

Financing Resiliency: from Smart Urban Design to Reconstruction

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These Problems Aren't Easy!



What do we need to do to in order to get there?



Private Sector Ways to Finance Resilience

- **Resilience as a Financial Asset** – how to consistently measure & underwrite to discount bonds & insurance
- **Evolving Resilience Measurement Tools** – clinical data science (AI/ML) using satellite imagery, IoT & other data sources
- **New Methods of Connecting Urban Budgets to Resilience**
 - Periodic Table of Quality of Life (QoLs) to see complex interdependencies
 - Sustainable Resiliency® as a supplemental regional credit score
 - Center for Intelligence in Regional Quality of Life Systems (CIRQoLs)





Private Sector Ways to Finance Resilience – Cont.

- **Smart Memory for Smart Cities & Buildings**
- Real Estate Operating System (RE-OS)
- **New Financial Instruments** – FinTech for Resilience
- **New Insurance Policies** – InsureTech for Resilience





Federal Ways to Finance Resilience

- **Recognize Federal Government as “Insurer of Last Resort”**
- **Post 2008 Federal Oversight of Insurance** – Federal Insurance Office (FIO), OMB & chief finance, information, innovation, risk and sustainability officers across the federal enterprise must research and develop cohesive resiliency guidance
- **Evolving Resilience Measurement Tools** – Federal Buildings & federally-funded projects can contribute clinical data science (AI/ML) using satellite imagery, IoT & other data sources





Federal Ways to Finance Resilience

– Cont.

- **Connect Urban Budgets to Resilience** - Periodic Table of Quality of Life as part of how the Treasury monitors state financial health as a function of investments in resilience
- **Smart Memory for Smart Cities & Buildings** - RE-OS or similar interoperable formats for capturing, storing & analyzing federal building exposures to resilience deficits
- **New Financial Instruments** – Federal Innovation Lab to encourage FinTech for Resilience
- **New Insurance Policies** – Federal Innovation Lab to encourage InsureTech for Resilience





Financial Resilience Observations

- Financial market need consistency in how other expert domains describe and measure risk
- Engineers, the cities and real estate investors they serve have less than a 500 batting average in predicting the effects of low frequency high damage events (disasters)
- Similarly, engineers have not defined and quantified the obverse: resiliency in order to know which building or infrastructure element will survive, and which cascades of interdependent systems will survive by minimizing single point of failure risk through redundancy, adaptation and innovation





Financial Resilience Observations – Cont.

- Engineers need to define and quantify Resiliency and its components as financial assets
- Finance is itself engineering, financial engineering
- If finance can engineer Cat Bonds and Credit Default Swaps to protect against downside risks, finance can engineer Resilience Bonds and Derivatives to transfer the benefits of avoiding such risks





Financial Resilience Complexities

- Financial Complexity is literally everywhere
- Everything is connected to everything with regard to money and finance
- Complexity on top of Complexity = vulnerability or opportunity
- Everything that was designed & developed in our physical world was developed by a human at some given point in time with State-of-the-art tech. This can & will change
- Complex, wicked problems + Cascading Failures + Bad Decisions = A REALLY BAD DAY



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Emerging Global Infrastructure Security Issues

- **Unconventional threats**
 - Changing, harder to define - requires flexible capabilities
- **Natural resources**
 - Climate, water, energy, food, and ecological induced social stress
- **Economic resources**
 - Need to transform government funding and spending paradigms
- **Infrastructure capacity and maintenance**
 - Maintain safe, secure, reliable, cost effective services - energy, water, transportation, waste, health, communications
 - Address significant interdependencies at a systems level
- **Information technology mining and cyber security**

Sandia Vision 2050 – Role of the Labs in an Uncertain World

Future Mission Assurance – Will require approaches that are resilient and sustainable from an economic, natural resource, social, infrastructure and technology viewpoint



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Questions?

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