

The Evolution of Muni **Green** Bonds

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Definition

Green Bonds

- Bond proceeds used to finance environmentally beneficial projects
- Same security as nongreen bonds

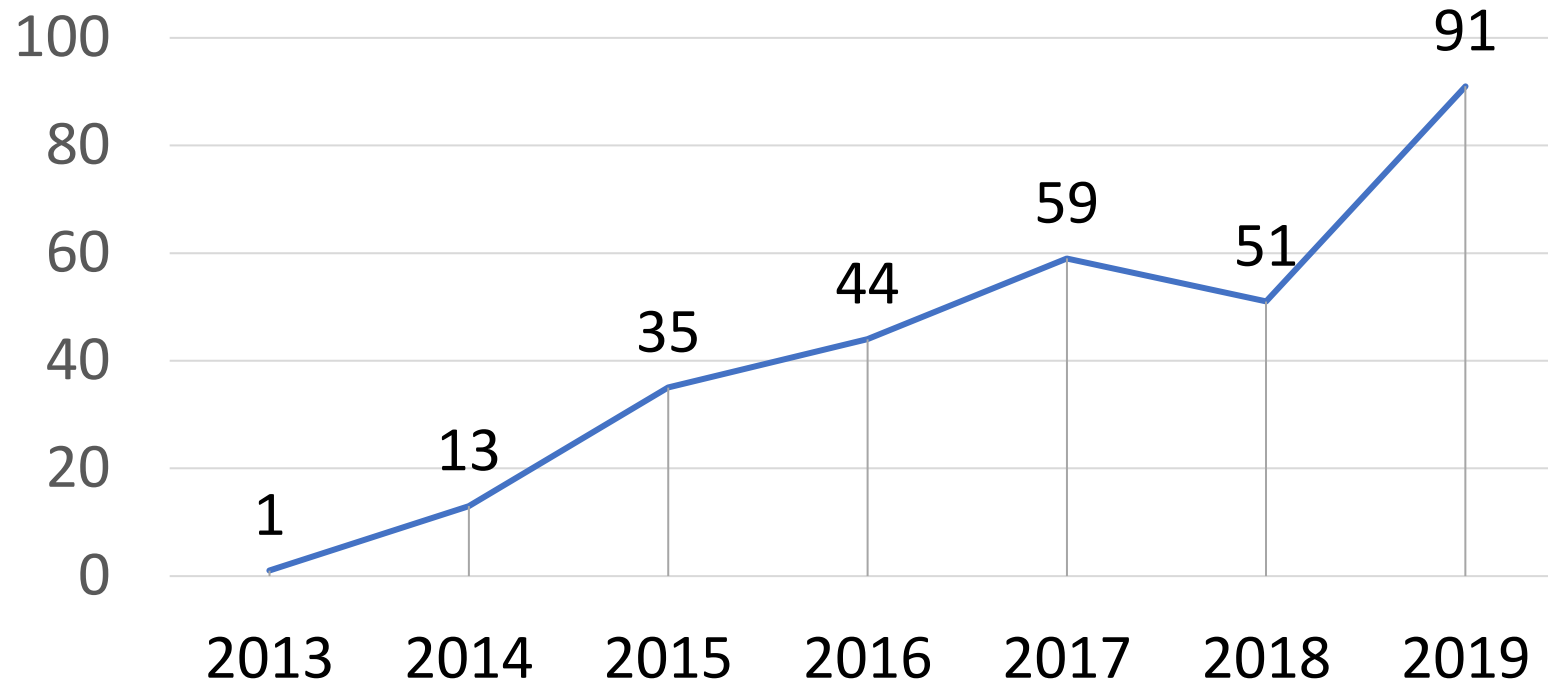
Voluntary Standards

- **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

Climate Bond Standards

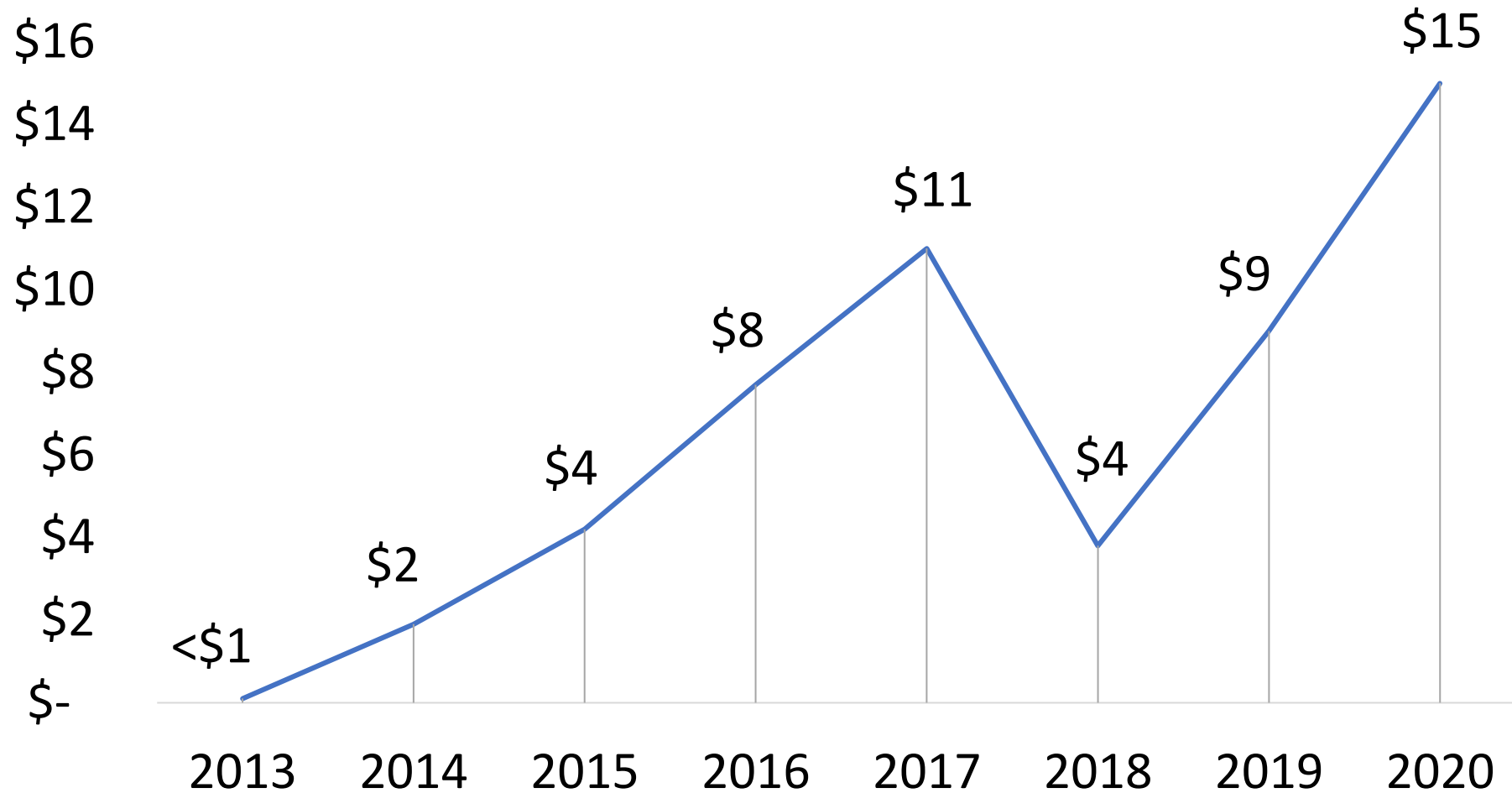
- **Climate Bonds Initiative (CBI)**
 - Green Bond Principles
 - Sector standards
 - Certification scheme
 - External certified verifiers
 - Board approval
 - Post-Issuance Verification & Reporting

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)

The Market for Green Bonds: Evidence from Mergent/FTSE Russell for 2013-2019

- Unit of analysis: a bond series (Cusip #)

CUSIP*	Principal Amount at Issuance (\$)	Security Description *	Coupon	Maturity Date	Initial Offering (%)		
					Price/Yield	Price	Yield
243127VC8	235,000	GENERAL OBLIGATION BONDS, SERIES 2016 (GREEN BONDS)	3	03/01/2017	-	100.524	1.3
243127VD6	765,000	GENERAL OBLIGATION BONDS, SERIES 2016 (GREEN BONDS)	3	03/01/2018	-	101.965	1.48
243127VE4	785,000	GENERAL OBLIGATION BONDS, SERIES 2016 (GREEN BONDS)	4	03/01/2019	-	105.328	1.64
243127VF1	815,000	GENERAL OBLIGATION BONDS, SERIES 2016 (GREEN BONDS)	4	03/01/2020	-	107.072	1.79

Green Bonds, 2013-2019

- Issuance
 - About 0.5 % of muni market by count of series issued
 - About 1.1% of muni market by volume
 - 2017: 2% of muni market by volume
- Type of Bond Sale by Volume
 - About 2/3 were negotiated sales

Type of Major Functional Uses Green vs. Non Green Bonds:
 2013-2019 Note 6 categories account for at least ¾ of muni
 bonds.

Value of Bonds	Green	Non-green
General Purpose Public Investment	16.7%	47.6%
Water	45.9%	9.9%
Primary/Secondary Education	1.7%	23.1%
Higher Education	6.3%	10.5%
Hospitals	3.4%	7.0%
Mass Transit	25.9%	1.8%

Distribution of Green Bonds by State

- 37 states
- California
 - **26% of green bonds**
 - 12% of the population
- New York
 - **25% of green bonds**
 - 5.9% of the population
- Massachusetts
 - **9.8% of green bonds**
 - 2.1% of population



Source: Climate Bonds Initiative, various years

Exploratory Model Explaining Mergent Reported Yield

- Period and Unit of Analysis: 1990-2019
- N = 3.3 million
- **Dependent Variable: Yield to Maturity**
- 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

Regression Model

- **Independent Variables**

- Maturity
- Insured or Not
- Type of Sale
- Callable or Not
- Sinking Fund or Not
- Revenue Bond or Not
- Market Conditions (year, month dummies)
- Green or Not

- **Preliminary Finding**

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

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

2021 Muni Green Bond Issuance

- Review of 52 Official Statements for Muni Green Bonds
 - First six months of 2021

**Third Party
Verifier
Climate Bonds**

7 issues

**Second Party
Green Bonds**

20 issues

**Self-Labelled
Green Bonds**

25 issues

Climate Bonds – Third Party Verifiers

- External Verification
 - Criteria for selection of projects
 - Nature of projects
 - Approval by CBI Board
- Post-Issuance Reporting
 - Within 24 months
 - Some annual reporting

Climate Bonds

- 3 states
 - Connecticut Green Bank – solar residential program (\$25 million)
 - New York State Housing Finance Agency – affordable housing (\$210 million)
 - California Education Facility Authority – Stanford University (\$300 million)
- 2 transit authorities
 - DC Metro (\$784 million)
 - NY MTA (\$495 million)
- 2 other
 - Regional Transportation District – Colorado (\$834 million)
 - Milwaukee Sewerage District (\$46 million)

Second Party Opinions

- 26 Build American Mutual (BAM)
 - Free Second Party Opinion (if eligible) with purchase of bond insurance
 - One-half were < \$10 million
 - One-half were refunding bonds
 - Standard information
 - Refer to Green Bond Principles and United Nations sustainability goals
 - Does not identify specific projects or category
 - No identification of “green bonds” in bond title
 - No post-issuance reporting
 - Marketing: lists green bonds on BAM website
- 4 Other Second Party Opinions
 - Three were refunding bonds
 - One for private firm – convert biosolids to energy
 - Two competitive bid – pre-qualified green by Kerstel

Self-Labelled Green bonds (n=25)

- Various purposes
 - Buildings (schools, higher ed, affordable housing)
 - Water/sewer/stormwater
 - Energy (wind, renewable natural gas)
 - Other
- 5 are refunding
- 14 are state governments
- 10 have environmental/sustainability goals or plans
- 9 discuss environmental impact
- Most do not include post-issuance reporting
- Median amount = \$85 million

Policy Issues

- How **green** are green bonds?
- What types of revisions would be needed to further develop the muni green bond market?
- Will green bonds eventually offer an interest rate savings to issuers?
- Will green bonds eventually make a difference to the environment and sustainability?