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Using AI to Manage Risks in the Rapid Transition to Renewables

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W+K TURNING POINT COMPETITION

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Overview

The *W+K Turning Point competition* has been established to promote international thought leadership across key sectors – mining, power generation, gas and renewables – via the lens of risk and insurance.

The annual prize aims to inspire the leading professionals across the industry to submit novel and inspired thinking in a publishable format to challenge how the customary world of transactional insurance products will need to evolve to meet accelerated change in the technologies and industries that insurers are underwriting.

Finalist Patrick Martin from Chubb Insurance Australia Limited partnered with Tully Anders from W+K's national Property, Energy & Infrastructure team to write this insightful paper considering how insurers can use artificial intelligence (AI) to inform their underwriting strategies to navigate the transition to renewables and sustainably grow market share and profitability.

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Introduction

Environmental, social and governance drivers have altered the risk profile of every class of insurance. The changes are particularly significant in the property and energy market, where environmental imperatives – shaped by governments, regulators, shareholders and customers – have resulted in a rapid move towards renewables and the decommissioning of many fossil fuel assets. These structural changes to energy production come with new and enlarged risks that will impact underwriting portfolios.

Traditionally, insurers used large volumes of historical data as the basis for statistical and actuarial models that predict future risks and informs premium and excess calculations. Those models would then be supplemented by information obtained by underwriters during the initial placement and renewal phases. Customers are typically obliged to provide information, such as the location of the risk, the nature of the customer's business, and methods and materials used in the construction on customer property. In many respects, insurers' data collection was a largely reactive process.

The problem facing insurers – especially those looking to build market share in the renewables space – is twofold:

- there is a lack of claims data on new technologies that can be used for rigorous actuarial analysis, and

- 'traditional', reactive data collection methods may not be adequate when it comes to understanding new risks in the renewables space.

The shift towards renewables is accelerating rapidly, which is why effective capture and analysis of data in this fast-changing landscape represents a turning point for the market. Insurers that do not adapt their actuarial and underwriting processes may take on questionable risks. In contrast, those that embrace the power of data and advanced analytics will be in a better position to grow market share sustainably.

This paper explores how insurers can use artificial intelligence (AI) to inform their underwriting strategies to navigate the transition to renewables and sustainably grow market share and profitability.

Figure 1: Renewable energy in total final energy consumption in Australia, 2000-2021
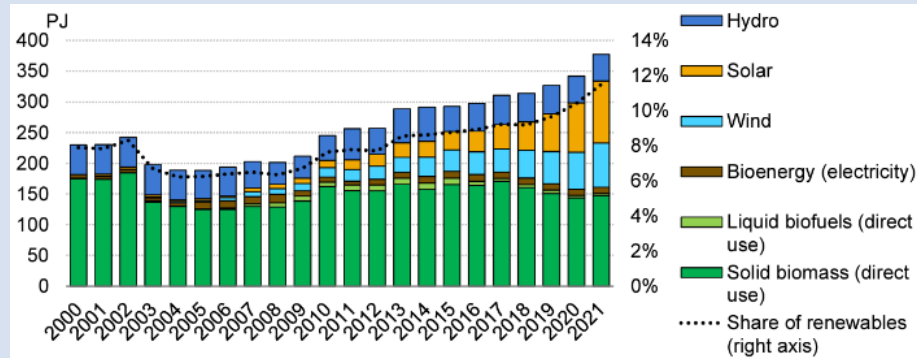
Source: IEA, 'Australia 2023 Energy Policy Review' (April 2023)

Figure 2: Current uses of advanced analytics in pricing/underwriting and claims
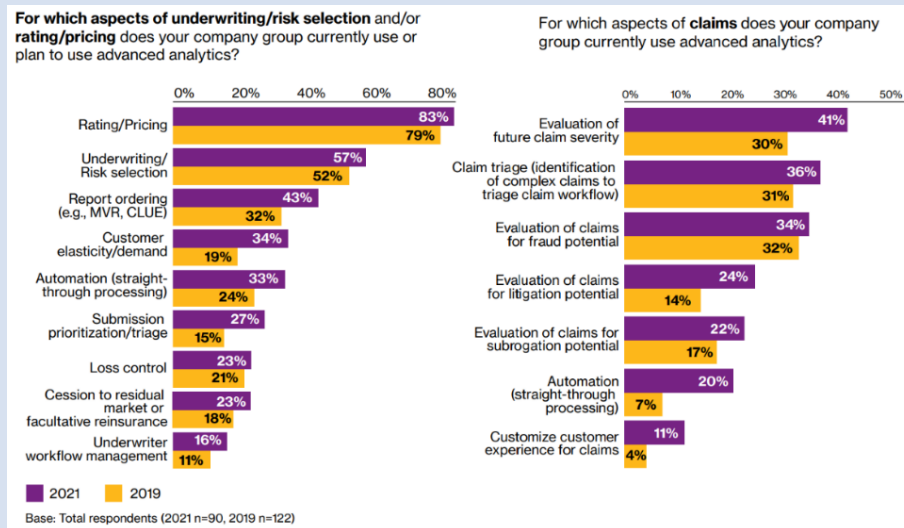
Source: WTW, 'Advanced analytics: Insurers move forward despite obstacles and competing priorities' (30 November 2021)

The Applications of AI

Much has been written about the increasing availability of real-time data with the rising demand for advanced analytics tools that offer actionable insights. In fact, Deloitte reported insurers cited greater use of automation, alternative data and AI as their top three changes to stay resilient in the future[1]. Reflecting this commercial imperative, KPMG found more than 180 partnerships between insurers and insurtechs have been publicly announced worldwide since 2017.[2]

Clearly, AI is being embraced by the industry. In the renewables space, AI also represents an opportunity to expedite data collection that can be used to build more accurate actuarial models, compared to the traditional approach of waiting for a critical mass of data obtained over several cycles of placement, renewal and claim.

This paper considers three applications for AI that insurers can use to expedite data collection:

- AI-assisted weather forecasting and modelling

- defect detection and asset inspections, and

- real-time business interruption monitoring.

While these applications have the potential to assist insurers, the reality is that information asymmetry still exists between insurers and their customers. To help overcome this imbalance, insurers can use the shifting risk landscape to change their overall approach to the underwriting relationship and move towards a 'shared value' approach with their customers, which should create more opportunities for data sharing and client engagement.

[1] B van Dalen, K Cusick and A Ferris, 'The rise of the exponential underwriter' (Deloitte, 24 February 2021) <https://www2.deloitte.com/us/en/insights/industry/financial-services/future-of-insurance-underwriting.html> accessed 23 May 2023

[2] P Kneeland and K Sadarangani, 'Get the most of your insurtech partnership' (KPMG, August 2019) <https://kpmg.com/xx/en/home/insights/2019/08/get-the-most-out-of-your-insurtech-partnership-fs.html> accessed 23 May 2023

Figure 3: **Global insured inflation-adjusted catastrophe losses, 1970-2018**
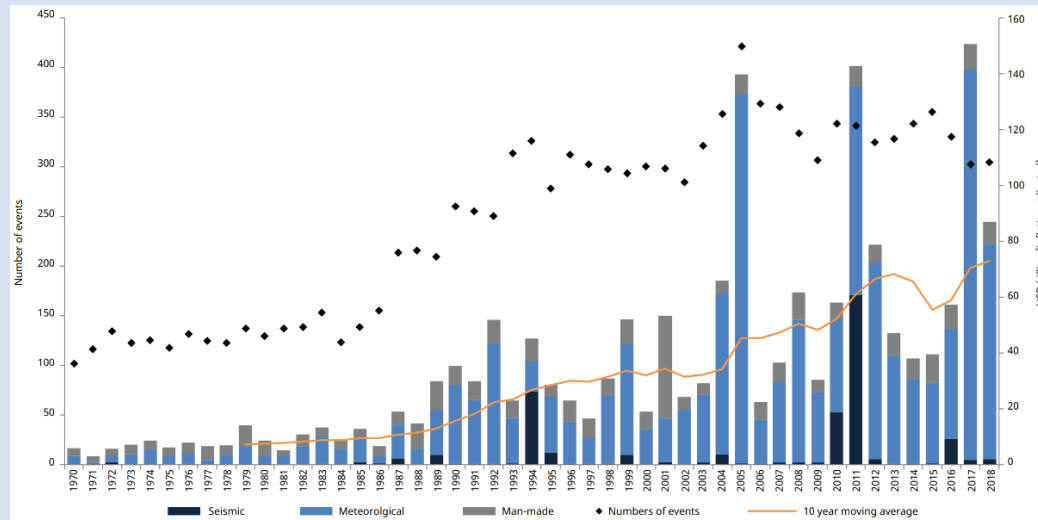
Source: Marsh, 'The impact of claims activity on insurance market dynamics' (November 2021)

Improved weather forecasting

Researchers at Stanford University found that due to climate change, the historical frequency of extreme weather events is no longer a reliable predictor of future weather patterns.[3] While those findings are not surprising, it's clear that insurers and their customers are yet to fully understand how climate change impacts their risk profile. For example, several renewable energy projects in Australia were surprised by the severity of flooding in 2022, with extensive damage to open trenches and unsealed roads, with some insurers failing to account for the cost of dewatering.[4]

AI has the potential to improve the accuracy of weather forecasting and natural catastrophe modelling. For example, researchers at Pennsylvania State University have developed an AI algorithm that detects cloud formations that lead to storms with greater accuracy than other existing severe-weather detection methods. After being trained with more than 50,000 historical weather satellite images, the AI accurately predicted 64% of extreme weather events.[5]

Similarly, research has shown certain types of machine learning models were able to accurately predict the occurrence, and model the extent of, certain natural disasters in Iran using climatic, topographic, geological, social and morphological factors input data.[6]

The ability to adapt to unpredictable and destructive weather patterns enables insurers to better understand their customers' evolving risk profiles and refine their actuarial models in response. Having a better understanding of the likely frequency and severity of weather events – and how they will affect customer property – should create opportunities for dynamic pricing and assist customers to plan and take appropriate preventive action.

Defect detection and classification

Renewable energy projects are often located in remote locations to maximise footprint and generation capacity. The location of these assets can create issues with identifying and managing damage, which in turn can lead to significant increases in the cost of claims. In one potential instance, a serial loss event may involve hundreds of offshore wind turbines in which loss is attributable to a single root cause.[7]

[3] N Diffenbaugh and R Jordan, 'Climate change means more extreme weather than predicted' (Stanford University, 18 March 2020) '<https://earth.stanford.edu/news/climate-change-means-more-extreme-weather-predicted> accessed 23 May 2023

[4] Willis Towers Watson, 'How record floods are changing Australia's renewable energy industry' (14 February 2023) <https://www.wtwco.com/en-au/insights/2023/02/how-record-floods-are-changing-australias-renewable-energy-industry> accessed 23 May 2023

[5] J Hallman, 'Using artificial intelligence to better predict severe weather' (Pennsylvania State University, 1 July 2019) <https://www.psu.edu/news/research/story/using-artificial-intelligence-better-predict-severe-weather/> accessed 23 May 2023
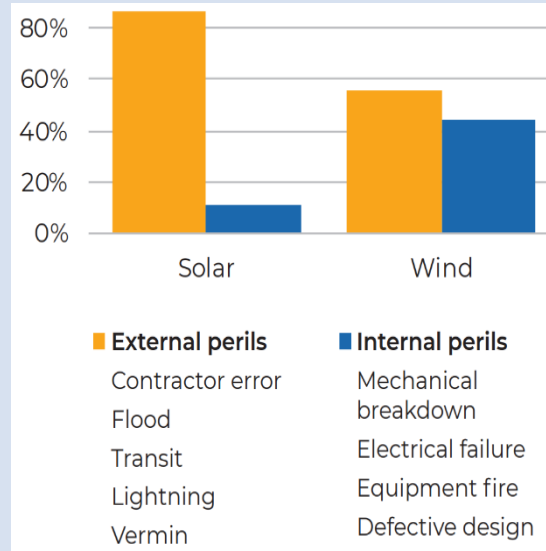
[6] S Yousefi et al, 'A machine learning framework for multi-hazards modeling and mapping in a mountainous area' (22 July 2020, Nature) <https://www.nature.com/articles/s41598-020-69233-2>, accessed 23 May 2023

AI is already being used in the residential and commercial property space to identify and mitigate water leaks, which has resulted in a reduction of claim frequency and severity. There are clear applications for similar AI in the renewable energy space. In fact, researchers at Loughborough University developed an algorithm that recognised and classified wind turbine blade defects with 85% accuracy. The premise behind this development is simple: an algorithm analyses photographs taken during the cyclic asset inspection process and identifies likely defects. The issue will become how insurers can access such data outside of the normal placement, renewal and claim cycles.

As with most problems, early detection always leads to better outcomes, especially when it comes to remotely located assets. The early detection of defects before damage ensues will drive better asset management practices, improve insurers' loss ratios, and create opportunities for risk segmentation and new products, such as parametric insurance.

Similar algorithms can help insurers track the condition of assets over a period of time. For example, one provider in North America has developed an algorithm that uses satellite images taken over time to track the condition of customer property and identify the occurrence of damage. This, in turn, informs risk rating and premium pricing. That particular product has only been used by home and contents insurers in North America, but a similar algorithm could be rolled out in energy lines of business to monitor asset conditions.

Figure 4: **Internal and external perils driving claims (AUD amount incurred)***

External perils	Internal perils
Contractor error	Mechanical breakdown
Flood	Electrical failure
Transit	Equipment fire
Lightning	Defective design
Vermin	

Source: BMS Group, 'The impact of claims activity on insurance market dynamics' (January 2021)

> "
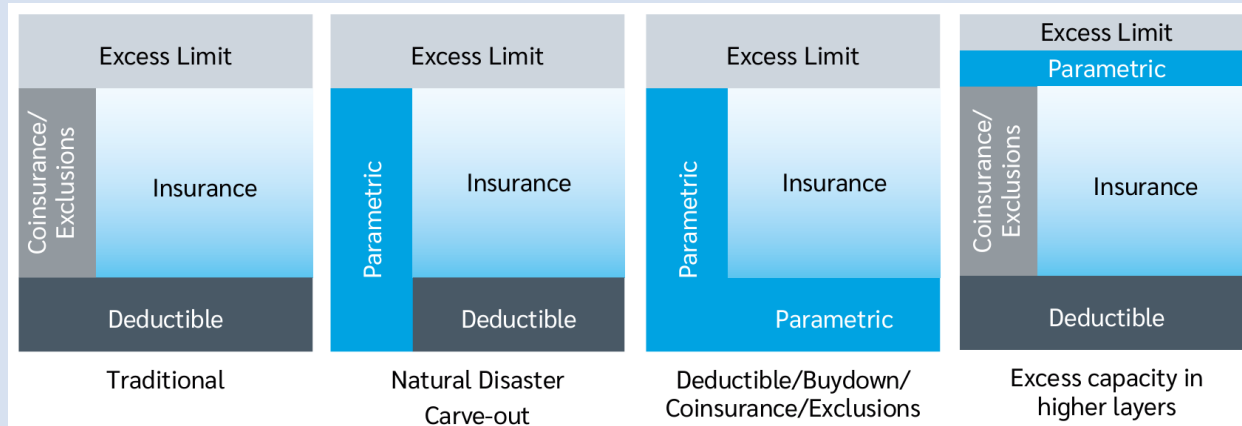> AI has the potential to improve the accuracy of weather forecasting and natural catastrophe modelling.

[7] G Walkling, 'International risk team: the potential and perils of offshore wind' (Lexology, 4 June 2020) <https://www.lexology.com/library/detail.aspx?g=10f3eaf9-51cf-41e2-987c-1952397b6d60> accessed 23 May 2023

[8] LexisNexis Risk Solutions, 'Finally! We now have evidence that smart home technologies impact loss performance' (May 2020) <https://risk.lexisnexis.com/insights-resources/white-paper/lexisnexis-flo-white-paper> accessed 23 May 2023

[9] Loughborough University, 'New AI tool, developed by Loughborough experts, 85% accurate for recognising and classifying wind turbine blade defects' (31 March 2021) <https://www.lboro.ac.uk/departments/compsci/news/2021/new-ai-tool-recognising-wind-turbine-blade-defects/> accessed 23 May 2023

[10] Cape Analytics, 'Change Detection' (undated, Cape Analytics) <https://capeanalytics.com/capabilities/change-detection/> accessed 23 May 2023

Figure 5: **Examples of how parametrics can work alongside traditional insurance programs**

Source: Lockton, 'Parametric insurance solutions guide' (14 September 2022)

Business interruption claims

AI's potential isn't limited to material damage claims.

While renewables technology is rapidly evolving, assessing exposure to business interruption losses can also be a fraught exercise. There are limited data sources, such as electricity spot price tracking on the National Electricity Market, which can inform – at a high level – assessment of business interruption claims. However, information like this is arguably only relevant to the particular claim at hand and, due to the rapid evolution of technology, has limited utility in identifying trends over periods of years.[11]

'Real-time' data from renewable generation sources will inform the adjustment of business interruption claims and help insurers more accurately assess exposures and price risk.

The availability of real-time data may also create opportunities for insurers to develop or offer new products – such as parametric insurance – to customers. For example, in collaboration with a data analysis consultant, Swiss Re developed a solar revenue 'put' product that provides certainty for the customer by paying out claims when generation does not reach a pre-agreed level due to a lack of irradiation.[12]

Obviously, there will be commercial sensitivities with sharing real-time data like generation statistics. Therefore, insurers need to ensure best practices for successful data management by collaborating with regulators and customers. As will be the case with accessing real-time defect detection data, insurers should use the shift towards renewables as an opportunity to change the overall insurance relationship to encourage open information sharing.

[11] See e.g., GCube Insurance, 'Offshore wind turbine scaling is creating unsustainable market risks', (2 May 2023, GCube Insurance) <https://gcube-insurance.com/Insights/News/Offshore-Wind-Turbine-Scaling-is-Creating-Unsustainable-Market-Risks> accessed 23 May 2023

[12] Swiss Re, 'First solar revenue "put"' (2019, Swiss Re) <https://reports.swissre.com/corporate-responsibility-report/2018/cr-report/solutions/sustainable-energy-solutions/first-solar-revenue-put.html#:~:text=The%20solar%20%E2%80%9Cput%E2%80%9D%20works%20like,Swiss%20Re%20covers%20the%20difference> accessed 31 May 2023

A Shift in Values

Traditionally, there was an information imbalance between insurer and customer. Compared to the underwriter, the customer was in a much better position to understand the risk for the cover that was sought. It was this information imbalance that prompted the duty of utmost good faith.

The world has changed dramatically since the early days of the insurance market. However, even with improved access to data, the information imbalance still remains as many customers are reluctant to share information outside the usual collection points of placement, renewal and claim. What's more, there is the potential for this imbalance to be amplified due to the rapid advancements in technology. Accordingly, insurers – especially those new to the renewable energy market – are at risk of misunderstanding and misclassifying risks associated with new technologies.

However, the current market also creates an opportunity for insurers to shift the underwriting dynamic to get access to better real-time data by repositioning the relationship from being transactional in nature to being a partnership in risk. Having access to real-time data would allow insurers to better assess risk and exposure, which in turn may prompt shifts in the underwriting model. For example, insurers might be able to offer dynamic pricing according to the time of year. Similarly, they will be able to better segment risk to offer improved terms for profitable customers. Parametric insurance may also become a more viable option.

Looking to the horizon

The change in the risk landscape caused by the shift to renewable energy represents a turning point for property and energy insurers. Insurers that rely on 'traditional' data collection methods to inform their actuarial analyses run the risk of misunderstanding and misclassifying risks. For those who embrace AI, the financial and relationship benefits are clear. For example, McKinsey & Company reported that insurers who employ advanced data analytics can see their loss ratios improve from 3% to 5%, their business premiums increase from 10% to 15% and customer retention in profitable segments jump from 5% to 10%.

Beyond evolving data collection and analysis methodologies, insurers should leverage the rapid shift to renewables to reimagine the overarching framework of their insurance relationships. By forming a risk partnership and building on shared values with their customers, insurers are likely to foster a relationship where data is shared freely and frequently. This empowers insurers to better assess risk and exposure and offer different products and pricing to their customers.

To better monitor changing risk profiles, and to craft appropriate coverage and pricing, insurers should not overlook AI's potential to accelerate their mitigation, adaptation and resilience efforts as the property and energy market rapidly shifts towards renewables.

[13] K Javanmardian et. al., 'How data and analytics are redefining excellence in P&C underwriting' (McKinsey and Company, 24 September 2021) <https://www.mckinsey.com/industries/financial-services/our-insights/how-data-and-analytics-are-redefining-excellence-in-p-and-c-underwriting> accessed 23 May 2023

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Bibliography

- BMS Group, 'The impact of claims activity on insurance market dynamics' (January 2021) <https://publications.bmsgroup.com/view/424753/> accessed 31 May 2023

- Cape Analytics, 'Change Detection' (undated, Cape Analytics) <https://capeanalytics.com/capabilities/change-detection/> accessed 23 May 2023

- Diffenbaugh N and Jordan R, 'Climate change means more extreme weather than predicted' (Stanford University, 18 March 2020) '<https://earth.stanford.edu/news/climate-change-means-more-extreme-weather-predicted> accessed 23 May 2023

- GCube Insurance, 'Offshore wind turbine scaling is creating unsustainable market risks', (2 May 2023, GCube Insurance) <https://gcube-insurance.com/Insights/News/Offshore-Wind-Turbine-Scaling-is-Creating-Unsustainable-Market-Risks> accessed 23 May 2023

- Hallman J, 'Using artificial intelligence to better predict severe weather' (Pennsylvania State University, 1 July 2019) <https://www.psu.edu/news/research/story/using-artificial-intelligence-better-predict-severe-weather/> accessed 23 May 2023

- IEA, 'Australia 2023 Energy Policy Review' (April 2023) <https://www.iea.org/reports/australia-2023> accessed 31 May 2023

- Javanmardian K et al., 'How data and analytics are redefining excellence in P&C underwriting' (McKinsey and Company, 24 September 2021) <https://www.mckinsey.com/industries/financial-services/our-insights/how-data-and-analytics-are-redefining-excellence-in-p-and-c-underwriting> accessed 23 May 2023

- Kneeland P and Sadarangani K, 'Get the most of your insurtech partnership' (KPMG, August 2019) <https://kpmg.com/xx/en/home/insights/2019/08/get-the-most-out-of-your-insurtech-partnership-fs.html> accessed 23 May 2023

- LexisNexis Risk Solutions, 'Finally! We now have evidence that smart home technologies impact loss performance' (May 2020) <https://risk.lexisnexis.com/insights-resources/white-paper/lexisnexis-flo-white-paper> accessed 23 May 2023

- Lockton, 'Parametric insurance solutions guide' (14 September 2022) <https://global.lockton.com/gb/en/news-insights/parametric-insurance-solutions-guide> accessed 31 May 2023

- Loughborough University, 'New AI tool, developed by Loughborough experts, 85% accurate for recognising and classifying wind turbine blade defects' (31 March 2021) <https://www.lboro.ac.uk/departments/compsci/news/2021/new-ai-tool-recognising-wind-turbine-blade-defects/> accessed 23 May 2023

- Marsh, 'The impact of claims activity on insurance market dynamics' (November 2021) <https://www.marsh.com/bw/risks/climate-change-sustainability/insights/esg-property-and-business-interruption-cover-considerations.html> accessed 31 May 2023

- Swiss Re, 'First solar revenue "put"' (2019, Swiss Re) <https://reports.swissre.com/corporate-responsibility-report/2018/cr-report/solutions/sustainable-energy-solutions/first-solar-revenue put.html#:~:text=The%20solar%20%E2%80%9Cput%E2%80%9D%20works%20like,Swiss%20Re%20covers%20the%20difference> accessed 31 May 2023

- van Dalen B, Cusick K and Ferris A, 'The rise of the exponential underwriter' (Deloitte, 24 February 2021) <https://www2.deloitte.com/us/en/insights/industry/financial-services/future-of-insurance-underwriting.html> accessed 23 May 2023

- Walkling G, 'International risk team: the potential and perils of offshore wind' (Lexology, 4 June 2020) <https://www.lexology.com/library/detail.aspx?g=10f3eaf9-51cf-41e2-987c-1952397b6d60> accessed 23 May 2023

- Willis Towers Watson, 'Advanced analytics: Insurers move forward despite obstacles and competing priorities' (30 November 2021) <https://www.wtwco.com/en-us/insights/2021/11/advanced-analytics-insurers-move-forward-despite-obstacles-and-competing-priorities> accessed 31 May 2023

- Willis Towers Watson, 'How record floods are changing Australia's renewable energy industry' (14 February 2023) <https://www.wtwco.com/en-au/insights/2023/02/how-record-floods-are-changing-australias-renewable-energy-industry> accessed 23 May 2023

- Yousefi S et al, 'A machine learning framework for multi-hazards modeling and mapping in a mountainous area' (22 July 2020, Nature) < https://www.nature.com/articles/s41598-020-69233-2> accessed 23 May 2023

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