REQUEST FOR PROPOSALS

District Energy Center and District Heat Distribution System Design, Permitting and Construction

Issued by:

Montpelier Community Renewable Energy Project
City of Montpelier, Vermont
Department of Planning and Community Development

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Contents

Please refer to separate attached document for Special Terms and Conditions.

Introduction

Vermont's Capital City, Montpelier, is deeply committed to leading the region and the nation in implementing strategies to deploy renewable energy technologies and reduce its carbon footprint. The City has committed to a goal of reducing greenhouse gas emissions and fossil fuel consumption by the City, its citizens and its business community by at least 80% by 2030. The energy plan the City has adopted includes residential and commercial energy efficiency improvements, renewable energy generation, transportation alternatives, bicycle and pedestrian improvements, and a new multi-modal transit facility.

The U.S. Department of Energy is interested in seeing the development and demonstration of a district energy system providing renewable energy that meet municipalities' needs with high efficiency and low emissions, and that could be replicated in other communities across the nation.

The City has made the commitment to design and construct a state of the art biomass-fueled district energy system that will provide clean, efficient production of renewable, sustainable, biomass energy for heat and electric power for Montpelier's downtown and the Vermont State Office Capitol Complex. This system will be:

a) Designed and built in partnership with the State of Vermont, incorporating some elements of the existing system that currently provides the State Complex with heat. Other ownership models may be considered.

b) Constructed with state of the art technology and equipment to maximize efficiency, minimize emissions, and ensure long-term system durability.

c) Constructed and implemented in compliance with all permits and with processes and systems that are verified and documented during construction, start-up, and commissioning in order to assure that it can be easily replicated in other communities and is a model of performance notable for its quality and ease of maintenance.

This RFP is focused on designing, permitting and constructing the Energy Center and District Heat Distribution System to serve the State of Vermont buildings in the Capitol Complex and the Montpelier community and to generate electric power. Specifications for this facility are provided herein; alternatives that achieve an equivalent outcome may be proposed with an acceptable demonstration of their equivalency.

Scope

a) **General:**

The scope of this RFP is to provide services to design, permit, and build an Energy Center and District Heat Distribution System that provides steam and hot water to serve the State of Vermont buildings and the Montpelier community, and electrical energy to the electrical grid. The project shall meet the goals of the DOE grant application and the provisions of the attached DOE Special Terms and Conditions. The following is critical for the Energy Center and District Heat Distribution System:

i) It must be easy to operate and maintain with particular emphasis on the need for minimal intervention by the plant operator.
ii) Systems with a demonstrated history of minimal equipment breakdowns and a history of reasonable repair and replacement costs, from a supplier with a history of supplying responsive service when needed.
iii) A very clean-burning system, with no likelihood of complaints about smoke or odor from building occupants, visitors to the facility grounds or neighbors.
iv) A highly efficient system, which minimizes the annual fuel requirements to meet both user requirements and power generation requirements.
v) A system that is designed to function efficiently with minimum emissions through a range of system loading.
vi) The Montpelier Community Renewable Energy Project requires a system that is flexible in its ability to handle a variety of woodchip fuel types available in Vermont.

b) **Challenges**

i) The Energy Center Site is in the 100 year flood plain and on the edge of a steep, high river bank.
ii) The Energy Center Site is located in the Capitol Complex District/Historic District and subject to both the Montpelier Master Plan and the Capitol Complex Master Plan. Many buildings in this area are on the National Register of Historic Places. Site utilization, building orientation, and preservation of view sheds are important values to the community.
iii) Supplying the needs of the current State steam distribution system, but with the capability of supporting this system should it be converted to hot water at some future date.
iv) Constructing the Energy Center without interrupting critical service currently provided by the existing State Boiler Plant to the existing State complex buildings.
v) State Street is planned for re-paving in 2011, which drives the schedule of the district heat piping in this portion of the downtown.
vi) Reconciling the project permitting schedule with the project equipment procurement and construction timelines.

c) **Project Context**

i) Existing Information: Two major reference documents can be accessed at the City of Montpelier's website http://www.montpelier-vt.org/community/99.html. These documents represent the work completed on the Montpelier Community Energy Project to date:

(1) The narrative portion of the City of Montpelier's application to the U.S. DOE for grant assistance ("DOE Grant Application")

(2) An Energy Feasibility Study, prepared for the City of Montpelier District Energy CHP System, April 7, 2010 by Veolia Energy and addendum dated July 14, 2010

(3) In the event information in the two reports appears to contradict one another, the information contained in the DOE grant Application shall be used.

d) **Project Size**

i) The Contractor shall size the project to meet the goals contained in the DOE Grant Application.

ii) It is the responsibility of the selected Contractor to develop the capacity requirements for the project. The objectives are as follows:

(1) Shall produce adequate steam to meet the current and future needs of the State steam distribution system. The current State steam distribution system operates at 50 psig steam, represents an estimated heat load of 25.05 MMBTU/H and requires an estimated 40,280 MMBTUs annually.

(2) Design and construct a district hot water distribution system serving the Montpelier community that meets the goals of the project, is cost effective, enables ease of connection, and provides for continued expansion.

iii) While the reference documents outline peak MMBTU/hr values, it is critical that the Contractor consider the demand curve for the loads and provide the proper sizing of the primary heating equipment, backup heating equipment and any heat storage to provide a sizing that is economical to install and operate over the life of the facility and meets the needs of the users under normal and emergency situations.

iv) Power Production Sizing: The Energy Center is first and foremost a thermal energy plant. The production of electrical power should be driven by increases in overall system efficiency and enhancing economic operations.

e) **Energy Center Scope**

i) General: Design, Permit, and Construct a state-of-the-art Energy Center which will produce heating, domestic hot water, and electricity to the City of Montpelier and the State Complex for the next 70 years. Provide an appropriate level of power generation to optimize the operating efficiency of the Energy Center and the financial aspects of the project, and meet the goals of the project for generating power locally from a renewable fuel.

ii) Location: The proposed location is on the site of the existing State boiler plant at 122 State Street. The Energy Center will replace the functions of the existing State boiler plant.

iii) Fuel Specification
   (1) The combustor shall be designed as primarily fueled with whole tree green wood chips that are unscreened, field chipped, green stems with bark, mixed hardwood species. All proposals should include this option. **For the purposes of this proposal all calculations for green wood chip use shall be based on the following:**
      (a) **Fuel Higher Heating Value = 8200 BTU/oven dry pound of fuel**
      (b) **@50% moisture content wet basis**
   (2) Alternative proposals using alternatives to green wood chips are acceptable if they can be shown to meet the performance specifications. These fuels need to be local, renewable, and meet the goals of the project.
   (3) A fuel oil fired back-up system shall be provided that is capable of meeting the entire heating load of the overall system under all conditions. Details of the backup fuel storage for the system shall be provided in the proposal.

iv) Energy Center Technologies: The feasibility study completed by Veolia Energy recommends biomass fired steam boilers with a back-pressure steam turbine to produce power. This technology shall be one of the alternatives included in each proposal. Bidders are encouraged to develop the general arrangement, configuration and phasing to the implementation of this technology that provides the most effective solution for the Energy Center. Bidders are encouraged to propose alternate technologies and configurations that can meet the requirements of this specification. Bidders shall provide information in their proposals that demonstrates their effectiveness and experience with each technology proposed.

v) Energy Center Phasing and Turn-Down: The demand on the Energy Center will vary significantly during daily and monthly operation and throughout the life of the plant as components are added to the district heating system. Proposals should address system operation, turn-down, and project phasing.

vi) Energy Center Reliability:
   (1) The Energy Center shall be designed with a high degree of reliability. It shall have adequate redundancy in equipment to insure that it is capable of delivering heat at an appropriate level at all times.
   (2) The Energy Center shall be capable of heating the district at an appropriate level without utility power.

vii) Wood Chip Storage:
   (1) The site presents real challenges to providing fuel storage due to the flood plain and the requirements driven by being located in the Capitol Complex District/Historic District.
   (2) Wood Chip Storage Quantity:
      (a) The need for fuel storage is driven by periods when fuel cannot be delivered. Routinely there are periods when forest harvesting and fuel deliveries cannot be accomplished due to seasonal conditions. Roads are routinely not passable either due to an ice storms or mud season.
      (b) Proposals should consider the requirements for management of deliveries as it

affects the design of the fuel storage facility.

(c) Nearby off-site storage may be a necessary option to practically provide a reliable fuel source for this facility and should be considered by bidders.

(d) Proposals shall include an on-site fuel storage alternative with a minimum 5-day period of primary fuel supply at peak plant output with no fuel delivery.

(3) Proposed storage configurations shall have a record of effectiveness in cold climates similar to that of Montpelier.

(4) Storage of green chips can result in degraded fuel quality. Bidders shall address this issue in their proposal as well.

(5) Delivery Vehicle Type and Chip Storage Loading: It is assumed that the majority of chip deliveries will be made in 40' or 45' self-unloading trucks which hold approximately 25-30 tons per load. Although there are very few chip suppliers who use dump trucks, the storage system will be capable of easily accepting dump truck or dump trailer deliveries, up to 30 tons per delivery,

(6) Fuel Storage Unloading Equipment: Each bidder's proposal shall include a fully automatic fuel storage unloading system of its own design. The mechanical equipment shall be of rugged durable construction, have low maintenance requirements, and be capable of long term regular daily use. The unloading equipment shall be capable of functioning in a trouble free manner in all seasons and with the fuel specified, or a proposed alternative. The unloading system must be configured to clean the full width of the base of the bin. The unloading equipment and any other chip handling equipment shall be capable of moving the listed fuels on a regular operational basis without experiencing jamming or shutdowns.

viii) Fuel Handling Equipment: The installation shall include a fully automated fuel handling system to convey fuel from the discharge of the fuel storage unloading system to the boiler or combustor. The handling system shall be designed to handle the fuel specified with particular emphasis on the occasional long chip. The handling system design shall give special consideration to locations where longer fuel pieces might hang up or bridge: junctions of augers or conveyors, auger bearing hangers, metering bins, etc. These critical locations shall be designed or sized in such a way as to prevent disruption to the fuel flow

ix) Fuel and Air metering and Combustion Controls: The system shall include the fuel metering capability to deliver fuel to the combustion grates at the appropriate rate for optimum combustion. The fuel feed rate must be easily adjustable, for tuning of the combustion process. The fuel feed system must be able to automatically respond to varying load conditions, supplying fuel to the fire at a faster rate during high-load conditions and at a slower rate during low-load conditions. The feed system shall have at least three primary firing rates (low, medium, and high) plus a "pilot" or fire maintenance mode, with firing rate automatically selected based on load conditions. For periods of very little or essentially no load, the system shall automatically go into the fire maintenance mode and re-start itself when the load returns. In the same way that fuel feed rates need to be variable for tuning purposes, the rates of supply of

combustion air to the combustion zone(s) must also be automatically adjusted, so that the proper amount of air to achieve desired combustion conditions can be met, particularly when the fuel feed rate is varied. Systems that allow separate variable adjustment of primary and secondary (or tertiary) combustion air streams are desirable. The ability of the system to control excess air to the combustion zone is extremely important and will be considered in judging proposals. The overall heat distribution system controls will be designed with the wood boiler as the primary boiler, and to deliver hot water to the District Energy Distribution System with its temperature modulated according to the outside temperature. The control interface between the wood and oil boilers will also be the responsibility of the Contractor.

x) Combustion and Combustion System Type: The system shall include a primary combustion chamber located in a separate combustor next to the boiler, or in the boiler base. These specifications are not premised on a preference for either type of combustion system. The combustor system shall house a durable grate system with provision of both under-fire and over-fire combustion air. Pre-heating of the over-fire combustion air is desirable. The combustor shall be refractory lined. The combustor shall be highly insulated and jacketed to reduce radiant losses to the boiler room. For systems with separate combustors, these must be designed in such a way that heat generated in the combustor is transferred to the gas stream and delivered to the boiler heat exchanger, so that there is not excessive radiant or conductive loss from the combustor to the boiler room ambient environment. Any system with a water-cooled combustor must have a water-to-water heat exchanger to extract heat from the cooling water and transfer it to the return main of the wood boiler. The system supplier shall also supply any base necessary for support of the boiler or for housing the grate and refractory system. The base shall be insulated so as not to present a safety problem to operators or casual occupants of the boiler room, and the insulating material shall have a durable protective covering if it is external to the base. The Contractor will be responsible for the supply of outside air louvers to supply combustion air for both the oil and wood boilers.

xi) Heat Exchanger (High Pressure Steam Boiler): The system shall include an ASME-rated 400 psi solid fuel high pressure steam boiler(s) as heat exchanger (with clearly visible ASME stamp). The boiler shall be equipped with normal trim, standard practice safety devices, and primary control based on boiler steam pressure and temperature. The sizing of the heat exchanger (boiler), including sizing of the fire tubes, is the responsibility of the Contractor. To keep efficiency from suffering at design-load conditions, the heat exchanger shall be sized large enough that, at high-load conditions, stack temperature does not increase sharply compared to low-load conditions.

xii) Ash Removal: An automated ash removal system shall be provided by the Contractor to remove ash from 1) the primary combustion zone; 2) from any other location within the boiler/combustor assembly; and/or 3) to automatically convey the collected ash out of the boiler room for discharge into a container. The ash build-up on the grates should not adversely affect system combustion, efficiency or emissions. The

Facility requires that the system function for extended periods of time without operator attention to ashing.

xiii) Boiler Tube Cleaning. An automatic "soot blower" or boiler tube cleaner is required under these specifications to minimize fly ash buildup in the heat exchange tubes, to reduce stack temperature, and to reduce maintenance requirements. The complete system shall include the air compressor and all wiring supplied by the Contractor.

xiv) Fire Prevention System. The Contractor is responsible for providing an automatic heat-sensing fire-suppression system at key points in the wood handling and combustion system. The purpose is to prevent burn-back from the combustion area into the fuel supply stream, and to detect and deal with any fire situation which might be caused by and threaten the wood system or the building structure. The Contractor will be responsible for providing general sprinkler protection of the building areas where its equipment is located.

xv) Stack and Breaching. The Contractor shall determine the viability of reusing the existing facility boiler room stack. There is a strong preference to continue to use and maintain the existing stack as it is a landmark in the Historic District. However, if deemed not usable, the stack which vents the wood boiler system shall be designed and supplied under the contract. Stack height shall be designed for optimal dispersal of stack gases, meet Good Engineering Practice Stack Height and to avoid the likelihood of stack gases being brought into the Facility's ventilation system through roof-top and other units and fit with any applicable criteria of the Historic District.

xvi) Electrical, Control Panel and Controls: The Contractor shall be fully responsible for the control panel which operates its system and for all controls which are part of its system including bringing power to the control panel. The Contractor is required to provide compatible direct output (DO) or analog output (AO) signals to indicate, at a minimum:

(1) Wood burner status (pilot, low, medium, high) (DO)
(2) Chip handling system trouble/status (DO)
(3) Stack temperature (AO)
(4) Steam turbine status
(5) Oil burner status
(6) Oil feed system trouble/status

xvii) Information System: An automatic phone dialer to report the condition of the wood system is a required component of the wood system. The dialer shall be capable of receiving alarm signals associated with the operation of the wood system and of being programmed to call the appropriate phone number. The Contractor is responsible for installing and setting up the dialer. The Facility will be responsible for supplying a phone line to the boiler room. The Contractor will be responsible for coordinating any interface between this information system and the facility's overall alarm system. The information system shall also include a modem which will allow the manufacturer and maintenance staff to call in to check the status conditions of the wood boiler.

xviii) Instrumentation: Sufficient instrumentation to allow operators to understand and react to equipment status immediately shall be provided. At each steam producing device, whether conventional boiler or heat recovery steam generator, at a minimum, the following parameters must be conspicuously displayed with circular chart recorders (or their electronic equivalent which shall record and save data in non-proprietary text format) attached and operational: a) Steam Pressure, b) Steam Flow in pounds per hour, c) Outside air temperature, c) Flue gas temperature, Flue gas O2 content, Flue gas opacity, Flue gas CO content and Boiler feed water temperature. More parameters may be proposed.

xix) Electrical demand and Electric Use of Wood System: The cost of electricity to run the wood system is a concern of the Facility, and is determined by the peak demand of the system and by the electrical consumption of the system. Bidders shall include in their proposals a complete list of all electric motors (or other devices in their proposed systems with significant electric draw), complete with sizing in connected horsepower, motor type (AC or DC), drive type (electric or hydraulic), and type of service (continual while firing, intermittent, etc.). The bid shall also include the total installed connected horsepower of all electrical devices. Bidders shall provide in their bids estimates of the peak demand of the system (in KW) and mid-winter monthly electrical consumption of equipment provided under the contract (in KWH).

xx) Power Generation: The Contractor shall recommend the appropriate technology and size for the power generation component of the Energy Center and estimate of annual amount of electricity generation. This scope includes developing the various alternatives for selling the power required to develop the optimum return on the power generated and then executing the contracts in cooperation with the City of Montpelier to establish the appropriate power purchase agreement(s). The proposed electrical generation equipment shall provide automatic, continuous duty electric power generation. It shall be fully compatible with existing electric power service with respect to voltage, frequency, harmonics content, and power quality. The generator(s) shall be selected from equipment routinely offered as standard, off-the-shelf equipment by reputable manufacturer/suppliers. Electrical generation equipment installed for this project shall be skid-mounted, factory assembled, modular, packaged units furnished complete with voltage and frequency regulation systems, cooling and lubrication systems, instrument package, and necessary features to meet all applicable standards. The General Contractor shall include all necessary auxiliary systems, including grid inter-connect, synchronization panels, cooling towers, pumps piping, make-up water feed, chemical treatment, tower blow down and power systems that may be needed. The electrical generating equipment shall be able to operate in part load and shall be able to start and re-start frequently.

xxi) Catwalks, Ladder, Platform and Safety Guards: All equipment supplied under these specifications shall be guarded, to the extent practical, to prevent accidental injury to system operators or to casual occupants of the boiler room or chip storage bin. All augers or fuel conveyors shall have covers unless such covers interfere with

the operation of the equipment. In such cases, other means of assuring the safety of the equipment operators must be provided. Warning signs shall be installed by the Contractor in areas of particular safety concern. For systems with a separate combustor with a top-hinged access cover that must be opened for regular maintenance while the combustor is hot, the system manufacturer shall include the supply of protective gloves, face mask, and coat. For combustion systems without a separate combustor and with a vertical access door for ash raking and removal, the manufacturer shall supply protective gloves only. The Contractor shall be responsible for the supply or installation of any ladders, catwalks, or platforms which are needed or recommended for maintenance and easy access to the system components. All such items shall conform to State Building Code requirements.

xxii) Spare Parts and Necessary Equipment. Each bidder shall list in its Bid all spare parts for its system that it believes should be stocked by the Montpelier Community Renewable Energy Project on site, and shall supply this equipment as part of its Base Bid.

xxiii) Installation and Coordination. The Contractor shall be responsible for the installation of all equipment to be supplied under these specifications. This installation includes responsibility for setting all equipment in place. The Contractor shall be fully responsible for the cost of rigging and moving the equipment into its final location. The Montpelier Community Renewable Energy Project assumes no responsibility for coordinating the installation schedules of the General Contractor and its subcontractors.

xxiv) System Instrumentation and Tuning. All instrumentation shall be of sufficient accuracy and precision as to support efficient and reliable operation. Data Quality Objective of all instrumentation shall be stated and all instrumentation shall be calibrated prior to initial system start-up. The system must be scientifically tuned both upon initial installation and again by schedule set by the City of Montpelier. On-site tuning shall be performed by an experienced and knowledgeable factory representative approved by the city of Montpelier. The cost of tuning the system, including any adjustments necessary to achieve the performance stated in the proposal, shall be included in the Contractor's responsibilities. The commissioning tune-up is intended to optimize system performance (overall efficiency and emissions). The results of the tune-up shall be in written form and submitted to the City of Montpelier.

xxv) Maintenance Requirements, Training and Manuals. The Contractor shall provide sufficient and coherent training for the Facility's maintenance staff in the proper operation, maintenance, and routine trouble-shooting of the woodchip system. The installer shall also be responsible for supplying four (4) sets of manuals which include documentation on all logic diagrams, computer algorithms (if any), instrumentation and controls wiring diagrams, information on control systems, explanation of the various system components, and other information on the operation of their system which is necessary documentation for the system operators. Upon completion of the commissioning, the Contractor shall supply four (4) sets of "as-

built" prints of the system and its components.

xxvi) Optional System Components. The bidder may propose optional system components that are believed to contribute to improved operations and maintenance and increase the overall reliability and efficiency of the Montpelier Community Renewable Energy Project. The cost of these options shall be identified separately from the Bidder's Base Bid. With an explanation as to why the Bidder's believes these options will deliver their value.

xxvii) Permit and Code Compliance. The Contractor shall be responsible for any permit fees associated with the system installation, including trade permits. The General Contractor and its sub-contractors shall be responsible for supplying trade permits and inspections, with particular attention to the State Boiler and Pressure Vessel Rules and the State Fire Prevention and Building Code. The Contractor shall be responsible for costs of bringing its system components and equipment into compliance with any local, state, and federal codes.

xxviii) Warranty and Service Capability. The installation of all of the equipment under the project shall carry a full unconditional warranty for a minimum of 18 months from acceptance of the system. In addition, the Contractor shall provide its standard equipment and operation warranties and any warranties specific to purchased equipment installed as part of the system. After successful initial operation, the Contractor must have its own trained trouble-shooting capability within close proximity (in Vermont) during the initial period of regular operation and through Project acceptance. The installer shall provide 24-hour emergency service capability (meaning on-site response within 24 hours of notification, regardless of time of day) for the period through system acceptance. After acceptance and during the warranty period, it will be the installer's responsibility to maintain service and trouble-shooting capability in the State with response within 24 hours of notification, as a protection for the Montpelier Community Renewable Energy Project's interest in having an optimally operational system which does not place an undue burden on its maintenance staff, particularly in the case of emergency or system malfunction, or if the need for fine-tuning arises.

xxix) Grid Connection: The Contractor is responsible for working with the City, State, and GMP to connect the generator to the grid including all equipment procurement, installation, transmission line work, substation work, and permitting both with GMP and with other entities as required (e.g. CPG).

xxx) Financial Incentives to support the Success of the Project: Bidders shall identify the most promising incentives associated with these types of projects and present these as part of the overall approach to the project.

xxxi) Plant Efficiency: The Energy Center operating efficiency is critical. It shall be designed to meet all of the requirements of the applicable state renewable energy programs, including SPEED program, net metering, feed-in tariffs, etc. and all applicable efficiency requirements for eligibility in the Renewable Energy Credits (REC) markets of the southern New England states. Bidders shall provide data to back up efficiency claims for all technologies included in their proposals.

xxxii) Accommodation of the District Heat Pumping Equipment in the Energy Center: It is generally desirable to locate the infrastructure for the District Heat Distribution System in the Energy Center Facility. This includes providing adequate space for the pumping, water treatment, controls and other aspects of the system as well as providing adequate electrical service to support the District Heat System. This should be addressed. Alternatives to this approach will be considered.

xxxiii) Administrative, Operations and Maintenance Spaces in the Energy Center: The Contractor shall provide adequate office space and maintenance space for personnel managing, operating, and maintaining the Energy Center and the District Heat Distribution System.

xxxiv) Phasing: The Contractor shall phase its work so as not to interfere with operation of the existing State Boiler Plant and the current systems supported by that facility that will need to be kept on line throughout the project.

xxxv) Re-use of the existing State Boiler Plant: The Contractor shall consider the reuse of portions of the existing equipment, support systems and/or buildings associated with the State Boiler Plant as part of development of the new Energy Center.

xxxvi) Architecture and Visual Impact: The Energy Center Site is located in the Capitol Complex District/Historic District and subject to both the Montpelier Master Plan and the Capitol Complex Master Plan. This will have a significant impact on the options for fuel storage and the configuration of the air pollution control equipment. All major equipment and accessories shall be located inside a building. The new biomass and oil boiler facility, which is proposed as two connected structures that will be located on the site of the existing boiler plant, shall be designed in a manner that complies with the National Park Service, *Secretary of the Interior's Standards* (http://www.nps.gov/hps/tps/standguide/), and the construction guidelines in *The Montpelier Cityscape Workbook* (http://www.montpelier-vt.org/page/301.html). This new building shall be designed with materials, massing and design elements that blend with the surrounding environment and historic resources that are part of the City of Montpelier Historic District, which is entered in the National Register of Historic Places. Such features that are typical of utilitarian buildings like a boiler plant, and which could be used in the new design are brick veneer for the exterior; metal, industrial type windows; flat roofs, and simple, geometric massing. Ornamental details such as molded cornices, or decorative elements such as elaborate entrance porches, are not recommended. The building shall be designed so as to not dominate the viewshed or to obstruct significant views; the building should appear secondary, lower in height, and set back behind the more significant structures that line the south side of State Street. The City of Montpelier has retained the services of an historic preservation expert and this expert shall be consulted during the development of the building(s) design.

xxxvii) Air Emissions

The system of combustion and its controls shall obtain a level of performance that provides continuous compliance under all operating modes with all applicable state and federal requirements regarding air emissions whether imposed by permit or rule,

including EPA proposed Area Source Boiler MACT rule.

(1) The facility shall be designed to accommodate and pass all testing and performance standards applicable to this facility.

(2) Within six (6) months of start-up, the Contractor shall perform, at its sole expense, stack testing of the combustion system(s) in accordance with appropriate state and EPA test methods and shall demonstrate compliance with all applicable standards and requirements.

(3) As an option, a system of emissions control shall be proposed that would allow the facility to be classified as a "Minor Source" under the Vermont Air Pollution Control Regulations.

(4) As an option, a system of emissions control shall be proposed that would allow the facility to participate in the Renewable Energy Credits (RECs) market of southern New England. While the emission standards for RECs are optional, the efficiency standards listed in 2(e) xxxi are required.

xxxviii) Flood Plain and River Bank Stabilization

The proposed site is in the 100 year flood and is proximal to a significant river bank. This should be assessed during the proposal phase and the concept developed for the overall Energy Center layout and phasing strategy should address this floodplain and floodway compensatory storage, flood proofing and draft language describing all flood mitigation.

xxxix) Environmental Enhancements: Proposals can include additional features designed to address environmental issues and historic preservation such as: LEED certification, green roofs, river enhancements, architectural features and the like.

f) **District Heat Distribution System Scope;** to serve the community of Montpelier (note: this is additive to supplying steam to the State of Vermont's distribution system)

i) General: Design, Permit, and Construct a state of the art district heating distribution system which will distribute 195-200 degree hot water generated by the new Energy Center to the City of Montpelier community.

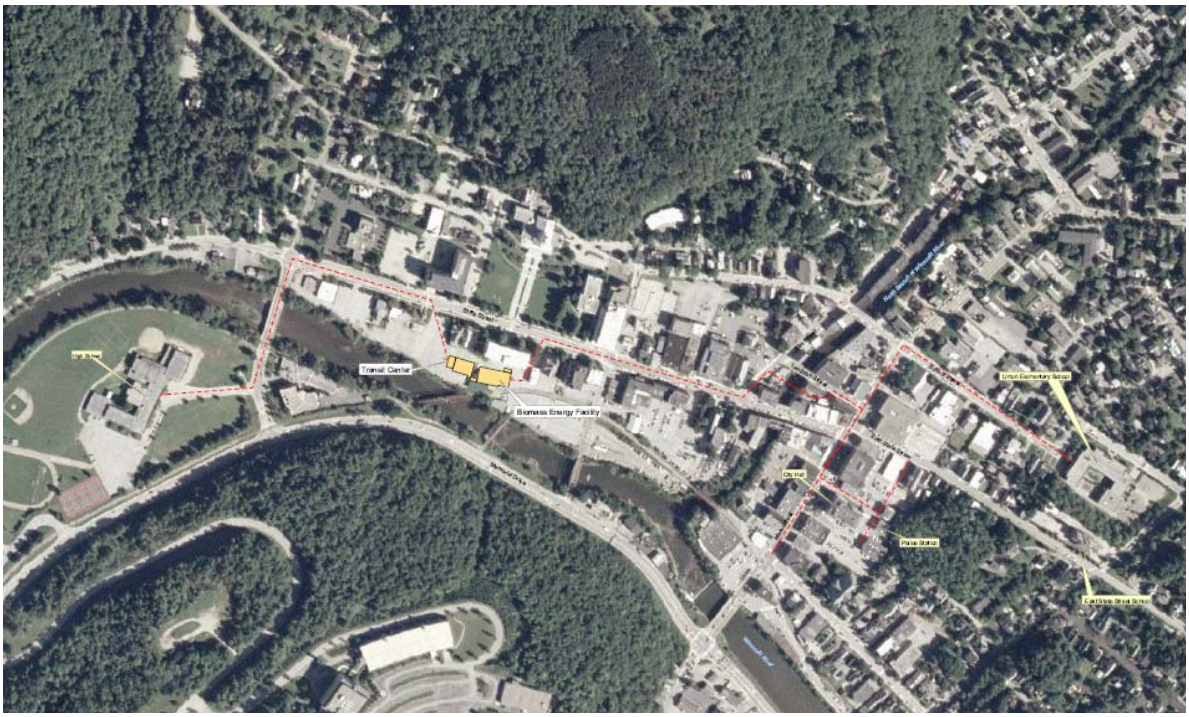
ii) Users:

(1) The Contractor shall provide district hot-water to users in the Montpelier community in accordance with the goals of the DOE Grant application.

(2) The potential users shall be evaluated by the Contractor in conjunction with evaluating the system routing. This analysis should include a detailed evaluation of the existing heating in these facilities to confirm load and assess the cost of converting each system for connection to the new District Heat Distribution System.

iii) System Routing:

(1) Refer to the Montpelier District Energy Project Location Map for the preliminary routing of the District Heat piping. (see map below)



(2) It is the responsibility of the Contractor to assess the proposed routing and propose a routing which is the most cost effective and supports the most hook-ups now and in the future.

iv) Phased Development: It is the responsibility of the Bidder to develop the sizing of the District Heat Distribution System. The application to DOE identifies that a total of 180 buildings comprising 1.8 million square feet of space to be heated in the community of Montpelier. All designs are to meet this level of performance; however Bidders may propose to accomplish this in phases. If phased development is proposed, bidders shall include details of the elements of each phase.

v) District Heat System Elements
   (1) Pumps
   (2) Pressurization System
   (3) Expansion Tank(s)
   (4) Controls
   (5) Water treatment
   (6) Heat exchanger(s) with Energy Source
   (7) Main power feeds and panels to be provided by Energy Center.
   (8) Motor Control Centers
   (9) Main Piping, Valving and service connections.
   (10) Customer connections
      (a) Service lines to customer
      (b) Heat X Interface Unit

(c) Conversion of existing customer heating system to support connection.

vi) Water Temperature:
The Contractor is responsible for designing a system that delivers the appropriate water temperature and delta T to the user to provide adequate heat transfer to the user hydronic systems and overall system efficiency.
(1) In general it is desirable to have a water temperature between 195 degrees and 200 degrees F to accomplish this with typical US hydronic systems.
(2) The delta T through the consumer installation will typically be approximately 65 degrees F.

vii) Water pressure: The Contractor shall design the appropriate water pressures for the specific project to provide a system which functions though a spectrum of pressure condition and can be constructed and operated economically. The following minimum standards shall apply: minimum return pressure = 25 psi; minimum differential pressure at end-user install = 8 psi

viii) Network Losses: Network losses can represent a significant impact on the efficiency of the system and should be minimized. Proposals should indicate the network losses and these should be kept below a maximum of 10%. Network losses will be considered in evaluating the proposals.

ix) Piping
(1) All piping shall meet the appropriate US standards and codes and also meet the requirements of the most current European Standards for district heat systems including:

EN253	Pre-insulated bonded pipe for hot water district heating
EN 448	Pre-insulated fittings
EN 488	Pre-insulated valves
EN 489	Joint kits
EN 13941	Design and installation

(2) Main Distribution Piping Requirements
(a) Leak detection monitoring
(b) Preinsulated piping
(c) Twin piping assemblies preferred for efficiency and installation cost savings.
(d) Ability to add new customers on the main lines in the future and designed to minimize associated costs.

(3) Service Piping
(a) Twin piping preferred
(b) Preinsulated piping

x) Freeze Protection: The Contractor shall propose proven design and operations approaches to protecting the system from freezing. The combination of pre-insulating the lines, adequate cover, maintaining water flow, keeping the water temperature elevated during the winter and heat tracing are general practices in climates similar to Montpelier's.

xi) Consumer Interface

The consumer interface is the piping and equipment installed between the district heat main supply and return piping and the hydronic system serving the end user. The requirement is for a standardized modular approach to minimize installation costs and streamline maintenance. Proposals shall include a detailed description and details of this interface. It shall include the following:

(1) Indirect Heating Required — there will be no direct connection between the District Heat main lines and the consumer hydronic system.

(2) Fully automated billing and reporting of energy consumption by user required.

(3) Heat Exchanger Interface Unit: The Contractor is responsible for providing an adequately sized heat exchanger unit to transfer the heat energy from the District Heat Distribution System to the consumer hydronic system. This unit essentially replaces the boiler in the existing hydronic system. This unit shall be include the following:

(a) Energy Meter interfaced to the Energy Center control and data acquisition system.

(b) Heat exchanger

(c) Controls

(d) To be based on a domestic hot water tank. As an alternative the Contractor can provide as assessment of using domestic hot water demand hot water heaters integrated into the HXIU and the impact on the sizing of the mains and service piping and sizing of the energy center.

(4) Standard Shop Built Heat Exchanger Interface Units will be provided for the majority of the units. The exception is the larger scale installation for the few large hydronic systems where standard components will be utilized where practical.

(5) Domestic Hot Water: The Contractor will assess the cost effectiveness of providing domestic hot water for users. As part of this analysis it will be determined whether it is critical to limit domestic hot water generation to Domestic Hot Water Tanks versus instantaneous hot water heaters DHW to reduce peak demand preferred.

(6) Conversion Requirements for Consumers: The Contractor will determine the requirements for the conversion of the consumers existing heating system to be compatible with the new district heat distribution system. This is the work beyond providing the service supply and return lines from the mains to the consumer site and supply and installing the Heat Exchanger Interface Unit. This will range from removing a boiler and adding and domestic hot water tank to converting a steam system to a hydronic system in complexity and cost.

xii) Network section valves to facilitate working on pipes, phasing, adding customers,

xiii) Information System. Bidders shall include a comprehensive information management system which allows operators to understand the condition and status of the District Heat Distribution System at all times. The system shall have capacity to record data and indicate warning and alarm conditions.

xiv) Electrical, Control Panel and Controls. The Contractor shall provide a system for control that is fully automatic and provides for continuous, reliable operation of the District Heat Distribution System under all operating conditions.

xv) Maintenance Requirements, Training and Manuals. The Contractor will be responsible for providing sufficient and coherent training for the Facility's maintenance staff in the proper operation, maintenance, and routine trouble-shooting of the district heat distribution system. The installer shall also be responsible for supplying four (4) sets of manuals which include documentation on all logic diagrams, computer algorithms (if any), instrumentation and controls wiring diagrams, information on control systems, explanation of the various system components, and other information on the operation of their system which is necessary documentation for the system operators. Upon completion of the commissioning, the Contractor shall supply four (4) sets of "as-built" prints of the system and its components.

xvi) Permit and Code Compliance. The Contractor shall be responsible for securing all permits and paying the fees associated with the system installation, including trade permits. The General Contractor and its sub-contractors shall be responsible for supplying trade permits and inspections. The Contractor shall be responsible for costs of bringing its system components and equipment into compliance with any local, state, and federal codes.

xvii) Warranty and Service Capability. The installation of all of the equipment under the project shall carry a full unconditional warranty for a minimum of 18 months from acceptance of the system. In addition, the Contractor shall provide the standard equipment and operation warranties and any warranties specific to purchased equipment installed as part of their system. After successful initial operation, the Contractor must have its own trained trouble-shooting capability within close proximity (in Vermont) during the initial period of regular operation and through Project acceptance. The installer shall provide 24-hour emergency service capability for the period through system acceptance (meaning on-site response within 24 hours of notification, regardless of time of day). After acceptance and during the warranty period, it will be the installer's responsibility to maintain service and trouble-shooting capability in the State with response within 24 hours of notification, as a protection for the Montpelier Renewable Energy Project's interest in having an optimally operational system which does not place undue burden on its maintenance staff, particularly in the case of emergency or system malfunction, or if the need for fine-tuning arises.

Project Schedule

The general construction schedule is expected to be:

a) June 2011 – Start District Heat Distribution Construction
b) June 2011 – Start Energy Center Construction
c) August 2011 – State Street District Heat Piping Construction Complete – need to

coordinate with planned repaving of State Street. State of Vermont contacts: Mark Woolaver (mark.woolaver@state.vt.us) and Mike Fowler (mike.fowler@state.vt.us).

d) June 2012 – District Heat Piping Complete
e) June 2012 – Energy Center Substantially Complete
f) Summer 2012 – commissioning, shakedown and start-up
g) September 2012 – Fully operational
h) By January 2012 – Project documentation complete.

Bidders shall submit a detailed project timeline that is task based and linked to cost, vendor schedules, man-work hours, etc. The schedule can be divided into project phases, and should indicate where changes from the general schedule above are indicated, or where significant levels of uncertainty arise. Bidders can build the schedule on the assumption that a V.S.A. Title 30, Section 248 permit will be used for project permitting.

RFP Response Contact Person

Harold Garabedian
Project Manager
Montpelier Community Renewable Energy Project
802.595.5412 phone
harold.garabedian@gmail.com

RFP Timeline:

i) Issue Proposal: August 5, 2010
ii) Vendors shall formally indicate interest in writing or by e-mail by 5 PM August 23, 2010.
iii) Pre-Bid Meeting and Site Visit: A pre-bid meeting and site visit will be conducted on August 19, meeting at 10am in the Montpelier Planning Office at 39 State Street.
iv) All questions must be received in writing or by email before 5 PM August 23, 2010. Responses to all questions will be provided to all registered vendors no later than August 27, 2010.
v) RFP Response Due: September 22, 2010, 3 PM
(1) Email an electronic copy or deliver hard copy to:

Gwendolyn Hallsmith
Director of Planning and Community Development
City of Montpelier
39 Main Street
Montpelier, VT 05602-2950
ghallsmith@montpelier-vt.org
802-223-9506 phone
802-223-9524 fax

(2) Provide five (5) hardcopies of the proposal by 5pm on September 22, 2010.
(3) The City of Montpelier reserves the right to reject any or all responses to this

RFP.

(4) The City of Montpelier assumes no responsibility or liability for any costs incurred by the proposer in responding to this request or to any future requests for interviews, presentations, additional data, etc., prior to the issuance of a contract.

(5) Prior to the opening of bids, it is assumed that each bidder will have inspected the work areas and become thoroughly familiar with the Contract documents, Federal requirements, project plans, existing field conditions and limitations. Failure of a bidder to review all documents pertinent to the Contract shall in no way relieve any bidder from the obligation with respect to his bid.

(6) Bids will be publically available on September 22, 2010 at 5PM

vi) Interviews: To be determined after bid review.

vii) Selection: Notice of selection expected in November, with contractor negotiations to follow. The City of Montpelier will negotiate terms to meet the goals of the community and in the interest of the City.

viii) Proposal Evaluation

(1) Technical -- 30%

(2) Experience, references and capacity -- 30%

(3) Cost --40%

Proposal Requirements

a) Proposal Deliverables

i) Executive Summary

ii) Proposal Summary Form

(1) Energy Center – Develop a separate form for each alternative

(2) District Heat Distribution System

iii) Scope Narrative – Attachments to the narrative should include:

(1) Site Plan for the proposed Energy Center with phasing indicated.

(2) District Heat Layout and preliminary sizing.

(3) PFD for the Technical Solution

(a) Energy Center including District Heat Pumping and interface with State Steam system.

(b) District Heating Distribution

(4) Equipment List

(5) Energy Balance for each Technical Solution

(6) System Sizing Basis

(a) System Demand Curve

(i) State Buildings

(ii) District Heat Users

(iii)Composite

(b) Heat Storage Strategy

(c) Analysis of Domestic Hot Water tank heaters versus instantaneous demand heaters.

(d) Analysis of potential for cooling and miscellaneous hot water uses e.g. ice melting.
(e) Analysis of year around hot water production versus seasonal hot water production.

(7) Peak and annual fuel use for primary and backup units.
(8) Turn-down capabilities of the system.

iv) Technical Solution Merits: The proposal must include the pertinent information and documentation demonstrating the merits and establish record of the technical solution including the performance, reliability, and maintenance requirements. Proposals which are based on technical solutions which are currently operating will be favored.

v) Work Plan

vi) Schedule: Bidders shall submit a detailed project timeline that is task based and linked to cost, vendor schedules, man-work hours, etc. The schedule can be divided into project phases, and should indicate where changes from the general schedule above are indicated, or where significant levels of uncertainty arise. Bidders can build the schedule on the assumption that a V.S.A. Title 30, Section 248 permit will be used for project permitting.

vii) Design Deliverable List

viii) List of Permits

ix) References – 3 required

x) Pricing Breakdown – A separate breakdown should be provided for the Energy Center and the District Heat System. Proposal Price. Each proposal shall include the fully-installed cost to the Montpelier District Heating Facility (a tax-free entity) in US dollars of the system specified herein as proposed by the bidder. The proposal price shall include installation and all equipment shipping costs to the facility site. The proposal shall also include clearly differentiated alternate prices for optional components or alternate approaches. The price proposal must recognize that commissioning of the Montpelier Renewable Energy Project will not take place until September 2012 although some components of the system (such as the boiler and combustor and energy distribution system) may be installed several months before that time. A retainage of 10% of the total cost will be held by the city of Montpelier until final acceptance. The Contractor shall make any provisions for this fact in the proposal pricing.

(1) Design
(2) Permitting
(3) Equipment
(4) Construction
(5) Start-up & Commissioning

xi) Payment Schedule

(1) The bidders shall include a payment schedule with each proposal.

xii) Financial Analysis including cost of ownership.

(1) Based on City and/or State ownership with cost of financing at 3.5% over 20 years. Alternate financing and ownership models are welcome.

xiii) Performance Guarantee: Draft performance guarantee for the completed system.
xiv) Team including all subcontractors
xv) Qualifications
xvi) Similar Project Examples
(1) Contact
(2) Project Summary/Description of Services/Date
(3) Budget and Final Cost

Proposal Summary Table -- Energy Center

Proposer:
Date:
Description of Technology for the Energy Center (this sheet should be developed for each alternative):

Element	*Units*	*Value*
Energy Center Total Annual Fuel Input	MMBTU	
Energy Center Total Annual Energy Output thermal and electric	MMBTU	
Energy Center overall system efficiency	%	
Energy Center Peak Thermal Output	MMBTU/h	
Energy Center Backup System Thermal Output	MMBUT/h	
Primary Fuel	Type	Green Wood Chips
Primary Fuel assumed unit cost	$/ton	
Primary Fuel characteristics assumed		Fuel Higher Heating Value = 8200 BTU/oven dry pound of fuel @50% moisture content wet basis
Primary Fuel Storage Volume		
Days of operation at peak output on primary fuel with no fuel delivery	days	
Primary Fuel Storage Method	describe	
Secondary Fuel	Type	
Secondary Fuel assumed unit cost	$/XXX	
Secondary Fuel Storage Volume	gallons	
Days of operation on backup heating system with no fuel deliveries	days	
Secondary Fuel characteristics assumed		
Secondary Fuel Storage Method	describe	
Primary Fuel input @ Energy Center rated thermal output	MMBTU/h	
Heat Storage Provisions	describe	
Annual System Energy Demand	MMBTU	
Annual Primary Fuel Use	Tons	
Annual Secondary Fuel Use		
Energy Center Electrical use at peak output including District Heating Pumping	MW	
Annual Energy Center electrical use not including	MW	

District Heat Pumping		
Annual District Heating Distribution electrical use not including District Heat Pumping	MW	
Energy Center Generator Design Power Output	MW	
Energy Center Generator Annual Net Power Output	KWH	
Assumed power Sell Rate	$/KWH	
Annual revenue from power sales to the grid	$	
Energy Center Design, Permitting, & Construction Cost (including space and support infrastructure for District Heating Distribution System)	$	
Energy Center Design Permitting and Construction Cost amortized over 10 years at 3.5%	$/year	
Energy Center Annual Operation and Maintenance Cost(not including District Heating Distribution)	$/year	
Annual Green House Gas Emissions reduction		

Proposal Summary Table – District Heat Distribution System

Proposer:
Date:

Element	*Units*	*Value*
District Energy Distribution Peak Demand	MMBTU/hr	
Normal Year Heating Degree Day Design Basis	DD	
Consumers global heat demand design basis(add categories for building type as required)	MMBTU/sf/year	
Annual Heating Demand	MMBTU	
Annual Domestic Hot Water Demand	MMBTU	
Annual Cooling Demand	MMBTU	
Annual Demand Miscellaneous (ice melting systems)	MMBTU	
Total System Annual Demand	MMBTU	
Total System Annual Network Heat Loss	MMBTU	
Network Losses	%	
District Heating Distribution Center Design, Permitting and Construction Cost	$	
District Heat Design, Permitting, & Construction Cost amortized over 10 years at 3.5%	$/year	
District Heat Annual Operation and Maintenance Cost	$/year	

Contractual Requirements

a) Sample Contract
b) Bid Bond
    i) A bid bond (or certified check, payable to the City of Montpelier) in the amount of 5% of the total amount bid is required. A bid bond (or check) must be received no later than 24 hours from the scheduled bid opening.
c) Performance and Payment Bonds
    i) Before a contract for work is executed, the Contractor will provide, at his/her cost, a Performance Bond and Payment Bond in the amount of 100% of the total amount of work.
d) Insurance
    i) Before commencement of work, certificates testifying to coverage of Worker's Compensation, Public Liability and Property Damage insurance will be provided by the Contractor. The City of Montpelier must be named as the certificate holder.

End of RFP