# BUILDING & ENERGY SERVICES OFFERED

**Design Phase Services**

Building envelope strategic review - Design critique with focus on local environment and energy use of home or commercial/industrial building.

Heat loss/gain calculation and modeling

Renewable electrical energy system design, engineering and permit drawings if needed (solar or wind)

Renewable thermal energy systems design and integration into building and processes

Provide guidance for reaching Net Zero build

**Drawings and for Permit Services**

Mechanical drawing services, to stamped permit drawings

Foundation drawings, with structural engineering stamp

Electrical system design and drawings, with engineering stamp

HVAC design (Forced Air and/or Hydronic) Permit ready.

**Build Quality Control Services**

Blower door testing services

Infrared camera thermal imaging services

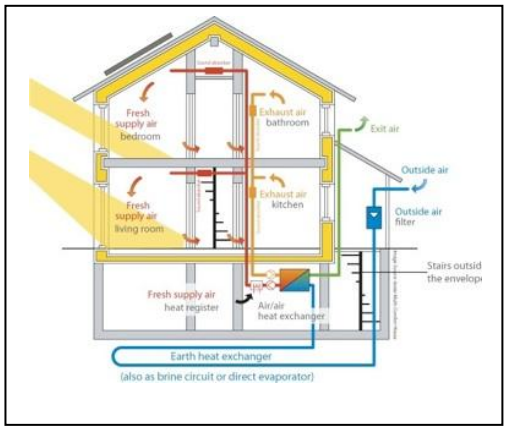
**Equipment Supply**

Supply hydronic on-demand heating, solar thermal and piping system

Supply all solar electric turnkey packages to attain Net Zero.

Supply full R50 building system components to contractors/builders.

**Building envelope strategic review**




Modern homes are built in compliance with the applicable Building Code. The Building Code represents a minimum standard relative to the components, subsystems and method used to construct the building. Builders endeavour to create more efficient structures by incorporating new products and methods directed at perceived structural deficiencies. This approach tends to be haphazard and the performance results are not generally cost effective.

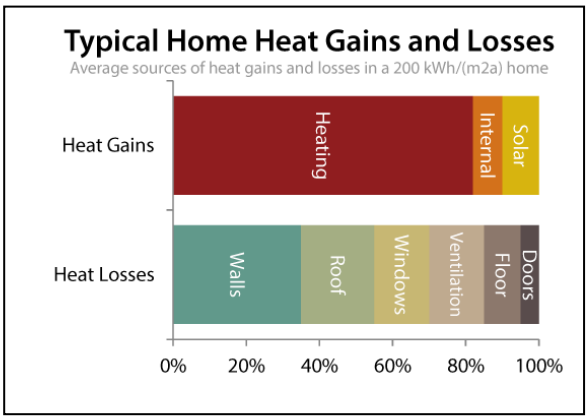
The more effective approach is a comprehensive review of the entire building system. An in-depth review of the building envelope using critical techniques to identify any of the three methods of thermal energy transfer. Conduction - traveling through a material, Convection - transferring of heat from one place to another by the movement of fluid (air usually), Radiation – Heating/Cooling by radiant energy. For example: energy gained from the sun during the day and lost to space at night.

How do the components/products utilized in the build fit together, do they create an effective thermal barrier? Are the methods consistent with healthy living? Are the movement of humidity and energy through the envelope controlled effectively?. Windows are one example of a build element that requires critical review The “right” window is chosen on the basis of function, performance and value. In many cases, the all-important thermal performance of the window frame is lost to exotic coatings and claimed thermal enhancement of glazing. This process is repeated to varying degrees throughout all the building materials and methods.

We produce a listed review of the elements and what to expect of the performance. We are reviewing the build design to find the best technology for your building, not just the ones that meet building code. Also, the review is set to encourage a cost benefit of each suggested critical element. Then the owner can decide if the expense is worthwhile.

This review will provide you with a clear understanding of what each building element is delivering based on energy cost savings and longevity, and therefore operating costs of your home. This discussion happens at the time when changes are possible and cheaply made to the design.

**Heat loss/gain calculation and modeling**




This service takes your building CAD files and enters them into a simulation software for calculating the thermal requirements and reactions of your home. This is needed to properly size and design your heating, air conditioning and air ventilation systems (HVAC). The resulting design and calculations provided, fulfil requirements of your building permit application. We then use all the simulation data to create 'best fit' solutions for your HVAC system.

Traditionally the HVAC designer will not review the best fit technology for your home. They will only suggest and provide a “distribution” system that meets you requirement by code. They do not compare various energy sources that may be available at your location, PV (Photovoltaic), natural gas, propane, heat pumps (air/ground source), Solar thermal, etc. In most cases, a combination of the technologies will have the potential to dramatically lower your long term energy bills.

We take that simulation information and create multiple suggested systems by providing you with financial analysis over 20 year life cycle of ownership. This enables you to make informed decisions based on overall life costs of your home. Over 70% of your energy expense is attributed to Space Heat/Air Conditioning and Domestic Hot Water. We provide you with viable options to reduce these ongoing operating costs and facilitate you making an informed decision.

**Renewable electrical energy system design (solar or wind)**

Renewable energy sources are now becoming commonplace. In order to properly leverage their value in your home, we will provide you with a 20 year cost of ownership simulation. With over 20 years in renewable energy system design and installation, we will ensure that the system design takes into account all of the environmental variables your site and home design has.

Using renewable generation means a source of power when the grid is down and a high level of safety and security for your family. We will discuss various system options. Basic systems, just used to offset some of your power consumed and lower your bills. Backup systems, that offset power from the grid and provide backup power in case of grid failure. Then full off-grid systems that mean little or no yearly expense once installed and no grid hook up.

These systems are an integral part of reaching the Net Zero energy target for your home.

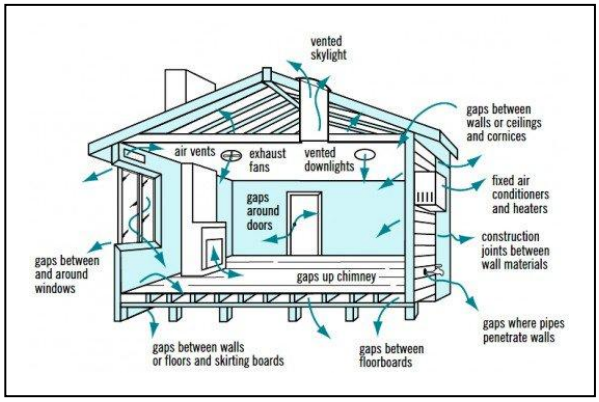
**Renewable thermal energy systems**

The most efficient use of sun energy is to produce heat. These solar thermal systems can easily produce all the hot water needed for domestic daily use. We will also explore using solar hot water to heat your pool, or hot tub to reduce the energy needed by those items. The final use of solar thermal would be to supplement your heating for the home.

Normally the final installation produces heat for as many of the home functions as possible. This means you produce pool heat for the spring and fall, hot water during summer, and then produce part of the heat for the home during the winter. That way your investment in solar thermal is best utilized and gives the best return on investment.

These systems are also an integral part of reaching the Net Zero energy target for your home.

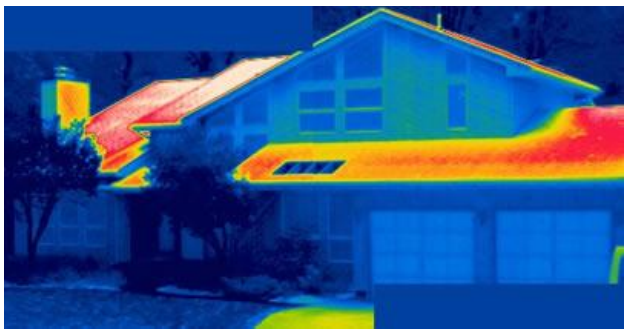
**Blower Door Testing of Envelope**




Blower Door equipment is utilized to conduct objective testing of the building envelope for air tightness. This comprehensive test confirms proper build practises during construction. Normally there would be 2 blower door tests completed during the build process. The first test is run when the building envelope including windows, and doors and there is no exterior or drywall finishes installed. This provides the baseline for the home. The second is done upon completion of the exterior and interior. This allows the discovery of any issues created by installation of equipment. The impact to build is that you get the observation of your actual Air Changes per Hour (ACH) measurement. The lower the air changes the less operating cost to the owner for energy to heat or cool the building. Building code minimums do not provide a good baseline for an Net Zero or truly low energy cost home. The target should be to reduce ACH to below the required fresh air requirement of 2.5 ACH by building code. If the building leaks are below 2.5 ACH (Targets should be <1.0) then you are truly controlling as much of the air changes through your HRV (Heat Recovery Ventilation unit) and recovering the energy from that air that you just heated or cooled. The HRV takes the heat/cool from the air it is exhausting and puts it into the air it is bringing into the home, therefore saving you energy dollars. If the house is leaking by itself, then none of the energy is captured and you have to re-heat or cool that air again. Costing you money.

We also use the final blower door test to complete the ACH (Air Changes per Hour) official testing for building permit sign off. This service is required anyway and we include it in the price.

**Infrared Thermal Imaging testing of envelope**



The use of a very sophisticated thermal camera to capture heat/cool (energy) loss from your building's envelope. This test allows us to find all the places where there is "thermal bridging" occurring in the walls/foundation/roof. These are areas that may have had insulation missed, or other thermal elements removed/missed. For example if you have a steel beam that is only covered by drywall on the inside and siding on the outside, it will be radiating heat/cool through your wall 24 hrs a day. Heat/cool that cost you energy to produce or to compensate for.

We perform the image service once when all the windows and doors are installed and the envelope is considered closed in. This shows many areas that can be addressed immediately and with little or no cost for access.

The second image would normally be performed upon completion and used to verify the building is performing as expected.

Other items that are found using thermal imaging are water leaks inside walls, door seals, window seals, heating system performance issues and roofing issues.

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This menu of services allows the home owner or builder to pick and chose the services most needed to compliment their existing skills. Each service will have a cost based on home size and scope of work. Please contact us today to begin your journey to a low cost Net Zero home or business. **<link to contact form>**