



Efficient Comfortable Homes = Economical Healthy Living



Sustainable Heating, Cooling and Energy Solutions

Helping create the Healthiest possible Living Space



How healthy is your home?

It's a wonderful new home, clean, modern with all the latest mod-cons, but is it a healthy place to live in?

New homes today are being built to be more energy efficient than ever before, with high levels of insulation and homes sealed air tight so the cold cannot get in and heat cannot escape. This is fantastic for energy efficiencies but what is it doing for the in-home environment and the health of the occupants?

The advantage of building a highly insulated air tight sealed home apart from its energy efficiencies is it creates the opportunity to really control the homes internal environment. There have been many studies completed on what is the perfect environment for the human body to live in, involving things such as Oxygen and Carbon Dioxide levels, air movement, relative humidity, radiant temperature and quite surprisingly the least important of all air temperature. So why leave the quality of the in-home environment to chance like every house being built today does. Why not live in a home that will provide the occupants healthiest possible living space, why not create a controlled environment at where the human body will feel the most comfortable and at ease with its surroundings.

By working closely with quality manufactures over the past 15 years and with hundreds of installations behind us, we have recognized that by bringing together and integrating some of these tried and trusted technologies we can attain the perfect in-home environment.

By integrating these technologies we can now control the homes ambiance, creating a wonderful living space, an environment that will enhance the feeling of cleanliness and comfort throughout the home and that will bring enormous health benefits to everyone including your house, your furniture and clothes.

It's hard to explain how a Be Green system will make you feel, the best way to describe it is, it's a bit like having all your windows open with a light breeze floating through the home on a spring morning.

With over 80% of our time spent in the home, if you were given the choice would you choose a home with low or no cost for heating, hot water and cooling, as well as a home with a healthiest possible living environment, we believe you would.

This booklet gives a brief and hopefully uncomplicated description of what is going on in the home.



When you're looking to buy a new home

When any of us are considering or looking to move home we all naturally start making a mental list of the type of things we want and are looking for, within a budget of course. Things such as the type of property, new-build or old, house size, number of bedrooms, location, schools, transport, etc. But during this thought process, would the in home environment even be considered on the list of things you would want or even would like to have? Probably not!

So the question is; how high would it be on your agenda if you could choose a home with a climate control system installed that would create the perfect living environment, a home that amongst other things would provide the healthiest possible living space for you and your family to live in. Our presumption is, if given the knowledge and choice; it would appear quite high, after all what could be more important than your family's wellbeing and health?

Furthermore, where would it be on your list of priorities if the heating, cooling and hot water system installed would not only significantly reduced your carbon footprint but also cost next to nothing to run, again we believe it would have to be given significant consideration, if given the choice.

Low or no heating, cooling and hot water bills

Investing in renewable and sustainable technologies into new and existing homes will reduce energy bills and significantly lower carbon emissions. But the Government wants to encourage further investment by offering grants to install these technologies. So an annual grant is paid that will last for the next 7 to 20 years dependent on technology used. In most circumstances this grant will pay back your investment in full. In addition the grants would in most cases, also comfortably pay for the running costs of the homes heating, cooling and hot water requirements.

So low or no heating and cooling bills for the foreseeable future is achievable, and with the addition of other renewable technologies installed like Solar PV panels or Hydrogen Fuel cells the home could cost nothing to run, indeed it could if designed correctly even generate a tax free income for years to come.

So with a Be Green system fitted gives you get the best of all worlds, a low carbon low energy home using the latest technologies that all help to create the perfect and healthiest possible living environment.



How a Be-Green system makes you feel

It's difficult to explain exactly how a Be-Green Climate Control system makes you feel other than it creates an in-home environment that makes the whole house feel fresh and clean and gives that general feeling of wellness for the whole family. It gives that feeling you get from a warm spring morning where all the windows are open and there's that slight fresh breeze floating through the home.

Being able to create an in-home environment with the perfect living temperature, air movement and humidity is proven to help with sleep patterns, reduce allergies such as hay fever, lessen the likelihood of becoming unwell as well as aiding recovery, and can even help with our concentration levels. This holistic approach to the in-home environment will aid everyone living in the home, but is especially beneficial for athletes and professional sports people, sick people or for someone that needs to concentrate and focus on something, kids with homework is a great example.



The system can even help with the feeling of being safe and secure in the home as the windows of the property can remain closed without the home becoming hot and stuffy.

It is designed to keep all rooms at a desired set temperature no matter what the circumstances or weather conditions outside. This is done by constantly monitoring of the indoor and outdoor environments and making continuous small changes to the homes set up to compensate. Different rooms in the home want to be at different temperatures, so we ensure once the room temperature is set by the occupant it never gets too hot or too cold, or never feels too damp or too dry. Controlled air movement is designed to supply the correct amount of air flow through each room whatever the rooms use, this air flow can be increased or decreased according to the rooms use. A good example of this would be the dining room where there is very little use for most of the time, but when it is in use it becomes the centre of the homes activities for a short while, so that rooms settings need to change to a large or small extent but always in balance with its usage.

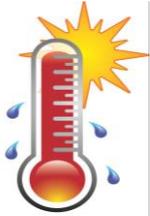


Controlling the heating, background cooling and air movement as one system enables us to create an environment that is not only a very healthy place to live but will be extremely energy efficient. For more details of how we do this please ask for our systems overview brochure.

This booklet outlines in brief the details of what our system does and why it creates a healthier place to live and why after living in a house with a Be-Green system installed, you will never want to live in a home without it again.

What's happening in the property?

Below is a brief explanation as to what is going on in the property, for a more detailed explanation please take a look at our comprehensive system overview booklet.



Heating Control

To achieve the uppermost levels of comfort and luxury, the home is softly and constantly heated via the under-floor heating, keeping any room at a temperature set by the owner. Continually heating the actual fabric of the building as well as controlled air movement by means of a weather compensator ensures the optimal levels of comfort in the home are always achieved. The home will never get too hot or too cold, as the system only creates the heat needed according to outside weather conditions, in effect, as the weather gets colder the heating gets warmer and vice versa.



Cooling Control

The background Comfort Cooling system automatically comes on when the home gets above a temperature set by the owner, gently and quietly cooling the whole property. Firstly the system slightly increases the air movement into the home, then by adding coolant to the incoming air keeps the whole house cool during those hot summer nights and evenings, additional equipment can be added for daytime or individual room cooling.

Individual room cooling

Rooms can be designed to stay at the set temperature, even during the hottest days of the year. Climate Control can be designed to keep a room as cool as you like all of the time with virtually no running costs.

A home needs to breathe

Controlling the air movement in and out of the home so it can breathe is essential to achieve the highest levels of comfort. Increasing the extracted air in bathrooms and toilets when in use or supplying clean fresh air to living areas like living rooms, bedrooms and even wardrobes will give your clothes that clean fresh feeling, or increasing air into areas of activity like Kitchens and dining rooms when in use all adds to the comfort levels.



Humidity Control

Keeping humidity at a set level is vital to creating an atmosphere in the home at where the human body feels comfortable and most at ease. Get the humidity right and everything else, heating, cooling and creating a healthy home, falls into place, which is not only good for us but also furniture, clothing or anything of value in the house.



Extract air movement

Continuously removing air from wet smelly areas like bathrooms, kitchens, utility rooms etc, this also reduces dust in the home.

Incoming air movement

Constantly bringing warm fresh, clean and filtered air into the living environments, bedrooms, living rooms, dining rooms etc

Heat recovery

The hot air being removed from the home heats up the air entering, so no chilly drafts.

Benefits of a Healthy Be Green Home

Below is a list of the 12 health and other benefits a Be-Green System will bring to a new home. For a more detailed explanation on the considerations we need to take into account please read our Simple Guide to Personal Thermal Comfort.

1. Allergies

As the air is constantly extracted this reduces dust levels and with the filtered fresh air entering the home this can help with asthma and hay fever sufferers and will help with other respiratory conditions.

2. Illness

With controlled air movement and humidity levels this can reduce the chances of catching common illnesses, indeed when you are unfortunate enough to be ill it can help speed up your recovery.

3. Sleep

Fresh clean filtered air, a room never too hot or cold at the correct humidity creates the perfect environment for a resting body and will improve sleep patterns.

4. Concentration

Fresh clean filtered air, a room never too hot or cold at the correct humidity will enable the mind to concentrate for longer and to a higher level.

5. Humidity

Correct humidity is vital for the health of the occupants in the home, with controlled air movement, working with a gentle non aggressive heating and cooling system we can ensure the home is never too damp or too dry helping all the above points.

6. More energy

Controlling the environment as well as doing all the above will lessen everyone's dehydration levels helping the occupant stay hydrated, as well as stopping sticky eyes and dry mouths etc, reducing the possible dehydration is also vital for serious and professional sports men and women.



7. Feel less lethargic

With the body fully hydrated with perfect room temperatures and constantly fed with fresh, clean filtered air, it will make you feel vigorous and less lethargic.

8. Security

As the windows never need to be opened for fresh air to enter the house, it is more secure when there is no one at home, or is a safer place when people are at home.

9. Dust removal

With the constant controlled air movement the dust can be reduced by over 80% reducing cleaning, less dust also means less dust mites, which benefits asthma sufferers.

10. Fresh clothes

With built in wardrobes a little controlled air flow will make them smell and feel fresh and clean.

11. Fragrance

A single air freshener can make the whole home smell fresh, not just a single room.

12. Furniture

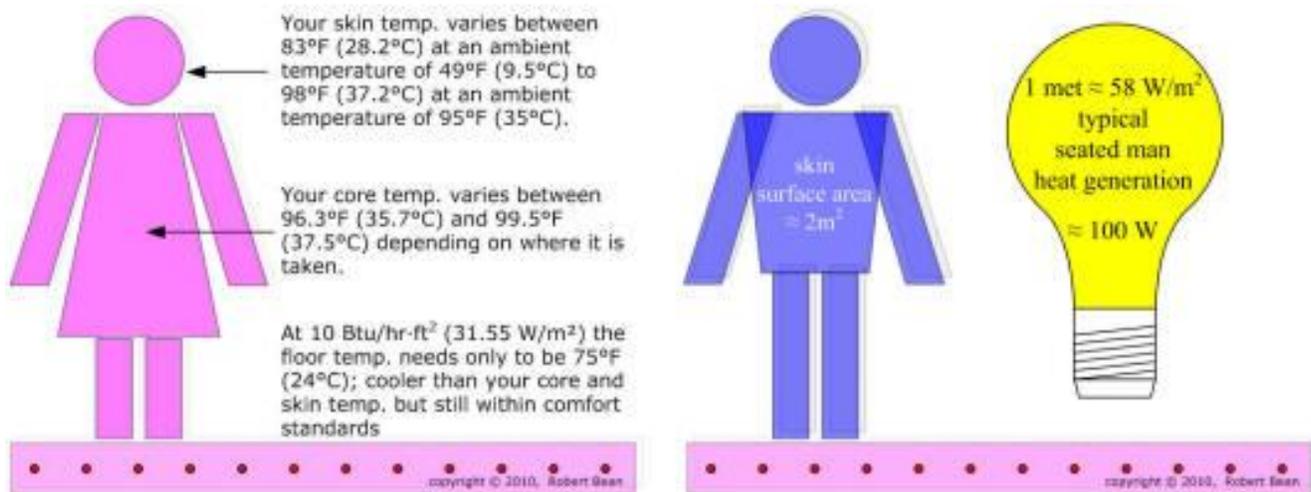
The correct environment is essential for the longevity and appearance of quality furniture.



A Simple Guide to Personal Thermal Comfort

Thermal comfort is a very subjective feeling affected by the physical laws of heat transfer. While we cannot strictly define what exact combination of environmental factors will produce comfort for all, we can define what the major contributing factors are and act to alter their influences.

The human body contains two sets of heat-sensing organs in the skin. One senses the outflow of heat from the body to objects of lower temperature. These sensors lie close to the skin's surface, concentrating in the fingertips, nose and bends of the elbow. The other set of sensors responds to the inflow of heat to the body. They lie deeper in the skin and are concentrated in the chest, upper lip, chin, nose and forehead. Both sets of sensors trigger body responses which control blood circulation through the skin.



Properly designed radiant floors in high performance homes using low VOC flooring such as tile, slate, concrete etc., often use fluid temperatures of less than 90°F (32°C) – that means the blood in your body is hotter than the water in the pipes.

The human body has its own source of thermal heating through metabolic activity and is able to adapt to a wide range of environmental conditions. The body's thermostat is located in the hypothalamus, a gland at the base of the brain just above the pituitary gland. This thermostat, set close to 98.6°F (37°C), monitors changes in blood temperature caused by thermal conditions within the body and the change of temperature across the skin. When the hypothalamus detects a body temperature less than the set point, it initiates physiological responses to increase the temperature. A warmer body temperature causes responses which act to decrease body temperature. In this way, the body attempts to maintain its thermal equilibrium or heat balance, resulting in thermal comfort.

While the body's ability to acclimatize to ambient temperatures is fairly flexible when in a good state of health, a person's thermal comfort is also dependent upon psychological factors and conditioning. If you are not used to or cannot produce a high indoor temperature, you do not expect it and therefore can acclimatize to a lower indoor temperature. Psychological and social conditions also effects how people perceive their alternatives to thermal discomfort, especially clothing.

Thermal Comfort Factors

Thermal equilibrium and its resulting thermal comfort are achieved by physiological and behavioral responses to the heat produced by the body and the amount of heat gained or lost to the environment. The five factors important to achieving this equilibrium are: body metabolic activity, conduction, convection, radiation and evaporative exchange.

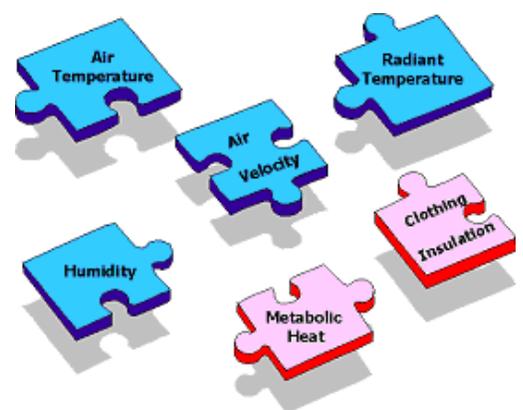
Body Metabolic Activity: The cereal you ate for breakfast, the sandwich for lunch, the pasta for dinner, all are turned into energy for growth, tissue regeneration and the operation of your body and its physical activity. These are metabolic processes which have an efficiency of only about 20 percent, the remaining 80 percent is converted into heat, most of which is rejected by the body to maintain the equilibrium temperature. The rate of metabolic heat production is primarily controlled by the rate of body activity. In general, the more physically active, the higher the metabolic rate. Other factors which influence an individual's metabolic rate include: body weight, sex, age and state of health.

To maintain thermal comfort, we must balance the heat generated by metabolism with the heat lost to or gained from the environment. Heat is primarily transferred away from the body by one of four methods: conduction, convection, radiation or evaporative cooling. Conduction: Conduction moves heat energy through a substance by transfer between molecules or atoms. Conduction of heat is analogous to transportation by land. It can be slow and its speed depends on the medium of transport. Air is a poor conductor of heat, transporting it slowly — like walking. Metals are the best conductors, transferring heat like a fast car or train. A heating pad or hot water bottle heats by conduction. We lose or gain heat by conduction when we are in direct contact with an object.

Convection: Convection moves energy by the movement of molecules or atoms in a fluid, i.e. a gas or liquid. It is analogous to movement by flight. In convective cooling, the fluid in contact with the object first gains heat by conduction, radiation or evaporation and then removes it from the site by fluid motion. The heat transfer rate varies with the medium in which the object is present. Generally, the more rapid the movement of the medium, e.g., a strong wind or water current, the greater the rate of heat loss. Convective heat loss is the process behind the wind-chill factor so common in cold season weather forecasts.

Radiation: Radiation moves energy by electromagnetic waves whose closest transportation analogy would be a Star Trek-type transporter beam. Objects exchanging heat energy through radiation need not be in contact but simply in sight of one another. All objects lose heat energy through radiation at a rate proportional to their temperature, some more efficiently than others. A heat lamp uses radiation as its primary method of heat transfer, and, of course, the sun heats us by radiant energy.

Evaporative Heat Loss: When liquid water evaporates from a surface, heat is required to change the water from the liquid to a gaseous state. This heat usually comes at the expense of the surface on which the liquid was present. The human body uses evaporation as a major cooling mechanism in hot environments. Perspiration is the most obvious form of evaporative heat loss from the body, but the lungs and respiratory passages continually lose heat through evaporative cooling. Evaporative heat loss is greatest in hot, dry environments.



Describing the Indoor Environment

Our homes, whether a house or some form of apartment, lose heat mostly through conduction, convection, and radiation. We attempt to maintain them, or specific rooms within them, at an ideal temperature for our bodily comfort which varies with room usage, our level of activity and personal preferences. Heat is usually added to our home by some form of heating device fuelled directly or indirectly by electricity, gas, oil, or wood — the building equivalent to metabolism.

Four factors can be used to describe the indoor environment relative to thermal comfort: air temperature, mean radiant temperature, air movement and relative humidity. Air velocity and relative humidity are more important during the warm season when we are trying to increase the rate of heat loss from our bodies.



Air temperature is the usual defining parameter most people think of in conjunction with thermal comfort. Air temperature directly effects convective and evaporative heat loss and indirectly affects conductive heat loss through its influence on the surface temperature of objects in a room.

Less known but equally important is **mean radiant temperature**. As mentioned earlier, all objects emit radiant energy at a level proportional to their temperature. Thus, when we are in a room, we radiate out to all surfaces and objects and they radiate back. The mean radiant temperature is a measure of the radiative effects arising in a room from all objects and surfaces. Large cold surfaces such as cold walls or windows can greatly reduce the mean radiant temperature of a room, causing significant thermal discomfort. For example, a poorly insulated home has cold interior walls, and bodies within its rooms continually lose heat to these cold surfaces. To compensate, room air temperature must be raised significantly, even as high as 27°C (80°F), before occupants feel comfortable.

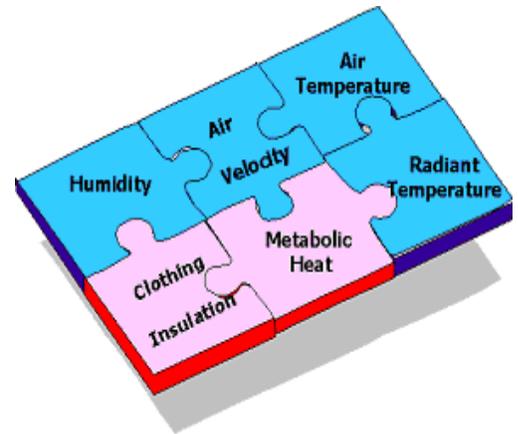
Relative humidity is another often neglected indicator of comfort, especially in the warm season when high humidity reduces the rate of evaporative cooling from the skin and lungs. In most homes, especially those heated by forced-air systems, the cold season is characterized by dry air conditions unless moisture is added through humidification. Low humidity may cause physical discomfort by drying skin, nasal passages and eyes. By adding moisture to the indoor air in winter, we can reduce the discomforting effects of relative humidity and raise the degree of thermal comfort. The effects of

low humidity are most notable when stepping from a bath or shower. If the air is very dry, we will quickly feel the chilling effect of evaporative cooling. Higher humidity in the bathroom will reduce this effect.

Air movement is again not as important in the cold season when windows and door are closed and fans not generally used for cooling. Higher air movement increases the rate of convective cooling when air blows across the body, what we term in the cold season as feeling drafty.

Some level of air movement is, of course, necessary to remove excess moisture and odours, a process termed ventilation. In a well-designed home, the ventilation is optimized to provide the maximum freshness to the interior air with the minimum loss of heated air to the outside.

In contrast, air infiltration is the unwanted flow of air from the cold outdoors into the building through various cracks and openings in the house's exterior shell. The greatest air infiltration generally occurs around window and door frames and can be eliminated by caulking and weather stripping. Air infiltration is greatest when the wind is strongest with maximum entry on the windward side of the building.



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Put a smile on your face!..

***“It is not the strongest of the species that survives,
nor the most intelligent,
but the one most responsive to change”***

Charles Darwin



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