



FUNDING RESILIENCY

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2014 *Idaho Law Review* Symposium: Resilient Cities:
Environment | Economy | Equity

Funding Resiliency Roadmap

1. Cities & the Cost of Enhancing Resiliency



2. Challenges Facing Municipal Bonding in Building Resilience

- A. High Cost / Difficult Economic Status
- B. Incompatible Goals



3. Alternative Mechanisms

- A. Increasing Capital through Collaboration
- B. Capture Risk Aversion Value



Part I

1. Cities & the Cost of Enhancing Resiliency



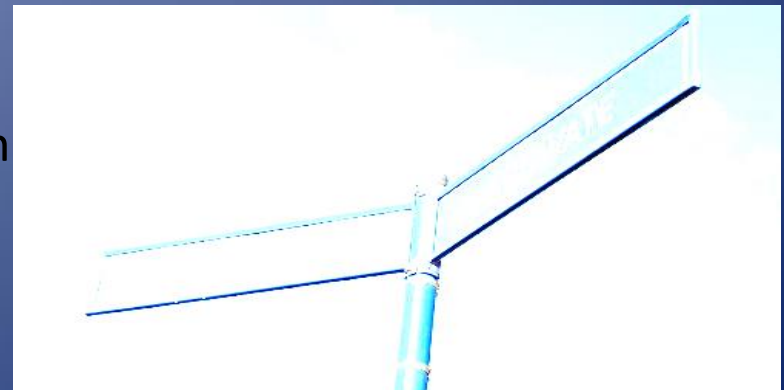
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At-Risk Local Government Services

Column 1

Column 2

Column 3

Potable water*
Provision & distribution of energy
Fire fighting
Transportation
Waste removal
Emergency medical
Airports
Policing
Stormwater management
Housing
Parks
Libraries
Prisons & jails

- Flood
- Drought
- Hurricane
- Heat wave
- Snow storm
- Tornado
- Wild fires

Systemic and
Catastrophic
Risk of
Damage to
Local
Infrastructure

Colorado Flood 2013



DSM Water Works 1993 Flood



DSM Water Works 2008 Flood



Water and Droughts / Fires



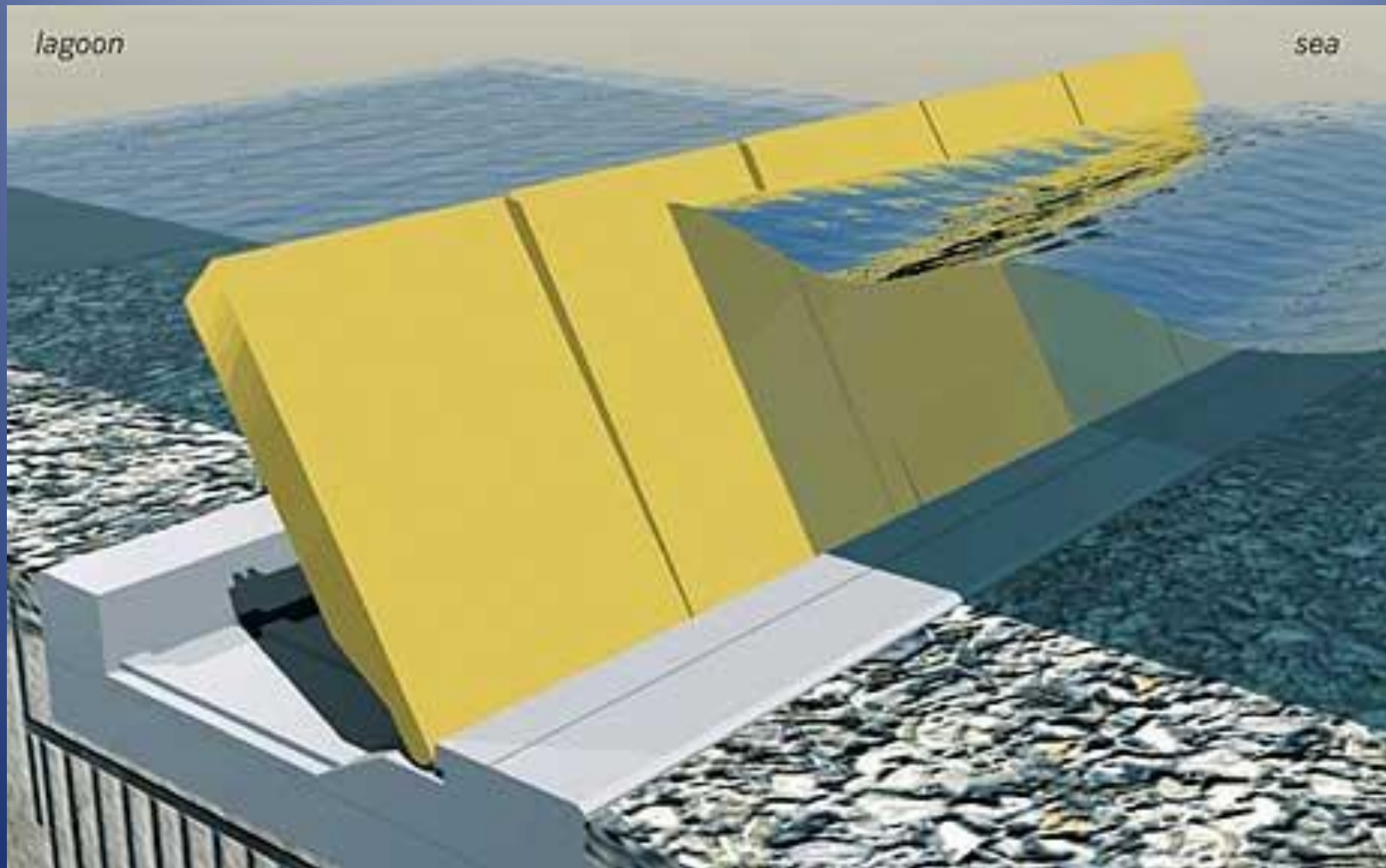
Arizona (2013)

California (2014)

Venice 2012



Venice 20__ : The “Moses Project”



Local Infrastructure Resiliency Costs

- **Projected**

- Venice, Gate Project: \$8 billion
- UN 2009 Report: \$50-170 billion / yr
- World Bank 2010 Report: \$140-175 billion / yr
- N.O., Inner Harbor Navigation Canal: \$14 billion
- N.O., Stormwater: \$6.2 billion
- London, Thames River: \$2.3 billion
- Red River of the North in ND & MN: \$1.8 billion
- Massachusetts, Seawalls (2006): \$1 billion
- NYC, Storm Surges: \$20 billion

- **Actual**

- Quito, Ecuador: \$350 million, to date
- St. Petersburg, Russia, Neva Bay: \$6.4 billion
- Grand Forks, ND: \$171 million

2009 Estimate of Water Utilities (based on IPCC 2007 Report)

SUMMARY

Drinking Water = \$325 - \$692 billion

Wastewater = \$123 - \$252 billion

GRAND TOTAL

Drinking Water

and Wastewater = \$448 - \$944 billion



Part II

1. Cities & the Cost of Enhancing Resiliency



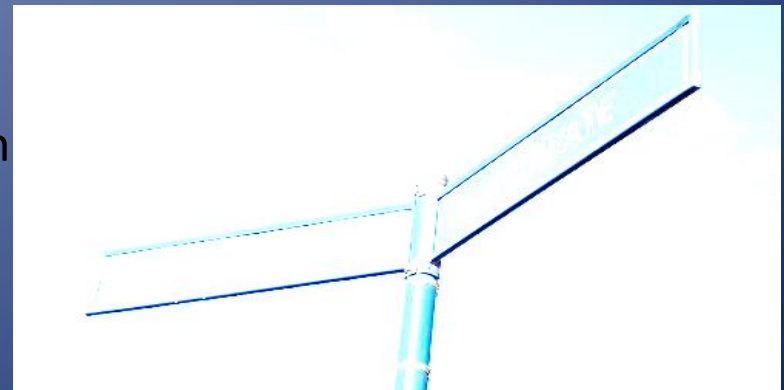
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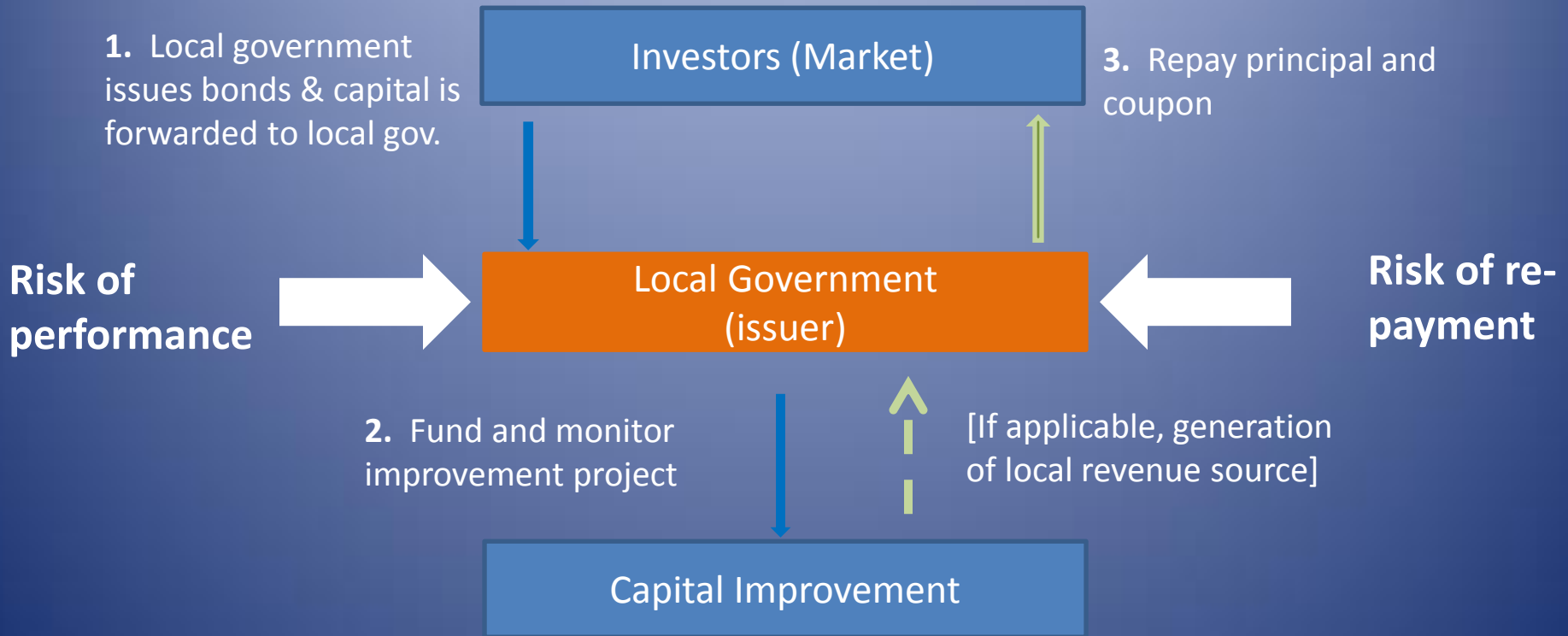


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Traditional Bonding



Part II

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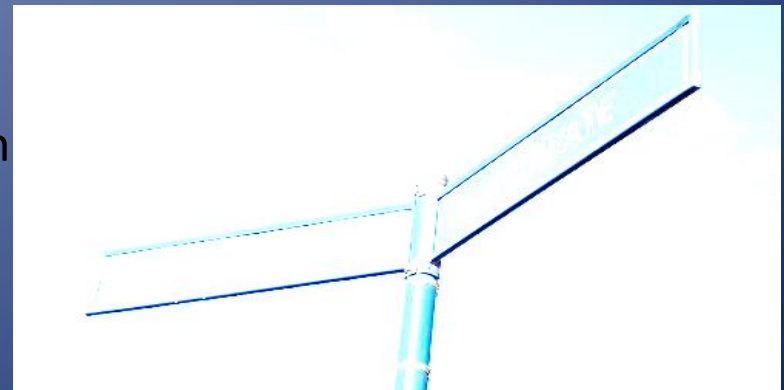
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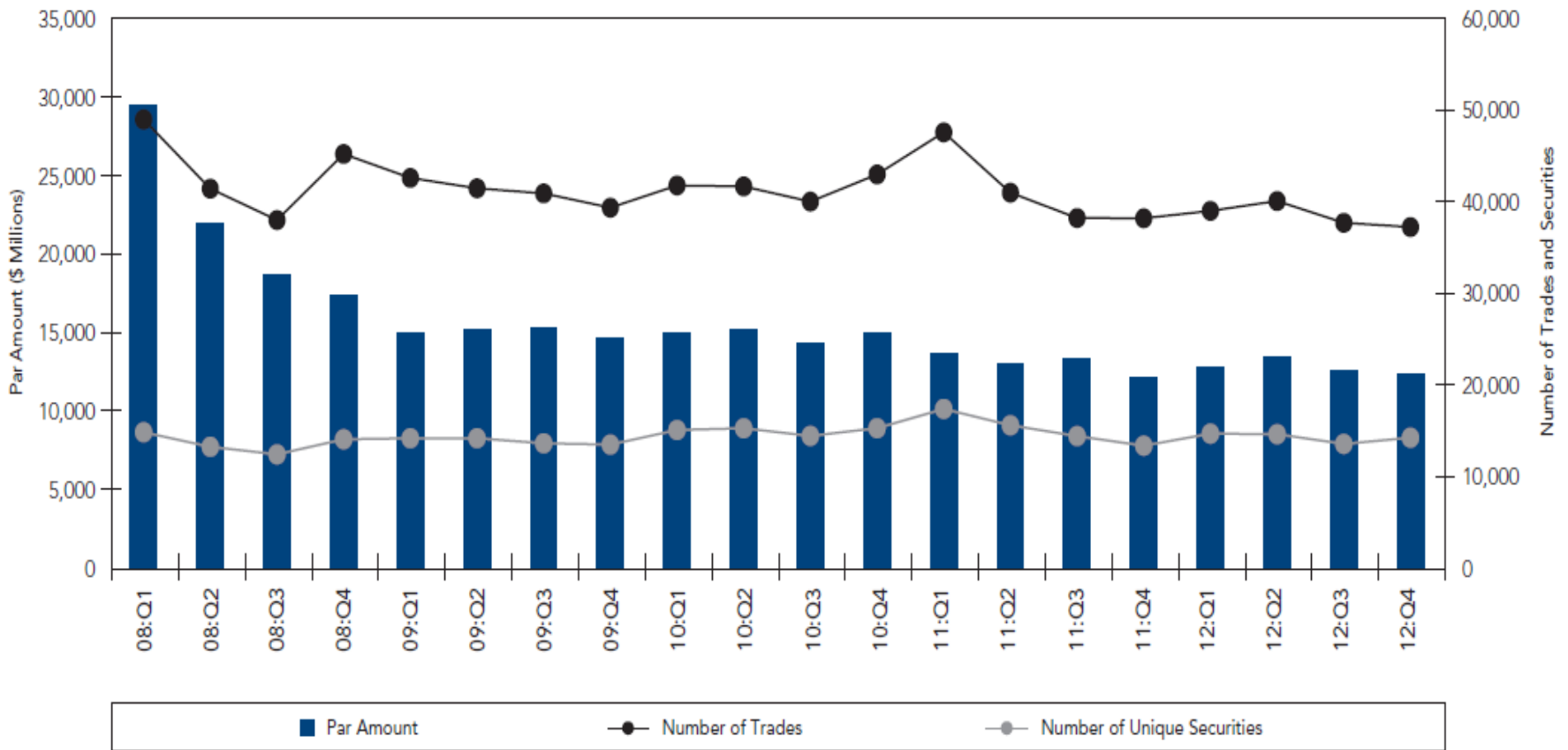
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Slowing of Bond Market

Average Daily Trading Volume, 2008–2012

By par amount, number of trades and number of unique securities



Local Government Bankruptcies

Cities, towns and counties

Stockton, Calif.

Status: Filed for bankruptcy
Date: 6/28/2012
Debt or deficit amount: \$26 million

Detroit, Mich.

Status: Filed for bankruptcy
Date: 7/18/2013
Debt or deficit amount: Estimated \$18.5 billion in long-term debt

Central Falls, R.I.

Status: Filed for bankruptcy
Date: 8/1/2011
Debt or deficit amount: \$21 million of outstanding debt, plus unfunded pension liabilities

Boise County, Idaho

Status: Bankruptcy filing rejected
Date: 9/8/2011
Debt or Deficit Amount: \$5.4 million

Vallejo, Calif.

Status: Filed for bankruptcy
Date: 7/3/2012
Debt or deficit amount: \$43 million

San Bernardino, Calif.

Status: Filed for bankruptcy
Date: 8/1/2012
Debt or deficit amount: \$46 million

Jefferson County, Ala.

Status: Filed for bankruptcy
Date: 11/9/2011
Debt or deficit amount: More than \$4 billion

Harrisburg, Pa.

Status: Bankruptcy filing rejected, defaulted on payments
Date: 3/10/2012
Debt or deficit amount: More than \$300 million

Source: www.governing.com, Reuters

Incompatible Goals: Equity in Resiliency

- “ensure[s] that the benefits of promoting resilience and reducing vulnerability are distributed fairly.”
 - J.B. Ruhl & James Salzman, *Climate Change Meets the Law of the Horse*, 62 DUKE L.J. 975, 1020 (2013)

Incompatible Goals: Adaptation in Resiliency

Municipal Bonding:

Project → *Growth* → *Projected Local Revenues*

Adaptation Funding:

Project → *Risk Reduction* → *Value in Risk Aversion*

Part III

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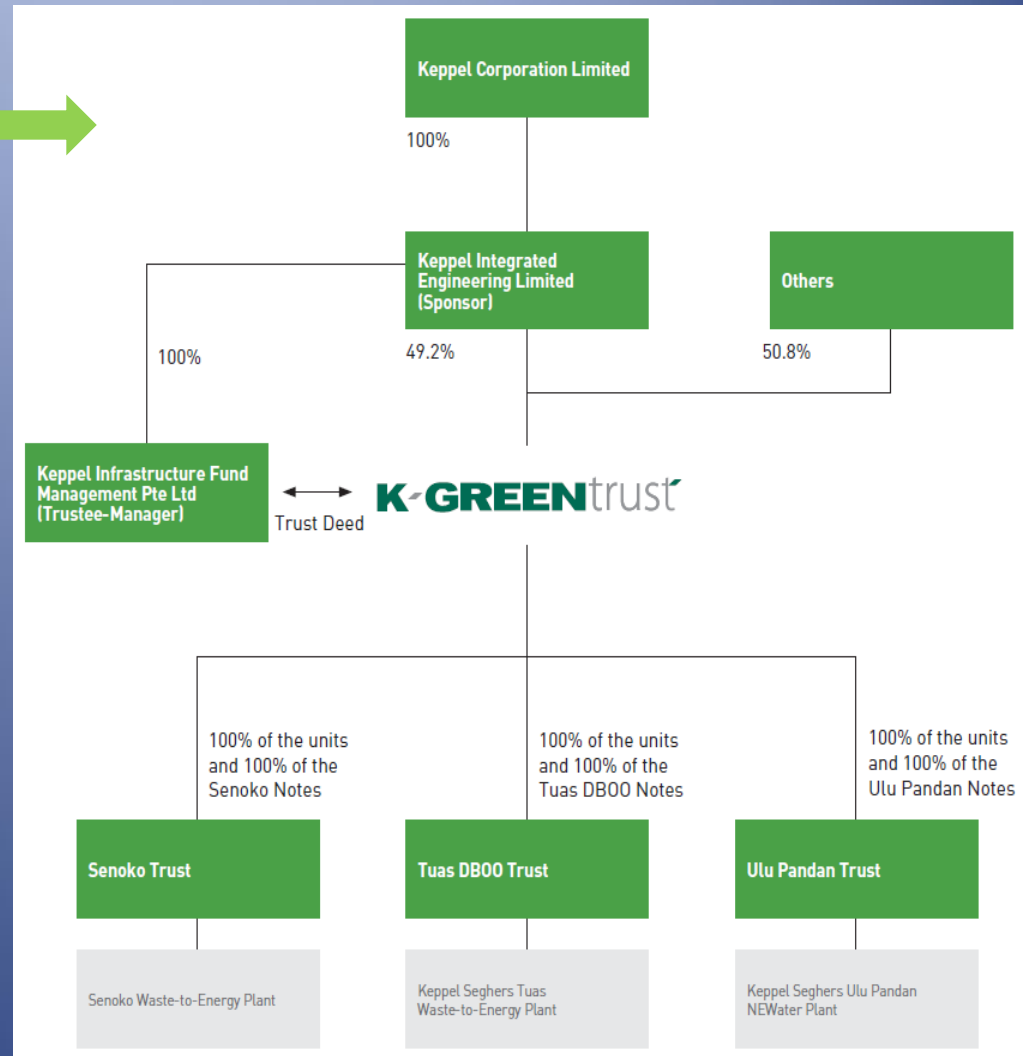
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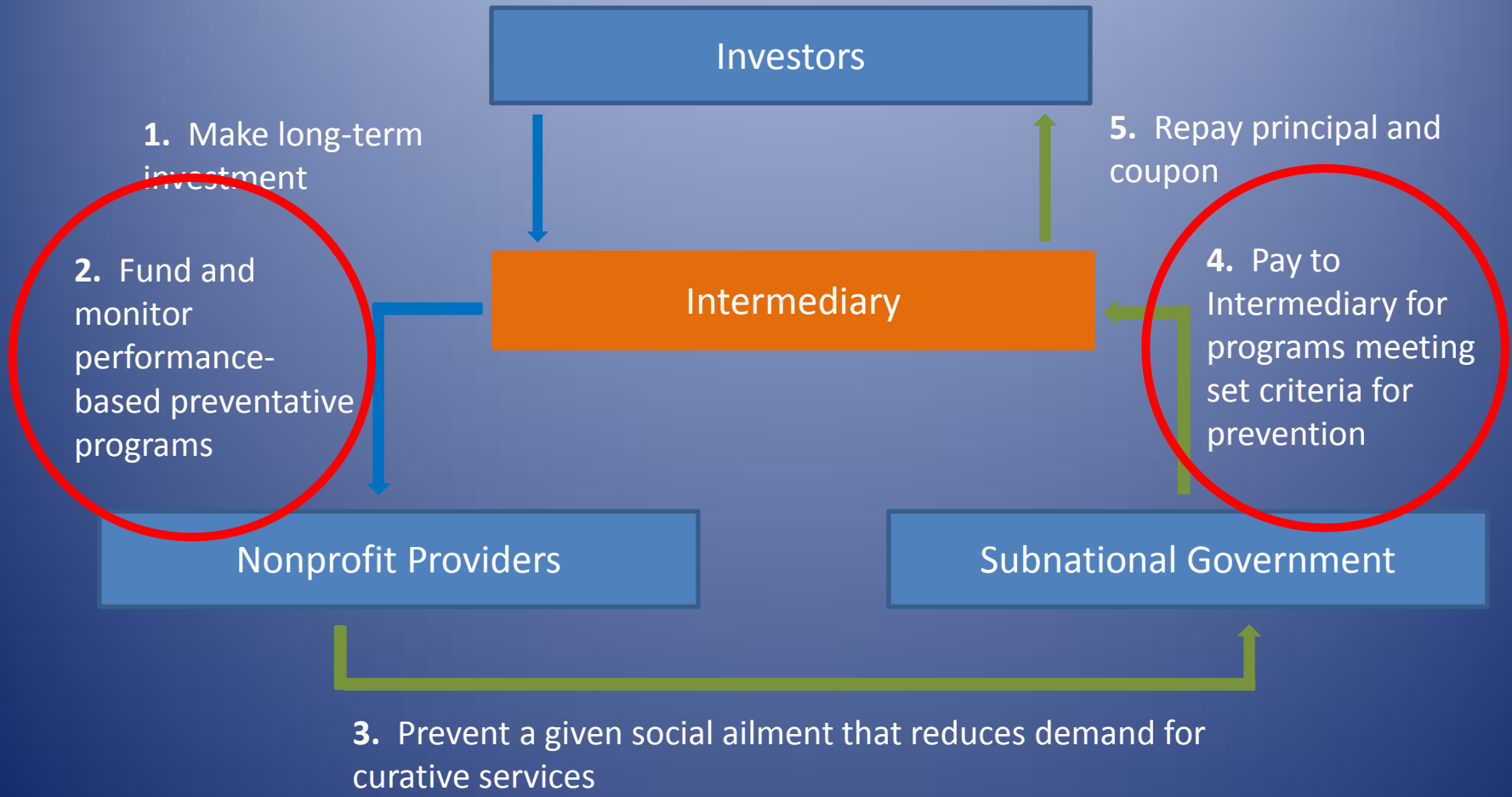


Public / Private Alternatives

- Infrastructure Trusts →
- Property Assessed Clean Energy (PACE)
- Kyoto Protocol's Clean Development Mechanism
- Green Banks
- Morris [County, New Jersey] Model



Performance-Based or Social Bonds

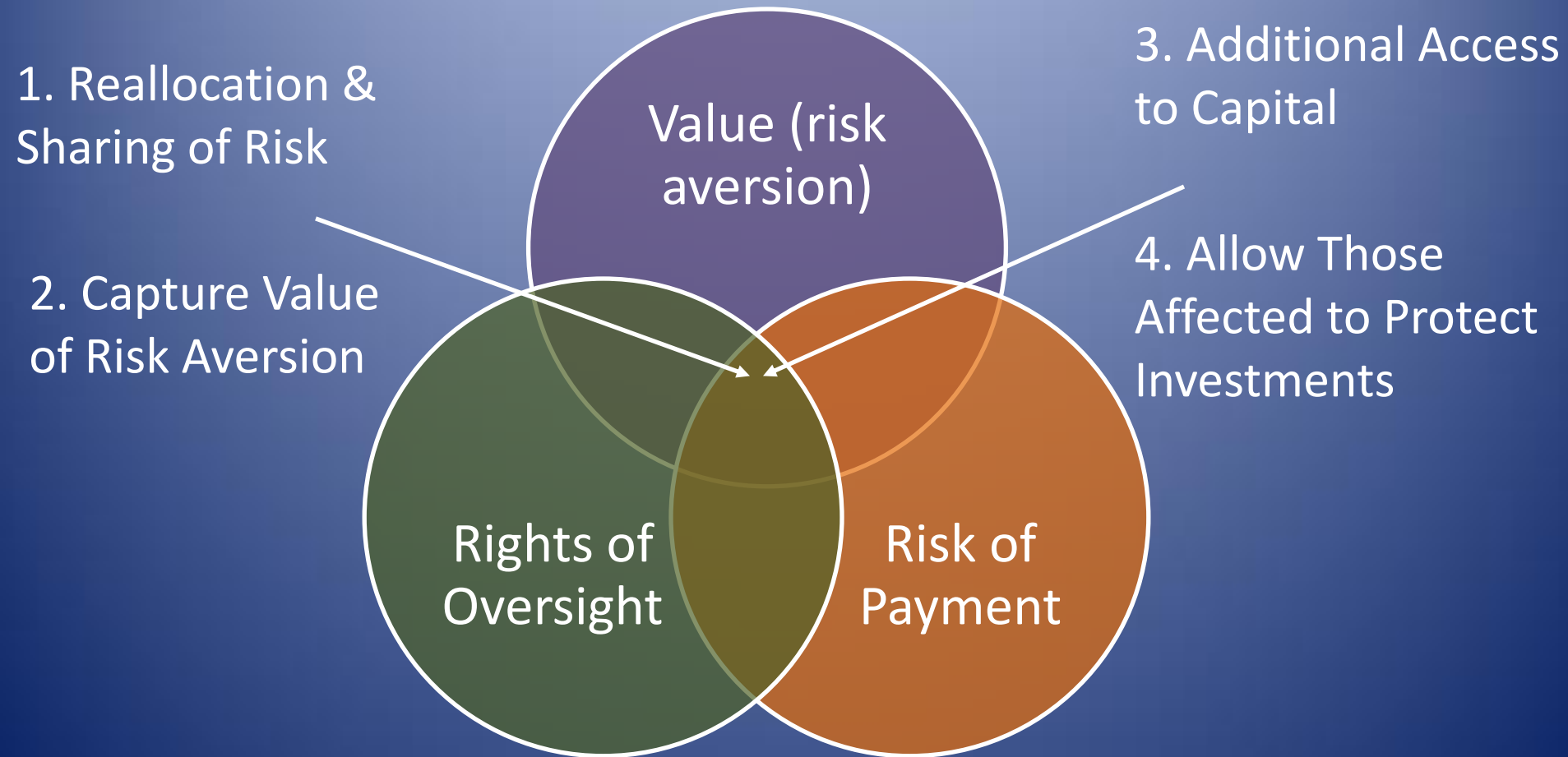


NYC's Social Impact Bond: Sliding Scale

Reduction in Re-Admission Rate	Projected Long Term City Net Savings	City Payments to Investors	Investor Return
≥ 20.0%	\$20,500,000	\$11,712,000	22.0%
≥ 16.0%	\$11,700,000	\$10,944,000	14.0%
≥ 13.0%	\$7,200,000	\$10,368,000	8.0%
≥ 12.5%	\$6,400,000	\$10,272,000	7.0%
≥ 12.0%	\$5,600,000	\$10,176,000	6.0%
≥ 11.0%	\$1,700,000	\$10,080,000	5.0%
≥ 10.0%	≥ \$1,000,000	\$9,600,000	0.0%
≥ 8.5%	≥ \$1,000,000	\$4,800,000	-50.0%

An ounce of prevention is worth a pound of cure.

-B. Franklin



Questions & Comments?

