

## Application Note 2006:

### Utilizing CITY MULTI<sup>®</sup> VRF, Lossnay<sup>®</sup>, M-Series and P-Series for LEED<sup>™</sup> Certification

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Reference Documents "Green Buildings show higher rents, occupancy" [Building Operating Management](http://www.facilitiesnet.com/bom/article.asp?id=9225) July 2008.  
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## LEED and Mitsubishi

The U.S. Green Building Council (USGBC) is the nation's foremost coalition of leaders from across the building industry working to promote buildings that are environmentally responsible, profitable, and healthy places to live and work. The core purpose of USGBC is:

*To transform the way buildings are designed, built, and operated, enabling an environmentally and socially responsible, healthy, and prosperous built environment that improves the quality of life.*

In order to further that purpose, USGBC developed the LEED™ (Leadership in Energy and Environmental Design) Green Building Rating System™. The LEED Green Building Rating System is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings. Members of the U.S. Green Building Council representing all segments of the building industry developed LEED and continue to contribute to its evolution. A study by the CoStar Group shows that “green buildings outperform traditional buildings in areas such as occupancy, sale price and rental rates. The study shows that LEED certified buildings get \$11.24 more per square foot and have 3.8 percent higher occupancy rates. ENERGY STAR® labeled buildings have a \$2.38 rent premium and 3.6 percent higher occupancy. The study also finds that ENERGY STAR labeled buildings sell for an average of a \$61 per square foot more than non-ENERGY STAR buildings while LEED certified buildings have a premium of \$171 per square foot.”<sup>1</sup>

Mitsubishi Electric HVAC, a corporate member of USGBC, is committed to helping those who desire to achieve LEED certification through the use of our efficient HVAC equipment. The CITY MULTI® VRF system, M-Series, and P-Series systems can help with LEED certification under different versions of LEED. The following information lists how our system aligns with the certification process based on the chosen path.

## LEED for Homes

LEED for Homes was developed to help those in the industry reduce the environmental impact of residential construction. Millions of new homes are constructed each year which leads to a larger usage of both energy and water resources. Sustainable construction by this industry can yield a lasting reduction on the carbon footprint of the residential sector.

LEED for Homes was developed to be applied to single family, multifamily, tract built, low income, and modular residential construction. Major renovations of residential buildings can also pursue LEED™ for Homes certification.

The P-Series and M-Series MXZ system can assist with LEED for Homes under the credits listed below. In addition, with its low profile, VRF heat pumps and condensing units can help to meet strict building height requirements for homes as well as high-rise residential buildings.

## LEED for New Construction or Major Renovation

LEED for New Construction (NC) is the original path of LEED certification. It has evolved through several versions and is now at version four, called LEED for Building Design and Construction (LEED BD+C). LEED BD+C applies to the majority of new commercial buildings constructed as well as major renovations of existing buildings. CITY MULTI® VRF equipment is the primary Mitsubishi Electric HVAC product used for commercial construction. CITY MULTI® VRF equipment can contribute to LEED BD+C v4 under the following credits.

## Energy & Atmosphere

### Fundamental Commissioning and Verification *Required*

CITY MULTI<sup>®</sup> controls system assists building commissioning by allowing easy testing, setting, and adjusting of the entire system. Mitsubishi Electric recommends the commissioning of their systems. A properly designed, installed and commissioned CITY MULTI<sup>®</sup> system receives an extended parts warranty of 10 years as opposed to the 1 year standard warranty.

### Minimum Energy Performance *Required*

All buildings must be designed at a minimum to exceed the mandatory and prescriptive or performance requirements of ASHRAE 90.1-2010. Several options are available to meet the prerequisite. A whole building simulation that illustrates a savings over the Appendix G baseline of 5% for new construction, 3% for major renovations, or 2% for core and shell utilizing EnergyPro software is recommended. VRF equipment has many energy saving features, further described under the Optimize Energy Performance credit, which helps with meeting this prerequisite.

### Fundamental Refrigerant Management *Required*

CITY MULTI<sup>®</sup> system uses R410A, which is a HFC based refrigerant, CFC free and has no ozone depletion potential.

### Optimize Energy Performance 1-20 points

CITY MULTI<sup>®</sup> systems utilize an Inverter Drive on the compressor and the outdoor fan motor, variable refrigerant flow through the indoor units, simultaneous heating and cooling operation, and an integrated control system allowing for scheduling of equipment in each room to maximize energy performance. The system can be coupled with the Lossnay<sup>®</sup> Energy Recovery Ventilator (ERV) to further reduce energy usage. Building energy savings can be demonstrated by performing a building energy model using a software program such as EnergyPro, TRACE 700, DOE2, eQUEST, HAP, or EnergyPlus and comparing the building design with a baseline building as defined by ASHRAE 90.1-2010. The software programs mentioned above have been approved by the USGBC as acceptable for *Optimize Energy Performance* calculations. In addition to HVAC, Mitsubishi Electric also offers a touch-free, high speed Jet Towel<sup>®</sup> hand dryer. The Jet Towel<sup>®</sup> hand dryer eliminates paper waste and is energy conserving. It provides either heated air or unheated air to quickly dry hands.

## Indoor Environmental Quality

### Minimum IAQ Performance *Required*

CITY MULTI<sup>®</sup> systems can often meet minimum outside air requirements through the ventilation connections of our indoor units. In applications where more outside air is required, and the indoor units capacity is exceeded, Mitsubishi Electric's Lossnay<sup>®</sup> ERV can bring in outside air by using the exhaust air from the building and transferring energy and moisture to or from the outside air before delivering it to occupied zones. A Lossnay<sup>®</sup> ERV can be fully integrated within the CITY MULTI<sup>®</sup> controls network. This function allows the unit to be programmed based on occupancy. A Lossnay<sup>®</sup> ERV can also be integrated with a CO<sub>2</sub> sensor to energize the unit and or vary the airflow based on CO<sub>2</sub> levels within the space.

### Minimum Acoustic Performance *Required (Schools only)*

Background noise is a major concern for schools and CITY MULTI<sup>®</sup> systems can help meet the acoustic performance and achieve the requirements of this prerequisite for school projects. Direct drive, ECM motors and forward curved centrifugal fans work concurrently and were designed to reduce noise at higher air volumes.

### Enhanced Indoor Air Quality Strategies 1-2 points

Option 1, C – Filtration: Many CITY MULTI<sup>®</sup> indoor units can be installed with a MERV 13 filter. A design professional should be consulted to ensure that adequate static pressure is available to provide desired airflow performance.

Option 2, B – Increased Ventilation: A Lossnay<sup>®</sup> ERV or PremiSys<sup>®</sup> can be used to exchange a high percentage of air, which when used with adequate air distribution from ducted units, can increase the ventilation rates to 30% above the requirements of ASHRAE 62.1-2010.

### Thermal Comfort 1 point

Mitsubishi Electric CITY MULTI<sup>®</sup> systems, when properly designed into a building, provide temperature and humidity control in accordance with the ASHRAE 55-2010 guidelines. CITY MULTI<sup>®</sup> systems have the ability to be controlled by the occupant via the wall-mounted remote controller that can be provided in every room, or centrally via web-based control. The occupant has the ability to control cooling/heating mode, airflow direction, fan speed and temperature set points.

### Acoustic Performance 1-2 points

CITY MULTI<sup>®</sup> systems are exceptionally quiet. The indoor and outdoor units are ideal for applications where noise is a factor. The compressor of the outdoor unit is compartmentalized and the fan blades are specially designed to reduce noise. An acoustical design professional should be consulted to ensure proper acoustic design.

## Other LEED Credits to Consider

CITY MULTI<sup>®</sup> systems use R410a refrigerant and although it has no ozone depleting potential, however, it does have a global warming potential (GWPr). Because of the refrigerant's GWPr and the amount of refrigerant required for a system, it is very difficult to achieve the **Energy and Atmosphere credit – Enhanced Refrigerant Management**.

The LEED credit for **Materials and Resources (MR) – Recycled Content** or **MR Credit Building Product Disclosure and Optimization** is for permanently installed building construction materials/products such as building construction paper, ceiling tiles, floor tiles, roofing, etc. This credit excludes MEP systems so HVAC equipment is not required for the scope of this LEED credit.

It is important to remember the LEED rating system is a measure of whole building sustainability. In order to effectively pursue a LEED certification for any building, the entire team (owner, architect, engineer, contractor, etc.) must work together to maximize potential. No single equipment selection can assure any level of certification. A properly applied CITY MULTI<sup>®</sup> VRF system and Lossnay<sup>®</sup> ERV, however, can assist in achieving many important credits on the path to certification. Mitsubishi Electric HVAC has LEED Accredited Professionals (LEED AP<sup>™</sup> or LEED BD+C<sup>™</sup>) on staff to assist design professionals as they pursue design of a LEED certified building.