



— **Keynote:**
The Limits of Climate Havens


11th Annual Green Infrastructure Conference




— **The Limits of Climate Havens**


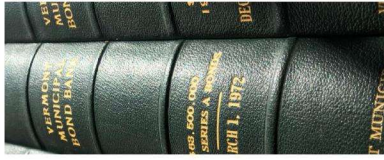

Michael Gaughan,
Executive Director, Vermont Bond Bank

A discussion of Vermont's successes, limitations, and opportunities for climate resilience and adaptation following 1,000 years of major flood events in less than 15 years





Vermont Bond Bank

THE LIMITS OF CLIMATE HAVENS

Presentation to Ballard Spahr's
 11th Annual Green Infrastructure Conference

October 25, 2023

The Vermont Bond Bank



Vermont Bond Bank

- Capital Debt Affordability Advisory Committee
- Local Investment Advisory Committee

Pooled Loan Program



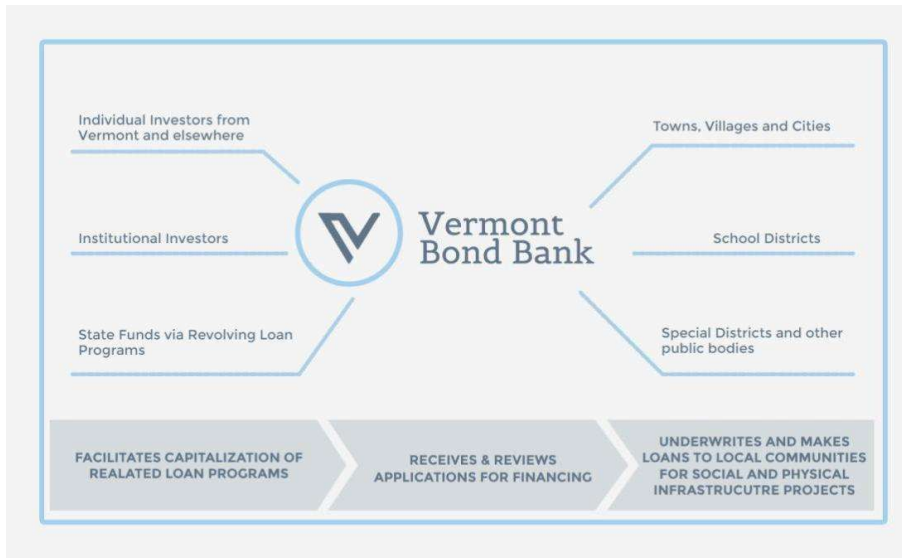
State Revolving Loan Funds




Program Development

- Technical Assistance
- Clean Energy Finance
- Climate Recovery
- Policy Development

How We Work



Bond Bank History

- State instrumentality created following period of school construction spending financed with short term borrowing
- Bond Bank provided long term financing solution
- First bond issue in 1971 exclusively provided loans to local schools

9 Harvard Journal of Law and Public Policy 699, 1986
THE OPTIMAL BOND BANK

MICHAEL A. FELDMAN*

I. INTRODUCTION

Lowering municipal borrowing costs can make feasible otherwise unaffordable improvements in infrastructure, including roads, bridges, sewers, and other public facilities. A municipal bond bank, which pools bond issues of many small entities, can be instrumental in lowering borrowing costs. The Vermont Municipal Bond Bank, for example, has been stimulating municipal development by lowering municipal borrowing costs for the past fifteen years. Massachusetts failed in its attempt to create a bond bank when its legislature became embroiled over an unnecessarily extravagant and encumbered financial scheme: Governor Michael Dukakis's "MassBank."¹ Because of its inadequacies, this proposal died in the Ways and Means Committee of the Massachusetts House of Representatives. A bond bank that is streamlined in comparison with MassBank, however, would be less controversial and, if given the proper latitude, quite successful. Massachusetts and other states could alleviate many of their infrastructure financing problems by creating an institution incorporating the most appropriate powers of and is upon the existing bond banks: "the optimal bond

forms of the bond bank device have been instituted "Alaska," Nevada,² Indiana,³ New Hampshire,⁴ North Vermont,⁵ and Puerto Rico.⁶ A bond bank is a finance that is an "instrumentality of the state," but it charily differs from a state agency in that it may not incur liability. It serves its participating municipalities by making them, either directly or by purchasing their bond

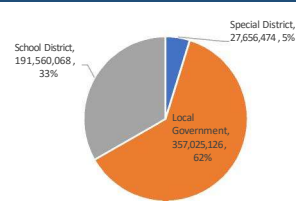


Bond Bank Today*

BOND BANK PORTFOLIO POST 2023 SERIES 2 LOANS

Borrower	Outstanding	% of Portfolio
1 Champlain Valley School District	36,349,541	6.35%
2 St. Albans City	28,471,832	4.98%
3 South Burlington City	27,181,197	4.75%
4 Middlebury Town	18,602,016	3.25%
5 Stowe Town*	17,888,153	3.13%
6 Hartford Town	16,809,518	2.94%
7 Montpelier City	16,536,225	2.89%
8 Rutland City	14,312,764	2.50%
9 South Burlington City School District	14,300,400	2.50%
10 Brattleboro Town	14,070,000	2.46%
Total	572,241,667	100.00%

LOANS OUTSTANDING AS OF JULY 5, 2023



Over the course of 2022 Vermont Bond Bank financed projects:

- ▶ Impacted 102,000 Vermonters
- ▶ Renovated or constructed 508,000 square feet of facilities
- ▶ Generate approximately 200 mWH of renewable energy annually
- ▶ Save approximately 157,000 kWh annually
- ▶ Improved 4,066 student seats
- ▶ Eliminated the annual use of 6,600 gallons of heating oil
- ▶ Constructed or renovated nearly 1 mile of streetscape
- ▶ Added nearly 1 mile of water line

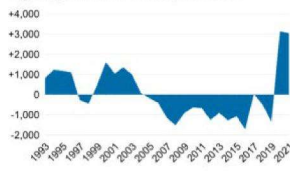
* Pooled Loan Program only; SRF consists of ~\$240 mm in loans

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Post Covid Picture of Vermont

Migration boosted Vermont's population

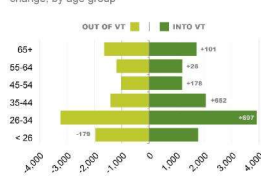
Annual net change in people* migrating to and from Vermont, 1993-2021



*Exempt from claimed on personal income tax returns are used as a proxy for number of people
 Data source: IRS Statistics of Income
 ©2023 Public Assets Institute

Migration to Vermont grew in nearly every age group

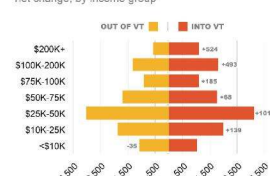
Number of tax filers who moved in and out between 2020 and 2021, with net change, by age group



Data source: IRS Statistics of Income
 ©2023 Public Assets Institute

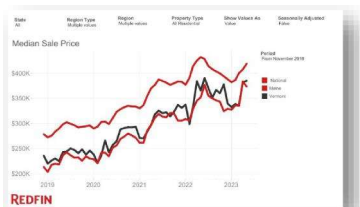
Net migration increased in all but the lowest income bracket

Number of tax filers who moved in and out between 2020 and 2021, with net change, by income group



Data source: IRS Statistics of Income
 ©2023 Public Assets Institute

Source: Vermont saw a surge of newcomers during the pandemic | Public Assets Institute



- Statewide rental vacancy rate ~3.5%
- Chittenden County rental vacancy rate <0.5%
- Second lowest countrywide unemployment rate of 1.9%

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Vermont as a Climate Haven

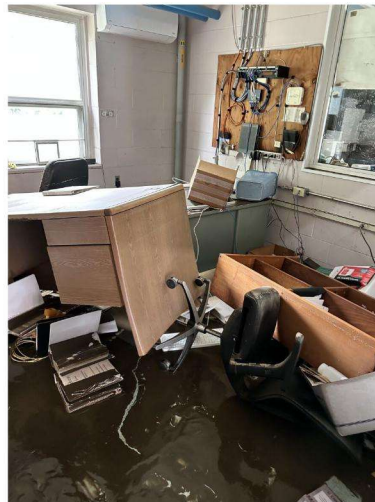


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#1 Climate Haven County in Vermont



https://www.vtcnr.com/news_and_citizen/news/local_news/flooding-



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Climate Risk in Vermont

FIRST STREET

Mission Methodology Data Access Risk Factor Research Lab Team Press Q

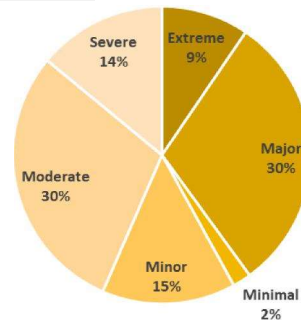
First Street Foundation Mission

Make climate risk accessible, easy to understand and actionable for individuals, governments, and industry.

A changing climate is impacting the risks facing American properties, communities, and businesses as events like floods, fires, heat, and other perils become more common, and more severe. The best science on these issues is complex, happening in silos, and left to peer review journals, making it largely inaccessible to everyday Americans. Until recently, there was no easy, accurate way for individuals to understand how environmental changes will impact them personally. Our work addresses that gap to ensure every American homeowner, renter, business, and community has access to the best climate risk data available through firststreet.com, providing in-depth, climate-adjusted, property-specific risk assessments for homes across the United States, including Alaska, Hawaii and Puerto Rico.

Our data and models also help inform federal government agencies like Fannie Mae, the Federal Housing Finance Agency, the U.S. Departments of Treasury, Commerce and others in their assessment of climate risk to the U.S. economy.

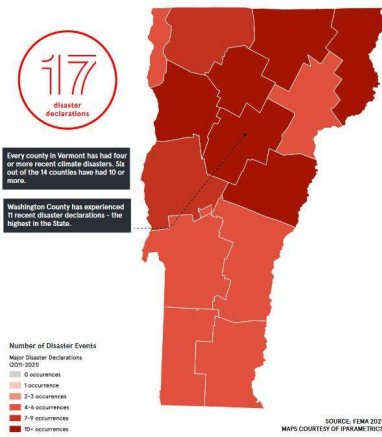
- Bond Bank began monitoring environmental risk as part of annual 2023 portfolio monitoring effort
- Distribution of flood risk show to the right in sample of Bond Bank portfolio by monitored entity
- Duh...



Increasing Climate Exposure

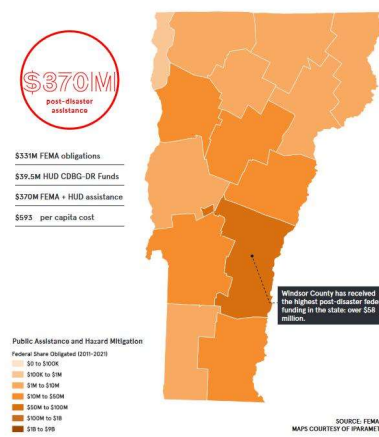
DISASTER OCCURRENCES 2011-2021

FEDERALLY DECLARED CLIMATE DISASTERS BY COUNTY



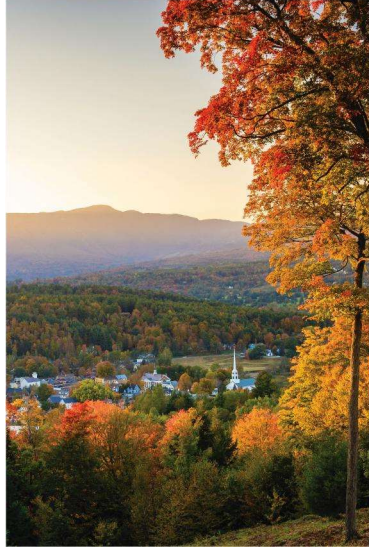
FEDERAL ASSISTANCE 2011-2021

POST-DISASTER PUBLIC ASSISTANCE AND HAZARD MITIGATION FUNDS OBLIGATED BY COUNTY FOR CLIMATE DISASTERS



From Vermont Atlas of Disaster by Rebuild by Design

Yes, but...Vermont!



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Shameless Plug



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A Decade Plus of Resilience

Tropical Storm Irene Flooding (2011)



Summer 2023 Flooding (2013)



Credit: Burlington Free Press/Credit: AP

A Decade Plus of Resilience

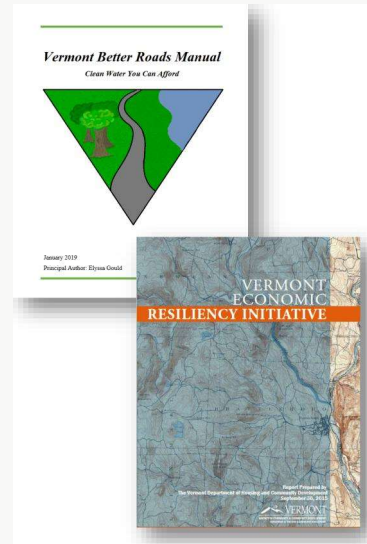
<i>Tropical Storm Irene Flooding Damage (2011)</i>	<i>Summer 2023 Flooding Damage (2013)</i>
Over \$850 million in property damage	TBD
20,000 acres of farmland	27,000 acres of farmland
3,500 homes	4,000 homes
1,000 culverts	800 culverts
200 bridges	2 bridges
<small>https://floodready.vermont.gov/sites/floodreadyv/files/documents/2013-IRO-final-report%20reduced.pdf</small>	<small>https://vtdigger.org/2023/07/26/preliminary-tally-indicates-vermont-floods-damaged-more-than-4000-homes-and-800-businesses/</small>

State engineers studied the 34 bridges that Irene had destroyed, and replaced them with new ones that minimized the number of large support piers in the water, which had blocked debris flowing down the rivers and caused it to build up and damage roads and bridges. Only two bridges are known to have been destroyed in the storm this week, said Joe Flynn, state secretary of transportation.

To move more people out of harm's way, the state increased restrictions on building in flood plains, and began a buyback program that has removed 150 homes from those areas, Dr. Magilligan said. This effort mitigates risk in two ways, he said: "It gets people out of danger, and it opens up more places for the water to go, slowing down the flow."

Statewide Adaptation Efforts Post Irene

- \$23 million in Hazard Mitigation Grants and \$40 million HUD CDBG-DR
 - Move municipal buildings out of floodplain
 - Buyout of 136 homes
 - Assist 24 towns with up-sized culverts and bridges, stormwater management, floodproofing buildings, relocating roads, and repairing a flood control dam
 - Misc. planning efforts
- Emergency Relief and Assistance Fund provides state match to FEMA assistance of up to 17.5% (of 25%) if local governments adopt a Local Hazard Mitigation Plan, adopt post-Irene road and bridge standards, and protect river corridors for new encroachments
- Debris removal permits and debris management in waterways
- In 2020, Passed Global Warming Solutions Act that required creation of Vermont Climate Action Plan and includes chapter entitled Pathways for Adaption and Building Resilience in Communities and the Build Environment
- In 2021, Vermont established Flood Resilient Communities Fund that provided \$20 million of ARPA dollars to allow buyouts of flood vulnerable communities



Culvert Expansion - Brandon, Vermont

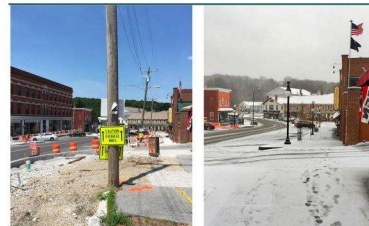


WCAX

- \$1.35 mm from FEMA for construction of a super-size culvert crossing under US Route 7
- Allowed preconditions for ~\$20 mm road reconstruction, utility undergrounding, and streetscaping project



<https://vem.vermont.gov/funding/mitigation/projects>Nina Keck / VPR

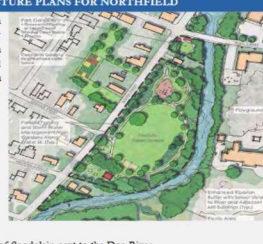


Buyouts and GI - Northfield, VT

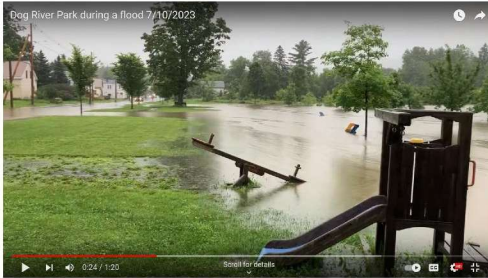
GREEN INFRASTRUCTURE PLANS FOR NORTHFIELD

Northfield plans to address the flood devastation along Water Street through the creation of a new park that will provide downtown Northfield with an outstanding new recreational amenity that will protect the floodplain function, offer other green infrastructure benefits and enhance the livability and resilience of the community.

Tropical Storm Iduna flooded 80 out of 100 homes along Water Street in the village. The town worked diligently with landowners to obtain Hazard Mitigation Grants from FEMA, securing buyouts for 12 houses with assistance from the state and regional planning commission. Besides helping landowners to move out of harm's way, the buyouts allowed the town to assemble a 4-5 acre contiguous area of floodplain next to the Dog River.

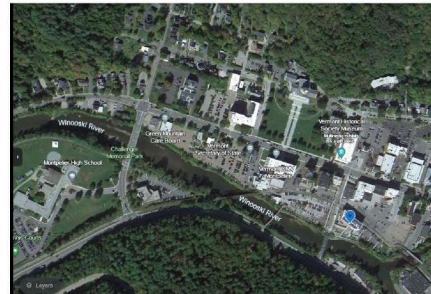


Credit: Marketplace



Mixed Use Adaptation - Montpelier, VT

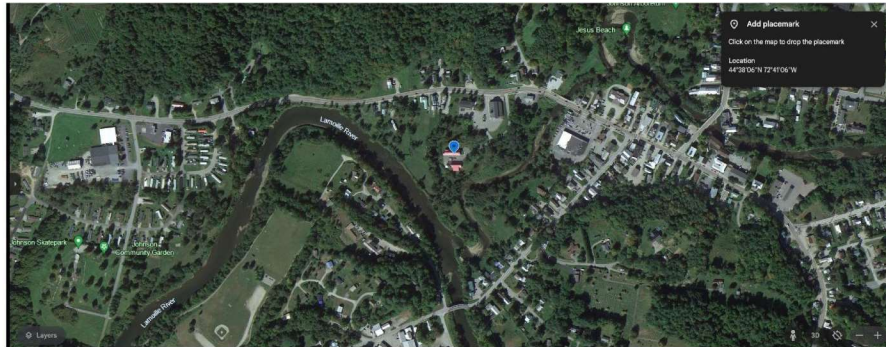
Taylor Street Apartments



First floor bus depot with hard surface and durable building materials with 30 units on upper floors

<https://www.sevendaysvt.com/vermont/after-summer-floods-state-planners-look-to-higher-ground-for-new-housing/Content?oid=38994434>

Too Little - Village of Johnson, VT



Top Five Rate Payers

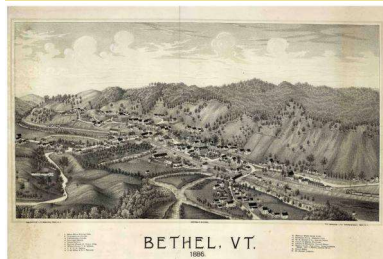
		\$ Collections	% of Total
1	Northern Vermont University	169,627	36.31%
2	Gilles Lehouillier	8,146	1.74%
3	St John's Knoll Apartments	6,280	1.34%
4	College Hall Apartments	4,211	0.90%
5	Johnson Town School District	3,974	0.85%

		Ann Avg	
		#	%
Population			
	2010	2020	
Vermont	625,741	643,077	2,167 0.34%
Village of Johnson	1,443	1,332	(14) -1.00%

"The Wastewater Treatment Facility (WWTF) is now 20 years old and will require some level of capital improvements as time goes on. The location of the WWTF in the floodplain may be an issue in the event the Facility is damaged during a flood." – from 2016 Town and Village of Johnson Municipal Development Plan

Constraints Building Back Smarter

Where to rebuild?
 How to adapt?
 What risk to accept?



High frequency of environmental events and related risk

Amenity rich and highly livable

Housing shortage concentrated in most desirable locations

Aging demographic picture that stresses workforce and opportunities for economic growth and supporting services

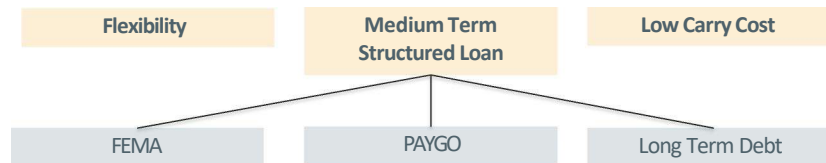
Rebuilding equally needs to consider both population decline and population growth

Hazard Mitigation Grants	Dedicated Adaptation Fund via Insurance Surcharge?	Permanent Recovery and Resilience Fund? Alternative Insurance?	Modifying Existing Funding and Financing Tools?
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Debt Needs in Responding to Acute Climate Events

The General Fund ended FY20 with a current year deficit reduction of \$264,192 and when combined with the carryover deficit from prior fiscal years of \$702,138, the General Fund ended the fiscal year with a cumulative deficit of \$437,936. The cumulative deficit is the result of expenses, outflow of resources, exceeding the inflow of resources, revenues, that have accumulated beginning in fiscal year 2012, primarily, though not exclusively, with the Irene, August 2011, and the July 2013 (FY14) catastrophic storms. There are other contributing factors, but the storms and other related infrastructure improvements are the primary drivers that essentially explain the cumulative deficit.

The final storm reimbursable amounts were determined and agreed upon between the Town, the State of Vermont and FEMA in FY20. Non-reimbursable amounts remaining for certain storm and other infrastructure related expenditures are expected to be permanently financed in FY21 with a combination of debt and capital reserves that would primarily eliminate the negative fund balance. The financing costs will be included for recovery in the FY22 annual budget that may require a tax increase or may be covered with reductions in other operating expenditures as determined by the Town Manager and the Select Board.



The Bond Bank and Climate Equity



Portfolio Diversification
 – diversified portfolio across the state partially mitigates environmental exposure

Access and Rate Equity
 – same rate provided to all borrowers

Stability and expertise despite local staff challenges – consolidated debt expertise despite wider financial officer recruitment challenges

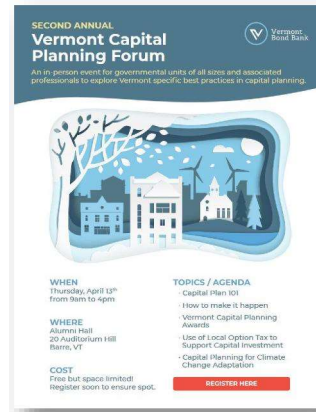


Capital Planning and Climate

1. *Identify and adopt a future looking climate model.* From the nonprofit First Street Foundation to state agencies, forward looking climate data is increasingly available that inform long term predictions of risk related to flooding, wind, heat, and fire. Acceptance of a common model will allow contributors and users of the capital plan a starting place for evaluating impact.
2. *Categorize equipment, facilities, and infrastructure by level of vulnerability to both acute and chronic risk.* Acute risk occurs from a significant and often, isolated event. This is typically the evaluation completely as part of local hazard mitigation plans. However, a changing environment is resulting in on-going challenges that will be faced on a shorter timeline than expected—like potholes.
3. *Integrate above findings in the capital plan.* Climate and environmental risks are becoming an unavoidable component of municipal management and the mitigation strategies should similarly be integrated with existing documents.

Additionally, the following broad concepts should be reevaluated within the existing capital plan and capital budget.

- Transition or grow some portion of operating reserves
- Modify capital project scoring
- Reexamine useful life calculations of all assets
- Dedicate chapters or sections within the capital plan to social infrastructure and natural systems



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Rebuilding More Efficiently

Governmental Units Seeking Finance

PURPOSE	Bond Bank Clean Energy Finance Program: Will provide low-cost loans for energy efficiency, electrification, fuel switching, solar, and other clean technology projects	
	Below sources will be optimized for governmental unit project. The Bond Bank's Clean Energy Finance Program will be one stop shop for all underlying sources that will be tailored to needs of borrower	
TERMS		
SOURCES	Existing	Expected
	USDA's Rural Energy Saving Program (RESP) State Revolving Loan Fund	Bond Bank Pooled Loan Program National Clean Investment Fund through EPA and IRA Other Emerging Programs

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Learn More About the Bond Bank



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Michael Gaughan
Executive Director

P: 802-861-0073
E: michael@vtbondbank.org

Elizabeth King
Controller

P: 802-861-0075
E: elizabeth@vtbondbank.org

Ken Linge
Loan Officer

P: 802-861-0074
E: ken@vtbondbank.org

vtbondbank.org

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