

**Request for Proposals:  
RFP #51232  
Natural Gas Heat Pump Combination Unit  
Prototype Installation and Monitoring**



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## 1 Introduction

### About the Northwest Energy Efficiency Alliance

The Northwest Energy Efficiency Alliance (NEEA) is an alliance of more than 140 utilities and energy efficiency organizations working on behalf of more than 13 million energy consumers. NEEA is dedicated to accelerating both electric and natural gas energy efficiency, leveraging its regional partnerships to advance the adoption of energy-efficient products, services and practices.

Since 1997, NEEA and its partners have saved enough energy to power more than 900,000 homes each year. As the second-largest resource in the Northwest, energy efficiency can offset most of our new demand for energy, saving money and keeping the Northwest a healthy and vibrant place to live. [www.neea.org](http://www.neea.org)

## 2 Background

NEEA's Natural Gas Combination Unit (Combi) Program seeks to leverage efforts in gas-fired heat pump water heating technology to develop a combination system that can provide both space and water heating at an efficiency exceeding that of current high-efficiency furnaces and stand-alone hot water heater technology. This combination system approach will be used to develop new energy code proposals as an alternative compliance approach for new construction.

NEEA has selected ThermoLift's Vuilleumier-style Thermal Compression Heat Pump (TCHP) for testing and analysis to assess its technical and market potential as a higher efficiency, natural gas-fueled, combination space conditioning and water heating appliance. The TCHP is a combined natural gas air conditioning and cold-climate heat pump that also produces hot or chilled water. Testing conducted by Oak Ridge National Laboratory of the 3<sup>rd</sup>-generation TCHP prototype resulted in a coefficient of performance (COP) of 1.52 at 46°F and exceeded Department of Energy cold-climate heat pump performance targets of 1.35 at -25°C.

## 3 Objectives

ThermoLift is in the development phase of their 4<sup>th</sup>-generation TCHP which moves the technology closer to a commercialized, market-ready product. NEEA seeks to verify the performance of the 4<sup>th</sup>-generation ThermoLift TCHP prototype as measured by: COP/energy savings (measured by therms saved compared to a baseline). In addition, the following performance metrics of the will be evaluated:

1. Heat pump real power (including the total power consumed by the unit);
2. All input and output water flow rates;
3. Chilled water supply temperature;
4. Chilled water output temperature;
5. Hot water supply temperature;
6. Hot water output temperature

Additionally, NEEA seeks to understand the ease or complexity of installation, including installation costs, unit performance, unit reliability, suitability for utility programs, and identify any additional features or benefits of the ThermoLift TCHP prototype that support market adoption over market alternatives.

#### 4 Contractor Qualifications

The awarded contractor should have experience in the following:

- HVAC equipment monitoring and data analysis
- HVAC retrofit system design and installation

#### 5 Scope of Work

Activities and deliverables for this work include, but may not be limited to the following:

1. **Kick-off Meeting & Work plan Development.** The awarded contractor will attend a project kick-off meeting and create a work plan covering all activities for NEEA approval.
2. **Establish methodology.** The awarded contractor will propose an overall test plan and data collection and analysis methodology for NEEA approval.
3. **Site selection.** The awarded contractor will recruit one site that will accommodate installation of the ThermoLift unit. Activities expected to include:
  - a. Site identification and review with NEEA
  - b. Negotiate and execute field trial agreements with end users
  - c. Develop and maintain site communication log, site issue log, and risk management plan pre-launch
  - d. Receive written manufacturer approval for site selected
4. **Permitting and Installation.** The awarded contractor will be responsible for confirming the suitability of the installation location to achieve the goals of the field study and for obtaining any necessary permits related to the installation of the ThermoLift TCHP unit.

Additionally, the awarded contractor will be responsible for the installation and commissioning of the TCHP unit (in coordination with ThermoLift) at the selected demonstration site and in parallel with the site's existing equipment. The TCHP unit should be installed as the primary heating/cooling source along with the primary domestic hot water (DHW) source.

Unit installation includes any necessary gas piping, plumbing, electrical and ducting necessary to run the ThermoLift TCHP unit and must meet applicable codes. The awarded contractor will also install all necessary equipment for the required data collection and system monitoring. Bidders should include their suggested approach for ensuring data quality throughout the data monitoring

period.

5. **Reporting.** The awarded contractor will submit quarterly reports on system performance throughout the data collection period and will provide a final report upon the completion of testing summarizing overall findings and recommendations.
6. **Decommissioning.** At the end of the test, the awarded contractor will remove all data collection equipment and return the system to pre-installation working order. ThermoLift will be responsible for the decommissioning and removal of the TCHP unit at the completion of the monitoring period.

## 5.1 Timeline

Work is anticipated to start in November 2019 and conclude in February 2021.

## 6 Proposal Submission

Bidder shall submit (1) electronic copy of the proposal by the end of business day listed in the RFP schedule below.

### 6.1 RFP Schedule

August 23, 2019	Intent to bid submissions due by
August 30, 2019	Bidder questions submitted by
September 6, 2019	Answers to questions emailed back by
September 16, 2019	Written proposals due by
September 20 – September 27, 2019	Finalist notified and presentations scheduled
October 7 – 11, 2019	Finalist presentations
October 16, 2019	Anticipated contract award date

### 6.2 RFP Point of Contact

All correspondence, included but not limited to, questions and submissions shall be directed to:

Eric Olson  
Sr. Product Manager, Natural Gas  
E-mail: [eolson@neea.org](mailto:eolson@neea.org)

Northwest Energy Efficiency Alliance  
421 SW 6<sup>th</sup> Avenue, Suite 600  
Portland, OR 97204

### 6.3 Intent to Respond

All “Intent to Respond” forms (see Appendix A) must be received no later than by the end of business day listed in the RFP Schedule.

Only those parties submitting the “Intent to Respond” form will be provided with updates to the RFP, have questions responded to and have their proposals considered.

## 6.4 Proposal Format

1. Executive Summary – Include the key strategies and approach to completion of the scope of work; proposed costs; and the reasons NEEA should select your team.
2. Approach to Project (Tasks and Deliverables) – Provide a detailed description of the specific methodologies and approach to be undertaken to complete the scope. Be sure to include project management activities in proposed implementation strategy as well. Identify all major phases and milestones for the project and the associated deliverables.
3. Project Timeline & Cost Estimate – Provide the proposed timeline for all major phases and milestones of the project broken out by proposed task and associated deliverables. Include the cost estimate for each task. A breakout of any direct costs and an hourly rate sheet for the project period may be included here.
4. Appendix Items:
  - Hourly Rate Sheet – Provide the hourly rate and estimated number of hours for each project team member, by task (required if time & materials)
  - Company background and qualifications
  - Project Team & Team Bios – Include information about program team members and team structure, past team efforts on similar work, years of experience and other relevant qualifications
  - References – Provide three (3) references for similar work conducted
  - In Good Standing – Provide documentation reflecting your organization’s good financial standing, such a Dun & Bradstreet report (\*\*required for new vendors)

## 7 Selection & Preferred Insurance

### 7.1 Scoring

Bidding firms will be rated among others in terms of the overall responsiveness to the RFP – how well all RFP requests have been addressed including, but not limited to:

1. Responsiveness to the RFP and demonstrated understanding of the issues surrounding the project.
2. The thoughtfulness and appropriateness of the proposed methodology used to accomplish the desired results of the project.
3. The experience and qualifications of the individuals specifically proposed to execute and manage the project. (Note: Proposed staffing is a significant factor in bidder selection. As such, no changes in key staff / substitutions or changes in roles/responsibilities can be made without the written agreement of NEEA project manager.
4. The experience of the firm or team of firms making the proposal.

5. The capability to execute the plan, including past experience and aptitude for collaboration.
6. Overall value for expenditure

Proposals may be evaluated by the NEEA Project Manager and other NEEA staff that we believe have the perspective needed to make this important decision. NEEA is under no obligation to provide work to any vendors responding to this solicitation, nor is there any obligation or intent implied to reimburse any party for the cost of preparing a proposal in response to this RFP.

## **7.2 Preferred Insurance**

Firms interested in working with NEEA should be aware of the following insurance requirements for all NEEA vendors.

Vendors must maintain adequate and reasonable insurance covering their performance under any offered contract, including, but not limited to Commercial General Liability of at least \$1,000,000/occurrence, Business Automobile Liability insurance, and any workers' compensation and unemployment insurance required by law. Professional Liability insurance may also be required. NEEA may request a copy of such insurance policies prior to awarding work.

See sample terms and conditions for additional information about minimum insurance requirements: <https://neea.org/img/documents/sample-neea-contract-terms-and-conditions.pdf>.

# Appendix A - Intent to Respond Form

## RFP #: 51232

Project Title: Natural Gas Heat Pump Combination Unit Prototype Installation and Monitoring  
NEEA Point of Contact: Eric Olson ([eolson@neea.org](mailto:eolson@neea.org))

### PLEASE PRINT:

<b>Company</b>	
<b>Address</b>	
<b>City, State, Zip</b>	
<b>Contact Name</b>	
<b>Contact Title</b>	
<b>Phone #</b>	
<b>Fax #</b>	
<b>E-mail</b>	

The company named above intends to submit a proposal in response to NEEA’s request for proposal listed above. The deadline for submitting the “Intent to Respond” form is end of business day of date listed in the RFP schedule.

Signature of authorized representative: \_\_\_\_\_

Print Name \_\_\_\_\_

Title \_\_\_\_\_

Date \_\_\_\_\_

## Appendix B – ThermoLift Technical Specifications



RENEWABLE, CLEAN HEATING & COOLING



### *Next Generation Natural Gas Heat Pump TCHP Installation Brochure*





# **THERMOLIFT HEAT PUMP CONNECTIONS AND DIMENSIONS** **INDOOR UNIT**

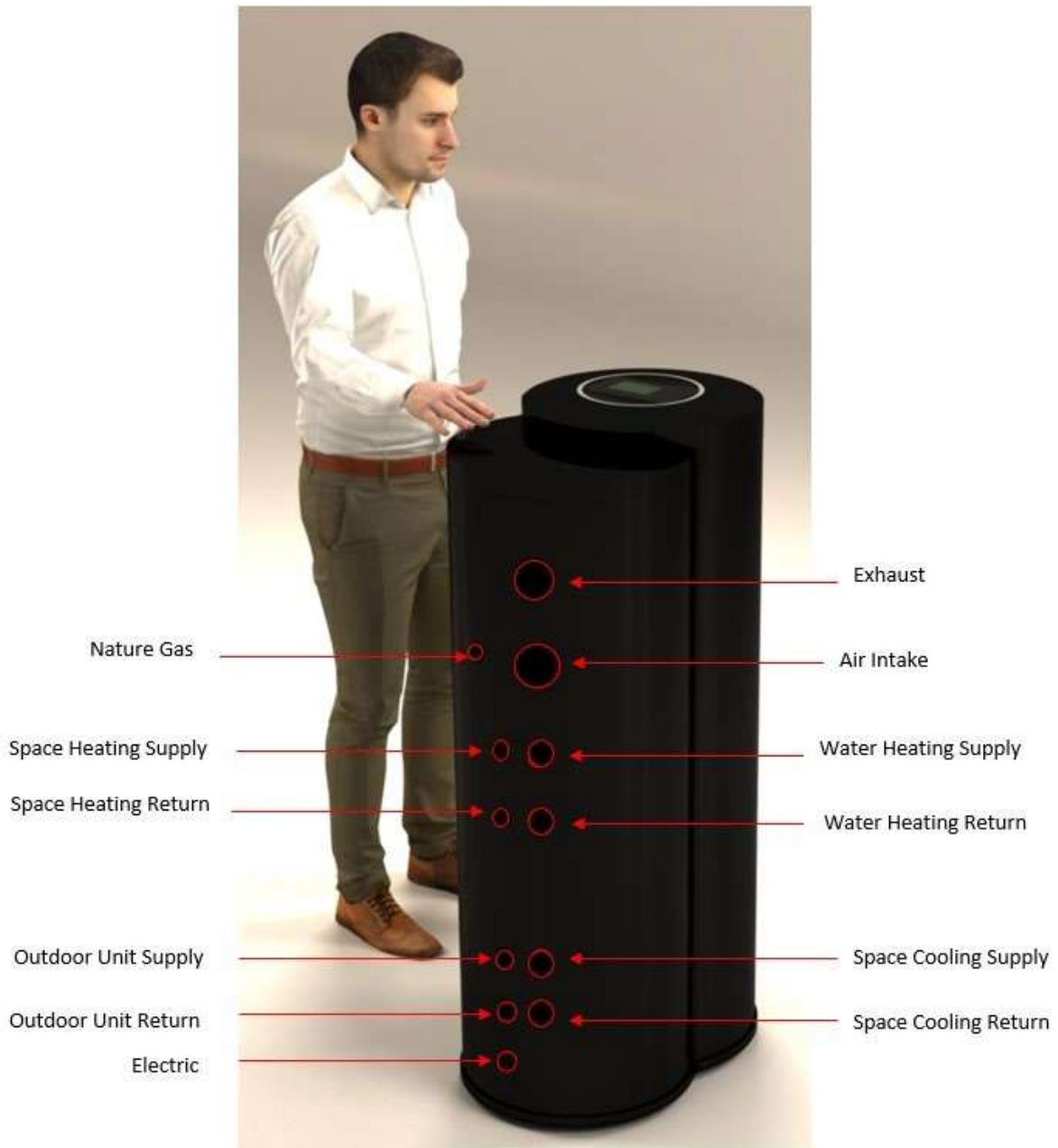


Figure 1: TCHP with Connections

## **Outdoor Unit**

An outdoor air-to-water heat exchanger is piped to the indoor ThermoLift unit to provide the ambient heat source that enables operation as a high efficiency heat pump. The outdoor unit enables the transfer of up to 25,000 Btu of renewable ambient heating energy to the indoor unit.

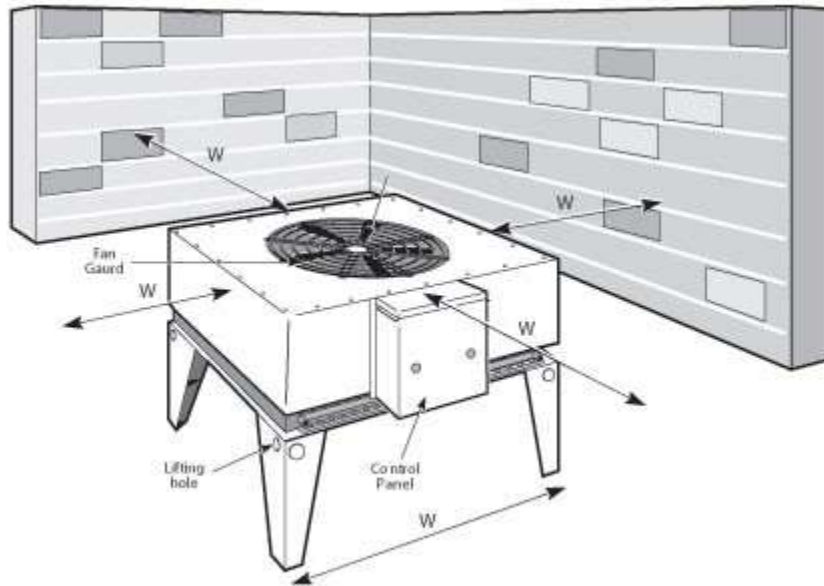


Figure 2: Outdoor Heat Exchanger Unit

W= 3 ft

Note: Horizontal configuration shown, alternative configurations available to suit site conditions.

## Indoor Unit



Figure 3: Various Indoor Unit Types

The ThermoLift TCHP provides Chilled and Hot water to any standard, commercially available, indoor fan coil unit. Both 2 and 4 pipe systems are supported. Additionally, both vertical and horizontal ducted air handling units are supported by the ThermoLift hydronic distribution system.



For heating only or combination heating/cooling systems where the heating system is hydronic the ThermoLift distribution system supports all types of radiator, finned tube convector, unit heater and radiant heat configurations.

# MACHINE SPECIFICATIONS

SPECIFICATION PARAMETER		VALUE / UNIT
<b>Installation Location</b>		Indoor Heat Pump with Outdoor Heat Exchanger
<b>Min Input</b>		16,000 Btu/hr
<b>Max Input</b>		32,000 Btu/hr
<b>Heating Capacity</b>		55,000 Btu/hr
<b>Cooling Capacity</b>		17,000 Btu/hr
<b>Gas Connections</b>		1 in
<b>Natural Gas Supply Pressure</b>		3.5 – 14 in. W.C.
<b>Ignition System</b>		Direct Electronic Spark Ignition / Flame Rectification
<b>Burner System</b>		Premixed Fuel Modulation / Tubular Reactor Burner
<b>Flue System</b>		Category IV, Sealed Combustion Direct Vent, Power Vent
<b>Air Size</b>		3 in
<b>Vent Size</b>		3 in
<b>Exhaust Gas Flow</b>		11.8 CFM
<b>Combustion Air Flow</b>		10.5 CFM
<b>Exhaust Temperature</b>		100 °F
<b>Min Combined Vent Run</b>		16 ft
<b>Max Combined Vent Run</b>		200 ft
<b>Exhaust Vent Materials</b>		PVC, CPVC, PP, Stainless Steel
<b>Shipping Weight (Indoor Unit)</b>		500 lbs
<b>Power Supply</b>		208 – 230 Volts / 60 Hz / Single Phase
<b>Ambient Temperature Range</b>		-40 – +104 °F
<b>Dimensions (Indoor Unit)</b>	Length	24 in
	Width	31 in
	Height	48 in
<b>Heating-Setpoint Temp. Range</b>		50 - 190 °F
<b>DHW Indirect Setpoint Temperature Range</b>		70 - 180 °F
<b>Chilled Water Setpoint Temperature Range</b>		35 - 46 °F
<b>Water Connections</b>		1 in
<b>System Piping Materials</b>		As allowed by local code
<b>Max. Hot Water Flow</b>		4 GPM
<b>Max. Hot Water Temperature</b>		190 °F
<b>Min. Hot Water Temperature</b>		50 °F
<b>Max. Chilled Water Flow</b>		2.6 GPM
<b>Max. Chilled Water Temperature</b>		46 °F
<b>Min. Chilled Water Temperature</b>		35 °F (-40 °F with antifreeze solutions)
<b>Max. Outdoor Unit Water Flow</b>		4 GPM
<b>Min. Outdoor Unit Water Temp.</b>		-40 °F
<b>Max. Outdoor Unit Water Temp.</b>		150 °F

<b>Networking/Connectivity</b>	Device will be internet / network ready, via CAT 6 or wireless standard 802.11.
<b>Safety Devices</b>	Flame Rectifier Probe, Dual Water Supply Temperature Sensor (200 °F), Water Pressure Switch (Min. 10 psi), Freeze Protection, Blocked Condensate Pressure Switch, Condensate Trap with Float, Flue Temperature High Limit Sensor (210 °F), Blocked Vent Pressure Switch, Optional UL 353, Low Water Cut-off, etc.

# HYDRONIC LOOP DIAGRAM

