



**Shawna Henderson**  
**Bfreehomes Design Ltd.**

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**CEO, Bfreehomes Design Ltd., Glen Haven, Nova Scotia**

**2008-present**

**Principal, Abri Sustainable Design & Consulting, Glen Haven, NS**

**1992 to 2008**

Shawna Henderson has been working in the field of energy-efficiency and housing since 1992, as principal of Abri Sustainable Design. In 2008, she partnered with Hal Richman to start Bfreehomes Design Ltd. Her experience with the R-2000 and EnerGuide for Houses (ecoENERGY) programs, coupled with research carried out for Canada Mortgage and Housing Corporation (CMHC) and Natural Resources Canada, provides the backbone of Bfreehomes consulting services. Bfreehomes recent project for CMHC, *Payback Period for 'Green' Building Features in Single Family Detached Dwellings*, received attention from the highest levels of the organization for its relevance and importance to builders and consumers in Canada.

Shawna has worked with eight to fifteen home design clients each year, on a wide variety of projects: load-bearing straw bale homes, double-wall new construction, standard stick framing and gut rehabs of older houses. In addition, she has designed solar thermal, PV and wind systems for several clients. Shawna has the ability to bring cutting-edge industry knowledge to builders and homeowners in an understandable and informed manner.

In 2007, Shawna served on the Selection Committee for CMHC's EQUilibrium House Initiative. In 2010, she served on the Information Subcommittee for the EnerGuide for Houses Rating System Upgrade. She has presented at many conferences including Nova Scotia's EnerHouse (1999, 2007, 2009); CMHC's first national Affordable Retrofit Conference (2009) and Affordable Comfort Institute's National Conference (2008, 2010). She is currently working with NRCan to develop a transferable presentation for builders on solar thermal space and water heating systems for the pilot project of Local Energy Efficiency Partnership (LEEP) Initiative in London, Ontario.

Ms. Henderson is also a published author of books related to sustainable housing: Deep Energy Retrofits for Cool Climate Houses, Earthscan Publishers (in progress), The Cool Climate Solar Home Design Manual, Earthscan Publishers, 2010; The Canadian Solar Home Design Manual, Solar Nova Scotia, 2009; The Maritime Solar Shelter Manual, Solar Nova Scotia, 1992.

**Examples of Recent Projects**

"Next Generation EnerGuide Rating System – Technical Procedure and Accompanying Training Modules". Natural Resources Canada.

Residential House Real Time Monitoring for Alternative-Renewable Energy". Natural Resources Canada.

"Analyses of Energy Efficient Construction Options to Achieve Net Zero Houses in British Columbia".

"Energy Efficiency Program Evaluation", PEI Office Of Energy Efficiency, Residential Energy Efficiency Programs

**Education**

Sustainable Shelter Technology, Assiniboine Community College, 1994  
Social Ecology and the Built Environment. B.A. program, Goddard College, 1991

**Professional Affiliations**

Heating Refrigeration and Air Conditioning Institute of Canada (HRAI)  
Solar Energy Society of Canada (SESCI)  
Canadian Solar Industries Association (CanSIA)  
Environmental Services Association of NS (ESANS)



**Hal Richman, Ph.D.**

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**COO, Bfreehomes Design Ltd., Glen Haven, Nova Scotia**

**2008-present**

Hal's role in the company is to provide project management services for design, energy consulting and research projects; conduct rigorous financial analysis of energy savings measures, participate in the design and quantitative and qualitative analysis for complex research projects for organizations like NRCan, CMHC and Ontario Power Authority; and provide marketing, business development and operations for the company.

Over the past three years, Hal has become increasingly involved in heat-loss gain calculations, specification of alternative-renewable technologies, management of HVAC procurements for clients, development of Deep Energy Retrofit Roadmaps™ and monitoring of residential energy systems.

In his role as management consultant from 1989-2008, Dr. Hal Richman developed significant experience in all facets of project management, research, analysis and training and development that are now being leveraged by Bfreehomes.

**Examples of Recent Projects**

"Next Generation EnerGuide Rating System – Technical Procedure and Accompanying Training Modules". Natural Resources Canada. Documentation and training for the next Generation EnerGuide Rating System.

"Analyses of Energy Efficient Construction Options to Achieve Net Zero Houses in British Columbia". Natural Resources Canada. Working with builders in British Columbia to determine progressions and cost-optimized methods of reducing space and water loads in new housing through envelope and mechanical improvements/upgrades.

"Energy Efficiency Program Evaluation", PEI Office Of Energy Efficiency, Residential Energy Efficiency Programs. Analysis of cost effectiveness of loan and grant programs for energy efficiency measures in 1800+ houses.

"Residential House Real Time Monitoring for Alternative-Renewable Energy". Natural Resources Canada. Real time monitoring of solar thermal systems in a residential dwelling in New Brunswick.

**Education**

B.A. with High Distinction, University of Rochester, 1968 (Political Science)

Ph.D. in Political Science, University of North Carolina at Chapel Hill, 1976

**Professional Affiliations**

Canadian Association of Management Consultants 1996-2006

Environmental Services Association of NS (ESANS)

## Aaron Caldwell, P. Eng., LEED® AP BD+C

### Manager, Atlantic Canada



- Manager of Enermodal Engineering Atlantic Canada Office
- Provides design assistance and energy efficiency solutions for a wide variety of building types including commercial, industrial, and institutional
- Assists building design teams in all phases of the LEED processes
- Expertise in mechanical design, commissioning, energy analysis and audits, energy efficient technologies for both new and existing building stock

### Sustainable Design Consulting

Projects include the following:

#### Commercial

##### **E'Terra Ecolodge (Tobermory, ON)**

##### **Sustainable design consulting, commissioning**

This environmentally-appropriate ecolodge, located on the Niagara Escarpment, is built from local, natural materials and features a high performance envelope, radiant heating, natural cooling, rainwater harvesting, wastewater bio-filtration, and solar water heating. LEED Gold certified by the CaGBC.

#### Institutional

##### **Glengarda Education Centre (Windsor, ON)**

##### **Sustainable mechanical and electrical design**

Reusing only the shell of an existing laundry facility, new plumbing, HVAC, electrical, fire protection, data, voice and security systems were designed and installed in this new 2,500 m<sup>2</sup> school. Innovative HVAC systems included, ventilation air heat recovery, demand controlled ventilation, hydronic heating with cascading water temperatures running from high temperature reheat coil loads through four stages ending with the radiant heated and cooled floors. The design achieved 65% energy savings and 64% cost savings.

##### **École secondaire Jeunes sans Frontières (Brampton, ON)**

##### **Fundamental and Best Practice Commissioning**

This secondary school also houses a continuing education training school. The project achieved recognition for a 31% reduction in indoor water use, 24% of building materials comprised of recycled content, and a green building education program. LEED Silver certified.

##### **Kingston Police Headquarters (Kingston, ON)**

##### **Fundamental and Best Practice Commissioning**

This state-of-the-art 10,500 m<sup>2</sup> facility contains administration, police vehicle storage, vehicle maintenance, officer training, court services, offender detention as well as other areas related to daily police activities. Energy consumption for the building is expected

#### Education

1996: B.A.  
History/Physics  
Mount Allison University

2005: B.Eng.  
Mechanical  
Dalhousie University

#### Recognition

Engineers Nova Scotia – Full Member

Green Building Certification Institute - LEED® Accredited Professional

American Society of Heating, Refrigerating & Air-Conditioning Engineers – Member

to be approximately 58% less than the MNECB. A LEED Gold rating was achieved through good design and construction practices, best practice commissioning, and the selection of energy and resource efficient equipment and products.

##### **Hazel McCallion Academic Learning Centre – University of Toronto (Mississauga, ON)**

##### **Fundamental & Best Practice Commissioning, LEED certification**

The 10,300 m<sup>2</sup> library achieved a 54% energy reduction and over 35 LEED Points for a LEED Silver rating. The project incorporates daylighting, low-emitting materials, CO<sub>2</sub> monitoring, construction indoor air quality measures, and construction waste diversion.

### Additional Related Experience

##### **Gerald Schwartz School of Business, St. FX (Antigonish, NS)** **Energy consultant**

Redevelopment of existing building to attain LEED Silver Certification.

##### **Halifax Herald Corporate Headquarters (Halifax, NS)** **Mechanical Design**

Performed tenant fit-up of an existing office tower. Extensive HVAC modifications were required to adapt an open space into a closed office plan. Responsible for all facets of the mechanical design including energy modelling, HVAC and plumbing design and preparation of performance specification for changes to the existing fire protection system.



## Troy Greene, P. Eng., LEED® AP BD+C

### Project Principal, Green Buildings



- Member of Enermodal Green Building Design and Building Commissioning Services Teams
- Seven years of experience in sustainable design facilitation, energy modelling, and technology assessment
- Assists building design teams to reduce energy use and meet sustainable objectives including LEED certification
- Expertise in energy efficient design, energy audits, design and performance of ground source heat pump systems, and wind resource assessments
- Experience in commissioning and performance assessment to ensure buildings function properly and work the way they are designed

## Sustainable Design Consulting and Commissioning

Projects include the following:

### Commercial

#### Stratus Winery (Niagara-on-the-Lake, ON)

##### Fundamental Commissioning

Through process and building system enhancements, the annual energy consumption of this 1,800 m<sup>2</sup> wine production, storage, office, and retail facility was reduced by 45% relative to the MNECB. Key features include wine making process savings, ground source heat pumps, and the extensive use of both recycled and regionally manufactured materials. LEED Silver certified.

#### Region of Waterloo Works Garage (Waterloo, ON)

##### Sustainable design facilitation, LEED certification

This LEED Silver certified 2,100m<sup>2</sup> workshop contains office space with vehicle repair, wash and storage. Employees will enjoy daylight and occupant controlled work spaces. Sustainable features include use of recycled materials and use of potable water for processes and sewage by harvesting rainwater. Landscaped areas will be planted with native and adaptive species eliminating the need for irrigation.

#### Xstrata Office and Dry Complex (Garson, ON)

##### Fundamental and Best Practice Commissioning, Sustainable design facilitation and LEED certification

The Nickel Rim South building is 5,500 m<sup>2</sup> with a sectored program consisting of a two level administrative office, a two level atrium with concourse, dry facilities, operations and staging, and mechanical and electrical workshops. Sustainable features of the LEED Gold certified building include water and energy efficiency measures, recycled, regional and low-emitting materials.

### Residential

#### Corner Brook Long Term Care Facility (Corner Brook, NL)

##### Sustainable design facilitation, LEED certification

The first building within the Province of Newfoundland and Labrador anticipating a LEED Silver rating, this facility will house approximately 200 rooms for patients. Building energy consumption is predicted to be 50% less than that of a conventional building. Key energy saving components include a ground source heat pump system and high performance building envelope.

## Education

1996: B. Eng.  
Mechanical Engineering  
Technical University of Nova Scotia

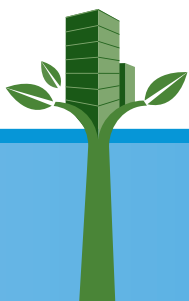
2000: M.A.Sc.  
Mechanical Engineering  
Dalhousie University

## Recognition

Professional Engineers Ontario - Full member

Green Building Certification Institute - LEED® Accredited Professional, Building Design + Construction

American Society of Heating, Refrigerating and Air-Conditioning Engineers - Associate Member



## Residential Continued

### **CFB Gagetown Training Quarters Accommodations (Oromocto, NB)**

#### **Sustainable design facilitation, LEED certification**

Housing 247 units, this LEED Silver certified residence includes base accommodation offices. Sustainable features include an enhanced building envelope, energy efficient mechanical and electrical systems, rainwater catchment system, daylighting to over 90% of the building, and recycled, regional and low VOC building materials.

## Institutional

### **University of Western Ontario Richard Ivey School of Business (London, ON)**

#### **Sustainable design facilitation, LEED certification**

A new quadrangle building totalling 12,700 m<sup>2</sup>, this facility will incorporate various sustainable design features including energy recovery ventilation, low-flow water fixtures, and spaces designed to allow for maximum daylighting along with operable windows. Other features on site include an underground rainwater cistern. Currently in construction, this project is targeting LEED Silver.

### **Upper River Valley Hospital (Waterville, NB)**

#### **Sustainable design facilitation, LEED certification**

This new 18,000 m<sup>2</sup> hospital features an innovative HVAC system that makes extensive use of energy recovery wheels to reclaim heat from warm air exhausted from the building. This facility also includes 100% fresh air ventilation design for the patient rooms, a rainwater cistern for toilet flushing, on-site wastewater treatment, occupancy-controlled lighting, low off-gassing and high-recycled content materials. LEED Silver certified.

### **Nova Scotia Community College- Centre for the Built Environment (Dartmouth, NS)**

#### **Sustainable design facilitation, LEED certification**

Anticipating LEED Silver, this post-secondary institution includes offices, classrooms, labs and construction workshop areas. This 9,700m<sup>2</sup> building features water and energy efficiency measures, low-emitting materials and use of recycled and regional materials.

## Recreational

### **Waterloo Library and YMCA (Waterloo, ON)**

#### **Sustainable design facilitation, LEED certification**

Occupied in the late summer/fall of 2011, a LEED Silver rating is anticipated for the Waterloo YMCA and Library. This 6,100 m<sup>2</sup> combination recreation facility and district branch library features an extensive green roof. Amenities include a pool, fitness area, multipurpose rooms, offices, and a library.

### **Laurentian University Ben Avery Addition (Sudbury, ON)**

#### **Fundamental and Best Practice Commissioning**

Targeting a LEED Silver rating, the facility will house new fitness

centre and recreation space, including a running track with playing courts in the centre, a climbing wall, and an athletic therapy clinic. Early commissioning reviews will be followed by the commissioning of the building's system of this 5,400 m<sup>2</sup> gymnasium addition.

### **Sister Margaret Smith Centre (Thunder Bay, ON)**

#### **Fundamental and Best Practice Commissioning, Sustainable design facilitation and LEED certification**

With residential units, office and administration, plus amenity space, the design and construction of this 4,800 m<sup>2</sup> facility for St. Joseph's Care Group is focused on the integration of energy efficient measures. Key sustainable features include radiant in-floor heating, efficient lighting with occupancy sensors, and the extensive use of recycled and regional materials.

## Technology Assessment

### **Solar-assisted Coffee Drying System (NRCan)**

Designed and installed a monitoring system and subsequently analyzed the energy savings achieved through the use of a solar air-heating system used to preheat air for drying coffee beans.

### **Monitored Performance-Insulated Concrete Forms Multi-Unit Residential Building (CMHC)**

Investigated the thermal performance of ICF wall construction including a) the nominal and effective thermal resistance of the ICF wall component, b) air-tightness of the building envelope, and c) thermal performance of the entire building envelope.

### **Market Potential of Energy-Efficient Commercial Air Handling System (NRCan)**

Produced a market study detailing the potential energy and cost savings arising from the adoption of energy-efficient air handling system in commercial and industrial buildings across Canada.

## Building Research

### **Nova Scotia Community College**

Evaluated energy efficiency measures during the design process for this expansion of four campuses. All facilities achieved the CBIP/IBIP energy efficiency level. Energy concepts included innovative approaches to dealing with trade shop heating and ventilation.

### **St. Mary's General Hospital**

Conducted an energy audit on this 11 storey hospital as part of an extensive renovation project. Energy efficiency upgrades included building envelope, mechanical and electrical systems. Analyzed and modelled these upgrades for a successful application to the Energy Innovators Incentive Program.



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# RICHARD VINSON ~ CREATIVE SOLAR

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Owner, Creative Solar, 63 McQuade Lake Cr., Halifax, NS, B3S 1C4

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## PROFILE

Industry specialist and owner/operator in the solar industry well versed in available technologies, client service, community relations, public education and outreach. A strategic thinker with a successful record in implementing new and innovative initiatives and building on opportunities to improve performance and output of solar systems - noted for the ability to apply technologies that work.

## PRESENT ACTIVITY

- ❖ Promotion, sale and installation of solar technologies, primarily to the residential, greater Halifax market area.
- ❖ Creative Solar unique in its ability to adapt the 'best fit' technology to the application at hand.
- ❖ Solar assessments and reviews based on industry-accepted principles and standards; notable clients for 2011: Bedford Institute of Oceanography, Halifax Regional Municipality
- ❖ Represents and sells systems c/o the following manufacturers: Apricus, Enerworks, Thermal Dynamics, Velux, Techno-Solis, Your Solar Home

## HALIFAX REGIONAL MUNICIPALITY

- ❖ Awarded the solar air contract in 2011 for installations at HRM community centers

## OUTREACH

- ❖ Nova Scotia Technical Educators Association: Presenter and resource person for annual conference, 2010 & 2011 Topic: *Solar Air Heaters*
- ❖ Nova Scotia Association of Realtors: Presenter as part of continuing education programs for members, 2010 & 2011; Topic: *Solar & Home Values*

## MEMBERSHIP

- ❖ Canadian Solar Industries Association, Solar Thermal Caucus, Member
- ❖ Solar Nova Scotia, Chair; Industry Committee, Member
- ❖ Atlantic Canada Green Building Council

## TRAINING

- ❖ Manufacturer certified "Solar Installer" completed for Enerworks, Apricus, Velux, Techno-Solis, Your Solar Home
- ❖ CANSIA "Solar Installer" course, Halifax, November 2010

## OTHER RELEVANT EXPERIENCE

- ❖ U.S. Department Commerce, U.S. Commercial Service: Sector Specialist, Canada – Renewable Industries, 2006-2007
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## **Brennan Vogel**

### **SSG Associate Member**

#### **BES | MA**

Brennan is a climate change, energy and sustainability consultation specialist who excels at facilitating outreach, education and community innovation in sustainability policy and planning with an emphasis on the Nova Scotian context.

#### **Project Experience**

##### **Plan**

- Integrated Community Sustainability Plan, Town of Kentville, NS (2009-10): sustainability coordinator and project manager, utilizing a diversity of consultation techniques and methods including: public outreach and engagement activities and qualitative and quantitative internal review processes.

##### **Strategize**

- Ecology Action Centre, Nova Scotia Sustainable Electricity Alliance, Atlantic Canada Sustainable Energy Coalition, Halifax, NS (2010-11): climate change and energy coordinator, monitoring, researching and shaping critical areas of climate change and energy policy issues in Nova Scotia, such as: renewable electricity opportunities and technologies, energy efficiency and conservation program development and implementation and greenhouse gas reductions from the electricity sector, buildings sector and transportation sector

##### **Engage**

- Over 10 years of public education and outreach experience in various governmental and non-governmental roles, notably including YMCA International, Ontario Parks and Environment Canada

##### **Academic Qualifications**

- Masters of Arts in International Development Studies: Saint Mary's University, Halifax, NS (2010) – *Thesis: Adaptive Capacity & Canadian Development Policy*
- Bachelors of Environmental Studies, Honors Co-Op: University of Waterloo, ON (2003)