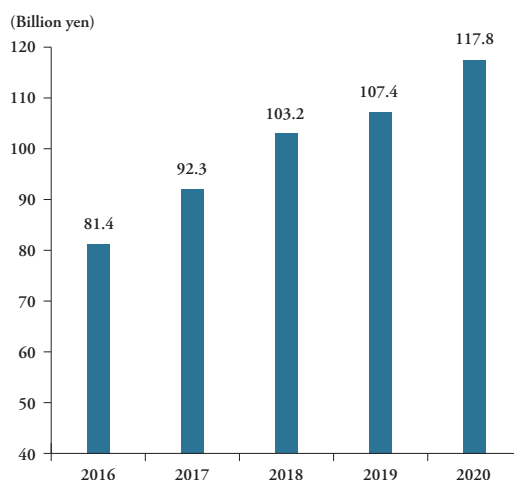


Figure 2: Premium Income



Source: The Small Amount and Short Term Insurance Association of Japan

(2) Trends in Business Results of Non-Life Insurance Companies in Fiscal 2021

The following is a summary of the main financial results (total) of 29 non-life GIAJ members in fiscal 2021.

Net premium income in all lines of business increased by 113 billion yen from the previous fiscal year to 8,806 billion yen, mainly due to automobile and fire classes.

Net claims paid (paid basis) increased by 147 billion yen to 4,711 billion yen because of the Earthquake off the Coast of Fukushima Prefecture, which occurred in February 2021, and the increase in automobile claims, which had declined in the previous year. As a result, the loss ratio increased by 1.3 percentage points to 59.3%.

Expenses increased by 55 billion yen to 2,894 billion yen. The net expense ratio increased by 0.2 percentage points to 32.9%.

Underwriting profit (earned/incurred basis) grew by 218 billion yen to 310 billion yen.

Ordinary profit, calculated as the sum of underwriting profit and investment profit, increased by 293 million yen to 891 billion yen. After deducting tax expense, net income also increased, by 233 billion yen to 670 billion yen.

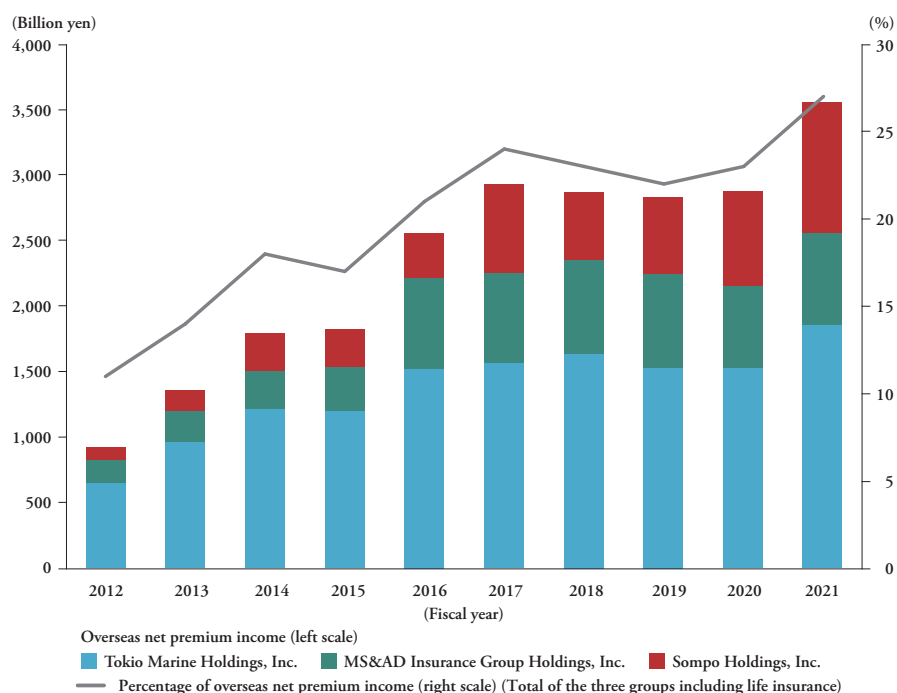
(3) Overseas Business Trends for the Three Largest Non-Life Insurance Groups

The three largest non-life insurance groups have all positioned overseas business as a growth driver, and have aggressively implemented initiatives such as forming business alliances with foreign insurance companies and engaging in M&A.

Figure 3 shows overseas net premium income* for the three largest non-life insurance groups. Their net premium income from overseas business in fiscal 2021 was about 4 times that of fiscal 2012, and overseas business accounted for approximately 27% of their net premium income.

* In this section, "overseas net premium income" includes both non-life and life insurance premiums.

Figure 3: Trends in Overseas Net Premium Income for the Three Largest Non-Life Insurance Groups





The three groups' business developments in the non-life insurance segment are as follows:

Mitsui Sumitomo Insurance Co., Ltd. acquired the general insurance operations of U.K. company Aviva plc in 2004, and has made Aviva its base for advancing into the ASEAN region. In 2015, another MS&AD group company, Aioi Nissay Dowa Insurance Co., Ltd., acquired Box Innovation Group, a major U.K. telematics automobile insurer. Furthermore, MS&AD Holdings strengthened its reinsurance business and specialty lines by completing the acquisition of Amlin plc of the U.K. in 2016. It also acquired Singapore insurer, First Capital Insurance Limited in 2017, and U.S. managing general agent, International Transportation and Marine Office, LLC in 2021.

Since 2014, SOMPO Holdings has made significant progress in its overseas business by acquiring leading U.K. specialty (re)insurer, Canopus Group Limited (later sold in 2017) and U.S. insurer and reinsurer, Endurance Specialty Holdings Ltd. (now called Sompo International Holdings Ltd). Sompo International has been their core company for doing overseas business. It acquired U.S. agriculture insurance provider, Diversified Crop Insurance Services in 2020, and announced the acquisition of Italian agriculture insurer, ARA 1857 S.p.A. in 2021, promoting its strategy of expanding agriculture insurance business. SOMPO International has also announced that it will spin off and sell the consumer insurance business of Sompo Seguros S.A. in Brazil in 2023.

Tokio Marine Holdings has pursued growth opportunities in its overseas business by acquiring businesses in emerging countries, as well as insurance companies with strong specialty lines in developed countries. Since 2008, it has completed the acquisition of Kiln Ltd. of Lloyd's in the U.K., Philadelphia Consolidated Holding Corp. of the U.S., Delphi Financial Group, Inc. of the U.S., specialty insurance group, HCC Insurance Holdings, Inc. of the U.S., and Privilege Underwriters, Inc. of the U.S. At the same time, Tokio Marine Holdings reviewed its business portfolio and sold reinsurance subsidiary Tokio Millennium Re AG in 2018. In 2020, it announced its goal of establishing a new non-life insurance subsidiary in Canada, and in 2021, its group companies, Tokio Marine Seguradora S.A. and Caixa Seguridade in Brazil established a joint venture to underwrite mortgage and homeowners insurance.

With a focus on life and non-life insurance, on the other hand, the three groups are expanding and strengthening an array of various areas based on synergies with insurance products and promotion of insurtech, including financial services, risk solutions and services, nursing and senior care, healthcare, and digital. They are enhancing alliances and investments in a variety of overseas companies including artificial intelligence startups and insurtech companies.

2. Latest Trends in Business Results of Non-Life Insurance Companies

(1) Trends in the Fire Insurance Market

After multiple large typhoons caused substantial damage in fiscal 2018 and fiscal 2019, the impact of wind and flood losses on the non-life insurance market was relatively minor in fiscal 2020 and fiscal 2021. The real impact of the Earthquake off the Coast of Fukushima Prefecture in March 2022 is still unclear as claim assessment and payment are ongoing, while it is assumed that results are likely to be influenced by the increased percentage of households that have taken out earthquake insurance since the Kumamoto Earthquake.

Table 1: Statistics for Recent Major Earthquakes

	Date	Magnitude	Number of Claims Paid	Insurance Claims Paid (Million yen)
Fukushima Earthquake	2022/3/16	7.4	289,929	210,730*
Kumamoto Earthquake	2016/4/14	7.3	214,003	389,811

* For the Fukushima Earthquake, as of June 17, 2022, including loss reserves

(Source: General Insurance Association of Japan website, "Key figures related to the Earthquake off the Coast of Fukushima Prefecture (occurred on March 16, 2022) (As of June 17, 2022) and Japan Earthquake Reinsurance Co., Ltd. website, "20 Largest Claims Paid for Earthquake Insurance on Dwelling Risks" from the Statistics part of the Annual Report)

Due to the fact that fire insurance business results in Japan have deteriorated due to major natural disasters in 2018 and 2019, the reference loss cost rate for fire insurance (homeowners' comprehensive insurance), as calculated by the General Insurance Rating Organization of Japan, has been raised three times since 2018. Non-life insurance companies have revised their premium rates in response to the reference loss cost rate revisions, and have also consistently phased in tighter terms and conditions (besides those related to premium rates) such as shortening the maximum policy period for fire insurance to five years from ten years, increasing deductibles, and setting limits of liability. The results of fire insurance companies are therefore expected to improve.



The following table presents the fire insurance premium rate increases for reference.

Table 2: The Fire Insurance Premium Rate Increases

Dare of Revision	Rate Increase*	Comments
October 2019	+7% to +10%	Reflected the revision of the reference loss cost rate in May 2018 (average 5.5% increase: in consideration of the impact of natural disasters before 2017)
January 2021	+8% to +10%	Reflected the revision of the reference loss cost rate in October 2019 (average 4.9% increase: in consideration of the impact of the major natural disasters Typhoon Jebi and Typhoon Trami in 2018)
October 2022	+8% to +10%	Reflected the revision of the reference loss cost rate in May 2021 (average 10.9% increase: in consideration of the impact of typhoons and heavy rain in 2019 and 2020)

* The average rate increase for residential, commercial and industrial properties by the three largest non-life insurance companies, based on interviews by Toa Re

(2) Reinsurance Renewals in 2022

Most reinsurance contracts of domestic non-life insurance companies, including cooperatives and SASTI companies, are renewed at the start of their fiscal year, generally April 1.

Reinsurance capacity was sufficient at the April 2022 renewals, although reinsurers expressed concerns about the substantial impact of inflation due to supply chain disruptions and labor shortages caused by the COVID-19 pandemic. In addition, reinsurers positively evaluated the improved direct insurance policy conditions, including increased premium rates in consideration of past losses related to large-scale natural disasters, and pro-rata property treaties were renewed with essentially the same conditions. The reinsurance cost increase under non-proportional treaties covering natural catastrophe risks was modest.

In response to Lloyd's Market's request for silent cyber clarification under casualty business (since July 2021), the introduction of the clarification clause for casualty treaties was a key issue at renewals. The standard Sanction Clause of Lloyd's Market Association (LMA) was widely introduced in various classes of business in consideration of regulations related to the economic sanctions imposed by various countries after the Russian invasion of Ukraine.

(3) Acceleration of Digital Transformation during the COVID-19 Crisis

The COVID-19 crisis that has persisted for more than two years has caused significant problems for insurance business operations. In order to overcome those difficulties, major insurers and others have rapidly accelerated digital transformation using various digital technologies premised on 'zero contact'. The following are examples:

- The introduction of various mechanisms and tools that enable remote and paperless customer interactions including insurance consultations, contract application and loss reporting, along with insurance premium and claims settlement.
- The application of AI techniques for customer communications, risk assessment, claim surveying, disaster prediction and mitigation, as well as for various new products and services.

(4) Trends in Regulation by Regulatory Agencies

Given changes in the financial environment, over the past several years the Financial Services Agency (FSA) has been inculcating principle-based inspection and supervision that emphasizes dialogue with financial institutions that has the requisite quality and depth to achieve the goals of financial administration.

Under these circumstances, the FSA has stated that it is important for insurance companies to create sustainable business models and to develop products that address evolving customer needs in response to changes in the business environment, such as the intensification of natural disasters, progress in digitalization, and post-COVID-19 strategies. The FSA is also promoting more sophisticated governance and improvement in management systems through dialogue with insurance companies.

At the same time, the FSA will address changes in the financial environment by steadily moving forward with appropriate initiatives to protect policyholders and will also introduce solvency regulations based on economic value.

In Japan, the FSA is examining evaluation and supervisory methods based on economic value in parallel with the introduction of the Insurance Capital Standard (ICS) by the International Association of Insurance Supervisors (IAIS). Solvency assessment based on economic value is central to this regime, and will likely come into force in line with the ICS application schedule (it will be introduced in fiscal 2025 as a full-fledged regulation after a five-year monitoring period).

The FSA has noted that introducing the economic value-based solvency ratio into the regulatory regime may bring unexpected consequences, such as excessively risk-averse behavior among insurance companies. Therefore, it is investigating unintended consequences and international trends while continuing its examination with emphasis on dialogue with relevant parties.



(5) ESG and SDGs Initiatives

Japan is among the countries promoting ESG and SDGs. Led by major insurers, various companies are proceeding with implementation of a broad array of studies and initiatives in areas including asset management, personnel systems, corporate governance, compliance and social contribution, in addition to improving insurance products and services.

The three largest non-life insurance groups have clearly defined their purpose and established sustainability committees, and have officially incorporated the ESG framework into the decision-making process for insurance operations and investment. They regularly publish sustainability reports. In addition, they are addressing the greater frequency and intensity of natural disasters as a result of climate change by cooperating more closely with other industries, local governments and other organizations in disaster mitigation initiatives ranging from disaster prevention to repair cost reduction. The three groups are also enhancing insurance products that facilitate renewable energy development. Some companies have announced they will not provide new insurance underwriting capacity or make investments related to coal-fired power generation.



Trends in Japan's Life Insurance Industry

4.

Life Planning Department

The Toa Reinsurance Company, Limited

1. Overview of Business Results for Fiscal 2021

The fiscal 2021 business results for 42 life insurance companies are as follows:

(1) Total Amount of New Business

During the fiscal year ended March 31, 2022 (fiscal 2021), even though sales personnel refrained from face-to-face marketing to prevent the spread of COVID-19, the total insured amount of new business for individual life increased by 5.3% to 46.5 trillion yen thanks to enhanced online sales. The total insured amount of new business for individual annuity insurance increased by 32.3% to 5.3 trillion yen. The total insured amount of new business for group insurance increased by 21.5% to 5.4 trillion yen.

(2) Total Amount of In-force Business

The total insured amount of in-force business for individual life decreased by 1.1% to 806.9 trillion yen, essentially unchanged from the previous fiscal year. The total insured amount of in-force business for individual annuity insurance decreased by 0.7% to 101.1 trillion yen, showing a similar trend to that of the total insured amount for individual life insurance. On the other hand, the total insured amount of in-force business for group insurance increased by 1.0% to 408.8 trillion yen.

(3) Premium Revenues and Total Assets

Total premium revenues increased by 3.5% to 32 trillion yen. Total assets increased by 1.8% to 419.7 trillion yen thanks to the increase in foreign securities.

2. Impact of COVID-19 on Life Insurance Companies

Japan has kept COVID-19 cases and deaths at relatively low levels compared with the United States and Europe. So, it is believed that the increase in death and hospitalization benefits paid due to COVID-19 will have only a limited impact on the performance of life insurance companies. However, the situation is changing due to the appearance of the highly infectious Delta and Omicron variants.

Life insurance companies have addressed societal needs and fulfilled their responsibilities by increasing COVID-19-related benefit payments since the pandemic began, and so-called "deemed hospitalization" is representative. Brought on by the shortage of available hospital beds because of an increase in patients due to COVID-19, deemed hospitalization involves paying hospitalization benefits to COVID-19-positive people who, based on a doctor's diagnosis, receive certification for self-care at home or at a hotel instead of at a hospital.

Benefit payments for deemed hospitalization have been increasing rapidly as the COVID-19 pandemic drags on, with the outbreak of the new and highly infectious Delta and Omicron variants. Prior to the outbreak of these variants, COVID-19-related hospitalization benefits paid from March 2020 through March 2021 totaled 12.33 billion yen, of which deemed hospitalization benefits totaled 6.98 billion yen. However, hospitalization benefits paid from April 2021 through March 2022 increased by more than 8 times to 102.26 billion yen, of which deemed hospitalization benefits increased by nearly 13 times to 88.97 billion yen.



Table: Hospitalization Benefit Payments Related to COVID-19

	2020/3 - 2021/3	Fiscal 2021*			
	Total	2021 Q1	2021 Q2	2021 Q3	2021 Q4
Hospitalization benefits	126,449 cases Approx. 12.33 billion yen	102,585 cases Approx. 10.36 billion yen	174,127 cases Approx. 18.43 billion yen	213,418 cases Approx. 21.56 billion yen	537,274 cases Approx. 51.90 billion yen
Deemed hospitalization benefits	79,988 cases Approx. 6.98 billion yen	77,976 cases Approx. 7.24 billion yen	141,237 cases Approx. 14.71 billion yen	190,619 cases Approx. 18.54 billion yen	503,853 cases Approx. 48.46 billion yen

* Fiscal year in Japan from April 1 to March 31

Some companies began selling insurance products for infectious diseases to address the outbreak of COVID-19. However, some of these companies had no choice but to terminate sales of these products because of the negative impact on results from increased COVID-19-related hospitalization and other benefits paid, which turned out to be higher than expected.

Deemed hospitalization is a program for patients who would normally be admitted to a hospital, but were not because of hospital capacity constraints brought about by the pandemic. These patients have a medical condition that requires a doctor's supervision, but have to receive medical treatment at home or at some other facility. Further to this, the current Omicron strain of the virus carries far less risk of serious complications, but deemed hospitalization benefits remain available. As a result, mildly ill people who would not normally require hospitalization are receiving hospitalization benefits because they are infected. The situation therefore differs from expectations when insurance companies began paying benefits for deemed hospitalization, leading to calls for a review of that program.

The extensive and protracted effects of the COVID-19 pandemic require life insurance companies to fulfill their responsibilities to contribute to social stability by addressing needs flexibly and quickly. At the same time, life insurers must also address the challenge of stable business management. Life insurers have to steer through a difficult management environment while balancing these contradictory requirements.

3. Major Life Insurance Companies Entering the Small Amount and Short Term Insurance Market

Major life insurance companies have begun to enter the small amount and short term insurance market. In 2019, Sumitomo Life made Aiaru Syougakutankihoken Corporation a subsidiary, and in 2021 Dai-ichi Life established Dai-ichi Smart Small-amount and Short-term Insurance Company, Limited. More recently, in April 2022 Nippon Life launched Nissay Plus Small Amount and Short Term Insurance Co., Ltd. as a subsidiary.

Small amount and short term insurance is a comparatively new insurance market created through a 2006 amendment to the Insurance Business Act. Small amount and short term insurance companies have to limit themselves to selling insurance in the form of protection cover (only) for small amounts and a limited term of one year, or two years at the maximum in the case of non-life insurance. The capital required for entry is a low hurdle of 10 million yen or more, and firms ranging widely from real estate companies and consumer electronics mass retailers to trading companies have entered the market through the establishment of small amount and short term insurance companies. While insurance companies are subject to a licensing system for sales of their products, small amount and short term insurance companies are subject only to a registration system (that requires only a screening process), which enables flexibility in developing products. Therefore, non-life insurance companies established small amount and short term insurance companies within their groups early on, and have been serving the small amount and short term insurance market with a focus on fire insurance for renters.

On the other hand, life insurance companies have been cautious about entering the small amount and short term insurance market because they generally issue policies with longer terms of 10 years to whole life, so policies with terms limited to one year were not a particularly attractive business. However, the emergence of fintech changed that. Companies have been increasing the number of insurance products available for purchase by smartphone, enabling them to approach customer segments comprising people who had been reluctant to buy insurance, particularly young people. Small amount and short term insurance is ideal for identifying and commercializing products that match particular demographics, and for flexibly addressing a wide range of customer needs with a broad portfolio of insurance products. In addition, major life insurance companies have traditionally relied on their sales personnel, but in recent years they have been expanding sales in agency channels, so entering the small amount and short term insurance market helps them approach more customers. Major companies also think that the information they collect through broadly based marketing will enable group synergies. In fact, companies that are part of major life insurance groups are providing flexible and distinctive new products. Aiaru provides coverage in niche markets to meet specific target needs, such as medical insurance for women undergoing fertility treatment. For its part, Dai-ichi Smart has launched a brand of insurance products that can be concluded completely digitally, mainly targeting young people, and sells a product with insurance premiums that fluctuate according to COVID-19 infection status on the first day of each month. Backed by lifestyle changes and the ubiquity of digital technology use, Nissay Plus entered the small amount and short term market in April 2022 and has addressed



diverse customer needs by launching products that cover risks during pregnancy and after childbirth based on collaboration with partner companies. All of these products take advantage of the characteristics of small amount and short term insurance and would have been difficult to quickly develop and sell within the conventional framework of an insurance company.

Japan's life insurance market is contracting because the birthrate is declining and the population is aging, so life insurance companies need to identify new needs. The small amount and short term insurance market is an attractive means for doing so because it enables flexible product delivery and has the potential to provide experience that supports the development of new life insurance products. A point of interest will be how life insurance companies serving the small amount and short term insurance market are able to generate synergies among group companies to develop growth strategies.

4. Life Insurance Company Response to the Introduction of Economic Value-based Solvency Regulations

The Financial Services Agency (FSA) of Japan plans to shift from the current solvency margin regulations to an economic value-based solvency margin regime in 2025, and life insurance companies are taking action in anticipation of the new regulations.

The current solvency margin regulations came into force in 1996 to protect consumers by ensuring companies maintain sufficient capacity. The regulations call for the calculation of liabilities based on locked-in assumptions and factor-based risk measurement. The current methods have advantages including straightforward solvency margin control and low administrative burden because variables are locked in at an insurance policy's inception. However, the current methods are not aligned with international methodologies for measuring soundness, and assessment does not reflect recent trends. Given such issues, the new regulations scheduled for introduction in 2025 will no longer use locked-in formulas for calculating liabilities. Insurance companies will need to address the impact of this change on their solvency margin, because interest rates and mortality rates will vary for each assessment period. A particularly significant impact from the new regime will arise from the large disparity between interest rates that vary for each assessment period and policies written in the past with high assumed interest rates inherent to insurance company portfolios.

Insurers are currently conducting analyses that include analysis of standard models and how their portfolios meet economic value solvency margin requirements, and verification of risk portfolios with the aim of maintaining the solvency margin at a high level. Based on this situation, and in anticipation of the new regime coming into force in 2025, companies have already implemented specific initiatives, as illustrated by the following two cases.

The first case is an initiative for lowering assumed interest rates for group pension products managed by life insurance companies. Nippon Life Insurance, a major Japanese life insurer, announced in April 2022 that it will reduce the assumed interest rate for group pension products to 0.50% from 1.25% in April 2023. This

is the first time in the 21 years since April 2002 that it has reduced the assumed interest rate for defined benefit group pension products. Another major life insurance company, Dai-ichi Life, already reduced its assumed interest rate to 0.25% from 1.25% in October 2021. Insurers are reducing assumed interest rates because protracted low interest rates constrain the yields they can guarantee for group pension products. Upward pressure on interest rates is gradually increasing, but the yield on 10-year Japanese government bonds is still around 0.2%, which suggests investment management results will deteriorate as insurance companies replace higher-yield public and corporate bonds purchased in the past with the low-yield bonds now available. Insurance companies are therefore reducing assumed interest rates to enhance their financial structure. Moreover, the longer interest rates remain low, the more liabilities will increase under the new capital regulations that will come into force in 2025. Life insurance companies are taking action now because they see management challenges intensifying under low-interest rates in the future.

The second case involves the growing use of reinsurance. Life insurance companies have increasingly used reinsurance as a solution for financial issues over the past several years. On a standard policy reserve basis, Dai-ichi Life made reinsurance transactions for about 100 billion yen in 2018 and about 300 billion yen in 2021, and Taiyo Life has done roughly 580 billion yen in reinsurance deals in 2022. In the past, Japanese life insurers typically used financial solutions for surplus relief to reduce initial acquisition cost. With some exceptions, while J-GAAP obliges life insurers to make provisions to standard policy reserves without considering initial acquisition cost, J-GAAP does not allow deferred acquisition costs, meaning companies need to record those costs in the year they acquired the new policies even though they have yet to generate any profit. So, insurers have used surplus relief to reduce the surplus strain in the first year of policies. On the other hand, in the above transactions by Dai-ichi Life and Taiyo Life, reinsurance is used to cede asset risk. In Japan, the assumed interest rate for life insurance was over 5% until the early 1990s because interest rates were high at that time, and there are many policies that are still in force with high assumed interest rates because whole life insurance and individual annuities were core products at that period. Insurance companies therefore use reinsurance to fix the variable negative spread risk of such policies. The new capital regulations are driving the increase in need for reinsurance. Under the current solvency margin regime, insurers value liabilities using assumptions of the mortality rate and the interest rate fixed at the inception of an insurance policy, but the new capital regulations will require insurers to use recent mortality rates and interest rates to value liabilities. Consequently, insurers are using reinsurance to preclude increased liabilities and reduced financial soundness (stemming from the new regulations) from long-term policies in their portfolios that carry high assumed interest rates.

Japanese life insurance companies have begun implementing various initiatives in advance for the purpose of resolving issues related to the introduction of the new capital regime coming in 2025. This trend will be more pronounced toward 2025, so it is important to pay attention to the future movement of each company.



Figure: Yield on 10-year Japanese Government Bonds and Nippon Life's Assumed Interest Rate



Company Overview

Profile

The Toa Reinsurance Company, Limited (Toa Re), was established in 1940. With the reinsurance market evolving and clients' needs expanding, we have recognized the importance of being able to provide a diverse line of life and non-life reinsurance products to lead the market as Japan's primary professional reinsurer. Toa Re is based in Tokyo with subsidiaries in New Jersey (U.S.A.) and Zürich (Switzerland). Increasing demand for reinsurance products in Asian countries prompted us to expand our operations in those regions and establish branch offices in Singapore, Kuala Lumpur and Hong Kong.

In acknowledgment of Toa Re's outstanding financial profile, credit rating agencies, Standard & Poor's Financial Services LLC, A.M. Best Company, Inc. and Japan Credit Rating Agency, Ltd., have assigned Toa Re ratings of A+, A and AA+, respectively. As of March 31, 2022, the Toa Re Group boasted total assets of ¥860.4 billion. Net premiums written during the fiscal year ended March 31, 2022, totaled ¥302.0 billion.

Mission Statement



ToaRe Mission Statement

Providing Peace of Mind

Toa Re aims to realize its mission by

working with society and applying the principles of fairness and integrity to all aspects of our business

offering long-term, solid support to our clients by supplying reinsurance products and services that enable them to maintain stable operations

striving to enhance our corporate value for the interests of our shareholders through open and transparent corporate management

respecting the creativity of our group employees and valuing their contributions

conserving the environment and contributing to a sustainable society

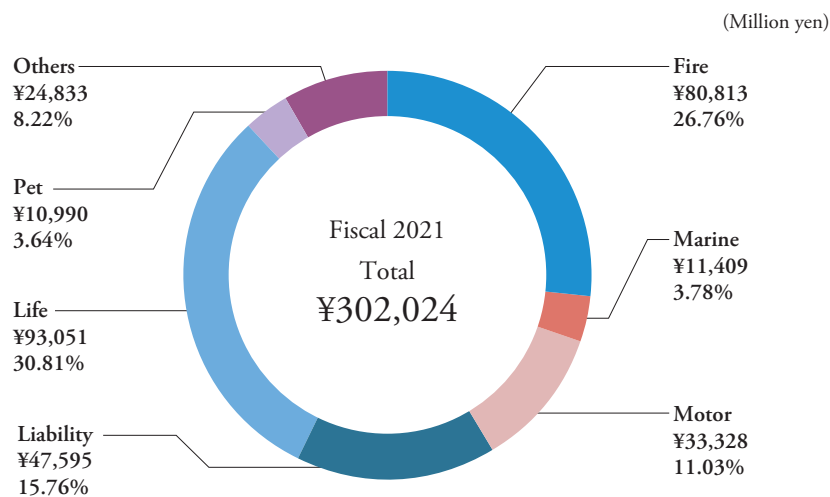
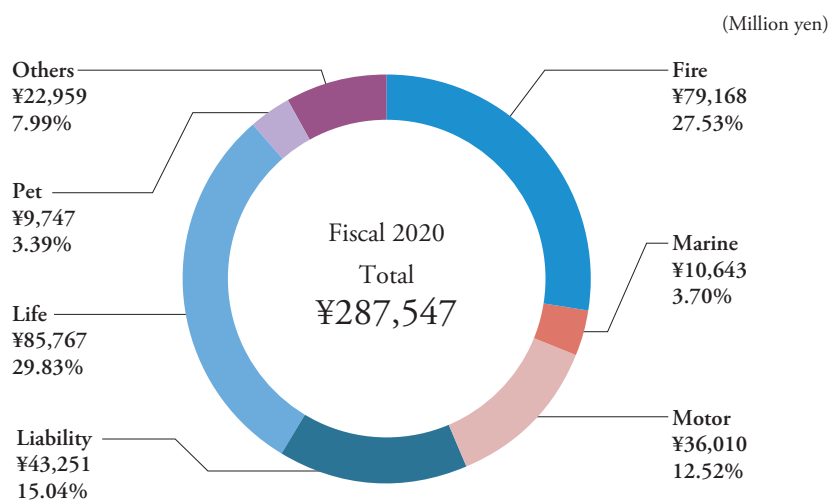


Consolidated Financial Highlights

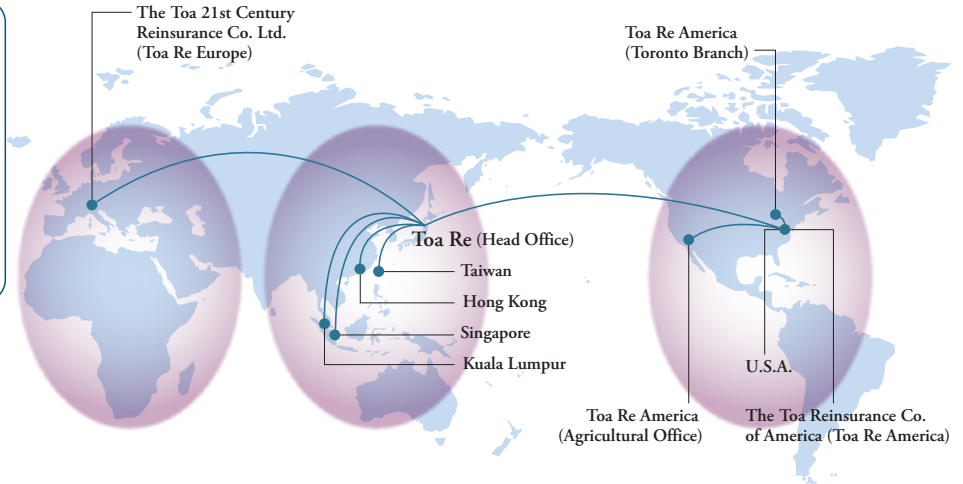
	Million yen					Thousand U.S. dollars
	2022	2021	2020	2019	2018	2022
For the year ended March 31						
Ordinary income	¥329,804	¥312,101	¥297,757	¥266,625	¥254,934	\$2,694,697
Net premiums written	302,024	287,547	270,252	248,288	237,911	2,467,717
Ordinary profit (loss)	827	2,164	88	(7,390)	9,857	6,757
Net income (loss) attributable to owners of the parent	(1,248)	2,745	(2,141)	(7,150)	9,191	(10,196)
As of March 31						
Total net assets	201,307	182,257	167,141	179,944	200,550	1,644,799
Total assets	860,421	772,108	711,690	694,088	687,950	7,030,157

(Rate: ¥122.39 = US\$1)

Net Premiums Written by Class (Consolidated Basis)



Overseas Network



Locations

Branches

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Memo

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Providing Peace of Mind

The Toa Re Group is a global composite reinsurer that provides peace of mind to its clients by protecting them from a broad range of perils such as catastrophic earthquakes and typhoons, casualty events, crop damage, mortality and health care.

We at The Toa Re Group aim to be chosen by clients from across the world because of our ability to offer a secure long-term partnership of optimal solutions and strong financial security.

