

Sustainable Housing & Communities, Solar Electricity, Solar Heating

Howell·Mayhew Engineering (HME) has provided the Canadian energy industry with technical services since 1985, undertaking sustainability, solar and energy efficiency projects for the government, private, and utility sectors.



HME's sustainable development policy supports and promotes sustainability's triple bottom line – economy, community, and ecology – both internally and in leadership positions within the community.

HME is objectively and independently positioned to meet unique client needs in the utilisation of solar energy in its projects.



Principals:

Gordon Howell BSc. (Electrical Engineering, Alberta, 1975),
P.Eng. (Alberta, Yukon)

Wil Mayhew BSc. (Zoology, Alberta, 1969)
BSc. (Environmental Biology, McGill, 1979)
BSc. (Mechanical Engineering, Alberta, 1984)





SERVICES

HME provides services focussed on the development of sustainable housing, one-planet-footprint neighbourhoods, solar electricity generating systems (photovoltaics or PV), and solar heating systems. The expertise and experience of its consultants provide clients with innovative solutions for demonstration, evaluation, commercialisation, and promotional objectives.

Services range in scope to suit clients' needs, from initial consultation to complete consulting, management, and turnkey projects. Such services include the full range of:

- Consulting, management, feasibility, definition, specification, approvals, procurement, integration, commissioning, performance monitoring, data interpretation, performance analysis, technology evaluation, documentation, reporting, and presentation.



SOLAR ELECTRIC (PV) TECHNOLOGY

Services include:

- Project development, co-ordination, consulting, promotion, management, system feasibility, specifications, performance simulation, and equipment procurement
- System electrical design, electrical code approvals, acceptance, commissioning, and obtaining regulatory utility grid-connection approvals
- Development of regulations, codes, standards, policies and protocols
- Technology barrier identification and resolution, case studies, surveys, courses, presentations and training
- Field performance monitoring, data analysis, evaluation
- System software beta testing and review
- Outsourcing of structural and mechanical design and construction

Specific projects have included:

- Complete project development of utility grid-connected systems.
- Regulatory approvals for utility grid-connected systems.
- Monitoring and evaluation of system and component operation, energy performance and reliability.
- Feasibility studies, performance simulation using RETScreen, PV F-Chart, WATSUNPV, PVCAD, and SYSTEM-SPEC.
- Industry surveys. Development and writing of case studies.
- Development of software for sizing, optimisation, and economic analysis of remote electrical generating systems including solar PV battery charging, genset battery charging, hybrid PV/genset battery charging and direct genset operation.



- Representation of Canada on international standards development and international market evaluation and information dissemination committees. Representation of the solar PV industry on provincial and national codes and regulation development committees.
- Writing articles for the public. Public presentations on solar PV at any level of detail. Public information and awareness courses. Media outreach.
- Homes, buildings, single site, multi-site, across Canada, remote, urban, short-term, multi-year.

Clients include:

- National, provincial, municipal and rural government departments and agencies – energy, environmental, housing, industry, research
- Electric utility companies
- The solar PV industry
- Corporations, educational institutions, and private people



SOLAR HEATING TECHNOLOGY

Services include:

- Project development, co-ordination, consulting, promotion, and management
- Technology barrier identification and resolution, case studies, surveys, and training
- Field performance monitoring, data analysis, evaluation
- Outsourcing of mechanical and controls design, specifications, approvals, procurement, product acceptance, construction, and commissioning

Specific projects have included:

- Turnkey solar water heating project on a municipal swimming pool - complete project management, definition, design, specification, procurement, assembly, integration, installation, commissioning, documentation, and training. Project also included management and definition of efficiency upgrades to water heating boiler, space heating furnace, and ventilation heat recovery.
- Case study on the process of installing solar water heating on a municipal swimming pool, for use in showing leadership to other municipalities.
- Review of municipal solar heating plans
- Feasibility of renovating an existing solar heating system on a municipal swimming pool.
- Public presentations on the opportunities for solar heating systems. Public information and awareness courses. Media appearances.
- Consulting on residential solar heating systems

Clients include:

- Municipal operations departments
- Educational institutions and private people



ENERGY EFFICIENT HOUSING TECHNOLOGY

Services include:

- Complete R-2000 plan evaluation, inspection, and air leakage testing for house certification.
- Technology surveys, transfer and training.

Specific projects have included:

- Full project implementation and management of energy-efficient housing programs that evaluate field-site energy performance, system and component operation and reliability.
- Furnaces, water heaters, heat recovery ventilation, windows, air tightness.
- Indoor air quality monitoring, testing, reporting, management – VOCs, formaldehyde, CO₂, RH, infiltration, ventilation strategies.
- Single or multi-family homes, single site, multi-site, across Canada, in the Arctic, short-term, multi-year.
- Survey and field audits for energy performance, air tightness, and indoor air quality of new and existing, R-2000 and conventional houses.
- Audits of R-2000 plan evaluators, inspectors and air testers.
- Management and organisation of seminars and workshops to homebuilders, government research organisations, learning institutions, and the public.
- Writing articles for the public.

Clients include:

- National and provincial government research, energy, and housing development departments.
- Homebuilders and equipment manufacturers.



SUSTAINABLE NEIGHBOURHOOD DEVELOPMENT

Services include:

- Sustainability consulting and coordination for organizations that have made the commitment to develop neighbourhoods with a one planet footprint.

Specific projects have included:

- Emerald Hills Urban Village SuN Pilot Project
- Implementation of the Emerald Hills Urban Village
- Authoring of *SuN LIVING: Developing Neighbourhoods with a One Planet Footprint*.

Clients include:

- National government research groups, neighbourhood-scale developers, municipalities.



CORPORATE CLIENTS

Our government clients have included:

- Canada – Natural Resources Canada CANMET Energy Technology Centre-Ottawa, Natural Resources Canada CANMET Energy Technology Centre-Varenes, Canada Mortgage and Housing Corporation (Ottawa), Public Works and Government Services Canada (Edmonton)
- Alberta – Energy, Environment, Municipal Affairs (Edmonton)
- Cities – Edmonton Waste Management, Edmonton Transit System, Lethbridge Real Estate and Land Development
- Municipalities – Hanna, Killam, Okotoks, Slave Lake, Strathcona County

Our research clients have included:

- Alberta Research Council (Edmonton)
- Belgian Building Research Institute (Brussels)
- Christenson Developments (Edmonton)
- Ontario Ministry of Energy (Toronto)
- Ortech International (Toronto)
- Saskatchewan Research Council (Saskatoon)
- Yukon Housing Corporation (Whitehorse)
- Holland & Associates (Edmonton)

Our housing clients have included:

- Alberta Home Builders' Association
- Canadian Home Builders' Association
- Geddes Enterprises (Toronto)
- Habitat Studio & Workshop (Edmonton)
- SAR Engineering (Vancouver)
- Sheltair Scientific (Vancouver)
- Unies Consulting (Winnipeg)
- numerous homebuilders in Alberta...

Our solar PV clients have included:

- Avalon Master Builder (Red Deer)
- EPCOR Utilities (Edmonton)
- Kerry Wood Nature Centre (Red Deer)
- Spruce Meadows Farms (Calgary)
- numerous private people in Alberta...

Our technology transfer and training clients have included:

- Agricultural Research and Extension Council of Alberta (Alberta)
- Battle River Research Group (Camrose)
- Canadian Solar Industries Association (Ottawa)
- Climate Change Central (Edmonton)
- Metro Community College (Edmonton)
- Solar Energy Society of Canada – Northern Alberta Chapter (Edmonton)



HME INTERNAL R&D PROJECTS

HME recognises the importance of development and leadership in its understanding of technology issues that are of importance to its clients. To this end, it developed the Cold Climate Solar Home, an HME-designed, built, operated, occupied, and fully instrumented house that serves as a facility to:

- Conduct short and long-term applied field research on the interaction of housing components and on utility-interconnected solar PV systems.
- Identify, evaluate, and resolve the barriers to utility-interconnected solar PV systems. This facility was Canada's first utility-connected PV system west of Toronto, and the 12th such system in Canada. Through it, HME is a participant in the Alberta Electric System Operator's Energy Trading System.
- Conduct media and promotional activities for solar PV systems.
- Test strategies, methods, and products under field operating conditions.
- Transfer information and technology to applied research organisations and industries.
- Hold the company's offices so that its consultants can live and work with the technology in which it provides services.

INDUSTRY VOLUNTEER ACTIVITIES

HME recognises the importance of community development for the on-going health and growth of the housing and the solar energy industries. HME's staff are participating as a:

- Presenter and lecturer on solar PV and solar heating technology to numerous community groups.
- Member of the Canadian Electrical Code Section 50 (Solar Photovoltaics).
- Member of the International Electrotechnical Commission's Technical Committee 82 (Solar Photovoltaics Energy Systems), Working Group 1 (Glossary), and Working Group 3 (Systems).
- Member of the organizing committee for Edmonton's Eco-Solar Home Tour <www.ecosolar.ca>.

Formerly:

- Member of MicroPower Connect's <www.micropower-connect.org> Distributed Generation Interconnection Committee and their Working Group on Net Metering.
- Member of the CSA International's Strategic Committee on Performance, Energy Efficiency, and Renewables (SCOPEER, SCC c400), its Renewables Committee (TC c420) and Technical Committee on Interconnection.
- Director and Newsletter editor of the Canadian Solar Industries Association <www.cansia.ca>.
- Co-chair of the North Sun '99 international conference on solar energy at high latitudes and cold climates.
- Member of the organizing committee for Edmonton's unique *Energy Awareness Week* <www.eaw.ca>.
- Member of the Solar Energy Society of Canada <www.solarenergysociety.ca>.
- Member of the American Solar Energy Society <www.ases.org>.
- Member of the International Solar Energy Society <www.ises.org>.
- Member of the Independent Power Producers Society of Alberta <www.ippsa.com>.