PowerScore CEA Survey Questions: HVAC

This document previews all questions from the third section of the survey, other than periodic open-ended questions about your facility's uniqueness.
https://powerscore.resourceinnovation.org/u/calculator/your-hvac

Describe the heating, ventilation, air conditioning, and dehumidification (HVAC) systems you use

There are many variables in your cultivation facility that impact HVAC equipment selection, unit size and cost of operation. These system types simplify the complex variety of options in grow operations today.

Due to the limited data and unique aspects of greenhouses, we will not yet be able to estimate an HVAC score for systems F and G.

- Describe the HVAC system you use for your cultivation and processing spaces. (Select system, then associate with Spaces)
    - System 0: No Heating or Cooling with Supplemental Standalone Ventilation and Dehumidification Equipment
      Heating, Ventilation, and Air Conditioning (HVAC) systems are not used, and supplemental, standalone ventilation or dehumidification equipment are the only components controlling your grow environments. Outside air may or may not be used for ventilation.
    - System A: Conventional Heating, Ventilation, and Air Conditioning (HVAC) with Supplemental Standalone Dehumidification Equipment
      Conventional factory-built or packaged HVAC equipment with cooling components sized to handle the entire sensible cooling load of the room are used to control your grow environments. Standalone dehumidification equipment in your cultivation spaces and/or HVAC equipment using an internal hot gas reheat coil is used to control your grow environments when lights are off, or to supplement the dehumidification capacity of the cooling components.
    - System B: Conventional Heating, Ventilation, and Air Conditioning (HVAC) and Enhanced Dehumidification
      Conventional factory-built or packaged HVAC equipment with cooling components sized to handle the entire sensible cooling load of the room are used to control your grow environments. Permanently installed dehumidifier equipment containing heat exchanger plates or heat pipes is used to improve the moisture removal capacity effectiveness of your system.

- System C: Conventional Heating, Ventilation, and Air Conditioning (HVAC) with Split Dehumidification System
  Conventional factory-built or packaged HVAC equipment with cooling components sized to handle the entire sensible cooling load of the room are used to control your grow environments. Split dehumidifiers with remote air-cooled condensers to provide dehumidification and supplemental cooling with improved effectiveness over portable dehumidification equipment installed in cultivation spaces using internal hot gas reheat.

- System D: Conventional Heating, Ventilation, and Air Conditioning (HVAC) with Desiccant System for Dehumidification and Sensible Cooling
  HVAC equipment with cooling components sized to handle the entire sensible cooling load of the room are used to control your grow environments. Additional desiccant dehumidification equipment with gas or electric heat is used when lights are off or to supplement the dehumidification capacity of cooling components. Your system can be integrated units that provide both sensible cooling and dehumidification for your cultivation spaces.

- System E: Fully Integrated Heating, Ventilation, and Air Conditioning (HVAC) and Dehumidification System
  Completely integrated equipment is used to control your grow environments using control systems that adjust sensible heat ratios to perform heating, ventilation, cooling, and dehumidification for your cultivation spaces.(Due to the limited data, we will not yet be able to estimate an HVAC score.)

- System F: Hydronic Chilled Water and Boiler System
  A central chilled water system can allow for heating and cooling for an unlimited number of independent growing zones within your facility. Hydronic fan coil units or air handlers exchange heat between the building and the outdoors, served by air- or water-cooled equipment located outside the building. Air-cooled chiller systems can reject their heat directly to outside air, while water-cooled chiller systems are often located indoors in a mechanical room and are connected to evaporative cooling towers located outdoors via separate condenser water loops in order to reject heat to the outside air.
    - Some portions of the chiller and/or boiler system can recover heat to recycle energy for dehumidification reheat and/or primary building heat
    - Chiller can be heat recovery type, otherwise a secondary source of hot water is required from a site-generated source (like a boiler)
    - Dry coolers can be utilized for free cooling in winter without introducing outside air into the space

- System G: Year-round Greenhouse HVAC Systems
  HVAC equipment addresses the ventilation, cooling and heating loads of your grow environments throughout the year. These systems may be a factory-built

central system or may be composed of packaged, standalone components that maintain greenhouse indoor environmental conditions within acceptable ranges.

- Other HVAC Systems: Your system is not described in A thru G above