

Climate Action Champions Application Template

Applications must be submitted electronically via EERE Exchange by **5:00 p.m. (ET) on October 27, 2014**. The Principal Investigator, identified below, should receive an email acknowledging receipt of the application within 24 hours. The application should utilize the template below and be submitted in Portable Document Format (PDF). Applications must not exceed 7 pages. Additional pages will not be reviewed. See Section V for additional information regarding Exchange.

Part 1: Administrative Detail

Project Title	Net Zero Montpelier	
Organization	City of Montpelier (Vermont State Capital)	
Principal Investigator	Name:	E-mail:
	William Fraser, City Manager	wfraser@montpelier-vt.org

Part 2: Current Approach and Strategic Plan

Please describe the local or tribal government’s accomplishments to date, existing approach/strategy to reduce greenhouse gas emissions and enhance climate resilience (particularly efforts that address both goals together) that demonstrates innovation and leadership. This should include identification of existing policies, systems planning, etc. that demonstrate a commitment to cutting greenhouse gas emissions and preparing the community for the potential effects of climate change, including increased resilience to extreme weather. Include key metrics and milestones.

Net Zero Montpelier

Montpelier is Vermont’s state capital, with a population of just over 8,000 people. The City serves as the hub of services, culture, employment and commerce for north-central Vermont and is the seat of the state’s government, many state offices and a vibrant business and non-profit sector. Montpelier is also home to *nationally significant energy innovation*. Some of the nation’s most significant energy initiatives have been launched from our humble state house – such as the now well-known concept of an “Energy Efficiency Utility,” Vermont’s leadership work on net-metering and distributed generation, our first-in-the-nation Standard Offer program for renewable technologies, and our emerging work on a Total Energy Standard.

As a City, Montpelier has made an innovative and highly visible commitment to sharply reducing - and ultimately eliminating - the use of fossil fuels across all energy sectors including heating, electric power and transportation. *In March of 2014 City officials joined with energy leaders from the state’s largest utilities and other key stakeholders to launch “Net Zero Montpelier” - a major initiative focused on making Montpelier the first net zero capital city in the country by the year 2030.* Achieving net zero means that Montpelier would meet all its energy needs (including electricity, heating and transportation energy use) through energy efficiency and renewable energy sources. While several cities have been working towards renewable electricity goals, we believe that Montpelier stands alone in the United States in its

commitment to eliminating fossil fuel use across all energy sectors. This ambitious goal, endorsed by the City Council and Mayor, sets a new direction for Montpelier's energy future that will stand as a national example of policy and practice towards elimination of green house gas emissions and local climate resilience.

Efforts & Accomplishments to Date

Montpelier is uniquely positioned to move forward on the net zero goal. Significant efforts over recent years include the following highlights of Montpelier's energy efficiency, renewable energy and climate resilience efforts:

District Heating to Displace Fossil Fuels

- The City of Montpelier has just completed installation of a state-of-the art Biomass Community District Heating system to provide local renewable and climate-resilient energy to heat buildings in downtown Montpelier. The District Heat plant will replace approximately 300,000 gallons of fuel oil per year with sustainably harvested wood chips. To enhance climate resiliency, it is built to 500 year flood requirements and will allow removal of many private oil furnaces and underground fuel oil storage tanks from potential flood areas.

Transforming Transportation

- The City is launching the Taylor Street Redevelopment and Transit Center. This project will develop a multi-modal transit center and provide a highly visible commitment to shifting transportation energy use in the City and for other cities across New England.
- Montpelier has four EV charging stations and two more currently being sited

Business Lead-By-Example – Integrated Energy Transformation

- The City's largest employer (National Life) has installed major energy efficiency measures, a sustainably sourced biomass heating system and, upon completion of a new 500kw net-metered solar array, will produce 3% percent of Montpelier's total commercial and industrial electricity use. National Life's investments also provide a climate-resilient facility to provide emergency services for the City.

Reducing Municipal Electricity Consumption

- The City has reduced total electric use by 20% from our 2006 electric energy baseline.
- A LED Street light retrofit saves about 253 MWh, enough power for 40 homes/year.

Building Energy Efficiency

- 15% of Montpelier's homes have been weatherized since 2006
- Energy efficient State buildings through a new \$8 million revolving loan fund
- Montpelier businesses use 16% less electricity than in 2006
- Montpelier's municipal buildings and schools use 19% less energy than in 2006

Community Solar Capacity

- Montpelier has issued a Solar RFP for a 1 MW community net metering project to provide electricity to City buildings.

Flood Resiliency

- Montpelier is defined by four rivers that shape our landscape and land-use patterns. Climate-related impacts largely focus on increased flood damage to public infrastructure, private homes and businesses, and interruptions to daily life and commerce. Montpelier has implemented zoning regulations that protect rivers and streams and include extensive

regulations concerning stormwater mitigation, both in zoning and within the review role by the Department of Public Works. In addition, site plan review provisions require protection of rivers and streams in all development proposals and all new development in the floodplain must be built above the base flood elevation.

Explain the strategic plan for future actions that either initiate new or further existing efforts, including policies, systems planning, etc. that demonstrate a commitment to cutting greenhouse gas emissions and preparing the community for the potential effects of climate change, including increased resilience to extreme weather. Include key metrics and milestones.

Strategic Plan, Goals, Metrics & Milestones

Montpelier has framed a dynamic 15 year strategic plan for its energy use across the electrical, thermal and transportation sectors so that all possible net uses are met by renewable resources by 2030. As Montpelier is a City defined by four rivers, our climate resiliency efforts focus on reducing flooding and related damage to public and private infrastructure. In addition to strict zoning regulations that protect rivers and streams and permitting provisions that require new development in the floodplain to be built above the base flood elevation, Montpelier’s climate resilience will stem from creating a distributed energy generation system maximizing use of locally available, renewable energy sources.

Electric Goal, 2014-2030

2014-15 “Kick-Off” Year Objectives	<ul style="list-style-type: none"> ▪ Commercial, Residential use: identify largest users; execute plan for Stage I reductions. ▪ City Smart-meter Infrastructure: increases participation by target 10%. ▪ City Solar Capacity: New city 1 MW system in place. ▪ New Electrical Generation: Identify sites & partners; plan & incentivize new generation; establish/support solar cooperatives for residents.
5 year Objectives (2016-2020)	<ul style="list-style-type: none"> ▪ Commercial electrical: Target 20% reduction from base ▪ Residential electrical: Target reductions in 40% of homes ▪ Complete infrastructure for smart meters through city ▪ Complete solar capacity for City/State critical needs ▪ New renewable electrical generation: Target 30% over baseline
10 Year Objectives (2021-2025)	<ul style="list-style-type: none"> ▪ Commercial electrical: Target 30% reduction from baseline ▪ Residential electrical: target reductions in 60% of homes ▪ New renewable electrical generation: Target 60% over baseline
15 year Objectives (2026-2030)	<ul style="list-style-type: none"> ▪ Commercial electrical: Target 40% reduction from baseline ▪ Residential electrical: Target reductions in 80% of homes ▪ New renewable electrical generation: Target 90% over baseline

Thermal Goal, 2014-2030

2014-15 “Kick-Off” Year Objectives	<ul style="list-style-type: none"> ▪ Commercial heating/cooling: identify largest users; execute plan for City incentives & finances to reduce use by a 10% target. ▪ Install infrastructure for fuel metering throughout city. ▪ Residential heating: reduce thermal energy use a 5% target from baseline. ▪ District Heat plant: Phase I complete and operational. ▪ Fuel Switching: complete plan to convert a target of 5% of homes from baseline.
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Five-year Objectives (2016-2020)	<ul style="list-style-type: none"> ▪ Commercial heating/cooling: Target 20% reduction from baseline. ▪ Install infrastructure for fuel metering thru city. ▪ Residential heating: Target 30% thermal energy use reduction from baseline. ▪ Expand District Heat plant to target supply to 90% of downtown. ▪ Fuel Switching: target 30% over baseline.
Ten-year Objectives (2021-2025)	<ul style="list-style-type: none"> ▪ Commercial heating/cooling: Target 30% reduction from baseline. ▪ Residential heating: Target 40% thermal energy use reduction from baseline. ▪ Expand District Heat plant to supply target 90% within City boundary. ▪ Fuel Switching: Target 60% over baseline.
Fifteen-year Objectives (2026-2030)	<ul style="list-style-type: none"> ▪ Commercial heating/cooling: Target 40% reduction from baseline. ▪ Residential heating: Target 50% thermal energy use reduction from baseline. ▪ Fuel Switching: Target 90% over baseline.

Transportation Goal, 2014-2030

2014-15 “Kick-Off” Year Objectives	<ul style="list-style-type: none"> ▪ City transport: Target 5% reduction from baseline. ▪ Fuel Switching: Target increase 5% over baseline. ▪ Public Transportation: Target increase bus use by 10%; improve bike facilities. ▪ Transportation Management: create parking management plan; complete multi-modal transit center. ▪ Transportation Management: Manage employer-based transport demand.
Five-year Objectives (2016-2020)	<ul style="list-style-type: none"> ▪ Reduce city transport: Target 20% reduction from baseline. ▪ Fuel Switching: Target increase 30% over base; power City fleet via renewables. ▪ Public Transportation: RR track trolleys; incentivize bus and bike use.
Ten-year Objectives (2021-2025)	<ul style="list-style-type: none"> ▪ Reduce city transport: Target 40% reduction from baseline. ▪ Fuel Switching: Target increase 50% over base; develop wireless EV charging. ▪ Public Transportation: incentivize bus/train use; ▪ Transportation Management: real-time traffic controllers.
Fifteen-year Objectives (2026-2030)	<ul style="list-style-type: none"> ▪ Reduce city transport: Target 60% reduction from baseline. ▪ Fuel Switching: Target increase 70% over base; develop wireless EV charging. ▪ Transportation Management: Parking relocated from surface lots

Density Goal, 2014-2030

2014-15 “Kick-Off” Year Objectives	<ul style="list-style-type: none"> ▪ Commercial density: Target 2% increase over base: Incentivize development. ▪ Residential density: Target 2% increase over base: new zoning, incentives ▪ Per Capita Energy Density: Target decrease 2% over base: Incentives
Five-year Objectives (2016-2020)	<ul style="list-style-type: none"> ▪ Commercial density: Target 10% increase from baseline. ▪ Housing density: Target 10% increase from baseline. ▪ Occupant Energy Density: Target decrease 10% over baseline.
Ten-year Objectives (2021-2025)	<ul style="list-style-type: none"> ▪ Commercial density: Target 20% increase from baseline. ▪ Housing density: Target 20% increase from baseline. ▪ Occupant Energy Density: Target decrease 20% over baseline.
Fifteen-year Objectives (2026-2030)	<ul style="list-style-type: none"> ▪ Commercial density: Target 30% increase from baseline. ▪ Housing density: Target 30% increase from baseline. ▪ Occupant Energy Density: Target decrease 30% over baseline.

List any recognitions or awards that have been received related to climate preparedness, resiliency to increasing threats/hazards, sustainability, clean energy, drought response, etc. (e.g., C40 city) in the last five years.

- US DOE American Recovery and Reinvestment Act award, 2010 – \$8 million US Department of Energy award to City of Montpelier for construction of biomass district heating facility
- Federal Transportation Administration award, 2004 – \$1.9 million to fund the 1 Taylor Street multi-modal transportation center redevelopment project.
- Federal Highway Administration award, 2011 – \$5.3 million to fund the 1 Taylor Street multi-modal transportation center redevelopment project.

Communicate any potential risks or challenges to successfully completing the strategic plan described above, including measures that have been taken to mitigate those risks or address those challenges:

Meeting Montpelier's goal of Net Zero Energy use by 2030 is an enormously ambitious task fraught with uncertainty and risk. Reducing green house gas emissions and transitioning to a clean energy economy is a bold, creative endeavor with significant challenges every step of the way. While it is impossible to articulate all risks, challenges and mitigation measures in this brief application, our overall approach will focus on the following:

Thermal Energy – The most significant challenge to transitioning to Net Zero thermal energy will be achieving deep efficiency retrofits to public and private buildings. The major strategies Montpelier will use in this area include: 1) aggressive efficiency programs through Efficiency Vermont; 2) development of new finance products to fuel the low and middle income markets; and 3) extensive public outreach and neighbor-to-neighbor education efforts from trusted local sources in the City.

Transportation Energy – As Montpelier is the Capitol of a rural, car-dependent state, transportation energy use is a particular challenge, and a valuable model for other rural areas of the nation. This challenge is increased by the fact that long-range electric vehicles are still an emerging technology. The major strategies Montpelier will use in this area include: 1) Reducing vehicle miles travelled through expanding public transportation options; 2) shifting from gas powered vehicles to high efficiency Electric Vehicles; 3) installing a robust EV charging infrastructure; 4) installations of renewably powered EV charging capacity at homes, businesses and public institutions.

Electric Energy – Vermont is already leading the US in terms of renewable electricity generation and is poised to continue to lead in this area through a range of innovative strategies. The major challenges in this sector are related to increasing electric power needs as we move to strategic electrification through cold climate heat pumps and electric vehicles. In Montpelier, efforts will focus on 1) expanding solar capacity through “community net-metering” approach to solar energy; and 2) developing new community ownership models for larger solar and wind projects to increase local investment and reduce opposition.

Outline potential replicability/scalability of the current approach and strategic plan to

other communities who may seek similar outcomes:

Building on Vermont's history of providing a nationally significant best-practices laboratory for replicable and scalable strategies for energy efficiency and renewable energy generation, Montpelier's Net Zero program provides a valuable and highly visible model for small towns and cities across the Northeast and beyond. Highlights of replicable/scalable elements of our approach include the following:

Heat:

- Development of model programs for deep efficiency retrofits in residential, commercial and public buildings through Efficiency Vermont (state-wide efficiency utility)
- Demonstration and testing of the Property Assessed Clean Energy (PACE) program
- Demonstration of biomass district heating system to displace fuel oil (Northeastern US uses 85% of the nation's home heating oil)
- Demonstration of cold climate heat pump technology

Electricity:

- Demonstration of new "Community Net Metering" model for solar generation
- Demonstration of "strategic electrification" through emerging high-efficiency technologies to displace fossil fuels through cold climate heat pumps and electric vehicles
- Demonstration of new community investment and ownership models for large scale renewable energy generation projects

Transportation:

- Demonstration of electric vehicle charging infrastructure for private residents and commercial and public institutions
- Demonstration of grid-integrated electric vehicles linked to residential and institutional renewably-powered charging infrastructure
- Demonstration of public transit and transport management strategies to reduce vehicle miles travelled

Part 3: Resources and Partnerships

Describe participation in existing Federal government programs, particularly those associated with energy and water efficiency, water reuse, renewable energy deployment, and climate resilience, including, but not limited to the following: EV Everywhere, Rooftop Solar Challenge, WaterSMART Basin Studies, Hurricane Sandy-related competitive grant programs, Federal Transit Administration or Federal Highway Administration climate adaptation pilot programs, Federal Green Challenge-Water, WeatherReady Communities, and Partnership for Sustainable Communities. Demonstrate how the local or tribal government's engagement in these efforts could be leveraged or amplified through designation as a Climate Action Champion.

- US DOE American Recovery and Reinvestment Act award, 2010 – \$8 million US Department of Energy award to City of Montpelier for construction of biomass district heating facility
- Federal Transportation Administration award, 2004– \$1.9 million to fund the 1 Taylor Street multi-modal transportation center redevelopment project.
- Federal Highway Administration award, 2011 – \$5.3 million to fund the 1 Taylor Street multi-modal transportation center redevelopment project.

Please describe the local or tribal government’s commitment to the current approach and strategic plan and any additional resources it plans to pursue and/or commit to support the desired objectives:

The City of Montpelier has expressed support for this project through a unanimous February 2014 City Council vote to make Montpelier the first net zero capital city in the country. The project leverages and amplifies investments in energy efficiency made by: 1) Efficiency Vermont for electric and thermal efficiency; 2) various weatherization programs; 3) Green Mountain Power’s Cold Climate Heat Pump pilot program; 4) extension of the city-state-federally funded district heat system; 4) catalyzes other community net zero efforts through emerging “Net Zero Community” partnership program; 5) demonstrates and pilots Vermont’s new “Community Energy Dashboard;” and 5) other public and private philanthropic investments. Montpelier has committed the following resources to the initiative:

- A \$2 million bond to help finance the new biomass district heating plant in 2011
- A Solar RFP for a 1 MW community net metering project to power City buildings
- A 10 year Capital Improvement program investing \$178,000/year for the next 8 years in weatherization and efficiency work for City buildings.

Please describe how the local or tribal government plans to engage key program partners and stakeholders including any local Federal facilities.

The City of Montpelier has engaged a powerful array of program partners including:

Net Zero Montpelier Partners & Supporters

Green Mountain Power	Vermont Natural Resources Council
Efficiency Vermont	Vermont Technical College
Vermont Energy Investment Corporation	National Life Group
State of Vermont	Agency of Buildings & General Services
Energy Action Network	Vermont Energy & Climate Action Network

Montpelier Energy Advisory Committee

Alison Hollingsworth, Vermont Energy Investment Corporation	Bill Neuburger Hallam, ICS Engineering
Tim Shea, National Life Group	Dan Costin, Northern Power Systems
Andrea Colnes, Energy Action Network	Dan Jones, Consultant
Paul Markowitz, Vermont Energy Investment Corporation	Geoffrey Fitzgerald, Private Attorney
Robert Dostis, Green Mountain Power	Johanna Miller, VT Natural Resources Council
Andrew Stein, VT State Auditor’s Office	Ken Jones, VT Agency of Commerce & Community Development
Anne Watson, Governor’s Institute on Engineering City Council	Rebecca Wigg, Regulatory Assistance Project
Barbara Conrey, VT Technical College	Scott Muller, Institute for Sustainable Communities
Barry McPhee, VT Public Service Dept.	State of Vermont – advisory capacity

Other notes – if there is any other relevant information the local or tribal government would like to convey, please include it below:

Net Zero Montpelier has many documents and additional strategic materials available upon request.