

LG HVAC Solution **Global LEED Reference**



<http://partner.lge.com>
<http://www.lg.com/b2b>
<http://www.lghvacstory.com>

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What is **LEED**

LEED (Leadership in Energy and Environmental Design) is an internationally recognized green building certification system, providing third-party verification that a building or community was designed and built using strategies aimed at improving performance across all the metrics that matter most: energy savings, water efficiency, CO₂ emissions reduction, improved indoor environmental quality and stewardship of resources and sensitivity to their impacts.

Developed by the U.S. Green Building Council (USGBC), LEED provides building owners and operators a concise framework for identifying and implementing practical and measurable green building design, construction, operations and maintenance solutions.

LEED is flexible enough to apply to all building types – commercial as well as residential. It works throughout the building lifecycle – design and construction, operations and maintenance, tenant fitout and significant retrofit. LEED for Neighborhood Development extends the benefits of LEED beyond the building footprint into the neighborhood it serves.

LEED provides a point system to score green building design and construction. The system is categorized in five basic areas: Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources and Indoor Environmental Quality. Buildings are awarded points based on the extent various sustainable strategies are achieved. The more points awarded the higher the level of certification achieved from Certified, Silver, Gold to Platinum.



How to Achieve LEED Points by LG VRF

A state-of-the-art HVAC technology, LG Variable Refrigerant Flow (VRF) zoning systems are highly beneficial in all areas of commercial construction because they provide precise zoned control that can contribute points toward LEED® certifications. The following summarizes the major benefits of MULTI V 5 and how to garner LEED points by applying its efficient technologies:



ENERGY EFFICIENCY

The Ultimate Inverter Compressor of **MULTI V 5** **increases part load efficiency** at all operation ranges, which eventually allows the VRF system to precisely meet each zone's load and reach required temperature quickly. **Power consumption is reduced** because the system operates only at the levels needed to maintain a constant, comfortable indoor environment.

LIGHT WEIGHT

In comparison to the previous model, **MULTI V 5** **decreases overall product weight up to 15%**, so it is **easier to handle and costs less to transport**. Moreover, the load can be distributed among the existing structure or avoided by mounting on the ground.

QUIET OPERATION

Sound levels are greatly reduced because the Ultimate Inverter Compressor of MULTI V 5 ramps up and down smoothly. Unlike the previous model which enabled **Low-Noise Operation Mode** only during the night after judgment time, MULTI V 5 can function regardless of the time at the noise sensitive areas for quiet performance.

DESIGN AND INSTALLATION FLEXIBILITY

By **providing up to 26HP for single unit line up**, MULTI V 5 decreases the total number of required outdoor units in order to **simplify installation process by making it faster with fewer installers**. At the same time, this also results in the flexible usage of the saved floor space.

LOWER LIFE-CYCLE COSTS

Because VRF systems have fewer components and ductwork than other HVAC systems, initial equipment and installation costs are reduced. Moreover, **LG's exclusive "Ocean Black Fin" heat exchanger** is designed for durable and long-lasting performance in corrosive environments, which eventually **prolongs product lifespan while reducing both the operational and maintenance costs**.

DISCREET OUTDOOR & INDOOR UNITS

The **wide variety of both the indoor and the outdoor units provide more design options that cater to consumer's diverse needs**.

Review the possible categories & credits

LG **VRF systems** can help earn on **LEED Certification**



For LEED certification of new construction, LG VRF systems can contribute a great number of points in Energy and Atmosphere, Indoor Environmental Quality in the following ratings :

Energy & Atmosphere (EA)

PREREQUISITE Fundamental Commissioning & Verification

INTENT

To support design, construction and eventual operation of a project that meets owner's requirements for energy, water, IEQ and durability.

LG can offer technical assistance before and during system installation and **assist with startup, commissioning of equipment and control systems.**

PREREQUISITE Minimum Energy Performance

INTENT

To reduce the environmental and economic harms of excessive energy use by achieving a minimum level of energy efficiency for the building and its systems.

VRF systems are **incorporated in ASHRAE Std. 90.1-2010 and AHRI 1230 established testing method for VRF technology.**

PREREQUISITE Fundamental Refrigerant Management

INTENT

To reduce stratospheric ozone depletion.

LG systems do **not use chlorofluorocarbon (CFC)-based refrigerants in HVAC&R systems.**

CREDIT Enhanced Commissioning

INTENT

To further support fundamental commissioning prerequisite standard.

LG could **support the commissioning of the building HVAC&R systems.** LG has a full library of guides, installation & operation manuals, service & maintenance and training materials.

CREDIT Optimize Energy Performance

INTENT

To achieve increasing levels of energy performance beyond the prerequisite standard.

Through **high efficient heat recovery and heat pump systems** energy consumption and cost can be reduced.

CREDIT Advanced Energy Metering

INTENT

To support energy management and identify opportunities for additional energy savings.

LG Control solution can **monitor and record system energy usage.**

CREDIT Enhanced Refrigerant Management

INTENT

To reduce ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to climate change.

The ozone depletion potential (ODP) of the refrigerants used in **our HVAC&R equipment has an ODP of 0.**

Indoor Environmental Quality (IEQ)

PREREQUISITE Minimum Indoor Air Quality Performance

INTENT

To contribute to the comfort and well-being of building occupants by establishing minimum standards for Indoor Air Quality (IAQ).

Through ERV or AHU, LG system can **meet the minimum requirements of ASHRAE Standard 62.1-2010.**

CREDIT Enhanced Indoor Air Quality Strategies

INTENT

To promote occupants' comfort, well-being, and productivity by improving indoor air quality.

LG ERV system has **particle filters that meet class 7 as defined by CEN standard EN 779-2002.** With CO₂ sensor and wired remote controller, CO₂ concentrations within all densely occupied spaces can be monitored.

CREDIT Construction Indoor Air Quality Management Plan

INTENT

To promote the well-being of construction workers and building occupants by minimizing indoor air quality problems associated with construction and renovation.

LG ERV system has **particle filters that meet class 7 as defined by CEN standard EN 779-2002.**

CREDIT Indoor Air Quality Assessment

INTENT

To establish better quality indoor air in the building after construction and during occupancy.

Flush out can be operated by LG HVAC&R system.

CREDIT Thermal Comfort

INTENT

To promote occupants' productivity, comfort, and well-being by providing quality thermal comfort.

LG HVAC&R can **deliver temperature, air flow and humidity to meet the requirement of ASHRAE 55-2010.**

CREDIT Acoustic Performance

INTENT

To provide workspaces and classrooms that promote occupants' well-being, productivity and communications through effective acoustic design.

LG HVAC&R system could **achieve the maximum background noise levels.**



With **LG Air Solution**,
getting **LEED score**
has never been easier

LEED v4 for BD+C: New Construction and Major Renovation

Credit Category ^a	Weight factor ^b	Sub category	Credit ^c	% of total LEED score	Credit name that can be gained through LG	VRF	Chiller	Ventilation
Energy and Atmosphere	30%	Fundamental Commissioning and Verification	Prerequisite	-				
		Minimum Energy Performance	Prerequisite	-				
		Fundamental Refrigerant Management	Prerequisite	-				
		Enhanced Commissioning	2-6	5.5%	Enhanced and Monitoring Based Commissioning	V	V	
		Optimize Energy Performance	1-18	16.4%	Energy Performance	V	V	
		Advanced Energy Metering	1	0.9%	System Level Energy Monitoring	V	V	
		Enhanced Refrigerant Management	1	0.9%	ODP Zero Refrigerant : R410A, R134a	V	V	
Indoor Environmental Quality	15%	Minimum Indoor Air Quality Performance	Prerequisite	-				
		Enhanced Indoor Air Quality Strategies	1-2	1.8%	Filtration (Class F7 filter), CO ₂ monitoring			V
		Construction Indoor Air Quality Management Plan	1	0.9%	Filtration (Class F7 filter)			V
		Indoor Air Quality Assessment	1-2	1.8%	Flush Out			V
		Thermal Comfort	1	0.9%	Meet The Requirement of ASHRAE Std. 55-2010	V	V	V
		Acoustic Performance	1	0.9%	Low Noise Level	V	V	V
Innovation	5%	Innovation	1-5	4.5%	Exemplary Level Criteria	V	V	V
		LEED Accredited Professional	1	0.9%	LEED Accredited Professional			

a. Category : Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Innovation, Regional Priority.

b. Weight factor represents the respective value of this category to the total LEED point (110) of a new construction project.

c. Credits are project dependent and can vary accordingly.



The Pravda Building

LEED Gold

Russia's First LEED Certified Commercial Office Building with highly efficient LG Multi V system

Bouygues Challenger

LEED Platinum

LG MULTI V Water System as an ideal HVAC solution for the eco-friendly building with minimized energy footprint

SITE

Bouygues Construction Co. HQ building

LOCATION

Paris, France

BUILDING DETAILS

Total area : 67,000m²
Renovation year : 2014

LG HVAC SOLUTION

Multi V Variable Water Flow (Geothermal system)
Indoor units (Duct)
BMS Control

CONSULTANT

Ferro Ingenierie

INSTALLER

ETDE

LEED

Platinum

Water Efficiency

WEc2	Innovative wastewater technologies	2/2
WEc3	Water use reduction	4/4

Energy & Atmosphere

EAc2	Optimize energy performance	19/19
EAc3	Enhanced commissioning	2/2
EAc4	Enhanced refrigerant Mgmt	2/2

CHALLENGE

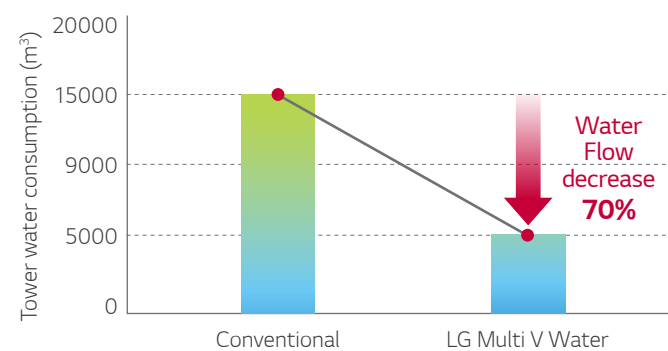
Bouygues' ambitious renovation project has three interconnected guiding principles: renovation, expansion and a deep respect for the environment. To match Bouygues' objectives to significantly reduce energy footprint, new air-conditioning system had to be the most energy efficient amongst those in the market.

SOLUTION

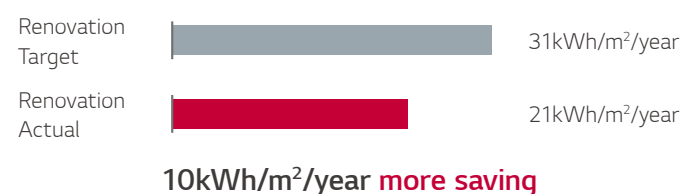
Automatic variable water flow control; Excellent performance along with energy savings were fulfilled and proved via a 56 day field test, where the water consumption decreased by more than a third, which in turn lowered the overall energy usage. In addition, the LG Multi V is a 3 reversible tube system capable of simultaneously handling hot and cold temperature in rooms where thermal needs are opposed, such as a floor office with numerous walls.

ENERGY SAVING

Savings by variable water flow



Energy consumption comparison



CHALLENGE

The Pravda building, located near the St. Petersburg city center, is the first LEED-certified commercial office building in Russia. The Pravda building has two basement floors and eight floors above ground. The ground floor consists of a four story atrium, administrative offices, a fitness center and dining areas. The remaining above ground floors house exclusive circulation areas and several types of leasable office space. Because this building housed different floor plans with varied configurations, the right combination of technology and equipment to reach the highest efficiency and comfort was required. Also, with energy-efficiency being of the utmost importance to building managers, they required a solution capable of performing effectively while reducing carbon emissions.

SOLUTION

VRF systems for cooling provide flexibility through the ability to connect various indoor units to the outdoor units located on the roof. It also allows for supplemental heating through heat pump operation. For the Pravda building, LG's Multi V system provided high cooling energy efficiency in all spaces (including the main lobby) as a result of its high COP values. In order to ensure reductions in energy and carbon emissions, additional energy-saving approaches were implemented in the air handling units, circulation pumps and automation system. These advances were coupled with high equipment efficiencies to reduce energy consumption by approximately 35% than similar buildings built to standard specifications.

SITE

Renaissance Pravda Business Center

LOCATION

St. Petersburg, Russia

BUILDING DETAILS

Total area : 19,609m²
Completion year : 2013

LG HVAC SOLUTION

Multi V VRF

DESIGN COMPANY

Architectural Workshop B2

ARCHITECT

Felix Viktorovich Buyanov

LEED

Gold

Energy & Atmosphere

EAc1	Optimize energy performance	12/21
EAc3	Enhanced commissioning	2/2
EAc4	Enhanced refrigerant Mgmt	2/2

LEED Projects



Edifício Jacarandá
LEED Platinum
· São Paulo, Brazil
· Commercial Building
· Product: Multi V IV



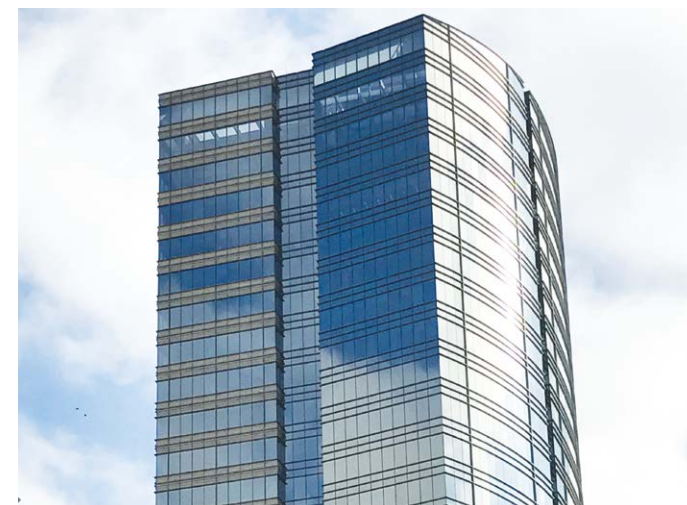
Banco Central Salvador Bahia
LEED Gold
· Salvador, Brazil
· Public Building
· Product: Multi V IV



Edifício Grand Station
LEED Gold
· São Paulo, Brazil
· Commercial Building
· Product: Multi V III



KEPCO Naju Headquarter
LEED Platinum
· Naju, Korea
· Commercial Building
· Product: Multi V IV, Single split



Edifício Torre Z
LEED Gold
· São Paulo, Brazil
· Commercial Building
· Product: Multi V Water IV



Infinity Tower
LEED Gold
· São Paulo, Brazil
· Commercial Building
· Product: Multi V Water II

Bouygues Headquarter
LEED Platinum
· Paris, France
· Commercial Building
· Product: Multi V Water II



Promenade ZITA
LEED Platinum
· Wrocław, Poland
· Commercial Building
· Product: Multi V IV Heat recovery



Rochaverá Corporate Towers

LEED Gold

- São Paulo, Brazil
- Commercial Building
- Product: Absorption Chiller, Centrifugal Chiller



Parque Titanium

LEED Gold

- Santiago, Chile
- Commercial Building
- Product: Multi V Water Heat recovery



Torre Titanium La Portada

LEED Gold

- Santiago, Chile
- Commercial Building
- Product: Multi V II



Xylem Water Solutions

LEED Gold

- Vadodra, India
- Commercial Building
- Product: Multi V III



Renaissance Pravda

LEED Gold

- St. Petersburg, Russia
- Commercial Building
- Product: Multi V III



Plaza Independencia

LEED Gold

- Madrid, Spain
- Commercial Building
- Product: Multi V 5



LG Gulf FZE Warehouse & Office

LEED Gold

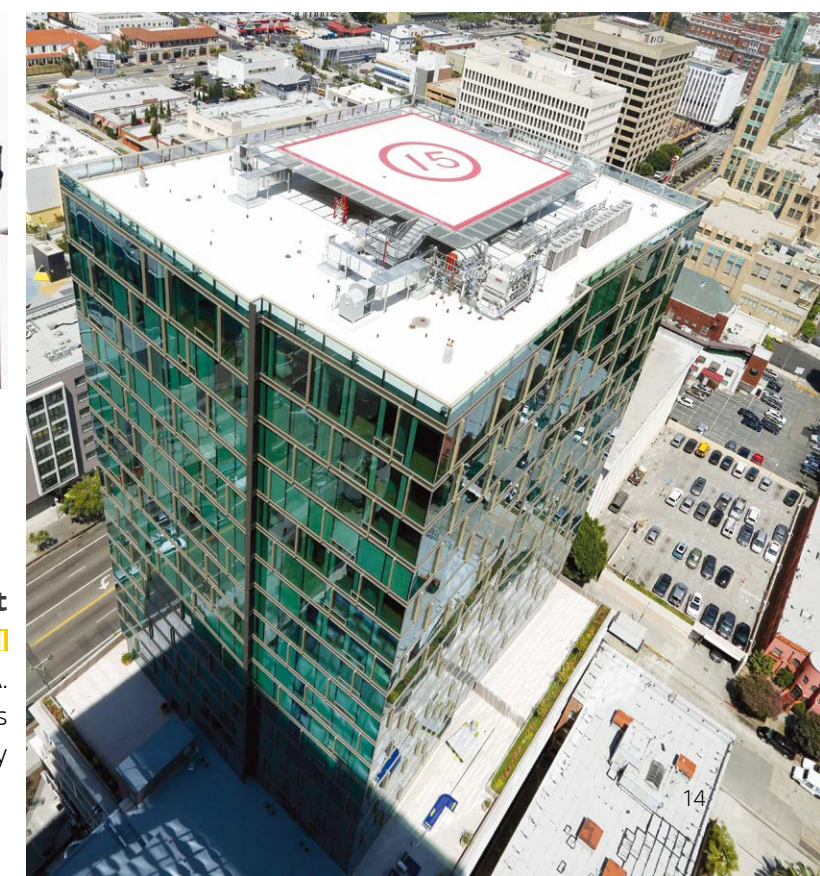
- Dubai, U.A.E.
- Commercial Building
- Product: Multi V IV, Single split



Imperial Hotel

LEED Gold

- Atlanta, GA, U.S.A.
- Accommodation Facilities
- Product: Multi V III



The Vermont

LEED Gold

- Los Angeles, CA, U.S.A.
- Residences
- Product: Multi V III Heat recovery

Mirae Asset Center 1
LEED Silver
 · Seoul, Korea
 · Commercial Building
 · Product: Multi V Water II, Chiller



Territoria El Bosque
LEED Certified
 · Santiago, Chile
 · Commercial Building
 · Product: Multi V III Heat recovery



Torre Virreyes
LEED Silver
 · Mexico City, Mexico
 · Commercial Building
 · Product: Multi V Water II



Saqqara Project
LEED Silver
 · Monterrey, Mexico
 · Residences
 · Product: Multi V Water IV



Hotel Hyatt Place
LEED Certified
 · Santiago, Chile
 · Accommodation Facilities
 · Product: Multi V Water Heat recovery



KOI Project
LEED Silver
 · Monterrey, Mexico
 · Commercial Building
 · Product: Product: Multi V Water IV



Hampton Inn (Chicago Motor Club Building)
LEED Certified
 · Chicago, IL, U.S.A.
 · Residences
 · Product: Multi V IV Heat recovery