

# Energy Efficiency, Thermal Comfort, Controllability & Health Redwell Conformability to LEED Principles

by Jay Castiglione, BA, LEED AP

Redwell Infrared Heating Systems can positively affect a LEED registered project in terms of energy performance and indoor environmental quality. Redwell technology turns 100% of the energy taken off the grid into usable and always comfortable radiant heat.

## Thermodynamics

Infrared radiant heat is absorbed into all surrounding thermal masses that in turn radiate heat back into the indoor environment. Due to the efficiency of the heating system and the efficient nature of the radiant heat they provide, thermal comfortability can be maintained at lower temperature levels, reducing energy demand. Many manufacturers advertise their heaters as “radiant heaters” while merely providing convection heating with little actual radiant benefits. Radiant heat is known to be more effective for heating space than convection. Why? Convection heats the air in a space, not the objects in a space directly. Air is used as a medium to carry heat to the objects in a room, making this method intrinsically less efficient for providing a comfortable room temperature. Heated air is lost every time a door opens or through leaks in the building envelope. Infrared radiant heaters will maintain a constant comfortable thermal level, eliminating additional energy demand associated with heating more air. Infrared radiant heaters store heat energy within all zone thermal masses. This characteristic of infrared heat affectively makes all thermal mass exposed to infrared rays into radiant heaters themselves, getting far more use out of each kwh taken off the grid. Simply stated, the nature of infrared radiant heat allows heat to remain in a zone much longer and better distributed than any other heating method.

## Energy Efficiency

Associating Redwell Infrared Heating with other forms of electric heating is a misnomer. In fact, Redwell has shown to use up to 75% less electricity than conventional electric heaters: The “Collegeway” Redwell Pilot Project in Mississauga, Ontario compared conventional baseboard heating to Redwell Infrared Heating in 2 identical apartment units with identical exposure for 20 winter days. While they both maintained comfortable thermal levels [baseboard heating mean temperature of 21 deg. C, Redwell heating mean temperature of 23.3 deg. C] the baseboard system used 617kwh while the Redwell system only used 150 kwh. This means Redwell used less than 25% of the electricity needed to power the baseboard heaters. In this particular building, a retrofit HVAC system would be costly and disruptive to occupants, while Redwell Heating systems can be easily hardwired in individual heating zones or simply plugged in.

## Indoor Environmental Quality

Redwell heating systems are easily integrated with zone thermostat controls allowing superior controllability for individual occupants and heating zones, promoting productivity, comfort and well-being. With a motionless radiant heating element, an indoor environment will not have the negative affects of dust and mold circulation experienced with convection heating. This is advantageous for indoor air quality and specifically for occupants suffering from asthma and allergies. While Redwell systems do not rid of mold, they provide a means to keep walls, floors and insulation dry and thus mold resistant. Redwell systems are tested to rigorous European EMF standards that ensure against toxic electromagnetic fields, or *electrosmog*. In fact, Far infrared is used as treatment for the negative effects of *electrosmog* and even sunburns.

### **FAR Infrared**

The radiant heat Redwell systems produce is between 7 and 10 microns, known as FAR infrared. FAR infrared has been empirically shown to provide human beings with health benefits, such as: Increasing blood circulation and oxygen supply to human tissue, reduction of chronic joint and muscle pain, stress relief, reduction of blood pressure, and increased metabolism between blood and tissue. Many spas and physical therapists offer FAR infrared treatment for detoxification, healing scars, acne and loosening dry outer skin. The McGraw-Hill Encyclopedia of Science and Technology reports medical practitioners make use of infrared radiant heat to treat sprains, strains, bursitis, peripheral vascular diseases, arthritis, and muscle pain.

### **LEED NC & Redwell Infrared Heating**

Redwell heating systems augment building heating systems and therefore become part of the “regulated loads” for the building design energy calculations. Certain LEED credits will apply when adding Redwell systems to a LEED project: EA prerequisites 1 & 2, EA credits 1,3,5, Indoor Environmental Quality credits 6 & 7 for LEED NC 1.0.

“For major renovations to existing buildings, some conventional HVAC designs are technically or economically not feasible because of existing building conditions or historic designation. Designated historical buildings [as defined in ASHRAE 90.1 Sec 4.1.2.2] do not have to comply with the envelope thermal performance requirements of either the MNECB or ASHRAE 90.1. However, the mechanical and electrical systems must comply with MNECB or ASHRAE 90.1.” [CaGBC LEED NC 1.0, 2004]

For these particular renovation projects, Redwell Infrared Heating systems are among the best options for heating consideration. In fact, Redwell systems are widely used for retrofit projects in Europe, where energy conservation is a way of life and not a “green” option. The various sizes and additional design functions, give these infrared panels far superior adaptability and functionality. They can provide the main source of heating or simply augment specific areas while also serving as a bathroom mirror, office chalkboard, or design art. Selecting a Redwell heater in place of an interior object ubiquitous with everyday design, such as a bathroom mirror, frees up space normally occupied by traditional heaters. With a life expectancy of 35 to 50+ years, the durability and long-life of Redwell systems compliment its inherent energy efficiency and added design function, giving us a truly “green” product.

Energy efficiency measures result in a more comfortable indoor environment while reducing operating and first costs. Even small energy savings have incremental effects on the environment and cost savings.

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For more information regarding the health benefits FAR infrared:

[www.chimachine4u.com/fir2.html](http://www.chimachine4u.com/fir2.html)

[www.bodycleanseintensive.com/HealthBenefitsofFarInfrared.htm](http://www.bodycleanseintensive.com/HealthBenefitsofFarInfrared.htm)

[www.ghchealth.com/natural-health/health-benefits-of-far-infrared-therapy/](http://www.ghchealth.com/natural-health/health-benefits-of-far-infrared-therapy/)

[www.farinfraredhealth.com/farinfraredtherapy.html](http://www.farinfraredhealth.com/farinfraredtherapy.html)

For more information regarding the energy efficiency of radiant heat:

[http://apps1.eere.energy.gov/consumer/your\\_home/space\\_heating\\_cooling/index.cfm/mytopic=12590](http://apps1.eere.energy.gov/consumer/your_home/space_heating_cooling/index.cfm/mytopic=12590)

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