

# CASE STUDY: THE PASSIVE HOUSE

ALL RENOVATION'S PARK SLOPE (BROOKLYN) PASSIVE HOUSE PROJECT



**Diagnostic Tools**  
Testing the airtightness of a home using a special fan called a blower door can help to ensure that air sealing work is effective. Often, energy efficiency incentive programs, such as the DOE/EPA Energy Star Program, require a blower door test (usually performed in less than an hour) to confirm the tightness of the house.

Labels in diagram: Exterior door frame, Temporary covering, Adjustable frame, Air pressure gauge, Fan.



### WHAT IS A PASSIVE HOUSE?

Passive home building is about installing features that regulate the building's interior temperature, without requiring active energy systems, such as heaters. Sealing the interior tight is key, features such as triple-thick walls, insulated, tightly-fitting double pane glass with reflective coating, and insulated floors. The orientation of the house itself helps as well, with windows that are shaded from the sun's natural arc during summer months, but more exposed to sunlight during winter months. The "heart" is the heat exchanger, which sucks outside air into the house, and warms it using inside air. It's incredibly effective: Passive houses require no central heating. Though passive homes are estimated to cost perhaps 15% more to build than regular homes, their energy costs can easily be a whopping 85% lower.

### ABOUT THE PARK SLOPE (BROOKLYN) PASSIVE HOUSE PROJECT

This 4 story house was originally configured as a two-family residence with a garden-level apartment and an owner's upper floor triplex over a simplex (3 stories over 1), including a full cellar. The dimensions of the building are 21' x 45' and the lot size is 21' x 100'. The main parlor floor has 10' 9" ceilings.

### PICTURE DETAILS OF THE PASSIVE HOUSE SCOPE OF WORK

1. The Park Slope (Brooklyn) Browstone Passive House. 2. Interior wall framing & plumbing. 3. Electrical box / switch cover (siliconed to create a gasket seal to wall board to reduce energy loss). 4. Cellar floors and walls show continuous spray foam from below slab to ceiling in perimeter walls. 5. & 6. Front facade master bedroom before/after the spray foam insulation. 7. Rear extension out of home envelope. 8. Energy recovery system located in basement (cellar) and one unit on top floor. You can view more pictures of this project at [www.allrenovationllc.com](http://www.allrenovationllc.com).

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WHY YOU SHOULD CONSIDER A

# ENERGY EFFICIENT HOME RENOVATION

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SAVES MONEY

# AN ENERGY EFFICIENT HOME (EEH) RENOVATION DOESN'T COST IT PAYS!



## WHY WE RECOMMEND A ENERGY EFFICIENT HOME (EEH) RENOVATION

Every year, millions of people decide to renovate their homes. Most renovations have the same goal — to make homes more functional, more secure, more comfortable and more enjoyable.

Over the past two decades, architects, engineers, designers and builders have made tremendous improvements in designing, building, and renovating homes. New homes today are far more energy-efficient and comfortable than in the past. All Renovation recognizes the importance of clean, fresh air indoors and of keeping chemicals and other pollutants to a minimum. We have learned how to build and renovate homes by using fewer natural resources and reducing the negative impact of housing on the environment.

This brochure represents our core beliefs in building and renovating with a GREEN perspective. Let us demonstrate how a house of any age can be turned into a healthy, comfortable and energy-efficient home today.

CONSIDER A ENERGY RECOVERY VENTILATION SYSTEM IF YOU ARE PLANNING A FULL GUT RENOVATION. ENERGY RECOVERY VENTILATION SYSTEMS PROVIDE A CONTROLLED WAY OF VENTILATING A HOME WHILE MINIMIZING ENERGY LOSS. THEY REDUCE THE COSTS OF HEATING VENTILATED AIR IN THE WINTER BY TRANSFERRING HEAT FROM THE WARM INSIDE AIR BEING EXHAUSTED TO THE FRESH (BUT COLD) SUPPLY AIR. IN THE SUMMER, THE INSIDE AIR COOLS THE WARMER SUPPLY AIR TO REDUCE VENTILATION COOLING COSTS.

## STEPS FOR PLANNING EEH RENOVATION

### PRE-RENOVATION INSPECTION

Goals: Determine the condition of the home and set priorities.

- \* Homeowner inspection
- \* Renovator inspection
- \* Building inspection by certified home inspector
- \* Energy assessment
- \* Environmental assessment
- \* Equipment inspection: heating, cooling, ventilation, hot water, etc.
- \* Electrical/fire inspection

### KITCHEN / BATHROOM

Goals: Save water and energy. Improve air quality. Think recycling.

- \* Restricted-flow taps (aerator)
- \* Low-flow toilet, showerhead and faucets
- \* Low-maintenance, durable, non-slip flooring (tile, linoleum)
- \* Energy-efficient windows, doors and skylights
- \* Energy-efficient appliances
- \* Energy-efficient lighting
- \* Low-maintenance, durable flooring (tile, linoleum, hardwood, ceramic)
- \* Low-emission cabinets (hardwood, sealed particle board)
- \* Low-emission countertop (solid surface, laminates)
- \* Low- or no-VOC paints
- \* Low-emission cements, grouts and caulking
- \* Range hood vented to the outside
- \* Area/whole-house ventilation
- \* Built-in recycling centre
- \* High-efficiency exhaust fans

### LIVING, DINING AND BEDROOM AREAS

Goals: Save energy. Improve the air quality and reduce dust.

Be resource-efficient. Think low maintenance. Increase comfort.

- \* Energy-efficient windows and exterior doors
- \* Programmable thermostats
- \* Energy-efficient lighting
- \* Area lighting
- \* Automatic timers and dimmer switches
- \* Low-emission, easy-maintenance flooring (hardwood, cork, marble, ceramic)
- \* Carpeting and area rugs from natural or recycled material
- \* Low-emission trim and mouldings
- \* Low-emission solid wood doors
- \* Low- or no-VOC paints and varnishes
- \* Low-emission cements, grouts and caulking
- \* Low-emission furniture and drapery (hardwood frames, natural fabrics)

### Making the Right Choice is Sometimes a Matter of Trade-Offs.

For instance, smooth flooring is easier to keep clean than carpeting and less prone to harbouring mold and dust. However, each type of flooring offers a different mix of benefits and drawbacks. Pre-finished hardwood has low offgassing, but a higher price. Cork, at a comparable cost, is harvested from a fast-growing renewable resource, but is still relatively unknown. Synthetic flooring may release more chemicals into the air, but is easier to clean and wears well.

### MECHANICAL ROOM / ATTIC

Goals: Save energy. Control air quality. Minimize water contaminants.

- \* Energy-efficient, sealed-combustion and correctly sized heating equipment
- \* Energy-efficient hot water tank
- \* Energy-efficient furnace fan motor
- \* Separate, direct air supply for equipment
- \* Insulated hot water pipes and Non-lead pipes
- \* Air filtration and humidification/dehumidification
- \* Whole-house ventilation system (heat recovery ventilator)
- \* Effective, balanced, sealed ductwork or distribution system
- \* Water purification system
- \* Central vacuum exhausted outdoors
- \* Upgraded insulation
- \* Air sealing and vapor barrier
- \* Weather stripping and insulating attic hatch
- \* Ventilation

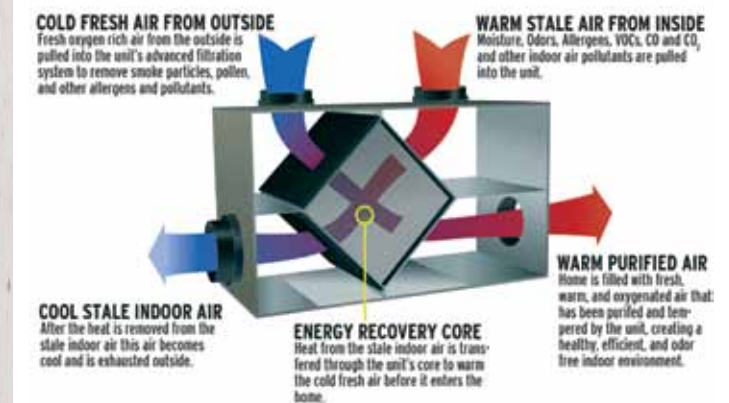
### BASEMENT

Goals: Control moisture and air quality. Eliminate mold. Save energy.

Think comfort if basement is living space.

- \* Determine and deal with sources of mold (repair, replacement, etc.)
- \* Mold treatment with warm water and detergent
- \* Air and moisture sealing of walls
- \* Moisture and soil gas sealing of floors
- \* Upgraded insulation
- \* Ventilation
- \* Reduce concrete floor dust with water-based wax sealer
- \* Energy-efficient lighting
- \* Natural light with high-performance windows
- \* Low-emission finishing materials
- \* Low-emission cements, grouts and caulking
- \* Range hood vented to the outside
- \* Area/whole-house ventilation
- \* Built-in recycling centre

### ENERGY RECOVERY VENTILATION SYSTEM



### ESTIMATED AVERAGE MONTHLY ENERGY COSTS

