

Design 2000_{plus}

HVAC - Chillers & Economizer Controls

2009 Project Information Form for Massachusetts and Nantucket

This Project Information Form provides a template to collect project systems and equipment information and specifications. In addition, this form serves as a guide to terms for HVAC Chiller Systems and Economizer Controls and identifies energy efficiency improvement products and incentives. Contact your **Energy Solutions representative** to complete an application and to determine the incentive for this HVAC Chiller Systems project.

Customer Facility Information

Customer Facility Name: _____ Date of Application: _____
 _____ Sq. Ft. Covered by Application: _____
 Contact Person: _____ Design 2000_{plus} Project Type:* (see below for details)
 Street Address: _____ Federal ID Number: _____
 City: _____ State: _____ Zip: _____ Company Type:
 E-mail Address: _____ Incorporated Exempt Not Incorporated
 Facility Description: _____ Phone Number: _____
 _____ Fax Number: _____

Customer of Record Information: Billing Account Number: _____ Internal Use only

***Design 2000_{plus} Project Type (select one)**

- Change in the use or Function of the Building Space
- New Building
- New Equipment for New Process or Expanded Operation
- Renovation of Existing Equipment
- Expansion of an Existing Building
- New Controls for Improved Operations
- Planned Replacement of Equipment
- Replacement of Failed Equipment

Installation Contractor Information

Installation Performed By:** Customer Installation Contractor Project Expediter Other (Vendor)

Complete this section if installation is not by the customer

Installation Company: _____ Street Address: _____
 Contact Person: _____ City: _____
 E-mail Address: _____ State: _____ Zip: _____
 Phone Number: _____

** If contractor has not been selected, select **Customer**

Application Information

Application Funding Type AAP Other *Internal Use only*
 Expected Completion Date _____
 Proposed Incentive Recipient Customer (Account Credit or Check) Installation Contractor*** Other (Vendor)***

***** Complete this section if Installation Contractor or Other has been selected**

Federal ID Number: _____ Company Type: Incorporated Exempt Not Incorporated

This Form Was Completed By:

Name: _____
 Phone Number: _____ E-mail Address: _____

For More information

Phone: 1-800-787-1706 Internet: www.nationalgridus.com

Project Information Form Index:

- Page 1: Customer information datasheet
- Page 2: Proposed Equipment Specification Table and reference guide to terms
- Page 3 HVAC Chiller Eligibility Requirements and Incentive Details
- Page 4: Hotel Occupancy Sensors Eligibility Requirements and Incentive Details and Equipment Table

Instructions:

- 1) Fill in the Customer information datasheet on page 1.
- 2) Fill in the Proposed HVAC Chiller Equipment in the table below.
- 3) For Hotel Occupancy Sensors, fill in Table 2 on page 4.
- 4) Contact your Energy Solutions representative to complete an application and to determine the incentive for this HVAC Chiller or Hotel Occupancy Sensors project.

Proposed Equipment Specification (Facility Detail)

A. Building, Room and Equipment Identification (Installation Site): _____

Measure Category: Chillers

Measure Description: _____

Quantity: _____

Unit Size (tons): _____

Unit Efficiency: EER _____⁽¹⁾ kW/ton Peak _____ kW/ton IPLV _____⁽²⁾

Estimated Equivalent Full Load Hours: _____

Note: Provide a copy of the manufacture's cut sheet for the equipment that states either the EER for air cooled or the kW/ ton peak and the kW/ton IPLV for water cooled chillers.

⁽¹⁾ EER for air cooled chillers only

⁽²⁾ kW/ton peak and IPLV both required for water cooled chillers \geq 150 tons

Does this Chiller have a Variable Frequency Drive (VFD)? Yes No (if yes – provide information below)

Harmonics Test Eligibility Information:

- Total VFD Load Supplied by Transformer (HP)* _____
- KVA Rating of Building Transformer _____

* The value for the "Total VFD Load Supplied by Transformer" is the sum of the rated horse power for all motors, existing as well as all proposed at this time, in the facility that are under control of Variable Frequency Drives. For Utility Owned Transformers, contact your Energy Solutions representative.

Guide to Terms

Measure Description: *see Table 1 on page 3*

Unit Size (tons): Manufacturer's Rated Capacity in Tons

Estimated Equivalent Full Load Hours: *see page 4, item #7*

I. HVAC Chillers Eligibility Requirements and Incentive Details

Prescriptive versus Custom Approach:

Under the prescriptive program, incentives are available for air or water cooled chillers, with or without Variable Frequency Drives in accordance with the rules that follow in this section.

- Incentives for all chiller projects will be issued through this program with the following **exceptions**:
 - a. Chillers larger than 1000 tons must use the Custom Approach.
 - b. Chillers applied for through the Comprehensive Custom Approach (Comprehensive Chiller or Comprehensive Design Approach).
 - c. Chillers used for process applications or chillers with Variable Frequency Drives may use the Custom Approach if the customer prefers.
- Contact your Energy Solutions representative for details on the Custom Approach.

Table 1: HVAC Incentives

Measure Description	Minimum Equipment Efficiency Criteria	Base Unit Incentive	Additional Incentive
Air Cooled Chillers ≤150 tons	10.2 EER	\$30/ton	\$5/ton for each 0.1 EER above minimum criteria
Air Cooled Chillers >150 to >300 tons	10.2 EER	\$20/ton	\$3/ton for each 0.1 EER above minimum criteria
Water Cooled Chillers ≥30 tons to <70 tons	0.75 peak kW/ton	\$25/ton	\$8/ton for each 0.01 kW/ton below minimum criteria
Water Cooled Chillers ≥70 tons to <150 tons	0.74 peak kW/ton recip. 0.65 kW/ton peak centrifugal	\$25/ton	\$8/ton for each 0.01 kW/ton below minimum criteria
Water Cooled Centrifugal Chillers ≥150 tons to < 300 tons			
Choose Option A or B			
A. Peak kW Option	0.61 kW/ton	\$20/ton	\$3/ton for each 0.01 kW/ton below minimum criteria (<i>See Note 5</i>)
B. IPLV Option	0.51 kW/ton	\$20/ton	\$3/ton for each 0.01 kW/ton below minimum criteria (<i>See Note 5</i>)
Water Cooled Screw Chillers ≥150 tons to < 300 tons			
Choose Option A or B			
A. Peak kW Option	0.61 kW/ton	\$15/ton	\$2/ton for each 0.01 kW/ton below minimum criteria (<i>See Note 5</i>)
B. IPLV Option	0.51 kW/ton	\$15/ton	\$2/ton for each 0.01 kW/ton below minimum criteria (<i>See Note 5</i>)
Water Cooled Chillers ≥300 tons ≤1000 tons			
Choose Option A or B			
A. Peak kW Option	0.56 kW/ton	\$6/ton	\$4/ton for each .01kW/ton below minimum criteria (<i>See Note 5</i>)
B. IPLV Option	0.51 kW/ton	\$6/ton	\$4/ton for each .01kW/ton below minimum criteria (<i>See Note 5</i>)

1. Use this application only for projects where a single chiller is installed at the site. Use the Custom application for other projects.
2. Chiller equipment efficiency criteria are based on applicable ARI standard conditions. Attach a copy of manufacturers' performance sheet. For water cooled chillers it shall state both peak (kW/ton) and part load (IPLV) efficiencies. For air cooled chillers, performance will be rated in EER. Tons should be ARI net capacity, not gross capacity.
3. ARI standard conditions are as follows: Chillers - ARI standard 550/590-98
 - a) 44°F leaving chilled water; 2.4 GPM/ton;
 - b) 95°F entering condenser air temperature (air cooled only)
 - c) 85°F entering condenser water temperature (water cooled only)
 - d) 3.0 GPM/ton condenser water flow rate (water cooled only)
4. Incentives for chillers over 150 tons may be calculated using either peak kW/ton or IPLV efficiency ratings but peak kW/ton must always comply with current building code.

(continued on page 4)

5. Incentive calculation:
 - a) Incentives for projects with efficiencies based on EER are calculated as: $\{(Base\ Unit\ Incentive \times Unit\ Size) + [Additional\ Incentive \times (Unit\ Efficiency - Minimum\ Equipment\ Efficiency\ Criteria) \times 10 \times Unit\ Size]\} \times quantity$
 - b) Incentives for projects with efficiencies based on kW/ton are calculated: $\{(Base\ Unit\ Incentive \times Unit\ Size) + [Additional\ Incentive \times (Minimum\ Equipment\ Efficiency\ Criteria - Unit\ Efficiency) \times 100 \times Unit\ Size]\} \times quantity$
6. Additional incentive shall not exceed \$52.00 per ton for water cooled chillers 150 tons and larger.
7. Chiller equivalent full load hours (EFLH) must be estimated by an engineer, Utility Technical Representative, or technically qualified vendor.
8. Chillers 300 tons and larger must operate a minimum of 300 hours per year to qualify for the incentive. Chillers under 300 tons must operate a minimum of 150 hours a year.
9. Chillers with VFD's must have as a minimum a 3% impedance series reactor in its AC power input connection.
10. Chillers with Variable Frequency Drives (VFD's) must comply with National Grid's Harmonics requirements. Contact your Energy Solutions representative for details.

Important Information on Variable Frequency Drive Chillers

VFDs can be sensitive to overvoltages that occur when power factor correcting capacitor banks on the utility power system are switched on. To qualify for an incentive payment, each VFD must include a series reactor (*inductor, choke*) in its AC input connections. Your VFD supplier should assist in the sizing of the reactor. Minimum requirement is a 3% impedance reactor, based on the horsepower of the VFD to be installed.

As a general rule, a 3% reactor is sufficient to avoid misoperation of VFDs during utility capacitor switching and will also help reduce the magnitude of harmonic currents generated by the drive. In some instances your supplier may find it necessary to install 5% reactors and, rarely, additional filtering devices to meet acceptable current and voltage harmonic distortion requirements.

If your power factor is less than 0.8 (80%), we recommend that you consider power factor correction concurrent with the installation of drives, because the presence of power factor correction equipment can influence proper reactor sizing, and because the presence of VFDs can influence the design of power factor correction equipment. In situations where the load due to VFDs is a substantial part of the facility load, we recommend that filters, rather than capacitors, be used for power factor correction.

The use of VFDs which incorporate pulse width modulation (PWM) may produce overvoltages which may cause premature failure of AC induction motors not rated for use with an inverter. We recommend that when installing PWM drives, you consider utilizing inverter rated motors or suitable overvoltages mitigation devices that may include additional line reactors between the drive and the motor. Consider shaft grounding, insulated bearings, load filters or conductive lubricants to prevent possible bearing frosting or fluting. This is particularly important for installations where the motor will operate in a narrow speed band for long periods of time.

II. Hotel Occupancy Sensors Eligibility Requirements and Incentive Detail

Eligibility Requirements for Hotel Sensors:

1. Sensors must control PTAC or heat pump units
2. Controlled units must have electric heat
3. To optimize the benefits of hotel occupancy, we require that:
 - (a) sensors be controlled by automatic occupancy detectors,
 - (b) rooms that have operable windows or patio doors include window/door switches
 - (c) during unoccupied periods, the set back for controlled units must be set to 65° Fahrenheit for heating and 78° Fahrenheit for cooling
4. Sensors controlled only by a front desk system are not eligible
5. Replacement or upgrade of existing occupancy based HVAC controls are not eligible
6. Hotels must operate 12 months of the year
7. The total quantity of eligible sensors can not exceed the total quantity of PTAC's of Heat Pumps controlled.

Table 2: Hotel Occupancy Sensors

Measure Description	Maximum Unit Incentive	Quantity of Units
Hotel Occupancy Sensors	\$75.00/Sensor	_____ Eligible Sensors _____ Heat Pumps _____ PTAC's