



**Commercial & Industrial (C&I)
NJ SmartStart Buildings® Program**

New Construction

Program Guide

Fiscal Year 2025
July 1st, 2024 – December 31st, 2024

Modified July 1, 2024

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Limitations

This document is not legally binding on the New Jersey Board of Public Utilities (Board), the Program Administrator, or the Program Manager. If there is any conflict between this document and a Board Order, the applicable Compliance Filing, any legally binding agreement(s), or any other legally binding document(s), such other document(s) shall take precedence and control over this document.

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1 Program Overview

1.1 Description

The C&I New Construction SmartStart Buildings® Program (“Program”) is a statewide energy efficiency program available to eligible commercial, industrial, institutional, governmental, and agricultural customers planning to construct, expand, renovate, or remodel a facility. Incentives are available for New Construction prescriptive and custom measures.

Prescriptive measures are incentives where dollar amounts are fixed for specific categories of equipment. The prescriptive applications are labeled by technology, such as lighting and HVAC, and defined as equipment most recommended for energy-efficient projects with well-established energy savings. The transparency of incentives aids customers in making informed decisions while assisting energy efficiency professionals to better solicit a prospective project.

Custom Incentives are offered for non-standard equipment, complex systems, and specialized technologies that are not addressed through prescriptive offerings. Customers are provided a discrete, flexible application process with the ability to submit one or multiple applications for any size project.

Routinely, the Program adds, removes, or modifies prescriptive incentives for various energy efficiency equipment based on national and local market trends, the development of new technologies, and changes in efficiency baselines. Note that on March 6, 2023, the State of New Jersey adopted the ASHRAE 90.1- 2019 energy code for all commercial and industrial buildings.

In FY22, specific energy efficiency Programs transitioned from the NJCEP to the utilities. NJCEP will continue to administer the New Construction Programs for commercial and industrial customers, and the utilities will be responsible for Programs serving existing buildings. See Section 2 for more information.

2 Program Transition

In 2018, Governor Murphy signed into law the landmark legislation known as the Clean Energy Act. The law called for a significant overhaul of New Jersey's clean energy systems by building sustainable infrastructure in order to fight climate change and reduce carbon emissions, which will, in turn, create well-paying local jobs, grow the state's economy, and improve public health while ensuring a cleaner environment for current and future residents.

As part of this statewide undertaking, the Clean Energy Act required New Jersey's investor-owned gas and electric utility companies to reduce their customers' gas and electricity use by setting percentages over time. To help reach these targets, the New Jersey Board of Public Utilities approved a comprehensive suite of efficiency Programs that would transition the state to some of the highest energy savings in the country.

Following the mandates from the Clean Energy Act of 2018, the administration of specific energy efficiency Programs transitioned from the NJCEP to the utilities. These new Programs will allow the utilities to work directly with customers to achieve energy savings.

NJCEP will continue to administer the New Construction Programs for commercial and industrial customers. The utilities will be responsible for Programs serving existing buildings.

3 Eligibility & Incentives

3.1 General Eligibility

Incentives are limited to new construction and substantial renovation (i.e., gut rehabilitation), as defined below.

- New Construction: Defined as a new building.
- Substantial Renovations (Gut Rehab): Defined as one of the following types of projects:
 - Change of use and reconstruction of an existing building.
 - Construction work of a nature requiring that the building or portion of the building within be out of service for at least 30 consecutive days; or
 - Reconstruction of a vacant structure or a portion of the building within.

In order to be eligible for the New Construction program, applicants or customers must be, or will be, contributors to the Societal Benefits Charge (SBC), be commercially billed and the project must be located within the service territory of at least one of New Jersey's seven regulated utilities; Atlantic City Electric, FirstEnergy/Jersey Central Power & Light, New Jersey Natural Gas, Elizabethtown Gas, Public Service Electric and Gas, Rockland Electric Company, and South Jersey Gas. Projects located in areas where electricity is provided by a municipal utility are eligible for only those portions of the program that address the energy efficiency of natural gas equipment if it is provided by a participating gas utility.

Energy efficient measures must be new and installed in buildings located within a New Jersey Utilities' service territory and designated on the customer's application. The customer must ultimately own the equipment, through an up-front purchase.

Equipment procured by the customer via another program offered by New Jersey's Clean Energy Program or the New Jersey Utilities, as applicable, are not eligible for incentives through this program.

Customers who have not, or will not, contributed to the SBC of the applicable New Jersey Utility are not eligible for incentives offered from the program.

Refer to each measure application form for additional terms and conditions specific to each technology.

3.2 Eligible Measures

New Construction Prescriptive Measures - Provide fixed incentives for common energy efficiency measures.

Technologies are as follows:

Electric Chiller	Gas Water Heating
Electric Unitary HVAC	Ground Source Heat Pump
Food Service Equipment	Performance Lighting
Gas Cooling	Prescriptive Horticultural Lighting
Gas Heating	Variable Frequency Drives (Air Compressor Only)

Custom Measures - Incentives are for non-standard equipment, complex systems, and specialized technologies that are not addressed through prescriptive offerings above.

3.3 Incentive Rates & Incentive Caps

New Construction Prescriptive Measures - Current incentive rates and requirements for each measure may be found on their respective application forms posted on the Program website <https://njcleanenergy.com/smartstart-new-construction-buildings>

Custom Measures - A project's incentives will be based on the **lesser of the three** calculations as shown below.

Equipment Type	Incentive Cap	Incentive Amount
Custom Measures	First-Year Savings	Electric Savings: \$0.16/kWh
		Gas Savings: \$1.60/therm
	Project Cost	50% of Total Installed Project Cost/Incremental Cost
	Buy-Down	Amount to buy-down to 1-year payback

Incentive Caps - Incentives are available up to \$500,000 per electric account and \$500,000 per natural gas account per fiscal year. A customer is defined as a utility account.

All projects are subject to an incentive cap equal to the applicant's cost for the project (material and labor).

4 General Requirements

4.1 Submission Guidelines

For most Prescriptive applications, to be eligible for incentives, the application must be submitted to the Program Manager within 12 months of equipment purchase. Sufficient documentation must be provided to the Program Manager confirming date of equipment purchase (material invoice, purchase order, etc.).

For Custom applications, as well as Prescriptive Lighting applications with incentive value of \$100,000 or more, the application must be submitted prior to installation of the proposed scope of work.

All applicants are encouraged to obtain the Program Manager's approval and an incentive commitment prior to commencing installation or construction. Customers implementing projects without the Program Manager's approval do so at their own risk, including, among other things, the risk of having their project deemed ineligible for incentives.

Measure Type	Application must be submitted prior to installation	Equipment may be installed prior to application submission at customer risk
Custom Measures	✓	
Prescriptive Horticultural Lighting, Performance Lighting with incentives < \$100,000		✓
Prescriptive Horticultural Lighting, Performance Lighting with incentives ≥ \$100,000	✓	
Measures meeting New Construction prescriptive measure requirements including Electric Chillers, Electric Unitary HVAC, Food Service Equipment, Gas Cooling, Gas Heating, Gas Water Heating, Ground Source Heat Pump, Variable Frequency Drives (Air Compressor Only).		✓

4.2 Inspections

All projects are subject to the Program's random post-inspection selection process. The Program must have reasonable access to participating customer's facility to post-inspect the energy-efficient measures installed under this Program.

4.3 Prevailing Wage Requirement

Participating projects with a contract at or above current prevailing wage contract threshold amount set pursuant to the New Jersey Prevailing Wage Act (N.J.S.A. 34:11-56.25 et seq.) are required to pay no less than prevailing wage rate to workers employed in the performance of any construction undertaken in connection with Board of Public Utilities financial assistance, or undertaken to fulfill any condition of receiving Board of Public Utilities financial assistance, including the performance of any contract to construct, renovate or otherwise prepare a facility, the operations of which are necessary for the receipt of Board of Public Utilities financial assistance. By submitting an application or accepting program incentives, applicant agrees to adhere to New Jersey Prevailing Wage requirements, as applicable. By signing the application, the signatories agree to comply with the provisions of the New Jersey Prevailing Wage Act, N.J.S.A. 34: 11-56.25 et seq., (Act), if and to the extent that Act may apply to the work covered by the application. More information can be found at <https://www.nj.gov/labor/wageandhour/tools-resources/laws/prevailingwageact.shtml>

4.4 Deficient Applications

If an application package is incomplete, information is missing or deemed insufficient, a deficiency notice will be sent to the participating customer requesting additional information via e-mail. The information or documentation requested on the email must be received by the Program Manager within 30 days of the date of the request. If additional deficiencies are still noted, there will be up to two additional notifications issued with the same time frames.

If a participating customer fails to respond to a deficiency request within 30 days or exceeds the three attempts provided, the application will be rejected.

4.5 Change In Customer Name/Contractor or Payee

These requests must come from the customer in writing detailing the changes along with the appropriate updated program documents.

4.6 Tax Clearance Certificate

Effective May 2016, the State of New Jersey launched an [online portal](https://www.state.nj.us/treasury/taxation/busasst.shtml) <https://www.state.nj.us/treasury/taxation/busasst.shtml>, which allows customers to apply for the Tax Clearance Certificate at no cost. The name of the customer listed on the certificate must match the customer's name listed on the utility bill and the application. The customer tax ID listed on the application must agree with the tax ID listed on the Certificate. Certificates are valid for 180 days and must be valid on the date the program approves the incentive for payment.

4.7 W9, ST-4 or ST-5

This form must be completed by the entity receiving incentive payment. Certain private business entities may hold a "Sales Tax Exempt Organization Certificate (Form ST-5)." This form applies solely to purchases of tangible personal property or services and does not exempt the entity from the requirement to submit the Application for Tax Clearance.

4.8 Utility Account

Each utility account requires a complete, separate application. Projects for the same utility account and the same technology that are being done at the same time must be submitted on one application. For Custom application submissions only, customers may group utility accounts serving one facility under one application.

4.9 Expirations and Extensions

Approved projects are given a one-year approval in which the proposed measure is to be installed and operational. When a project has expired the participating customer will have 30 days to either submit a request for an extension OR submit final project paperwork. If no response is received within 30 days of expiration, the project will be cancelled. Extension requests must be in writing from the participating customer and include the circumstances that led to the extension request, and the percentage of the project completed. Extension requests may be granted for a period no longer than six (6) months. The Program Manager may provide up to two six-month extensions from the original approval expiration date. Upon expiration, if the project has not started, the existing application will be cancelled.

5 New Construction Prescriptive Application Requirements

5.1 Initial Application Process

Each type of New Construction Prescriptive Measure has its own application that can be submitted directly via the online portal or emailed to the program. To be eligible for incentives, a customer, or an agent (contractor/vendor) authorized by a customer, must submit a properly completed application package. A complete application package should include:

- Completed application forms signed by the customer.
 - For applications signed by someone other than the customer, a letter of authorization is required.
- Manufacturer specification sheets and supporting documentation of qualifications.
- Excel worksheet.
- Recent copy of a complete utility bill from a participating utility (gas or electric depending on technology) showing Societal Benefits Charge and commercial billing code. For new construction projects where a utility account has not been established yet, the customer will be required to submit a utility bill prior to the incentive payment.
 - Customer name listed on application must match the customer's name on the utility bill.

5.2 Process for Payment

Once installation is complete, an applicant must submit:

- An invoice establishing the applicant has paid for the material and labor related to the installation of the equipment covered by the application (requirement listed on each application);
- A valid Tax Clearance Certificate; and
- A W-9, ST5 or ST4 Form. This form must be completed by the entity receiving incentive payment.

Refer to each measure application form for additional guidance.

6 Custom Application Requirements

6.1 General

Custom Incentives are offered for non-standard equipment, complex systems, and specialized technologies that are not addressed through prescriptive applications. Proposed measures will not be eligible for Custom Measure incentives if a Prescriptive incentive is available. Eligible electric and gas measures may include lighting systems, HVAC systems, motor systems, large boiler systems, gas-engine driven chillers, and other non-prescriptive measures. Technologies not explicitly listed as Custom (per the Filing and/or Program Guide) will be reviewed for eligibility by the Program Manager on a case-by-case basis. In general, work designated as repair, monitoring only, or maintenance is not eligible. Additional guidance on Custom Measures can be found in Appendix A of this Program Guide.

The process for calculating Custom Measure incentives is performance-based and may include a commissioning component. Incentives are evaluated and determined via an incremental cost and energy savings analysis provided by the customer or customer's authorized representative (vendor/contractor), which are subject to review and approval by the Program. The specific incentive rates and caps are outlined in Section 3.3.

The Program allows a single facility with multiple utility accounts to submit a proposed custom project under one application. Projects at multiple facilities may not be submitted under one application.

6.2 Application Process

The Custom Measure application process generally follows that of Prescriptive, as outlined in Sections 5.1 and 5.2. There is some additional documentation required, please refer to the complete list within the Custom Measure Application.

6.3 Establishing a Baseline

All custom projects must establish a baseline from which energy and energy cost savings are measured.

- Baseline for new construction/gut-rehab projects will be established using ASHRAE 90.1- 2019. Proposed measure must exceed the established baseline.
- In cases where ASHRAE 90.1-2019 does not apply, other applicable standard will be used, such as the Consortium for Energy Efficiency (CEE), EPA ENERGY STAR, or other established resources such as: current New Jersey baseline studies and other market research; the program experience of the Commercial/Industrial Program Manager; experience of the New Jersey utilities; or utility/public program experience from other comparable jurisdictions.
- Information supporting the proposed project exceeding ASHRAE 90.1-2019 or applicable industry standard must be provided in the application submission.
- Please consult the Program Manager if additional assistance is required to determine the applicable baseline for your project.

See Appendix A for additional guidance.

6.4 Incremental Costs

All custom projects must establish the incremental cost of the project. Incremental cost is defined as the difference in material and/or labor costs between the proposed equipment and its respective baseline component, whose specifications only meet ASHRAE 90.1-2019 (or other industry standard).

- New construction/gut-rehab projects must provide both a total proposed cost, as well as a corresponding baseline cost, to calculate the project's total incremental cost.
- The Program Manager reserves the right to determine whether an incremental cost is not required for a new construction project, where the above situations do not strictly apply or where special circumstances prevail.
- The Partner may estimate costs using cost estimation manuals, vendor quotes, design team calculations, online pricing, or other reasonable methods. Project cost should include, at a minimum, relevant material and labor/installation costs. Sales tax should be excluded from these figures.
- All energy and cost savings figures must be explicitly defined and referenced in the application package. Any prescriptive or ineligible measure energy savings and cost should be excluded from the application.

6.5 Metering / Measurement & Verification

Certain measures may require post-installation metering, trending analysis, and/or a Statement of Substantial Completion by the installing contractor. In particular, measures with high savings uncertainty may be required to submit measurement and verification (M&V) data to prove measure performance prior to receiving the incentive. This will be clearly requested by the Program Manager during application review and outlined on a subsequent approval letter.

7 Program Dispute Resolution

Disputes, concerns, or complaints that arise will be addressed initially by the Program Manager or Program Staff at the point of contact. If resolution for whatever reason is not possible, there is a [dispute resolution process](#) backed by the NJ Board of Public Utilities. Appeals and disputes must be presented to the Program Administrator within 45 days of the Program Manager's determination regarding the subject of the appeal or dispute.

For contractual disputes between a system owner and installer or registrant, the NJ Division of Consumer Affairs (DCA) is the point of contact and the agency has an online complaint form.

The program is designed to allow for participation by any third-party contractor that meets the program requirements. One of the primary responsibilities of the program is to oversee the level of performance of the contractors that participate in the program. There are BPU approved contractor remediation procedures that will be followed if a contractor is found to violate program procedures and rules or consistently violates program requirements, which may include being barred from participating in the program.

8 Call Center Support

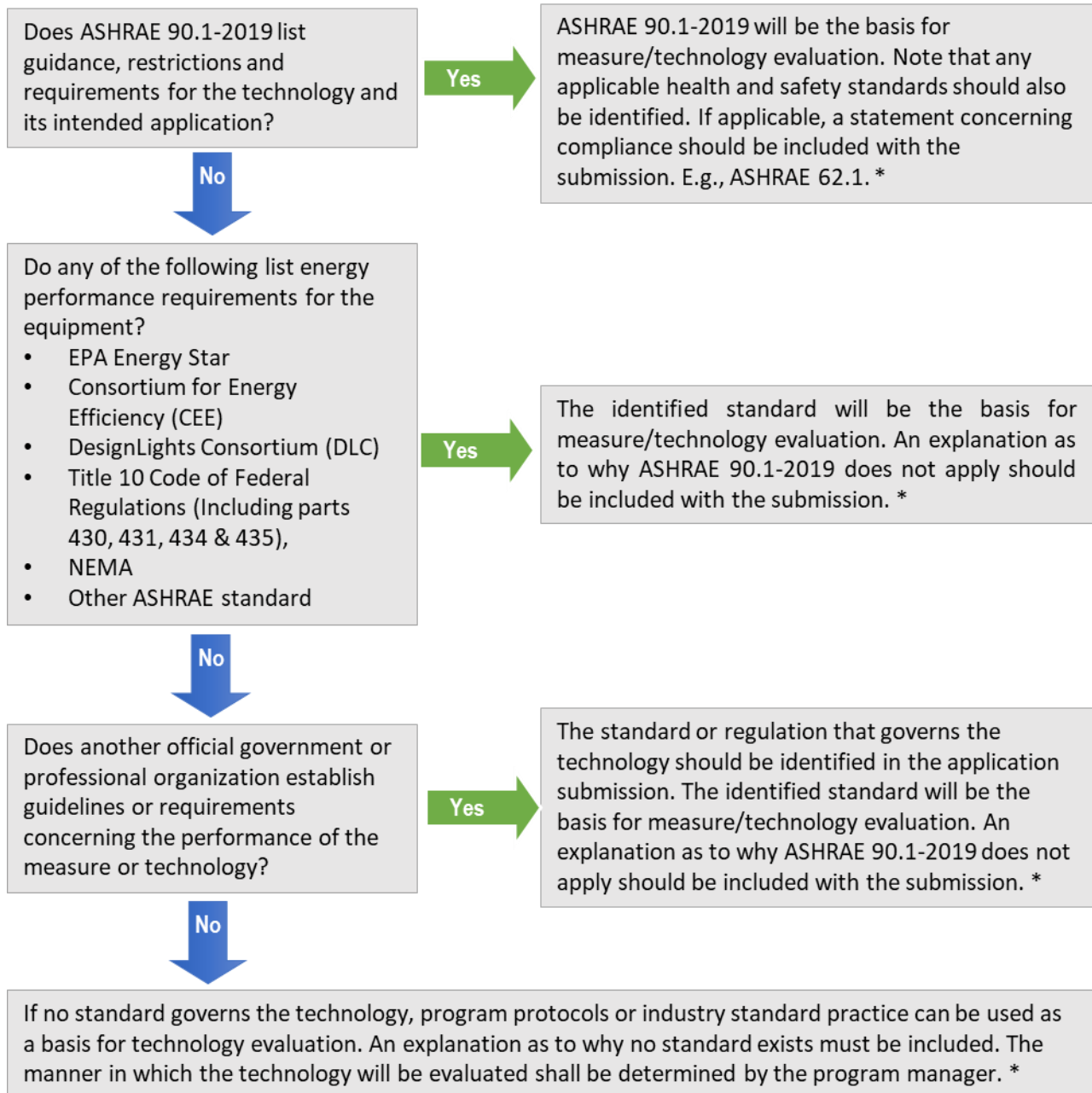
New Jersey's Clean Energy Program operates a call center staffed weekdays between 8 AM and 7 PM. The phone number is 866-657-6278. The call center is trained in answering general questions about the program and application processes. It also provides specific information pertaining to an application.

9 Program Website Link

This link routes to the overall NJ SmartStart program homepage:
<https://njcleanenergy.com/commercial-industrial/home/home>

Appendix A: Custom Measure Guide

A-1. Code Guidance



**Ultimately the applicable standard(s) will be subject to the program manager's discretion. More than one standard may apply*

A-2. Specific Measure Guidance: Standards and Calculations

Measure Description	Applicable Standard	Typical Format/Methodology of Supporting Calculations
VFD in specialized applications (including computer rooms and data centers) and serving condenser water pumps	ASHRAE 90.1-2019 Section 6, ASHRAE 90.4-2019 (for computer room systems)	Fan or pump affinity laws and/or performance curves shall be applied for baseline and proposed systems and load profiles. The baseline system shall comply with ASHRAE 90.1-2019 Sections 6.4 and 6.5, where applicable. The proposed system shall exceed these requirements. Common key variables are horsepower controlled, motor and drive efficiencies, plant production load profile, and/or run hours.
Large Boilers: Comfort	ASHRAE 90.1-2019 Section 6	Typical formats include bin-based analysis or hourly analysis using modeling software. The baseline system shall comply with ASHRAE 90.1-2019 Sections 6.4 and 6.5, where applicable. The proposed system shall exceed these requirements. Alternative approaches include using the NJCEP Technical Resource Manual.
Large Boilers: Industrial or Mixed Usage	ASHRAE 90.1-2019 Section 6	Typical formats include bin-based analysis or hourly analysis using modeling software. The baseline system shall comply with ASHRAE 90.1-2019 Sections 6.4 and 6.5, where applicable. The proposed system shall exceed these requirements. Alternative approaches include using the NJCEP Technical Resource Manual.
Non-Standard Lighting Fixtures	ASHRAE 90.1-2019 Section 9, DesignLights Consortium® (DLC), and/or ENERGY STAR®.	The product must be Design Lights Consortium (DLC) or Energy Star listed. The equipment/application must be listed in ASHRAE 90.1-2019 Table 9.2.3.1 and meet minimum control requirements, where applicable.
Non-Standard Lighting Controls	ASHRAE 90.1-2019 Section 9, DesignLights Consortium® (DLC), and/or ENERGY STAR®.	The control system must be Design Lights Consortium (DLC) listed. The equipment/application must be listed in ASHRAE 90.1-2019 Table 9.2.3.1 and meet minimum control requirements, where applicable.
Refrigeration: Controls	ASHRAE 90.1-2019 Section 6	The measure must not be a prescriptive measure, and the system must exceed requirements of ASHRAE 90.1-2019 Sections 6.4.5, 6.4.6, and 6.5.11. Typical formats include bin-based analysis or hourly analysis using modeling software.
Refrigeration: Racks/Compressors	ASHRAE 90.1-2019 Section 6	The proposed system must exceed requirements of ASHRAE 90.1-2019, Section 6.5.11. Typical formats include bin-based analysis or hourly analysis using modeling software.

Computer Room HVAC Systems	ASHRAE 90.1-2019 Section 6, ASHRAE 90.4-2019	For computer room IT equipment loads less than or equal to 10 kW, the proposed system must exceed requirements of ASHRAE 90.1-2019 Table 6.8.1-10. For computer room IT equipment loads greater than 10 kW, HVAC systems shall comply with <i>ASHRAE 90.4-2019 Energy Standard for Data Centers</i> . Typical formats include bin-based analysis or hourly analysis using modeling software.
Insulation: General Building Envelope	ASHRAE 90.1-2019 Section 5	A heat loss calculation shall be submitted. Typical formats include bin-based analysis or hourly analysis using modeling software. The proposed assembly must exceed requirements of ASHRAE 90.1-2019 Section 5.
Process Chiller	ASHRAE 90.1-2019 Section 6	Typical formats include bin-based analysis or hourly analysis using modeling software. The baseline system shall comply with ASHRAE 90.1-2019 Sections 6.4 and 6.5, where applicable. The proposed system shall exceed these requirements.
HVAC: Variable Refrigerant Flow (VRF)	ASHRAE 90.1-2019 Section 6	Typical formats include bin-based analysis or hourly analysis using modeling software. The proposed system efficiency must exceed requirements of ASHRAE 90.1-2019 Tables 6.8.1-8 or 6.8.1-9.
HVAC: Energy Recovery	ASHRAE 90.1-2019 Section 6	Typical formats include bin-based analysis or hourly analysis using modeling software. The proposed system must exceed requirements of ASHRAE 90.1-2019 Section 6.5.6. The baseline HVAC system shall comply with ASHRAE 90.1-2019 Sections 6.4 and 6.5, where applicable.
HVAC: Demand Control Ventilation	ASHRAE 90.1-2019 Section 6 ASHRAE 62.1-2019	Typical formats include bin-based analysis or hourly analysis using modeling software. The proposed system must exceed requirements of ASHRAE 90.1-2019 Section 6.4.3.8. The baseline HVAC system shall comply with ASHRAE 90.1-2019 Sections 6.4 and 6.5, where applicable.
Building Automation Systems (BAS)	ASHRAE 90.1-2019 Section 6	Typical formats include bin-based analysis (simpler systems and projects) or hourly analysis using modeling software (complex projects). The baseline HVAC systems shall comply with ASHRAE 90.1-2019 Sections 6.4 and 6.5, where applicable. The proposed BAS control strategies shall exceed these requirements. BAS control strategies shall be modeled individually and incrementally in calculations rather than grouped together. Rules of thumb such as estimated percent reductions shall not be used to determine savings.
Controlled Environment Horticultural (CEH) / Indoor Agriculture	ASHRAE 90.1-2019 Sections 5, 6, and 9. Please refer to supplemental CEH guidance document in the next section.	Please refer to the supplemental CEH guidance document in the next section.

A-3. Controlled Environment Horticultural (CEH) / Indoor Agriculture

July 1, 2023



New Jersey Clean Energy Program

Controlled Environmental Horticulture Baseline V1.1

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Disclaimer: The program team will periodically update this baseline document. The latest version of this document approved for use by the program shall be used to establish baselines.

1 Introduction

On February 22, 2021, Governor Murphy signed into law the New Jersey Cannabis Regulatory, Enforcement Assistance, and Marketplace Modernization Act (CREMMA), which legalizes personal use cannabis for adults, creates Cannabis Regulatory Commission (CRC) to regulate personal use and medical cannabis, and provides expungement relief for certain past marijuana offenses. The CRC was created to establish rules and regulations governing the sale and purchase of recreational cannabis, to administer the state's medicinal cannabis program, and to oversee licensing for all areas of the cannabis industry.

As a direct result of CREMMA and establishment of the CRC, high energy use intensity facilities to produce, cultivate, and maintain cannabis are currently being designed and constructed throughout the state. Cannabis grow facilities and other facilities dedicated to plant production (controlled environmental horticulture or CEH) are outside the scope of local and state energy codes. Therefore, baseline efficiency requirements for lighting, HVAC, dehumidification, and other loads are not currently established for custom and whole building programs which often reference energy code to establish baseline.

The purpose of this document is to:

- Provide definitions of new terms relevant to CEH buildings
- Establish baseline HVAC and dehumidification (HVAC/D) system definitions and types for CEH buildings
- Define specific lighting, envelope, heating, cooling, dehumidification, heat recovery, and ventilation baseline efficiency requirements for Custom Commercial and Industrial (C&I) programs
- Provide modifications to ASHRAE 90.1-2019 and ASHRAE 90.1-2019 Appendix G to establish baseline requirements for whole building projects using the Performance Rating Method.

The program team will periodically update this baseline document. The latest version of this document approved for use by the program shall be used to establish baselines.

2 Definitions

The following definitions are applicable to controlled environmental horticulture buildings and spaces and are referenced throughout this document.

- **Controlled Environmental Horticulture (CEH) Space:** a building space dedicated to plant production by manipulating indoor environmental conditions, such as through electric lighting, irrigation, mechanical heating, mechanical cooling, or dehumidification. CEH space does not include building space where plants are grown solely to decorate that same space. Greenhouse and indoor growing are types of CEH spaces (see “greenhouse” and “indoor growing”).
- **Desiccant dehumidification system:** a mechanical dehumidification technology that uses a solid or liquid material to remove moisture from the air.
- **Greenhouse:** a type of CEH space that maintains a sunlit environment for the purpose of horticultural production, cultivation or maintenance, with Skylight Roof Ratio of 50 percent or more above the growing area. Greenhouse spaces are erected for a period of 180 days or more.
- **Greenhouse, conditioned:** a greenhouse with heating that has a capacity exceeding 10 Btu/hr-ft² or mechanical cooling that has a capacity exceeding 5 Btu/hr-ft².
- **Horticultural lighting:** luminaires used for plant growth and maintenance. Horticultural luminaires may have either plug-in or hard-wired connections for electric power.
- **Indoor growing:** a type of CEH space used exclusively for the purpose of horticultural production, cultivation or maintenance, with Skylight Roof Ratio of 50 percent or more above the growing area. Growing plants in a warehouse with or without skylights is an example of an indoor growing space.
- **Integrated HVAC/D system:** an HVAC/D system designed to handle both sensible and latent heat removal. Integrated HVAC/D systems may include, but are not limited to, HVAC/D systems with a sensible heat ratio of 0.65 or less and the capability of providing cooling, dedicated outdoor air systems, single packaged air conditioners with at least one refrigerant circuit providing hot gas reheat, and portable dehumidifiers modified to allow external heat rejection.
- **Photosynthetic photon efficacy (PPE):** photosynthetic photon flux divided by input electric power in units of micromoles per second per watt, or micromoles per joule as defined by ANSI/E S640.
- **Skylight Roof Ratio:** the ratio of skylight area to the gross exterior roof area.

3 Baseline HVAC/D Systems (Custom Projects)

3.1 System Type Definitions

The following options describe possible system types for dehumidification and space cooling systems in CEH spaces. The baseline for Custom projects must correspond to one of these system types.

3.1.1 System Type 1: Packaged Dehumidifiers

In this option, packaged dehumidifiers are utilized to control humidity in the grow area. The dehumidifiers utilize a refrigeration system with DX coil to condense moisture from the air and have the sole purpose of dehumidifying air. Heat is added to the space from the dehumidifiers. External HVAC systems are designed to handle the full space sensible cooling load.

The baseline dehumidifier and HVAC system efficiencies shall be determined by selecting the appropriate equipment types and size ranges from the table in Section 4. If the proposed HVAC system type is not represented in the table, the baseline HVAC system type shall be “air-cooled air conditioner (cooling mode)”.

3.1.2 System Type 2: Integrated HVAC/D Systems

In this option, HVAC/D systems are designed to handle both the space sensible and latent heat removal. Air is cooled by a DX cooling coil for space conditioning and dehumidification, then typically reheated to the design supply air temperature by a source of heat. This option may include, but is not limited to, HVAC/D systems with a sensible heat ratio of 0.65 or less and the capability of providing cooling, dedicated outdoor air systems, single packaged air conditioners with at least one refrigerant circuit providing hot gas reheat, and portable dehumidifiers modified to allow external heat rejection.

In this option, at least 75% of the annual energy for electric reheat shall come from on-site heat recovery. If the proposed design includes 100% hot gas reheat, energy savings can be claimed for 25% of the baseline annual energy used for electric reheat.

The baseline HVAC/D system efficiencies shall be determined by selecting the appropriate equipment types and size ranges from the table in Section 4. If the proposed HVAC/D system type is not represented in the table, the baseline HVAC/D system type shall be “air-cooled air conditioner (cooling mode)”.

3.1.3 System Type 3: Chilled Water System

In this option, dehumidification systems utilize chilled water cooling coils to condense moisture from the recirculated air. The air is then reheated to the design supply air temperature by a source of heat.

In this option, at least 75% of the annual energy for electric reheat shall come from on-site heat recovery. If the proposed design includes 100% hot gas reheat, energy savings can be claimed for 25% of the baseline annual energy used for electric reheat.

The baseline chiller efficiency shall be determined by selecting the appropriate chiller size range from the table in Section 4 for the appropriate fuel type. For electrically operated chillers, the baseline chiller may be air-cooled or water-cooled.

3.1.4 System Type 4: Solid or Liquid Desiccant Dehumidification

In this option, dehumidifiers with a solid or liquid desiccant are used to remove moisture from the recirculated room air. The air temperature increases as moisture is removed. Once the desiccant has removed moisture from the air, heat is added to the system to regenerate the desiccant. This option shall be used for systems that require a space dew point temperature of 50°F or less. In this option, 75% of heat added by the desiccant system shall be removed by a heat exchanger with energy recovery.

3.2 Baseline System Type Options

There are two options to establish baseline HVAC/D system type for Custom projects:

3.2.1 Option 1 (Simplified Approach)

1. Select the baseline HVAC/D system type from Section 3.1 that best corresponds to the proposed HVAC/D configuration.
2. Use appropriate baseline efficiencies and parameters from Section 4 to determine the baseline based on the proposed equipment included in the scope of work.
3. Calculate proposed energy consumption per design, which must be lower than the baseline energy consumption to be eligible for incentives.

3.2.2 Option 2 (Complex Approach)

1. Select any of the HVAC/D system type options from Section 3.1 to establish baseline.
2. Calculate baseline energy consumption using appropriate baseline efficiencies and parameters from Section 4.
3. Calculate energy consumption of the proposed HVAC/D system type using appropriate baseline efficiencies and parameters from Section 4. If energy savings will be claimed due to differences in HVAC/D system type, baseline energy consumption for each HVAC/D system type must be established.
4. Calculate proposed energy consumption per design. The analysis should clearly distinguish savings related to changes in system type and savings related to system efficiency improvements. The proposed design energy consumption must be less than the energy consumption of both baselines to be eligible for incentives.

For both options, the baseline heating system shall be the same type as the proposed case heating system. For both heating and cooling systems, the baseline fuel type shall match the fuel type used in the proposed system.

4 Baseline Components (Custom Projects)

Building Type	Building Component	Subcategory or Rating Condition	Baseline Description	Baseline Efficiency	Sources
Lighting¹					
Indoor Grow Spaces	Indoor Lighting	< 40 kW connected lighting load		PPE = 1.7 μMol/J Baseline kW = Proposed PPE / 1.9 x Proposed kW	ASHRAE 90.1-2022 Section 9.4.4.2
Indoor Grow Spaces	Indoor Lighting	≥ 40 kW connected lighting load		PPE = 1.9 μMol/J Baseline kW = Proposed PPE / 1.9 x Proposed kW	ASHRAE 90.1-2022 Section 9.4.4.2
Greenhouse	Indoor Lighting	All		PPE = 1.7 μMol/J Baseline kW = Proposed PPE / 1.7 x Proposed kW	ASHRAE 90.1-2022 Section 9.4.4.1
Envelope					
All	Opaque Wall		Steel-framed	U-0.064 (CZ 4A) U-0.055 (CZ 5A) U-0.049 (CZ 6A)	ASHRAE 90.1 – 2019 Table 5.5
All	Opaque Roof		Insulation entirely above deck	U-0.032 (CZ 4A-6A)	
Conditioned Greenhouse	Non-Opaque Wall			U-0.7	

¹ As of the date of this document, Horticultural Lighting incentives may only be pursued through the NJCEP SmartStart Program. For such projects, the baseline shall be equal to the proposed lighting power submitted in the application to avoid double counting HVAC/D savings.

Baseline Components (Custom Projects)

Building Type	Building Component	Subcategory or Rating Condition	Baseline Description	Baseline Efficiency	Sources
Conditioned Greenhouse	Non-Opaque Roof		Two or more glazing's separated by either air or gas fill	SHGC-0.36 (CZ 4A)	CEH CASE Report CA Title 24 2022
				SHGC-0.38 (CZ 5A-6A)	
Conditioned Greenhouse	Non-Opaque Roof		Two or more glazing's separated by either air or gas fill	U-0.7	ASHRAE 90.1 – 2019 Table 5.5
				SHGC-0.36 (CZ 4A)	
All	Vertical Fenestration, 0% to 40% of wall		Fixed	SHGC-0.38 (CZ 5A-6A)	ASHRAE 90.1 – 2019 Table 5.5
				U-0.36 (CZ 4A-5A)	
All	Skylight		Entrance door	U-0.34 (CZ 6A)	ASHRAE 90.1 – 2019 Table 5.5
				SHGC-0.36 (CZ 4A)	
All	Skylight		All types	SHGC-0.38 (CZ 5A-6A)	ASHRAE 90.1 – 2019 Table 5.5
				U-0.63 (CZ 4A-6A)	
All	Skylight		All types	SHGC-0.33 (4A-5A)	ASHRAE 90.1 – 2019 Table 5.5
				SHGC-0.34 (6A)	
Cooling and Dehumidification Systems – Direct Expansion					
All	Air-cooled air conditioner (cooling mode)	< 65,000 Btu/h	Code compliant split system and single package	13.4 SEER2	ASHRAE 90.1 – 2019 Table 6.8.1-1
		≥ 65,000 Btu/h and <135,000 Btu/h		11.0 EER 14.6 IEER	

Building Type	Building Component	Subcategory or Rating Condition	Baseline Description	Baseline Efficiency	Sources
		≥ 135,000 Btu/h and <240,000 Btu/h		10.8 EER 14.0 IEER	
		≥ 240,000 Btu/h and <760,000 Btu/h		9.8 EER 13.0 IEER	
		≥ 760,000 Btu/h		9.5 EER 12.3 IEER	
	DOAS unit, air-cooled	Dehumidification mode	Code compliant DX DOAS unit without energy recovery	4.0 ISMRE	ASHRAE 90.1 – 2019 Table 6.8.1-13

Cooling and Dehumidification Systems – Chilled Water

Air-cooled chiller	<150 tons	Code compliant air-cooled chiller without heat recovery	10.1 EER (Full Load) 13.7 EER (IPLV)	ASHRAE 90.1 – 2019 Table 6.8.1-3
	≥ 150 tons		10.1 EER (Full Load) 14.0 EER (IPLV)	
Water-cooled chiller	< 75 tons	Code compliant water-cooled chiller without heat recovery	0.75 kW/ton (Full Load) 0.60 kW/ton (IPLV)	ASHRAE 90.1 – 2019 Table 6.8.1-3
	≥ 75 tons and < 150 tons		0.72 kW/ton (Full Load) 0.56 kW/ton (IPLV)	
	≥ 150 tons and < 300 tons		0.66 kW/ton (Full Load) 0.54 kW/ton (IPLV)	

Baseline Components (Custom Projects)

Building Type	Building Component	Subcategory or Rating Condition	Baseline Description	Baseline Efficiency	Sources
		≥ 300 tons and < 600 tons		0.61 kW/ton (Full Load) 0.52 kW/ton (IPLV)	
		≥ 600 tons		0.56 kW/ton (Full Load) 0.50 kW/ton (IPLV)	
	Absorption double effect (indirect or direct fired)	All capacities	Code compliant Adsorption chiller	≥ 1.000 COP (Full Load) ≥ 1.000 COP (IPLV)	ASHRAE 90.1 – 2019 Table 6.8.1-3
	DOAS unit, water-cooled	Dehumidification mode	Code compliant chilled-water DOAS without energy recovery	6.0 ISMRE	ASHRAE 90.1 – 2019 Table 6.8.1-13
Heating Systems					
	Gas-fired furnace	All capacities	Code compliant furnace	81% AFUE or 81% E _t	ASHRAE 90.1 - 2019 Table 6.8.1-5
All	Gas-fired hot water boilers	< 300 MBH		82% AFUE	
		≥ 300 MBH and ≤ 2,500 MBH	Code compliant gas-fired boiler	80% E _t	ASHRAE 90.1 - 2019 Table 6.8.1-6
		> 2,500 MBH		82% E _c	
	Air Source Heat Pump	< 65,000 Btu/h (cooling capacity)	Code compliant air-cooled heat pump	7.5 HSPF2 (split system) 6.7 HSPF2 (single package)	ASHRAE 90.1 - 2019 Table 6.8.1-2

Building Type	Building Component	Subcategory or Rating Condition	Baseline Description	Baseline Efficiency	Sources
		≥ 65,000 Btu/h and <135,000 Btu/h (cooling capacity)		3.4 COP _H at 47°F db/43°F wb outdoor air, 2.25 COP _H at 17°F db/15°F wb outdoor air	
		≥ 135,000 Btu/h and <240,000 Btu/h (cooling capacity)		3.3 COP _H at 47°F db/43°F wb outdoor air 2.05 COP _H at 17°F db/15°F wb outdoor air	
		≥ 240,000 Btu/h (cooling capacity)		3.2 COP _H at 47°F db/43°F wb outdoor air 2.05 COP _H at 17°F db/15°F wb outdoor air	
	DOAS unit, air source heat pump (heating mode)		Code compliant DOAS unit without energy recovery	2.7 IS COP	ASHRAE 90.1 – 2019 Table 6.8.1-13
Portable Dehumidification Systems					
		≤ 25 pints per day		1.30 L/kWh	10 CFR 430
All	Portable dehumidifier	> 25 and ≤ 50 pints per day		1.60 L/kWh	10 CFR 430
		> 50 pints per day		2.80 L/kWh	10 CFR 430

Heat Recovery					
All	Integrated HVAC/D System	Heat Recovery		75% of the annual energy used for dehumidification reheat	CA Title 24 2022
	Chilled Water System	Heat Recovery		75% of the annual energy used for dehumidification reheat	CA Title 24 2022
	Desiccant System	Heat Recovery		75% of heat added by the desiccant system is removed by a heat exchanger with energy recovery	ASHRAE 90.1-2019 Section 6.5.2.3
Pumps					
All	Chilled Water Pump	Pump Efficacy	Constant-volume chilled water pump	9 W/GPM	ASHRAE 90.1-2019 Section G3.1.3.10
			Variable-volume chilled water pump	13 W/GPM	
	Hot Water Pump	Pump Efficacy	All hot water pumps	19 W/GPM	ASHRAE 90.1-2019 Section G3.1.3.5
	Condenser Water Pump	Pump Efficacy	All condenser water pumps	19 W/GPM	ASHRAE 90.1-2019 Section G3.1.3.11
	Chilled Water System	Pump controls	Variable-flow chilled or heating-water system	System shall include controls that result in pump	

Baseline Components (Custom Projects)

Hot Water System		motor demand of no more than 30% of design wattage at 50% of design flow	ASHRAE 90.1-2019 Section 6.5.4.2
Condenser Water System	Constant-volume condenser water system	Constant Volume	ASHRAE 90.1-2019 Section G3.1.3.11

Ventilation Fans

All	Constant Volume Fan System	Constant Volume Fan Power	Maximum allowable motor power	$P_f = \text{bhp} * 746 / \text{fan efficiency, where}$ $\text{bhp} = \text{cfm} * 0.00094 + A$ (see Appendix A)	ASHRAE 90.1 – 2019 Table 6.5.3.1-1
	Variable Volume Fan System	Variable Volume Fan Power	Maximum allowable motor power	$P_f = \text{bhp} * 746 / \text{fan efficiency, where}$ $\text{bhp} = \text{cfm} * 0.0013 + A$ (see Appendix A)	

Table 1. Baseline Components

5 Whole Building Projects

Whole building projects using the performance rating method shall follow ASHRAE 90.1-2019 Appendix G with the following modifications to 90.1-2019 Section 4 and Appendix G:

- The following building area type shall be added to Table 4.2.1.1 Building Performance Factors:

Building Area Type	Climate Zone																
	0A and 1A	0B and 1B	2A	2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
Controlled environmental horticulture	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Table 2. Building Performance Factors

- The following requirements shall be added to Section G3.1.1 Baseline HVAC System Type and Description
 - i. For *Controlled Environmental Horticulture* buildings, use system types 3 or 4. For thermal zones classified as *Controlled Environmental Horticulture*, portable dehumidification systems shall be modeled in accordance with Table G3.5.7. Portable dehumidification shall not be modeled for any other zone such as office or retail space.
- The first sentence of Section G3.1.2.1 Equipment Efficiencies shall be replaced with:

All HVAC equipment in the baseline building design shall be modeled at the minimum efficiency levels, both part load and full load, in accordance with Tables G3.5.1 through G3.5.7².
- The following exception shall be added to the *Baseline Building Performance* column of Table G3.1 5. Building Envelope bullet b (Opaque Assemblies).

Exception: For controlled environmental horticulture spaces, opaque assemblies used for new buildings, existing buildings, or additions shall match the appropriate maximum U-factors in Tables 5.5-1 through 5.5-8.
- The following exception shall be added to the *Baseline Building Performance* column of Table G3.1 5. Building Envelope bullet c (Vertical Fenestration Areas).

Exception: For controlled environmental horticulture spaces, vertical fenestration area for new buildings and additions shall equal that in the *proposed design* and shall be distributed on each face of the building in the same proportions as the *proposed building*.
- The following exceptions shall be added to the *Baseline Building Performance* column of Table G3.1 5. Building Envelope bullet d (Vertical Fenestration Assemblies).

Exceptions: For indoor growing spaces, fenestration U-factors shall match the appropriate requirements in Tables 5.5-1 through 5.5-8 for U_{all} . For greenhouses, the fenestration U-factor shall be modeled as U-0.7.

² For proposed systems rated in terms of ISMRE or ISCOP that exceed ASHRAE 90.1-2019 Table 6.8.1-13 requirements, baseline efficiency in Tables G3.5.1 and G3.5.2 may be derated using the program-approved methodology.

For controlled environmental horticulture spaces, fenestration SHGCs shall match the appropriate requirements in Tables 5.5-1 through 5.5-8 for the SHGC_{all}.

- The following exceptions shall be added to the *Baseline Building Performance* column of Table G3.1 5. Building Envelope bullet e (Skylights and Glazed Smoke Vents).

Exception: For controlled environmental horticulture spaces, skylight and non-opaque roof U-factor and SHGCs shall match the appropriate requirements in Tables 5.5-1 through 5.5-8.

- The following exceptions shall be added to the *Baseline Building Performance* column of Table G3.1 6. Lighting

Exception: For controlled environmental horticulture spaces, lighting controls shall comply with the requirements of Table 9.6.1.

For controlled environmental horticulture spaces, exterior lighting in areas identified as “Tradable Surfaces” in Table G3.6 shall be modeled with the baseline lighting power shown in Table 9.4.2-2. Other exterior lighting shall be modeled the same in the *baseline building design* as in the *proposed design*.

- The following exception shall be added to Section G3.1.2.6 Economizers:

Exception: For controlled environmental horticulture buildings, *air economizers* shall not be included in the baseline.

- The following system types shall be added to Table G.3.1.1-2 Baseline Service Water-Heating System:

Building Area Type	Baseline Heating Method
Controlled environmental horticulture	Gas storage water heater

Table 3. Baseline Service Water-Heating System

- Table G3.5.7 *Performance Rating Method* Portable Dehumidification Systems shall be added³:

Equipment Type	Size Category	Minimum Efficiency	Test Procedure
Portable dehumidifier	≤ 25 pints per day	1.3 L/kWh	10 CFR 30
Portable dehumidifier	> 25 and ≤ 50 pints per day	1.6 L/kWh	10 CFR 30
Portable dehumidifier	> 50 pints per day	2.8 L/kWh	10 CFR 30

³ Projects shall use the program-approved CEH latent load calculation methodology and tool to estimate latent load. Projects shall use the program-approved modeling methodology to account for dehumidification energy consumption and latent loads in the model.

Whole Building Projects

- The following common space types shall be added to Table G3.7 *Performance Rating Method Lighting Power Density Allowances and Occupancy Sensor Reductions Using the Space-by-Space Method*.

Common Space Types ^a	Lighting Power Density, W/ft ²	Occupancy Sensor Reduction ^b
Greenhouse ⁴	Proposed PPE ÷ 1.7 x Proposed W/ft ²	None
Indoor Growing ⁵ ≥ 40 kW connected lighting load	Proposed PPE ÷ 1.9 x Proposed W/ft ²	None
Indoor Growing ⁶ < 40 kW connected lighting load	Proposed PPE ÷ 1.7 x Proposed W/ft ²	None

Table 4. Space by Space Method Lighting Power Densities

⁴ Per ASHRAE 90.1-2022 Section 9.4.4.1, luminaires in greenhouse buildings with at least 40 kW of connected load for horticultural lighting shall have a photosynthetic photon efficacy (PPE) of at least 1.7 μmol/J for integrated, non-serviceable luminaires, or a PPE of at least 1.7 μmol/J for lamps in luminaires with removable or serviceable lamps.

⁵ Per ASHRAE 90.1-2022 Section 9.4.4.2, for connected lighting loads ≥ 40 kW, luminaires in indoor grow spaces used for horticultural lighting shall have a PPE of at least 1.9 μmol/J for integrated, non-serviceable luminaires, or a PPE of at least 1.9 μmol/J for lamps in luminaires with removable or serviceable lamps. Horticultural lighting in indoor grow spaces shall be controlled by a device that automatically turns off the horticultural lighting at specific programmed times.

⁶ Per the Exception of ASHRAE 90.1-2022 Section 9.4.4.2, indoor grow buildings with less than 40 kW of connected load for horticultural lighting shall have a PPE of at least 1.7 μmol/J for integrated, non-serviceable luminaires, or a PPE of at least 1.7 μmol/J for lamps in luminaires with removable or serviceable lamps.

Appendix A: Baseline Fan Power Allowance

Tables 6.5.3.1-1 and 6.5.3.1-2 of ASHRAE 90.1-2019 shall be used to determine the baseline fan power allowance.

Table 6.5.3.1-1 Fan Power Limitation^a

	Limit	Constant Volume	Variable Volume
Option 1: Fan system motor nameplate hp	Allowable motor nameplate hp	$hp \leq cfm_S \times 0.0011$	$hp \leq cfm_S \times 0.0015$
Option 2: Fan system bhp	Allowable fan system bhp	$bhp \leq cfm_S \times 0.00094 + A$	$bhp \leq cfm_S \times 0.0013 + A$

a. where

- cfm_S = maximum design supply airflow rate to conditioned spaces served by the system in cubic feet per minute
- hp = maximum combined motor nameplate horsepower
- bhp = maximum combined fan-brake horsepower
- A = sum of (PD × cfm_D/4131)
where
- PD = each applicable pressure drop adjustment from Table 6.5.3.1-2 in in. of water
- cfm_D = the design airflow through each applicable device from Table 6.5.3.1-2 in cubic feet per minute

Table 6.5.3.1-2 Fan Power Limitation Pressure Drop Adjustment

Device	Adjustment
Credits	
Return or exhaust systems required by code or accreditation standards to be fully ducted, or systems required to maintain air pressure differentials between adjacent rooms.	0.5 in. of water (2.15 in. of water for laboratory and vivarium systems)
Return and/or exhaust airflow control devices	0.5 in. of water
Exhaust filters, scrubbers, or other exhaust treatment	The pressure drop of device calculated at fan system design condition
Particulate Filtration Credit: MERV 9 through 12	0.5 in. of water
Particulate Filtration Credit: MERV 13 through 15	0.9 in. of water
Particulate Filtration Credit: MERV 16 and greater and electronically enhanced filters	Pressure drop calculated at 2× clean filter pressure drop at fan system design condition
Carbon and other gas-phase air cleaners	Clean filter pressure drop at fan system design condition
Biosafety cabinet	Pressure drop of device at fan system design condition
Energy recovery device, other than coil runaround loop	For each airstream [(2.2 × Enthalpy Recovery Ratio) – 0.5] in. of water
Coil runaround loop	0.6 in. of water for each airstream
Evaporative humidifier/cooler in series with another cooling coil	Pressure drop of device at fan system design condition
Sound attenuation section (fans serving spaces with design background noise goals below NC35)	0.15 in. of water
Exhaust system serving fume hoods	0.35 in. of water
Laboratory and vivarium exhaust systems in high-rise buildings	0.25 in. of water/100 ft of vertical duct exceeding 75 ft
Deductions	
Systems without central cooling device	–0.6 in. of water
Systems without central heating device	–0.3 in. of water
Systems with central electric resistance heat	–0.2 in. of water