

KINGSTON TECHNOLOGIES, INC.

SUBJECT: Passive and Active Solar House with Thermal Mass for Heat Storage and Cooling for the Summer Months. The mass stores the sun's energy starting in August till early winter storing enough energy to provide radiant mass heat through the winter with the occasional intermittent winter sun. By Spring time, the mass has lost most of its energy and has cooled sufficiently to keep the house cool for the summer months with cupola venting if necessary. The house is designed as a sealed enclosure developing a controlled internal ECO system with material selection and HRV for providing a health living space while respecting the environment yet providing a level of comfort and luxury not available in a conventional structure.

LOCATION: Hunt Road, Kingston, New Hampshire on 12.5 acres

CONSTRUCTION STATUS: Started July 2000 and moved in 14 months later as a purely passive structure. The passive performance was confirmed for the last two winters and summer months. The active portion is now nearly completed which includes a Sunda (16 tube) HWC for domestic and radiant floor heating with 7500 cubic feet of thermal mass storage below the solarium floor. All the circulator pumps are SID and powered by a 50 Watt Evergreen PV panel.

ARCHITECTURAL STYLE: A mix of contemporary, Mediterranean and Frank Lloyd Wright.

LIVING SPACE: As you enter the front door, the west third of the main floor is the private area made up of a master bedroom on the south side, a central master bathroom with closet dressing room and a library on the north side. Directly facing the main front door is a large sitting room on the north side with a south facing 700 square foot glass enclosed solarium with gas fireplace with access by two French doors from the sitting room and the family room on the east side. On the left of the sitting room is a large open area which is comprised of the kitchen with island on the north side, dining area in the center and a family area with corner gas fireplace on the south side. Off the kitchen is a pantry and a hall way leading to a two car garage. Off the hall way is a half bath with laundry room. Above the master bath and library is a loft office which is accessed by a floating stairs case and walk way overhang to a spiral stair case to 100 square foot working cupola. Directly below the stairs leading to loft is a set of stairs leading to the lower living area. At the bottom of the stairs is a sitting area and two large guest bedrooms on the north and south side with a full bath adjoining both bedrooms. Off the sitting room is an exercise room with an adjoining large storage closet and a wine cellar. Adjacent to the storage area is full work shop and a utility room below the main level hall way. The utility room houses all the mechanical and electrical for the entire house with the exception of the radiant floor manifolds which are mounted directly on the solarium wall thermal mass. The main upper level is approximately 3220 square feet including the solarium with a lower level living area of 1100 square feet.

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CONSTRUCTION AND MATERIALS:

The walls, from the footings to the roof are the EPS insulated concrete forms with steel reinforcement. The roof is made up of peralam hip beams and 2 X 12 and 6 inches of sprayed polyurethane foam. The lower level has a 60 mil poly moisture barrier, 4 inches of ridged foam, 6 inch wire mess with PEX tubing and 6 inches of poured concrete with a marble tile surface except the work shop and utility room. The upper level floors are made up of 14 inch engineered beams followed by 6 inch wire mess with PEX tubing and 3 inches of poured concrete (not gypcrete) as standard concrete has better thermal retention properties and the engineered beams were selected to support the weight with no other support. The upper main concrete floor is covered with an 18 inch porcerlen Italian tile and a ceramic tile in the private area and marble in the half bath. Terra coat tiles were chosen for the solarium floor for their emissivity and thermal properties. A synthetic stucco was chosen to cover the out side wall foam and blue board with a medeterain textured stucco for the inside. The foundation footing forms are a French drain inside and outside the walls which also incorporates a radon vent. Main walls have and effective R value of 50 with 67 for the roof. A design target temperature for this house was 68 degrees with a measure inside low temperature during this winter of 64 and a high last summer of 71 degrees in the passive mode only. The active radiant floor system is now functioning and predicted to reduce the maximum temperature difference to approximately 4 degrees.

TO BE COMPLETED:

2.2KW of PV panels and a barn like structure to be erected on the north east side approximately 100 feet from the garage.