

**MODULE ENM1050: RENEWABLE RESOURCES**

**Level:** Introductory

**Theme:** Technology and Applications

**Prerequisite:** None

**Module Description:** Students demonstrate applications of one or more renewable energy technologies, examine the contributions of each to sustainable energy development, and identify related career opportunities. Potential areas of investigation include solar, hydro, wind, tidal, biomass and geothermal energy, as well as energy generated from waste.

**Module Parameters:** Access to relevant government, industry and community resources (e.g., Alberta Energy, Alberta Environmental Protection, Energy Efficiency Association of Alberta, Pincher Creek Development and Information Centre, Biomass Energy Institute, Canadian Wind Energy Association, Solar Energy Society of Canada, Small Power Producers Association of Alberta).

**Curriculum and Assessment Standards**

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>describe applications of renewable energy technology</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>identifying and mapping sources of renewable energy on a map of Alberta. <i>Assessment Tool</i> <i>Task Checklist for Mapping, ENMMAP</i> <i>Standard</i> <i>Complete mapping activities to a standard of 1 on the rating scale</i></li> <li>given a specific energy need, constructing a drawing/model of a renewable energy system to meet that need. The drawing/model must address:               <ul style="list-style-type: none"> <li>component parts and principles of operation</li> <li>efficient use of resources</li> <li>human and environmental safety.</li> </ul> <i>Assessment Tool</i> <i>Project Assessment: Technology Design, ENMTEC</i> <i>Assessment Criteria: Diagrams and Technical Drawings, ENMDRA</i> <i>Standard</i> <i>Complete the design <u>and</u> drawing/model to a standard of 1 on the rating scale</i> </li> </ul>	<p>60</p>

**MODULE ENM1050: RENEWABLE RESOURCES** (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>explain current and potential contributions of renewable energy to sustainable energy development</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>a concept test in which the student demonstrates knowledge of renewable energy resources and systems currently used in Alberta. Test items to address the use of hydroelectric, solar, hydro, wind, tidal, biomass and geothermal energy, and energy generated from waste.</li> </ul> <p><i>Assessment Tool</i> Energy Sources/Applications/Alternatives (<i>Instructor's Manual</i>)</p> <p><i>Standard</i> Response indicating 60% mastery</p> <ul style="list-style-type: none"> <li>a presentation or report on basic principles of sustainable energy development. Report to address:           <ul style="list-style-type: none"> <li>definitions and examples of sustainable energy development</li> <li>benefits and difficulties related to the use of renewable and nonrenewable energy</li> <li>the role of alternative energy options, energy efficiency and conservation lifestyles in achieving sustainable energy development</li> <li>a comparison of sustainable energy development in Alberta and another part of the world.</li> </ul> </li> </ul> <p><i>Assessment Tool</i> <i>Presentations/Reports: Introductory Level, ENMPRE-1</i></p> <p><i>Standard</i> Achieve a minimum rating of 1 on the rating scale for <i>Presentations/Reports</i></p>	<p>30</p>

**MODULE ENM1050: RENEWABLE RESOURCES** (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> <li>• identify career opportunities relevant to renewable energy development</li> <li>• demonstrate basic competencies.</li> </ul>	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> <li>• given a current issue regarding use of a renewable and/or nonrenewable energy technology:               <ul style="list-style-type: none"> <li>– identifying social, economic and environmental perspectives relevant to the issue</li> <li>– developing a plan for dealing with the issue that furthers sustainable energy supply.</li> </ul> </li> </ul> <p><i>Assessment Tool</i>  <i>Issue Analysis: Sustainable Energy Development, ENM1050–1</i></p> <p><i>Standard</i>  <i>Analyze the issue <u>and</u> develop a plan for dealing with the issue to a standard of 1 on the rating scale</i></p> <ul style="list-style-type: none"> <li>• completing a research project on one or more career opportunities in renewable energy development.</li> </ul> <p><i>Assessment Tool</i>  <i>Career Search: Introductory Level, ENMCAR–1</i></p> <p><i>Standard</i>  <i>Conduct research to a standard of 1 on the rating scale</i></p> <ul style="list-style-type: none"> <li>• observations of individual effort and interpersonal interaction during the learning process.</li> </ul> <p><i>Assessment Tool</i>  <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>10</p> <p>Integrated throughout</p>

**MODULE ENM1050: RENEWABLE RESOURCES** (continued)

Concept	Specific Learner Expectations	Notes
<p>Renewable Energy Technology</p>	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• identify and describe renewable energy sources currently used in Alberta; e.g.:               <ul style="list-style-type: none"> <li>– hydroelectric</li> <li>– solar</li> <li>– wind</li> <li>– biomass</li> <li>– geothermal</li> <li>– energy from waste</li> </ul> </li> <li>• show on a map regions of the province that use renewable energy technologies</li> <li>• describe renewable sources of energy not currently used in Alberta</li> <li>• design and/or construct a renewable energy technology</li> <li>• demonstrate one or more applications of renewable energy technology.</li> </ul>	<p>Research/debate the statement—“there is no such thing as renewable energy.”</p> <p>Which renewable energy sources have the greatest potential for use in Alberta? Why?</p> <p>Compare active and passive solar systems.</p> <p>Explain applications of wind energy:</p> <ul style="list-style-type: none"> <li>• electricity generation</li> <li>• water pumping.</li> </ul> <p>Design, construct and test technologies used to perform specific tasks.</p> <p>Plan and design a community that uses renewable energy as a supplement to energy needs.</p>
<p>Sustainable Energy Development</p>	<ul style="list-style-type: none"> <li>• define sustainable energy development</li> <li>• compare the role of renewable and nonrenewable energy technologies in sustainable energy development</li> <li>• identify factors that determine the feasibility of renewable energy development; e.g.:               <ul style="list-style-type: none"> <li>– social and economic</li> <li>– geological</li> <li>– technological</li> <li>– environmental</li> </ul> </li> <li>• compare and contrast use of renewable energy in Alberta with other parts of the world in supplementing energy supply</li> <li>• assess potential impacts of renewable energy development on the environment.</li> </ul>	<p>Explain the meaning of the phrase “soft energy path”; e.g.:</p> <ul style="list-style-type: none"> <li>• least-cost energy strategy</li> <li>• efficient energy use</li> <li>• sustainable energy path.</li> </ul> <p>What factors enable renewable resources to be an effective supplement to energy needs in specific areas of Alberta, Canada and other parts of the world?</p> <p>Conduct research on:</p> <ul style="list-style-type: none"> <li>• the use of wind energy in Quebec or Minnesota</li> <li>• energy diversification in Europe</li> <li>• the development of remote solar and micro-hydro systems in South America.</li> </ul>

**MODULE ENM1050: RENEWABLE RESOURCES** (continued)

Concept	Specific Learner Expectations	Notes
Career Opportunities	<p><i>The student should:</i></p> <ul style="list-style-type: none"> <li>• research career opportunities relevant to renewable energy development; e.g.:               <ul style="list-style-type: none"> <li>– resource exploration</li> <li>– recovery and production</li> <li>– engineering and design</li> <li>– resource management</li> </ul> </li> <li>• interpret employment statistics within one or more employment sectors; e.g.:               <ul style="list-style-type: none"> <li>– types of careers</li> <li>– number of workers</li> <li>– employment trends</li> </ul> </li> <li>• predict career opportunities and trends from employment statistics</li> <li>• research renewable energy development in the future, and resulting career opportunities.</li> </ul>	<p>Contact the “Career Information Hotline” (Alberta Advanced Education and Career Development).</p> <p>See National Occupational Classification System (NOC) in Section H: Linkages/Transitions.</p> <p>Arrange/facilitate:</p> <ul style="list-style-type: none"> <li>• information interviews/field visits</li> <li>• work study/work experience</li> <li>• job shadowing.</li> </ul> <p>Plan for individual/group research and presentations.</p>

