The Evolution of the Issuance of Green Bonds by U.S. State and Local Governments

Sino-US Scholar Dialogue Series on Public Administration

Environmental Governance in the Context of Climate Change

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Outline

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1.1 Green Bonds

- **<u>Bond</u>**: a government or company borrows funds and repays principal over time with interest

- **<u>Green Bonds</u>**: bonds that are issued to finance projects that have positive environmental effects and are labelled as **"green bonds"**

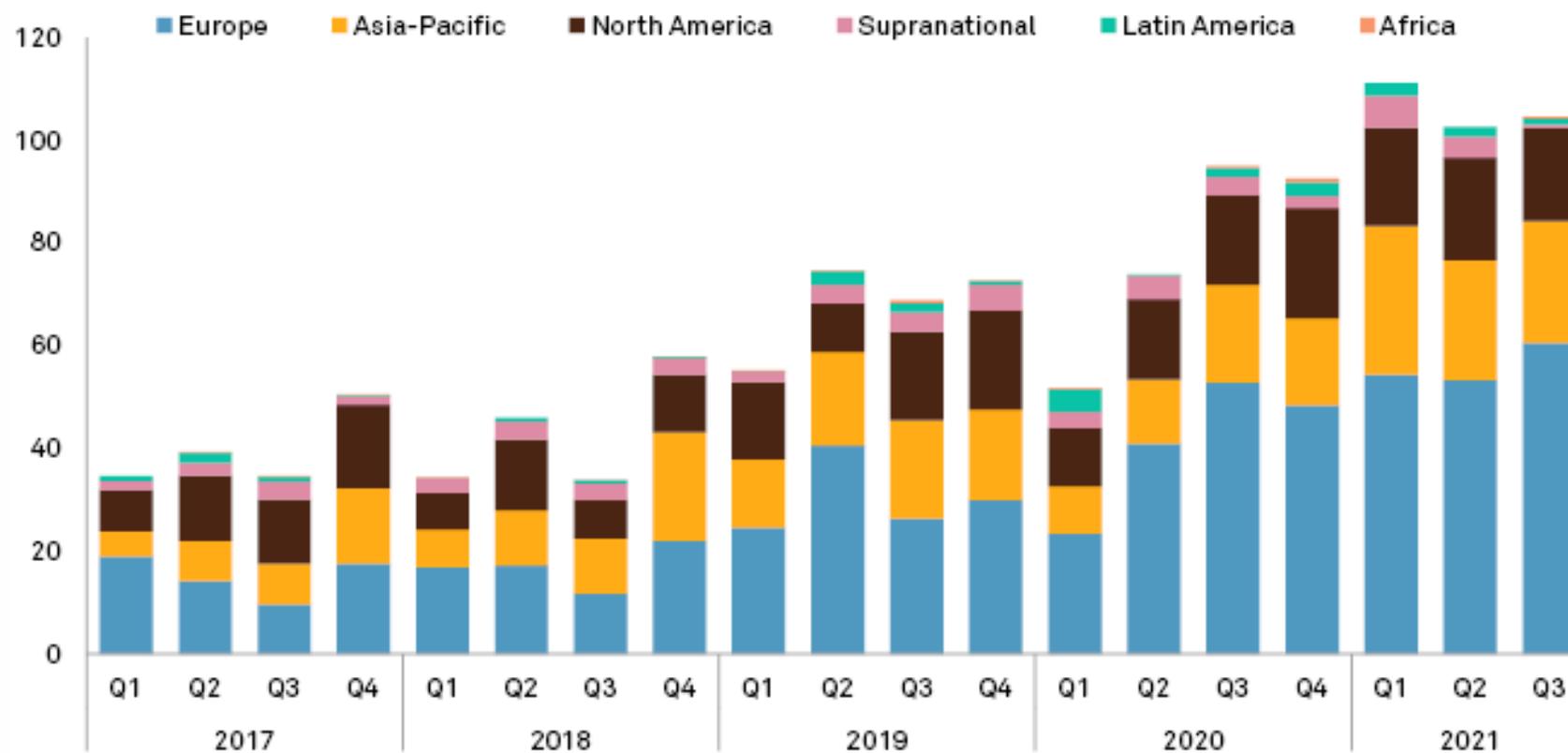# Green Bond Market Worldwide

▶ Cumulative $1.1 trillion end of 2020

  ▶ 1,400 issuers

  ▶ 71 countries

▶ 2020 issuance

  ▶ $290 billion (Jones, 2021)

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Europe, Asia-Pacific and North America are the Largest Green Bonds Issuers

Regional breakdown of green bond issuance
By volume of issuance ($B)

Legend: Europe · Asia-Pacific · North America · Supranational · Latin America · Africa

Source: S&P Global, 2021.

Types of Projects

▶ Renewable energy

▶ Energy efficiency

▶ Green buildings

▶ Clean transportation

▶ Pollution prevention and control

▶ Sustainable water and wastewater management

▶ Climate change adaptation

▶ Environmentally friendlier products

▶ Sustainable land use

▶ Terrestrial and aquatic biodiversity conservation

Source: International Capital Market Association (ICMA), 2018.

1.2 US Governments by Type

- 1 **National Government**:
  - Definition: the federal government or US government)
  - Powers: to tax, to spend, to issue federal bonds;
  - Conflict with Sovereign States: if federal laws conflict with state laws, federal trumps.
  - 3 Co-Equal Branches: Executive, Congress (House & Senate), Judicial
 - Role of US Supreme Court: independent national court ultimately decides conflicts

- **50 state governments**:
  - Powers: each co-equal, each with separate state constitution, to spend, to tax
  - Decision Processes: 3 Co-Equal Branches, executive, state legislatures, state courts;
  - Debt: state govt and instrumentalities can issue debt. May have debt limits.

1.2 US Governments by Type (continued)

- **89,000 Local Governments**: Organized as Creatures of Each State Govt

- **Geography:**

  - Each state divided into counties with power to tax, to spend, and issue debt;

  - state constitutions/laws limit local debt

  - Municipalities and townships are separate from counties, and can cross county boundaries with power to tax and issue debt

  - K-12 education provided either through politically independent districts, or districts which are part of municipal govt; power to tax and issue debt;

- **Special districts/public authorities:**

  - Established under state law; can issue debt but typically do NOT have taxing powers; financing through use charges

- **Federal government receipts were 64 percent of the $5.4T of total receipts in 2017;**

- **State and local receipts (excluding intergovernmental transfers) were 21 percent and 15 percent, respectively.**

Significant Decrease in # of Local Governments
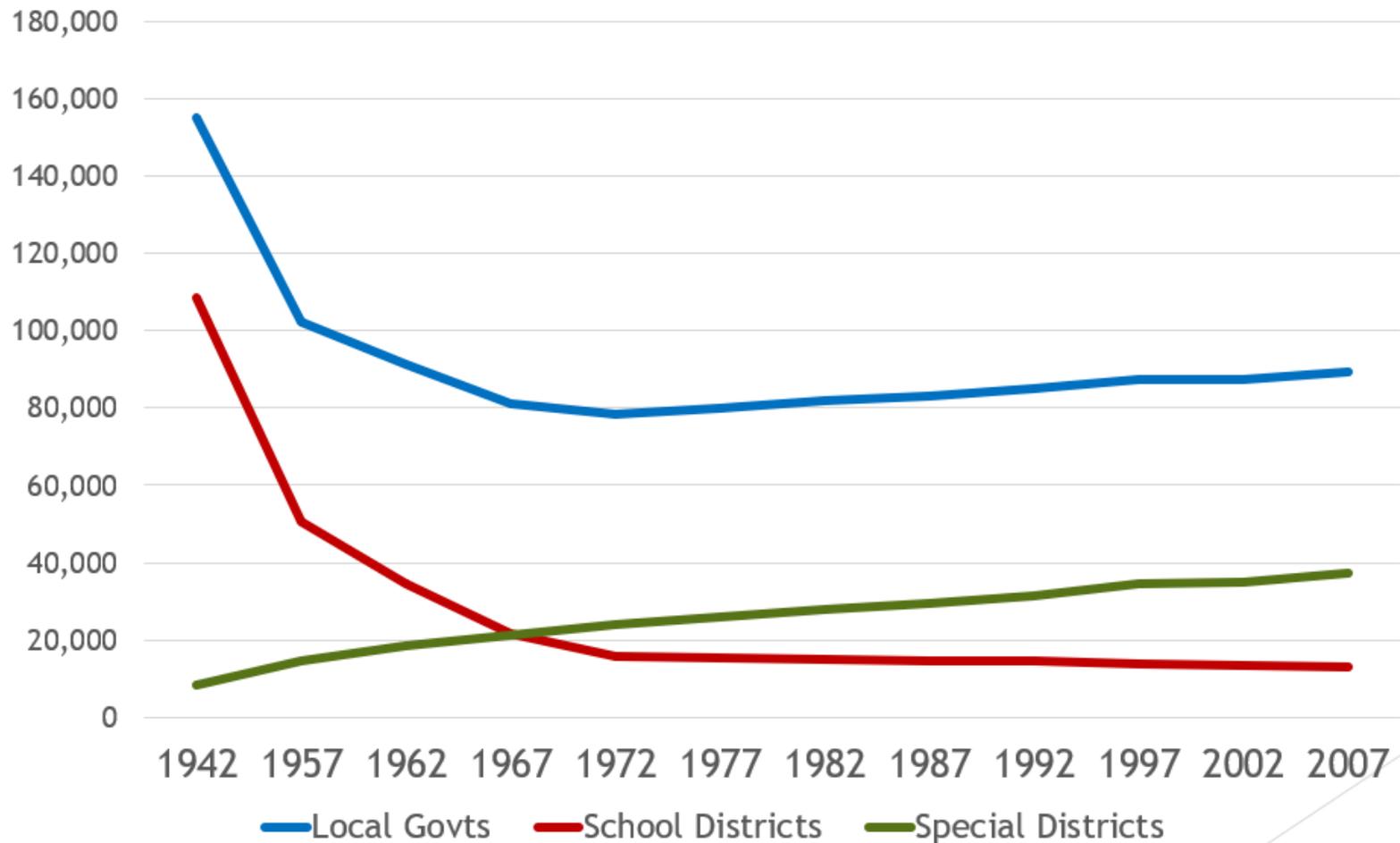
Source: U.S. Census Bureau (2011).

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1.3 State and Local Government Debt in US

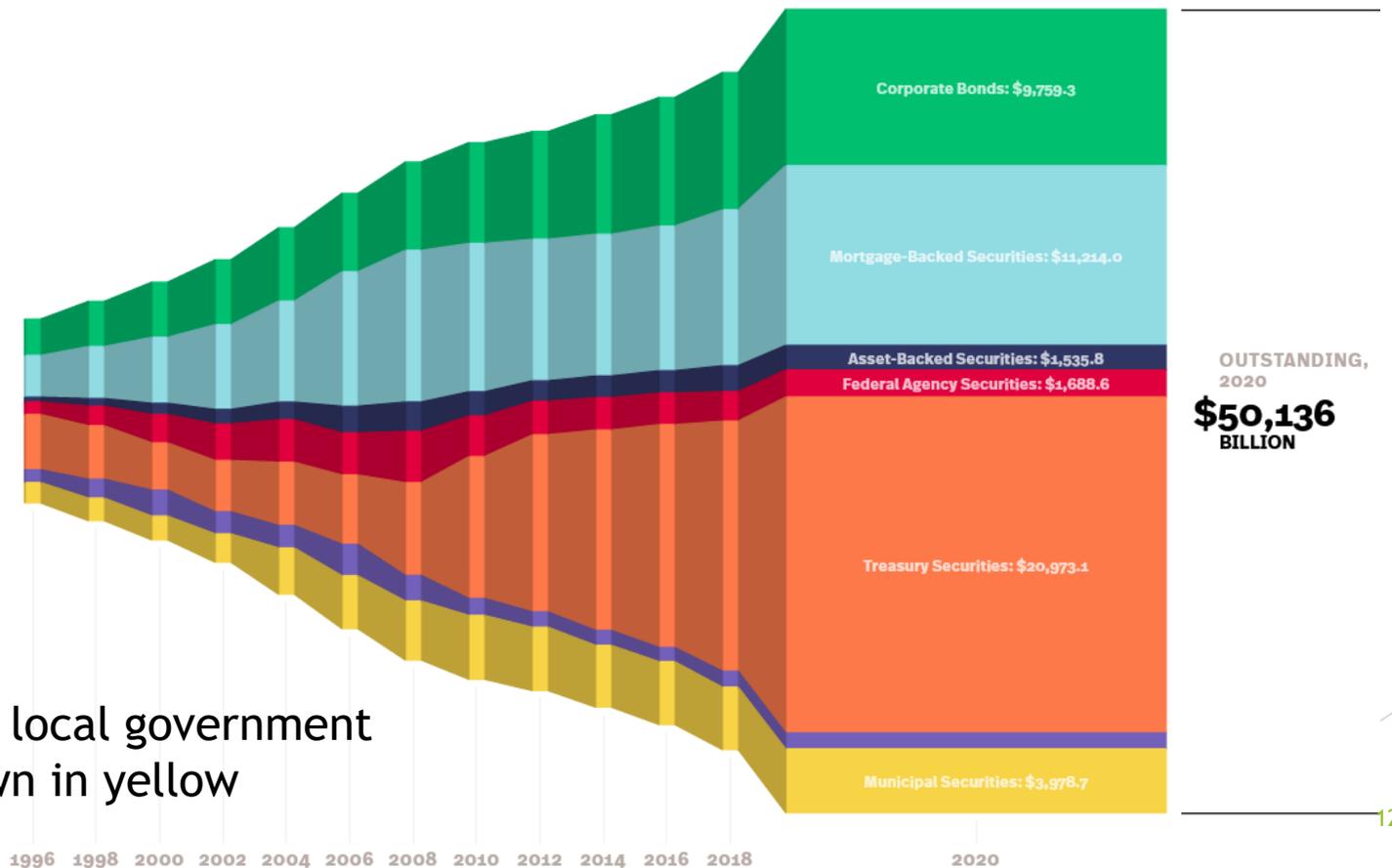## Early Origins: Paying Off War Debts

- As British Colonies
  - King imposed taxes on colonies to help support British war debts

- Revolutionary War 1776-1783
  - 13 Colonies fought for freedom from Britain
  - 13 Colonies incurred debt to support war effort

- 1787 United States Constitution
  - created a national government and co-equal state governments, federal system of govt.

- Funding Act of 1790
  - National Government assumed the states' debts that were related to the Revolutionary War

- State debt defaults (1840s, 1890s, and 1930s)
  - No assistance from the national government

State and Local Government Bonds are Tax-Exempt

- ▶ National government does not impose the national income tax on the interest investors receive on state and local government bonds issued for public purposes

- ▶ Helps lower the costs of borrowing for state and local governments
  - ▶ But state and local government debt is less attractive to international investors due to lower interest rates

2020 total US debt outstanding was $50.1 trillion State/Local was $3.9 trillion (~7.8%)

Corporate Bonds: $9,759.3

Mortgage-Backed Securities: $11,214.0

Asset-Backed Securities: $1,535.8

Federal Agency Securities: $1,688.6

OUTSTANDING, 2020

$50,136 BILLION

Treasury Securities: $20,973.1

Municipal Securities: $3,978.7

1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018   2020

State and local government debt shown in yellow

The Federal Government's and State and Local Governments' Spending on Transportation and Water Infrastructure, by Type of Infrastructure, 2017
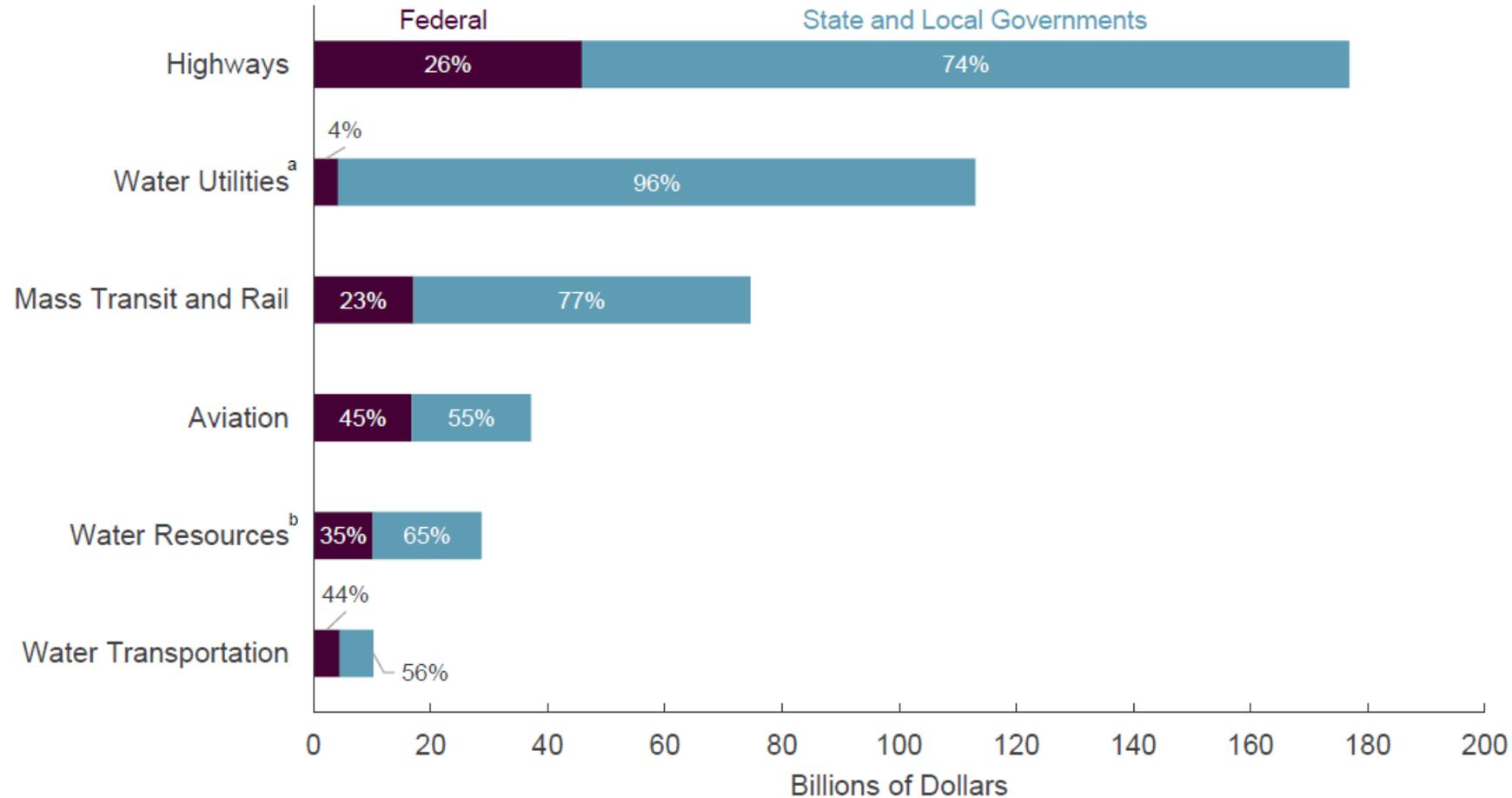
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2.1 Research Questions

1. Which state and local governments in the United States are issuing green bonds?

2. Why are those governments issuing green bonds?

3. How are the governments determining which projects are green?

4. What is the impact of issuing green bonds?

2.2 Research Approach

- Data
  - Climate Bonds Initiative
  - Mergents Municipal Bond Data

- Review of the scholarly literature

- Review of documents
  - government documents
  - websites
  - news stories

- Interviews
  - State and local government officials
  - Most conducted in 2016 (a few in 2021)

28 INTERVIEWS CONDUCTED

6 State Governments

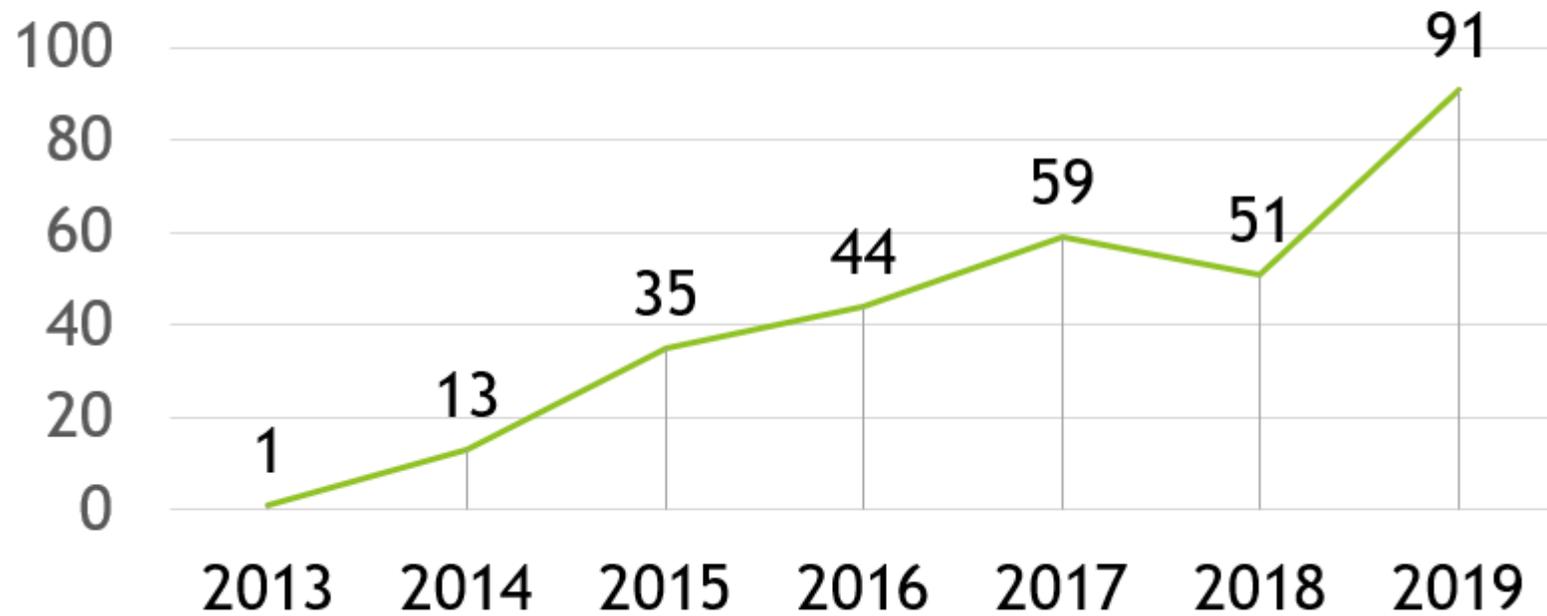8 Local Governments

3 Universities

1 School District

9 Special Districts

   - 2 Mass Transit Districts

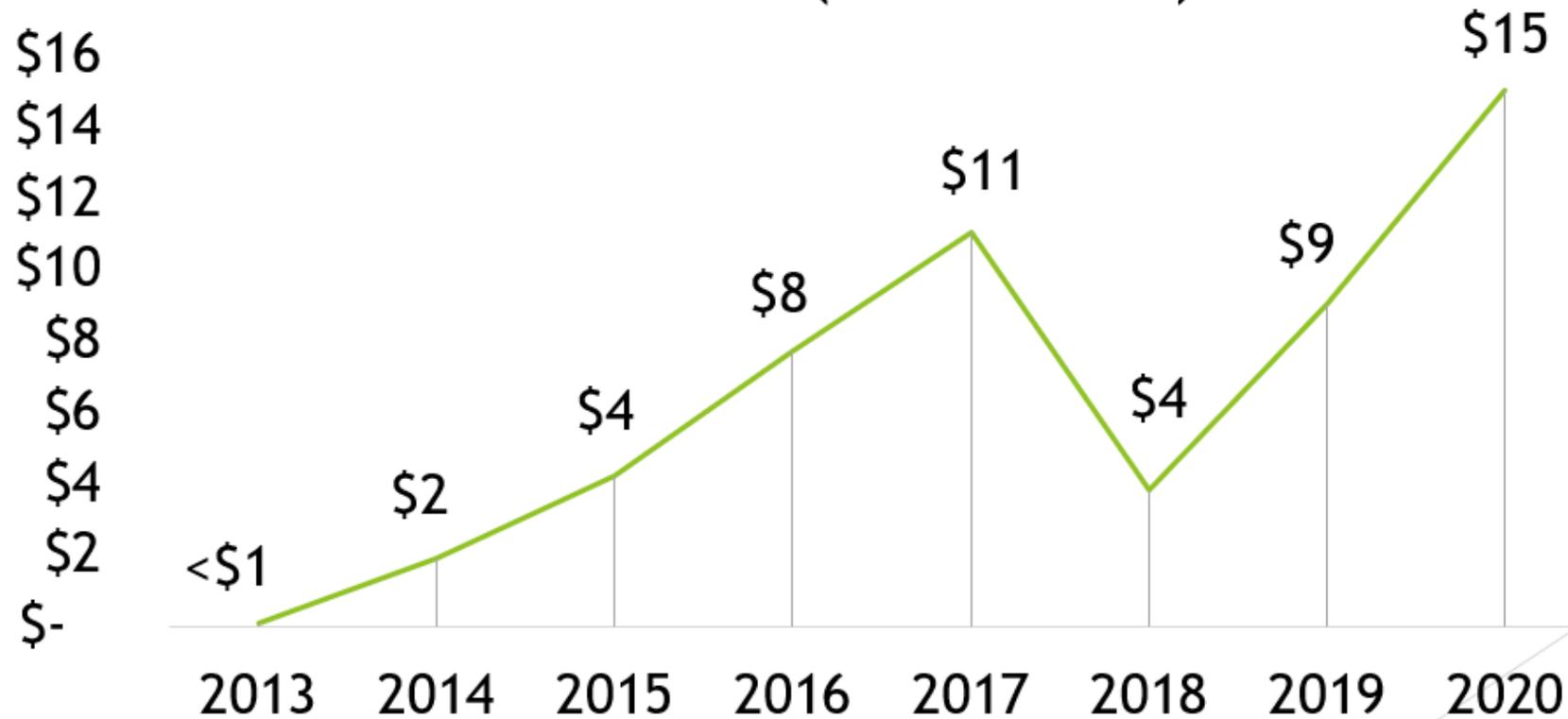   - 6 Water/Sewer Districts

   - 1 Port District

Number of State and Local Government Green Bond Issues, 2013-2019

Source: DeGood (2021)

Volume of State and Local Government Green Bond Issues, 2013-2020 (in billions)

Source: Harrison & Muething (2021)

2.3 Research Findings

Distribution of Green Bonds by State

- ▶ 37 of 50 states

- ▶ Largest Volume
  - ▶ California
  - ▶ New York

Source: Prepared using
Climate Bonds Initiative Data

Type of Major Functional Uses Green vs. Non-Green Bonds: 2013-2019

Value of Bonds	Non-Green	Green
General Purpose Public Investment	48%	17%
Schools	23%	2%
Water	10%	46%
Mass Transit (urban trains and buses)	2%	26%
Hospitals	7%	3%
Higher Education	10%	6%
Total	100%	100%

Source: Authors' calculations using Mergent's Database.

Interviews – Why the Government Decided to Issue Green Bonds

1. View their government as a leader

2. Consistent with their environmental focus

3. Good match for the type of project they were undertaking

4. Want to increase the number of investors

5. Recommended by their underwriter

Determination of Which Projects are "Green"

- No mandatory standards in the U.S.
- Concerns regarding "green washing"
  - Labelling projects as "green" that do not benefit the environment
- But there are
  - Voluntary standards
  - Independent review options

Voluntary Standards

- **International Capital Markets Association (ICMA)**
  - Green Bond Principles
    1. Use of bond proceeds
    2. Process and criteria used to select projects
    3. Management of bond proceeds
    4. Reporting
  - Issuers can contract for a **Second Party Opinion** to certify compliance with one or more of the principles

Voluntary Standards

- **Climate Bonds Initiative (CBI)**
  - Projects consistent with lowering greenhouse gas emissions as established in the Paris Treaty
  - Green Bond Principles
  - Sector standards
  - **Third Party Verification** program
  - Post-Issuance Verification & Reporting

DC Water: Green Bond Performance Metrics

Indicator Reference	Indicator	Criteria
(F)	Pollutants Removed at Blue Plains	Percentage removal of total nitrogen, total phosphorus and total suspended solids in pounds contained in the water entering (influent) and exiting (effluent) Blue Plains for the current fiscal year as measured at Blue Plains and used to calculate information submitted in EPA Monthly Reports.

The table below represents the percentage removal of contaminants and pollutants by the DC Water Advanced Wastewater Treatment Plant at Blue Plains, as of September 30, 2016.

Pollutants Removed at Blue Plains			
Parameter	Influent (lbs)	Effluent (lbs)	Percent Removed (F)
Total Nitrogen	33,555,342	2,629,476	92.2%
Total Phosphorus	2,708,375	87,880	96.8%
Total Suspended Solids	198,047,671	1,021,336	99.5%

Interviews with Early Issuers of Green Bonds -- How They Identified "Green" Projects

- ▶ Very few early issuers used an independent reviewer

- ▶ Most relied on an internal review process

Increased Usage of External Reviewer Among More Recent Issues

▶ Review of 52 Official Statements for Muni Green Bonds

  ▶ First six months of 2021

Self-Labelled Green Bonds	**Second Party Opinion**	**Third Party Verification**
25 issues	20 issues	7 issues

What was the Impact from Issuing Green Bonds – Perspective of the Early Issuers

▶ Good public relations

▶ Attracted a few new investors

▶ Generally strong demand for the bonds

▶ Minimal, if any, impact on interest rates

Exploratory Regression Model Explaining Mergent Reported Yield

▶ Period and Unit of Analysis: 1990-2019

▶ N = 3.3 million green and non-green bonds modeled

▶ **Dependent Variable: Yield to Maturity**

▶ **Research Question: are Green Bonds borrowing cost less/more/same as non-Green bonds in US?**

▶ **Literature**

  ▶ Baker (2018): after-tax yield on green bonds 5-7 basis points (.05-.07 percentage point) lower

  ▶ Larcker & Watts (2020): no difference in after-tax yields

  ▶ Bunch-Strauss(2021): 16 basis (-.16 percentage points) _lower_ borrowing costs for Green Bonds

Regression Model

- **Independent Variables**
  - Maturity +
  - Insured +
  - Type of Sale:
    - Callable or Not
    - Sinking Fund or Not
    - Revenue Bond or Not
    - Competitive
  - Market Conditions (year, month dummies)
  - Green or Not

- **Green bonds**, after controlling for other factors,

  16 basis point (.16%) lower yield to maturity than non-green bonds

3.0 Conclusion

▶ Growing market among U.S. state and local governments

▶ Recent increase in the use of independent reviewers

▶ A marginal impact, if any, on interest rates

Future Issues

▶ Ongoing Questions

  ▶ Are the projects truly "green"?

  ▶ Will the promise to be "green" be kept over time?

  ▶ How will the environment be helped as a result of projects financed through green bonds?

  ▶ Will green bonds result in projects being undertaken that otherwise would not have occurred?

  ▶ Does life cycle analysis of green projects demonstrate net environmental benefits?

Future Issues

- Evolving Practices

  - Increase in reporting before *and* after the bond issue

  - Expanded use of performance metrics

  - Increase in development and acceptance of international standards

  - Increase in use of independent reviewers

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