

# Geoscientists

Geoscientists have a critical role in helping the energy industry develop natural resources, protect the environment, and reach low-carbon goals. There are many opportunities for Geoscientists and the fields in which they specialize. In the energy sector these include geologists, geophysicists, geochemists, and environmental geoscientists. They assess the potential impacts of developments on the Earth's systems. This includes impacts on the Earth's minerals, soil, water, oceans, forests, and energy resources. Geoscientists apply their knowledge of what could happen on and under the Earth's surface.

Geoscientists use different techniques to gather information including physical and chemical analysis of rocks, minerals, and fluids. Data may be acquired through on-site field observations. Seismic surveys are used to survey underground structures to help create cross-sectional drawings for Geoscientists to study and interpret.

The work of Geoscientists in energy includes mineral exploration and production, evaluating water resources, environmental assessment and remediation, and monitoring and analyzing natural hazards. Geoscientists help to make decisions such as drilling locations, pipeline routings, development of mineral resources, and identifying opportunities for geological carbon storage and development. The career might be a fit for you if you like to travel and work with ideas, facts, and software tools to figure out problems related to the physical environment. You probably also have an interest in the study of Earth as well as math, science, computing, and geography.

## Established Energy Sectors:

[Oil and Gas](#)[Offshore Oil and Gas](#)[Oil Sands](#)[Energy Services](#)[Pipelines](#)[Refining](#)

## Emerging Energy Sectors:

[Biofuels](#)[Hydrogen](#)[Liquefied Natural Gas \(LNG\)](#)[Carbon Capture and Storage \(CCS\)](#)

For energy sector definitions, go to [CareersinEnergy.ca](https://careersinenergy.ca)



# What Geoscientists Do



## Plan, Direct, and Participate in Studies

Geoscientists conduct geological, geochemical, and geophysical field studies. They carry out laboratory and computational analyses. The analysis is done to support areas such as resource exploration, site selection for projects, waste management, and restoration of contaminated sites.



## Identify and Advise on Potential Natural Risks

Geoscientists help to understand the potential risks of energy development projects that might affect workers, communities, and the environment. Examples include slope erosion, landslides, soil instability, volcanic systems, and earthquakes.



## Compile and Interpret Observations and Models

Geoscientists analyze and interpret geological, geochemical, or geophysical information to develop approaches to using natural resources while limiting risk to the environment. Sources of information include field observations that can be in remote locations, geophysical survey data, well logs, bore holes, public well files, aerial photos, and satellite remote sensing.



## Develop Waste Treatment and Disposal Solutions

Geoscientists work to understand the sources of waste and how it is transported in energy projects. They do this to develop ways to reduce or recycle waste.



## Assess and Measure Mineral and Hydrocarbon Deposits

Geoscientists assess the size, orientation, and composition of mineral ore bodies and hydrocarbon reservoir deposits. They use this information to provide advice to operations teams in their companies. This contributes to decisions such as acquiring land, reservoir suitability for carbon storage, drilling programs, and opportunities to repurpose well sites.

# Key Skills and Abilities Geoscientists Need

This chart shows the knowledge, skills, certifications, and abilities needed as Geoscientists enter and advance their career in the energy industry. Each occupation, job level, and responsibility will require a different mix of these skills and abilities.

## Core Knowledge

Concepts and principles of material composition

Sourcing and preserving mineral and metal resources

Advanced mathematical, chemistry, physics, and other sciences

Technical design concepts and use of tools to create plans, drawings, and models

Specialized statistical and digital tools for analysis

Knowledge of environmental legislation and regulations

Understanding of Indigenous relations

## Technical Skills

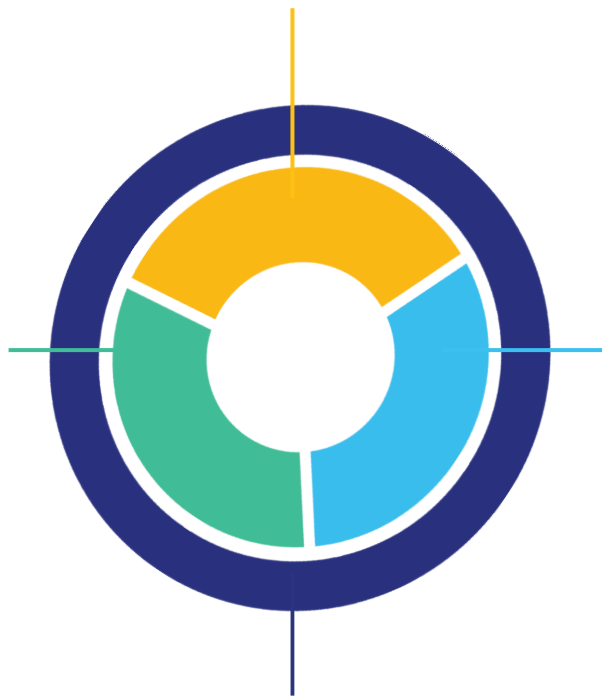
Use research and analyses to develop economical ways to create safer methods of production and improve resource conservation

Develop and use statistical models and geoscience software and equipment for analysis and interpretation of data

Develop and read geological maps

3D seismic interpretation and visualization

Gather information and write reports



## Beneficial Certifications

Driver's licence plus a clean abstract

Applicable health and safety certifications, as determined by job requirements

## Personal Attributes

Analytical thinking

Collaboration

Attention to detail

Independence

Adaptability

# Geoscience Careers in the Energy Industry

Entry to a geoscience career in energy can start with relevant education or education combined with related job experience. The chart shows how roles and educational requirements change for each career level. As you advance your career, your education and experience can help you to move across the various sectors in the energy industry.

Career Level	Entry	Mid	Senior
<p><b>Types of Jobs</b></p> <hr/> <p>After Completion of a 4-year University Degree in Geology, Geochemistry, Geophysics, Environmental Geoscience, or Geoscience</p>	<p><b>Entry-Level Geoscientist</b></p> <hr/> <p>Work in intern or entry-level position to get on-the-job training, take direction, and develop technical skills needed to work autonomously</p> <hr/> <p><b>Junior Geoscientist</b></p> <hr/> <p>Licensing by a provincial or territorial association requires 3 to 4 years of supervised work experience in a geoscience role and, in some provinces, passing an exam</p> <hr/> <p><b>Other common job titles:</b></p> <ul style="list-style-type: none"> <li>• Geologist</li> <li>• Geophysicist</li> <li>• Geochemist</li> <li>• Environmental Geoscientist</li> </ul>	<p><b>Intermediate Geoscientist</b></p> <hr/> <p>Work experience to develop the technical and personal skills needed to adapt to a variety of situations and work settings</p> <hr/> <p>Professional Geoscientist (P.Geo.) licence</p> <hr/> <p><b>Other common job titles:</b></p> <ul style="list-style-type: none"> <li>• Geologist</li> <li>• Geophysicist</li> <li>• Geochemist</li> <li>• Environmental Geoscientist</li> </ul>	<p><b>Senior Geoscientist</b></p> <hr/> <p>Professional Geoscientist (P.Geo.) licence</p> <hr/> <p><b>Common Specializations:</b></p> <ul style="list-style-type: none"> <li>• Petroleum exploration and development</li> <li>• Environmental</li> <li>• Hydrogeology</li> <li>• Archeology and near-surface geophysics</li> <li>• Earthquake seismology</li> <li>• Surveying, mapping, and measurement</li> <li>• Consulting</li> </ul>

# Transferring Geoscience Skills from One Energy Sector to Another

There are core skills and knowledge that all Geoscientists need for their careers, no matter what sector they start in. These building blocks are needed for oil and gas, offshore oil and gas, oil sands, energy services, hydrogen and carbon capture and storage (CCS). Other sectors have little to no requirement for geoscientists including pipelines, liquefied natural gas (LNG), refineries and biofuels.

The following flowchart presents the core skills and knowledge as building blocks. Each energy sector uses the building blocks in different ways.

As new entrants to training for a geoscience career, use the diagram to understand the building block skills needed to work in sectors across the energy industry. As an experienced Geoscientist, use the diagram to explore how each building block is applied across the energy sectors.

## Skill: Knowledge of company business models, technologies, products, and operational processes

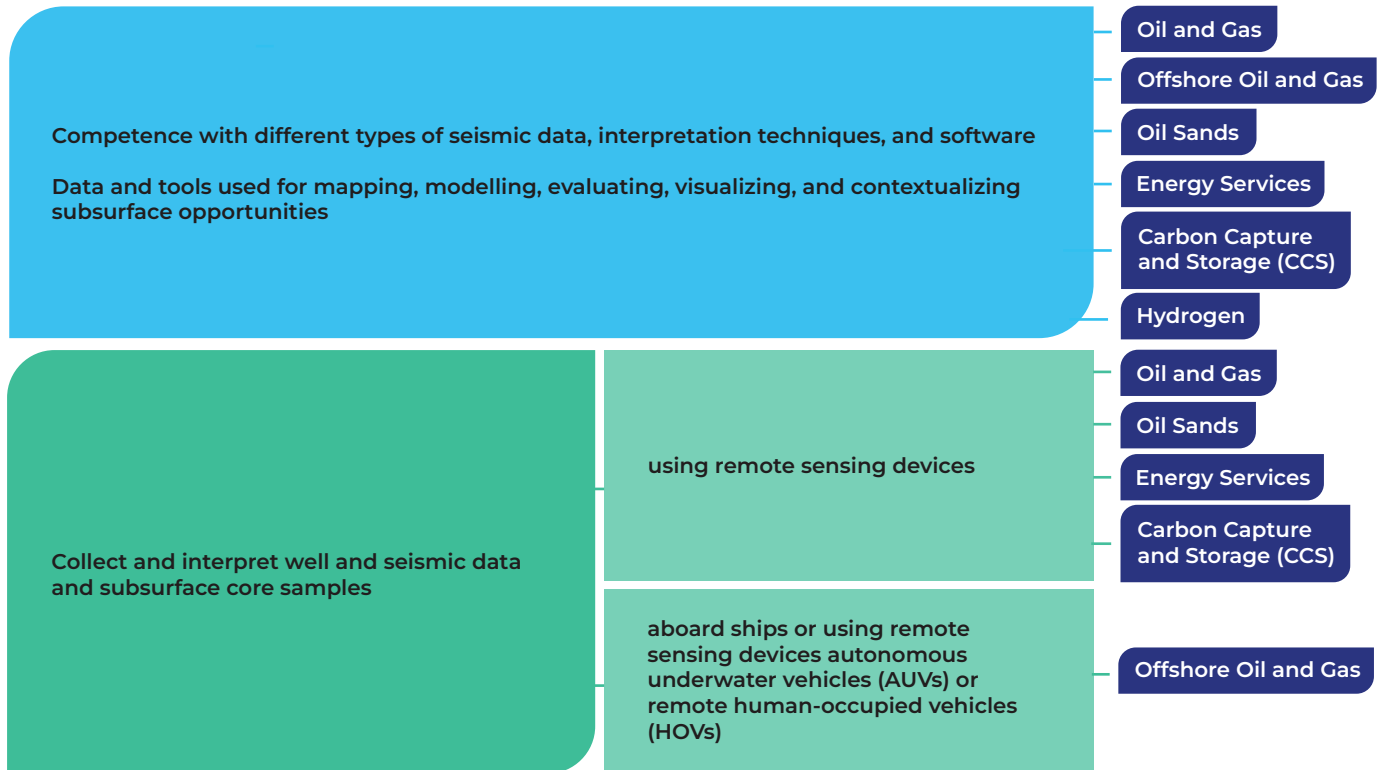
Skill attributes

Sector



## Skill: Conduct field testing and remote sensing studies to assess the physical properties of the Earth including mineral, natural resource deposits, natural hazards, and groundwater resources

### Skill attributes



## Skill: Collaborate with multi-disciplinary teams to support and quantify subsurface resource opportunities and risk-management decisions

### Skill attributes



# Career Outlook for Geoscientists



## Projected to have a large number of job openings

Projected to have 1,500 or more job openings over the period 2022-2035 nationwide.

Source: Careers in Energy, National Labour Market Outlook to 2035



## Projected labour shortages

The demand for workers is projected to be greater than the supply of available workers.

Source: Careers in Energy, National Labour Market Outlook to 2035



CareersinEnergy.ca

---



@energycareersca



@energycareersca



/energycareers

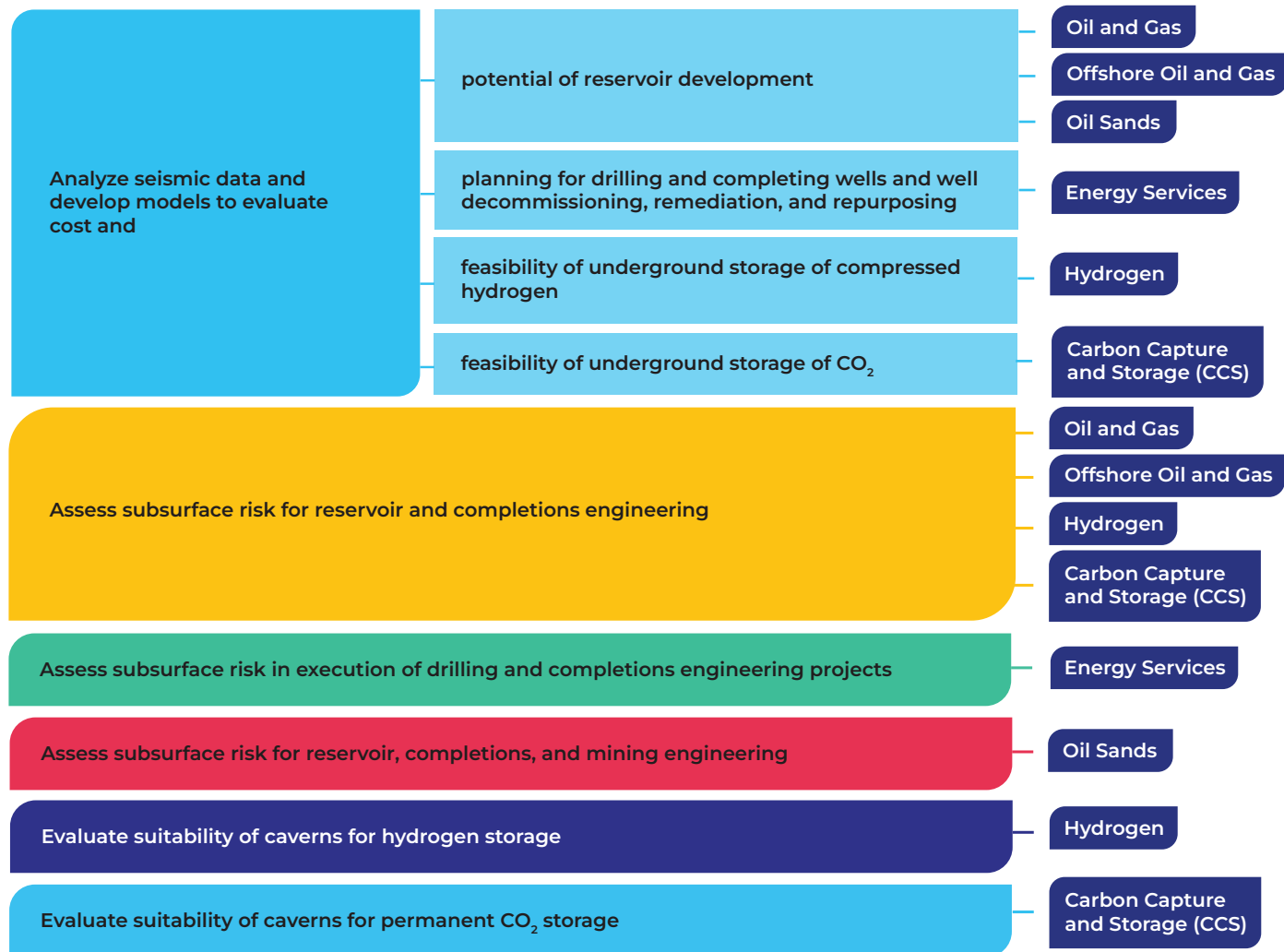


/careersinenergy

# Skill: Evaluate geological, geochemical, and geophysical data to improve production, reduce environmental impact, and identify risk

## Skill attributes

## Sector



# Skill: Safety programs and certifications for industrial operations

## Skill attributes

