

*Pricing disaster risk:  
Towards risk-informed  
and risk-sensitive public  
and private investments*



***Argument 1: Mispricing of extreme weather risk can lead to investment with significant contingent liability***

**GVAR**

**Global Assessment Report  
on Disaster Risk Reduction**

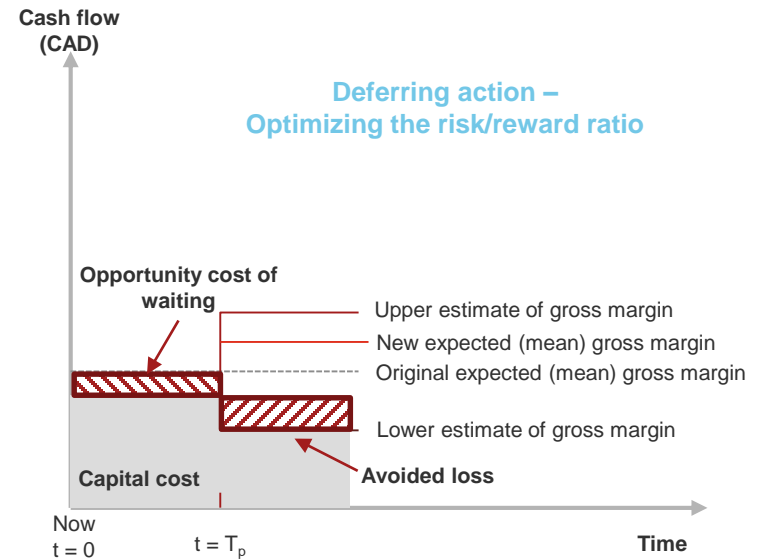
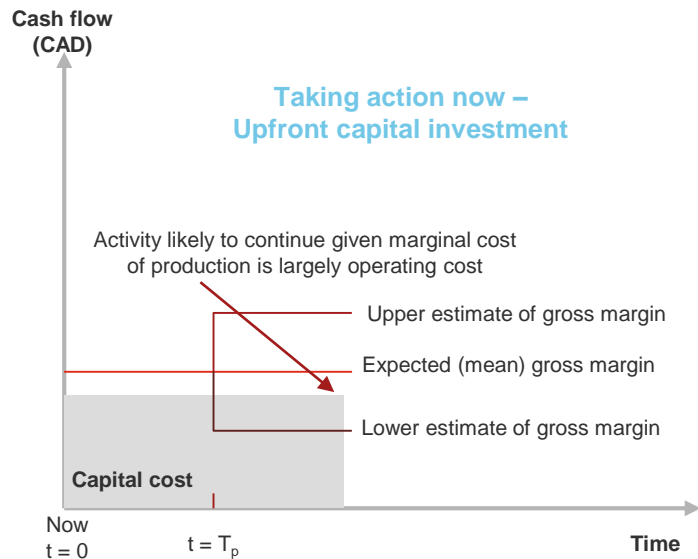
**2015**

*Continuous “mispricing” of risk threatens our future*

“Investment tends to flow to locations with comparative advantages.... investment decisions rarely take into account the level of hazard in those locations.”

Large volumes of capital continue to flow into hazard prone areas...leading to significant increases in the value of exposed economic assets

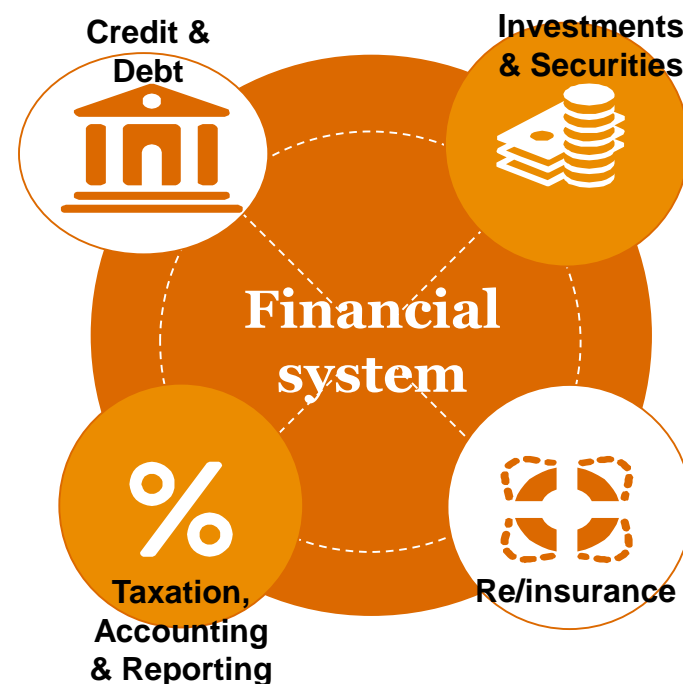
# ***Argument 2: There is an immediate need to adopt flexible, risk-adjusted and resilient investment pathways – in order to avoid climate lock-in***



**Climate 'lock-in': shifting to a new resilient pathway becomes ever more difficult and expensive**

## ***Argument 3: Conditions exist to rationally allocate capital in respect to extreme weather disaster risk***

- Approaches and techniques exist that have been developed over the last 25 years to evaluate and regulate natural disaster risk within re/insurance
- Scientific and analytical techniques and data needed to assess risk have become far more open – we are witnessing a transformation in the awareness and access to the information ecosystem



# *SFDRR – Private sector call for action*



#switch2sendai

Sendai Framework for Disaster Risk Reduction 2015-2030



All financial investment and accounting decisions, public and private, become risk-sensitive

**01**  
Vision



The identification and disclosure of risks carried, and their proactive management becomes standard business practice

**03**  
Vision

- Calls for business and private sector financial institutions – including financial regulators and accounting bodies – to integrate disaster risk management into disaster risk-informed business models, financial and fiscal instruments

# Changing the understanding and availability of climate risk information



## 1-in-100 Initiative

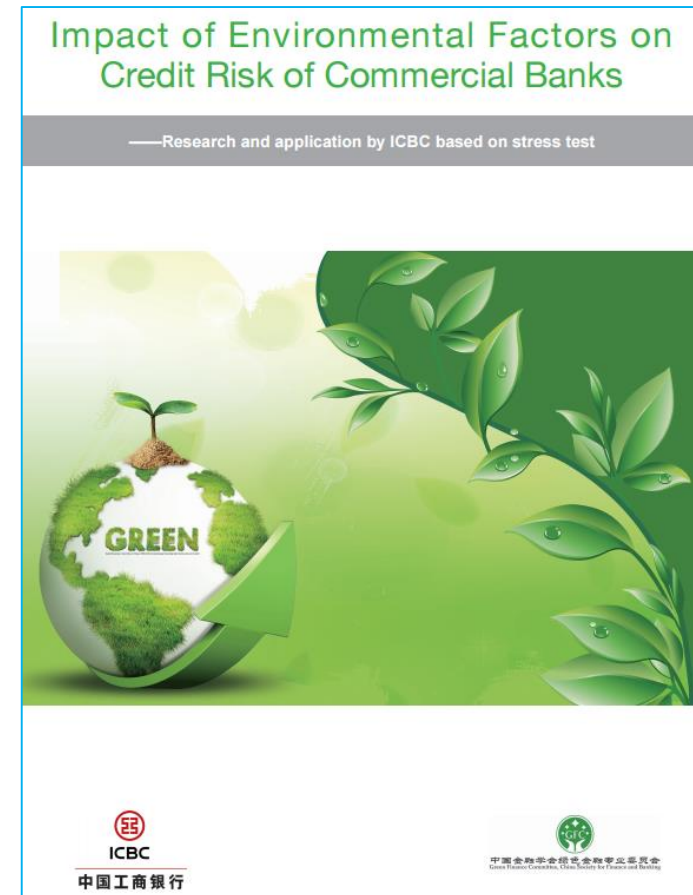


# Changing the understanding and availability of climate risk information



*“Extreme weather events raise costs for insurance companies, reduce investment valuations and lower the value of collateral posted for bank loans”*

The Royal Society 2015



# Valuing and incorporating climate disaster risk and resilience into the financial system – financial metrics are key!

## Standardized Disaster Resilience Stress Tests



*Maximum probable annual losses*



**1-in-100 year  
return period**



**1:20 year  
return period**



**Annual  
average loss**



Average Annual Loss (AAL) by hazard

Hazard	Absolute [Million US\$]	Capital stock [%]	GFCF [%]	Social exp [%]	Total Reserves [%]	Gross Savings [%]
Earthquake	294.11	0.005	0.068	0.067	0.410	0.078
Wind	97.47	0.002	0.022	0.022	0.136	0.026
Tsunami	2.35	0.000	0.001	0.001	0.003	0.001
Flood	2,817.82	0.045	0.650	0.643	3.923	0.748
Multi-Hazard	3,211.75	0.051	0.741	0.733	4.472	0.853

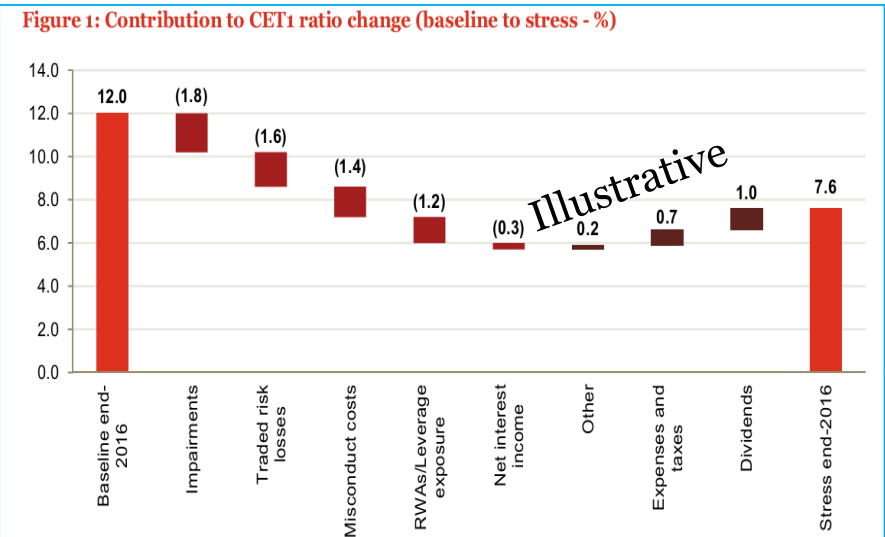
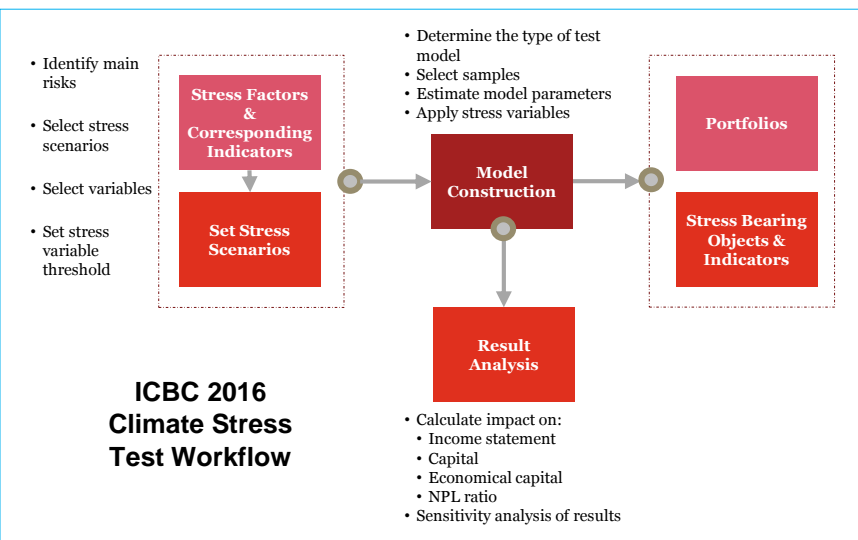
Probable Maximum Loss (PML)

Mean return period in years - Values for hazard are in million US\$

Hazard	20	50	100	250	500	1000	1500
Earthquake	700	1,889	4,125	10,700	19,504	32,093	41,279
Wind	530	1,339	2,168	2,857	3,472	3,791	3,965
Storm Surge	0	0	0	0	0	0	0
Tsunami	0	0	15	90	248	550	767



# Identifying emerging risks and evaluating adequacy of capital levels in the banking system re/ climate induced shocks

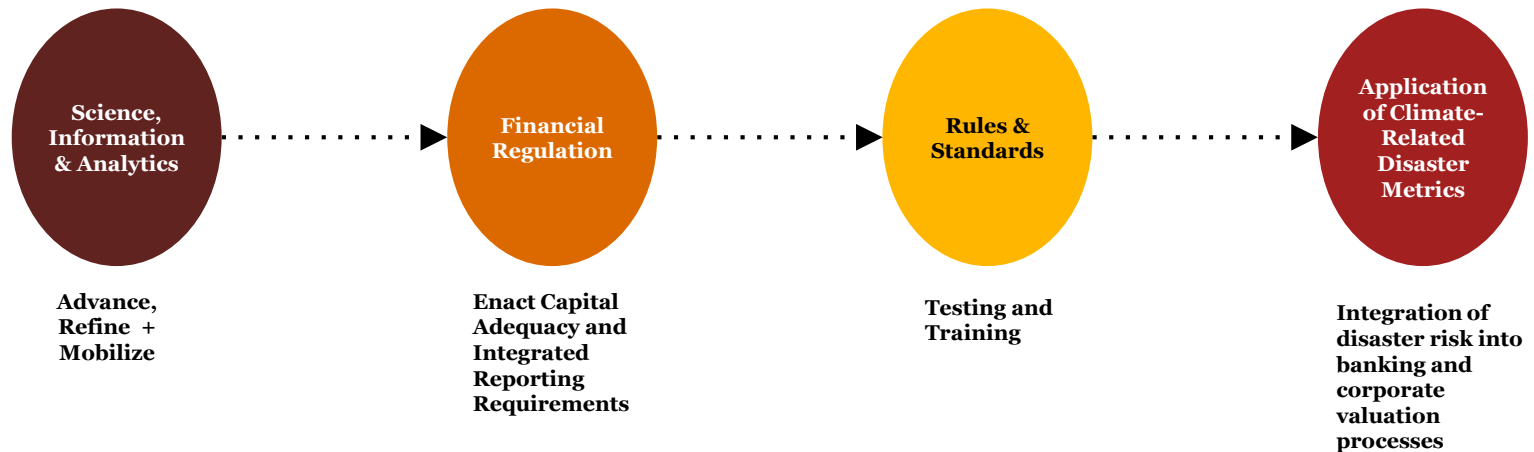


## Climate stress testing requires strong capabilities in:

- Scenario analysis
- Risk and finance data management
- Climate and financial modelling and analytics
- Credit, market and operational risk aggregation and reporting

# Next steps

By 2020? 2030?...



**End game** = alignment of the physical realities of climate and disaster science with price setting mechanism in our economic and financial systems

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