

# ***Solar-Electric System – Design, Development, Consulting –***

Howell·Mayhew Engineering (HME) has provided engineering services since 1985, undertaking solar energy, energy efficiency and community sustainability consulting and development projects for government, commercial, private, and utility sectors.

Today, HME is focussed on the design and development of solar photovoltaic (PV) systems and all that it takes to provide complete systems from concept to operation and performance assessment. It is objectively and independently positioned to meet unique client needs for the development and use of solar electricity of any size or configuration in any projects – house-mounted, building-mounted, ground-mounted or building-integrated.

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

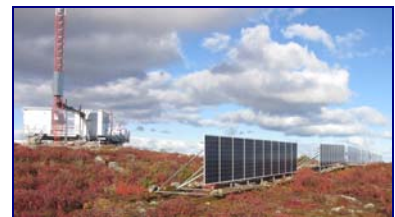
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HME provides services focussed on the development of solar electricity generating systems (photovoltaics or PV). The expertise and experience of its staff provides clients with innovative solutions for operational, commercialisation, evaluation, demonstration, and promotional objectives.

Services range in scope to suit clients' needs, from initial consultation to complete consulting, management, design, development and turnkey projects.

## ***SOLAR ELECTRIC (PV) TECHNOLOGY***

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Services include the full range of:

- PV system project development, implementation, definition, co-ordination, consulting, promotion, project management, system feasibility, system design review, system specifications, working with architects to integrate the system into building envelope and features;
- Full PV system electrical design, working with building structural engineers and electrical engineers to make the building "PV ready", obtaining development and building permits, obtaining electric utility grid-connection and regulatory approvals, equipment specifications, equipment procurement, equipment sales and supply, equipment acceptance, selecting and working with electrical and civil-works contractors to install the system, and system inspection and commissioning;
- Energy performance simulation, field performance monitoring, data interpretation, performance analysis, and technology evaluation;
- Development of regulations, codes, standards, policies and protocols;
- Economic analyses, case studies, surveys, educational courses, presentations, reporting, documentation development, staff training, technology barrier identification and resolution;
- System design and modelling software testing and review;
- Grid-connection and regulatory approvals for all types of micro-generating systems.

Specific projects have included:

- Complete project design and development of 58 utility grid-connected systems on homes and buildings.
- Complete project design and development on 19 off-grid solar PV projects including projects in the Yukon and NWT.
- Regulatory approvals for 69 utility grid-connected systems (solar PV and microwind).
- Monitoring and evaluation of system and component operation, energy performance and reliability.
- Feasibility studies, performance simulation using PV SYST and RETScreen.
- 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 solar PV standards development and international PV 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, northern Canada, western Canada, remote, urban.

Clients include:

- National, provincial, municipal and rural government departments and agencies – energy, environmental, housing, industry, research
- Industrial corporations, educational institutions, a nature centre, architects, homebuilders, homeowners and farmers
- Electric utility companies
- The solar PV industry

Government clients have included:

- Canada – Natural Resources Canada CANMET Energy Technology Centres in Varennes (Québec), Canada Mortgage and Housing Corporation (Ottawa)
- Alberta – Energy, Environment, Municipal Affairs, Infrastructure (Edmonton)
- Yukon – Vuntut Gwitchin First Nation (Old Crow), Yukon Energy Solutions Centre (Whitehorse)
- Municipalities – Edmonton Office of the Environment, Edmonton Waste Management, Edmonton Transit System, Hanna, Killam, Lethbridge Real Estate and Land Development, Okotoks

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### ***INDUSTRY VOLUNTEER ACTIVITIES***

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

- Presenter and lecturer on solar photovoltaics to 400+ community and professional groups.
- Member of the International Electrotechnical Commission's Technical (IEC) Committee 82 (Solar Photovoltaics Energy Systems), Working Group 1 (Glossary), and Working Group 3 (Systems) (1990 to present).
- Founding member (2000 to present) of the organizing committee for Edmonton's Eco-Solar Home Tour <[www.ecosolar.ca](http://www.ecosolar.ca)>.
- Co-founding member of the Solar Energy Society of Alberta <[www.solaralberta.ca](http://www.solaralberta.ca)>.