



SUSTAINABLE BUILDINGS AND COMMUNITIES GROUP

CLEAN ENERGY TECHNOLOGIES

HOUSING • BUILDINGS • COMMUNITIES
 DISTRICT HEATING & COOLING • DISTRIBUTED ENERGY
 HVAC & ENERGY SYSTEMS • INTERNATIONAL PROJECTS
 RENEWABLE ENERGY: SOLAR, WIND, & SMALL HYDRO
 SIMULATION RESEARCH & DEVELOPMENT • SOFTWARE & TOOLS



WHO WE ARE

Experts in energy innovations for the built environment, the Sustainable Buildings and Communities (SBC) group is recognized nationally and internationally for its leadership role in the research, development, and deployment of leading-edge energy efficient and renewable energy technologies for new and existing housing, buildings and communities.

With headquarters in Ottawa, Ontario, we are part of the CANMET Energy Technology Centre, which is the research and development branch of Natural Resources Canada.

WHAT WE DO

We accelerate the introduction of innovative energy technologies into the marketplace by collaborating with private sector companies, associations and other government agencies.

The desired outcomes of our work are:

- increased use of renewable energy;
- greater efficiencies in energy consumption;
- decreased greenhouse gas emissions; and
- a secure energy supply for the future.

Active throughout the commercialization cycle, we advance energy technologies through the stages of fundamental research, proof of concept, development, technology demonstrations, and deployment to the marketplace.

Our activities include energy analysis and simulation tools, technology design criteria, testing, rating and monitoring, standards development, field trials and demonstrations, technology transfer and support in technology feasibility and economics.

We work collaboratively with researchers, innovators and early adopters of energy technologies throughout the energy industry. These individuals and organizations may belong to associations, universities, utilities, manufacturers, builders, developers, architects, engineers, the trades, research facilities, simulation modeling and software developers, and all levels of government.

Each partnership arrangement is unique, depending on partner expertise, capacities and funding sources. Priority is given to partnership opportunities related to SBC technology areas.

Corbett Cibinel Architects applied SBC's Integrated Design Process to their award-winning Red River College project in Winnipeg, Manitoba.



Photo Credit: Gerry Kopelow

SMALL HYDRO

We partner with private industry and other government agencies to increase efficiencies and reduce costs of small hydro power plants.

Through research, technology development, and the application of innovative approaches to design optimization and operational procedures, our small hydro experts advance the ecological and environmental benefits associated with small-scale and low head hydro initiatives.

INTEGRATION AND ASSESSMENT

We develop projects that integrate one or more renewable energy technology - wind, hydro, solar, and bioenergy - into larger energy systems, such as storage and hydrogen, to form integrated energy solutions that benefit individuals, small businesses, and communities.

Our experts perform resource assessment, such as hydrological assessment, and public outreach for renewable energy technology. Outreach activities include the support of web sites for CanREN, the International Small Hydro Atlas and the National Wind Atlas for Canada.



Cowley Ridge Castle River wind farm in Alberta.

SOFTWARE, TOOLS AND FACILITIES

Information about our software, tools, and research and test facilities is available at www.sbc.nrcan.gc.ca.

SOLAR

We perform research and development of integrated solar heat and power technology, solar domestic hot water, solar assisted cooling, integrated SOLARWALL and heat recovery systems, simulation tools and large-scale solar seasonal storage and district heating system development.

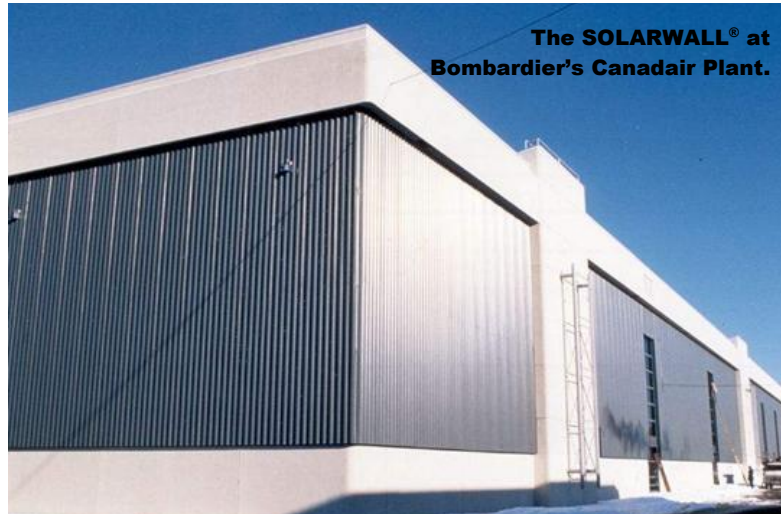
Our designing, testing, rating and monitoring of solar technologies provides industry with accurate and credible information on the energy savings, reliability, safety, environmental impact and costs of emerging systems. We also work to optimize efficiencies of integrated HVAC and renewable energy systems.

WIND

Our wind energy experts partner with industry and other government agencies to develop the Canadian wind energy industry, with a focus on technology development and optimization for the Canadian context.

Our technology focus is on developing wind turbines and components for wind turbines including: generators, blades, nacelles, control systems and inverters.

The SOLARWALL® at Bombardier's Canadair Plant.



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HOUSING

Our projects for new and existing housing includes whole-house design and building envelope systems.

We focus on advanced and integrated space heating, water heating, ventilation and air conditioning systems, combined heat and power systems, and the integration of renewable energy technologies.

Award-winning Mountain Equipment Co-op in Winnipeg, Manitoba, applied SBC's Integrated Design Process.

Photo Credit: Priarie Architects



BUILDINGS

We work closely with the building sector to innovate energy technologies for commercial, institutional and multi-unit residential buildings.

We focus on integrated design process and whole building design, building envelope systems, lighting and daylighting, and heating, ventilation and air conditioning. Integration of renewable energy technologies is also an important factor in our projects.

COMMUNITIES

Our community energy systems group supports municipal stakeholders and developers with the development and implementation of integrated sustainability plans and initiatives.

We accelerate the deployment of innovative technologies and solutions that allow Canadians to live 'green' without sacrificing a modern, urban and mobile lifestyle.

DISTRICT HEATING AND COOLING

Our district heating and cooling experts focus on the use of district energy as an energy management system that calls upon combined heat and power and other renewable heating and cooling systems, such as ground source heat pumps, biomass and solar.

To promote the philosophy of district energy and its role in community energy planning, we develop guidelines for planning and development of community based networks, facilitate outreach and training workshops, and support conferences of synergistic organizations.

DISTRIBUTED ENERGY

Our focus for distributed energy includes:

- microturbine based combined heat and power systems;
- heat-based cooling;
- gas turbine inlet air superchargers;
- distributed power using gas network differential pressure;
- zero emissions direct ammonia fuel cell development;
- residential cogeneration systems; and
- high efficiency cascading thermal photovoltaic and thermal electric systems.



HVAC AND ENERGY SYSTEMS

We work to develop advanced techniques and technologies for highly energy-efficient residential and commercial HVAC and energy systems, including low-emitting combustion processes.

For residential applications, activities involve increasing the real, total energy efficiency of furnaces, boilers and alternative water heaters, space heaters, energy-efficient fireplaces, ventilation systems, air conditioning systems, and optimal heat distribution.

An area of major interest is integrated technologies that provide multiple functions from one energy source, such as ultra-high-efficiency present and next-generation systems combining space heating, water heating and

ventilation. Further integration with electricity generation with such advanced technologies as thermophotovoltaics, fuel cells, stirling engines, micro gas turbines and novel gas lighting concepts is also part of our focus.

For commercial applications, activities are underway to characterize operational conditions, develop appropriate performance test procedures for seasonal efficiency and develop new, high-efficiency equipment, with emphasis on unit and infra-red heaters, rooftops, condensing boilers and combined heat and power systems. Work incorporating renewable energy technologies, such as building integrated photovoltaics, is also underway.

After heating, lighting is the highest energy load in commercial buildings. We therefore work closely with other government departments to advance lighting and daylighting technologies and tools. Innovative gas-fired lighting technologies are also being advanced.



This eKOCOMFORT® integrated mechanical unit combines space heating, water heating, and ventilation.



This energy-efficient home in Scotland is a product of SBC's Super E® House Program
Photo Credit: John Paul Photography

INTERNATIONAL PROJECTS

Our international projects support the Canadian building and renewable energy technology export industries with identifying and adapting products and systems for foreign markets.

We deliver targeted demonstration and deployment programs as well as support Canada's international cooperation obligations by participating in strategic science and technology working groups.

SOFTWARE AND SIMULATION R&D

We develop software and perform building simulation research and development (R&D) for the building industry and to support government programs, to assess the performance of emerging energy technologies, and to assist manufacturers of energy technologies with the optimization, integration and speed-to-market of their innovations.

Our building simulation R&D activities include the development of modelling algorithms, simulation "engines" that perform energy calculations, and validation approaches.

R&D focuses on the integration of advanced technologies with buildings systems, such as renewable energy, distributed generation, and combined heat and power.