PowerScore Pro: All Survey Questions

This document previews all the questions, other than periodic open-ended questions about your facility's uniqueness. Most questions are optional, but the more data you put in, the more KPIs you'll get out of the survey.
https://powerscore.resourceinnovation.org/go-pro

Describe your cultivation facility

Calculating your PowerScore depends on a few dozen details about your facility. You will need information about your energy bills, lighting equipment, and HVAC systems.

- Which crops do you grow at this facility? Describe each distinct crop your facility produces. Provide each crop a name to track its performance separately.
  (Select all that apply)
    - Cannabis
        - Hemp Fiber
        - Hemp Oil Seed
        - CBD (<0.3% THC)
        - THC (>0.3% THC)
    - Floriculture
        - Finished Plants (perennials, grasses, herbs, ferns, succulents)
        - Young Plants for Wholesale (plugs and cells of varying cultivars like veggies, herbs, perennials)
    - Leafy Greens
        - Lettuce, Arugula, Spinach
        - Macrogreens (Radish, Beet, Cabbage, Kale, Arugula, Mustard)
        - Microgreens (Radish, Beet, Cabbage, Kale, Arugula, Mustard)
        - Genetics (Lettuce, Arugula, Spinach, Radish, Beet, Cabbage, Kale, Mustard)
    - Cole Crops
        - Mustard family including Broccoli, Brussels Sprouts, Cabbage, Cauliflower, Collards, Kale, Kohlrabi
        - Genetics
    - Specialty Greens
        - Herbs (Basil, Cilantro, Oregano, Lavender, Amaranth, Sorrel, Cress)
        - Genetics (Basil, Cilantro, Oregano, Lavender, Amaranth, Sorrel, Cress)
    - High Wire Fruit and Vegetable Specialty Crop
        - Vine Tomatoes
        - Tomato Genetics
        - Vine Cucumbers
        - Cucumber Genetics
        - Specialty (Pepper)
    - Fruit
        - Berries (Raspberries, Blueberries, Blackberries)
        - Strawberries
        - Grapes

        - Melons (Watermelon, Cantaloupe, Honeydew)
        - Genetics
    - Mushrooms
    - Humulus (Hops)
- Which of your facility's growing spaces do you want to track?
  Describe each distinct growing space in your facility for which you want to enter separate data. Naming each space is optional, but it can also help you identify the correct space.
    - What is the type of each growing space?
        - Outdoor
        - Indoor
        - Greenhouse/Hybrid/Mixed Light
          (High and low tunnel environments are considered Greenhouses for the purposes of this survey.)
- Which part of your facility are you wanting to benchmark?
    - Whole facility
    - Your main production environment(s)
    - Your research chamber(s)
- Name of facility
  Optional. Will only be used for communication between us and you.
- Facility's postal code
- Last reporting month and year
  The last full month you have complete energy, water, and production information you can report.
- Would you like to upload images or files of your utility bills?
  This could include electricity, natural gas, generator gas, fuel oil, propane, or water. Data will be imported and verified from your bills, and let you skip related questions in this survey. Depending on your utilities, there may be a wait time in processing your files.
    - If so, which utility companies do you want to upload bills from?
        - **For Each Utility:**
            - Utility Name
            - Billing Schedule (One bill per month, One bill per quarter, One bill per delivery, Annual bill or zip file)
            - Which data points should appear in this utility company's bills? (Select all that apply)
                - Net Electricity (e.g. kWh)
                - Electricity Peak (e.g. kW)
                - Water Usage (e.g. gallons)
                - Waste Usage (e.g. lbs)
                - Natural Gas (e.g. therms)
                - Back Up Generator (e.g. gallons)
                - Biofuel Wood (e.g. tons)
                - Propane (e.g. gallons)
                - Fuel Oil (e.g. gallons)
- How would you like to enter the measurements or estimates of your space sizes?
    - Square Feet
    - Meters
- How would you like to enter your water measurements or estimates?
    - Gallons
    - Liters

    - CF (Cubic Feet)
    - CCF (100 Cubic Feet)
- What growing and processing activities do you do at your facility? (Select all that apply)
    - Tissue culture laboratory
    - Nursery
        - Seed starts
        - Mother plants
        - Clone plants
        - Vegetating plants
    - Flowering plants
    - Drying and curing
    - Conditioned storage
    - Extracting
    - Post-extraction processing
    - Manufacturing of plant-based products
    - Manufacturing of packaging for plant-based products

Describe your growing environments

Temporary seasonal greenhouse structures such as low tunnels are considered outdoor environments.

- **For Each Growing Space:**
    - What type of environment is Space #1?
        - Indoor or Greenhouse
            - (New construction / Renovated space)
            - Zoning:
                - Industrial Commercial
                    - (Warehouse / Other)
                - Residential
                    - House/Apartment
                    - Garage (attached to home)
                    - Outbuilding (not attached to home)
            - Has Ceiling?
                - What is the height of the ceiling in Space #1? (ft)
            - Uses Vertical Stacking?
            - Uses Mobile Racking?
            - Are the interior walls of Space #1 insulated? (Y / N)
            - Did the design of Space #1 meet current IECC (energy code) standards? (Y / N / ?)
            - How many types of light fixtures are used for growing in Space #1? If lights have different wattages, then they are different types.
        - Greenhouse
            - (Ventilated / Sealed)
            - Hoophouse?
            - Light Deprivation?
            - Supplemental Electric Light?

            - How many types of light fixtures are used for growing in Space #1? If lights have different wattages, then they are different types.
        - Are the interior walls of Space #1 insulated? (Y / N)
        - Did the design of Space #1 meet current IECC (energy code) standards? (Y / N / ?)
    - Outdoor
- For each crop, what is the average square footage under production throughout the 12-month reporting period in Space #1?
- Which stages of growth occur in Space #1?
    - Clone or Mother Plants
    - Vegetating Plants
    - Flowering Plants

- What is the average square footage under production for your Mother Plants throughout the 12-month reporting period?
- What type of building commissioning did/do you use for your facility, if any?
    - Commissioned newly constructed facility
    - Have retro-commissioned your facility's building systems after occupancy
    - Ongoing commissioning of your facility during operation
    - No commissioning yet

      If yes, check all that apply:
        - Third party commissioning agent performed/performing commissioning activities
        - Owner performed/performing commissioning activities

Describe your lighting fixtures

- **Details for Each Light Type within Each Space:**
    - Make
    - Model
    - Lighting fixture wattage
    - Number of these fixtures
    - While in operation, how many hours a day are the lights in this space turned on? (hours)
    - How many days a year are the lights in this space in operation? (days)

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

- Does your facility use any of these thermal technologies? Please describe anything interesting at the end of this page.
  - Heat pump technology
    - What type of heat pump?
      - Air-to-air (ducted or ductless systems)
      - Air-to-water (hydronic systems)
      - Ground-source (ducted or hydronic geothermal systems)
      - Heat pump rooftop unit
  - Direct use geothermal (not a heat pump system)
  - Pelton wheel
  - Other

Describe your target environmental conditions

- **For each growing stage:**
  (Clone or Mother Plants, Vegetating Plants, Flowering Plants)

    - What is the target temperature setting for your Flowering Plants? (F) Minimum, Maximum
    - What is the target relative humidity setting for your Flowering Plants? (%) Minimum, Maximum

Describe your water sources and recirculation

- Please select any significant sources for the water you use at your facility for cultivation and non-cultivation processes: (Select all that apply)
    - Potable
        - Municipal Potable Water
            - Groundwater
            - Reservoir
        - Private Well / Bore
    - Non-potable
        - Natural Surface Water
            - River / Stream
            - Pond / Lake
        - Municipal Recycled Water
        - On-site Reclaimed (Recycled) Water
            - Condensate
            - Rainwater
            - Irrigation Runoff
- How do you use water in your facility? (Select all that apply)
    - Watering for plant growth
    - Fogging for plant health
    - Hydronic HVAC processes and systems
    - Integrated pest management
    - Potable drinking water
- Do you recirculate water in your operation?
    - Do you treat your recirculated water?
        - Did you review recirculated water quality before selecting treatment equipment? (Y / N)
        - What water treatment processes do you use for your recirculated water? (Same options as source water treatment)
- How much of your annual water usage is for cultivation? (0-100%)
- How would you like to enter your water usage?
    - By month
    - By stage of plant growth
- When and how much water do you use and store during the year?
  For each month...
    - Water Usage
    - Source Water Storage
    - Recirculated Water Storage

Describe your water use details

- **For each growing stage:**
  (Clone or Mother Plants, Vegetating Plants, Flowering Plants)
    - What growing media do you use for your Flowering Plants? (Check all that apply)
        - Hydroponics
            - Deep Water Culture
            - Nutrient Film Technique
            - Other Hydroponics
        - Aeroponics
        - Soil Mixture
            - Living Soil
            - Field Soil
            - Top Soil
            - Mineral Soil
            - Rockwool
            - Coco
            - Peat
            - Perlite
            - Expanded Clay
            - Engineered Foam
            - Vermiculite
            - Clay Pebbles / Clay Balls
            - Growstones
            - Sand
    - How do you distribute water to your Flowering Plants?
        - Hand
        - Ebb & Flow
        - Drip Irrigation
    - On average, how many Flowering Plants are watered at a time each day?
    - How often do you water your Flowering Plants?
        - Once a day
        - Twice a day
        - More than twice a day
        - Perpetual
    - How much water do you give all of your Flowering Plants?
        - Minimum (gal/day)
        - Maximum (gal/day)
        - Don't know
    - How much water do you drain from all of your Flowering Plants?
        - Minimum (gal/day)
        - Maximum (gal/day)
        - Don't know
    - What does your facility do with its Flowering Plants drained water, if any?
        - Drain to Waste
        - Capture, Treat, and Reuse
    - How much water do you recirculate for all of your Flowering Plants?
        - Do not recirculate
        - Minimum (gal/day)

        - Maximum (gal/day)
        - Don't know
- How do you estimate or measure water use for your plants?
    - Best Guess
    - Water Meter
    - Application Rate
    - Storage Filling Frequency
    - We do not estimate or measure water use for our plants
    - Other:

Describe your electricity sources and usage

For the most accurate and current results, answer the following questions for the most recent 12-month period.

- Does your reported electricity consumption include non-facility usage, such as a residential dwelling or unrelated business?
    - Please estimate the percentage of your overall reported electricity consumption that is attributable to cannabis cultivation operations. (0-100%)
- Does your facility produce renewable electricity onsite?
    - What types of renewable electricity does your facility produce onsite?
        - Solar PV
        - Wind
        - Other
    - Our numbers are reported as net electricity consumption and include renewable energy production. (Y / N)
    - **For each month of the reporting year:**
        - Renewable Electricity Generated (kWh)
- Over the 12-month period, how many total annual kilowatt hours (kWh) did your facility use? Enter 0 for any months that you did not consume any electricity from the grid. Please report the most recent 12 months of energy consumption, or the previous calendar year's energy consumption.

  For each month of the reporting year:
    - Electricity Usage (kWh)
    - Peak Electric Demand (kW / kVA)
- Would you like to upload images or files of your electricity bill data?
- Does your facility use an electric utility as a fuel source? We're still building a more complete database of utilities and energy providers.
- Do you work with your utility to source your electricity from solar, wind, or hydro?

Describe your other energy sources

- Did your facility use natural gas in the last 12 months?
    - What is the name of your natural gas utility?
- Does your operation consume other delivered fuels?
    - What delivered fuels does your operation consume?
        - Back up generator

        - Biofuels (cord wood, wood pellets, other)
        - Propane
        - Fuel oil

Describe your other energy usage

For the most accurate and current results, answer the following questions for the most recent 12-month period.

- **For each month's consumption of the reporting year:**
    - Natural Gas (Therms / CCF)
    - Back Up Generator (Gasoline Gallons / Diesel Gallons / Natural Gas Therms / Natural Gas CCF)
    - Biofuels (Tons / Cords)
    - Propane (Gallons)
    - Fuel Oil (Gallons)

Describe your annual production

- For each crop, what is the total production throughout the same 12-month reporting period?
    - Measure Method
        - Fresh weight
        - Dry weight
        - Number of Plugs/Cells
        - Number of Pots/Baskets
    - Units
        - Kilograms
        - Pounds
        - Hundredweight (cwt)
        - Units
    - Annual total production
- On average, how many times will a flower canopy be harvested per year?
    - Perpetual Harvesting
    - 1 - 52
- Generally, how many days is the cycle for each stage in the growth cycle?
    - **For each growing stage:**
      (Clone or Mother Plants, Vegetating Plants, Flowering Plants)
        - Stage duration (days)

Describe your facility's waste management approach

- Over the same 12-month period, how much green/plant waste did your facility dispose of? (Pounds / Cubic Yards)
- What does your facility do with its green/plant waste? (Check all that apply.)
    - Handled On-Site
    - Compost
    - Aerobic Waste Management
    - Landfill / Dump
    - Incinerator
- Are you required to mix your green/plant waste with inert material? (Y / N)
- What does your facility do with any agricultural or growing media waste?
    - Landfill / Dump
    - Recycle
    - Compost
- What does your facility do with supplies and materials waste? (trellis netting, etc)
    - Landfill / Dump
    - Recycle
- How does your facility keep track of compliance waste?

How would you like to move forward?

- E-mail address
  We will e-mail your PowerScore, but we will not share your e-mail with anyone.
- Yes, I would like to occasionally receive email updates from the Resource Innovation Institute
- Would you like to support RII's conservation efforts by joining as a member? ResourceInnovation.org/joinwithus/
- Are you considering a lighting, HVAC and/or dehumidification upgrade over the next 12 months? (Y / N)
- Have you used incentives from a utility program? (Y / N)
- Would you like to be contacted by your utility representative to learn more about incentives for which you may be eligible? (Y / N)