

Bristol Trading Post

PROJECT:

Bristol Trading Post
5 Mountain St.
Bristol, VT 05443

PROJECT TEAM:

OWNER:

John Moyers
23 Main ST
Bristol, VT 05443

ARCHITECT:

Keefe and Wesner Architects, PC
135 S. Pleasant St.
Middlebury, VT 05753

BUILDER:

Conner and Buck Builders
16 Main St
Bristol, VT 05443

STRUCTURAL ENGINEER:

Zaremba-Sopko Associates, PLLC

ENERGY CONSULTANT:

Efficiency Vermont

INSULATION CONTRACTOR:

Energy Alternatives

SOLAR HOT WATER AND PHOTOVOLTAIC DESIGN/BUILD:

Vermont Solar Engineering

MECHANICAL:

Champlain Valley Plumbing
and Heating, Inc.

ELECTRICAL:

Peck Electric, Inc

PHOTOGRAPHER:

Susan Teare

PRESENTATION DESIGN:

Jim Burns

PROJECT DESCRIPTION

The Bristol Trading Post, originally constructed in the early 1900's, had been used as a garage and filling station, furniture manufacturing/warehouse and an appliance store. When purchased in 2005 it was in need of a major overhaul. The business plan was to renovate the space in a manner that would save as much of the original/historic building as possible and create new space that would serve the community as an example of adaptive re-use, energy efficient and sustainable construction.



The project was a collaborative effort between the Owner, Architect and Builder. We focused on addressing, through an integrated planning process, recycling and reusing existing materials, optimizing the energy performance and creating quality spaces for the tenants.

Since completion in 2006 the owner has been monitoring the energy use and has compiled 2 years of results to help analyze the building systems implemented.

The design hinged on saving as much of the existing footprint as possible. To do this we needed to remove the roof and 2nd floor walls. Recycle North assisted us with this phase of the project and re-circulated back into the community \$12,000.00 worth of materials.

The building thermal envelope and mechanicals were then addressed as an integrated system. The owner wanted low energy bills, reasonable maintenance costs and to be an energy producer. The design team agreed upon a high performance wall and roof insulation system along with a high efficiency oil fired boiler. We then integrated into the design a solar hot water and a 6kw Photovoltaic Electric system with the ability to add another 6kw in the future. If 6kw more are added to the system it would produce 90% of the buildings in electric energy needs.

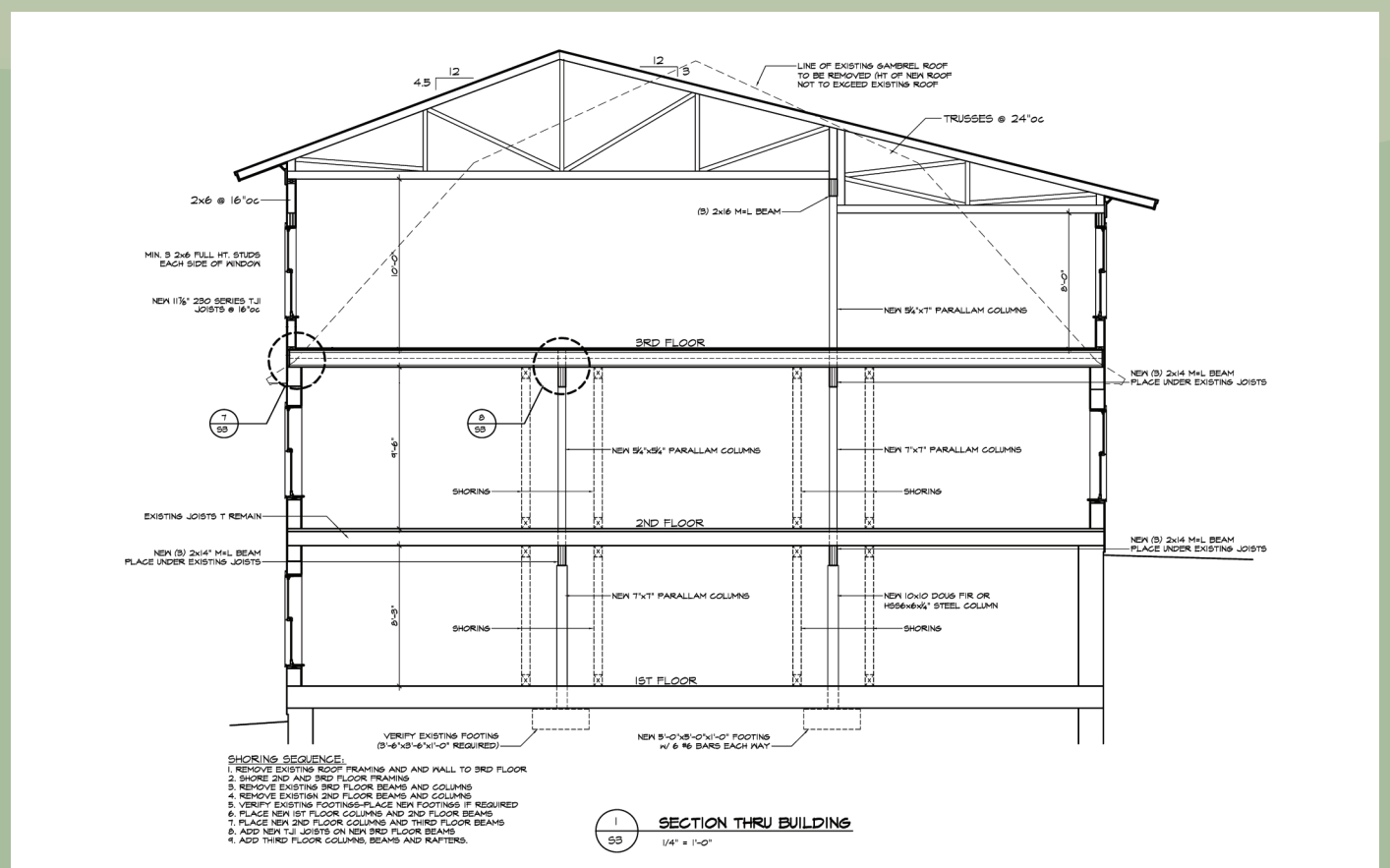
The building was designed to accommodate persons with disabilities and achieve a higher level of privacy between units. Four apartments occupy the upper two floors and the two commercial spaces fill the ground floor. The building entrance to the apartments has been fitted with ADA approved automatic doors. One apartment was designed and built to accommodate a person with disabilities. The other three are ADA compliant. Both commercial spaces are presently being rented by one tenant for a Yoga instruction institute. Along with the thermal envelope, the sound deadening design and installation between floors was integral to the success of this project. Residential and commercial tenants, today, expect a higher level of privacy. This enhances the ability to keep tenants happy and renting longer.

We believe that the "Green and Sustainability Building" movement should be rooted in common sense design with a long term approach to the return on the investment. It needs to apply to existing as well as new buildings, and the design needs to be open to all parties for discussion. The material and systems installed in this project were typical to the building industry. All of the systems had good performance, maintenance and life cycle records. With this approach we feel that we have delivered a durable building that optimizes its energy use.

- Project Completion: November 2006
- 4 apartments and 2 commercial spaces
- 48' x 90' x 3 stories = 12,960 sf
- Project Cost - \$1.4 mil



CONNER & BUCK
DESIGN BUILD CONTRACTORS
www.connerandbuck.com





Deconstruction and salvage operation by Recycle North and Conner and Buck Builders. \$12,000 worth of building materials were reclaimed and recycled back into the community.



BUILDING EFFICIENCY MEASURES INTEGRATED INTO THE PROJECT



Recycle North Deconstruction:

- Reclaimed \$12,000 of Fair Market Value Construction Materials

Saved on site and incorporated into project:

- 1st floor framing, foundation, salvaged beams
- Site sensitivity: saved existing trees surrounding building

Sustainable materials specified in the project:

- Standing seam metal roof
- Corrugated metal siding
- Cement board clapboards
- Metal clad windows
- 7500sf of Cork floor
- 550sf of Bamboo floor
- Vermont Green Slate in all the bath rooms and showers
- Low VOC paints
- 100% sprinkler building
- Cellulose insulation

Thermal Envelope includes:

- Concrete Floors – 2” Rigid insulation under radiant slab R-6
- Between floor Sound Insulation – 12” Dense Packed Cellulose
- All walls – 6” cellulose with 1” rigid R-28
- Attic – 16” cellulose R-50
- Windows/Doors – Marvin Clad U-.29
- Blower door test/air exchange – .19/hour

Heating:

- Boiler: Buderus 215/6 w/ Riello Burner and 2107 Ecomatic Control
- Buderus Non-Electric Wall Heaters Piped in Reverse Feed/Return
- Lux Programable Thermostats
- Insulated all heating/hot water pipes in mechanical room
- Designated make-up air to sealed mechanical room



Plumbing:

- Solar Hot Water System – 96sf of collectors and 120 gallon storage
- Domestic hot water co generated off of boiler
- Toto low flow toilets
- Kept cold water and hot water lines in separate chases

Electrical:

- PV System – 6,600 watt with Utility Intertie
- 50 – Hard wired Compact Florescent Fixtures
- 23 – T -5 Fluorescent Tube lights

Ventilation:

- Airetrack Fan Controls for Bathrooms
- Panasonic Whisper Ceiling Fans with inline dampers
- Source point Kitchen Hood exhaust fans

Appliances

- Energy Star Rated Appliances

Building Energy Star Rating

- Energy Star Rating of 46





PREDICTED BUILDING LOADS vs ACTUAL USAGE

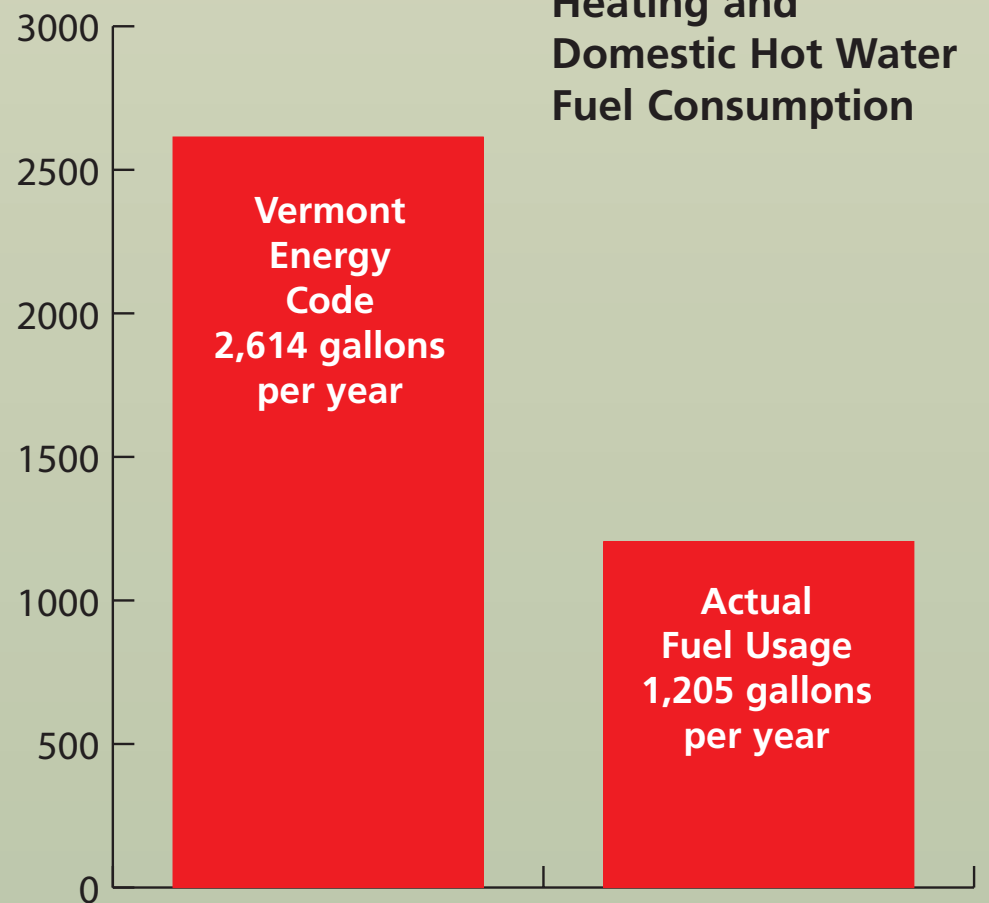
The Heat/Hot Water Load Calculation for this building, abiding by the Vermont Energy Code, generated a 227,346btu/hr load for the building. This would have converted into 2,614 gallons of fuel oil a year. We have an actual fuel oil usage of 1,205 gallons per year (Part of this is being offset by the Solar Hot Water system). We have an actual KWh usage of 16,000KWh per year which about 7,000KWh are being produced by the 6,600 watt Solar PV System.



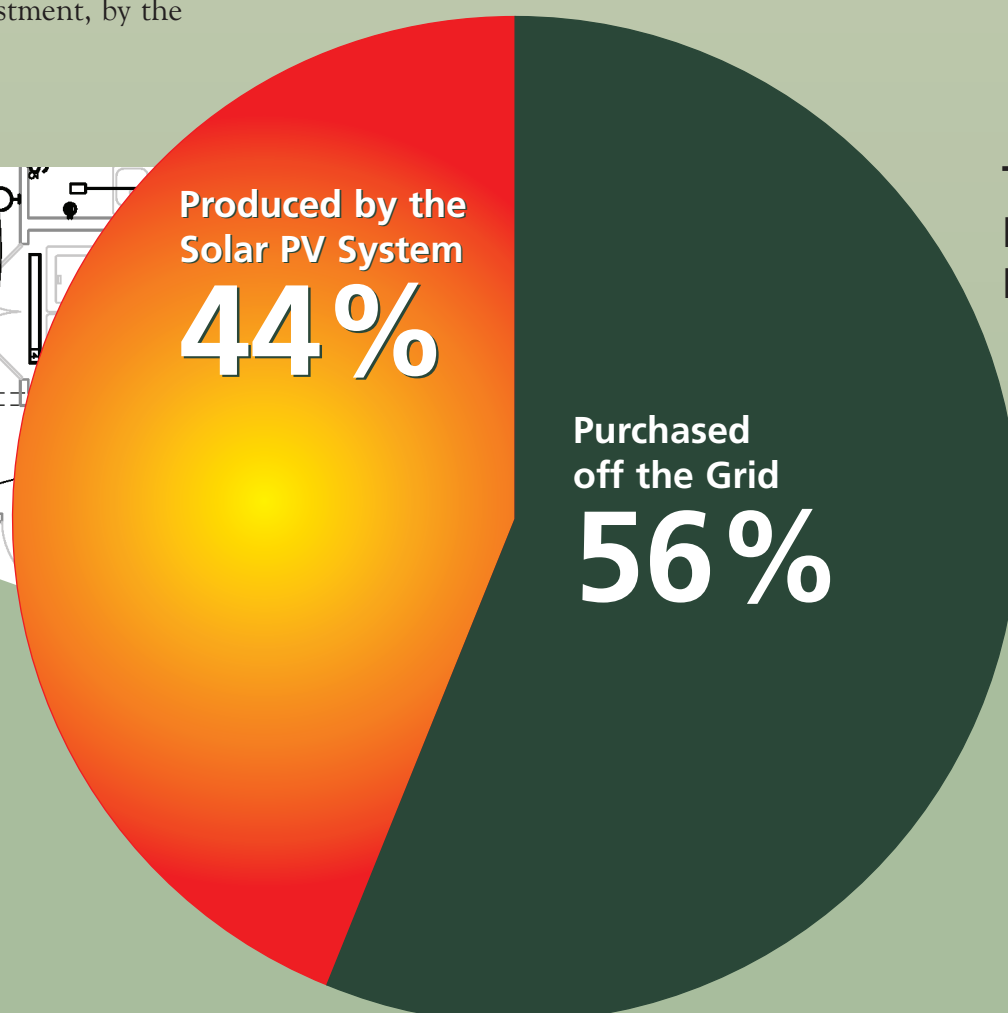
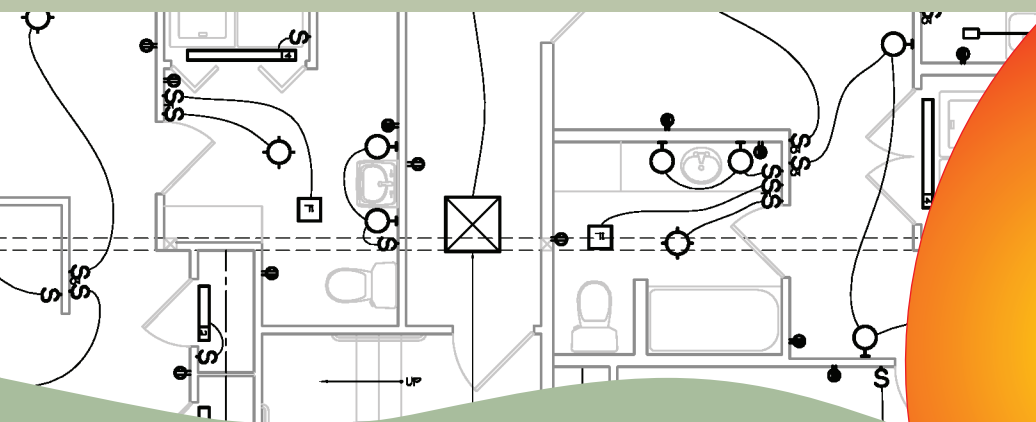
This low fuel oil and KWh usage is a reflection of the attention paid to the building systems by the design team and particularly the contractors involved. At the onset of the design the owner made it clear that he would support any energy saving ideas introduced to the program. Many discussions ensued relating to the thermal envelope, energy production, life-cycling/maintenance of mechanicals and building comfort. Everyone involved was responsible for addressing the building program goals for their specific system. After the design team finished the plans and specifications the contractors moved through the selective demolition/salvage phase on to the construction phase, always emphasizing the importance of the building working as a system.

The fact that the building is both energy efficient and a joy to live and work in supports the program used in the design. The huge savings on the energy load that are being recouped has made this an excellent investment, by the owner, in the property and systems installed.

GALLONS
of Fuel Oil



Total Building Heating and Domestic Hot Water Fuel Consumption



Total Building Electrical Usage Breakdown