NYS Clean Heat Integrated Controls Eligibility for Con Edison and Orange & Rockland

Background and Definitions

The main purpose of integrated controls (ICs) is to coordinate the heating operation of heat pump (ducted and ductless) systems with ancillary heating systems such as fossil fuel boilers and furnaces. ICs prioritize operation of the heat pump system as the first stage of heat and relies on the ancillary system as backup or second stage of heat.

Integrated Controls are control packages that:

a. Have the capability to control all heat pumps in a single heat pump system, AND
b. Automatically switch the source of heating between the heat pumps and an ancillary, second stage system, based on a predetermined outdoor and/or indoor temperature setpoint configuration for droop operation[1].

For purposes of the NYS Clean Heat Program, "integrated controls" include dual fuel thermostats, which are multi-stage thermostats installed with centrally ducted heat pump systems and that have the capability to control an ancillary, second stage fossil HVAC system.

Program Eligibility Requirements

General Requirement: Integrated control systems must operate the heat pump system as the first heat stage and engage the ancillary heating system as the second heat stage. Refer to the Integration Logic Section for additional details.

First Heat Stage: Heat Pump System (ductless or ducted)

Second Heat Stage: Ancillary Heating System (boiler, furnace, etc.)

Integrated control products eligible for Con Edison's Clean Heat Program incentives must satisfy the eligibility criteria laid out below and submit the required information, also listed under this section, for inclusion in the Qualified Product List.

Eligibility Criteria

Eligible integrated controls and dual-fuel thermostats must meet the following criteria:

1. The integrated controls system must accommodate at least two heating stages and be configured to operate the heat pump system as the primary (first stage) heating source.
2. The integration algorithm must implement a switchover temperature and/or a droop temperature differential in its control logic. If an outdoor switchover temperature is utilized, representative switchover temperatures are shown in Table 1, and are expected to be set by contractors.
3. If an outdoor switchover temperature is utilized, the system must function with either a local outdoor temperature sensor or have access to a live weather feed via Wi-Fi.
4. The sequence of operation must include adjustable setpoints, lockouts and droop differential temperatures at which the controlled systems perform.
5. Setpoints and droop differential settings must be adjustable by the customer.

[1] An integrated control strategy where heating system changeover is executed when the indoor temperature falls to a pre-determined amount (e.g. 2 °F) below the indoor temperature set point.

6. The integrated controls system must maintain full inverter functionality of the compressor.
7. The integrated controls system must allow fan speed settings to be adjusted by the customer.
8. Manufacturer must provide wiring diagrams and installation setup instructions/configuration in the Operation Manual and Install Guide.

Submitting Products for Inclusion on the Qualified Product List (QPL): Required Fields

To be considered and included in the Integrated Controls Qualified Product List, the manufacturer must demonstrate that their IC product complies with the eligibility criteria described in the previous section, and provide the following details:

1. Manufacturer Name
2. Model Name
3. Model #
4. 24 V Circuit (Y/N)
5. Communicating (Y/N)
6. Wi-Fi Enabled (Y/N)
7. Other
    a. Manufacturer's Operation Manual and Install Guide
        i. Wiring diagrams
        ii. Installation setup
    b. Customer facing material
8. Notes

Contact ICF at NYSCleanHeat@icf.com to initiate a new integrated controls product qualification review and approval process.

Integration Approach Guidance

Integration Components

The typical components of integrated control packages are summarized below. IC packages may not require all of these components and may rely on others to achieve the required sequence of operation.

1. Control of Heat Pump (Indoor Unit)
2. Control of Ancillary Heating System
3. Hardware Used to Communicate Between Devices
4. Software Used to Control Integrated Systems
5. Cloud-based User Interfaces/Apps
6. Outdoor Temperature Source (if utilizing an outdoor temperature switchover)

Integration Methods

A non-exhaustive list of integration methods is shown below. Other integration approaches may be considered as long as they achieve the required sequence of operation outlined in the Integration Logic Section.

1. Wired 24 V Relay Kit
2. Wireless embedded control (indoor unit connected to thermostat. Thermostat or module wired to ancillary system control panel)[2]

[2] Requires access to homeowner's local Wi-Fi network. Some IC models may have specific Wi-Fi requirements.

3. Wireless to Infrared Control (indoor unit connected to IR controller. IR controller connected via wireless to thermostat. Thermostat wired to ancillary system control panel)[2]
4. Dual-fuel thermostat (wired to indoor controller and ancillary system control panel)
5. Cloud-to-Cloud and API-based integration platforms including but not limited to IFTTT Applets[3]

Integration Logic

Sequence of Operation:

1. Integrated controls must enable operation of the heat pump system as the first stage of heating while conditions are favorable:
    a. Outdoor temperature is above the 99% dry bulb heating design temperature[4] (in °F) plus a buffer temperature offset as shown in the Table 1, AND/OR
    b. Indoor droop temperature differential is within 1.5-4 °F of setpoint

    Heat pump indoor units should be controlled via one of the methods described in the Integration Methods Section above. Backup heat lockout may also be adjusted at a set outdoor temperature.

2. The second stage of heating must engage when:
    a. Outdoor temperature falls below the 99% dry bulb heating design temperature[4] (in °F) plus a buffer temperature offset as shown in the Table 1, AND/OR
    b. Indoor droop temperature differential is greater than 1.5-4 °F of setpoint

    The ancillary heating system should be controlled either by thermostats wired directly to the system's control panel, a relayed signal from the heat pump system or other integration hardware or software coordinating both stages. The heat pump system may continue to operate in tandem with the ancillary heating system and a compressor lockout is not required.

Manufacturer and contractor best practices will be considered and deemed acceptable on a case-by-case basis. Please contact ICF at NYSCleanHeat@icf.com for more details.

Table 1 - Design temperature, buffer temperature and switchover temperature for ICs setup for Clean Heat Program locations.

Location	99% Dry Bulb Heating Design Temperature (°F)	Buffer Temperature (°F)	Switchover Temperature (°F)
Monticello	4.7	5	9.7
New York City – Central Park	17.5	5	22.5
New York City – JFK	18.0	5	23
New York City – LaGuardia	18.4	5	23.4
Poughkeepsie	8.4	5	13.4
White Plains	13.5	5	18.5

[3] Requires the download of the IFTTT app on the customer's local device, compatible Wi-Fi dual fuel thermostat, and account creation for 3 separate apps.

[4] Refer to ASHRAE (2017) dry bulb heating and cooling design temperatures table on page 25.