Heat Pump Demonstration Study Workshop
Meeting Procedures

Before beginning, a few reminders to ensure a smooth discussion:

> The session will be recorded.

> If you want to ask a question, please submit one to the panelists in the Q&A feature. Questions submitted through Q&A are only visible to panelists. We will address questions at the end.

> The Chat feature is also open and visible to all attendees and panelists.

> Slides will be distributed to all providers after the webinar.
Program Process
Snapshot of HPDS Process

<table>
<thead>
<tr>
<th>Application and Scoping</th>
<th>Workscope Development and Confirmation</th>
<th>Installation</th>
<th>Post Construction Performance Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>FlexTech Application and Scoping</td>
<td>Heat Pump Demo Application and Scoping</td>
<td>Heat Pump Demo Installation</td>
<td>Performance Payment Approved MPP Stage 4 Payment</td>
</tr>
<tr>
<td>Heat Pump Demo Application and Scoping</td>
<td>NYS Clean Heat Application and Scoping</td>
<td>NYS Clean Heat Installation</td>
<td>MPP Stage 3 Payment Electrical Service Upgrade Payment Heat Pump Demo Study Payment NYS Clean Heat Utility Payment</td>
</tr>
</tbody>
</table>

- MPP SAV-IT Submitted + Heat Pump Demo documents + FlexTech documents
- 100% Construction Complete Submitted (no additional documentation needed for Heat Pump Demo or NYS Clean Heat)
Additional Submittals

The following submittals are required in addition to the normal MPP requirements.

> Application
  > Electrical Service Upgrade – NEC Panel Sizing Calculator

> Stage 1 Workslope Development
  > Required Measure Evaluation worksheet
  > Energy Savings and Rent Affordability Plan
  > Pre-construction Rent Roll

> Stage 2 & 3 Construction
  > Post-construction Rent Roll
  > Required Measure documentation
  > Heat pumps must be installed by Participating Contractor in NYS Clean Heat Program
# Heat Pump Demo Study Funding

Projects can qualify for multiple heat pump incentives

<table>
<thead>
<tr>
<th>Heat Pump Technology</th>
<th>Funding (per dwelling unit)</th>
</tr>
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<tbody>
<tr>
<td>ASHP</td>
<td>$2,000</td>
</tr>
<tr>
<td>GSHP</td>
<td>$4,000</td>
</tr>
<tr>
<td>HPWH</td>
<td>$900</td>
</tr>
<tr>
<td>Electric Service Upgrade (optional)</td>
<td>$1,500</td>
</tr>
</tbody>
</table>
Stackable Incentives

- Multifamily Performance Program
- Heat Pump Demo Study
- NYS Clean Heat Program

= Aggregated Incentive < Project Costs
This is not meant to take the place of professional design services. It’s a good estimate so it will help understand these buildings and provide solid assumptions, but it does not take the place of a design professional.
Goals
Purpose of the study

Educational & Informative
• This will help us understand these buildings better and provide guidance to upgrade service and/or panels.

Screening for incentives
• The sheet will help to determine financial incentives
• Everyone will be required to fill out the sheet
SAMPLE WORKSHEET

APARTMENT SUMMARY AND LOAD CALCULATIONS
# Sample worksheet

**NYSERDA**

Multifamily Performance Program
Electrification Electrical Service Worksheet

NYSERDA'S REVIEW/APPROVAL OF THE PROVIDED PROJECT INFORMATION AND CALCULATIONS DOES NOT IMPLY APPROVAL OF THE DESIGN, BUT IS RATHER JUST TO ASSESS QUALIFICATION FOR THE ADDED ELECTRICAL INCENTIVE. EACH PROJECT SHOULD ENSURE THAT ITS DESIGN COMPLIES WITH THE NATIONAL ELECTRICAL CODE, STATE, AND LOCAL CODES.

THE MINIMUM NUMBER OF APARTMENTS REQUIRED TO QUALIFY FOR THIS INCENTIVE IS FIVE. THE PROJECT CAN CONSIST OF A SINGLE BUILDING, OR MULTIPLE BUILDINGS. IF THE PROJECT DOES CONSIST OF MULTIPLE BUILDINGS THE APPLICANT MUST PROVIDE A SEPARATE PROJECT INFORMATION ENTRY FOR EACH BUILDING.

APPLICANT TO FILL IN YELLOW SHADED CELLS  (TAB or SHIFT TAB to move to next/previous cell)

<table>
<thead>
<tr>
<th>NAME OF PERSON COMPLETING THIS FORM</th>
<th>James Cedar</th>
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<tbody>
<tr>
<td>DATE</td>
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<td>BUILDING NAME</td>
<td>Living Apartments</td>
</tr>
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<td>1234 Main St.</td>
</tr>
<tr>
<td>CITY  STATE  ZIP</td>
<td>Anytown  NY  12345</td>
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</table>
# Sample Worksheet

## General Building Information
- **Total Building Area:** 24,000 sq. ft.
- **Total Number of Apartments:** 32
- **Additional Non-Apt Spaces:** Y

**Note:** If answer is "Y", provide list of spaces with description of use and area (sq ft) in area below. (Ex: interior corridors, laundry room, storage spaces, community lounge, etc.)

Building Manager/Rental Office - 700 sq ft. Tenant storage - 1,200 sq ft. Laundry - 500 sq ft (8 washing machines, 6 gas clothes dryers). Mechanical room - 300 sq ft. Corridors/Stairs

## Maximum Electric Demand for Building Common Spaces (House Meter)

<table>
<thead>
<tr>
<th>kW</th>
</tr>
</thead>
</table>

## Does Building Have an Elevator(s)
- **Quantity of Elevators:** N

## Building Electrical Information
- **Existing Electrical Service Size:** 800 AMPS
- **Electrical Service Voltage:** 240 VOLTS
- **Phases:** 3

## Apartment Electrical Information
- **Apartment Voltage:** 240 VOLTS
- **Apartment Phases:** 3

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</table>
# Sample panel feed

## NYSERDA

Multifamily Performance Program Electrification Worksheet

NYSERDA's review/approval of the provided project information and calculations does not imply approval of the design, but is rather just to assess qualification for the added electrical incentive. Each project should ensure that its design complies with the national electrical code, state, and local codes.

EXISTING APARTMENT PANEL(S) ARE NOT ADEQUATELY SIZED.

EXISTING APARTMENT PANEL(S) ARE MARGINALLY SIZED (ADEQUATE FOR ADDED LOADS, BUT WITH LESS THAN 10% SPARE CAPACITY).

EXISTING APARTMENT PANEL(S) ARE ADEQUATELY SIZED

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<td>MARGINAL</td>
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<td></td>
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FINDINGS TO DATE
## Summary of Findings

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<tr>
<th>Site</th>
<th># of Apts.</th>
<th>Electric Heat</th>
<th>AC</th>
<th>Cooking</th>
<th>Water Heater</th>
<th>Dish/clothes washer/dryer</th>
<th>Panel Size</th>
<th>Service to bldg.</th>
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<td>7100</td>
<td>OK</td>
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</table>

IN WATTS (W)
6 OUT OF 9 SYSTEMS DO NOT NEED UPGRADE
If buildings start adding other electric appliances, like electric stoves, it could tip things over the edge.
SUMMARY OF FINDINGS

Unusual situations

Example:
- master metered
- all electric
- vertical circuits
- electric resistance

We won't use the spreadsheet unusual situations like these. These situations will be evaluated case by case.
Presenters
Ian M. Shapiro
imshapiro@taitem.com
Myron J. Walter
mjwalter@taitem.com
The calculator is intended for buildings that have panels in each apartment. It could also be used for buildings that don’t have panels in each apartment, but the apartments do have electric stoves.

For all other building configurations, we need supplemental information from electrical engineer to confirm need for electric service upgrade and will evaluate on case by case basis.

Common area space should also be included.

The calculator assumes that the only additional electric load to the building will be the heat pump. If other measures in the scope of work also increase electric load (such as, electric stoves), please notify the Project Manager.

Panels will be upgraded to prepare building for full electrification.
FAQ

• What additional information can/should be provided with the worksheet?
  > A description/sf-area of all non-apartment spaces fed from the electrical service, and a list of all electrical loads for each space, or the maximum electrical kW demand for each space.

• Do we need to submit the NEC Panel Sizing Calculator Worksheet even if we don’t need to upgrade the panels?
  > Yes, NYSERDA is collecting data to study the actual conditions of buildings

• If the project is composed of different buildings, can we use one panel calculator for all the buildings?
  > Every building needs to have a NEC Panel Sizing Calculator

• Is there a difference in the panels size calculation if the project is going to install GSHP instead of ASHP?
  > If the GSHP is a configuration where one heat pump is in each apartment, then we would use the same calculator. But if there’s a big central GSHP on the house meter (or multiple GSHP’s on the house meter), then it’s a non-standard situation and would be reviewed on a case-by-case basis.
Energy Savings and Rent Affordability Plan
Overview of Plan

> This Plan template was developed so building owners can inform us how they intend to avoid shifting heating costs to LMI tenants

> Building owners should identify changes to rent, utility allowances or vouchers in response to heat pump or other upgrades in SOW

> Certify that rents won't be raised for 2 years post construction due to increased utility costs or increased value of unit

> Comply with plan for 2 years post construction

> Performance payment dependent on compliance with Plan
Components of Plan

> Building Information

> Demonstrate Rent Affordability
  • Affordable housing verification
  • How to prevent passing on electrified heating costs to tenants
  • What information could be provided to measure rent maintenance
  • How will the information on rent affordability in the Plan be shared with tenants

> Signature
FAQ

• When to submit the Energy Savings & Rent Affordability Plan and the Required Measures Evaluation Worksheet?
  • *We expect to receive these documents with the SAV-IT rev0 package.*
  • *Approved documents will be sent with complete package – SAV-IT approved + HPDS documents approved*

• Does the completion of the plan or signing of the T&C prevent any increases to tenant rent to recoup the funding, for instance through Major Capital Improvement and Individual Apartment Improvement regulations?
  • *No, it does not.*

• If property is a condo or co-op where tenants own their units, does a Plan still need to be completed?
  • *No, it is not needed.*
Required Measures
Evaluation
Required Measures to be Evaluated

> Envelope
  > Air Sealing (including weather stripping)
  > Insulation - Roof Deck or Attic
  > Windows - High Efficiency Windows and/or Storm Windows (when single-pane windows are present)

> HVAC
  > Distribution - Insulate All Hot Surfaces (condensate tank, steam & HW piping)

> In-Unit
  > ENERGY STAR Refrigerators
  > ENERGY STAR Dishwashers
  > High Efficacy Hardwired or Linear Fixtures (CFL, LED)
  > DHW - Low-flow Showerheads and Sink Aerators
Required Measures Evaluation Review

> Each of the measures in the Required Measures Evaluation should be evaluated OR an explanation of why a measure was not evaluated should be provided.

> Some acceptable reasons measures were not evaluated include:
  > If the measure was recently completed in the building or is not relevant for the building
  > If the building owner requests the measure not be evaluated

> All evaluated measures should be part of the scope of work detailed in the SAV-IT
SAV-IT Tool Tips
SAV-IT Reporting Tips

> Describe the energy efficiency improvement to be installed in the Measure Descriptions tab

> Provide a detailed description providing the key elements of the work scope, such that a contractor or designer would understand the intent and an inspector would be able to verify that the improvement was implemented as designed. This should include:

  > Descriptions of All Installed Equipment
  > Quantities
  > Capacity
  > Efficiency
  > Proposed make/model if available
  > Operating Assumptions
  > Modeling Assumptions
Avoiding SAV-IT Review Comments

> Review tabs which have flags prior to submission
  > QC Checks tab
  > Flags if any tabs contain required cells that are omitted
  > Measure QC tab
  > If a flag is populating in column J (circled below), the reviewer will likely ask for a model or external calculations to be submitted. Please consider submitting the project's model or external calculations for these measures to preemptively avoid a comment regarding this flag.

> MPP Provider Portal
  > Tech Tips
  > Choosing Air Source Heat Pumps for Multifamily Buildings

<table>
<thead>
<tr>
<th>Measure Classification</th>
<th>Measure Name</th>
<th>Cost</th>
<th>Site Energy Savings</th>
<th>Source Energy Savings</th>
<th>Source Energy Savings</th>
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</thead>
<tbody>
<tr>
<td>Split System AC/HP</td>
<td>Air Source Heat Pumps</td>
<td>$1,184,444</td>
<td>1,082</td>
<td>2,758</td>
<td>21.1%</td>
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</tbody>
</table>

This measure is being flagged as either falling below or not meeting site energy savings, source energy savings, or source energy savings typical values. Please refer to the guidance in the above instructions and respond accordingly.
NYS Clean Heat Program
Heat Pump Demo Study projects must apply to the NYS Clean Heat Program.

Incentives for the Study will not be released without pre-approval for project from NYS Clean Heat.

Projects must submit their applications before starting construction.


Information about Program, [https://saveenergy.ny.gov/NYScleanheat/](https://saveenergy.ny.gov/NYScleanheat/).
Interaction with Heat Pump Demo Study

> Heat Pump Demo Study defers to the NYS Clean Heat Program Technology Requirements
  • All projects in the study should meet the requirements of the Clean Heat Program

> Incentives from MPP + Heat Pump Demo Study + NYS Clean Heat Program may be layered for heat pump measure
  • Incentives must not exceed project costs

> Heat Pump Demo Study projects will go through MPP inspection process
NYS Clean Heat Program Categories

- Cold Climate Air Source Heat Pumps
  - All ccASHPs in multifamily buildings are in category 2, regardless of heating capacity
  - Multifamily new construction or gut renovation that plan to install Minisplit Heat Pump or Central ccASHP systems are eligible for category 4, regardless of system capacity

- Ground Source Heat Pumps
  - All Multifamily buildings with retrofit GSHP systems are eligible for category 3 regardless of heating capacity
  - Multifamily new construction or gut renovation that plan to GSHP are eligible for category 4, regardless of system capacity

- Category 4 – Custom Space Heating Applications

- Category 4A – Heat Pump + Envelope
  - Category 2 or 3 multifamily retrofit projects + envelope improvements are eligible

- Heat Pump Water Heater
  - Category 6 – Custom application for systems with storage capacities greater than 120 gallons
FAQ

> What is the process with the NYS Clean Heat Program? Does NYSEERDA need to receive a notification of technology approval from that program to approve and release HPDS funding?
  
  - Providers and Participants must apply to the NYS Clean Heat Program separately from MPP. NYS Clean Heat program application entails:
    - Select approved participating contractor
    - Select technology
    - Depending on category chosen, may need to show projected energy savings
  
  - Applicants should receive a written notification of approval from utilities. That should be shared with NYSEERDA and with this approval, HPDS funding can be released after installation is completed.

> Is there a deadline to submit the NYS Clean Heat Program application?
  
  - No, but we should receive the pre-approval letter from the utilities before construction starts.

> Can the Heat Pumps be installed before NYS Clean Heat or NYSEERDA HPDS approval?
  
  - No, the Heat Pumps need to be approved by NYS Clean Heat Program before installation or risk not being funded if the technology is not approved.
Heat Pump Education Materials
Tenant Materials

- NYSERDA is preparing educational materials for tenants with heat pumps.
- Materials are undergoing stakeholder review.
- Materials consist of best practices for optimizing use of heat pumps.
- The materials will be shared with building owners to be customized and distributed to tenants. Customizable features include maintenance contact info and who’s responsible for cleaning filters.
Contacts

Ed Righter, MPP Provider Liaison – ed.righter@nyserda.ny.gov
Brian Cabezas, Senior Project Mgr, MPP – brian.cabezas@nyserda.ny.gov
Angelica Quintero, Project Manager, MPP – angelica.quintero@nyserda.ny.gov
Jackie Albanese, Pipeline Manager, MPP – jackie.albanese@nyserda.ny.gov

General MPP questions – multifamilyprograms@nyserda.ny.gov

Information on Heat Pump Demo Study Requirements available on MPP Provider Portal.
Cold Climate Air Source Heat Pump - Full Load Heating

Eligible Technologies

- Minisplit Heat Pump (“MSHP”)
- Central Cold Climate Air Source Heat Pump

Eligibility Criteria

- Each unit in system must be on the NEEP Product List
- Total heat pump system heating capacity must be <300,000 Btu/h
  - Exception: for existing multifamily buildings, all retrofit ASHP systems shall be eligible for Category 2 regardless of heating capacity
- For central ASHPs installed with a back-up furnace in the same cabinet, the back-up furnace must have capacity <225,000 Btu/h
- Total heat pump system heating capacity satisfies at least 90% of the building’s design heating load (BHL)
Category 2 - ccASHP

Incentive Structure

- $/10,000 Btu/h of maximum heating capacity at 5°F, as documented on the NEEP Product List
- Total incentive to be limited to 120% of the building’s design heating load (BHL)

<table>
<thead>
<tr>
<th>Company</th>
<th>Incentive Structure</th>
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<td>Central Hudson</td>
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<tr>
<td>NYSEG/RGE</td>
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<tr>
<td>Orange &amp; Rockland</td>
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<td></td>
<td>a. Plus integrated controls (inclusive): $2,400</td>
</tr>
<tr>
<td></td>
<td>b. Plus decommissioning (inclusive): $2,400</td>
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Category 3 - GSHP
Incentive Structure

- $/10,000 Btu/h of full load heating capacity as certified by AHRI
- Total incentive to be limited to 120% of the building’s design heating load (BHL)

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<tr>
<th></th>
<th>Central Hudson</th>
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<th>National Grid</th>
<th>NYSEG/RGE</th>
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<td>$1,500</td>
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</table>
Category 4A – Heat Pump + Envelope

Must meet category 4 requirements + include significant envelope upgrade

Eligible Category 4 Heat Pump Technologies:
- Central Cold Climate Air Source Heat Pumps
- Mini Split Heat Pumps
- Commercial Unitary Systems/Large Commercial ASHPs
- Air Source Variable Refrigerant Flow Heat Pumps ("VRF")
- Ground Source Heat Pumps
- Packaged Terminal Heat Pumps ("PTHPs")

Eligible Envelope Measures:
- Window replacements, window film
- Wall insulation, continuous insulation, window walls, curtain walls exterior façade
- Air leakage sealing, air barrier continuity
- Roof insulation
Category 4A – Heat Pump + Envelope

Eligibility Criteria

> Total heat pump system heating capacity must be ≥300,000 Btu/h at design heating temperature unless:
  
  • If under 300,000 Btu/h, contains equipment that is three-phase or contains equipment that meets or exceeds the NEEP cold climate air-source heat pumps specifications but is not NEEP listed
  
  • MF new construction projects are eligible for Category 4, regardless of installed heating capacity

> Projects shall be for full-load heating systems and installed systems must satisfy the dominant HVAC load for the building, per applicable code

> The envelope upgrade must produce a quantifiable impact on the heat pump sizing

> For scenarios in which custom project eligibility is not clearly defined, the program guidelines provide additional information on how to determine eligibility for Category 4 applications
  
  • Fossil fuel energy consumption must be reduced by the new electric technology or application and
    
    o Must not increase the overall annual site energy consumption
    
    o Shall be market ready and can meet or exceed applicable minimum efficiency specifications
Category 4A - Heat Pump + Envelope
Incentive Structure

- $/MMBtu of annual energy savings
- Tier 1 for Existing: 5% - 30% reduction in dominant load compared to baseline
- Tier 2 for Existing: >30% reduction in dominant load compared to baseline

<table>
<thead>
<tr>
<th>Company</th>
<th>Tier 1</th>
<th>Tier 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Hudson</td>
<td>$80</td>
<td>$100</td>
</tr>
<tr>
<td>Con Edison</td>
<td>$200</td>
<td>$400</td>
</tr>
<tr>
<td>National Grid</td>
<td>$80</td>
<td>$100</td>
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<tr>
<td>NYSEG/RGE</td>
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<td>$100</td>
</tr>
<tr>
<td>Orange &amp; Rockland</td>
<td>$80</td>
<td>$160</td>
</tr>
</tbody>
</table>
## Category 6: Custom Hot Water Heating Applications

**Incentive Structure**

$/MMBtu of annual energy savings

<table>
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<tr>
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<th>Central Hudson</th>
<th>Con Edison</th>
<th>National Grid</th>
<th>NYSEG/RGE</th>
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