

PA C-PACE Lehigh County Program Guidelines
September 2022 Addendum

Implementation of PA Act 43 of 2022, C-PACE Expansion to include Multifamily Properties,
Indoor Air Quality and Resiliency Measures

Pennsylvania C-PACE Statute – [Pennsylvania Public Law 198 No. 30](#) was amended by [Act 43 of 2022](#). Act 43 was signed by Governor Tom Wolf on July 7, 2022 expanding the Commercial Property-Assessed Clean Energy (C-PACE) Program in Pennsylvania. The law expands eligibility for C-PACE financing to include multifamily commercial buildings, indoor air quality and building resiliency improvements.

Definitions

CO₂ – Carbon dioxide (CO₂) is a natural component of the atmosphere. The amount of CO₂ in an air sample is expressed as parts per million (ppm) – the number of CO₂ molecules per million molecules of air. The CO₂ levels in the air outside of a building are usually 380 ppm or higher, depending on:

- Local conditions – vehicle traffic, industry and other sources of combustion;
- Weather conditions – wind and temperature inversions can cause combustion gases to build up in a local area.

An elevated indoor CO₂ concentration is directly related to the number of occupants in the building, the building's ventilation rate, and the CO₂ level in the outside air. Indoor CO₂ can accumulate if ventilation is not adequate to dilute and remove the CO₂ that is continuously generated by building occupants.

Eligible Properties – Any real property that is agricultural, commercial, industrial **or multifamily housing with five or more units** owned by an individual, partnership, limited liability corporation, corporation or nonprofit. The term does not include any residential property, except for a commercial, multifamily rental property or mixed-use property which contains no less than five residential units.

Energy Reliability Improvement – An improvement to a premises that increases the reliability of energy usage, at the premises, including energy storage or backup power generation improvements or improvements that facilitate participation in a microgrid.

Indoor Air Quality Measure (IAQM) – The installation or modification of a permanent improvement fixed to real property that is associated with maintaining healthy indoor air.

Indoor air quality project – Under the Pennsylvania C-PACE statute, a project that improves the rated performance in indoor air quality by reducing exposure to indoor airborne contaminants.

MERV – Minimum Efficiency Reporting Values, or MERVs, report a filter's ability to capture particles between 0.3 and 10 microns (µm).

Microgrid – A group of interconnected electrical loads and distributed energy resources that acts as a single controllable entity with respect to the grid. A Microgrid can connect and disconnect from the grid to operate in grid-connected or island mode.

Non-Resource Improvement (NRI) – A Resiliency Improvement or Energy Reliability Improvement.. Projects that create public benefits but may not result in energy or water savings for an Eligible

Property. Public benefits include measures that are aligned with locally adopted Hazard Mitigation Plans or FEMA Lifelines objectives. (Alternatively referenced as “Eligible Measures” when referring to both ECMs and NRIs)

PM 2.5 and PM 10 – Particulate Matter (PM). PM 2.5 describes fine inhalable particles with diameters that are generally 2.5 micrometers and smaller and PM 10 have diameters that are generally 10 micrometers and smaller.

Performance based IAQ indicators – CO₂, tVOCs, PM 2.5 and PM 10

Resiliency improvement – Under the Pennsylvania C-PACE statute, “any fixture, product, system, equipment, device, material, or interacting group thereof intended to increase resiliency or improve the durability of qualifying commercial property needed to withstand natural disasters, including but not limited to, flood mitigation, wind resistance, energy storage, and microgrids, as defined by local governments.”

tVOCs – Total Volatile organic compounds (tVOCs) are emitted as gasses from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors. VOCs are emitted by a wide array of products numbering in the thousands. Many VOCs are known to be harmful to human health.

Retroactive Projects

Retroactive C-PACE financings for building types and measures made newly eligible through Act 43 must occur after September 6, 2022 (60 days after the Pennsylvania C-PACE Statute was enacted on July 7, 2022) and within 730 days after the completion of the installation/construction (as proven by the date on the Certificate of Occupancy or other acceptable construction completion documentation). Retroactive financing requirements are detailed in Section 11.0 of the Pennsylvania C-PACE Program Guidelines.

Disclosures and Risks

In order to ensure that Property Owners are aware of the financial risks associated with C-PACE financing and are receiving adequate legal and financial guidance, all Property Owners must sign the Disclosures and Risks form.

Multifamily Properties

Pennsylvania C-PACE Lehigh County Program Guidelines for commercial properties apply in the same manner to multifamily properties as to other eligible property types.

Project Survey Requirements

All C-PACE project applications must, at a minimum, include:

- The name, firm name and credentials of the qualified professional who prepared the Project Survey;
- Written description of the proposed C-PACE Project;
- Description of the baseline conditions against which benefits and risks were evaluated;
- Estimate of the useful life of each NRI, including a reference to the basis of the selected EUL;
- The total project capital cost required for the purchase and installation of each NRI;
- A description of the document set that was used to develop the Project Survey, including the effective dates of the design information;
- Certification by a Qualified Engineering Professional preparing the Project Survey.

Indoor Air Quality

Pennsylvania is one of the first C-PACE programs to make IAQ measures eligible for financing; the Program Administrator therefore anticipates that there will be regular updates to these guidelines. The Program Administrator strongly encourages anyone considering using C-PACE to finance a possible IAQ project to contact the Program Administrator as early as possible in the planning process.

According to the U.S. EPA¹ indoor air quality is influenced by many factors. *Outdoor* air quality impacts indoor air quality though most contributors to poor IAQ originate *inside* buildings, including: combustion byproducts such as carbon monoxide, particulate matter, and environmental tobacco smoke; substances of natural origin such as radon, pet dander, and mold; pesticides, lead, and asbestos; ozone; and volatile organic compounds from a variety of products and materials. The COVID-19 pandemic has brought increased focus to airborne infectious aerosol exposure and ways to reduce transmission.

Improving IAQ in existing buildings does not necessarily require large capital investments. The Centers for Disease Control (CDC) and ASHRAE have recommendations for improving IAQ and reducing transmission of SARS CoV-2, most of which are operations and maintenance focused.

ASHRAE's guidance² has a hierarchy of actions to control COVID-19 transmission which include ensuring existing HVAC equipment is working properly, reducing viral particles in the air by masking, reducing building occupancy, social distancing, increasing the outdoor air mix to dilute airborne particles and increasing filtration. Additional disinfection techniques include upper room or in-duct UV-C, electronic air cleaners, among others.

The Program Administrator will rely on ASHRAE guidance to determine what technologies may be financed with C-PACE. Examples of possible technologies for existing buildings are included in the [existing building section](#). New construction and gut rehab properties will follow the performance criteria listed in the new construction section below.

¹ <https://www.epa.gov/report-environment/indoor-air-quality>

² <https://www.ashrae.org/technical-resources/filtration-disinfection#mechanical>

All measures must be permanently affixed to real property. The C-PACE Financing term shall not exceed the expected useful life of the proposed IAQMs as described in the IAQ Survey. For projects that include multiple IAQMs, the term of C-PACE Financing may not be greater than the weighted average useful life of each IAQM based on cost, subject to the Program Administrator's review and approval.

New Construction/Substantial Renovation

The high level of interdependency in building systems means that funding one prescriptive IAQ solution can make IAQ worse if it isn't part of an integrated solution. The new construction IAQ guidelines are performance-based but rely on design to improve rated performance. Because C-PACE projects are typically fully funded prior to construction completion, project design and not actual performance will be reviewed by the Program Administrator. Monitoring is included in the requirements to provide the Program Administrator with data to improve the Program over time and to ensure that financed IAQ improvements are performing as expected.

IAQ projects must be designed for the performance-based indicators in project area (building or improved area) not to exceed:

- CO2: 800 ppm
- tVOCs: 500 µg/m3 or 220 ppb
- PM 2.5: 15 µg/m3 (for projects where the annual average outdoor PM2.5 level is 35 µg/m3 or higher, 25 µg/m3)
- PM 10: 50 µg/m3 or lower

IAQ must be designed to meet one of the following standards/requirements:

- RESET Air pre-accredited, documentation of audit approval. Air Standard v2 for Core and Shell or Commercial Interiors (depending on project type); or
- WELL v2; or
- Living Building Challenge Healthy Interior Environment; or
- Most recent version of ASHRAE 62.1 (as of August 2022 it is 62.1-2019)

Verification:

- RESET Air pre-accredited approval; or
- WELL precertification approval; or
- Professional designer/engineer with documented expertise in IAQ attestation that the project design is expected to achieve one or more of the above standards/requirements. Professional qualifications may include:
 - RESET AP
 - WELL AP
 - LEED AP
 - IAQ Certified Industrial Hygienist (CIH)
 - Professional Engineer (PE)
 - Registered Architect

Monitoring:

- Results from an Indoor Air Quality test conducted during all hours of occupancy during a 24 hour period must be submitted to the Program Administrator (1) after occupancy and (2) nine months after first test for performance based IAQ indicators
- Testing protocols must be consistent with one of the standards listed above
- Program Administrator must approve the completion certificate which requires commissioning

(per existing Program Guidelines for energy efficiency)

Building operations:

- Project applications for financing IAQ must include a [clean indoor air action plan](#) or equivalent.

Existing Buildings

Prescriptive and performance pathways are available for existing buildings.

Performance:

Projects must be designed for the project area (building or improved area) to improve upon existing IAQ conditions. Measurements of the performance-based indicators shall be taken (1) prior to project construction/installation, (2) after project completion and (3) nine months after project completion and submitted to the Program Administrator.

A professional designer/engineer with documented expertise in IAQ (see above) must attest that the project design/equipment to be installed is expected to achieve *at least a 10 percent improvement in one or more of the baseline conditions* of the four Performance Based IAQ Indicators listed above.

Testing protocols must be consistent with one the standards listed above.

Program Administrator must approve the completion certificate which requires commissioning (per existing Program Guidelines for energy efficiency).

Building operations:

- Project applications for financing IAQ must include a [clean indoor air action plan](#) or equivalent.

Prescriptive:

Filtration and air cleaning measures identified by ASHRAE in its [technical resource guidance](#) including:

- Upgrading HVAC equipment to accommodate higher MERV-rated filters than currently installed
- HEPA filtration systems
- Electronic air cleaners
- Gas-Phase air cleaners
- Ultraviolet Energy (UV-C)
- Photocatalytic Oxidation (PCO) and Gaseous Hydrogen Peroxide
- Photocatalytic Oxidation (PCO)
- Bipolar Ionization/Corona Discharge/Needlepoint Ionization and Other Ion or Reactive Oxygen Air Cleaners

Electrification equipment and upgrades:

Indoor combustion of fossil fuels contributes to indoor air contamination. Replacement of combustion equipment with permanently affixed electric equipment is considered an eligible measure. These measures include but are not limited to electric heat pumps, electric water heaters, electric commercial-scale cooking equipment, and upgrades to electrical systems.

Safety and Efficacy Cautions:

UV-C technologies are proven to inactivate infectious agents including SARS CoV-2. Equipment must be properly sized and placed to be effective and avoid harm. Exposure to UV-C energy can cause temporary eye and skin damage.

Several of the systems listed above are emerging technologies and do not have scientific evidence to prove their effectiveness and safety. We encourage all Project Sponsors to read the [CDC Position on Emerging Technologies for Air Cleaning](#).

IAQ Survey

The application for IAQ projects must include a written description of the proposed project including:

- Explanation of the rationale for the selected solution(s)
- Expected IAQ improvements over existing conditions (existing buildings)
- Estimate of the useful life of each IAQM with cut sheets supporting useful life
- The total project capital cost required for each IAQM including soft costs
- Qualifications of the professional who prepared the IAQ survey
- Impact on energy use; IAQ and energy consumption interact with each other. The measure(s) proposed should aim to optimize energy use and IAQ

New construction/substantial renovation projects must also include verification documentation showing design is expected to achieve maximum levels of performance-based IAQ indicators.

- [RESET Air pre-accredited](#) approval; or
- [WELL precertification](#) approval; or
- Professional designer/engineer with documented expertise in IAQ. Professional qualifications may include:
 - RESET AP
 - WELL AP
 - LEED AP
 - IAQ Certified Industrial Hygienist (CIH)
 - Professional Engineer (PE)
 - Registered Architect

Resiliency

Resiliency Projects

A Project Survey for a Resiliency Improvement shall describe the baseline conditions against which resiliency benefits of the proposed improvement are assessed. The baseline for Resiliency Improvements to existing buildings is the existing conditions of the building(s) and site. The baseline for new construction projects is the minimum requirements stated in the building code, as well as any applicable zoning regulations, for building components in relation to the ability of the building to withstand damage from wind, precipitation, flooding and fire.

A Project Survey for a Resiliency Improvement shall be prepared by a Professional Engineer (P.E.) or Architect licensed in the State of Pennsylvania. The Program Administrator recognizes that certain individuals and firms that do not meet these licensing requirements may also be qualified to complete a Project Survey for a Resiliency Improvement. The Program Administrator will consider requests on a case-by-case basis from qualified professionals who are not licensed engineers or architects to provide a Project Survey. If a firm or individual who does not meet the licensing requirement will prepare the Project Survey, written approval of the provider by Program Administrator must be obtained prior to submitting a C-PACE Final Application for the project.

In addition to the components of a Project Survey described in Section 4.4 Project Survey Requirements, a Project Survey for a Resiliency Improvement shall include:

- Certification of whether the property is subject to a 100 year flood area, and/or a floodplain zoning ordinance and, if so, whether the Property is a Nonconforming Building, as defined in the local zoning ordinance. If Property is a Nonconforming Building, the Project Survey shall certify:
 - That after completion of the Resiliency Improvement(s) the building will be permanently repaired, reconstructed, or improved so as to comply with all applicable requirements of the floodplain zoning ordinance for the area of the floodplain that it occupies.
- Description of baseline resiliency performance required by building codes, zoning ordinances, and other applicable regulations, or (for existing buildings) existing conditions of the Property relevant to resiliency to wind, precipitation, flooding, and fire.
- Description of improved performance of Resiliency Improvements above baseline requirements
- Incremental benefits to be offered by each Resiliency Improvement (e.g., Resistance to 80 mph winds vs. baseline of resistance to 50 mph winds.)
- Indication of building resiliency modeling software (if any) used in preparing the Project Survey
- Current climate prediction data and projected impacts of climate change on the benefits provided by the proposed measures.

Energy Reliability Improvement

An Energy Reliability Feasibility Survey for an Energy Reliability Improvement must be prepared by an individual, or a team that includes a Qualified Engineering Professional, who holds one of the qualifications listed in the Pennsylvania C-PACE Program Guidelines. The Program Administrator recognizes that certain individuals and firms that do not meet these licensing requirements may also be qualified to complete a Project Survey for an Energy Reliability Improvement. The Program Administrator will consider requests on a case-by-case basis from qualified professionals who do not hold one of the listed credentials to provide a Feasibility Survey. If a firm or individual who does not meet the credential requirement will prepare the Project Survey, Property Sponsor must obtain written approval of the provider by the Program Administrator prior to submitting a C-PACE Final Application for the project.

In addition to the components of a Project Survey described in Section 4.3 of the Pennsylvania C-PACE Program Guidelines, a Project Survey for an Energy Reliability Improvement shall include:

- Description of the energy storage system or Microgrid, and of all components that will supply energy to, store energy within, or control the transmission of energy within the Energy Reliability Improvement.
- Nameplate energy storage capacity of each energy storage system
- Baseline energy consumption of the Property. [See Section 4.3 of the Pennsylvania C-PACE Program Guidelines to determine the applicable energy baseline consumption to be used for the Project Survey.]
- Estimated reduction in electricity demand and consumption charges to be enabled by the Energy Reliability Improvement
- Description of end uses and systems that are included in the expected critical load to be supported by the Energy Reliability Improvement
- Description of end uses and systems that are included in the business-as-usual load to be supported by the Energy Reliability Improvement

- Quantified energy reliability benefits of the improvement, including estimated hours of operation that the Energy Reliability Improvement will enable for critical loads only and for a business-as-usual load.
- Description of applicable utility interconnection and islanding requirements.
- For Microgrid projects, discussion of any uncertainties introduced by the project due to gaps in applicable industry standards for Microgrid interconnection and energy controls.
- Qualitative discussion of non-energy benefits that the Energy Reliability Improvement is expected to produce.

If a Property has existing energy storage or reliability systems that it will use C-PACE Financing to upgrade, and/or has on-site renewable energy systems with grid-connections that are capable of islanding from the electrical grid, a Feasibility Survey for an Energy Reliability Improvement shall apply a baseline of the existing conditions of the Property. In all other cases, a Project Survey for an Energy Reliability Improvement shall apply a baseline of 100 percent grid-supplied electricity.