



# Global Risk & Resilience Fellowship

Summary Report, 2023



Sustainable  
Markets  
Initiative



# The total population of world cities is projected to grow from **4.2 billion in 2018, to 8.7 billion by 2050.**

*“Cities are the engines for implementing the Sustainable Development Goals, which provide a blueprint for achieving global sustainability.”*

A big data approach to assess progress towards Sustainable Development Goals for cities of varying sizes, published in Communications Earth & Environment in 2023 ([access here](#))

*“One dollar invested in prevention saves between four and ten dollars in reconstruction. Resilience really matters.”*

Dagmar Vogel, Head of Infrastructure Financing Division, Swiss State Secretariat for Economic Affairs (SECO), statement at Resilient Cities Network speaker series in January 2022 ([access here](#))

## Contents

|   |           |
|---|-----------|
| <b>Introduction</b>                       | <b>4</b>  |
| The purpose                               | 4         |
| The process                               | 4         |
| The learnings                             | 5         |
| The future                                | 6         |
| <b>Glasgow, Uk</b>                        | <b>8</b>  |
| The City's Ask                            | 9         |
| The Fellowship Response                   | 10        |
| Outcomes                                  | 11        |
| <b>The Hague, The Netherlands</b>         | <b>12</b> |
| The City's Ask                            | 13        |
| The Fellowship Response                   | 14        |
| Outcomes                                  | 15        |
| <b>Melaka, Malaysia</b>                   | <b>16</b> |
| The City's Ask                            | 17        |
| The Fellowship Response                   | 18        |
| Outcomes                                  | 21        |
| <b>Surat, India</b>                       | <b>22</b> |
| The City's Ask                            | 23        |
| The Fellowship Response                   | 24        |
| Outcomes                                  | 25        |
| <b>Greater Miami And The Beaches, USA</b> | <b>26</b> |
| The City's Ask                            | 27        |
| The Fellowship's Response                 | 28        |
| Outcomes                                  | 29        |
| <b>Acknowledgement and thanks</b>         | <b>30</b> |
| <b>About the project coordinators</b>     | <b>31</b> |

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# Introduction

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The first year of the Global Risk and Resilience Fellowship has been a resounding success. This report summarises the collaboration between Resilient Cities Network and members of the Sustainable Markets Initiative's Insurance Task Force. The outcomes and specific work conducted in each city is discussed in detail.

## The purpose

The Global Risk and Resilience Fellowship seeks to support city leaders to harness the power of insurance to de-risk and accelerate resilience-building activities.

The Fellowship was conceived at COP26 in November 2021 with the objective of delivering tangible movement towards increased city resilience. It brings together city leaders with a deep understanding of urban resilience challenges and those who have the expertise and resources to overcome those challenges, in order to collaboratively develop the solutions that empower cities to build a safe, equitable, and sustainable future for all.

By placing insurance professionals ("Fellows") into city leadership teams to work on specific resilience challenges for up to six months, the Fellowship is structured to support city leaders to take practical action. Through these focused placements, the Fellowship's objective is to both equip city leaders to take action to reduce current resilience gaps and to build long-lasting partnerships between the private sector and city leaders to facilitate further collaboration in the future.

## The process

The process sought to match the specific needs of the cities with the relevant insurance expertise of the Fellows.

In late 2022 a call for interest in participating in the Fellowship was released to member cities of the Resilient Cities Network. In this application, the cities were required to identify a resilience gap they believed could be overcome, or lessened, with support from insurance sector experts.

From the applicants, five cities across three continents were selected: Glasgow, UK; Greater Miami & the Beaches, USA; Melaka, Malaysia; The Hague, Netherlands; and Surat, India. This selection was based on the ability of the Fellowship organisers to match the needs of the city to an insurance professional with suitable expertise and the city's ability to seamlessly integrate a fellow into its organisation and to demonstrate how the work of the fellow would lead to tangible action that increased the city's resilience.<sup>1</sup>

Between March and June 2023 the five fellows - four from Howden and one from Beazley - began their work. Over the course of each three to six month placement, fellows and city leaders considered how to use insurance sector expertise and the power of risk transfer to bridge the resilience gaps identified and support long-term sustainable growth.

<sup>1</sup> For further details of the Fellowship please see [here](#)

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## The learnings

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The fellowship successfully contributed to building city resilience by addressing the shocks and stresses identified by each city.

These shocks and stresses varied from city to city, so addressing each has required tailored advice and led to multiple positive outcomes. These outcomes and the work conducted in each city is discussed in detail in this report.

The experiences of the fellows and city leaders were both incredibly positive. By selecting fellows with expertise to meet the specific needs of a city, and then placing the fellows within a city's leadership team for a prolonged period, the Fellowship cultivated effective partnerships and productive working relationships.

City leaders have accessed expertise which catalyses their ability to deliver a secure, equitable and sustainable future for their city. Through Resilient Cities Network these learnings can be shared across the remaining 100 cities, resulting in cascading benefits and the opportunity to increase urban resilience globally. Equally, the fellows have had an invaluable learning experience, collaborating with others in their industry to drive innovation and explore the role that insurance can play in building the resilience of communities across the globe.

### Improved communication through the development of a shared understanding of risk and preparedness.

This was a common outcome across all five cities, despite the unique context in each. This collective outcome speaks to a fundamental need to overcome differences in how cities and insurance markets consider and speak about risk and preparedness if they are to collaborate effectively to increase urban resilience.

City leaders and the insurance markets look at the same risks but view risk assessment and management through different prisms. The cities are primarily concerned with the socio-economic impact of risks, while the private sector - particularly the insurance market - is focused on the financial cost of risk. This impedes knowledge sharing, and cities' adaptation and use of private sector tools - like risk transfer - to manage risk and build long-term resilience.

### The first step toward establishing a shared understanding of where data or tools could unlock resilience building solutions.

Some cities had already developed, or had access to, data sets they use to assess risks such as flood. In parallel, the insurance market has developed data sets that they use to price the same risk. The cities' and markets' use of different metrics to measure and respond to the same risks obstructs knowledge transfer and collaboration. Through the fellowship, Resilient Cities Network, Howden and the Sustainable Markets Initiative Insurance Task Force have started to bridge the gap and enable city leaders and the insurance sector to establish a shared understanding of where data or tools used by either can be shared to unlock resilience building solutions. Expanding on this and establishing a common understanding of how each party views and assesses risks will unlock the collaboration that will drive innovation and the use of risk transfer as a tool to build the resilience of urban communities.



## The future

In 2024, the Fellowship will build on this year's success by sending a second cohort of fellows to new cities to spur practical action to overcome more resilience gaps.

The power of partnerships will continue to be key to the Fellowship's success. Through the Sustainable Markets Initiative the Fellowship will forge further collaboration, connections and the transfer of expertise to directly build city resilience and support the world's transition to a more sustainable and low-carbon future.



*"The fellowship demonstrates how insurance can plug a critical gap in urban resilience when incorporated into broader solutions. We will build on this fantastic achievement next year by again harnessing deep insurance expertise and partnering to meet the needs of cities directly. Together, we will continue to show how insurance can be a force for good and an enabler of sustainable change."*

**David Howden, CEO, Howden,** and member of the Sustainable Markets Initiative Insurance Task Force



*"Our city-insurance partnership in the inaugural Fellowship cohort exemplifies dynamic cross-sector collaboration. Our cities excel in adapting to challenges, and insurance is a catalyst for comprehensive resilience, demystifying and managing risk. We'll further harness this alliance to build capacity throughout our network, infusing essential risk considerations into every facet of resilience building."*

**Lauren Sorkin, Executive Director,**  
Resilient Cities Network



*"The Global Risk and Resilience Fellowship is an excellent example of how collectively, the Sustainable Market's Initiative Insurance Task Force is working to help businesses, government and society better manage risk, while at the same time seeking to understand and influence new climate resilient solutions. The connections made between the Fellows, across the private sector and government, will prove invaluable in supporting the SMI's objective of accelerating global climate, biodiversity and Sustainable Development Goal targets."*

**John Neal, CEO, Lloyd's,**  
and Chair of the Sustainable Markets Initiative Insurance Task Force





**Glasgow,  
UK**

## Collaborating with private sector to accelerate Glasgow's transition to net zero by 2030

### The City's Ask

In 2019, the city of Glasgow declared a city-wide climate and ecological emergency. The response was an ambitious yet necessary goal for the city to achieve net zero carbon emissions by 2030.

To achieve this goal, the city council's climate emergency working group prepared a report comprising over 60 recommendations in the areas of transport, biodiversity, economy and energy. These recommendations set the basis for the Glasgow Climate Emergency Implementation Plan, a roadmap to smooth Glasgow's transition to a low-carbon and resilient city and achieve climate neutrality by 2030, whilst improving its people's quality of life.

The plan included the establishment of a Greenprint for Investment, a £30bn portfolio of investment projects designed to boost Glasgow's net zero target significantly. It included major infrastructure projects and investments. Glasgow was selected to participate in the Fellowship to explore how the city could engage and use the expertise of the insurance and private sectors to deliver the Greenprint for Investment portfolio.



*"I love Glasgow. I was born and bred here, and live here still. The Fellowship was a great opportunity to help my home city advance its resilience and net zero objectives. I am really pleased I was able to assist and work alongside an incredibly talented team in Glasgow City Council - the links we created will last long after the secondment has ended."*

**Kenny Hogg, CEO Howden Scotland**  
Fellow for Glasgow



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## The Fellowship Response

Kenny Hogg, CEO of Howden Scotland was selected as the city's fellow as his experience and networks, both in the insurance sector and beyond, were well-suited to respond to Glasgow's need.

His fellowship role was to provide support and recommendations around how best to unlock financing - including developing financing mechanisms within the private sector, and considering how insurance could be used as a macro and micro tool - for all the projects within the Greenprint for Investment.

This fellowship placement was carefully structured to embed Kenny within core teams in the Glasgow Council, which are focused on the city's net zero efforts. This enabled Kenny to fully engage with stakeholders and develop a complete understanding of the resilience challenges faced by Glasgow. Through strong collaboration, Kenny was able to advise Glasgow around its plans for financing its net zero 2030 ambitions and to create links with the private sector that will aid in implementing these plans.

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## Outcomes

### Recommendation 1: Working Group

The working group is a platform for meaningful and effective collaboration and communication. It is comprised of senior decision makers in all the relevant departments e.g., planning, finance, procurement, and the city leader's office. Its objective and purpose are to identify the best implementation avenues available to Glasgow; and then facilitate fast decision-making and action while ensuring all the relevant teams are involved in and have ownership over the ultimate decisions taken.

This group responds to a core need noted by Glasgow: to make tangible steps towards the net zero target given the limited time left to them before 2030.<sup>2</sup> The working group is one tool for the city to enhance the efficiency and effectiveness of its operations.

The group will serve as a platform for discussing and identifying the most impactful and beneficial innovative solutions and private-sector partnerships. The specialised knowledge of each member will allow for a holistic assessment of the opportunities available to the city.

Crucially it will also be a platform for Glasgow to move forward with the opportunities identified. With representatives from all the crucial departments regularly meeting with a single goal, the city gains the ability to break down silos that might have previously hindered cross-departmental cooperation. The fluidity in communication facilitates information sharing, streamlines coordinated decision-making processes across departments, and avoids duplication of efforts.

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<sup>2</sup> When the fellowship placement began there were just over 1,945 working days left until 1 January 2030.

Following Kenny's recommendations on this agenda, the Council has also appointed a new Climate Finance Manager post (which started in August 2023) to support the work of this group and to co-ordinate the Council's approach.

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### Recommendation 2: Fostering Private Sector Connections

In addition to supporting the Council to consider and adjust its internal working processes, Kenny worked with the Sustainable Markets Initiative to connect relevant city officials to private sector players with the expertise to support Glasgow in its ambition of reaching net zero by 2030. Kenny attended the UK's Real Estate Investment and Infrastructure Forum (UKREiiF) event with the Council Leader and senior officers in May 2023 and facilitated conversations with key industry leaders on the climate finance agenda for the Council to engage in and to progress as a legacy of the Fellowship.

Through the Fellowship, Glasgow has made connections with private sector experts from the insurance sector and beyond, who are active in developing and implementing innovative financing mechanisms that increase investment in climate-smart urban projects. These meetings have facilitated useful discussions on how project preparation facilities, the public sector and the private sector can join forces to develop new financing mechanisms.

The conversations facilitated by the Fellowship are ongoing. The ambition for both the Fellowship and Glasgow is that these connections, in conjunction with the working group, will fast track the implementation required for Glasgow to achieve its ambition of reaching net zero by 2030.





# The Hague, The Netherlands

## Using an insurance risk assessment methodology to build urban resilience in The Hague

### The City's Ask

Urban risks are increasingly complex and interdependent, making it more and more important for municipalities to take an innovative approach to managing risk and developing resilience. To address this complexity, The Hague sought to establish a risk assessment and monitoring framework that its officials could use to effectively identify, assess, and inform the city's response to existing and emerging risks.

The Hague needed a framework that could build the city's internal capacity to make well-informed, data-driven decisions and enable the municipality to proactively identify risks and implement effective preventative and adaptive measures to address those risks and build resilience. Crucially, the framework needed to be endorsed by all relevant city stakeholders to allow risk-focused city officials to clearly and quantitatively express to other city officials and the public which risks were most pressing. This clear communication and engagement would enable the city to channel its capacity to the most effective resilience-building activities.



*"My day job is in natural catastrophe underwriting. The Fellowship was a chance to think outside what I usually do and to meet different people with different perspectives on risk - how it is viewed, how it is measured, how people think about it - because there is a lot to learn."*

**Max Hoff, Reinsurance Treaty Underwriter, Beazley**  
Fellow for The Hague



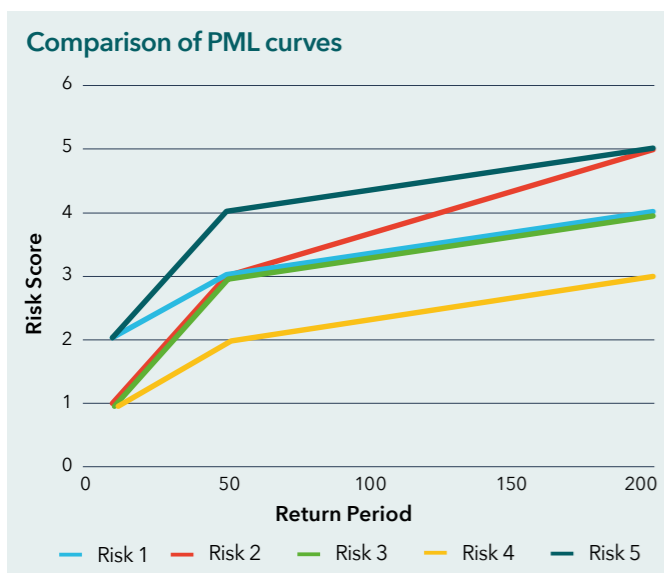
## The Fellowship Response

Through the Fellowship, Max Hoff from Beazley's Treaty Underwriting team, Howden's Climate Risk and Resilience team<sup>3</sup> and Howden's Netherlands team, worked with the Resilience Office of The Hague to develop a risk assessment and comparison framework using insurance sector risk assessment and quantification.

The Fellowship team initially identified a list of risks that affect The Hague and needed to be assessed within the framework. An effective risk assessment methodology needed to allow for like-for-like comparison across the broad spectrum of identified risks. To accomplish this, the Fellowship team worked with city officials to develop a set of modified probable maximum loss (PML) curves. PML curves allow for the two main - from an insurance perspective - attributes of any risk to be plotted: (i) severity (i.e., the extent of impact on the city) and (ii) frequency (i.e., how often the risk will occur). As PML curves can be highly detailed tools, the Fellowship team simplified the process to allow the city to develop PML curves independently in the future while maintaining the effectiveness of its outputs.

To do this, the team compiled a framework to assess all risks on a 1 to 6 severity scale. This scale provided a way to qualitatively and quantitatively measure the impact of risks across five categories: economic, social, political, technology and environment impacts (e.g., financial costs, social unrest and polarisation, disruption to technology infrastructure, degradation of nature). The framework ensures that the severity of all risks are categorised in the same way and, therefore, can be compared like-for-like. The team assessed the risks across three statistical frequencies or return periods: 1 in 10; 1 in 50; and 1 in 200 years.<sup>4</sup>

To test the framework, the Fellowship team conducted a risk assessment of five potential and diverse crises, ranging from environmental to political to social. The risk assessment methodology allowed The Hague to effectively compare the severity of these diverse risks, as all were assessed on the same severity scale across the same return periods. The image below shows the comparison of the five PML curves, demonstrating how the city can use the framework to prioritise which risks are most pressing, communicate this effectively, and take effective action to manage the risk.



<sup>3</sup> Flood analysis conducted by Climate Analytics, part of Howden Climate Risk and Resilience.

<sup>4</sup> This is a way of expressing the likelihood of an event happening in any given year. The likelihood of a 1-in-10-year event is 10% for any given year (1 divided by 10% is 10). The 200-year event has a statistical likelihood of 0.5% in any year (1 divided by 0.5% is 200).

## Outcomes

The Hague's resilience team is working to implement the framework fully by completing PML curve assessments for all potential crises and exploring additional criteria like cascading effects and return costs. This implementation and development of the framework will ensure it remains adaptive and relevant in the face of evolving risk scenarios.

Adopting the framework has brought transformative change to The Hague's risk management and resilience planning by fostering a deeper understanding of potential crises across the city. Specific benefits identified by The Hague include:

- 1. Enhanced risk awareness and assessment:** The framework initiated crucial conversations within the city about risk appetite and the best methodologies for effectively thinking about and assessing risk. The recognition of, and ability to assess increasingly complex risks has prompted the city to integrate risk comparison into its resilience strategy to focus on actions beyond crisis response.
- 2. Innovative risk transfer strategies:** The Fellowship and the framework provide The Hague with a fresh perspective on risk transfer, particularly in the management of catastrophic risks. It also fostered a partnership between The Hague and the insurance sector, unlocking the potential of insurance to be utilised as a powerful tool to deliver the city's resilience objectives. The city gained invaluable insights and avenues to implement various innovative insurance approaches - such as parametric insurance - to enhance its resilience against emerging and complex threats, such as cyberattack, flood and pandemic.
- 3. Enhanced intra-organisational collaboration:** Through the adoption of the framework, new links have been forged within the city organisation to promote greater collaboration among different departments and officials. The increased cross-department engagement has brought more stakeholders into the conversation about risk and resilience, ensuring a more holistic and cohesive approach to city-wide risk management.
- 4. Knowledge sharing:** The framework has garnered interest from other cities, which are also seeking ways to monitor and prioritise risks effectively. The Hague is now looking to share their knowledge and expertise with other cities to contribute to global efforts to strengthen urban resilience.





# Melaka, Malaysia

## Understanding flood risk to enhance Melaka’s journey toward climate resilience

### The City’s Ask

Melaka’s resilience journey underscores the complexities many cities face as they work to protect their future: cities must balance taking actions that address today’s global challenges while ensuring these steps also preserve their past

Aligned to an increase in frequency of rainfall in tropical zones, Melaka has experienced frequent flooding in the recent past. Flooding is a multifaceted challenge for city officials. Influenced by various natural and human-induced factors – such as sea level rise and ageing building infrastructure – flooding is experienced differently in different parts of the city. In Melaka, the floods have a complex confluence of causes: river overflow, flash floods and storm surges.

Through the Fellowship program, Melaka, a UNESCO World Heritage site, sought to leverage insurance sector expertise to understand its flood exposure in these areas now and in the medium term. Based on that enhanced understanding, the MBMB wanted to explore solutions that both cost-effectively manage increasing flood risks and preserve its heritage sites and UNESCO status, which is a cultural and economic pillar of the city and, therefore, integral to its resilient future.

The Melaka Resilience Unit, within the Melaka Historic City Council (MBMB<sup>5</sup>) Town Planning Department, in collaboration with experts from the Engineering Department and the Logistics and Community Infrastructure Department, has identified areas within the MBMB administration zone that are grappling with flooding and heat-related challenges.



*“Moving away from transactional broking has been on the table for me for the last 10 to 15 years, but in reality, would it really happen? This Fellowship was a great opportunity for that process to take place, and for me to be part of that change through a partnership that enables innovation and demonstrates the utility of insurance as a force for good.”*

**Saw Kheng Law, Advisor, Howden Malaysia**  
Fellow for Melaka

<sup>5</sup> Majlis Bandaraya Melaka Bersejarah



## The Fellowship Response

The Fellowship team, led by Kheng-Lay Saw and Beatrice Grace Chan from Howden Malaysia, worked with Howden's Climate Risk and Resilience<sup>6</sup> team to conduct a flood hazard analysis across five focal areas in the city.<sup>7</sup> These focus areas included buildings of cultural significance integral to Melaka's UNESCO World Heritage status.

The analysis provided a detailed assessment of flood vulnerabilities in each area and the trajectory of those vulnerabilities in the period to 2100 across various climate scenarios. The Fellowship team examined the exposure to three flood risks: river floods, flash floods, and storm surges. Each of these perils was assessed across a range of return periods. The data used to determine the flood exposure in each area was standard for the insurance industry.<sup>8</sup> The flood exposure analysis considered various contributing elements (e.g. topographical features, elevation gradients, land utilisation patterns, urbanisation levels, the intricate river network, and the proximity of potential backwater effects stemming from coastal areas or major rivers). The results of the detailed analysis enabled city officials to understand at a 'street-by-street' level, the risk of flood caused by flash flood, storm surge, or river flood to critical buildings and districts.

Using this detailed hazard analysis, the Fellowship team worked with insurance experts and engineers with expertise in managing flood risk at a city level to suggest practical actions for MBMB to develop an effective response to the flood exposures identified. These actions ranged from detailed risk quantification to risk management, including risk transfer, physical risk mitigation, and emergency response planning.

The Fellowship team outlined a roadmap for MBMB to develop a future-proofed flood risk management strategy, based on data-driven loss modelling and integrating parametric insurance\* solutions with early warning systems and physical risk mitigation.

In addition, the Fellowship team provided a high-level evaluation of heat stress across the city in the period to 2100. Heat stress, like flood, is an escalating climate-related risk in the region that carries interconnected implications for human health, social well-being, economies, and the environment.

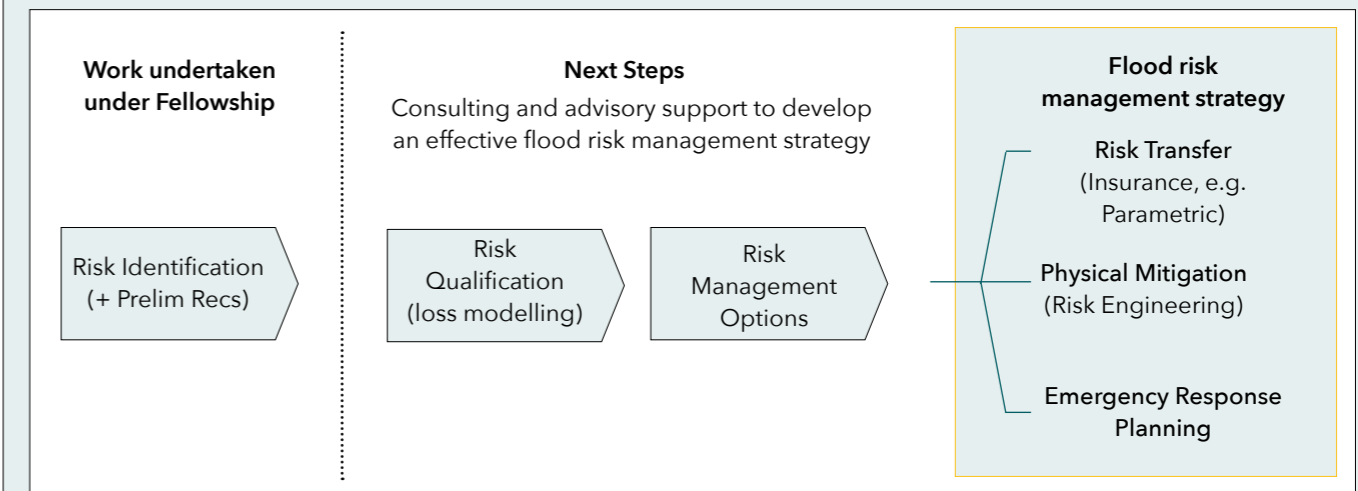
Collectively, the Fellowship team recommended that the city incorporate the above tools into an effective flood risk management strategy, reinforcing systematic resilience at the city level.

<sup>6</sup> Flood analysis conducted by Climate Analytics, part of Howden Climate Risk and Resilience.

<sup>7</sup> The chosen areas were (i) The core zone and buffer zones - these areas contain the most culturally significant heritage buildings; and (ii) three villages: Kampung Morten, Kampung Bunga Raya Pantai, and Kampung Pulau Kelapa.

<sup>8</sup> The report used MunichRe data. The River Flood data used in this report specifically comes from JBA, which is the company MunichRe has licensed for their flood outputs. JBA is a recognizable and respectable name within the insurance industry.

### Roadmap to develop flood hazard analysis into an effective flood risk management strategy



#### Risk Quantification:

**Flood Loss Modelling:** Using insurance analytics expertise and data to quantify the likely property damage from floods. MBMB can use this quantitative analysis to identify the most appropriate risk mitigation and transfer solutions.

#### Risk Management:

**(1) Flood Risk Mitigation:** Identifying proactive adaptation solutions that enhance preparedness and resilience and minimise the impact of flood events.

**(2) Risk Transfer Solutions:** Consider traditional and innovative risk transfer mechanisms (including parametric insurance) that complement the adaptation solutions by addressing unresolved flood exposures and their socio-economic impacts. Suitable risk transfer solutions should provide communities with financial protection and expedite recovery after a flood event.

\***Parametric insurance** offers pre-specified pay-outs based upon specified trigger events. Although a market in its infancy, parametric solutions are well suited to many climate risks, including natural catastrophes and the performance of carbon markets. A unique benefit of this type of insurance is the speed and certainty of pay-outs, which are essential to humanitarian agencies seeking urgent resources after a disaster and financial institutions looking to hedge exposure to weather, carbon or commodity risks.



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## Outcomes

The work undertaken by the Fellowship team equipped MBMB with a deeper understanding of the multifaceted nature of flood risk facing the city. It provided city officials with a roadmap to develop a data-informed flood management strategy, combining adaptive measures and insurance solutions to build long-term city resilience effectively.

With the data-informed set of recommendations provided by the Fellowship, MBMB is equipped to work with other city officials and the private sector to implement a comprehensive and holistic set of solutions that will effectively respond to the city's flood exposures, one of its primary urban resilience challenges.



*"There were so many positive aspects to the Fellowship, but the greatest was the opportunity to give back to Melaka by sharing knowledge, and working with others in the private sector to enable the city officials to take practical action to build Melaka's resilience."*

**Beatrice Chan, Manager, Corporate Risk, Howden Malaysia**  
Fellow for Melaka

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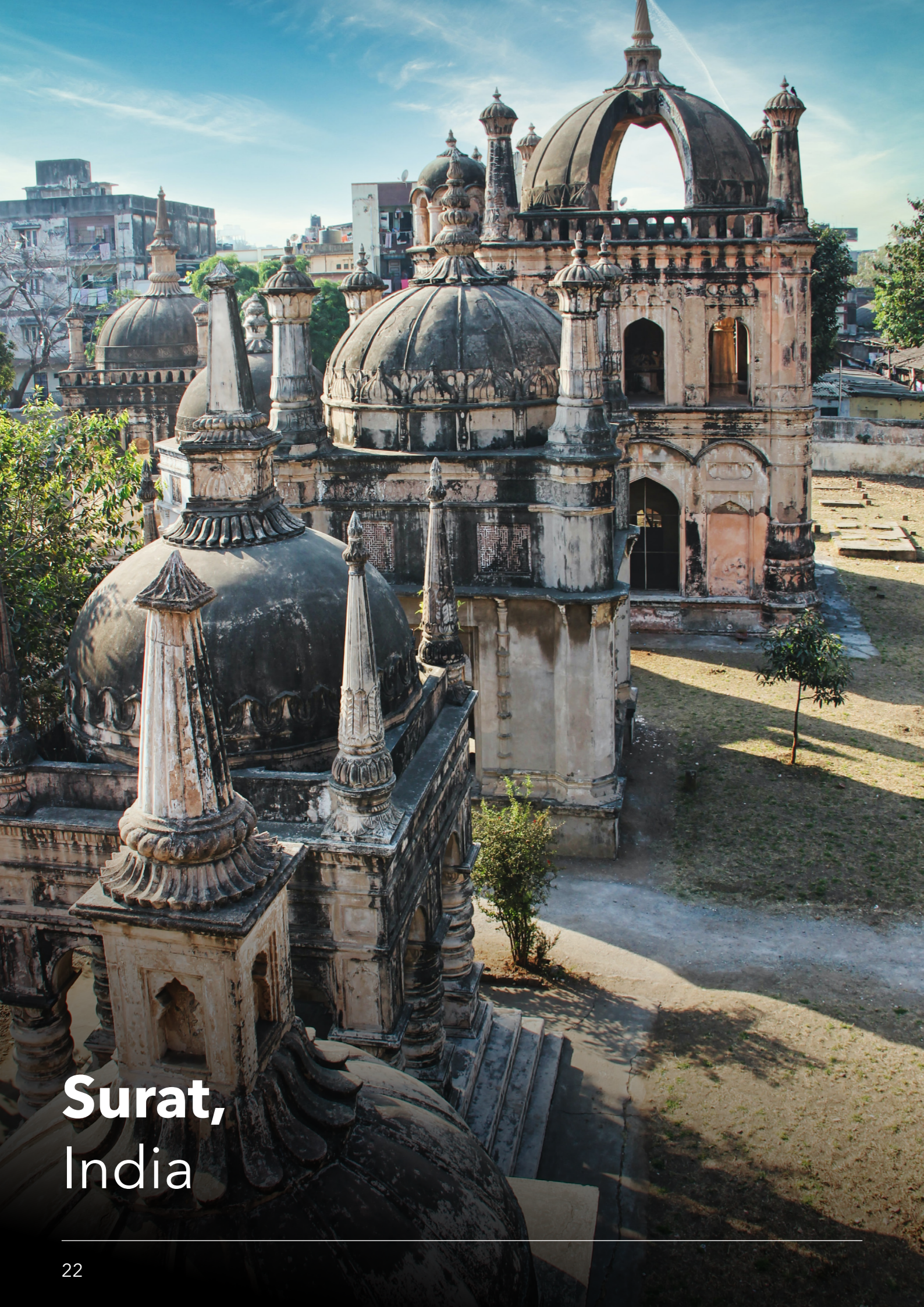
**Without major new defences or cuts in carbon emissions, the global cost of flooding in cities could rise from \$6 billion a year in 2005, to \$1 trillion in 2050.**

Future flood losses in major coastal cities, published in Nature Climate Change in 2013 ([access here](#))

**Extreme heat exposure increases morbidity and mortality, impacts people's ability to work resulting in lower economic output, and exacerbates pre-existing health conditions. A study of urban extreme heat exposure in over 13,000 cities found that in 2016, globally 1.7 billion people were exposed to extreme heat on multiple days.**

Global urban population exposure to extreme heat, published in Proceedings of the National Academy of Sciences in 2021 ([access here](#))





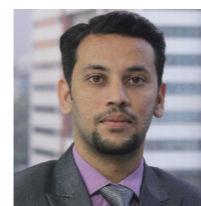
# Surat, India

## Building resilience to climate risk into Surat's waste management strategy

### The City's Ask

Surat is on the front line of the escalating impact of climate change. Rising temperatures, changing weather patterns and rising sea levels threaten its socio-economic resilience. The Surat Municipal Corporation (SMC) has taken remarkable strides to foster and enhance Surat's resilience in response to these growing climate-related concerns and other pressures - notably population increases. In 2018, Oxford Economics projected that Surat would be the fastest-growing city globally in the 2019 to 2035 period.<sup>9</sup>

The SMC is committed to accelerating resilience-building efforts. To this end, as part of the Fellowship, the SMC sought the expertise of a fellow to work with its Chief Engineer to conduct a detailed climate hazard analysis of critical aspects of Surat's solid waste management infrastructure. That deep understanding of the physical climate risks to which Surat's waste management infrastructure is exposed would then be integrated into the SMC's ongoing work to optimise and future-proof its waste management strategy. The Fellowship's focus underlines the SMC's deep commitment to responsible waste management and reducing untreated solid waste's adverse impact on the local community and environment.



*"Collaborating with Surat, one of India's fastest-growing cities, during the Fellowship was a pleasure. I had the chance to learn and understand more about the diverse and interconnected risks facing the city's waste management operations, and to inject an understanding of the future climatic exposures into the city's plans to enhance its waste management resilience."*

**Mani Trivedi, Senior Vice President, Howden India**  
Fellow for Surat

<sup>9</sup> Economic Times of India, 7 December 2018, access [here](#)



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## The Fellowship Response

The Fellow, Mani Trivedi, an experienced risk engineer from Howden India, worked with the SMC to identify Surat's critical waste infrastructure assets. Mani and the SMC then instructed Howden's Climate Risk and Resilience team to: (i) assess which climate perils the four identified waste treatment and disposal sites were most vulnerable to, and (ii) to conduct a detailed, forward-looking assessment of these assets' exposure to the identified climate perils, in the period to 2100. This hazard analysis was conducted using standard data sets in the insurance industry.

Using this detailed hazard analysis, Mani worked with Howden's Climate Risk and Resilience team and other insurance and city experts to develop data-informed recommendations for adaptation and risk transfer solutions that would effectively build the resilience of Surat's waste management practices over the long term. These recommendations offered practical actions for the SMC to mitigate the escalating climate-related physical risks to which its existing waste infrastructure is exposed, and to consider those same risks as it formulates plans to increase its waste management capacity in the city.

The recommendations included traditional and innovative risk transfer mechanisms (including parametric insurance) and complementary adaptation solutions. The recommendations focused on building holistic resilience by offering social, environmental and economic protections. For example: reducing the risk of waste management operations being disrupted by flooding; providing waste sector workers with income protection in the event of extreme heat; and risk transfer that secures financial protection to expedite recovery in the event adaptation measures prove insufficient and extreme flooding of waste management sites causes negative environmental consequences.

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## Outcomes

Through the Fellowship, the SMC gained a deeper understanding of where extreme weather is likely to present the greatest threat to the resilience of its waste management assets in the coming 75 years. Using this analysis, the city has identified core areas for risk mitigation measures that will ensure the city's waste management infrastructure is resilient over the long term.

This knowledge has come at a critical time for SMC as it looks to expand its waste processing capacity to responsibly manage the rising volume of waste produced by its increasing population. The city has a strong foundation on which to build its waste management strategy, having been named India's second cleanest city in the fifth edition of Swachh Survekshan – an annual urban sanitation and cleanliness survey conducted by India's Ministry of Housing and Urban Affairs – in 2020. With the knowledge and networks the SMC accessed through the Fellowship, it is well-placed to develop effective strategies that, even in the face of rising climate risks and a growing population, enhance the resilience of its critical waste management facilities, protecting the environment and its population. By quantifying the exposures and putting data-informed risk management solutions at the heart of its new waste management strategy, SMC can secure the city's ability to responsibly manage waste and minimise the negative environmental and socio-economic consequences of disruptions to waste management facilities in the long term.





# Greater Miami and the Beaches, USA

## Developing parametric insurance as a resilience tool for Miami's Resilient305

### The City's Ask

Miami-Dade County, the City of Miami, and the City of Miami Beach in partnership with the Miami Foundation work together under the Resilient305 banner to develop Greater Miami's Community resilience. The Resilient305 brings public officials from Greater Miami and the Beaches together to share learning and jointly respond to rising climate challenge: tropical storms and hurricanes are becoming wetter and more powerful, and as sea levels rise, king tide or sunny day flooding reach further inland.

The physical risks of extreme weather events caused by climate change are one of the most pressing resilience challenges for officials working together through Resilient305. These events hinder the ability of everyone living in Greater Miami and the Beaches to build and maintain a viable future. However, the low-to-moderate-income population is disproportionately affected due to the cost of adapting and building back after a shock. In response, Greater Miami and the Beaches officials - often in partnership with The Miami Foundation - are working to enhance pre-planning for disaster recovery and response to better protect the population, particularly those most vulnerable to the adverse impact of climate change.

Greater Miami and the Beaches has a long history of managing risk through insurance, self-insurance, and local policies. However, the current risk transfer system - self-insurance pools and traditional insurance policies - has reached a breaking point due to increasing damage claims, growing reinsurance and litigation costs, rising sea levels, and ever-larger storms. In partnership, Resilient305 and The Miami Foundation sought the Fellowship's input to explore how innovative insurance solutions could address the protection gap for low-income households and small and medium-sized enterprises (SMEs) in Greater Miami and the Beaches.



*"The Fellowship was a chance to work with others in the insurance sector and the public officials from Greater Miami and the Beaches to develop an innovative solution to better protect the local communities that are most vulnerable to extreme weather events. It was a privilege to work together to build community resilience."*

**Leandro Ramirez, Associate Director, Howden**  
Fellow for Miami



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## The Fellowship Response

A Fellowship team made up of experts from the Howden Specialty team in Miami, led by Leandro Ramirez, was selected to support Resilient305 explore which novel insurance solutions could be deployed to build the resilience of its most vulnerable communities to extreme weather events.

The team worked closely with city and county staff from Resilient305, executives from the Miami Foundation, and local-level public and private sector stakeholders to identify: (i) three focus neighbourhoods in the Resilient305, and (ii) the 'need' amongst the communities within those neighbourhoods.

The Fellowship team used recent innovations in parametric flood insurance, such as the policy developed by the Center for NYC Neighborhoods (CNYCN), in partnership with the New York City Mayor's Office of Climate & Environmental Justice (MOCEJ) and Environmental Defense Fund (EDF) as a starting point. The team analysed existing efforts in other cities, current resilience interventions in Greater Miami and the Beaches, and the gaps in risk transfer and resiliency identified in the course of stakeholder engagement. From the results of this analysis the Fellowship team proposed that a parametric insurance policy structured to trigger when inhabitants are displaced post-flooding event, would reduce vulnerability to climate-related risks by covering some of the associated cost. The team therefore worked to develop a parametric insurance policy concept that sought to build resilience around displacement in two ways:

- (1) **'renters'** and **'owner occupiers'**: funds to cover the cost of short-term displacement or recovery of contents necessary to reoccupy rented premises.
- (2) **'landlord'**: funds to partially cover the cost of lost rental income due to displacement

Working with parametric insurance data experts and underwriters, the Fellowship team assessed data sources to model parametric policies with appropriate trigger points for each focus neighbourhood that would provide effective coverage for Resilient305 inhabitants at a reasonable cost. This modelling was an iterative process undertaken in conjunction with Resilient305 staff and other stakeholders with a deep understanding of the need and flooding context in each neighbourhood.

<sup>10</sup> Allapattah, Little River and North Beach.

<sup>11</sup> For example, the Private Property Adaptation program in Miami Beaches and the Miami Beach Stormwater Infrastructure Adaptation plan. For further information about The Private Property Adaptation program please see [here](#). For more information about the Miami Beach Stormwater Infrastructure Adaptation plan see [here](#).

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## Outcomes

The work undertaken by the Fellowship team to design parametric policies that specifically respond to the unique risks faced by three neighbourhoods was a clear demonstration that parametric policies can feasibly fill a gap in the market. It showed that despite the extreme climatic stresses faced by Greater Miami and the Beaches citizens, a carefully considered parametric (i.e., index-based) insurance solution – designed collaboratively by insurance experts and those with a deep understanding of the local context – could be an effective and affordable tool in a wider resiliency strategy. Such insurance is not a silver bullet, but it can effectively respond to a specific resilience gap and build a community's resilience in a way other tools cannot.

Through the Fellowship, Resilient305 has developed a data-based understanding of how innovative risk transfer, such as parametric insurance, can be a value-adding tool in their resilience efforts and what specific resiliency gaps parametric insurance can address. At the end of the Fellowship, the team presented the concept parametric policies in a workshop with city leaders from across Greater Miami and the Beaches. The response was positive, and the next step is for the Resilient305 to consider how to take this proof of concept to implementation.



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# Acknowledgement and thanks

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- **Bank of America** - Abyd Karmali
- **Beazley** - Rachel Turk
- **Climate Bond Initiative** - Sean Kidney
- **Descartes** - Brian Thompson
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- **Skyline** - Laurent Sabatie, Gethin Jones and Tom Osborne
- **Sustainable Markets Initiative** - Kelly Sapp, Holly Roberts-Harry, and Laura Ward

Particular thanks to Howden and Beazley for supporting the Fellowship by affording their people the opportunity to be Fellows, and to those who acted as Fellows in 2023:

- Max Hoff, Reinsurance Treaty Underwriter, Beazley - Fellow for The Hague
- Kenny Hogg, CEO Howden Scotland - Fellow for Glasgow
- Beatrice Chan, Manager, Corporate Risk, Howden Malaysia - Fellow for Melaka
- Saw Kheng Law, Advisor, Howden Malaysia - Fellow for Melaka
- Mani Trivedi, Senior Vice President, Howden India - Fellow for Surat
- Leandro Ramirez, Associate Director, Howden - Fellow for City of Miami, and the City of Miami Beach

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# About the project coordinators

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## About the Sustainable Markets Initiative

Founded by His Majesty King Charles III in 2020, as Prince of Wales, the Sustainable Markets Initiative has become the world's 'go-to' private sector organization on transition. Launched in 2021, the Terra Carta serves as the Sustainable Markets Initiative's mandate with a focus on accelerating positive results for Nature, People and Planet through real economy action. For more information, please visit: [www.sustainable-markets.org](http://www.sustainable-markets.org)

## About Howden

Howden is a leading global insurance group with employee ownership at its heart. Founded in 1994, it operates in 50 countries across Europe, Africa, Asia, the Middle East, Latin America, the USA, Australia and New Zealand, employing 14,500 people and handling \$30bn of premium on behalf of clients. For more information, please visit [www.howdengroupholdings.com](http://www.howdengroupholdings.com)

## About Resilient Cities Network (R-Cities)

Resilient Cities Network is the world's leading urban resilience network. It brings together global knowledge, practice, partnerships, and funding to empower its members to build safe and equitable cities for all. Its unique city-led approach ensures cities drive the agenda to benefit the communities they serve. At work in nearly 100 cities worldwide, the Resilient Cities Network supports on-the-ground projects and solutions to build climate resilient, circular and equitable cities while also facilitating connections and information-sharing between communities and local leaders. For more information, please visit <https://resilientcitiesnetwork.org/>



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# Connect with us to continue the conversation

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We are eager to hear from others to discuss the findings of this report, deepen our understanding, and increase the impact and reach of the Global Risk and Resilience Fellowship.

To get in touch, or to get involved, please contact:

**Henrietta Southby**

Associate Director - Resilience Coordinator  
henrietta.southby@howdengroup.com

**Wadeisor Rukato**

Resilience Partnership and Project Lead  
wadeisor.rukato@howdengroup.com

**Allison Ahern**

Consultant, Resilience Finance  
aahern@resilientcitiesnetwork.org

One Creechurch Place, London, EC3A 5AF

T +44 (0)20 7623 3806  
E [info@howdengroup.com](mailto:info@howdengroup.com)

[www.howdengroup.com](http://www.howdengroup.com)