

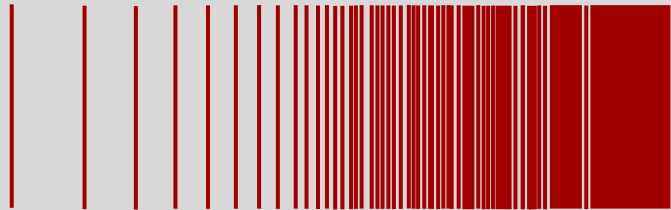


# **Risk Management for Real Assets**



**ALTUM**  
Group  
Advisors

# EXTREME EVENTS ARE THE NEW NORMAL



## Terrorist attack

September 11<sup>th</sup> attacks cause \$55B of direct physical damage and over \$1T of economic loss

2001

## Financial Crisis

The 2008 GFC creates a loss of more than \$2T in global economic value

2005

2008

## Hurricane Katrina

Katrina leads to \$160B of direct economic losses in the private sector only

## Haiti Earthquake

Haiti's January 12<sup>th</sup> earthquake wipes out 90% of its critical infrastructure assets. It destroyed 250,000 residences and 30,000 commercial buildings. The death toll reached 230,000, the 5<sup>th</sup> largest casualty count of any earthquake in history.

2010

## Tōhoku Earthquake and Tsunami

The Tōhoku Earthquake, followed by a strong tsunami, was the 4<sup>th</sup> most powerful in history. The World Bank pegged its economic cost at \$235B with insured losses at \$34B.

2011

## Hurricane Sandy

Sandy interrupted 309 (out of 414) U.S. direct economic sectors and caused over \$115B in economic losses. Critical infrastructure in 11 states experienced inoperability rates of over 70%. That figure reached 92% in New York City.

2012

## Hurricanes Harvey, Irma, and Maria

Those hurricanes caused \$190B in economic losses while forcing major changes in the energy sector's structure. That was true not only in the U.S. South but also globally.

2017

## COVID-19 Pandemic

The pandemic created massive supply disruptions, which led to the fastest U.S. stock market plunge in history. It also resulted in record-high unemployment rates, triggering comparisons with 1929. The death toll reached 200,000 in United States alone and over a million globally. The estimated global economic impact stands at \$82T.

2020



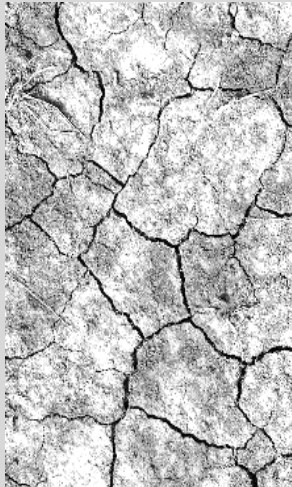
FACTORING



the IMPACT of  
EXTREME EVENTS



Real Asset  
Investment  
Portfolios



## OUR COMPARATIVE ADVANTAGE

Detailed risk analysis of infrastructure investments is critical due to the large and idiosyncratic nature of infrastructure assets.

Altum Group Advisors brings specialized knowledge to infrastructure investment decisions through **unique expertise** at the **intersection of infrastructure and risk analysis**.

At Altum, we provide **CUSTOMIZED SOLUTIONS** for those potential infrastructure investors wishing to take their risk assessments to the highest level of precision. Despite their underlying rigor, Altum makes those findings applicable and accessible.





# Our Risk Focus

Substantial risk is inherent in infrastructure investment. Its sources are both endogenous and exogenous. Altum Group Advisors focuses only on infrastructure risks associated with Extreme Events.

**EXTREME EVENT** risks are acute threats to infrastructure systems created by:

1. Sudden extreme events such as floods, hurricanes, and pandemics, as well as man-made hazards such as terrorist attacks
2. Chronic threats from long-term, gradual changes in natural cycles such as sea-level-rise, weather patterns, and heat waves



# OUR SERVICES

## Risk Analysis

1. We investigate the unique type, intensity, and frequency of hazards facing a key infrastructure asset
2. We conduct a vulnerability assessment, which includes modeling the particular infrastructure asset's direct and indirect physical vulnerability to hazards
3. We translate the asset's physical vulnerability into financial risk
4. We equate the asset's risk and returns, allowing the investor to obtain the right match between (i) resilience-enhancing costs and the dollar value of resilience driven by risk-averse decisions; and (ii) non resilience-enhancing costs and dollar value of potential regrets

## Risk Mitigation

1. We develop a series of resilience-enhancing strategies across a real asset's lifecycle
2. Our strategies maximize resilience through a combination of due diligence, forward-looking design, and proactive disaster-disruption management



## Risk Monitoring

After an infrastructure investment is made, we help investors address asset-level vulnerabilities by periodically monitoring its wellbeing, as well as potential threats from exogenous hazards.



## What We Deliver

# SOLVING THE PUZZLE OF INFRASTRUCTURE RESILIENCE

### 1. PRE-INVESTMENT DUE DILIGENCE

We help establish a baseline set of resilience standards prior to making an infrastructure investment.

### 2. POST-INVESTMENT RESILIENCE EXCELLENCE

We create systems and processes that ensure resourcefulness and rapidity as part of business continuity planning.

### 3. DIVESTMENT

After balancing resilience concerns, market attractiveness and cost/benefit analysis, investors may conclude that a potential or current asset does not meet the necessary thresholds or criteria to justify an investment. Where returns no longer balance with risks, investors or fund managers may opt to divest.





**Arash  
Beheshtian,  
Ph.D.**

Arash Beheshtian has an undergraduate degree in Civil Eng. and master's degrees in Planning, Transportation Eng., and Systems Eng. He earned his doctoral degree in Planning from Cornell University. He has been a post-doctoral fellow at Cornell University and a research fellow at Massachusetts Institute of Technology.

Arash is an adjunct Professor at Columbia University in the City of New York. He has also taught courses in Risk Analysis, Planning Methods, and Mathematics at Cornell University.

Arash is a Fellow at Physical Security Committee of Critical Transportation Infrastructure Protection, The National Academies of Sciences, Engineering, and Medicine.



**Rick  
Geddes,  
Ph.D.**

Rick Geddes has an undergraduate degree in Economics and Finance. He holds both masters and doctoral degrees in Economics from the University of Chicago. He is a Professor in the Department of Policy Analysis & Management and in the Department of Economics at Cornell University. Rick is also Founding Director of the Cornell Program in Infrastructure Policy (CPIP).

Rick has taught classes in Economics and Infrastructure at the University of Chicago, Cornell University, and Yale.

### Trusted by



**GFDRR**  
Global Facility for Disaster Reduction and Recovery



**NYC** Mayor's Office of  
Resiliency

