

# Clean Energy and Pathways to Net Zero

ICTC's WIL Clean Energy and Pathways to Net Zero e-learning course will take an in-depth look at using clean energy to meet the changing environmental, social, economic, and political realities of our world. Students will be asked to review key concepts of clean energy and the issues surrounding Net Zero goals.

Modules		Lessons	Learning Objectives	
Module 1	<b>What is Clean Energy?</b>	<ul style="list-style-type: none"> <li>What is Clean Energy?</li> <li>What are the uses and markets for energy?</li> <li>Energy sources and energy storage</li> <li>The role of energy efficiency</li> <li>Conflicting definitions (scenario)</li> </ul>	<ul style="list-style-type: none"> <li>Describe commonly used terms such as green energy, clean energy, and renewable energy</li> <li>Understand various technologies used for generating and storing energy</li> <li>Explain how reaching net zero also depends on the efficient use of energy</li> <li>Apply definitions used in the clean energy sector to practical conversations where misunderstanding can arise.</li> </ul>	Quiz + Padlet Discussion
Module 2	<b>The Goal - Energy and Net Zero</b>	<ul style="list-style-type: none"> <li>Net Zero</li> <li>Green Energy Sources</li> <li>Other Energy Sources</li> <li>Carbon Capture, Utilization, and Storage</li> <li>Hydrogen as Stored Energy</li> <li>Approaches to Net Zero Emissions Scenarios</li> <li>Decarbonizing Canada: Choosing the Right Path to Net Zero (Scenario)</li> </ul>	<ul style="list-style-type: none"> <li>Explain what a commitment to net zero involves.</li> <li>Describe the relationship between clean energy, energy storage, and non-renewable energy sources</li> <li>Describe the role of different methods of clean energy production in reaching net zero emissions</li> <li>Describe the role of energy storage in reaching net zero emissions</li> <li>Explain how nuclear energy can be an important part in reaching net zero goals</li> <li>Describe the role of hydrogen in Canada's plan to reach net zero emissions</li> </ul>	Quiz + Padlet Discussion
Module 3	<b>Risks and Opportunities - Energy Security</b>	<ul style="list-style-type: none"> <li>The Global Energy Crisis</li> <li>Energy Vulnerability</li> <li>Creating Resiliency</li> <li>Economic Opportunities from Developing Renewable Energy and Clean Technology (Scenario)</li> </ul>	<ul style="list-style-type: none"> <li>Explain the current state of global energy.</li> <li>Define energy security.</li> <li>Identify six different risks to energy security that result from the world's current approach to energy, including the use of centralized energy systems</li> <li>Compare the differences between centralized and distributed energy systems and their effects on resiliency</li> <li>Explain how moving to renewable energy approaches supported by infrastructure changes can lead to more resilient communities</li> <li>Decide which, if any, economic opportunities become available by developing renewable energy and clean technology in Canada</li> <li>Reflect on the effects that shifting from centralized to distributed energy systems would have on different communities in Canada</li> </ul>	Quiz + Padlet Discussion
Module 4	<b>Our Current State of Energy Development and Storage</b>	<ul style="list-style-type: none"> <li>Our current tools for energy development and storage</li> <li>About electricity</li> <li>Energy storage</li> <li>Evaluate the energy needs of a small community (Scenario)</li> </ul>	<ul style="list-style-type: none"> <li>Describe the different methods of energy development and storage.</li> <li>Explain the central role electricity has in transferring usable energy.</li> <li>Describe the types of energy storage found in Canada.</li> <li>Determine when each type of energy storage type is appropriate.</li> <li>Identify and compare clean technology solutions for different energy needs.</li> </ul>	Quiz + Padlet Discussion

Module 5	<b>Current Renewable Energy Systems</b>	<ul style="list-style-type: none"> <li>• Solar</li> <li>• Wind</li> <li>• Hydroelectric</li> <li>• Geothermal</li> <li>• Tidal</li> <li>• Biomass</li> <li>• Make a recommendation on the best approach to dealing with community issues surrounding a new wind project (Scenario)</li> </ul>	<ul style="list-style-type: none"> <li>• Justify the use of solar energy production for energy production in the appropriate situation</li> <li>• Justify the use of wind energy production for energy production in the appropriate situation</li> <li>• Justify the use of hydroelectric energy production for energy production in the appropriate situation</li> <li>• Justify the use of geothermal energy production for energy production in the appropriate situation</li> <li>• Justify the use of tidal energy production appropriately.</li> <li>• Justify the use of biomass energy production for energy production in the appropriate situation</li> <li>• Identify and compare different solutions for different energy needs</li> </ul>	Quiz + Padlet Discussion
Module 6	<b>Innovations in Clean Energy</b>	<ul style="list-style-type: none"> <li>• Key areas for innovation</li> <li>• The Life Cycle of Clean Energy Projects</li> <li>• Smart Grids</li> <li>• Supply Chain Technology Innovations</li> <li>• Supporting Technology Innovations</li> <li>• Technology Roadmap — A Canadian Example</li> <li>• Make a Recommendation on the Use of Natural Gas (Scenario)</li> </ul>	<ul style="list-style-type: none"> <li>• Identify near-term and long-term clean energy demand and opportunities.</li> <li>• List four phases in the life cycle of renewable energy projects and assess labour market needs related to each one</li> <li>• Describe how innovations in the energy supply chain build resilience and decrease our ecological footprint</li> <li>• Identify supporting technologies, like software, that enable other renewable technologies to work more effectively</li> <li>• Recommend how to use natural gas in a location that will have renewable energy in 10 years</li> <li>• Reflect on the time it takes for innovations to come to market and how that process could be sped up</li> </ul>	Quiz + Padlet Discussion
Module 7	<b>Making It Work - The Business of Energy</b>	<ul style="list-style-type: none"> <li>• Interview with Nagwan Al-Guneid (director of the Business Renewables Centre – Canada)</li> <li>• Energy, Private Capital, and Financial Markets</li> <li>• Improve on a business plan for clean energy solutions (Scenario)</li> </ul>	<ul style="list-style-type: none"> <li>• Identify the most common challenges that businesses face in transitioning to clean energy</li> <li>• Explain the role of finance in achieving net zero emissions, including through the use of green finance initiatives, such as green bonds, and market mechanisms, such as carbon pricing.</li> <li>• Develop a business case for clean energy solutions.</li> <li>• Reflect on how clean energy solutions contribute to economic growth</li> </ul>	Quiz + Padlet Discussion
Module 8	<b>Opportunities to Engage</b>	<ul style="list-style-type: none"> <li>• Interview with Jim Sandercock from NAIT</li> <li>• Net Zero Skills</li> </ul>	<ul style="list-style-type: none"> <li>• Assess varied labour market needs related to the clean energy economy</li> </ul>	Quiz + Padlet Discussion