



Shawna Henderson, CEO of Bfreehomes, has been working in the field of energy-efficient housing with a focus on 'the house as a system' since 1990. She was first licensed as an R2000 plan evaluator, air tightness tester and site inspector in 1992. She was one of the first accredited EnerGuide for Houses evaluators in the country, working with Sustainable Housing in Nova Scotia to pilot the initial EnerGuide for Houses program. While working with the R2000 program in Nova Scotia (1992 – 2000), she carried out over 800 evaluations, air tightness tests and site evaluations for new houses. In combination with field research on indoor air quality, moisture testing and depressurization levels and the EnerGuide for Houses program, Shawna has carried out more than 2000 blower door tests and EnerGuide for Houses evaluations between 1992 and 2002. Over the past five years, through six applied research projects with CMHC

and NRCan, Shawna has carried out over 3,000 EnerGuide for Houses runs for both new and existing houses, modelling progressive reductions in space and water heating consumption to determine cost-effective measures that approach Net Zero Energy.

Shawna has worked successfully with eight to fifteen home design clients each year since 1992, on such widely varied projects as 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, working with vendors and installers to complete the finer operating details. On each project, Hot2000 is used to model a variety of options to minimize space and water heating loads.

Shawna has the ability to bring cutting-edge industry knowledge from research projects to builders and homeowners in an understandable and informed manner. She has written and illustrated several promotional and educational publications for the energy-efficient building industry, including the manual for The EnviroHome, Nova Scotia's Advanced House (1992). Ms. Henderson is the 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).

In 2010, Shawna participated on the Information Subcommittee of the EnerGuide for Houses Rating Service Upgrade Process. In 2007, she participated on the Selection Committee for CMHC's Equilibrium House Initiative. Shawna has presented at several conferences including CMHC's first annual national Affordable Retrofit Conference (Deep Energy Retrofits, and a panel discussion on how to move from audit to action). She has also presented on deep energy retrofits, energy and community and solar thermal systems at the US Affordable Comfort Institute's national conference in 2008, and presented on the Non-Energy Benefits in Deep Energy Retrofits at the same conference in 2010.

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 Design consulting services. Bfreehomes specializes in guiding homeowners through cost-effective deep energy retrofits and new, low-impact houses.

Selected Relevant Experience:

#### Research/Technical Reports and Studies

- *The Path to Net Zero Energy in New Housing in British Columbia* (NRCan, 2011)
- *Cost-Optimization Study of Construction Options for Net Zero Houses in Nova Scotia* (NRCan, 2010)
- *Payback Period for "Green" Building Features in Single Family Detached Dwellings* (CMHC, 2010)
- *Regional Cost-Optimization Study of Progressively Improving Energy Efficiency Towards Net Zero Houses* (NRCan, 2009)
- *International Survey of Cold-Climate Low Impact Housing and 24 Case Studies* (CMHC, 2008)

- *Review of State of the Art Insulation Materials and Assemblies* (NRCan 2008)
- *Approaching Net Zero Energy in Existing Housing* (CMHC 2008)
- *Solar Ready Homes*, NRCan 2007
- *Review of International Energy Efficiency R&D Initiatives* (NRCan 2007)

#### Recent Consumer-oriented Publications & Presentations

##### Lead Facilitator/Presenter, Focus Groups

- The Path to Net Zero Energy in New Housing in British Columbia (NRCan, 2011)
- New Housing Construction Options Beyond The 2012 Ontario Building Code (Ontario Power Authority, 2010)
- The Path to Net Zero Energy in New Housing in Nova Scotia (NRCan, 2010)
- The Path to Net Zero Energy in New Housing in Southern Ontario (NRCan, 2009)
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##### Presenter:

- Optimizing Solar Thermal Space and Water Heating Systems (NRCan, 2011)
- Non-Energy Benefits of Deep Energy Retrofits (Affordable Comfort Institute, 2010)
- Deep Energy Retrofits: An Overview (Affordable Renovation Conference, CMHC, 2009)
- Panel Discussion on getting from Evaluation to Action in Renovations (CMHC's Affordable Renovation Conference, 2009)
- Solar Thermal Systems: An Overview (Affordable Comfort Institute, 2008)
- Living Off-Grid, As If... (Affordable Comfort Institute, 2008)
- Community and Deep Energy Retrofits (Affordable Comfort Institute, 2008)
- Deep Energy Retrofits (Affordable Comfort Institute, 2008)
- In Hot Water: Solar Thermal Systems in Canada (CanSIA, 2003)

##### Building Science-based Publications for Consumers and Builders

- About Your House Series: Deep Energy Retrofits (NRCan/CMHC 2010)
- Cool Climate Solar Home Design Manual (Earthscan, 2010)
- The Canadian Solar Home Design Manual (Solar Nova Scotia 2009)
- Approaching Net Zero Energy in Existing Housing (CMHC Research Highlight 2008)
- Benchmarking Compact Fluorescent Lights in Residential Usage (CMHC Research Highlight, 2007)
- Evaluation of Modified Air Circulation and Ventilation Practice for Energy Savings and Fuel Switching (CMHC Research Highlight, 2007)
- Drainwater Heat Recovery Performance Testing (CMHC Research Highlight, 2007)
- Identifying and Removing Pollutants from Heat Recovery Ventilators (CMHC Research Highlight, 2005)
- "Renovating for Energy Savings" Series (CMHC, 2004)
- Lennox Island First Nation Demonstration House Guidebook (CMHC, 2003)
- PV on the Grid (CanSIA, 2003)
- Burn it Smart (NRCan, 2003)
- Nova Scotia House (NS Home Builders Association, 1995)
- Passive Solar Home Primer (Solar Nova Scotia, 1994)
- Passive Solar Home Design Video, script (NS Department of Natural Resources)
- The Envirohome, Nova Scotia's Advanced House Project (Clayton Developments/NS Department of Natural Resources/NRCan, 1993)
- Maritime Solar Shelter Manual (Solar Nova Scotia, 1992)

Research projects using Hot2000 simulations for progressive energy reductions in new and existing housing

- The Path to Net Zero: Regional Cost-Optimization of Progressive Energy Reductions in British Columbia (NRCan, 2011)
- Energy Efficiency Loan and Grant Evaluation (Prince Edward Island Office of Energy Efficiency, 2011)
- Payback for Green Building Products (CMHC, 2010)
- New Housing Construction Options Beyond The 2012 Ontario Building Code (Ontario Power Authority, 2010)
- The Path to Net Zero: Regional Cost-Optimization of Progressive Energy Reductions in Nova Scotia (NRCan, 2010)
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- The Path to Net Zero: Regional Cost-Optimization of Progressive Energy Reductions in Southern Ontario (NRCan, 2009)
- Enhanced Total Recovered Cost (TRC) Retrofits (NRCan 2008)
- Approaching Net Zero Energy in Existing Houses (CMHC 2008)
- Greenhouse Gas Reduction Strategies in Suburban Settings: Factor 5 reductions (CMHC 2004)

Research Projects using Hot2000 simulations and air tightness testing

- Monitoring Indoor Air Quality in R2000 houses (SHE Consultants, 2000)
- Energy Use Patterns in Off-Grid Houses (CMHC, 2000)
- Moisture in Straw Bale Housing (SHE Consultants, 1997)
- Contaminants in HRV Systems (SHE Consultants, 1997)