



Request for Information  
RFI NEEP9075

**Field Validation of Variable Refrigerant Flow  
System Performance in Cold Climates**

**Issued by:**  
**Northeast Energy Efficiency Partnerships, Inc.**  
**October 2, 2020**

**Responses Due:**  
**October 23, 2020**

This RFI has been released to solicit information regarding the field measurement of VRF system energy efficiency and refrigerant leakage in connection with DOE project (DE-EE0009075/BASE) Northeast Energy Efficiency Partnerships, Inc. (NEEP), "Field Validation of Variable Refrigerant Flow System Performance in Cold Climates."



## **I. GENERAL INFORMATION**

Northeast Energy Efficiency Partnerships (NEEP) is issuing this Request for Information (RFI) to identify current industry methods and practices for measuring the energy efficiency and refrigerant leakage of Variable Refrigerant Flow (VRF). The information will be used to develop an assessment report of the existing body of knowledge in relation to VRF in-field performance and performance testing protocols. The report will inform the eventual protocols used in the field measurement portion of the project and NEEP's Request for Proposal (RFP) for qualified engineering firms to lead in-field measurements of selected VRF systems to measure actual energy performance and refrigerant leakage.

## **II. FACTORS TO BE EVALUATED**

The team reviewing responses to this RFI is looking for actionable information that could help inform the project team's eventual methods to measure both the energy efficiency and refrigerant leakage of VRF systems. Current technology, systems, protocols, methods, results, suggestions, and pitfalls to avoid are all welcome. We are also interested in receiving any results from recent measurement activities related to VRF system energy efficiency and refrigerant leakage. Please include the building characterization to explain any significant heating or cooling loads. Please find the attached list of Project Technical Data under consideration, and comment on the ideal performance metrics and methods to measure each one. The study intends to consider performance data collection via VRF unit controls, building automation systems, and third party controls, sensors, and monitoring systems. Please note whether data points are available from the system manufacturer via BACnet as standard, as an option, or require additional sensors by others. Please include options for data collection cadence (e.g. every 15 minutes), applicable COP tables, nominal efficiency ratings, and actual line length de-rates. Any method for determining delivered capacity is welcome, including air-side measurements and refrigerant-side measurements.

## **III. CONFIDENTIALITY OF RESPONSES**

If a respondent notes in a response that any material is proprietary or confidential, such material will not be shared publicly, and will be used solely to inform the assessments, methods and protocols developed for the DOE project.

## **IV: ABOUT NEEP**

NEEP was founded in 1996 as a non-profit whose mission is to serve the Northeast and Mid-Atlantic to accelerate regional collaboration to promote advanced energy efficiency and related solutions in home,



buildings, industry, and communities. Our vision is that the region's homes, buildings, and communities are transformed into efficient, affordable, low-carbon resilient places to live, work, and play.

## V. SUBMISSION and CONTACT INFORMATION

Please respond via email to Ben Hiller at [bhiller@neep.org](mailto:bhiller@neep.org) and include "RFI NEEP9075" in the subject line. Include any relevant VRF studies, project documentation, product specifications, etc. as attachments. If the email will exceed the size limit of 35 MB, please provide download links for the files or send multiple smaller emails. Please note if you would like to be included on the future RFP for qualified engineering firms to lead in-field measurements of selected VRF systems. We welcome your response to the RFI, although it is not required to bid. Let us know if you have any recommendations for qualified engineering firms or potential VRF sites for the project. We encourage you to share this RFI with anyone interested in contributing.

VRF DOE Field Validation Project – Project Technical Data	
The actual Project Technical Data collected at a site will be determined after the Project Team assesses existing lab and in-field protocols and develops standard protocols for this project. Technical Data gathered during the project may include, but is not limited to, the following list of performance metrics.	
<u>Project Technical Data</u>	<u>Units</u>
Compressor amperage	A
Compressor voltage	V
Compressor power	kW
Compressor frequency	Hz
Expansion valve position	%
Outdoor unit power	kW
Indoor unit power	kW
Supply airflow	CFM
Supply fan speed	Low/med/high
Supply air temperature	deg F
Supply air humidity	%RH



Return air temperature	deg F
Return air humidity	%RH
Output power	BTUH
Output energy	BTU
Capacity	BTUH
Space temperature set point	deg F
Space temperature	deg F
Space humidity	%RH
Outdoor temperature	deg F
Outdoor humidity	%RH
CO2	ppm
Particulate matter	ppm
Refrigerant concentration	ppm
Refrigerant receiver level	%
Refrigerant pressure	PSI
Refrigerant charge	lbs.