Agency of Administration
Department of Buildings and General Services

Report to the House Committees on Corrections and Institutions, and Energy and Digital Infrastructure; and the Senate Committee on Institutions

Municipal Energy Resilience Program

In accordance with 2022 Acts and Resolves No. 172 ('Act 172') §6(f), for funds appropriated in §4(1) and §4(2)

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VERMONT
AGENCY OF ADMINISTRATION
DEPARTMENT OF BUILDINGS AND GENERAL SERVICES

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Background

The Municipal Energy Resilience Program (MERP) was established under Act 172, effective June 2, 2022, and authorized $45 million in American Rescue Plan Act (ARPA) funding to help Vermont municipalities transition municipal buildings toward greater energy efficiency and lower greenhouse gas emissions.

The program specifically supports:

- The recommendation and deployment of efficient renewable or electric heating systems.
- Building improvements that reduce fossil fuel consumption in municipal facilities.

A portion of ARPA funding was converted to state-level revenue replacement, enabling flexible use of the funds as state dollars.

The Vermont Department of Buildings & General Services (BGS) administers MERP in partnership with Vermont's Regional Planning Commissions (RPCs), the Vermont League of Cities and Towns (VLCT), Efficiency Vermont, and the Vermont Energy & Climate Action Network (VECAN). The program provides municipalities with direct staff support, technical assistance, and funding through multiple grant tracks, including RPC partnership grants, municipal energy assessments, implementation grants, and community capacity mini-grants.

Eligible implementation projects include weatherization, thermal system upgrades, and conversion from fossil fuel systems to renewable or electric alternatives. Applications are evaluated per Act 172 criteria, with prioritization for high-energy-burden (defined in Efficiency Vermont's 2019 Energy Burden Report) and low-capacity communities.

In addition to MERP, Act 172 created the Municipal Energy Loan Program, providing long-term financing for municipal energy improvements.

1. Regional Planning Commissions and Partnerships

In early 2023, BGS executed grant agreements with all 11 Vermont Regional Planning Commissions, allocating $120,000 per quarter to each RPC—totaling $2.4 million for the duration of the program.

RPCs provide outreach, application assistance, energy assessment coordination, event planning, and support for procurement and project implementation. To date, approximately $2,368,997 has been disbursed, with $31,002 remaining.

RPCs submit quarterly progress reports detailing municipal assistance activities and outcomes. Moving forward, RPCs will continue to assist awardees with procurement, invoicing, project monitoring, and peer-learning events.

MERP also collaborates closely with VLCT, Efficiency Vermont, and VECAN for outreach, webinars, and technical support.

2. Energy Resilience Assessments

All assessments were completed by September 2024, for more information on energy resilience assessments please see the 2024 MERP Report to the House Committees on Corrections and Institutions, and Energy and Digital Infrastructure, and the Senate Committee on Institutions.

3. Grants

a. Community Capacity Building Mini Grants

MERP Mini Grants, capped at $4,000 per municipality, were designed to strengthen local energy resilience capacity—supporting consultant hires, committee formation, ADA assessments, community outreach, and promotional materials.

Applications were open March 9, 2023 – May 31, 2024, resulting in 175 awards totaling $693,859. All funds were fully obligated and disbursed by December 31, 2024. One award was returned in 2025. For more details on mini grant awards by category please visit the 2024 MERP Report to the House Committees on Corrections and Institutions, and Energy and Digital Infrastructure, and the Senate Committee on Institutions.

Mini Grant Spending To Date:

Number of Mini-Grants fully expended	47
Amount fully expended	$185,860
Number of Mini Grants partially expended	70
Amount partially expended	$122,897
Total Amount expended partial and full	$308,757
Total Amount Remaining	$377,371

b. Community Capacity Building Implementation Grants

Program Overview

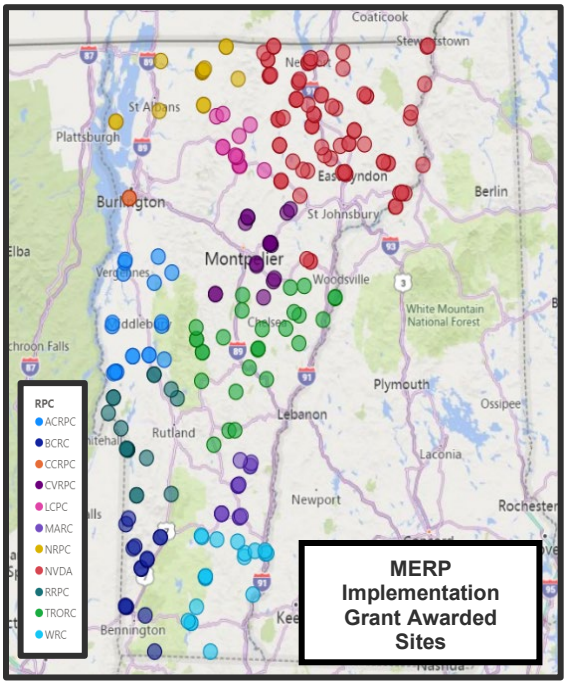
Municipalities were eligible to apply for up to $500,000 per jurisdiction for projects including weatherization, thermal upgrades, and fossil fuel replacement with efficient renewable or electric systems.

Eligibility required a MERP Energy Assessment (Level 1 or Level 2). Projects were also required to attest to, or plan for, high-speed internet accessibility and achieve ADA compliance at project completion. Awarded Municipalities were allowed to claim up to 20% of funds for accessibility upgrades.

Applications were scored competitively, factoring in:

- Municipal energy burden (per the Efficiency Vermont Energy Burden Report).

- Administrative capacity.
- Geographic balance across counties.
- Community size and prior funding history.
- Emission reduction potential and resilience impact.



Application and Awards

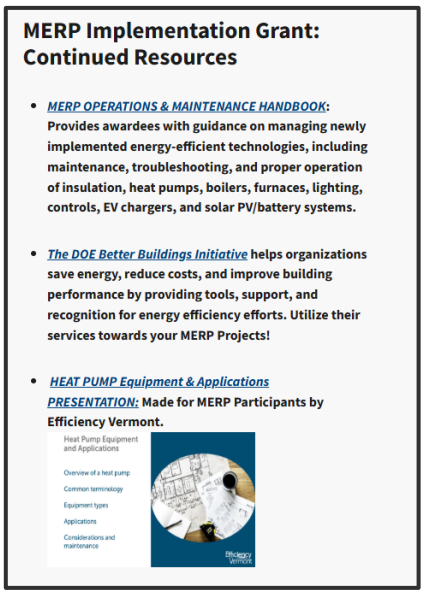
- A total of 215 applications requested $68.2 million in funding. BGS awarded $35,906,142 across 126 municipalities, encompassing 246 municipal buildings statewide.

Implementation Progress

- **Historic Preservation Review (VDHP)**
    - The MERP–VDHP Memorandum of Agreement ensures compliance with the Vermont Historic Preservation Act, requiring review of municipal energy projects that may affect historic or archaeological resources. Oversight is delegated to the Vermont Division for Historic Preservation (VDHP), with consultation procedures coordinated through the Vermont Advisory Council on Historic Preservation (VACHP).
    - A webinar was held in January 2025 to review this process with grantees, which can be viewed by clicking here.
    - **VDHP Review Summary:**
        - 68 buildings exempted from review.
        - 56 buildings under active review.
        - 117 buildings approved post-review.
        - 4 pending submittal or approval.
- **Site Visits**
    - As of December 15, 2025, BGS staff have conducted 47 site visits.
    - These visits support effective project management, technical validation, and communication between awardees, RPCs, and BGS. See Attachment A for MERP Implementation Grant Site Visit Highlights.

- **Scope Amendments**
    - As of December 15, 2025, 50 scope amendments have been approved across 42 municipalities.
    - Scope amendments are reviewed case-by-case to ensure alignment with Act 172 priorities while maintaining program flexibility in response to unforeseen project changes.

- **MERP Implementation Resources**
  - The **MERP Implementation Grant webpage** serves as the central hub for resources supporting awardees throughout project implementation, including internal tools and external incentive information.
    - **Key Resources:**
      - **Incentives:** Utility rebate programs and Efficiency Vermont offerings.
      - **Tracking Tools:** Energy-use monitoring and reporting templates.
      - **Procurement Guidance:** Tax credit, direct pay, and compliance resources.



  - **BGS-Developed Resources:**
    - **MERP Operations & Maintenance Handbook:** Guidance on the operation, maintenance, and troubleshooting of key systems including insulation, heat pumps, boilers, lighting, controls, ventilation, EV chargers, and solar/battery systems.
    - **Cut Sheets:**
      - Electric Vehicle Supply Equipment (EVSE) Cut-Sheet
      - Solar Technology Cut-Sheet
      - HVAC Cut-Sheet
      - Thermal Envelope / Insulation Cut-Sheet
      - MERP Advanced Wood Heating (AWH) Factsheet

    - **MERP Permitting Guide:** Overview of local and state permitting requirements for municipal energy projects.
    - **Program Memos:**
      - MERP Quarterly Reporting MEMO (June 2025)
      - MERP Quarterly Reporting MEMO (September 2025)
      - MERP Historic Review MEMO

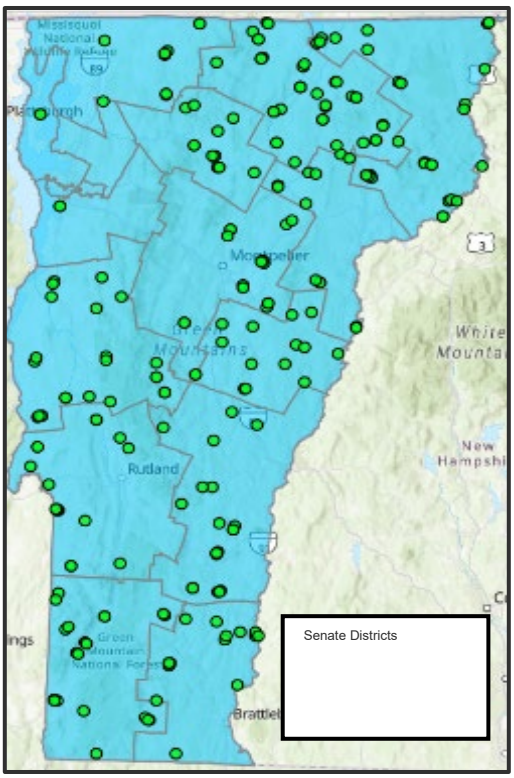
- MERP Reimbursement Protocol MEMO

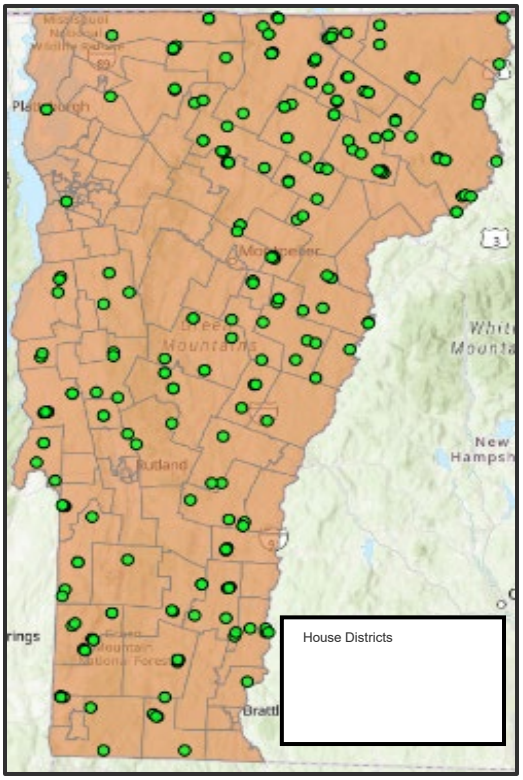
- **Project Procurement & Contracting Page**
  - The MERP – Project Procurement & Contracting subpage lists all active municipal RFPs by county, promoting bid visibility for Vermont contractors.
  - The MERP RSOI Template assists municipalities in developing strong RFPs to attract qualified bids.

- **MERP Marketing**
  - Presentations:
    - MERP implementations and technologies were highlighted on 01/28/2025 during the American Council of Engineering Companies (ACEC) of Vermont Conference.
    - MERP Staff as well as RPC representatives, MERP Energy Resilience assessor representatives, and town representatives presented an overview and progress report of the program at Efficiency Vermont's Better Buildings by Design (BBD) conference on 04/03/2025.

    - MERP Staff presented MERP's enhancement to the economy of Vermont's municipalities at the Southern VT Economy Project (SVEP) Town Building Symposium on 08/28/2025.

- Legislative Notifications:
    - BGS MERP Staff have mapped MERP Implementation Grant awardees within Vermont's Senate and House Districts. This has helped staff alert senators and representatives of completed MERP projects in their territories.





- **Financial Reporting of MERP Implementation Grant Projects thus far:**

  Financial Hardship Statistics (those awardees who requested funds to cover expenditures they could not afford upfront)

Number of Municipalities Applied for Financial Hardship	45
Number of Municipalities Delivered Financial Hardship	39
Total Amount Delivered as Financial Hardship Funds	$2,316,814
Average Amount Delivered per Municipality	$51,484

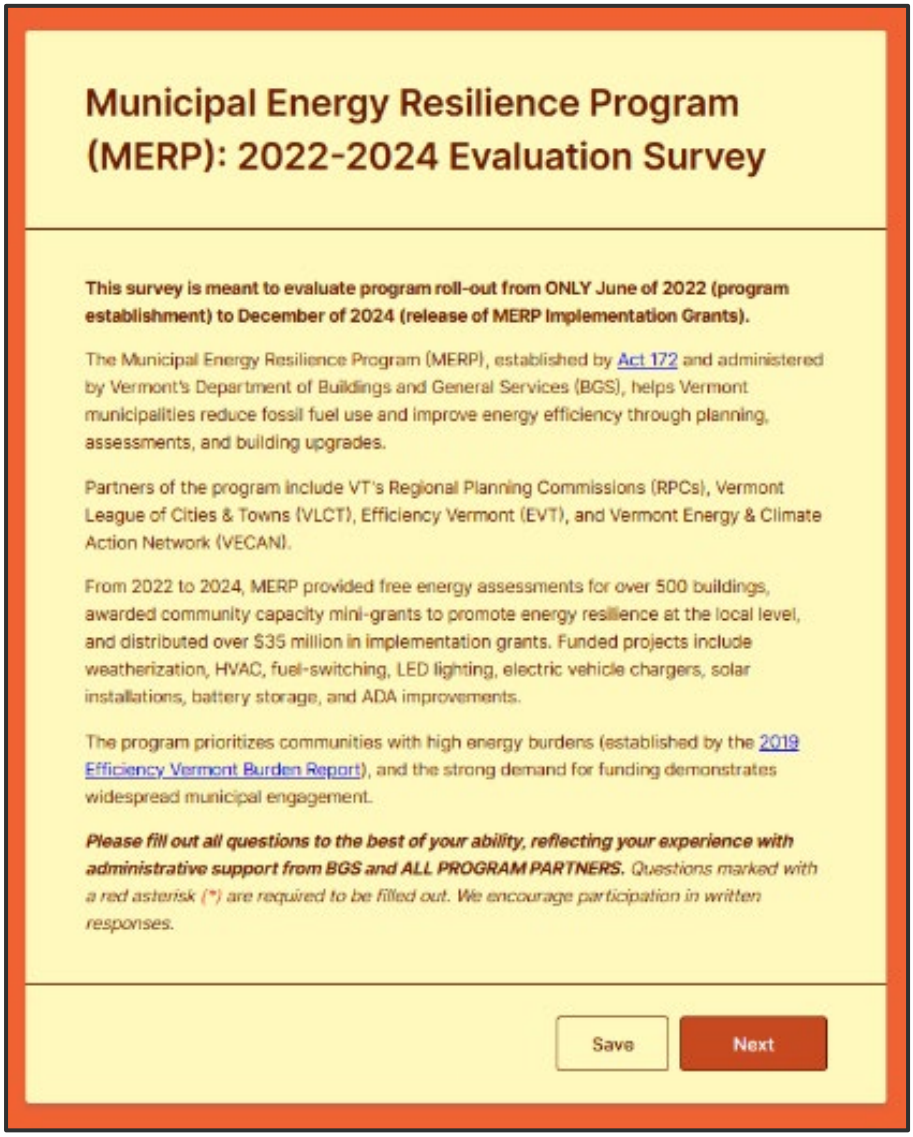
  Reimbursement Statistics:

Number of Reimbursement Requests	324
Number of Municipalities Receiving Reimbursement	60
Total Amount Reimbursed	$3,753,229
Average Reimbursement per Request	$11,584
Average Reimbursement per Municipality	$62,553

4. Program Evaluation

Evaluation Survey:

- The MERP 2022–2024 Evaluation Survey was released to participants and stakeholders on October 1, 2025, to assess program implementation from June 2022 through December 2024.
- The survey included both qualitative and quantitative measures, with 18 questions (five optional) to accommodate participants' varying capacities.
- The evaluation received 90 total responses, including 85 from municipalities and five from partners, providing data to inform continuous improvement. A summary of responses is expected in the first quarter of 2026.



5. Municipal Revolving Loan Program

Program Overview

- To extend the legacy of the Municipal Energy Resilience Program (MERP) beyond the American Rescue Plan Act (ARPA), the Municipal Energy Revolving Fund (MERF) was established to provide low-cost financing for municipal energy efficiency and renewable energy projects. MERF is capitalized through two U.S. Department of Energy programs: the Energy Efficiency Revolving Loan Fund (EERLF) and the Energy Efficiency and Conservation Block Grant (EECBG).
- The program is administered by BGS in partnership with the Vermont Bond Bank to further support municipalities in implementing cost-effective and energy-saving improvements that reduce fossil fuel consumption and improve building performance across Vermont's public infrastructure.

Program Funding and Structure

- MERF offers a total of $1.24 million in available funding, consisting of $547,000 from EECBG and $690,000 from EERLF. Loan administration costs are capped at 10% of allowable administrative expenses.
- Eligible borrowers include Vermont cities, towns, villages, and fire districts, with projects located in municipally owned or perpetually leased facilities (evaluated on a case-by-case basis). Loan funds may be used for a wide range of energy efficiency and resilience measures.

Federal and State Compliance Requirements

- All MERF-funded projects must align with Act 172 priorities and comply with U.S. Department of Energy audit standards, specifically ASHRAE Level 2/BuildingSync energy audits. Loans may include funding for audits if one does not already exist.
- Projects must also comply with the following federal and state standards:
    - Davis-Bacon Act – prevailing wage requirements
    - Build America, Buy America (BABA) – domestic material sourcing
    - National Environmental Policy Act (NEPA) – environmental review beyond routine retrofits
    - National Historic Preservation Act (NHPA) – historic review via the Vermont State Historic Preservation Office (SHPO)

Execution of Agreements

- In May 2025, staff from BGS and the Vermont Department of Public Service (PSD) jointly executed a Memorandum of Agreement (MOA) to secure the draw down of the Federal EERLF funds and to define interagency responsibilities for fund administration and reporting.
- The MERF loan program has been approved to operate with a 0%* interest rate, significantly enhancing its accessibility and affordability for municipalities across the state.

*0% rate approved as temporary to increase initial access to the program and will be reassessed to align with program costs after initial round of loan awards.

VERMONT

State of Vermont Department of Buildings & General Services
Municipal Energy Resilience Program (MERP)
Municipal Energy Revolving Fund (MERF)
Project Information Survey & Energy Conservation Measures (ECMs) Budget Breakdown

1. PROJECT / BUILDING INFORMATION

ALL APPLICANTS MUST FILL THIS PORTION OUT

Building Name:	
Does the municipality applying for the loan own this building (*select from drop down*)?	No
Building Complete Address:	
Year Building Was Built (approximation is acceptable):	
Building Gross Square Footage (approximation is acceptable):	
Building Electric Utility Provider (*select from drop down*):	Green Mountain Power
Cost projected for this building project (*Do not use $ or commas. Example: 100000*):	
Please select the appropriate MERP Energy Resilience Assessment status for this building (*select from drop down*).	This building has received a Level 2 MERP-administered energy resilience assessment.
Briefly describe the historical use of this building, the history of its energy use and comfort, and who/what will benefit from the proposed project.	
Building Project Estimated Start Date - End Date	
Please select all that apply to this building (*select from drop down*):	This building is used as an emergency shelter for the town.
Municipality Name:	

6. Administrative Costs

The amount obligated to MERP for administrative costs was $1,000,000 per Act 172 §4(2)(B). $594,860 has been paid out, with $405,140 remaining.

a. Building Project Manager II

Current Position filled on October 7th, 2024. Duties include designing and executing the implementation program: drafting implementation application, FAQs, guidance documents and reporting documents; working with Program Coordinator to help assist with energy assessments; compiling questions from RPCs and municipalities about the implementation program and developing program wide responses to common issues.

The PM helps the Grantees understand the changes in scope of work, recommendations of contractors and make a smooth transition into an active RFP. Communication with the towns is necessary to understand their goals and ensure that MERP funds are spent according to ACT 172 priorities.

2025 brought the start of implementation projects across the state and the workload for the PM increased significantly as they began traveling around the state to connect with awardees and review project status. Site Visits are performed weekly to answer questions, document project progress, make changes to contractual scope of work and document project completion. A financial spreadsheet maintained by the grants management specialist triggers project site visits at 50% and/or 100%. Information from site visit meetings is often used to inform grant progress payments. Meeting with the GMS to discuss any billing or equipment issues. Site visits are also scheduled at the request of the Grantee or RPC.

The Project Manager also participates in division meetings about the loan program development, EVSE Development, Energy Office agenda, Contract Management and Continuous improvement.

b. Grants Management Specialist

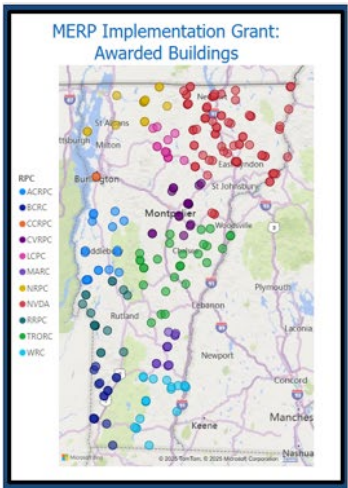
Duties include reviewing and approving reimbursement or financial hardship requests ensuring that all expenditures were in the scope of work, processing administrative invoices, ensuring compliance with state and federal guidance documents, reporting standards.

In addition, this position has been foundational in the coordination and negotiations of the Municipal Loan Program with the Department of Public Service and the Vermont Bond Bank. They have provided exceptional staff support, promoting a constant line of communication between financial entities at all awarded municipalities as well as contractors and ensuring that invoices and awards have been paid on time and accurately.

c. Program Coordinator

In 2025 the duties of the program coordinator shifted to supporting the development of municipal implementation projects including setting up and participating in site visits with the project manager across the state. In addition, the coordinator worked with program staff and partners at the Department of Public Service to secure loan program funds from the U.S. Department of Energy by the May 23, 2025, deadline. The position was vacated in October 2025, and the department has been recruiting for a replacement coordinator during the final weeks of the year. Staff expect to complete the recruitment in early 2026.

Appendix A: MERP Implementation Grant Site Visit Highlights



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MERP Site Visit Highlights

The Municipal Energy Resilience Program (MERP) staff have been conducting site visits to MERP Implementation Grant awarded municipalities and their buildings since the grants' release in December of 2024.

These site visits have proven highly valuable to awarded municipalities, providing critical support in project planning, scope amendments, and access to technical resources.

Look at these examples of MERP site visit success stories, and book one by emailing BGS.MERP@vermont.gov.

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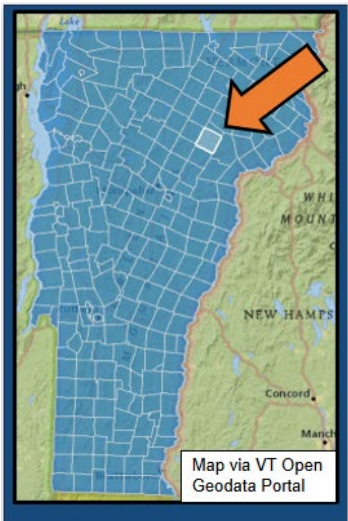
CRAFTSBURY, VT

"Our Craftsbury MERP Working Group hosted Doug and Grace in person to review our buildings and to discuss amendments we could make to our work-scopes mainly to address the details of preparing our 185-year-old Town Hall for energy conservation and HVAC upgrades. Their presence on-site was a huge help to our learning how to communicate our needs and their knowledge of our volunteers ready to get to work. Since their visit our Energy Committee members have put in over 100 hours of volunteer labor in preparation for building upgrades."

"The visit from Doug and Grace to our Craftsbury MERP building sites was a huge help in guiding us from our original grant application to grant work-scope and then to amended scope when changes were needed after engineer and contractor inspections. They answered a million questions and were really helpful in looking closely at the details of work needed."

- Craig Taylor, Craftsbury Energy Committee



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WALDEN, VT

"The site visit we had was a follow up for the work we had completed so far and where we could go from there. I was grateful for the suggestions from the team in how to use our remaining Grant funds. As we walked through what we had done, the team noticed that we could replace old appliances with energy efficient ones and that more energy efficient lighting could be done. The team discussed an air barrier with us, to stop cold air from front door to continue through to office area. The team was friendly, knowledgeable and more then happy to assist in any way they could to continue our projects forward. The Town of Walden office feels very fortunate to have been awarded this grant and to have the continued support of the Merp Grant Team."

- Debbie Messier, Walden Town Clerk/Treasurer

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GROTON, VT

"As a small town with limited resources, figuring out and pursuing the MERP grant can be a real challenge. We are very fortunate that Grace & Doug of BGS have rolled up their sleeves right alongside us. They've been generous with their ideas, quick with answers, and always ready to steer us in the right direction as we work towards optimizing our three municipal buildings (Community Building, Fire Station, and Town Garage) and getting the most out of this grant for our town. Thanks to their guidance and that of NVDA and Efficiency Vermont as well, we've been able to continue to navigate towards making smart choices. It has felt less like working with an agency and more like working with good neighbors who want to see our community thrive."

- Mike Gaiss, Groton Community Leader

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GRANBY, VT

"The experiences we have had with all entities involved with the MERP grant have been wonderful. We are overwhelmed with the support we have received in navigating through the process, be it by emails, phone calls, in person meetings. This is a first in the world of Grants for Tyler and me. We wonder if all grants will run as smoothly as this one. We sure hope so. Thank you to you and the team for being here for us. The town of Granby could not have been successful without the connections and support that you have provided us. Mostly, we love the results of the project and how much it has benefited our town, especially in a time when we could not have done so ourselves on our small-town budget. Thank you, thank you, thank you."

- Terri Williams & Tyler Fournier, Granby Town Clerk and Selectboard Member

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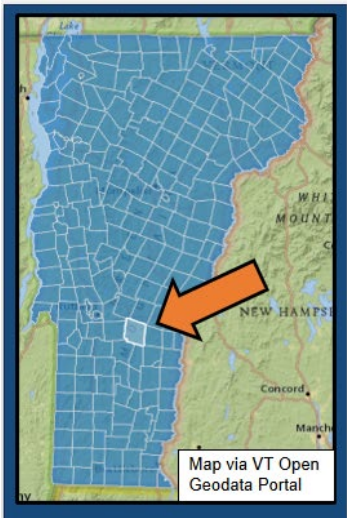
LONDONDERRY, VT

"Touring our completed Town Office renovation project with MERP staff was an opportunity to show off our newly renovated, historic school building, and to get ideas and advice on what to expect going forward with our Town Hall renovation, which is our next big renovation project. Staff have been helpful in guiding us through the reimbursement process as well. These projects would not have gotten off the ground without this funding, so it was definitely worth it."

- Aileen Tulloch, Londonderry Town Administrator



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PLYMOUTH, VT

"The MERP program was straightforward and easy to navigate the process. It did not lack oversight or rigor and was clear what outcomes were desired. MERP is a model for all governmental grants."

"MERP helped us stay focused on energy efficiency with our renovation project."

"MERP staff along with the Regional Planning Commission made the process easy to navigate."

- Jay Kullman, Plymouth Selectboard Chair

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DEPARTMENT OF BUILDINGS AND GENERAL SERVICES

CHESTER, VT






"Meeting with your team was a game changer for our projects. I was very concerned that I was not going to be able to spend all of the funds we were given since we are not completing the lift in the Academy Building. After meeting your team, we have identified several additional energy improvements we can make. We would not have known that unless we met with your staff. The knowledge and understanding that you and your staff have about your program and your sincere desire to see positive outcomes for our community was what made the difference. Every question was answered thoroughly and thoughtfully with great advice and guidance. We so appreciated all that you offered us. Thank you so much."

- Julie Hance, Chester Town Manager

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BAKERSFIELD, VT


"We were fortunate to have the BGS team come to Bakersfield to review our MERP project and listen to our concerns. The team was polite, knowledgeable, thorough and patient. They took the time to listen to us, ask qualifying questions, investigate and provide a quick response. We would like to thank them for traveling all the way to Bakersfield and letting us show them our concerns and plead our case."

- John West, Bakersfield Selectboard

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FAIRFAX FIRE DISTRICT #1, VT

"The MERP grant has helped the Fairfax Fire District #1 significantly move towards our mission of providing safe, clean, and reliable water to our small water district. Through this grant we have been able to install a ground mounted solar system, battery backup system at our pump house, and install a heat pump. This work reduces our reliance on propane, but more importantly will allow us to provide water to our neighborhood when we lose power. Our system has never been able to afford a back-up generator and annually we typically lose power for at least a day due to wind, ice, or snow storms. With our back-up batteries people will be able to access water even when we do not have power making an uncomfortable situation more manageable. As an all volunteer Board, we have not previously sought out State funding, however working with the folks form the MERP team has made the process move smoothly and taught our Board a lot about how State funds work. The email exchanges, phone conversations, and site visits with the MERP team have made our small system feel important and really assisted us with completing this vital work. Helping small systems like our 27 connection water district to ensure we can reliably provide water to our neighborhood and generate our own power allows us to complete work we would never have been able to prioritize or afford. Thank you MERP team and everyone who helped bring this project to our community."

- Emily Morgan, Fairfax FD #1 Clerk & Prudential Committee Chair

Appendix B: MERP Envelope and Insulation "Cut Sheet"

Department of Buildings and General Services *Agency of Administration*
Municipal Energy Resilience Program
133 State Street, 5th Floor
Montpelier VT 05633

Building Envelope and Insulation Design Considerations

The intention of this document is to help guide the process of siting, design and installation of envelope insulation systems at Vermont municipal sites.

1. **Historic Review**- The First step in the process is to evaluate the need for a historical review by VT Division of Historic Preservation (VDHP). *Is the building on the Historic Registry or more than 50 years in age?* If YES, Projects require submitting a 2 page application for review. Some projects will be exempt from historical review per existing MOA which can be found on the MERP Implementation Grant | Buildings and General Services website. Special concerns: impact on air flow and removability of spray foam.

2. **Ground Work** -*Is there any major ground disturbance for foundations?* In design phase town records should be referenced to ensure there are no septic, well or utilities in the area. Before installation ensure Dig Safe reviews the excavation area for safety. (811 or 888-344-7233). Ground Disturbance of more than 100 square feet or new trenching may require Historical Review on buildings more than 50 years.

3. **Design**– Thermal envelope design and insulation approaches will vary from site to site.

   A. Consult with an licensed expert that is experienced in current technologies. Efficiency VT List

   B. Perform an analysis of the site and envelope information. Level 2 assessments provide all information for designers to choose the best approach. Blower door tests and Infrared Imaging technology quantify the tightness of the building and pinpoint areas of high leakage.

   C. Review design approaches, and options for insulating the structure. Common questions include the benefits of foam verse other approaches. Consider Cost savings. Understand the potential need for heat and energy recovery ventilators as building tightness increases.

   D. Evaluate the energy savings, fuel offsets, and building health vs investment including existing financial incentives.

4. **Permitting**- Ensure all the proper permits are filed for projects and considered in planning. Installation of new insulation could necessitate a Historical Review permit, a building or zoning permit, electrical permit, plumbing permit, or special fire permit.

5. **Types of Insulation**– Creation of a well sealed envelope often involves multiple types of insulation products and installation methods. Understanding the design approaches, costs, safety, and ease of installation for different types of insulation will ensure the best project outcome.

Fiberglass– Made from glass fibers it is one of the most common insulation types in the world. Commonly installed as batts and rolls in pre-cut sizes for stud spacing. Used in walls, floors and ceilings. R value varies with 3.1-3.4 per inch average.

Foam Board– Made from polystyrene, polyisocyanurate, or polyurethane. Liked for ease of installation over large spaces, rigid foam has high insulation value for little thickness. Used on walls, roofs and foundations.

Polystyrene– Most commonly Extruded or XPS. Known by its blue, pink or green color. Excellent moisture resistance, R value Avg. 4.2"
Polyisocyanurate or Polyiso– Often used for fire resistance due to foil face. R Value Avg. 5.4"
Polyurethane– Another closed cell foam that is used in both boards and spray foam. R Value Avg. 6.2"

Cellulose– Made from recycled paper and cardboard it is an environmentally beneficial choice for thermal insulation. The cellulose is often treated with boric acid as a flame retardant and provides resistance to insects.

Cellulose is a cost competitive option that has good thermal performance (R-3.5"), adds sound resistance, and can be retrofitted into buildings with less invasiveness. Cellulose blowers can be used to fill attics and walls by using access points and accurate drilling methods.

Spray Foam– Made from urethane foam and delivered by blowing agents. Has an R value of 6-7" providing excellent insulation. Closed cell foam creates both an air and moisture barrier. Has the ability to form to odd shapes and surfaces.

Spray foam is one of the most expensive insulation approaches in both material and specialist installation costs. Off gassing can be a health concern during installation. Foam is difficult to remove and creates long term landfill waste. Specific installation methods for historic structures that necessitate removable approaches. Like a vapor barrier over fieldstone foundations before foaming.

Mineral Wool– this insulation is also know as rock wool and comes in both batt rolls for stud walls and rigid boards for wall wraps and roofs. Liked for is fire resistance and natural material content. Mineral wool is moisture resistant but allows for air permeability. Avg. R value of 3"

6. Preliminary Site Inspection: NAIMA Checkpoints

1. Ensure that areas of to be insulated are not necessary to building airflow. This can include covering vents necessary for heating and cooling systems, filling cavities used for air return, or airflow near roof joists that connect to soffits.
2. Install blocking around areas that can not be filled with insulation, including attic access points, NEC code distances for recessed lighting fixtures, or heating systems, chimneys, and flues.
3. Inspect walls, ceilings and areas to be insulated for evidence of moisture penetration, peeling paint, or water stains. Make sure no repair or remediation is necessary before installation of new insulation.
4. Ensure that the addition of insulation will not necessitate reinforcement of the structure. This can include roof rafters, ceilings, and walls that can not handle increased weight loading or the pressure created during installation.

7. Installation Management– Contractors should identify and plan to deal with any issues associated with the site. Movement and storage of materials as well as access for workers will be important, and planning is required. In some cases, this may involve providing lifts or specialized jobsite vehicles. It is ideal to provide a secure storage area for materials and equipment. Never install insulation materials that have become wet or damaged.

Have a planning meeting with all contractors involved in the project. Ensure that there is a timeline established and that overlap of duties are planned. Time the carpenters, electricians, plumbers, roofers, dry wallers etc. to complete all tasks necessary before, during or after code compliant installation of insulation materials.

8. Insulating Active Systems– Insulation projects are not limited to walls, attics, foundations and floors. Insulation projects also include sealing of doors and windows, wrapping storage tanks and retrofitting pipe insulation. Local codes and manufacturers can also necessitate the installation of plastic and metal jacketing, fire retardant coatings and fire safety assemblies.

9. ASTM Standards

C168 Standard definition of terms relating to thermal insulating materials
C739 Standard specification of cellulosic fiber loose-fill thermal insulation
C755 Standard recommended practice for selection of vapor barriers
C1015 Standard practice for installation of cellulosic and mineral fiber
C1149 Standard specification for self supported spray applied cellulose

10. Ventilation Systems– Tightening up the building envelope saves on heating and cooling costs and increases comfort. In some buildings it is ideal to install ventilation systems that ensure healthy air flow, provide moisture control and reduce heat loss in air exchange.

Energy Recovery Ventilator (ERV) and Heat Recovery Ventilator (HRV) are devices used in HVAC systems to improve indoor air quality and energy efficiency by exchanging stale indoor air with fresh outdoor air while minimizing energy loss.

11. Project Completion and Testing– Perform a visual inspection to ensure that all areas are completed with no visible gaps, holes, settling or areas of concern.

A blower door test will provide accurate testing of the insulation gains. A comparison of blower door tests before and after the project can quantify the gains. IR cameras can be used to ensure that all air gaps have been filled and leaks sealed.

Savings in heating and cooling costs should be observed in future billing. Making the building more comfortable as well as decreasing the heating and cooling expenses.

Glossary Terms

Applied Thickness– The average thickness of insulation provided immediately after installation. It may be 5-12% greater than the settled thickness.

Backer Board- A rigid, non-vapor barrier forming material such as rock lath, treated cardboard, plywood, etc. which is used to cover the open side of an existing wall and forms a cavity which may be filled with loose-fill insulation. Backing boards and support structure must have sufficient strength to withstand the pressure developed during installation.

Blocking- Any material used to divide the area to be insulated from an area that is to be left free from insulation. (like soffit areas).

Blowing Agent: A substance added to spray foam to create bubbles or cells and aid in its expansion.

Closed-Cell Spray Foam- A type of spray foam insulation that is composed of cells that are completely sealed off from one another, providing a higher R-value and increased moisture resistance.

Curing: The process in which liquid spray foam transforms into a solid foam by chemical reactions and expansion.

Dense-Pack– Application technique used to apply cellulose insulation to enclosed cavities such as walls, floors, or ceiling, where cellulose insulation is pneumatically injected to pack the cavity full.

Design Density– The mass-per-unit-volume at which the product attains stated thermal resistance. For attic applications, it represents the final density achieved once settling has occurred.

Expansion Ratio: The degree to which spray foam expands from its liquid form after application. This ratio varies depending on the type and brand of spray foam.

Fill Tube- A tube or nozzle that enables a cavity to be filled through a single-entry hole.

Flash and Batt Insulation: A hybrid insulation method involving the application of a thin layer of spray foam followed by traditional batt insulation.

HFO (Hydrofluoroolefin): A newer, more environmentally friendly blowing agent used in some spray foams, replacing older, high-global-warming-potential agents.

Ignition Barrier: A material that prevents the ignition of spray foam insulation and is required in specific applications to meet building codes.

Open-Cell Spray Foam: A type of spray foam insulation with open, interconnected cells, offering a lower R-value compared to closed-cell foam but excellent sound dampening properties.

Overfill– Insulation sprayed beyond the stud face to insure a totally filled cavity after settling.

R-Value- A measure of thermal resistance, indicating an insulation material's ability to resist the flow of heat. Higher R-values

Settling– Refers to the compression or sagging of insulation over time. Settling is a natural process, however proper material installation can minimize losses over time.

Stabilized Cellulose– A cellulosic insulation product treated to resist settling. Stabilized cellulose, branded as such, will settle no more than 5 %.

Substrate: The surface or material to which spray foam insulation is applied, such as walls, roofs, or floors.

Vapor Barrier: A material that prevents the movement of water vapor through walls or ceilings, often used in conjunction with insulation to manage moisture.

Wall Scrubber– A tool with a rotating brush that grooms the insulation flush to the face of the studs.