



Catastrophe Insurance Programs for Public Assets— Operational Framework

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Abbreviations

ADB	Asian Development Bank
ANI	National Infrastructure Agency
APEC	Asia-Pacific Economic Cooperation
CCS	Central Public Sector Procurement Agency
DHBs	District Health Boards
DRFA	Disaster Recovery Funding Arrangements
DRFI	(Regional) Disaster Risk Financing and Insurance
DRM	Disaster Risk Management
DTMR	Department of Transport and Main Roads
FONDEN	Mexican National Fund for Natural Disasters
ISII	Insurance Services II (United Kingdom)
JICA	Japan International Cooperation Agency
JR	Japan Railways
JRTT	Japan Railway Construction, Transport, and Technology Agency
LAPP	Local Authority Protection Program (New Zealand)
MHCP	Ministry of Finance and Public Credit
MLIT	Ministry of Land, Infrastructure, Transport, and Tourism
MoF	Ministry of Finance
NHS	National Health Service (United Kingdom)
PFI	Private Finance Initiative
PPPs	Public-Private Partnerships
QGIF	Queensland Government Insurance Fund (Australia)
QRA	Queensland Reconstruction Authority (Australia)
RPA	Risk Protection Arrangement (UK Department of Education)
SHCP	Ministry of Finance and Public Credit (Mexico)
UK	United Kingdom
UNAM	Universidad Nacional Autónoma de México

Executive Summary and Framework Overview

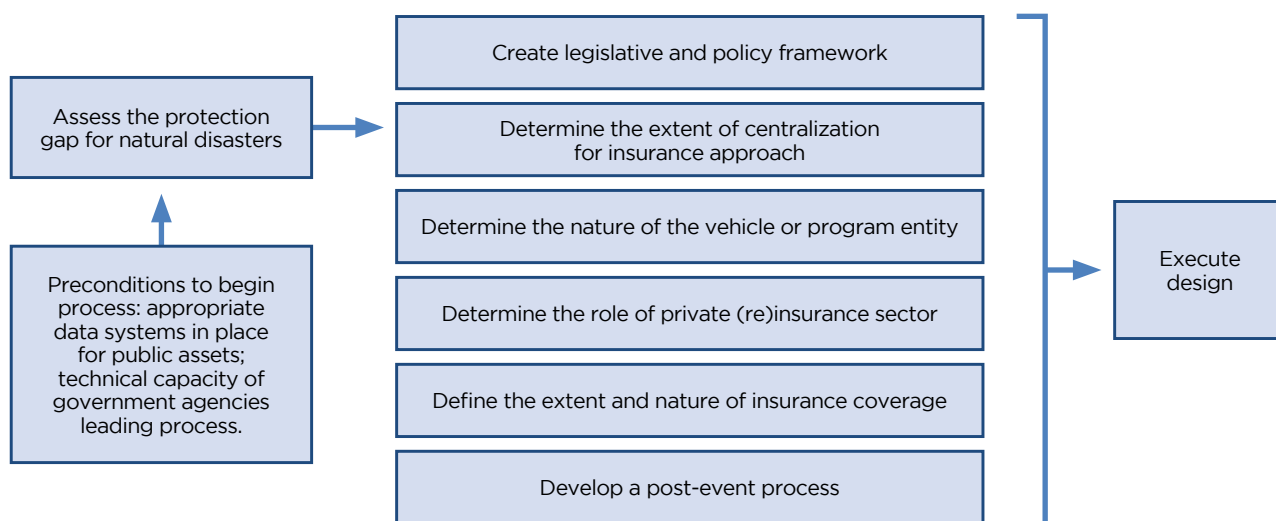
Natural disasters in APEC (Asia-Pacific Economic Cooperation) economies have significant impacts on the economy and daily lives of the population. To minimize those impacts, a comprehensive policy package is required, which covers the key strands of “Prevention, Preparedness and Response.” The establishment of an insurance scheme to support the financial protection of public assets against disasters can form an important part of this package, alongside the use of complementary financial instruments within a broader disaster risk financing strategy, and investments in quality, resilient infrastructure and buildings to prevent losses.

This report has been produced at the request of the Working Group on Regional Disaster Risk Financing and Insurance (DRFI) Solutions for APEC Economies to contribute to the APEC Finance Ministers’ Meetings. It aims to synthesize peer-to-peer learning among APEC economies into a document that provides useful, practical guidance to finance officials about the design and implementation of catastrophe risk insurance programs for public assets¹ based on case studies of APEC economies and beyond.

The case studies identify seven key activities in the design and implementation of disaster insurance schemes for public assets (see figure 1). Within each of the activities, economies can learn valuable lessons from the success and failures of schemes globally. These elements are further outlined in the figure. The activities are numbered within this report, but it should be noted that the activities are interconnected and are therefore not sequential.

Before embarking on the process of design and implementation of any scheme, certain preconditions need to be in place. As discussed under Operation 1, the appropriate data systems for public assets need to be in place. Additionally, the government entities that will lead the process need to have the technical capacity required to undertake the exercise. Later on, this paper discusses options for retaining elements of technical capacity versus outsourcing to partners, as observed in the case studies.

FIGURE 1. ACTIVITIES WITHIN AN OPERATIONAL FRAMEWORK FOR THE DESIGN AND IMPLEMENTATION OF DISASTER INSURANCE ARRANGEMENTS FOR PUBLIC ASSETS



¹ This report extends work presented in the APEC reports on “Financial Risk Management of Public Assets against Natural Disasters in APEC Economies” and “Improving Public Assets and Insurance Data for Disaster Risk Financing and Insurance Solutions,” prepared by the World Bank for 2017 APEC Finance Ministers’ Meeting.

Operation 1. Assess the financial protection gap for natural disasters

An understanding of the gaps in financial protection is needed in order to set policy priorities for a scheme for insurance of public assets. To assess this gap, an understanding of the possible losses arising from the catastrophe exposure of public assets is needed, along with detail of existing financial protection arrangements. The following are required:

- Detailed data on the location, value and characteristics of assets (public assets database);
- A quantitative (ideally probabilistic) view of the risk arising from the catastrophe exposure of these assets; and
- A catalogue of existing arrangements for financial protection of public assets.

The assessment of the financial protection gap based on these data is the starting point for all other activities described in this report. This report does not aim to cover best-practice in respect of the information listed above, as best-practice is covered extensively elsewhere.²

This activity lays the foundation for setting the scope of coverage for any scheme, as discussed under Operation 6.

Operation 2. Create a legislative and policy framework to enable the use of insurance where effective

A sound legislative basis for the financial management of public assets can support a long-term approach even through changing administrations. Accompanied by a sound policy framework, this approach can promote the effective use of insurance by managers of public assets. However, legislation needs to be carefully crafted and accompanied by additional actions to ensure the following:

- Coverage is purchased where needed;
- Coverage is appropriate; and that
- Coverage is not being purchased in situations where it is not value for money.

LESSONS LEARNED

Explicitly clarifying and limiting the extent of financial assistance from the Ministry of Finance in legislative or guidance documents produces more effective outcomes.

Mechanisms to incentivize the uptake of insurance are needed, such as:

- Use of conditionality in access to other forms of financing;
- Enforcement of compulsory insurance purchase by the Ministry of Finance, or other entity with financial oversight of participating entities within a scheme;
- Mechanisms to verify that purchase of insurance has taken place; and
- Mandating quantification of disaster risk within long-term financial planning processes of public sector entities.

Ensuring that public sector entities have the funds and necessary authorizations to pay for insurance premiums.

- It is not unusual—especially for economies with limited experience in the use of insurance—that insurance premiums are excluded from eligible expenditures for government entities, and revision of legislation and/or policy is needed.

² Best practices in catastrophe risk assessment and in public asset databases are covered by the APEC reports on “Financial Risk Management of Public Assets against Natural Disasters in APEC Economies” and “Improving Public Assets and Insurance Data for Disaster Risk Financing and Insurance Solutions,” which were prepared by the World Bank for the 2017 APEC Finance Ministers’ Meeting. This document considers such areas out of its scope to avoid duplication.

Operation 3. Determine the extent of centralization for the insurance approach

Some economies have opted to create centralized programs to insure public assets. This approach allows for oversight and consolidation of management of disaster risk for public assets. Other economies have opted for less intervention, with more flexibility in management given to individual entities. The advantages and disadvantages of the various approaches are laid out below in table 1.

TABLE 1. CENTRALIZED, PARTIALLY CENTRALIZED, AND DECENTRALIZED INSURANCE APPROACHES

APPROACH	ADVANTAGES	DISADVANTAGES	PRECONDITIONS
<p>Centralized: centralized insurance vehicle or program</p> <p>Risk is aggregated into a program or vehicle, such as the Queensland Government Insurance Fund (the State Level) and Mexico's FONDEN (Federal Level).</p>	<ul style="list-style-type: none"> Consolidated purchasing power and conduit to international market capacity Management of pricing volatility Financial efficiencies from risk pooling/better managed risk retention Quality control for insurance coverage standards Visibility over multiple classes of risk, allowing for comprehensive risk management 	<ul style="list-style-type: none"> High administrative and operational cost burden Risk of disconnecting insurance decision-making from experience of risk Removal of choice in financial decision-making from direct managers of assets 	<ul style="list-style-type: none"> Strong alignment of financial interest between participating and operating levels of government, to invest time/effort/resource in scheme Appropriate data systems for public assets, with the potential for consistency across participating entities Technical capacity within lead agency to undertake the process
<p>Partially Centralized: framework agreement with the insurance market</p> <p>An insurance procurement framework of contracts that facilitates and standardizes access to the commercial markets for public agencies.</p>	<ul style="list-style-type: none"> Facilitates access to commercial insurance Standardizes insurance purchase process, increasing the chance of successful placement Promotes competition on price Provides robustness in overall terms of engagement of risk and financial decision-making between insurers and public sector (but not necessarily in terms of coverage itself) Protects freedom of choice in financial management for managers of public assets 	<ul style="list-style-type: none"> Relatively high level of effort to implement Reduction of choice of suppliers Application of minimum standards in insurance terms and pricing that may not be possible in certain market contexts No additional financial efficiencies from risk pooling/better managed risk retention 	<ul style="list-style-type: none"> Relatively developed domestic insurance market with required financial/technical capacity to underwrite property catastrophe risk Robust and transparent approach to procurement within the public sector Technical capacity within government to manage the procurement framework once developed Appropriate data systems for public assets
<p>Decentralized: individual agency approaches</p>	<ul style="list-style-type: none"> Protects freedom of choice in financial management for managers of public assets—keeping experience of risk and financial decision-making in the same place Has no administrative or operational burden for government Protects free market competition between suppliers 	<ul style="list-style-type: none"> Variability in price and coverage quality outcomes, with particular risk for small scale public entities with limited purchasing power Increased risk of unsuccessful placements No additional financial efficiencies from risk pooling/better managed risk retention 	<ul style="list-style-type: none"> Relatively developed domestic insurance market with required financial/technical capacity and appetite to underwrite property catastrophe risk Strong technical capacity at all levels of government (central to local) for effective risk management and robust procurement Appropriate data systems for public assets

Source: Authors

Operation 4. Determine the nature of the vehicle or program entity

Where a decision has been made to establish a vehicle or program for public asset insurance, the next step is to determine the nature of the vehicle or program; namely, the type of entity (e.g. a trust, foundation, company, or program within the budget) and how it will be governed and managed. The decision on the type of entity should be guided by: the level of operational and administrative burden that is acceptable to the government; the extent of financial segregation required from government accounts; the level of independence or integration of the vehicle with existing public agencies; the role of government agencies and other stakeholders in the governance and management of the vehicle.

LESSONS LEARNED

The decision to create a separate legal entity for the insurance vehicle depends on the importance of transparency and ring-fencing of funds, versus the appetite for operational and administrative burden in establishing a vehicle.

An effective governance structure can substantially improve outcomes, particularly on sustainability and uptake of insurance, with actions such as;

- Ensuring senior representation from the end-users on the governing Board;
- Ensuring that governance processes actively and frequently engage the Board;
- Ensuring that the secretariat function for governance forums is given appropriate priority;
- Ensuring that the selection of Board appointees and the rotation of the Board Chair give a breadth of end-user representation;
- Making strategic political appointments to the Board.

While outsourcing of specialist functions may be most practical in the early days of operations for an insurance scheme, keeping certain areas of expertise in-house can add substantial value in the longer term. These included:

- An internal challenge function for pricing;
- Expertise to stress test of the prevalent view of risk;
- Basic Geographic Information System (GIS) skills for catastrophe exposure management and event monitoring;
- Data management and manipulation functions to exploit asset catalogues and claims data for broader risk management and response;
- Expertise in valuation and vulnerability estimations for assets.

Operation 5. Determine the role of private (re) insurance sector

Governments need to consider how private (re)insurance can be used effectively. The balance between risk retention (self-insurance) and risk transfer should be determined by the size of potential catastrophic shocks in the context of budget flexibility and borrowing capacity. For potential large losses beyond the capacity of contingency and flexibility within the budget, and where borrowing is not a practical or desired option for the government, then risk transfer to the commercial markets can be a highly useful option.

Case studies reveal a wide variety of roles for the private (re)insurance sector within public asset insurance schemes, including; the use of international reinsurance capacity for self-insurance vehicles; framework agreements with domestic insurers to facilitate access to insurance for smaller-scale public entities; use of the domestic insurance market for large portfolios of exposure for specific central government departments.

LESSONS LEARNED

Risk transfer to the commercial markets is helping governments manage the volatility of the cost of disasters, and avoid budget disruption from large shocks

Commercial insurance and reinsurance are valuable tools for large shocks beyond the financial response capacity of governments. However, governments should consider where self-insurance may be feasible—for example, for smaller shocks—alongside commercial risk transfer to ensure a cost-effective strategy.

The use of commercial (re)insurance has increased transparency and data standards for public asset insurance schemes

The minimum standards in data collection required by commercial (re)insurers can produce multiple indirect benefits in insurance vehicles for public assets, including for self-insurance vehicles. These benefits included: reduced uncertainty in pricing; improvements in insurance products; identification of additional risk reduction opportunities; improved catastrophe exposure management within vehicles; and increased trust from the end-users of the schemes.

The use of commercial (re)insurance can help develop the domestic market

Insurance schemes for public assets have demonstrated an ability to develop the domestic insurance market, both in terms of its capacity to absorb public asset risk, but also in its competitiveness with respect to covering such risk.

Governments should be aware of, and prepared for, pricing volatility when using commercial (re) insurance, particularly after a large disaster

The volatility of commercial premiums was a recurring issue across case studies, particularly after the occurrence of large catastrophe events where premiums often increased substantially. At the time of writing of this report, this issue was apparent through the hardening of reinsurance pricing as the international reinsurance markets responded to the impact of Coronavirus Disease 2019 (COVID-19). Lloyd's of London has warned of potential US\$200 billion in underwriting and investment losses that could negatively impact the global non-life markets in 2020, with a number of large international catastrophe risk carriers already reporting substantial COVID-19 losses through pandemic underwriting on business interruption, trade credit and event cancellation.

Operation 6. Define the extent and nature of insurance coverage

Governments need to define the types of loss, and the types of asset that they want to bring within scope for coverage within an insurance scheme for public assets. Some schemes opt for a broad spectrum of asset inclusion, while others carve out very specific liability to keep premiums low. Building damage, contents damage, and service interruption, were typically all within the scope of cover. It was noted in multiple cases that the costs of service interruption, although harder to quantify, had the potential to dwarf the costs of restoring physical assets.³ In some cases, the scope of assets brought within a scheme was driven by disaster resilience objectives, with a broad inclusion covering even low-income housing. In others, governments prioritized specific assets for cover, to minimize costs. In one example, modelling was undertaken to identify those assets most critical to service continuity in the event of a disaster, and these were prioritized for insurance purchase. Another approach was to carve out those assets where pricing would be less favorable on the commercial markets (specialist infrastructure, and social housing as two examples), and then to exclude these from programs to improve overall cost outcomes. The case studies showed that schemes can also facilitate resilient reconstruction by using coverage terms to promote risk reduction investments.

LESSONS LEARNED

Governments need to set scope for cover within their public asset insurance schemes, balancing disaster resilience objectives and financial efficiency

The scope of insurance schemes varies across case studies, from inclusive coverage of a broad range of public assets and even low-income households, to schemes that only cover a specific type of hard-to-insure asset such as underground water and flood control infrastructure.

Post-event loss adjustment and claims settlement processes can be designed to enable the public sector to 'build-back-better'

Although the cost of betterment in reconstruction was not covered by commercial (re)insurers, in multiple case studies, the post-event process of assessing and settling a (re)insurance claim allowed assets to be 'built-back-better' with the additional costs of betterment being funded from outside of the commercial contract.

Coverage terms can be set to minimize underinsurance and promote risk reduction

The strategies being used by schemes to set effective terms of cover include: the use of deductibles⁴ to promote risk averse behavior; ensuring that coverage limits for assets properly account for replacement costs and additional site management costs (e.g. demolition, securing of unstable sites); and the inclusion of multiple reinstatement provisions⁵ to ensure that cover is in place for sequences of events.

Risk-based pricing model offers advantages

Most schemes use risk-based pricing for participating entities. Risk-based pricing can incentivize risk reduction and reduce the risk of adverse selection.⁶ Other schemes link the cost of cover to the financial capacity of the insured entity, rather than its underlying risk, creating implicit premium subsidies. In these cases, alternative methods to encourage risk reduction can be applied in parallel, such as technical capacity building, and the use of program surpluses to undertake targeted investments to reduce risk.

A range of methods can be used to ensure price adequacy for insurance schemes for public assets;

Among the methodologies applied to set pricing in insurance schemes, probabilistic modelling provides the most sophisticated approach. However, these models are not available for all perils and territories, and in cases, the uncertainty in model results can be very high. Therefore, a complementary approach was almost always required. Public sector actuarial functions played an important role in a number of schemes, working with claims' histories or other data to develop a view of risk. Pricing methods also included the use of industry benchmarking for likely claims experience; and the use of specialized engineering expertise.

³ For example, the Queensland government identified the cost of relocating hospital services to another building in the event of damage as their largest potential loss arising from a single physical asset.

⁴ The level of loss at which a contract begins to pay.

⁵ A reinstatement provision automatically reinstates cover after an event leads to a claim, typically with the payment of a pre-agreed reinstatement premium.

⁶ The risk of adverse selection is a risk that only the entities more likely to make a claim choose to participate in an insurance scheme, leading to sustainability issues

Operation 7. Develop a post-event process

Claims management processes need to allow governments to rebuild their assets, and particularly, critical infrastructure, quickly after a disaster occurs. Standard practices for claims management in the commercial (re)insurance markets are not always suitable for public sector entities, given the specific procurement processes that may apply in the public sector, government policy on 'building-back-better', and the high importance of restoring critical infrastructure as soon as possible after the event.

LESSONS LEARNED

A variety of strategies can be considered to facilitate the post-event claims management process for public assets

These include:

- Incorporating pre-existing public sector loss assessment processes into insurance contracts;
- Developing the claims management function within the government;
- Sharing loss adjustment resources between the public and private sector;
- Establishing long term partnerships with loss adjustment service providers;
- Use of technology to facilitate rapid settlement.



Operation 8. Undertake stakeholder and market engagement

Whatever the approach, stakeholder and market engagement will be a critical part of design and implementation of catastrophe insurance programs for public assets. Early and effective integration of the right stakeholders into the development process for an insurance scheme can substantially improve outcomes. The case studies also provided useful guidance on how governments can apply strategies in their interactions with the commercial markets to improve the price and coverage outcomes when placing risk.

LESSONS LEARNED

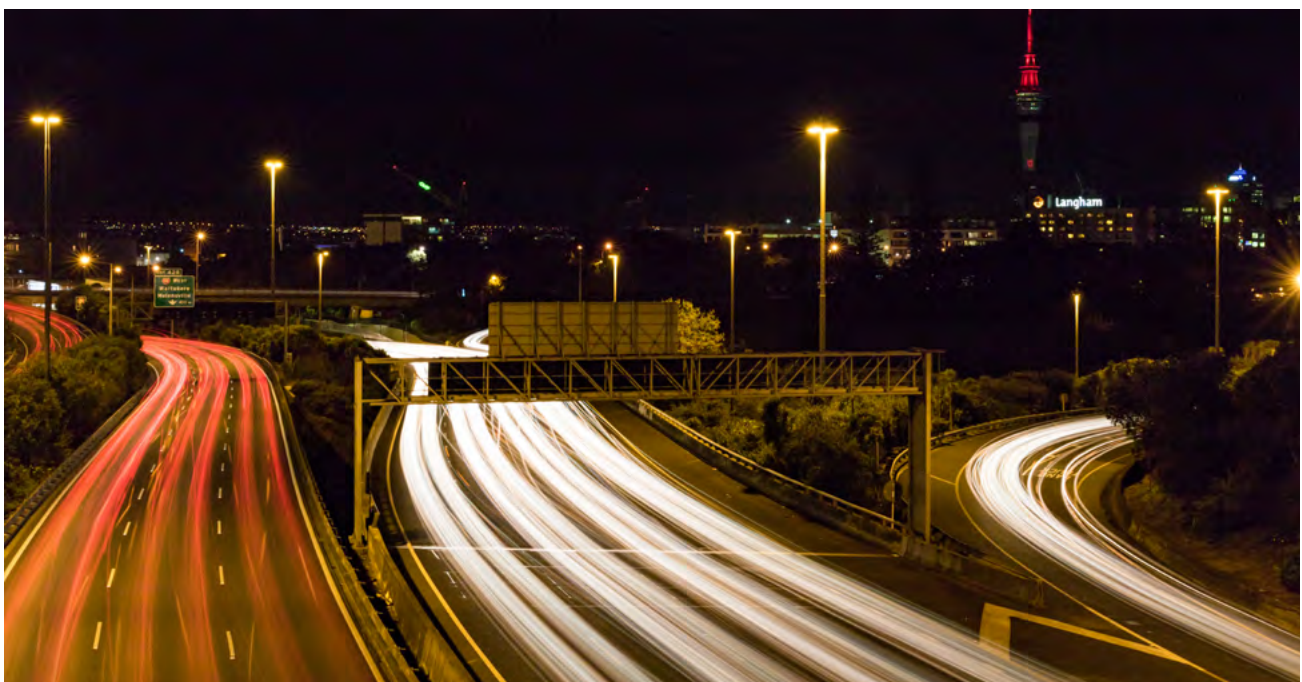
A variety of strategies were being used within the case studies, to improve the price and capacity outcomes of an approach to the commercial insurance and reinsurance markets

These include:

- Structuring the risk (i.e. separating into frequency layers, splitting capacity between competing brokers, separating certain types of asset) to increase the number of bidding (re)insurers;
- Engaging early with the market before the competitive tender, to present the risk;
- Crafting a bidding process for (re)insurers that promotes structured competition and transparency;
- Properly leveraging and understanding the role of the broker, including financial relationships between brokers and (re)insurers;
- Ensuring that selection criteria for (re)insurers take into account the quality of the cover (and thus the (re)insurer supplying cover) and not solely the price.

Fully integrate end-user public agencies into the process of designing a scheme, and connect with the insurance regulator and domestic insurance market early in the design process—even where they will not have a formal role in the scheme

- The common lessons learned raised from multiple case studies were to engage earlier with interested stakeholders, to properly bring end-users into the design process, and to present the concept for the scheme early on to stakeholders with an indirect interest.



Introduction

APEC (Asia-Pacific Economic Cooperation) economies are situated along the Pacific Ring of Fire, exposed to a wide range of natural disaster hazards including earthquakes, tsunamis, tropical cyclones and floods, wildfire, and volcanic eruptions. Risk is expected to rise with increasing disaster exposure and vulnerability linked to climate change. This will bring further widespread social and economic costs in these economies, impacting the daily lives of the population, the health of the economy, and bringing disruption to the implementation of key development programs. Strengthening disaster resilience is critical for protecting exposed populations and their livelihoods, protecting macro-fiscal stability, and securing progress towards the Sustainable Development Goals.

Disasters create substantial fiscal risks when governments bear the burden of costs of emergency relief, recovery and reconstruction efforts. Ministries of Finance (MoF) have a leading role in coordinating post-disaster financing, where potential contingent liabilities can occur outside the regular government budget, especially where insurance penetration is low, as is the case in many emerging economics.

The cost of restoring damaged public assets owned by government entities, and the associated cost arising from service interruption as a result of that damage, is a significant source of contingent liability for governments. With increasing investment in infrastructure in many economies, this contingent liability is growing. This is especially true for the APEC region where infrastructure investments in member economies have been growing rapidly; as highlighted by programs such as the “Build, Build, Build” campaign launched in 2016 by the Philippines, setting out US\$158 billion of investments in airports, rail and urban transport, and power plants. The 2019 World Bank report on resilient infrastructure estimates direct disaster damages to power and transport infrastructure at US\$18 billion a year in low- and middle-income economies. Enhancing the financial resilience of infrastructure is fundamental to mitigating disaster impacts. Rapid reinstatement of critical infrastructure can protect continuity of livelihoods, and provision of public services.

Effective financial protection strategies for public assets can help reduce disaster-related contingent liabilities linked to infrastructure and other assets. Well defined cost-sharing rules for rebuilding public assets between the public and private sector help to smooth volatility for the fiscal budget, freeing up limited fiscal resources for the most urgently needed recovery activities. By clarifying the scope of costs that will be covered at different levels of government, it is possible to encourage the uptake of private insurance and promote risk reduction activities.

To realize disaster risk management objectives of minimizing such impacts, a comprehensive policy package is required, which covers the key strands of “Prevention, Preparedness and Response”. It is only through the application of a comprehensive approach addressing all three actions that both physical resilience and financial resilience can be achieved. In the context of financial management of public assets, this means development of quality, resilient infrastructure and buildings to prevent losses, as well as the development of effective financial strategies including insurance, to speed response and ensure preparedness.

Disaster risk management of public assets also needs to account for emerging risks such as the ongoing coronavirus pandemic, which has the potential to create a significant compound risk event should a natural disaster occur during its ongoing impact. Pandemic could be a prolonged, multi-faceted global shock, creating large fiscal, economic, and social impacts in economies worldwide. It has put increasing strains on governments’ fiscal capacity and exacerbated debt distress in many middle- and low-income economies. For those economies also exposed to natural disaster risks, this leaves them in a place of exceptional vulnerability, and efforts to strengthen financial resilience to disasters are more urgent than ever. Early financing for infrastructure resilience is essential to ensure quick restoration of critical services after disasters and climate shocks, allowing economies to financially prepare for compounding shocks when resources are more stretched, and households and firms are more vulnerable. This is both critical for protecting businesses and households in the short term as they battle the immediate impacts

from the pandemic, and also important for long-term socioeconomic recovery.

Many Ministries of Finance in APEC economies are using a range of instruments to boost their financial management of public assets in the face of disaster risks. These include a range of ex-ante tools such as reserves provisioned within the budget, disaster response funds, contingent loans, and risk transfer instruments such as insurance. While more frequent, less severe disasters can be addressed by retaining risk through reserve-type mechanisms, a number of governments opt to transfer risks of large-scale, catastrophic events to the international markets through pre-arranged insurance and reinsurance. The combination of these instruments, each applied to the layers of risk at which they are most effective (World Bank, 2014),⁷ can produce an optimized overall system for managing the costs of disasters.

There has been great progress in the APEC community to develop disaster risk financing strategies and solutions that aim to manage governments' financial exposure to disasters through risk transfer and risk sharing mechanisms. Indonesia developed a national disaster risk financing and insurance strategy in 2018 and is currently in the process of developing an insurance scheme for public assets. The Philippines became the first economy to transfer a portfolio of subnational risks onto the international financial markets by launching a parametric insurance program in 2017 that provided coverage to national government assets and to 25 provinces against losses from major typhoons and earthquakes, with the World Bank as intermediary. Four Pacific Alliance economies—Chile, Colombia, Mexico, and Peru—placed a joint catastrophe bond issued by the World Bank for total earthquake coverage of US\$1.36 billion in 2018.

Insurance for public assets is only one component of a comprehensive and layered disaster risk

management system. Such programs require a high level of effort to design and implement, and must take into consideration the wider macroeconomic framework, economy-specific legal and institutional arrangements, and the capacity and appetite of the local insurance market, among many other factors. It is as a result of this, that the APEC Working Group on DRFI Solutions requested that the World Bank provide practical guidance on the design and implementation of insurance schemes for public assets.

This report builds on previous work focused on public asset financial protection in the APEC region. It extends work presented in the APEC reports on “Financial Risk Management of Public Assets against Natural Disasters in APEC Economies” and “Improving Public Assets and Insurance Data for Disaster Risk Financing and Insurance Solutions,” prepared by the World Bank for 2017 APEC Finance Ministers' Meeting.

This report aims to synthesize peer-to-peer learning among APEC economies into a format that provides useful, practical guidance to finance officials in APEC economies but can be a foundation to be applied to other economies on undertaking the design and implementation of catastrophe risk insurance programs for public assets. This report takes a broad definition of catastrophe risk insurance programs for public assets, considering any structure designed to transfer or pool the disaster risks arising from physical assets owned and managed by central or local governments or state-owned enterprises. This is done deliberately, as we find that government arrangements that may appear very different in composition are often fulfilling a common function. The report considers all aspects of design and implementation, from legal and institutional aspects, to instrument structuring, to scope of participation and covered risk, to stakeholder engagement.

⁷ See the World Bank's operational framework on disaster risk financing for further detail (World Bank, 2014). <http://documents.worldbank.org/curated/en/523011468129274796/Financial-protection-against-natural-disasters-from-products-to-comprehensive-strategies-an-operational-framework-for-disaster-risk-financing-and-insurance>

Scope and Methodology

The scope of this work is to provide an operational framework for the design and implementation of insurance schemes for public assets against disaster risk, based on experience from APEC economies and beyond.

A selection of case studies forms the principal basis of content, although lessons learned from other contexts and best practice frameworks relevant to the field have also been drawn upon. Research has relied upon interviews with stakeholders from the principal case studies, supplemented with publicly available information in reports. The authors acknowledge that the selected case studies do not represent the complete range of approaches globally to the insurance of public assets against disaster risks. However, the selected examples represent a diverse range of approaches with applicable lessons learned. The proceedings of the 2018 APEC Workshop on Financial Management of Public Assets against Disaster Risks (June 21–22, 2018, in Tokyo) have also been used to develop the content presented herein. As shown in the Acknowledgements section, the authors are extremely grateful for the contributions of the many participating contributors, but note again here that any errors or omissions in the text are the authors' own, and this document does not represent the views of any institutions referenced herein.

This report is aimed at finance officials in middle income economies responsible for fiscal policy and financial management of public assets. Given the audience and purpose of this report, the lessons learned are presented through a public sector lens in the spirit of a peer-to-peer learning exercise. This report does not review best practice in product offerings from the commercial markets; such a review is outside our scope. In addition to the target audience, the proposed framework aims to provide a foundation for knowledge products and guidelines for other economies, including low-income economies, through the lessons learned. For those uses—both in particular and in general—recommendations will need to be tailored to address specific economy context.

The case studies used as the principal source of content are established schemes from among APEC economies and beyond as shown in table 1 and further detailed in the annexes. As discussed above, a broad definition of catastrophe risk insurance program for public assets is taken. The case studies cover a range of types of coverage, although the focus is primarily costs arising from damage to physical assets, where useful lessons can be drawn, case studies are expanded beyond this.

TABLE 2. CASE STUDIES USED AS THE PRINCIPAL SOURCE OF CONTENT

Australia	The Queensland Government Insurance Fund	<i>A state-level insurance “captive” managed as an internal program, providing standardized insurance cover for public assets. (See Annex 1)</i>
	The Disaster Recovery Funding Arrangements, formerly the National Disaster Relief and Recovery Arrangements	<i>National-level policy that formalizes terms of financial assistance from the Commonwealth to sub-national entities in the event of a disaster.</i>
Japan	Insurance arrangements for the Shinkansen rail infrastructure	<i>The use of commercial insurance for a specific layer of risk for this extensive nationwide high-speed rail infrastructure. (See Annex 2)</i>
Mexico	The Mexican national fund for natural disasters (FONDEN)	<i>A long-established national financial program, including a trust vehicle, that formalizes cost sharing arrangements for disasters, consolidates disaster-related liabilities, and through which reserves and risk transfer arrangements to cover such liabilities are arranged.⁸ (See Annex 3)</i>
	Additional State and Federal Department arrangements for insurance of public assets against disasters	<i>Commercial insurance programs for public assets for federal departments and state governments.</i>
New Zealand	The New Zealand Local Authority Protection Program (LAPP)	<i>A mutual insurance arrangement for specialist infrastructure of local authorities in New Zealand. (See Annex 4)</i>
	The New Zealand Local Government Insurance Corporation Limited (Civic Assurance)	<i>A public insurer previously offering property catastrophe risk coverage to local authorities, but which has ceased to offer catastrophe-related cover due to circumstances arising from the Christchurch earthquakes.</i>
	The New Zealand District Health Boards’ insurance program	<i>A collective insurance program established to improve efficiencies in procuring insurance for district health boards, which has been discontinued.</i>
	Other approaches to insurance of public assets in New Zealand	<i>Lessons drawn from general practice on the insurance of public assets.</i>
Colombia	The insurance of transport infrastructure managed as public-private partnerships	<i>A government initiative to improve standards of insurance for concessions. (See Annex 5)</i>
United Kingdom (UK)	The Insurance Services II Framework	<i>A nationwide procurement framework for public sector entities in the UK that standardizes and facilitates access to commercial insurance. (See Annex 6)</i>
	The National Health Service (NHS)-Resolution insurance scheme	<i>The self-insurance program of the national health service.</i>
	The Risk Protection Arrangement (RPA) self-insurance scheme for Academy Trust schools ⁹	<i>An internal program of the UK Department for Education to self-insure schools. (See Annex 7)</i>
	Other general arrangements for insurance of public assets including the experience of individual Local Authorities	<i>Lessons drawn from general practice on the insurance of public assets.</i>

⁸ Disaster risk reduction investments are also within the remit of the overall program.

⁹ And extended in 2020 to Local Authority managed schools.

Preconditions and Limitations

The establishment of catastrophe insurance programs for public assets is a highly complex process, and requires certain pre-conditions to be in place both in the public sector and the target insurance market (specifically where domestic risk carriers will be part of the scheme). The conditions revealed by the case studies include the following:

- **Clear ownership of public assets and the disaster-related contingent liability arising from these** public assets at the various levels of government and by any related non-governmental stakeholders is the first step towards understanding the potential scope of any insurance scheme and the types of assets to be covered. It is critical to clarify where accountability for disaster losses will sit through formal, explicit, advance arrangements in order to facilitate active financial management of risk at all levels. For example, when central and state governments clarify and limit their share of disaster risk, it encourages managers of public assets to plan for the residual portion.
- **Appropriate data systems for public assets** are required, including details such as the location and characteristics of assets (age, function, asset type, size, etc.). The data structure across participating government entities needs some level of consistency, or a centralized database is required, to facilitate data sharing and management. Historical data on damage from natural disasters is also valuable, where available, to support quantification of risk.
- **Funding** is required, either for the payment of insurance premiums, or for allocation into any funds used for retaining or pooling risk.
- **Alignment of financial interest** between the participating agencies and the operating entity was a pre-requisite for a number of the case studies. The development and subsequent uptake of schemes requires investment of time, effort and resource. Without the correct alignment of financial interest between participating and operating entities, these investments may not be prioritized, and schemes are likely to fail.
- **Technical capacity and coordination of responsible agencies**, such as finance ministries, is required for the design and implementation of any scheme to be successful. The decision on where to access external expertise through outsourcing, and where to keep expertise in-house, will be highly context specific. Factors such as pre-existing public institutions carrying out relevant functions, the condition of the local market to access specific expertise, and internal decisions on headcount will determine what is appropriate in each case.
- **Robust and transparent procurement framework and practice in the public sector** is key to most, although not all approaches. In all cases where risk is shared between the public and private sector, the procurement of cover is a key step. For some of the case studies, the government's approach to improving the insurance coverage of public assets is focused on standardization of procurement. These efforts require the existence of effective procurement standards and practice in the first place, to serve as a foundation for this further work.
- **A developed domestic insurance market with the necessary financial and technical capacity** to underwrite property catastrophe risk, is required, although not for all types of scheme. Many of the case studies integrate the domestic insurance market into schemes, although, as the LAPP and FONDEN case studies demonstrate, this may not be desirable or feasible at the outset of scheme development, depending on the capacity of the market and pricing (see Section 5-3). Where this does occur, the domestic insurance market needs to demonstrate the appropriate level of insurance literacy, specifically for property catastrophe underwriting, with an understanding of the assets and risks to be covered. Domestic carriers need to have both the willingness, and financial capacity, to underwrite such risks. Where this capacity is not in place at the outset, it may be developed over the course of the scheme such that domestic insurers can be later integrated.

Catastrophe insurance programs for public assets are not without limitations. It is important for governments to take into account limitations and challenges when planning for public asset insurance schemes, and to acknowledge that insurance is not a silver bullet and must be used in concert with other financial and non-financial arrangements to improve disaster outcomes.

- Insurance schemes take time and effort to establish, requiring strong political support and consistent political will for both implementation and ongoing uptake and maintenance;
- As insurance requires up-front payment of premiums, which can be significant for economies with limited fiscal space, there are implications for the fiscal budget and allocation of funds to other resilience and development activities;
- It is not cost-effective, or feasible, to cover all risks arising from the disaster exposure of public assets through insurance. The risk of underinsurance is exacerbated where asset information is limited and the understanding of asset exposure to disaster hazards is incomplete;
- Insurers and reinsurers may be reluctant to underwrite risks if historical data on disaster events and asset damage is insufficient, or if the assets in question are highly specialized;
- For parametric insurance that relies on pre-defined physical hazard parameters and thresholds, it is possible that insurance payouts are not triggered where damage and loss is incurred. This is due to the imperfect capture of event experience through the modeling (basis risk);
- Pricing volatility often occurs in the market, particularly as (re)insurers respond to the aftermath of large events. At the time of writing of this report in 2020, this issue was apparent through the hardening of reinsurance pricing as the international reinsurance markets responded to the impact of the pandemic. Lloyd's of London has warned of potential \$200bn underwriting and investment losses impacting the global non-life markets in 2020, with a number of large international catastrophe risk carriers already reporting substantial COVID-19 losses through pandemic underwriting on business interruption, trade credit and event cancellation. Significant changes in premium pricing or market retrenchment may occur after a catastrophic event impacts international or domestic (re)insurance capacity.
- A high level of coordination and clearly defined governance structure is crucial, as the successful development and implementation of public asset insurance programs require a high level of coordination between finance ministries, disaster risk management agencies, regulators, private sector participants, modeling agencies, among other stakeholders.



Operation 1. Assess the financial protection gap for natural disasters

A strategy for insurance of public assets against disaster risk needs to be developed within an overall comprehensive national strategy for financial protection against disasters, and the government's broader framework for financial management of public assets.

The first step is the decision to proceed and invest the time and resources required to formalize any scheme for the financial protection of public assets. Whether the subsequent design decisions take the strategy in the direction of self-insurance or commercial insurance, the creation of a dedicated vehicle or no program at all, the starting point is the same. Both an understanding of the risk, and building on this, an understanding of the gaps in protection are required in order to set policy priorities in the development of a scheme for insurance of public assets.

To achieve an understanding of the risk, a quantitative risk assessment will deliver an understanding of the size of potential costs arising from disaster damage to public assets, and thus the government's contingent liability in this area. Detail on the location and characteristics of assets is needed to produce this, as an input into the model of the catastrophe risk to which such assets are exposed. This activity

lays the foundation for setting the scope of coverage for any scheme, as discussed under Operation 6. By quantifying potential contingent liabilities, both implicit and explicit,¹⁰ the government can make a decision on what type, and magnitude, of contingent liability it wants to bring within any scheme. As the following sections demonstrate, this is an iterative process, combining an assessment of feasibility, an understanding of potential losses, and setting of priorities for coverage.

Next, a stock-taking of current insurance—or other financial protection—arrangements in place can highlight the extent to which potential disaster costs will not be covered by existing insurance or self-insurance arrangements.

Best practices in catastrophe risk assessment, and public asset databases are covered by the APEC reports on “Financial Risk Management of Public Assets against Natural Disasters in APEC Economies” and “Improving Public Assets and Insurance Data for Disaster Risk Financing and Insurance Solutions,” prepared by the World Bank for 2017 APEC Finance Ministers’ Meeting. This document considers such areas out of scope to avoid duplication.



¹⁰ Governments are exposed to both explicit and implicit contingent liabilities in the aftermath of disasters. Explicit liabilities are those clearly laid out in advance, in policy commitments, laws, or contracts. Implicit liabilities are those arising from political or social pressure in the aftermath of a disaster event.

Operation 2. Create a legislative and policy framework to enable the use of insurance where effective

Insurance is a long-term strategy for the financial protection of public assets, being most cost-effective when applied to events that occur infrequently but with high severity. A sound legislative basis for the insurance of public assets can support a long-term approach even through changing administrations. However, legislation needs to be carefully crafted, and accompanied by additional actions (see below), to ensure the following:

- Coverage is purchased where needed;
- Coverage is appropriate; and that
- Coverage is not being purchased in situations where it is not adding value.

Some governments opt to mandate the purchase of insurance, while others elect to give freedom in the

method of financial management to the accountable managers, conferring only a statutory duty for prudent financial management of public assets but no requirement to use insurance to achieve this. Amongst the case studies examined for this report, the approach of giving freedom in method of financial management was more prevalent in those economies with a stronger insurance culture, where insurance penetration was relatively high across all sectors, public and private. It may be the case that insurance is less likely to be used within this 'freedom of financial management' model in economies where penetration is low and thus general familiarity with insurance is lower.

International experience points to the following five actions to create a favorable environment for insurance of public assets;

BOX 1. NEW ZEALAND, MEXICO AND THE UNITED KINGDOM—STIMULATING ACTIVE FINANCIAL MANAGEMENT OF RISK BY LIMITING SUPPORT

The Government of New Zealand sets general principles regarding the limitations of its financial assistance to local authorities in the event of a disaster, in the National Civil Defense Emergency Management Plan, and then further defines these limitations with quantitative boundaries in accompanying guidance to local authorities. To encourage local governments to plan financially, central government reduced its post-disaster funding provision to cover 60 percent of damage but only for uninsurable assets. This led to the creation of the Local Authority Protection Program (LAPP), established to cover the share of liability that fell to Local Authorities for underground water and flood control infrastructure.

Mexico uses a similar mechanism through its Natural Disaster Fund (FONDEN), which limits its financing to 50 percent of the recovery and reconstruction costs for the damaged infrastructure of states and municipalities. These local government entities are required to have insurance in place to manage the residual portion of costs, which has led to some states drawing from the best-practice applied at the federal level to place risk into the international markets using the tools and channels developed for FONDEN's own catastrophe exposure management purposes.

In the United Kingdom, funding through the Bellwin scheme administered at the central government level is made available for local authorities for response and recovery spending following emergencies such as extreme weather events. Support is limited to expenditures deemed "uninsurable" and a deductible is applied, such that emergency costs must exceed 0.2 percent of the relevant local authority annual budget before it qualifies for financial assistance.

2-1. Internal stakeholder engagement

To ensure the success and sustainability of a public asset insurance scheme, it is vital to integrate the target end-users (i.e. public sector entities who will be policyholders or equivalent) into the design process from the outset. There needs to be agreement on the program objectives from the end-users, and the entity or entities leading the scheme development and providing oversight, before development work begins. Consistent feedback from across case studies, was that while it was often difficult to secure time and commitment from the target end-users, where this process was not conducted properly, the end-users did not feel a sense of ownership of the resulting scheme and this impacted participation rates.

For some of the schemes reviewed, the lead agency developing the scheme undertook roadshows, where they travelled to spend time with each of the target public sector agencies for the scheme, as part of the consultation process. Strategies used to engage end-users included creation of user working-groups, end-user engagement days to present scheme design, customer insight days where brokers and insurers were invited to present to the end-users, and surveys.

Other entities that need to be engaged in scheme design, include the legal/compliance function within the relevant government entities, the audit function (internal, and potentially external, as relevant to the economy-specific context), and the insurance regulator. Where the insurance regulator is at arms' length from the scheme development, early presentation of the scheme design is advisable within the implementation timeline. The role of the regulator in the establishment of a scheme for public assets will vary significantly depending on the specific institutional contexts in economies. There will be scenarios under which the insurance regulator is an integral part of the scheme design and implementation. In cases where the insurance regulator is not involved in implementation, and even where regulatory approvals are not needed, early engagement is prudent and often necessary when establishing an insurance scheme. An opinion may be needed from the regulator that the establishment of a scheme does not adversely impact the fair functioning of the domestic insurance market.

2-2. Clarify and limit what central government will cover

It is critical to clarify where accountability for disaster losses will sit through formal, explicit, advance arrangements in order to facilitate active financial management of risk at all levels. When central and state governments clarify and limit their share of disaster risk, it encourages managers of public assets to plan for the residual portion (see Box 1). Policies for financial assistance to departments, local government, and other public sector entities are typically set for certain types of asset (e.g. central government will or will not cover road infrastructure under the management of local authorities), and will constitute a percentage of costs above a certain threshold.

This explicit allocation of risk ownership is even more important when responsibility for assets is shared between public and private actors. When private finance and/or private management of assets are an issue, the sharing of costs incurred by disasters should be made explicit within the contract for the infrastructure/concession in question. The allocation of costs between public and private actors is a policy decision, and many different structures of ownership and operational responsibilities mean that there is no single right answer to setting this allocation. Some governments allocate 100 percent of the responsibility for disaster costs to concessionaires or private construction firms for infrastructure, and then set contractual obligations for these private entities to purchase insurance. Japan provides an example of a sharing arrangement, where private finance initiative (PFI) contracts for Sendai Airport mandate insurance purchase from the private operator, but the government assumes responsibility for any costs in excess of this cover (World Bank 2017).

Even where the cost of reconstruction is formally assigned to the private sector party, the government may still find itself ultimately responsible for costs in cases where assets have not been properly insured by private operators, and there is a strong public interest to resume operations for certain infrastructure.

2-3. Incentivize use of insurance

Even for those economies where the purchase of insurance is explicitly mandated by law for public assets, a strong legislative basis is not, on its own,

BOX 2. COLOMBIA—ENSURING MINIMUM STANDARDS FOR INSURANCE COVER OF INFRASTRUCTURE UNDER CONCESSION

Colombia provides an example of how the government can act to ensure that liability for disaster losses falls properly to private sector partners. Following catastrophic flooding from the 2010-11 La Niña season, extensive damage to transport infrastructure resulted in a dispute between the Government of Colombia, and the concessionaires managing the infrastructure as to where the cost of restoring assets should be borne. Consequently, the Government has worked to avoid a repeat of this by using the concession contracts as a mechanism to enforce minimum standards of insurance protection for infrastructure managed by the private sector. The additions to the concession contract include:

- Minimum requirements for insurers and reinsurers eligible to act as risk carriers for the infrastructure in question;
- Minimum requirements for the terms and conditions for certain types of insurance; and
- Minimum information requirements for the risks to be insured, which will also be provided to the reinsurance market. By stipulating a minimum standard for information required for underwriting, the Government of Colombia will ensure broad access to high quality risk carriers for financial assistance.

enough to ensure insurance uptake.¹¹ Mechanisms to incentivize insurance purchase can be effective in increasing insurance penetration and compliance with mandatory purchase. Case studies show the following to be effective:

2-3-1. Conditional access to other financing

Conditional access to other financing such as disaster relief funds and contingency budget can incentivize insurance purchase. In Australia, section 4.5 of the Natural Disaster Relief and Recovery Determination required States to have *"adequate capital or access to capital to fund liabilities or infrastructure losses, and to proactively explore a range of insurance options in the market place and assess available options on a cost-benefit basis"* in order to access central funding from the Natural Disaster Relief and Recovery Arrangements (now the Disaster Recovery Funding Arrangements).

In Mexico, FONDEN rules limit repeat eligibility for FONDEN resources, such that coverage drops from 100 percent to 50 percent of the reconstruction cost for eligible federal assets where the asset remains uninsured following a prior disaster claim, and from 50 percent to 25 percent for eligible State assets that remain uninsured following a prior disaster

claim. If assets are uninsured following two claims to FONDEN, they become ineligible for support.¹² (World Bank 2012).

2-3-2. Compulsion by the Ministry of Finance or other entity with financial oversight of participating entities

One way to ensure insurance uptake is to structure an insurance scheme that is administered and overseen by the entity that has oversight of budgets and emergency funding in the event of a disaster. For example, the Queensland Government Insurance Fund (QGIF) is situated within Queensland Treasury. Agencies all have a specific line entry in their budgets to pay for QGIF insurance premiums, and since participation is compulsory, the scheme has a 100 percent compliance rate for eligible assets. The UK Department for Education's Risk Protection Arrangement (RPA) scheme is a contrasting example, where the scheme is run by the Ministry financially responsible for eligible Academy Trust schools, but is not compulsory. The voluntary nature of the scheme is consistent with the Departmental policy to empower financial decision by responsible entities. The participation rate is about 60 percent of the total academies in the United Kingdom (UK).

¹¹ This is best demonstrated by the widespread flood damage to uninsured public assets during the 2010-2011 La Niña season in Colombia, despite the longstanding legal requirement for managers of public assets to purchase insurance, and the existence of penalties for non-compliance.

¹² 2012. FONDEN : Mexico's natural disaster fund—a review (English). Washington DC : World Bank. <http://documents.worldbank.org/curated/en/408711468286527149/FONDEN-Mexico-natural-disaster-fund-a-review>

The decision to take a voluntary or compulsory approach will be context-specific, depending to a large part on the objectives of the scheme. Compulsion can ensure the sustainability and effectiveness of the scheme, by keeping participation rates high, and giving end-users a strong incentive to engage actively in scheme design and implementation. Conversely, a voluntary approach to scheme use protects freedom of choice in financial management for managers of public assets—keeping the experience of risk and financial decision-making in the same place. There may also not be political appetite for a compulsory approach.

2-3-3. Mechanisms that verify that purchase of insurance has taken place

Development of mechanisms to verify insurance purchase can increase uptake of insurance cover. In the case of Australia, eligibility to Commonwealth funds (Disaster Recovery Funding Arrangements, or DRFA, formerly the National Disaster Relief and Recovery Arrangements, or NDRRA) is verified by a compulsory, independent review of the details of insurance for essential public assets. Experience in the residential insurance market for catastrophe risk has long shown that verification mechanisms influence purchasing behavior. Although the mechanisms in the residential market are not applicable in this context (e.g. use

of land registration processes in Turkey, mortgage qualification in the UK), and there are limitations to all these mechanisms, the principle of a regular verification of purchase is valid across contexts.

2-3-4. Mandate identification and quantification of disaster risk within long-term financial planning processes of public sector entities

When public sector entities have to explicitly account for potential costs arising from disasters in their core financial planning, the incentive to actively manage risk is increased. When the potential cost of disasters is visible, the cost of insurance is easier to justify. Whilst catastrophe risk modelling does provide options for presenting the potential cost of disasters over a short timeframe,¹³ the fact that disasters are by their nature infrequent and severe means that it is easier to articulate the potential cost of disasters in financial planning over a longer time horizon. Space needs to be created within core financial planning processes to properly account for, and manage, disaster risk to public assets. In complement to these processes, development of a long-term disaster risk financing strategy can encourage officials to make policy decisions that maximize benefit in the long run. (See box 3.)

BOX 3. NEW ZEALAND—THE IMPACT OF PLANNING TIME HORIZONS

The introduction of 10-year Long Term Plans for Local Authorities in New Zealand has created a financial planning format that lends itself better to the evaluation of insurance as a tool for financial disaster risk management, with Local Authority infrastructure strategies uniformly taking account of the risks of natural disasters.

Conversely, an Auditor General review of the collective insurance program established for District Health Boards (DHBs) in New Zealand cites a misalignment of planning horizons as a key factor in the failure of the scheme. The pressure to demonstrate financial results in the short term reduced the incentive for DHBs to engage in the insurance program, which offered longer term cost reductions but required upfront additional investment from the DHBs.

¹³ For example, an average annual loss can show the average annual expected cost of disasters when spread over the long term. Probabilistic metrics can also be presented, that show the probability of different levels of severe events.

2-4. Ensure ability to pay premiums

Giving public sector entities the funds and necessary authorizations to pay for insurance premiums can improve uptake of insurance. It is not unusual—especially for economies with limited experience in the use of insurance—that insurance premiums are excluded from eligible expenditures for government entities.¹⁴ In such a case, legislation and/or policy may need to be revised. The importance of dedicating and funding budget lines for insurance premiums for responsible agencies was a recurring theme across case studies. As noted earlier, these lines are funded automatically for agencies eligible for QGIF. In the case of Mexico, the requirement to make budget provision for insurance of assets, and the introduction of insurance premiums as permissible expenditures, are conferred by Decree (Ley de Adquisiciones Arrendamientos y Servicios del Sector Público). In the Philippines, a special provision was introduced to the Act relevant to the National Disaster Risk Reduction and Management Fund to allow its use for payment of insurance premiums for a

parametric catastrophe insurance program.¹⁵ (Philippine Department of Finance 2017).

The issue of funding horizon for premiums is also important. Whilst (re)insurance programs are typically annual in nature, increasing options for multi-year cover are emerging. These include multi-year reinsurance and insurance contracts, and capital markets instruments for risk transfer (such as catastrophe bonds) where multi-year cover is a longstanding and widespread feature. In the early stages of scheme design and implementation, the political visibility and momentum behind schemes can facilitate the sourcing of funds for premiums. However, once the initial momentum and political visibility transition into business-as-usual operations, the policyholders/end-users will still require a sustainable, consistent source of premium funding to maintain the scheme. It is therefore important to consider, at the outset, how funding will be maintained to support schemes beyond the first year.



¹⁴ For example, as a special vehicle, FONDEN was not able to access risk transfer instruments prior to a change to its operational manual in 2004. This issue has also appeared for core government agencies in less developed economies.

¹⁵ <https://www.dbm.gov.ph/wp-content/uploads/Issuances/2017/Joint%20Memorandum%20Circular/JOINT%20MEMORANDUM%20CIRCULAR%20NO.%202017-1%20DATED%20JUNE%2030,%202017.pdf>

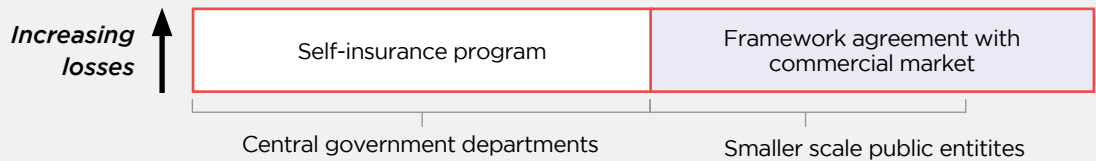
Operation 3. Determine the extent of centralization for the insurance approach

Many factors need to be considered to ensure that scale and extent of centralization of an insurance approach is appropriate for the risk-profile and public assets in question, and for the existing related systems and institutions. Economies are applying diverse sets of structures for the insurance of public assets (see figure 2).

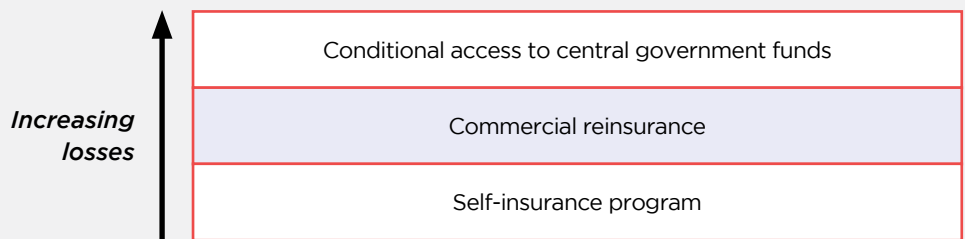
Some economies have opted to create comprehensive centralized programs with considerable structure, allowing for oversight and consolidation of management of disaster risk for public assets. Other economies have opted for less intervention, with more freedom in financial management given to individual entities. The broader policy environment will guide this decision.

FIGURE 2. SIMPLIFIED DIAGRAMS OF STRATEGIES FOR INSURANCE OF PUBLIC ASSETS APPLIED BY GOVERNMENTS ACROSS SELECTED CASE STUDIES, TO ILLUSTRATE DIVERSITY

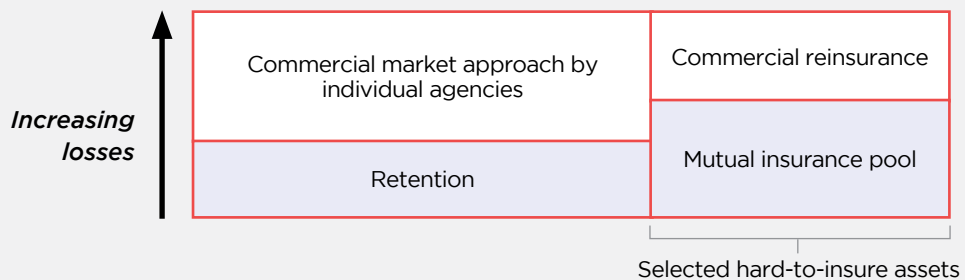
Approach A. Use of a self-insurance strategy with a purchasing framework for smaller entities unable to self-insure effectively (e.g. UK)



Approach B. Use of a self-insurance program to access international reinsurance capacity (e.g. Queensland Government Insurance Fund)



Approach C. Prevailing use of commercial insurance on individual entity basis, with a mutual public insurer for selected hard-to-insure assets (e.g. New Zealand)



Mexico provides an example of a highly centralized and structured approach, with the creation of a federal-level entity (FONDEN) through which exposure from both federal and state level public sector entities is covered,¹⁶ and through which an approach to the international capital and reinsurance markets is made. New Zealand

provides a contrasting example of a decentralized approach, where public sector agencies at both the central and local level tend to make individual approaches to the commercial markets.¹⁷ Options for insurance structure with advantages and disadvantages of each approach are summarized in Table 3.

TABLE 3. CENTRALIZED, PARTIALLY CENTRALIZED, AND DECENTRALIZED INSURANCE APPROACHES

APPROACH	ADVANTAGES	DISADVANTAGES	PRECONDITIONS
<p>Centralized: centralized insurance vehicle or program</p> <p>Risk is aggregated into a program or vehicle, such as the Queensland Government Insurance Fund (the State Level) and Mexico’s FONDEN (the Federal Level)</p>	<ul style="list-style-type: none"> • Consolidated purchasing power and conduit to international market capacity • Management of pricing volatility • Financial efficiencies from risk pooling/better managed risk retention • Quality control for insurance coverage standards • Visibility over multiple classes of risk allowing comprehensive risk management 	<ul style="list-style-type: none"> • High administrative and operational cost burden • Risk of disconnecting insurance decision-making from experience of risk • Removal of choice in financial decision-making from direct managers of assets 	<ul style="list-style-type: none"> • Strong alignment of financial interest between participating and operating levels of government, to invest time/effort/resource in scheme • Appropriate data systems for public assets, with potential for consistency across participating entities • Technical capacity within lead agency to undertake process
<p>Partially Centralized: framework agreement with the insurance market</p> <p>An insurance procurement framework of contracts that facilitates and standardizes access to the commercial markets for public agencies.</p>	<ul style="list-style-type: none"> • Facilitates access to commercial insurance • Standardizes insurance purchase process, increasing chance of successful placement • Promotes competition on price • Provides robustness in overall terms of engagement between insurers and public sector (but not necessarily in terms of coverage itself) • Protects freedom of choice in financial management for managers of public assets 	<ul style="list-style-type: none"> • Relatively high level of effort to implement • Reduction of choice of suppliers • Application of minimum standards in insurance terms and pricing that may not be possible in certain market contexts • No additional financial efficiencies of risk pooling/better managed risk retention 	<ul style="list-style-type: none"> • Relatively developed domestic insurance market with required financial/technical capacity to underwrite property catastrophe risk • Robust and transparent approach to procurement within public sector • Technical capacity within government to manage the procurement framework once developed • Appropriate data systems for public assets
<p>Decentralized: individual agency approaches</p>	<ul style="list-style-type: none"> • Protects freedom of choice in financial management for managers of public assets—keeping experience of risk and financial decision-making in the same place • Has no administrative or operational burden for government • Protects free market competition between suppliers 	<ul style="list-style-type: none"> • Variability in price and coverage quality outcomes, with particular risk for small scale public entities with limited purchasing power • Increased risk of unsuccessful placements • No additional financial efficiencies from risk pooling/better managed risk retention 	<ul style="list-style-type: none"> • Relatively developed domestic insurance market with required financial/technical capacity and appetite to underwrite property catastrophe risk • Strong technical capacity at all levels of government (central to local) for effective risk management and robust procurement • Appropriate data systems for public assets

¹⁶ FONDEN covers 100 percent of reconstruction of federal and 50 percent of reconstruction of state assets, with some exclusions.

¹⁷ The Local Authority Protection Program (LAPP) is one such exception, and a risk-pooling vehicle (Civic Assurance) for general local authority assets did exist at one point. There have also been additional limited attempts to pool risks for certain sectors (such as the District Health Boards).

3-1. Centralized approach; aggregation of risk into an insurance vehicle or program

Some economies opt to create a program or vehicle through which the liabilities arising from public asset exposure to disaster risk can be pooled and managed. For example, disaster funds or self-insurance programs that underwrite losses. There are many benefits to a centralized aggregation of

risk into an insurance vehicle or program. Examples include self-insurance captive programs (QGIF), national Natural Disaster Funds as public trusts (FONDEN), mutual insurance funds (the LAPP trust) and self-insurance pools for specific assets (the UK RPA for schools) amongst many others. These benefits should be weighed against the increased administrative and operational cost burden of taking such an approach (see Box 4 for the rationale for a centralized aggregation of risk)

BOX 4. BENEFITS OF A CENTRALIZED AGGREGATION OF RISK

1. Consolidated purchasing power

Aggregating risk into a vehicle or program increases scale, and thus demand for the risk. This produces more favorable pricing, and broader risk carrier options. For example, in the last renewal season (as of June 2018), around 30 risk carriers participated in Mexico's FONDEN reinsurance program, and in prior years, demand was so strong that FONDEN was able to further tighten its requirements on the financial strength ratings of reinsurers. Conversely, in other economies, some local government authorities have reported challenges in generating strong demand from insurers due to their smaller portfolios. In order to overcome this, some governments have created mutual vehicles such as Civic Assurance, the LAPP in New Zealand and a Local Government Mutual under development in the UK.

2. Reduce volatility in premiums for agencies

A number of self-insurance schemes use their structure to protect entities from volatility in (re)insurance premiums. For example, the LAPP in New Zealand adds an additional component into its insurance pricing to allow for the accumulation of a fund. The fund aims to reduce reliance on reinsurance to mitigate the impact of volatility of reinsurance costs from market cycles. QGIF in Australia has protected its participating entities from excessive upwards or downwards pressure on pricing, by smoothing this volatility over time. The issue of significant changes in commercial pricing was frequently reported as a challenge in case studies, notably after significant catastrophes. The Auditor General's Office in New Zealand reported significant insurance premium increases for the public sector in the aftermath of the Christchurch earthquakes in 2011. About 40 percent of surveyed insurance policies showed an increase of more than 20 percent in premium between 2011 and 2012, and about 14 percent of insurance policies had premiums that more than doubled during that period.

3. Conduit to international market capacity

New Zealand's LAPP, and Mexico's FONDEN provide examples of how self-insurance vehicles can access the international reinsurance market. In 1993, commercial insurance cover for underground water infrastructure was not readily available in New Zealand for local authorities. Thus, the LAPP was developed to overcome this gap, as a mutual insurance fund that was able to connect hard-to-insure underground water and flood control infrastructure with international reinsurance capacity.

4. Comprehensive risk management across multiple agencies

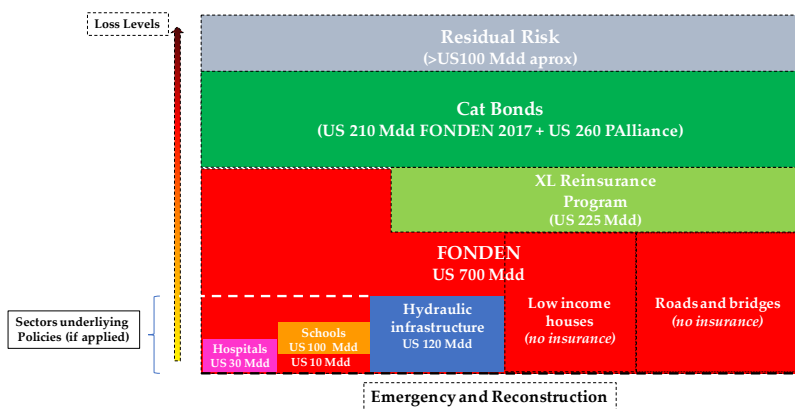
Aggregating risk into a single program can provide an opportunity for comprehensive management of risk across multiple agencies and types of asset. For example, QGIF in Australia oversees exposure and claims data pertaining to all its eligible agencies, and supports capacity building at the agency level by providing regular reports on claims and trends to QGIF participants. This high level of oversight of claims data allowed QGIF, working with the Department for Education, to identify that shade sails used on Queensland schools were highly vulnerable to storm damage. As both the ultimate owner of the assets, and the insurer, the Queensland government had the information, the means, and the incentive to then take action to replace the shade sails with less vulnerable options.

BOX 4. BENEFITS OF A CENTRALIZED AGGREGATION OF RISK *continued*

5. Opportunities to better manage retention

Retention of risk can be the most cost-effective option where there is financial capacity to absorb the potential losses, and particularly for the lowest ‘frequency’ layers of risk which experience frequent smaller disaster losses (Box Note 1). Aggregating risk into a centralized structure allows more efficient determination of retention levels, and the benefit of risk pooling across entities—specifically, allowing more efficient use of budget capacity to cover individual large losses. As a mutual instrument, the fund component of New Zealand’s LAPP provides an opportunity to efficiently retain risk for local authorities. FONDEN provides perhaps the best example of informed and well-structured retention of risk. The FONDEN Trust aggregates risks from across departments and states, and then determines its retention capacity based on: its accrued funds and legislated annual contribution, individual property catastrophe insurance covers in place for specific departments, and using analysis from the R-FONDEN catastrophe risk model (see section Operation 5) to determine potential claims.

BOX FIGURE 4-1. THE FEDERAL RISK FINANCING STRATEGY OF THE GOVERNMENT OF MEXICO



Source: Salvador Pérez Maldonado

As another example, one Local Authority in the UK exposed to flood risk uses a mutual contingent credit pool to efficiently manage risk that cannot be transferred to the commercial markets. The responsible managers for the assets pay annual fees into a collective fund, which covers the residual higher frequency, low severity risk that commercial insurers in the UK will not cover (e.g. losses below the commercial deductible for the commercial policy covering the portfolio of exposures). When significant asset damage occurs, funds are available from the collective pool on a loan basis, to be later repaid by the borrowing entity over a two-year period (Box Note 2).

6. Quality control

One rationale for the establishment of QGIF in Australia was the application of consistent insurance coverage terms across all eligible agency assets. Where exposed assets are brought within an insurance vehicle or program, it is easier to apply minimum policy standards, to ensure that: pricing is fair and signals risk (Box note 3); coverage limits and deductibles are appropriate; and that policy exclusions are consistent with the risk management objectives of the Government. Where there is no central oversight of insurance purchase, and where public agencies have limited experience of insurance, issues have been raised across case studies regarding poor quality of insurance cover.

Notes:

1. This is due to the way that technical premiums are calculated. For more information, see the *Operational Framework for Disaster Risk Financing and Insurance*, (World Bank, 2014).
2. The local authority in question is Sheffield City Council, a part of the United Kingdom that has high flood exposure.
3. That is, higher pricing indicates higher risk exposure.

One issue faced by centralized schemes for the insurance of public assets, is how to maintain the connection between financial decisions, accountability for outcomes and physical risk management. All of the structured, centralized schemes examined for this report were managing the challenge of having removed elements of financial decision-making from the manager directly accountable for the asset. The importance of connection between the manager of the asset, and the insurance decision-making process is twofold:

1. Where managers accountable for assets are integrated into the insurance process, it can help ensure that claims and exposure data produced as part of that process are being used to inform risk management; and
2. The consequences of outstanding, or poor, risk management practices appear in insurance pricing—thus a financial incentive for improving risk management practices is created when decision-making on insurance and risk reduction activities is appropriately aligned.

When determining how much autonomy to give to public sector entities in respect of participating in an insurance scheme for public assets, governments should ask the following:

- How do the lost benefits from low participation rates in a scheme weigh against the effects of empowering financial decision-making on insurance purchase by managers of public assets?
- What mechanisms could be established to keep the managers of public assets connected to data on claims experiences, and able to feedback productively into the insurance product design, even where they are not themselves evaluating and selecting insurance? For example, QGIF provides regular claims experience reports to its participating agencies.

3-2. Partially centralized approach: Framework agreement with the insurance market

A framework agreement with the insurance market can be used to facilitate purchase of insurance, ensure competition on price, and to some extent, to introduce minimum contract standards that appropriately represent the interest of public sector entities. Framework agreements do not offer the opportunities for comprehensive oversight and management, and financial efficiencies of risk pooling, which a centralized aggregation of risk offers. However, they give more responsibility and freedom in choice to the managers of assets, and can provide particular value to smaller scale public

BOX 5. A FRAMEWORK AGREEMENT APPROACH IN THE UK

The UK's Insurance Services II (ISII) Framework provides value to smaller public sector entities that don't have the capacity to self-insure, the scale to individually create strong market demand, or the appetite to develop collective insurance vehicles—for example, universities, fire services and certain local authorities. As its use is optional, and as it provides a range of options on insurance cover, it protects the freedom of public sector entities to choose how they manage risk. The ISII framework provides some level of guidance of public sector entities throughout the process of insurance purchase. Although the terms and conditions and pricing of the insurance contracts vary by supplier, there is protection to public sector agency framework users in the quality of suppliers. The framework includes 12 brokers, and 27 insurers which have been pre-qualified for ISII based on a series of criteria including past performance and financial strength.

An overarching contract defines the relationship between the authorized brokers and insurers, and the central public sector procurement agency (CCS), and individual insurance contracts are developed underneath this overarching umbrella agreement. This overarching agreement provides some assurance of quality and robustness in the terms under which business is conducted between the market and framework users. Framework users also benefit from capacity building and templates on: how to engage the market prior to placement; data collection; portfolio presentation; and how to remain compliant within legislative boundaries.

entities that don't have the capacity to self-insure effectively, or the scale to create strong market demand for their risk.

3-3. Decentralized approach: Individual agency/entity approaches

In economies with ready access to commercial insurance and reinsurance, and a policy for empowering financial decision-making by individual managers of public assets, there may be less impetus to create vehicles or frameworks for the insurance of public assets. Central government departments are themselves natural aggregators of risk, with consolidated purchasing power. For example, in New Zealand, the majority of central government risk from the disaster exposure of public assets is spread across a small number of departments,¹⁸ and these have portfolios of sufficient size to attract the services of brokers that have considerable weight in the market.

As well as consolidated purchasing power, central government entities can make use of the geographic diversification across their portfolios to keep insurance costs low. The Ministry of Education in New Zealand is one such case, where the department insures for less than the total replacement value of its assets as the geographic spread of buildings means a probable maximum loss will not impact 100 percent of the portfolio¹⁹ (New Zealand Auditor General 2013). The Government of Mexico complements cover through its central fund for natural disasters (FONDEN) with individual commercial property insurance programs for education assets, hydraulic infrastructure and hospitals. The federal departments—such as the Ministry of Education—are the individual counterparties for these insurance placements. It should be noted, however, that the data, processes and channels to market developed for FONDEN are utilized to make these placements, so it is not a wholly independent departmental approach.



¹⁸ *Insuring Public Assets*, Auditor General, New Zealand, 2013

¹⁹ *Insuring Public Assets*, Auditor General, New Zealand, 2013

Operation 4. Determine the nature of the vehicle or program entity

Where a decision has been made to adopt a centralized approach and to establish a vehicle for insurance of public assets, a decision as to the nature of that entity needs to be made. There are a variety of options, which will depend on conditions specific to the economy in question, and particularly the legal and regulatory environment. It is recommended that the government develop a set of principles for the nature of the entity, based on the key decisions that have to be made. Detailed legal and technical work on the most appropriate vehicle within the relevant jurisdiction can then be commissioned on the basis of those principles. Those key decisions are:

- The level of operational and administrative burden;
- The extent of financial separation from public accounts;
- The level of independence or integration of the vehicle with respect to existing, relevant public agencies; and
- The role of government agencies and other stakeholders in vehicle governance and management.

4-1. Identify the type of program or vehicle most appropriate to the institutional, legal and regulatory context

A fund integrated into government finances

One option for a self-insurance scheme is to manage it as an integrated part of government finances, rather than to have a separate entity. For example, claims under the QGIF scheme come out of Queensland Treasury's administered accounts, and provisions for future claims are managed within the Queensland government's long-term investment portfolio. QGIF is essentially an agreement between the Queensland Treasury and the covered entities, and it sits on the balance sheet of the Queensland government. This type of approach offers lower cost and administrative burden compared to the full financial isolation of the scheme into a separate entity, but is only suitable in cases where the government has adequate financial

capacity to easily absorb the total liability caused by the insurance scheme.

A separate legal entity

An insurance program can be given a distinct legal character through its establishment as a trust, foundation, or type of company. The Government of Mexico, and the New Zealand Local Government Association have established trusts—the FONDEN Trust and the LAPP Fund Trust respectively—for their self-insurance vehicles. These dedicated entities allow for further separation of the finances of the insurance scheme, which offers additional transparency and ring-fencing of funds. Although these trusts are funded very differently (the FONDEN Trust through an annual federal budgetary provision, the LAPP fund through annual member contributions), they take a broadly similar approach to managing their contingent liabilities with reserves accumulated over time to retain risk, and the purchase of reinsurance. One key advantage of an entity entirely separated from the budget (such as a trust, or an insurance company) is the possibility of accumulating reserves over time, and thereby retaining risk and reducing the cost of reinsurance.

Use of pre-existing public insurers is an option for the structure of an insurance scheme for public assets. Both the Mexico and New Zealand case study schemes used pre-existing public insurers such as Agroasemex in Mexico (as a conduit for FONDEN to international capacity) and Civic Financial Services (formerly Civic Assurance) in New Zealand (as the administration manager for the LAPP Fund).

In the case of FONDEN, Agroasemex has played a fundamental role in accessing international risk-bearing capacity, and the Government has also made use of the state-owned development bank, Banobras, as fiduciary agent and trustee for the resources transferred to the FONDEN Trust.

The LAPP Fund is a distinct legal entity, but Civic Financial Services (formerly Civic Assurance) provides administration management. Civic is financial services

provider, and the local authorities using its services are its shareholders. It was established by the 1960 Municipal Insurance Act²⁰ as a cooperative insurer for local authorities, and prior to the Christchurch earthquakes, was underwriting general property risks for local authorities. The company ceased underwriting property catastrophe risk after its financial strength rating was substantially downgraded following the impact of the Christchurch earthquakes on its financial position. However, its successor entity (Civic Financial Services Limited) acts as the administration manager for the LAPP Fund.

4-2. Develop an effective, representative governance structure

The governance structure of an insurance entity has multiple functions. In addition to their governance function, governance structures can be used to:

- Confer a strong sense of ownership of the initiative to participating entities;
- Develop the trust of participating entities through their integration into decision-making processes;
- Provide political leverage to vehicles.

A well-crafted governance structure is needed to bring a sense of shared interest in the success of a scheme. Global experience demonstrates that creating active roles within the governance structure for the public agencies that will be insured, builds trust in the undertaking. This in turn promotes sustained participation²¹ and also can help schemes successfully navigate particular challenges; for example, disputes over large claims payments or loss of participation.

A number of lessons learned were taken from the successes and failures of insurance schemes, on what good governance looks like in practice. Key lessons learned from these examples are summarized below:

- Ensure senior representation from the end-users/clients of any vehicle on the governing Board;
- Ensure that the forums for governance actively and frequently engage the Board, and that the secretariat function for running these forums is given appropriate priority;

- Ensure that the selection of Board appointees and the rotation of the Board Chair selection give a breadth of end-user representation in the governance structure, so that there is no perception of imbalance towards a particular group of end-users;
- Consider strategic political appointments to the Board, to give vehicles a strong base for their interactions with end-user public agencies, and broader market participants.²²

4-3. Determine the balance of retained internal expertise versus outsourcing

For the operations of insurance programs and vehicles, the decision on where to access external expertise through outsourcing, and where to keep expertise in-house, will be highly context specific. Factors such as pre-existing public institutions carrying out relevant functions, the condition of the local market to access specific expertise, and internal decisions on headcount will determine what is appropriate in each case.

However, a general theme across case studies was the importance of keeping certain types of expertise in-house in order to ensure effective operations. And where it is not possible to retain this critical expertise within the entity itself, the importance of having independent technical advice from an agency that: does not have a financial interest in any placement of risk itself; or has an alignment of interest with the public-sector entity seeking cover. In the case of QGIF in Australia and the UK RPA, government actuarial functions play an advisory role. In the case of FONDEN in Mexico, the Insurance, Pensions and Social Security Unit of the Ministry of Finance and Public Credit has played a significant technical advisory role, as has public insurer Agroasemex. Many governments have brought expertise in-house by hiring from the private sector, in cases moving from an outsourcing model to an in-house function by building up technical capacity over time.

The following examples demonstrate where retained expertise has added particular value:

²⁰ The act was fully repealed last year. See <http://www.legislation.govt.nz/act/public/1960/0029/latest/DLM324688.html#DLM324687>.

²¹ One reason cited by the Auditor General review for the failure of the New Zealand District Health Board collective insurance scheme, was that the governance processes and forums did not appropriately engage the Board of the scheme. As this was where the senior representation from the end-users (District Health Boards) was, this failure to engage had significant impacts on the success of the scheme. See 'Insuring public assets', New Zealand Auditor General, 2013

²² For example, the presence of the Ministry of Finance on the Board of Agroasemex has contributed to the sustainability and effectiveness of the public insurer.

1. Pricing of risk

It is important that Governments have access to an additional view of the pricing for their risk, beyond the view provided from those entities within the risk transfer chain. In the context of FONDEN in Mexico, the Government has access to its own view through R-FONDEN, which it complements with loss results from vendor models provided by the firms bidding on the risk for FONDEN's reinsurance placement. QGIF in Australia provides a very specific example, where the close connection of the QGIF team to the exposure data, and understanding of their risk allowed them to challenge over-pricing relating to a specific high-rise asset. The QGIF team was able to use its understanding of the data to demonstrate that the covered assets were all on the higher floors of the building in question, and there was therefore no flood risk to the contents or service provision covered under the policy.

2. Stress testing of the prevalent view of risk

Governments' insurance schemes should have access to the expertise needed to understand the major assumptions within catastrophe risk models. Otherwise, the exposure management and pricing strategy for a scheme could be overly reliant on a single view of risk.²³ In both Mexico and New Zealand, public technical agencies add substantial value in this process. In New Zealand, the GNS Science Institute has been commissioned by the LAPP fund to produce models. GNS played a vital role in the early days of development of the LAPP Fund, when data, and the understanding of risk, was limited. In Mexico, the Institute of Engineering of the Universidad Nacional Autónoma de México has played a core role in the development of the Government's R-FONDEN risk platform, which provides an internal view of risk to complement market provision of vendor modelled results.

3. Basic GIS functions for catastrophe exposure management and event monitoring

A number of schemes that do not retain extensive catastrophe risk modelling expertise, still retain basic GIS expertise in order to map risk zones and the onset of events over their portfolio of assets. The use of publicly available tools such as google maps,

and publicly available information on flood zones and storm tracks was a common theme.

4. Exploiting public asset and claims datasets for broader risk management and response

Having data management functions within public agencies can ensure that a close connection to the data is maintained, and that opportunities to use data for risk management are properly exploited. This is covered further above under Box 4, however an additional example comes from Japan. The Ministry of Finance of Japan has a comprehensive database for public assets managed by multiple ministries, and used for multiple public asset management purposes. The database enables the Ministry of Finance to provide information to local government authorities on which state assets have vacant rooms in their locality in the event of a catastrophe. These vacant rooms can then be used to respond to urgent needs including evacuation sites. This process provided substantial value to the disaster response especially following the earthquakes in 2016. Although the database in this case is not part of an insurance scheme, its use is shared here due to its equivalence with insurance exposure datasets.

5. Valuations and vulnerability estimations for specific assets unfamiliar to the commercial market

A number of types of public asset included within insurance programs and vehicles from the case studies, are highly atypical compared to assets underwritten within the commercial market. In such cases, the public entity may have a comparative advantage in commissioning and leading work to estimate the value of the assets and their vulnerability to disasters. In the case of the underground water and flood control infrastructure covered by the LAPP in New Zealand, the expertise on the value and vulnerability of these assets sits with the public sector rather than in the insurance market. These views are then incorporated into the underwriting process from the commercial market.

²³ One strong lesson learned from all the case studies, was that views of catastrophe risk change dramatically after a large event. The Christchurch earthquakes are one such example, where a new understanding of the presence of highly liquefiable soils after the events led to a dramatic increase in the modelled risk.

Operation 5. Determine the role of the private (re)insurance sector

The most fundamental question to ask in the design of a scheme for insurance of public assets, is what risk to retain, versus what risk to transfer to domestic or international (re)insurers. Policy on whether or not to transfer risk to the commercial markets should be driven by the size of potential catastrophic shocks in the context of budget flexibility and borrowing capacity.

It can be more cost-effective to self-insure in cases where governments have ready access to alternative financing options for post-disaster losses, and particularly for the ‘lower layers’ of risk—the type of loss events that occur more frequently and are less severe. For example, guidance to public entities from Treasury in the United Kingdom stipulates that self-insurance is better value for money than commercial insurance,²⁴ where feasible in the UK context. The substantial financial response capacity of the UK Government to meet disaster needs in the absence of insurance²⁵ makes a self-insurance approach viable. However, where disasters overwhelm the financial response capacity of government budgets, the costs of delayed response and of diverting funds from priority investment areas are ultimately more expensive than insurance (Clarke et al. 2017).²⁶

Governments need to determine how private (re) insurance can be used effectively. Case studies reveal a wide variety of potential arrangements with the private (re)insurance sector, including;

- Use of international markets to reinsure self-insurance vehicles;
- Framework agreements with domestic insurers to facilitate access to insurance for smaller-scale public entities under an umbrella agreement with the public sector;
- Use of the domestic insurance market for large portfolios of exposure for specific central government departments.

When determining how to bring the commercial market into a scheme for insurance of public assets, governments should consider the following:

5-1. The transfer of risk to protect government budgets

The use of commercial (re)insurance can be a prudent way to avoid budget disruption post-disaster, by transferring the volatile contingent liabilities that arise from catastrophe events. Risk transfer can add value even in cases where governments are not budget constrained; the Government of Japan provides an example of a targeted use of risk transfer to the private sector to reduce the contingent liabilities arising from disaster damage to rail infrastructure. Note that public assets in Japan are in most cases self-insured, with a restoration budget being made available by the responsible line ministry (e.g the Ministry of Land, Infrastructure, Transport and Tourism (MLIT)), even in some cases where the asset is privately operated. In the case of new Seibi Shinkansen rail infrastructure, Japan Railway Construction, Transport and Technology Agency has arranged disaster risk insurance to reduce the frequency of access to the contingency budget.

5-2. Increasing transparency and data standards

Within the case studies examined, the interaction with the commercial markets was instrumental in increasing transparency and data standards within insurance schemes for public assets. In cases, the minimum standards on exposure (asset) and claims information required by commercial reinsurers transformed the quality of exposure management, and the insurance offering itself, in self-insurance vehicles. These transformations, driven by the involvement of the private sector, have not just served to reduce uncertainty in pricing of commercial contracts, but have also facilitated risk management by the public agencies using these schemes. As one example bringing assets within scope for schemes served to highlight their condition, bringing issues such as the need for increased investment in ongoing maintenance into focus. Some case studies also reported increases

²⁴ Managing Public Money, HM Treasury UK, 2013

²⁵ Ibid

²⁶ Clarke et al., “Evaluating sovereign disaster risk-financing strategies: a framework”, 2017.

in trust from the public agencies participating in public asset insurance schemes, arising from the inclusion of an external commercial provider. As well as bringing about these positive changes within the schemes that they serve, (re)insurers and brokers are also providing valuable technical inputs—such as alternative probabilistic views of risk—that are being used to improve catastrophe exposure management, targeting of cover, and pricing within schemes.

5-3. Developing the domestic insurance market

Insurance schemes for public assets can be an opportunity to develop the domestic insurance market. However, a domestic market route for public asset risks may not always be feasible or desirable, depending on the capacity of the market and on pricing. The LAPP in New Zealand and FONDEN in Mexico are examples of self-insurance vehicles created in response to the infeasibility of placing risk in the domestic insurance market. For example, early consultation with the local insurance market association in Mexico on FONDEN revealed that the domestic market did not have capacity to support the program. Consequently, the FONDEN vehicle accessed reinsurance through the public insurer Agroasemex, which transfers the risk onto the international reinsurance markets. In the case of the LAPP, a self-insurance vehicle was necessary, as the domestic insurance market did not have appetite or technical capacity to underwrite underground water and flood control infrastructure of local authorities in 1993. The LAPP fund retains some risk, but also passes risk on through reinsurance.

Domestic insurance markets have in cases, responded in positive ways to the establishment of self-insurance vehicles for public assets. The LAPP played a facilitating role in the opening of the domestic insurance market to the highly specialized underground water infrastructure that previously had been considered commercially uninsurable. The domestic insurance market in New Zealand has now evolved to the point that it is able to compete with the LAPP on underwriting these risks. The Government of Mexico is now also passing risk into the domestic market through property catastrophe indemnity insurance policies under its overall risk financing strategy. In the

UK, the establishment of a self-insurance vehicle for schools—the Department for Education’s RPA—has put considerable downwards pressure on pricing, such that insurers are now competing effectively with the self-insurance scheme for the Academy Trusts.

5-4. Challenges in using commercial (re)insurance—volatility in the cost of cover

The volatility of commercial premiums is one reason why governments have adopted self-insurance approaches in cases, and why they have also sought to minimize the use of commercial reinsurance to support self-insurance schemes. This volatility, which is inherent in the (re)insurance industry, has posed a challenge to the sustainable management of insurance schemes for public assets.

Volatility of pricing after large disasters is an issue that governments must plan for when relying on risk transfer to the private sector. For example, many public entities throughout New Zealand reported to the Auditor General that one of their most significant cost pressures after the Canterbury earthquakes has been insurance. Nearly 40 percent of the insurance policies of public entities participating in the Auditor General’s review of insurance of public assets included an increase in premiums of more than 20 percent in the year following the Canterbury quakes. Some survey respondents reported premium increases of 200 percent or more. Insurers and reinsurers also increased the deductibles/excesses on their policy offerings, requiring public agencies to retain more risk. These changes in the terms under which cover can be accessed arise from multiple reasons. Insurers and reinsurers may be dealing with changes to their capital position, following large claims payouts. Catastrophe events also inevitably provide new information on the risk exposure of assets, and the nature of perils, necessitating a review of pricing adequacy. In the case of New Zealand, new information around the presence of, and vulnerability from, highly liquefiable soils substantially changed the understanding of seismic risk to structures in the economy after the Christchurch events. As noted earlier in this report, a self-insurance vehicle can elect to smooth volatility in pricing, as QGIF in Australia does.

Operation 6. Define the extent and nature of insurance coverage

6-1. Set priorities for asset and loss types to be covered

When establishing a scheme for insurance of public assets, governments need to determine the types of loss, and the types of asset, that they want to bring within scope for coverage. This will be partly a policy decision, partly a question of feasibility. Some schemes opt for a broad spectrum of asset inclusion, while others carve out very specific liability to manage costs of premiums. Building damage, contents damage, and service interruption, were typically all within the scope of cover. It was noted in multiple cases that the costs of service interruption, although harder to quantify, had the potential to be larger than the costs of restoring physical assets.²⁷ Some contrasting approaches to setting scope for coverage are shared below:

- Scope defined by disaster resilience objectives:** Mexico's FONDEN provides broad coverage of assets,²⁸ including even low-income housing to offer protection to affected vulnerable communities. It also includes very few exclusions in the cover offered for assets. This comprehensive, inclusive approach to cover arises from the disaster resilience objectives of the overall program. FONDEN has been successful in passing this broad spectrum of risks into the reinsurance market. Exclusions from FONDEN's commercial reinsurance policy are relocation expenses arising from damage, and costs for 'building-back-better', which are covered by FONDEN but not passed onto the commercial markets.
- Scope defined by financial efficiency:** To most effectively manage the cost of premiums, some schemes prioritize assets for cover. For example, some public agencies focused on maintaining service continuity in the event of a disaster, with those assets most critical to this continuity prioritized for inclusion in the

commercial insurance program. Getting certain assets back online in a short time period can have a huge impact on the overall cost of a disaster. Identifying these assets through modelling can help in prioritizing insurance cover.²⁹

There are also examples of schemes choosing to separate certain types of asset/operation out of the portfolio they present to the commercial market, due to low demand from insurers for these particular risks. Where the commercial market is less willing to underwrite risk from certain types of asset/operation, it can result in low demand, reduced choice in insurer, and less favorable pricing. In these cases, it may be advisable to separate coverage of these less desirable risks out of the portfolio, to protect competition on other classes of business. This is the case for social housing under the Insurance Services II framework in the UK, where a decision was made to separate these exposures from the rest of the framework and take them to market separately.

- Scope defined by a market failure:** The LAPP in New Zealand was established to cover a very specific exposure; underground water and flood control infrastructure. This carving out of such a specific liability arises from the purpose of the vehicle—to fill a market gap that was present at the time of the vehicle's creation.
- Scope defined by benchmarking against the best available commercial coverage:** Australia's QGIF and other schemes reviewed available commercial cover in their developed domestic insurance markets when considering the best available terms to meet the needs of their end users.

How to include transport infrastructure posed a specific challenge across all the schemes that considered its inclusion. For QGIF in Australia, while

²⁷ For example, the Queensland government identified the cost of relocating hospital services to another building in the event of damage as their largest potential loss arising from a single physical asset.

²⁸ Roads and bridges, water infrastructure, schools, hospitals and low-income housing make up 90 percent of the historical support requirements through FONDEN.

²⁹ The impact of downtime for service infrastructure on overall disaster costs is modelled and elaborated here: <http://pubdocs.worldbank.org/en/959121528158915945/IPF-Resilience-drmhubtokyo.pdf> <https://www.tandfonline.com/doi/abs/10.1080/09535314.2013.872081?journalCode=cesr20&>

certain infrastructure such as bridges and tunnels are included,³⁰ roads were not deemed cost-effective to cover. This was due to the extensive size of the road network (many tens of thousands of kilometers), the poor quality of parts of the network, and the fact that the State of Queensland has to budget for resurfacing of roads on a frequent basis, even without the occurrence of a disaster. Where discrete elements of the transport network are selected for cover, issues of defining the covered element can cause challenges in the post-event loss assessment process. One example shared by QGIF, was the challenge of agreeing the exact start and end point of a bridge; the bridge had been damaged by a severe weather event, and QGIF and its commercial reinsurers had some difficulty in agreeing the extent of damage that fell within the commercial policy.

Similar considerations were raised by local authorities in the UK, where, while disasters can increase the extent of resurfacing needed, there is a need to resurface roads on a regular basis anyway. Thus, many public sector entities opt to retain the cost of disaster damage to roads, through their roads' maintenance funds where possible. Conversely, the Government of Mexico has elected to transfer the cost of damage to roads through FONDEN, to the commercial reinsurance markets. The different types of damage caused to transport infrastructure in economies exposed to seismic hazards versus those only exposed to hydro-meteorological perils is also significant when considering the feasibility and desirability of retaining losses that arise.

6-2. Facilitate resilient reconstruction within post-event processes

Some schemes facilitate a 'build back better' approach through their claims processes, although this is not funded by the commercial insurance policy. In these cases, it is agreed that the commercial payout will cover a portion of the cost of rebuilding the asset, with the cost of betterment being funded from elsewhere. The key design feature is that the procurement of services and materials for reconstruction of assets can be in excess of the figure agreed with the risk carrier as part of the loss adjustment process. For example, in Mexico, the FONDEN Technical Committee is able to

approve post-disaster reconstruction funding not only for the replacement, but also for the improvement, of damaged assets to increase resilience against future disasters. However, it is not viable to include these additional costs in FONDEN's commercial reinsurance policy, so the indemnity reinsurance program covered by the reinsurance market only covers replacement costs.³¹ As the claims settlement process has been developed to accommodate FONDEN's processes, and as the oversight and responsibility for reconstruction sits with FONDEN, the government has the mandate and agency to undertake reconstruction in the way it deems most effective. Similarly, QGIF in Australia has developed its own claims settlement processes that allow its participants to build back better, despite the cost of improvements not being covered under the insurance contract. Experience from the devastating Christchurch earthquakes in New Zealand (2010-2011) was that standard commercial loss adjustment processes can pose a challenge to betterment in reconstruction. There were difficulties in separating the costs of betterment from the costs of reconstruction covered by commercial contracts, which led to long delays of loss adjustment. Developing a claims settlement process that allows betterment to occur, without the cost of it being paid for through a commercial (re)insurance contract, was a key lesson learned across multiple of the case studies. A further identified challenge to inclusion of betterment within insurance contracts, is the treatment of public assets with heritage value. In these cases, standardized coverage may not be suitable anyway, due to preservation requirements that need to be applied within any reconstruction approach.

6-3. Set coverage terms to minimize underinsurance

Deductibles: In some commercial markets, standard deductibles for natural perils can be high. For example, insurers in Japan did not consider it feasible to underwrite losses below the 1 billion yen (around US\$10 million) mark for the Shinkansen rail infrastructure insurance program, and in the UK, one local authority placing risk in the domestic market reported that deductibles imposed by the market for natural perils were four times higher than for other risks. Self-insurance schemes offer ways around this issue. QGIF in Australia, for example, covers 100 percent of the cost of

³⁰ Bridges and tunnels are included in the commercial contract, but QGIF does not cover losses below the commercial deductible for the state agency responsible for transport infrastructure (DTMR).

³¹ Those costs are estimated to represent, on average, around 75 percent of total reconstruction costs for the scheme.

rebuilding assets—with no deductible for participating agencies. Sheffield City Council in the UK has created a mutual contingent credit pool for its sub-agencies, to manage the retained risk below the deductible on their commercial policy. However, deductibles have an important function in aligning the interest of the insured and insurer, and mitigating the risk and administrative burden of unnecessary small claims. In recognition of this, some schemes opt to use commercial benchmarks for deductibles for participating agencies when setting their insurance coverage terms. Where participation rate is an issue, some schemes have opted to lower deductibles to increase the frequency of payouts and thereby demonstrate how the scheme adds value to its members.

Coverage limits: As regards coverage limits for individual assets, underinsurance was a frequently reported issue in global experience, with insurance policies covering a current carrying value of an asset rather than the replacement cost. Ensuring that exposure data includes up-to-date valuations that account for replacement costs, and demolition costs where possible, is recommended. The Christchurch earthquakes in New Zealand revealed a substantial undervaluation issue for the LAPP coverage of underground and flood control assets. There were significant, unforeseen, additional costs in reconstruction that arose from expensive actions required to make the sites safe to survey and build on.

When considering how to set coverage limits for a portfolio being placed in the commercial market, the New Zealand Ministry of Education provides an interesting example of how to save costs. The Ministry elects to insure its portfolio of assets for less than 100 percent of the total replacement value to save costs, and benefit from the geographic diversification of losses that is inherent in its nationwide portfolio (New Zealand 2013).³²

Reinstatement of cover: Reinstatement clauses are of particular significance. As noted above, it is not unusual for the cost of insurance and reinsurance to increase dramatically following a catastrophe occurrence (see Box 4: Manage volatility of pricing). Cover may also no longer be offered by the market. After the Christchurch earthquakes in New Zealand, it was difficult to access insurance or reinsurance in the impacted area. This was due to factors such as:

new understanding of the risk from highly liquefiable soils; demand exceeding capacity for construction services and materials; substantial claims reducing the capacity of insurers to take on risk; and the international reinsurance market reviewing its high levels of aggregate exposure to earthquake in the New Zealand market. Reinstatement clauses are a prudent inclusion, to ensure that cover is automatically reinstated following a catastrophe or series of shocks, given the difficulties in approaching the market for cover after a large disaster. For example, the LAPP had one automatic reinstatement of cover in its reinsurance policy, which meant that cover was reinstated after the first earthquake event, and was therefore in place for the second event, but that the third earthquake in the Christchurch sequence was not covered. For economies exposed to seismic perils, it is also important to review the definition of an earthquake event within policies for coverage, to determine whether multiple shocks in a sequence would be treated as a single event or multiple, and to consider how the financial terms of the policy (deductibles, reinstatements, limits) will apply in each case.

It is also worth noting here that some public sector entities purchase multi-year covers to fix in costs and reduce the burden of tendering on an annual basis. For example, a five-year cover with the option to break on an annual basis.

6-4. Decide upon a risk-based versus solidarity model for pricing

Most schemes use a risk-based approach to setting pricing for participating agencies, in which the cost of premiums reflects the level of risk in respect of a participating agency. The UK RPA for schools is an exception, where schools pay a fixed per-pupil amount that is reviewed annually by the Government Actuary's Department to ensure that the overall income for the scheme is adequate given its contingent liabilities. The riskier schools are therefore having their cover subsidized by those with better claims experience (i.e. solidarity model). The advantage of this approach is that it links the cost of cover to the capacity of institutions to pay; schools in the UK are funded (largely) on a per-pupil basis.

³² *Insuring Public Assets*, Auditor General, New Zealand, 2013

The disadvantage of the solidarity model is that it does not use price to incentivize risk reduction. Other schemes actively seek to achieve this outcome, with risk-based premiums, and in the case of the LAPP, the offer of premium discounts to local authorities that display strong risk management practices. This missing feature of the pricing model is acknowledged by the RPA management team, who use alternative strategies to promote risk reduction. This includes using the surplus from the scheme to invest in the resilience of schools that the RPA data identifies as being particularly exposed, the application of deductibles on the contracts so that risk experience is partially shared across the insured and insurer, and the delivery of risk management workshops and risk audits,³³ in which the risk management practices of Academy Trusts are reviewed.

Another disadvantage of the solidarity model is that it can lead to adverse selection issues, whereby schools with lower levels of risk will opt to buy cover in the commercial market where their premiums are lower, and the scheme would then attract only the riskier exposures. This could lead to issues with price adequacy, if it is assumed in setting pricing that the participating schools will represent a full cross-section of risk-exposed Academies.

Where the participating agencies in an insurance scheme are independent of each other, the desire for cross-subsidization tends to be lower. One of the greatest challenges reported by the LAPP was managing the perceptions of members as to their subsidizing other member's coverage, despite the risk-based allocation of member contributions to the fund (their premium equivalent). Working with members to understand their differing risk profiles for flood, earthquake, volcanic and tsunami when compared to other members was critical to maintaining participation in the scheme, by clarifying with members that pricing was fair, and no cross-subsidization was occurring.

The UK National Health Service operates a self-insurance scheme (NHS-Resolution) for claims arising from injury or negligence. The scheme uses a three-tiered approach to charging, in which the insured agencies are assigned to one of the pricing tiers based on their claims history. This provides some signaling of risk in the cost of cover, but there is subsidization of

premiums across the agencies. Although this example does not come from property catastrophe insurance, the idea of a partially risk-based, but simple, approach to pricing could add value in the context of physical damage to public assets.

6-5. Ensure sustainable pricing

While differing policies for pricing within schemes are perfectly valid, price adequacy for schemes as a whole must be maintained. Schemes have choice in how they allocate the cost of cover to individual participating agencies, and even in how the cost of cover is distributed year-on-year (i.e. schemes may elect to smooth large cost rises or reductions over time). However, ensuring that pricing is adequate to support the long-term sustainability of the scheme must be the basis of any model.

Among the methodologies applied to set pricing in self-insurance schemes, probabilistic modelling results provide the most sophisticated approach. However, these models are not available for all perils and territories, and in cases, (particularly flood modelling) the uncertainty in model results can be very high. Therefore, a complementary approach is almost always required.

Methods being used to determine pricing include:

- Outputs of probabilistic catastrophe risk models (either delivered by broker, (re)insurer, or developed internally):**
 Probabilistic catastrophe risk models provide a sophisticated view of risk, but are not available for all perils and territories, and development of new models requires a large investment. Both Australia's QGIF and Mexico's FONDEN use probabilistic modelling results provided by the commercial market to supplement their own methods for risk assessment. FONDEN also has its own in-house model, R-FONDEN;
- Pricing developed by the government actuarial function based on claims history (with scenario modelling of possible large losses):**
 Government actuarial functions play a core role in pricing for multiple schemes. Best practice methodologies for calculating premiums using such data are well-established in developed

³³ To ensure learning, risk management audits occur for new joiners to the scheme, but also for Trusts with high or low claims experience compared to the average claims made by Trusts using the scheme

insurance markets, and working with actuarial resources affiliated with a globally recognized actuarial body will ensure that these are applied. Both the UK RPA and QGIF in Australia rely on internal actuarial expertise to maintain price adequacy in their schemes;

- **The use of industry benchmarks alongside survey methods on past damage:**

In the case of the UK RPA, pricing for the early years was established using survey results from schools on their past damage and claims experiences, alongside the provision of industry benchmarks for claims from similar risks being underwritten elsewhere in the market. The RPA team worked with a broker who provided these industry benchmarks, and also with a claims service provider to further understand likely claims patterns. There were challenges with this approach; namely that

the quality of information from the surveys varied from school to school, and that the performance of the industry benchmarks in capturing actual claims experiences has not been strong. However, this approach offered a starting point to an entity operating in a data poor environment, and as the scheme develops its own claims experience over the years, this is being blended with the industry benchmarks to improve pricing.

- **Engineer assessment for hard-to-insure assets:**

In the case of the LAPP, the challenge of modelling flood damage to hard-to-insure underground water and flood control infrastructure was approached using engineer assessment, and self-assessment from local authorities on the portion of their infrastructure located in different flood zones. The availability of detailed flood zoning in New Zealand contributed to this approach.

BOX 6. CHALLENGES COMPARING SELF-INSURANCE TO COMMERCIAL INSURANCE PRICING

Issues with high commercial pricing, or high volatility in pricing can be the stimulus for the creation of a self-insurance scheme. The pricing for what appears to be equivalent cover can be significantly lower for self-insurance schemes. This can be due to inefficiencies in the market, or how risk pooling in a scheme can bring diversification benefits into premiums compared to individual policies for covered agencies. However, it is important to note that self-insurance schemes are often not fully isolating their assets and contingent liabilities from the budget of the relevant government agency. They may therefore be implicitly relying on flexibility in the government budget to cover large losses, which does not appear in premiums in the same way that an insurer or reinsurer will account for the cost of capital to back large losses into their calculations of price. Therefore, a direct comparison of the cost of commercial insurance versus pricing for a self-insurance scheme relying on central government budget capacity is not really valid. However, relying on budget flexibility for self-insurance schemes, where possible maximum losses have been quantified and can be absorbed by flexible budget capacity, is one option for a strategy in seeking to achieve value for money. Especially since those liabilities are usually held on the balance sheet of the government anyway, even in the absence of an insurance scheme. For example, the UK RPA was established following an assessment that a self-insurance approach could save the Department for Education about £100 million per year in costs (Department of Education, 2014).

Operation 7. Develop a post-disaster process

Standard practices for claims management in the commercial markets are not always suitable for public sector entities. Commercial practices may need to be adjusted to allow governments to efficiently, and quickly, reconstruct assets, and to get critical infrastructure back online as soon as possible. In the event of a severe catastrophe, insurance of public assets serves not just the government but the population as well. Hospitals, utilities, schools, transport infrastructure, and government services need to be restored as soon as possible after a disaster, and where insurance funds are a planned part of that recovery, they need to be executed quickly and efficiently.

Challenges in loss adjustment after disasters can add years onto the timeframe for settlement of claims, as demonstrated by the experience of the 2010-11 Queensland floods in Australia and the 2010-11 Christchurch earthquakes in New Zealand. Even where the claims settlement process is efficient, and funds can be released in a matter of a few months (large settlements have been achieved in three months for indemnity cover used in Mexico's FONDEN context), governments will need access to more immediate financing options to get reconstruction of critical infrastructure underway immediately to minimize service interruption. In the FONDEN case, an Immediate Partial Response Mechanism fills this gap. After a disaster occurs, resources are authorized by the Ministry of Finance and Public Credit within 24 hours of the receipt of a request from a federal or state entity, and are then released through the FONDEN Trust. These early payments are later deducted from the total approved FONDEN allocation through the full loss assessment process.

The following strategies may be applied to facilitate the post-event claims settlement process for public assets:

7-1. Incorporate an established public sector loss assessment process

Where processes exist already for the assessment of damage by public sector agencies, the incorporation of these processes into commercial insurance processes can facilitate rapid settlement. The

FONDEN reinsurance program in Mexico, placed through public-insurer Agroasemex, makes use of the protocols developed for FONDEN's determination of its own payouts to federal and state entities. A collaborative approach is taken, whereby engineers from local and federal government go into the field alongside the reinsurance loss-adjustors, to estimate damage. Multiple loss estimates are produced, and a process of reconciling these figures then follows. Because the government has designed the post-event loss assessment process, it is consistent with FONDEN timeframes.

7-2. Bring the claims management function in-house

QGIF in Australia works with external loss adjustors, but keeps the overall claims management function in-house. Due to the nature of the scheme, they are able to set post-event processes that accommodate the existing procurement processes of their participating agencies. For example, public sector agencies may have emergency procurement arrangements with service providers to make procurement for reconstruction faster. Conversely, commercial insurance claims processes may require that work be procured in a certain way, and may involve putting out a tender for quotes after the damage has occurred. QGIF allows agencies to work through their emergency procurement arrangements.

7-3. Share loss adjustment resources between public and private sector

One challenge across multiple case studies, was of the disagreements that arose from having multiple loss adjustors on-site post-disaster, representing different parties, and arriving at different figures. FONDEN manages this issue through the joint loss assessment activity between the public and private sector as described above. One local authority in the UK, with a self-insurance structure sitting below a commercial placement, opted to share the procurement of loss adjustors with their commercial insurance provider. A framework agreement is put in place with a panel of individual loss adjustors on an annual basis, with the insurer's approval of the selected panel. When an

event occurs the loss adjustors can be on the ground in 24 hours.

7-4. Establish a long-term partnership with an external provider of loss adjustment services

The hard-to-insure nature of certain types of infrastructure can make loss assessment challenging. This was the case for the underground water and flood control infrastructure in New Zealand covered by the LAPP, which was impacted by the 2010-11 Christchurch earthquakes. Loss adjustors struggled with the damage assessment for these underground assets, with issues such as differentiation between betterment and reconstruction causing long delays. Subsequently, LAPP has worked in partnership with a loss adjustment firm over an extended period, to build expertise in-house regarding the underground assets.

7-5. Use technology to facilitate rapid settlement

FONDEN uses a web-system for rapid sharing of post-event damage information, to facilitate quick agreement on a loss figure by the responsible committees within FONDEN and the commercial parties involved. Geo-referenced damage assessment evidence—namely photographs—are uploaded onto the system for sharing with the FONDEN damage assessment committee. Federal and State entities are required to give precise detail on losses before requesting assistance from FONDEN (geolocation data, photographic evidence and a full description).



Operation 8. Undertake Stakeholder and market engagement

Whatever the approach, stakeholder engagement will be a critical part of design and implementation of catastrophe insurance programs for public assets. Early and effective integration of the right stakeholders into the development process for an insurance scheme can substantially improve outcomes. The case studies also provided useful guidance on how governments can apply strategies in their interactions with the commercial markets to improve the price and coverage outcomes when placing risk

8-1. Engaging with the domestic insurance market

For almost all of the case studies, the market engagement was with either the international reinsurance market, or a domestic insurance market that was already relatively developed. In these cases, governments were dealing with experienced counterparties with strong technical capacity, able to understand the risk and price for it appropriately. The case studies therefore provide examples of the different strategies applied to get the best out of a competitive, developed market for catastrophe risk. For many developing economies, the domestic insurance market cannot be approached in this way, as domestic carriers lack the technical and financial capacity to underwrite catastrophe risks as effectively, and as competitively.

Catastrophe insurance schemes for public assets present an opportunity to develop domestic insurance market capacity—both technical and financial. The section on “the Role of the Private (Re)insurance Sector” discusses this opportunity in more detail. Mexico is an example where the domestic insurance market did not have capacity to support the FONDEN program in its early years, but where both the Government of Mexico’s strategy for insurance of public assets, and the domestic market, developed to the point that some public sector risk is currently being absorbed through domestic carriers.

The development of the domestic insurance market to underwrite catastrophe risks effectively is itself

a valuable activity in developing financial resilience within an economy—for both public and private sector exposures. Therefore, engaging the domestic insurance market within the development of any scheme, even where it is not feasible to pass risk through it at the outset, can serve a longer-term resilience strategy. For economies with relatively under-developed insurance markets, governments will need to balance the feasibility and sustainability of any insurance program for its assets against the longer-term objective of developing the domestic market, when it sets the level of involvement of domestic insurers.

For certain types of program that rely on domestic insurance market capacity—for example, the procurement framework approach with the domestic market—a relatively developed, competitive local market is a pre-requisite for scheme success. For the more centralized approaches that aggregate risk into a program or vehicle, domestic carriers do not need to be an integral part of the risk transfer chain. In fact, as noted earlier, both the FONDEN and the LAPP case studies demonstrate where the infeasibility of passing risk through the domestic market in a cost-effective way pushed governments to take a more structured, centralized approach to insuring assets.

An assessment of the capacity of the domestic insurance market to form part of the risk transfer chain is a starting point for any scheme. Governments need to keep in mind the following factors: one, that the more involved the domestic market is, the better the development outcome for these carriers; and two, that in the event of a significant catastrophe impacting an economy, having risk concentrated within the domestic market could lead to poor outcomes for all stakeholders. Mitigating options for this are the use of reinsurance, and a robust post-event process that allows the scheme to fulfill its obligations to its public sector policyholders, even where domestic carriers may be operationally overwhelmed by responding to insured losses incurred across all sectors of the economy. These factors are discussed in more detail earlier in the note.

8-2. Commercial process— optimizing price and coverage outcomes

A common strategy to keep the cost of premiums low, but also to manage the risk of counterparty default, is to increase the number of participating (re)insurers. Global experience shows that disputes over payments of large claims after catastrophes are not uncommon.³⁴ Having multiple high-quality (re)insurers reduces the impact should a dispute arise with any individual participant. Many of the case study schemes use a panel of (re)insurers, although for entities with smaller portfolios this may not be an option due to low demand from the market. Placing risk with multiple insurers or reinsurers adds some complexity to the process of settling claims, but the role of the broker and/or the lead (re)insurer can mitigate this.

8-2-1. Structuring the risk to increase number of bidding insurers

To improve the price and coverage outcomes of an approach to the market, the risk can be structured in a way that allows the maximum number of (re)insurers to bid. Strategies being used by public sector entities to improve outcomes include; risk layering to appeal to a broad range of risk appetites (i.e. splitting risk into higher and lower frequency event layers); dividing capacity between multiple brokers who each approach the market to compete on price and capacity (FONDEN in Mexico); splitting risk by class of business (type of asset/operation) within insurance procurement frameworks such that insurers can bid on specific types of public asset (this facilitates the participation of specialist and smaller insurers on the UK ISII Framework that cannot offer cover for all types of asset that the public sector requires).

8-2-2. Pre-engagement with the market

The interactions with the commercial market before the competitive tender can play an important role in price and capacity outcomes. Submitting high quality information on the exposures in the portfolio is critical. Some public sector entities go further, to

present their risk management strategies and the portfolio claims experience in person to the market, during organized insurance days where the market is invited to a series of presentations.

8-2-3. Designing a bidding process

The process for competitive tender of risk varies substantially between case studies. In the case of the UK ISII framework, a direct award option is also made available to users alongside the option to invite bids on the risk.

For FONDEN, a multi-broker approach is taken to maintain competition and downwards pressure on pricing. A number of brokers are invited to compete on the program, and written guidance is provided to reinsurers and brokers on the rules that will be used to allocate capacity for each renewal of the program. The brokers return with offers on price and capacity, and the risk is allocated under these set rules, including:

- One offer at 40 percent or more of capacity (the total amount of cover sought) is required to assign a program lead to coordinate across all the participants at the point of claim;
- 50 percent of the risk is allocated to reinsurers that quote below the average premium rate (the average across the full set of quotes received during the tender).
- To allow a range of brokers to participate, the minimum capacity requirement threshold (i.e. the minimum amount of risk that a broker must place in order to participate) is set low, at 5 percent of the total program. There is no minimum capacity requirement for reinsurers.

This approach, plus the strong demand for the program, attracted around 30 reinsurers, and six brokers for the last renewal.³⁵

The bidding process for the UK ISII framework approach provides another approach, with the same objective of maintaining effective competition to drive down price, but with the added complexity of needing to work for a broad range of public sector entities and classes of business (i.e. types of asset/operation). There are two

³⁴ For example, not all of Civic Assurance and the LAPP's reinsurers agreed to meet in full the claims made in respect of the Christchurch earthquakes. Arbitration, and ultimately legal action was taken. See New Zealand Dispute Resolution Centre, [https://www.nzdrcc.co.nz/site/commercialdisputes1/files/Court%20Decisions/NEW%20ZEALAND%20LOCAL%20AUTHORITY%20PROTECTION%20PROGRAMME%20DISASTER%20FUND%20v%20THE%20NEW%20INDIA%20ASSURANCE%20COMPANY%20LTD%20CIV-2012-404-7453%20\[2013\]%20NZHC%201327%206%20June%202013.PDF](https://www.nzdrcc.co.nz/site/commercialdisputes1/files/Court%20Decisions/NEW%20ZEALAND%20LOCAL%20AUTHORITY%20PROTECTION%20PROGRAMME%20DISASTER%20FUND%20v%20THE%20NEW%20INDIA%20ASSURANCE%20COMPANY%20LTD%20CIV-2012-404-7453%20[2013]%20NZHC%201327%206%20June%202013.PDF)

³⁵ Numbers were provided by Agroasemex at the time this report was being written.

points of competition; one at the point of framework establishment to determine the participating brokers and insurers for the four-year duration of the framework; and one at the point of access to the framework by public sector agencies looking for cover, where the framework brokers compete for the specific business. There are 12 brokers participating in the framework, and 27 insurers,³⁶ of which the vast majority (24) will only offer coverage through a broker.

This structured approach to negotiating has both positives and negatives:

- The framework must appeal to both the service providers as well as the public sector users to work. Therefore, it is necessary to limit the number of prequalified service providers in the first layer of competition to make participation in the framework an attractive proposition to brokers and insurers. Conversely, the panel of providers must be broad enough to protect choice for public sector agencies, and to allow effective competition on risk that is presented through the framework.³⁷
- By its very nature, and the nature of insurance pricing, the framework necessarily limits competition without information on how insurers will price risk. The framework offers other advantages, such as a minimum level of quality of participating service providers, and a facilitated purchasing process for its users—reducing the risk of failure of tenders. However, the principal area of price competition is on insurance brokerage services, and not on the price of the risk which is considerably larger.

8-2-4. Understanding the role of brokers

A good broker can offer far more than just the placement of risk to public sector entities. They can bring technical assistance and increased negotiating power on both premiums and claims. While they add additional cost into the process, they have the potential to positively influence outcomes and deliver significant value for money. However, it is important for public sector entities to understand how brokers are remunerated, and how this may influence their interactions with (re)insurers.

Within the case studies reviewed here, brokers are providing catastrophe risk modelling results for the public sector agency portfolios of exposure, giving an additional view of risk that has utility beyond just insurance-decision making. They are also providing guidance and modelling for how to best structure programs and present portfolios to improve competition on risk. One key area of value is in the claims process, where brokers play a coordinating role, and for those that carry considerable weight within the market, they can help facilitate disputes. As noted earlier, disputes over large claims payments after catastrophes are not uncommon, so having the intermediation of a respected broker through this process can be invaluable. Under the UK ISII framework, brokers offer a broad range of fee-based technical services to clients. A number of the schemes reviewed opt to contract with a broker for a multi-year period, with annual break options, to take best advantage of the partnership.

It is important for public sector agencies contracting the services of brokers to understand their structure of remuneration, and how this may impact whether and how (re)insurers will bid on risk. Public sector agencies looking to place risk may pay an insurance brokerage services fee upfront, to engage a broker. This cost is usually transparent, and will be linked to the size of the risk placement. Additionally, brokers will often receive commission from the insurers that they invite to bid on the risk, and this amount may be larger than the insurance brokerage service fee. One issue raised by stakeholders from multiple case studies was of not having visibility of this amount within the quoted overall price for the risk. It is also important to understand that many brokers have pre-existing tied relationships with certain (re)insurers; these relationships are a reality of certain insurance and reinsurance markets. Therefore, when working with a broker, public sector agencies should be aware of how these relationships, and how commission from (re)insurers, will impact how a broker will place risk.

8-2-5. Taking selection criteria beyond price

Price is an important factor in achieving a successful placement, but it should not take precedence over the quality of cover. As the experience of the 2010-2011 Christchurch earthquakes in New Zealand shows,

³⁶ At time this report was being written.

³⁷ When this report was being written, the UK was considering whether a dynamic purchasing agreement that allows suppliers to enter during the framework period should be considered for the next iteration of the Insurance Services initiative

non-payment and disputes over claims, can and do occur. Eligibility criteria for insurers and brokers to enter the tender process are being used to mitigate this issue, including factors such as;

- Financial strength/credit quality;
- Regulatory authorizations;
- Prior performance in claims payment.

The terms and conditions of the insurance contract should also be a key factor in selection, as these can vary substantially from (re)insurer to (re)insurer in areas such as coverage exclusions. It is vital that the terms of cover be reviewed by a party with the necessary technical capacity, whether this be an internal or external function to the public sector agency being covered. For most of the case study schemes reviewed, individuals with insurance expertise had been hired out of the market and into the relevant public sector entity to perform this function. Brokers can also play a role in this process.

8-3. Stakeholder engagement

To ensure the success and sustainability of a public asset insurance scheme, it is vital to integrate the target end-users (i.e. public sector agencies) into the design process from the outset. For some of the schemes reviewed, the scheme development teams undertook roadshows, where they travelled to spend time sitting with the target public sector agencies for the scheme, as part of the consultation process. Consistent feedback from across case studies, was that while it was often difficult to secure time and commitment from the target end-users, where this process was not conducted properly, the public sector agencies did not feel a sense of ownership of the resulting scheme and this impacted participation rates. Strategies used to engage end-users included creation of user working-groups, end-user engagement days to present scheme design, customer insight days where brokers and insurers were invited to present to the end-users, and surveys.

Engaging with the domestic insurance market can be beneficial, even where their role is not integral to the operation of the scheme. The role of the domestic market varies substantially across schemes, from being an integral player in a framework agreement, to cases where a self-insurance strategy is taken and there is no role for the private sector. Engaging with the domestic insurance market, even when they are

not an active player in a scheme, can ensure that where future cost-effective opportunities to pass risk through the domestic market exist, they are not overlooked. For example, although the domestic market in Mexico did not have capacity to support the FONDEN program in its early years, the Ministry of Finance consulted from the outset of FONDEN with the local insurance market association. Currently, both the Government of Mexico's strategy for insurance of public assets, and the domestic market, have evolved to the point that some public sector risk is being absorbed through the domestic insurance market.

Where the insurance regulator is at arms' length from the scheme development, early presentation of the scheme design is advisable within the implementation timeline. The role of the regulator in the establishment of a scheme for public assets will vary significantly depending on the specific institutional contexts in economies. There will be scenarios under which the insurance regulator is an integral part of the scheme design and implementation. In cases where the insurance regulator is not involved in implementation, and even where regulatory approvals are not needed, early engagement is prudent and often necessary when establishing an insurance scheme. An opinion may be needed from the regulator that the establishment of a scheme does not adversely impact the fair functioning of the domestic insurance market.

Other entities that need to be engaged in scheme design, include the legal/compliance function within the relevant government entities, the audit function (internal, and potentially external as relevant to the economy-specific context), and the insurance regulator. Where the insurance regulator is at arms' length from the scheme development, early presentation of the scheme design is advisable within the implementation timeline. The role of the regulator in the establishment of a scheme for public assets will vary significantly depending on the specific institutional contexts in economies. There will be scenarios under which the insurance regulator is an integral part of the scheme design and implementation. In cases where the insurance regulator is not involved in implementation, and even where regulatory approvals are not needed, early engagement is prudent and often necessary when establishing an insurance scheme. An opinion may be needed from the regulator that the establishment of a scheme does not adversely impact the fair functioning of the domestic insurance market.

Moving forward

This technical note highlights eight key operations for the design and implementation of catastrophe risk insurance programs for public assets

- Assess the financial protection gap for natural disasters.
- Create a legislative and policy framework to enable the use of insurance where effective.
- Determine the extent of centralization for the insurance approach.
- Determine the nature of the vehicle or program
- Determine the role of the private (re)insurance sector.
- Define the extent and nature of insurance coverage.
- Develop a postevent process.
- Undertake stakeholder and market engagement.

It is important to note that this list is not exhaustive and that the application of the proposed framework should be tailored to an economy's specific context, demands, and objectives.

In the current circumstances in 2020, the risk of natural disaster shocks is compounded by the ongoing COVID-19 pandemic, which further underlines the role of resilient public infrastructure to maintain delivery of critical services and protect livelihoods. The process of establishing a catastrophe insurance program for public assets will assist economies in their response and recovery endeavors in the long-term. Activities such as the identification and valuation of key public assets, the establishment of data systems for public assets, and the clarification of ownership of the contingent liability associated with asset damage, will help strengthen fiscal discipline and improve financial risk management of public assets in many economies, thus speeding socioeconomic recovery as economies emerge from the pandemic.

A number of pre-conditions for the feasibility of the different types of insurance schemes are highlighted throughout this note. In the effort to adapt the proposed operational framework to low-income

economy settings, it is important to recognize that these pre-conditions will not exist in many target economies. In a low capacity environment where the government has limited fiscal capacity, the domestic insurance market is underdeveloped, and data is sparse, priority must be given to develop these foundational elements, alongside any design endeavors for an insurance scheme. Policy-makers are reminded that the process of setting up public asset insurance programs is time and resource-consuming, and it is advisable to create an enabling environment first and put in place the fundamental building blocks through capacity building and domestic market development.

As demonstrated by the case studies, catastrophe insurance programs for public assets can bring a variety of benefits: taking pressure off of the fiscal budget to free up resources for the most urgent recovery activities post-disaster; enhancing risk management in the public sector; and developing the domestic insurance market, to name a few. However, catastrophe risk insurance is not a silver bullet and works best in combination with other disaster risk financing instruments. To realize climate risk management objectives and minimize disaster impacts on businesses and vulnerable households, a comprehensive policy package is required using a range of tools to address risks of various frequency and severity. Many economies adopt a variety of ex-ante risk financing tools such as disaster reserves, contingent credit, and risk transfer instruments, each applied to the layers of risk at which they are most effective, to produce the optimal financial protection against disaster shocks. In the context of financial management of public assets, this means activities to strengthen both physical resilience (e.g. resilient infrastructure, disaster risk reduction incentives) and financial resilience (e.g. insurance) to speed up response and recovery. Decision makers should approach public asset catastrophe insurance programs as a component of comprehensive DRFI strategies, not a standalone program.

Annex 1. Case Study: The Queensland Government Insurance Fund (QGIF)

A centralized state-level insurance “captive” is managed as an internal program, provides standardized insurance coverage for eligible state-owned public assets, and uses a self-insurance scheme to access international reinsurance capacity.

Compulsory public asset insurance that has a dedicated budget line. The Queensland Government Insurance Fund (QGIF) is operated by the Queensland Treasury, and all state agencies have a specific budget line automatically funded to pay for QGIF insurance premiums, with a 100 percent compliance rate for eligible assets. Essentially an agreement between the Queensland Treasury and the covered entities, QGIF is fully integrated into government finances as the government has adequate financial capacity to absorb the contingent liabilities. Claims under the scheme come out of Queensland Treasury’s administered accounts, and provisions for future claims are managed within the Queensland government’s long-term investment portfolio.

Benefits come from centralized risk aggregation. By aggregating risks into a single program, QGIF applies consistent insurance terms and quality control across all eligible agency assets and provides comprehensive risk management across multiple agencies. QGIF has oversight of exposure and claims data and provides regular claims experience reports to participating agencies in order to keep the asset managers connected to the data and to enable feedback into insurance product design. QGIF covers 100 percent of the cost of rebuilding assets with no deductible for participating agencies, thus minimizing the risk of underinsurance. QGIF has also protected its participating entities from excessive upward or downward pressure on pricing by smoothing the volatility of premiums over time.

In-house expertise is kept to ensure effective operations and sustainable pricing. QGIF retains actuarial and claims management expertise that has contributed to the efficiency and cost-effectiveness of the program. Pricing developed by the government actuarial function is based on claims histories and is supplemented by probabilistic modeling provided by the commercial market. Because QGIF has oversight of the exposure data and risk profile, the team has been able to challenge pricing from the commercial market on its reinsurance contract; smooth the volatility of the cost of the scheme for participating entities, and set effective terms for the insurance agreements with participating agencies. QGIF also keeps the claims management function in-house and hires expertise from the private sector; the majority of staff members have prior experience as claims administrators. Bringing claims management in-house has allowed the scheme to accommodate the existing emergency procurement processes of the participating agencies, which facilitates the rapid recovery of assets.

Scope of coverage is defined based on cost-benefit analysis and commercial benchmarking. QGIF reviewed available commercial cover in the domestic insurance market when considering the best available terms to meet the needs of the end users. Although the scheme generally takes an inclusive approach to coverage, roads are not deemed cost-effective to cover because of the extensive size of the road network, the poor quality of certain parts, the low appetite from the commercial market to reinsure this risk, and the ongoing expenditure on restoration activities even without a disaster. The state agency responsible for transport infrastructure (the Department of Transport and Main Roads, or DTMR) retains the cost of damage to the road network, although it has potential support from the Commonwealth Disaster Recovery Arrangements (DRFA) whereby the Commonwealth reimburses 75 percent of state losses for restoration of certain public assets when a minimum damage threshold is reached for the state overall.

Annex 2. Case Study: Japan Insurance Arrangements for the Shinkansen Rail Infrastructure

A targeted use of commercial insurance for a specific layer of risk exists for the extensive nationwide high-speed rail infrastructure.

Explicit allocation of risk ownership. The allocation of costs between public and private sectors is an important policy decision for large public infrastructure projects. Public assets in Japan are in most cases self-insured, with a restoration budget being made available by the responsible line ministry—even in some cases where the asset is privately operated. For certain assets, the government provides a cost-sharing arrangement between public and private sectors. As an example, the private financing initiative (PFI) contracts for Sendai Airport mandate insurance purchase from the private operator, but the government assumes responsibility for any costs in excess of this coverage.

Cost-sharing framework between public and private sectors. The Shinkansen bullet train network is owned by the Japan Railway Construction, Transport, and Technology Agency (JRTT), which is the state-backed corporation that builds and owns the network and receives its budget allocation from the Ministry of Land, Infrastructure, Transport, and Tourism (MLIT). The Shinkansen trains are operated by Japan Railways (JR) Group companies. Under the current cost-sharing framework, members of the formerly state-owned JR Group lease the bullet train's infrastructure from the JRTT using fixed price, 30-year leases that have been based on estimated earnings from rail operations over 30 years.

Role of insurance in managing risks of infrastructure.

Commercial insurance companies have the technical expertise and capacity to assess risks of disaster perils on the rail infrastructure and to quantify such risks with statistical modeling and analysis. The companies are able to design policies that use technology (artificial intelligence [AI], satellite imagery, drones, etc.) and expert claims handling to enable swift payment after a disaster occurs. Insurance as a de-risking pool also helps to attract quality finance and investment from the private sector.

Targeted use of risk transfer to protect government budget.

JRTT introduced an indemnity insurance policy for the Shinkansen rail infrastructure to reduce the contingent liabilities for the government and to minimize budget disruption caused by natural disasters. The program insures assets including viaducts, bridges, tunnels, embankments, railroad tracks, crossties, overhead wires, utility poles, and other relevant facilities and equipment, but it excludes mechanical and electrical breakdown. Among the covered perils are fire, lightning, flood, landslide, earthquake, and tsunami; damage from volcanic eruption is not covered.

Arrangement of a layered insurance framework.

For the Shinkansen rail infrastructure insurance program, the bottom layer of risk up to 1 billion yen (US\$10 million) is retained by the JRTT, because insurers in Japan did not consider it feasible to underwrite losses below this amount. A panel of insurers underwrite an indemnity policy for losses up to approximate US\$100 million and coordinate access to reinsurance capacity.³⁸ The targeted use of commercial insurance for the middle layer of risk helps reduce disaster related contingent liabilities for the government, protects the budget, and enhances fiscal stability.

³⁸ Tokio Marine Holdings, Inc. 2019. "The Role of Insurance Industry to Strengthen Resilience of Infrastructure—Experience in Japan." APEC seminar on Disaster Risk Finance.

Annex 3. Case Study: Mexico's National Disaster Fund (FONDEN)

Mexico provides an example of a highly centralized and structured approach with the creation of the Natural Disaster Fund (FONDEN) in 1996 to support disaster relief for the affected population and fund reconstruction of damaged public infrastructure at the federal and state level.

Comprehensive and layered approach to disaster risk financing. By aggregating risk into a centralized vehicle, FONDEN increases the market demand for risk and produces favorable pricing. FONDEN was established as a trust in BANOBRAS, the state-owned development bank, allowing it to aggregate risks from across departments and states. FONDEN determines its retention capacity based on its accrued funds, its legislated annual contribution from the fiscal budget, and individual property catastrophe insurance covers in place for specific departments (that reduce liability through the vehicle). The program then uses risk transfer to manage its contingent liability, including the issuance of Catastrophe Bonds with parametric triggers, and a substantial reinsurance program with the international markets.

Ways to incentivize insurance uptake with conditional access to financing. FONDEN covers 100 percent and 50 percent of the reconstruction of federal and state assets, respectively. To incentivize active financial management, FONDEN coverage drops from 100 percent to 50 percent for eligible federal assets and from 50 percent to 25 percent for state assets, where the asset remains uninsured following a prior disaster claim. If assets are uninsured after two claims to FONDEN, they become ineligible for support. This has encouraged local government entities to draw from the best-practice applied at the federal level to seek commercial insurance coverage.

Multiple views of risk for pricing. FONDEN use modelling offered by the commercial market for risk pricing, based on catastrophe risk models from global third party vendors. This is supplemented by its own in-house model R-FONDEN jointly developed by the Ministry of Finance and Public Credit (SHCP) and Universidad Nacional Autónoma de México (UNAM) to provide an internal view of risk. Both R-FONDEN and the third party vendor views of risk are probabilistic in nature, providing a sophisticated approach to pricing that extends beyond the historical record of damage and loss.

Integration of technology and established processes to facilitate rapid settlement and recovery. FONDEN uses a web system for rapid sharing of post event damage information—including geo-referenced evidence of damage—to facilitate quick agreement on a loss figure by the responsible FONDEN committees and the commercial parties involved. The FONDEN commercial reinsurance program uses protocols developed for FONDEN's determination of its own payouts to federal and state entities: engineers from local and federal governments go into the field alongside the reinsurance loss adjusters.

Early stakeholder engagement and domestic market development. The Government of Mexico consulted from the outset of FONDEN with the local insurance market and determined that it did not have the capacity to support the program. Currently, both the government's strategy for insurance and the domestic market have evolved sufficiently, such that domestic carriers absorb some public sector risk.

Annex 4. Case Study: The New Zealand Local Government Insurance Corporation Limited and the Local Authority Protection Program

Civic Assurance (now Civic Financial Services) was a mutual insurer that was owned by local authorities in New Zealand. It was established by the 1960 Municipal Insurance Act as a cooperative for local authorities, and prior to the Christchurch earthquakes, it was underwriting general property risks for local authorities. The Local Authority Protection Program (LAPP) is a separate mutual insurance arrangement for specialist infrastructure of local authorities in New Zealand. LAPP was set up in 1993 by Local Government New Zealand and Civic Assurance.

A mutual insurance arrangement to overcome a market gap. The LAPP was established to cover specific exposure: underground water infrastructure. The vehicle was created in response to the following:

- Under the Civil Defence Emergency Management Plan, the central government sought to encourage local governments to plan financially for disasters. To achieve this goal, the government reduced post-disaster funding provision to cover 60% of damage for local governments, but only for uninsurable assets;
- The domestic insurance market did not have appetite or technical capacity to underwrite underground water infrastructure of local authorities in 1993.

These two factors led to creation of the LAPP to cover the share of “uninsurable asset” liability that fell to Local Authorities for underground water infrastructure. The LAPP Fund is a distinct legal entity (a trust fund). Civic Financial Services (formerly Civic Assurance) provides administration management.

Pricing to avoid cross-subsidization, to incentivize risk management, and to manage reliance on the international reinsurance market. A risk-based

approach to pricing is applied for the LAPP through risk-based allocation of member contributions to the fund with premium discounts for those members who display strong risk management practices. The LAPP fund retains some risk, but it also passes risk on through reinsurance. One fund objective is to reduce reliance on reinsurance to manage the volatility of reinsurance costs from market cycles. An additional component is added into its insurance pricing to allow for the accumulation of a fund to achieve this goal.

The experience of Civic Assurance has provided a cautionary lesson. When Civic Assurance ceased underwriting property catastrophe risk after its financial strength rating was downgraded following the Christchurch earthquakes, it was unable to renew or secure new reinsurance capacity. Before the earthquakes, it had built a sizeable insurance portfolio and reinsurance program. However, it suffered substantial underwriting losses from the quakes; the outstanding claims liability in December 2012 was estimated to be in excess of \$800 million (Auditor General 2012).³⁹ Reinsurance bore a substantial part of these costs, although not all members of Civic’s reinsurance panel honored their obligations, which meant the insurer was forced to enter disputes over nonpayment (New Zealand 2020).⁴⁰ Civic Assurance was not able to secure reinsurance after the Christchurch events; consequently, it ceased offering property catastrophe coverage.

Development of the domestic insurance market. The LAPP played a facilitating role in opening the domestic insurance market to the highly specialized underground water infrastructure that previously had been considered commercially uninsurable. The domestic insurance market in New Zealand has now evolved to the point that it is able to compete with the LAPP on underwriting those risks.

³⁹ Controller and Auditor General of New Zealand, *Insuring Public Assets*, 2012.

⁴⁰ New Zealand Dispute Resolution Centre, 2020, [https://www.nzdrcc.co.nz/site/commercialdisputes1/files/Court%20Decisions/NEW%20ZEALAND%20LOCAL%20AUTHORITY%20PROTECTION%20PROGRAMME%20DISASTER%20FUND%20v%20THE%20NEW%20INDIA%20ASSURANCE%20COMPANY%20LTD%20CIV-2012-404-7453%20\[2013\]%20NZHC%201327%206%20June%202013.PDF](https://www.nzdrcc.co.nz/site/commercialdisputes1/files/Court%20Decisions/NEW%20ZEALAND%20LOCAL%20AUTHORITY%20PROTECTION%20PROGRAMME%20DISASTER%20FUND%20v%20THE%20NEW%20INDIA%20ASSURANCE%20COMPANY%20LTD%20CIV-2012-404-7453%20[2013]%20NZHC%201327%206%20June%202013.PDF).

Annex 5. Case Study: Enforcement of Minimum Standards of Insurance Protection for Transport Infrastructure Managed as PPPs in Colombia

Following the widespread flood damage to uninsured public assets during the 2010–11 La Niña season, the Government of Colombia set out to improve standards of insurance for transport infrastructure managed as Public-Private Partnerships (PPPs).

Low compliance for insurance adoption. In Colombia, each public entity at both the national and subnational levels is responsible for insuring its public assets with its own budgetary resource as mandated by law. Public asset insurance is required by Article 107 of Act 42 of 1993, which makes it compulsory for all entities and individuals managing public assets to purchase insurance policies or special funds. The failure to do so could lead to disciplinary action as stipulated in Article 48 Act 734 of 2002 (Disciplinary Code) (World Bank 2017).⁴¹ Despite this longstanding legal requirement, the severe La Niña season in 2010–11 revealed that public assets—and particularly PPP infrastructure—had not been properly insured. While the total replacement costs for public buildings were estimated at US\$89 billion, only US\$400 million was collected from private insurance policies (World Bank 2013a).⁴² The public transport sector suffered greatly, with damage to primary and secondary roads approximated at US\$1.7 billion (World Bank 2013b).⁴³

Insurance requirements for transport infrastructure PPPs as government priority. The Government of Colombia has been developing and implementing a Disaster Risk Financing and Insurance (DRFI) strategy since 2012. One priority area of the DRFI strategy is to improve insurance protection in concession contracts for transportation infrastructure. The

Ministry of Finance and Public Credit (MHCP) is responsible for reviewing new concession contracts between the National Infrastructure Agency (ANI) and potential concessionaires. The MHCP requested technical assistance from the World Bank in 2012 to introduce targeted, technical guidelines on insurance requirements for PPPs based on international best practice as well as local context. These recommendations have been integrated into the Master Insurance Contract, with which PPPs must comply.

Enhanced minimum standards of insurance arrangements for transport infrastructure under PPPs. The additions to the Master Insurance Contract include:

- Minimum requirements for insurance contract participants such as insurers, reinsurers, local intermediaries, reinsurance brokers, and loss adjustors.
- Minimum requirements for the terms and conditions for certain types of insurance; and
- Minimum information requirements for the risks to be insured, which will also be provided to the reinsurance market. By stipulating a minimum standard for information required for underwriting, the Government of Colombia will ensure broad access to high quality risk carriers.

Subsequently, the first contracts of the fourth generation of concessions under PPPs between ANI and the concessionaires were approved in compliance with the new technical guidelines in July 2013.

⁴¹ World Bank 2017. "Financial Risk Management of Public Assets against Natural Disasters in APEC Economies -World Bank Technical Contribution to the APEC Finance Ministers' Process".

⁴² World Bank 2013a. "Insurance of Public Buildings".

⁴³ World Bank 2013b. "Insurance of Public Infrastructure Under Concessions—Colombia".

Annex 6. Case Study: The UK Department for Education's Risk Protection Arrangement (RPA)

An internal program of the UK Department for Education to self-insure schools, the Risk Protection Arrangement (RPA) was established in 2014 as an optional alternative to commercial insurance and with the aim of reducing insurance costs.

Risk retention versus private sector insurance.

Self-insurance is widely used in the UK, where the substantial fiscal space of the government to meet post-disaster financial needs in the absence of insurance makes the approach viable. The UK RPA was established following an analysis that a self-insurance approach could save the Department for Education about £100 million per year in costs (UK Department of Education 2014).⁴⁴ Self-insurance by pooling risks across schools was a viable option, because the Government was able to assess the liability from the scheme, and found that this could be absorbed by budget capacity. The existence of a strong actuarial function facilitated this—the UK Government Actuary's Department. Since the scheme launch, downwards pressure on commercial pricing for school trusts has been observed, such that insurers are now competing effectively with the self-insurance scheme.

Linking cost of cover to capacity to pay. Many schemes use a risk-based approach to set pricing. The UK RPA is an exception, where schools pay a fixed per-pupil amount that is reviewed annually by the Government Actuary's Department to ensure that the overall income for the scheme is adequate given its contingent liabilities. The riskier schools are therefore having their cover subsidized by those with better claims experience. The advantage of this approach is that it links the cost of cover to the capacity of institutions to pay; schools in the UK are funded (largely) on a per-pupil basis. The disadvantage of this model is that it does not use price to incentivize

risk reduction. This is acknowledged by the RPA management team, who use alternative strategies to promote risk reduction. This includes using the surplus from the scheme to invest in resilience, the application of deductibles so that risk experience is partially shared across the insured and insurer, and the delivery of risk management workshops and risk audits for school trusts.

A voluntary approach to empower asset managers.

The participation rate was about 60 percent of the total academies in the UK in 2018.⁴⁵ The rationale for a voluntary approach was to protect freedom of choice in financial management for managers of public assets—keeping the experience of risk and financial decision-making in the same place.

Managing data gaps in scheme design and pricing.

A comprehensive claims history for participating schools was not available to support scheme design. The RPA team had to collate this data as part of the exercise. Initial pricing was established using survey results from schools on their past damage and claims experiences, alongside the provision of industry benchmarks for claims from similar risks being underwritten elsewhere in the market. The RPA team worked with a broker who provided these industry benchmarks, and also with a claims service provider to understand likely claims patterns. There were challenges with this approach; namely that the quality of information from the surveys varied from school to school, and that the performance of the industry benchmarks in capturing actual claims experiences has not been strong. However, this approach offered a starting point to an entity operating in a data poor environment, and as the scheme develops its own claims experience over the years, this is being blended with the industry benchmarks to improve pricing.

⁴⁴ The Department for Education, Risk Protection Arrangement for Academies, Willis Towers Watson, 2014, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/391343/RPA_actuarial_analysis.pdf.

⁴⁵ Although the scheme has been expanded to cover other types of state-funded school as of 2020

Annex 7. Case Study: UK's Insurance Services II Framework (ISII)

The Insurance Services II Framework (ISII) is a nationwide procurement framework for public sector entities in the United Kingdom (UK). It standardizes and facilitates access to commercial insurance.

Filling a market gap for insurance of small public sector entities. Public assets are generally self-insured in the UK as the government agencies have sufficient fiscal capacity to meet the expenditure requirement arising from contingencies including natural disasters. However, smaller public sector entities, e.g. universities, fire services and certain local authorities, may not have the capacity to self-insure, and cannot access the insurance market on favorable terms due to their small size and lack of bargaining power. Through a collective insurance framework, the ISII is able to create the economies of scale and offer value for these entities.

Partially centralized insurance system with some degree of freedom. The framework includes 12 brokers, and 27 insurers (as of August 2018) which have been pre-qualified for ISII based on a series of criteria including past performance and financial strength. An overarching contract defines the relationship between the authorized brokers and insurers, and the central public sector procurement agency (CCS). Individual insurance contracts are then developed upon request under this umbrella agreement. This overarching agreement connects the market and the framework users (public entities) and provides quality assurance and protection to both sides, creating efficiency in the market which would not have existed otherwise. The system provides a large range of options on insurance cover, allowing some extent of freedom for public sector entities to choose the level of coverage best suited to their needs.

Capacity building for participating entities. The ISII framework facilitates and provides some level of guidance for public sector entities throughout the process of insurance purchase. Framework users also benefit from capacity building and templates on how to engage the market prior to placement; data collection; portfolio presentation; and legal compliance requirements. Brokers in the framework offer a variety of fee-based technical services to clients, which can be purchased if needed.

Strategic risk structuring to increase bidders. The framework splits risk by class of business (type of asset/operation) so that insurers can bid on specific types of public assets rather than an entity's entire asset portfolio. This allows the participation of specialist and smaller insurers, which increases the diversity within the framework and fosters domestic insurance market development.

Limited competition. Although the ISII framework promotes competition between service providers to drive down insurance pricing, it is challenging to create the right amount of competition to appeal to both the supply and demand side. The number of prequalified providers (insurers/brokers) must be somewhat limited to make participation an attractive option to them (otherwise the competition on risk will be too high to warrant the process for participating). On the other hand, the participating providers must also be broad enough to protect diversity of choice for the end users (public sector entities). The bidding process for the ISII framework has two points of competition: 1) at framework establishment to determine the pre-qualified service providers; 2) at the point of access to the framework by public sector agencies looking for cover, where the brokers can compete for specific business. The principal area of price competition is on insurance brokerage services, and not on the price of the risk to be insured.

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